

**CAPE HATTERAS NATIONAL SEASHORE
MARINE MAMMAL STRANDINGS
2008-2012, A FIVE-YEAR SUMMARY**



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ABSTRACT

Cape Hatteras National Seashore (CAHA) experiences very high numbers of marine mammal strandings each year, this includes cetaceans (whales, dolphins, and porpoises), pinnipeds (seals), and sirenians (manatees). The five-year period between 2008 and 2012 was no exception; ranging from 29 to 73 individual animals and with an overall average of 51 animals. This accounts for an average of 45% of all strandings on the Outer Banks and an average of 38% of the entire state of North Carolina's stranding numbers.

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.

CAHA 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, or active Navy sonar testing, leading to high stranding numbers of both live and dead animals.

METHODS

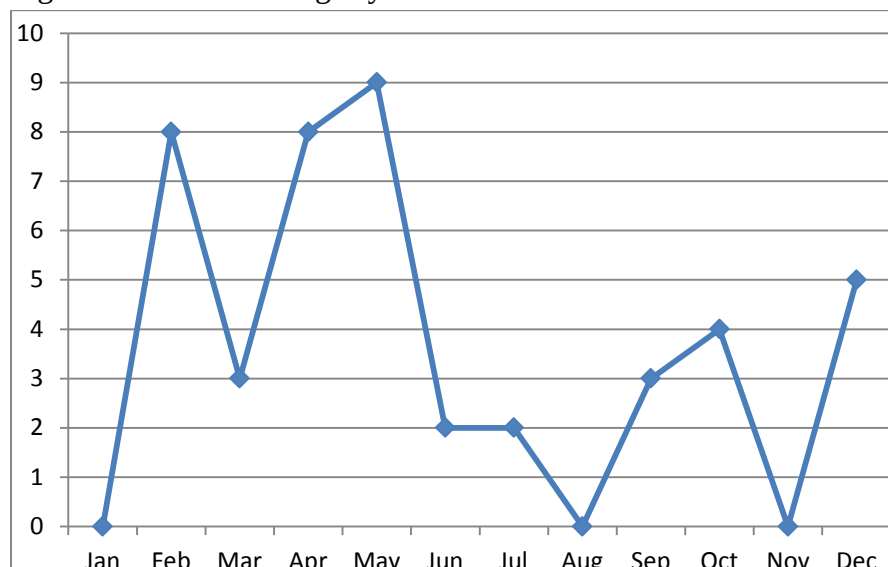
National Park Service (NPS) personnel respond to live and dead marine mammals in CAHA by patrolling the beach daily using UTV's or 4x4 trucks in the summer months and conducting walkthroughs on the Pamlico sound side of the islands during fall, winter, and spring. Also, NPS personnel receive and act-upon many reported strandings by the general public. This also includes tips from members of the Outer Banks Marine Mammal Stranding Network (OBXMMSN), of which the NPS is also a member. The OBXMMSN is comprised of four organizations; The National Park Service, the North Carolina Wildlife Resources Commission, the North Carolina Aquarium on Roanoke Island, and the Network for Endangered Sea Turtles. 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 light decomposition), a thorough 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 countless graduate research projects and potential publications.

Participating colleges include the University of North Carolina-Wilmington and North Carolina State University.

RESULTS AND DISCUSSION

2008 Strandings

Figure 1. 2008 Strandings by Month



The monthly stranding trend appears to fall in-line with the fact that CAHA sees more strandings throughout the winter and spring months. Occasionally, high dolphin calf mortality can extend high stranding numbers into April/May, as was the case in 2008.

Figure 2. 2008 Strandings by Island.

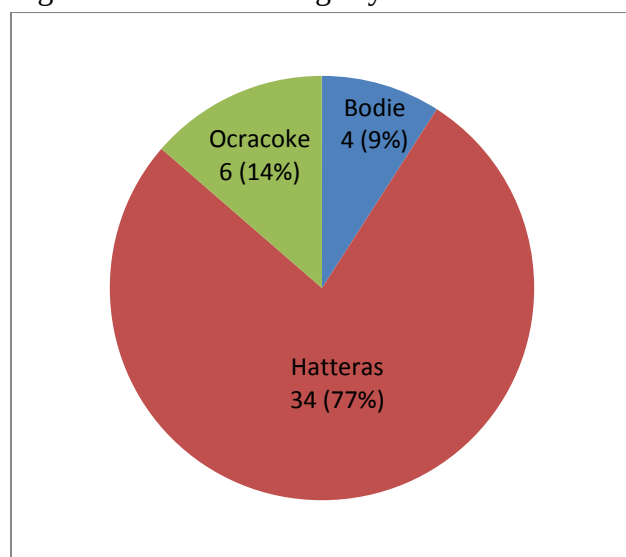
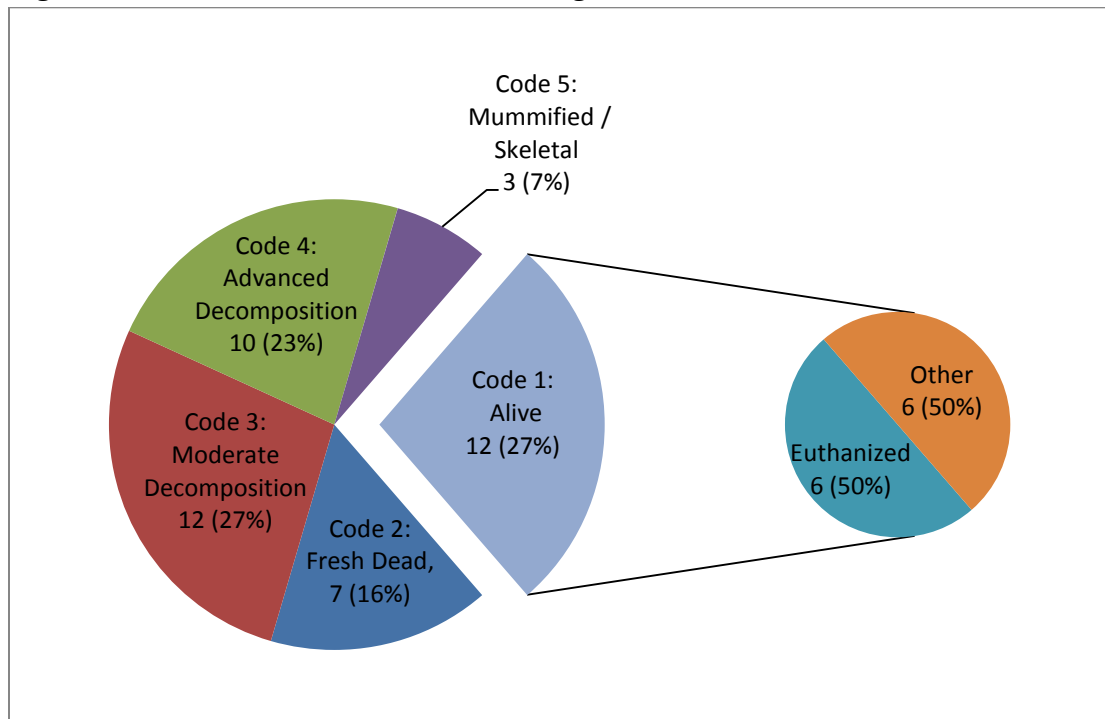
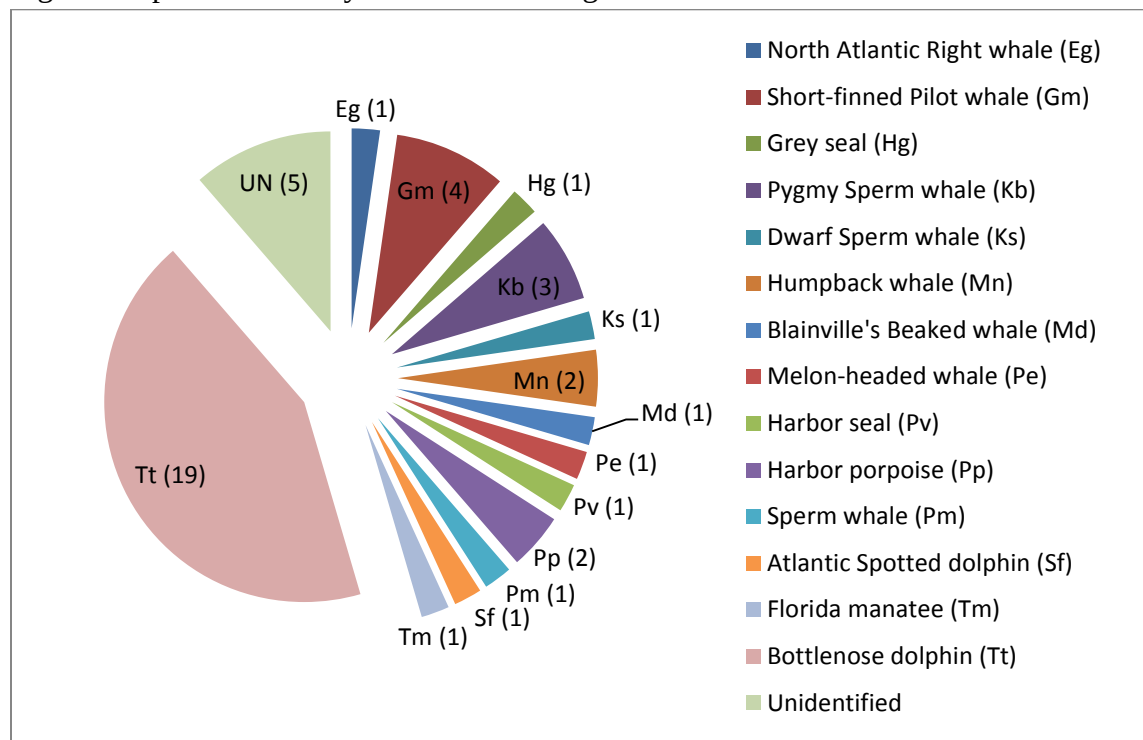


Figure 3. Condition Codes of 2008 Strandings.



Given the size and physical location of Hatteras Island, the majority of stranded animals occur here. The condition of the stranded animals was fairly balanced which is a bit unusual. Animals that strand still alive generally should make-up a smaller percentage of the total animals but this was not the case in 2008. Half of the still-alive animals were successfully euthanized while the rest died on their own either onsite or while being transferred to rehab. Some were pushed back out to sea by the public. Live strandings were dispersed throughout the year; five in winter, four in spring, two in summer and one in fall.

Figure 4. Species Diversity of 2008 Strandings.



With a total of 14 different species, 2008 was the most diverse stranding year over the past five years. Bottlenose dolphins will always make-up the majority of our strandings given the huge resident population. The vast water temperature fluctuations are evident by the presence of warm-water manatees and multiple cold-water species such as the Grey and Harbor seals and Harbor porpoises.

Figure 5. 2008 CAHA Strandings Compared to the Entire Outer Banks.

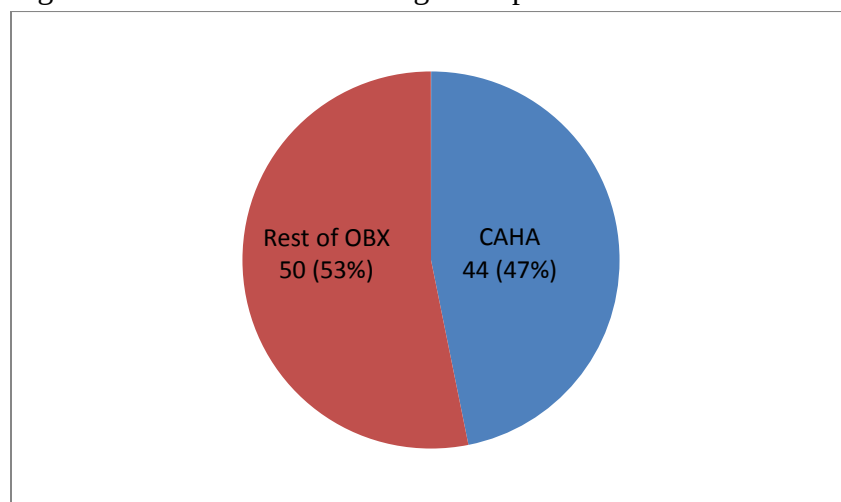
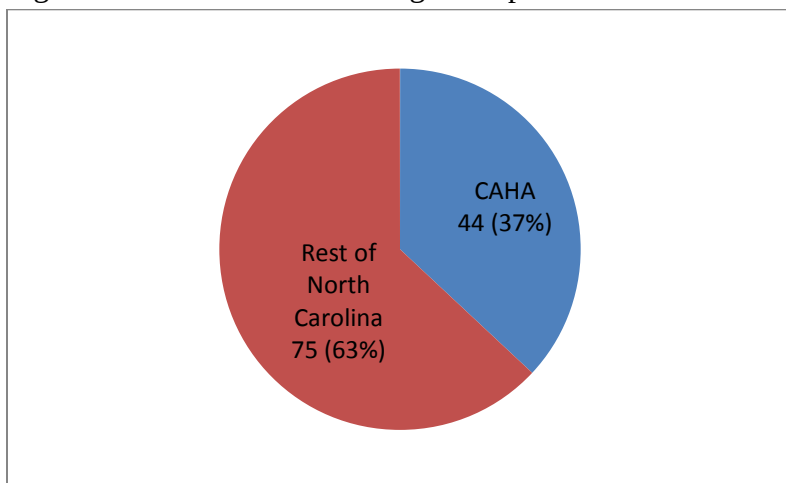


Figure 6. 2008 CAHA Strandings Compared to the Rest of North Carolina.

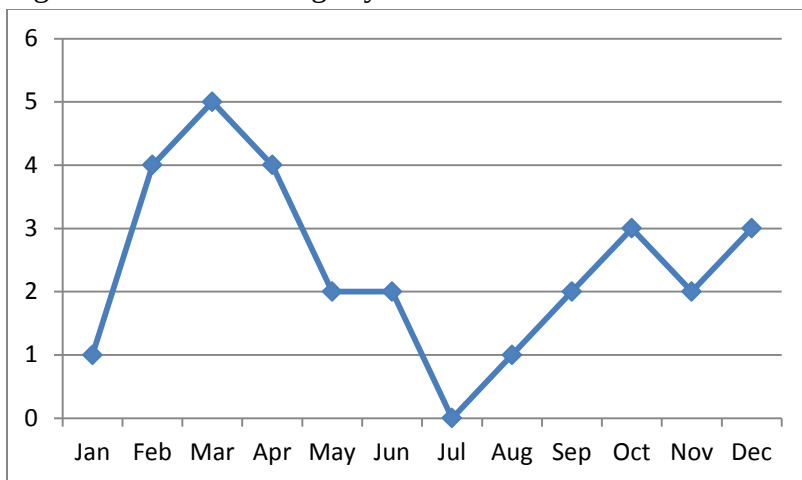


Cape Hatteras continues to be the key location for stranded animals, nearly making up half of the Outer Banks animals and over one-third of the entire state of North Carolina. One unique occurrence was that of a live Sperm whale calf that stranded near Avon pier; the animal eventually died on its own. There were two cases of animals being transferred to rehab. A harbor porpoise was taken to the Riverhead Foundation in New York where it died overnight. Also, a Grey seal was transferred to the National Aquarium in Baltimore where the decision was made to euthanize based on injuries to the jaw and flipper.

Human Interaction cases are a common factor every year to some degree. There were five cases (11%) observed of the total 44 stranded animals. Four of the five animals had lesions or scarring on external appendages (flippers, fluke, dorsal fin) caused by fishery equipment, and one animal had a mass of fishing line and plastic still attached to the carcass.

2009 Strandings

Figure 7. 2009 Strandings by Month.



The majority of strandings once again occur within the first 3-4 months of the year, followed by a downward spike. The usual trend persists as the numbers begin to rise toward fall and winter.

Figure 8. 2009 Strandings by Island.

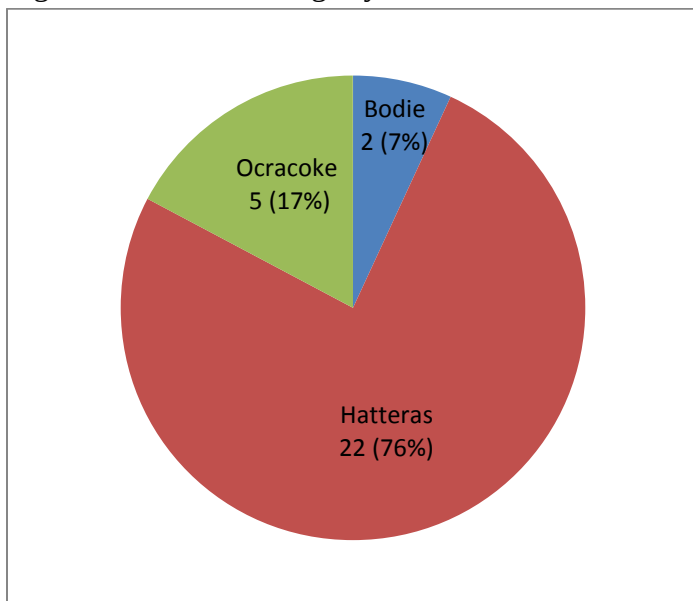
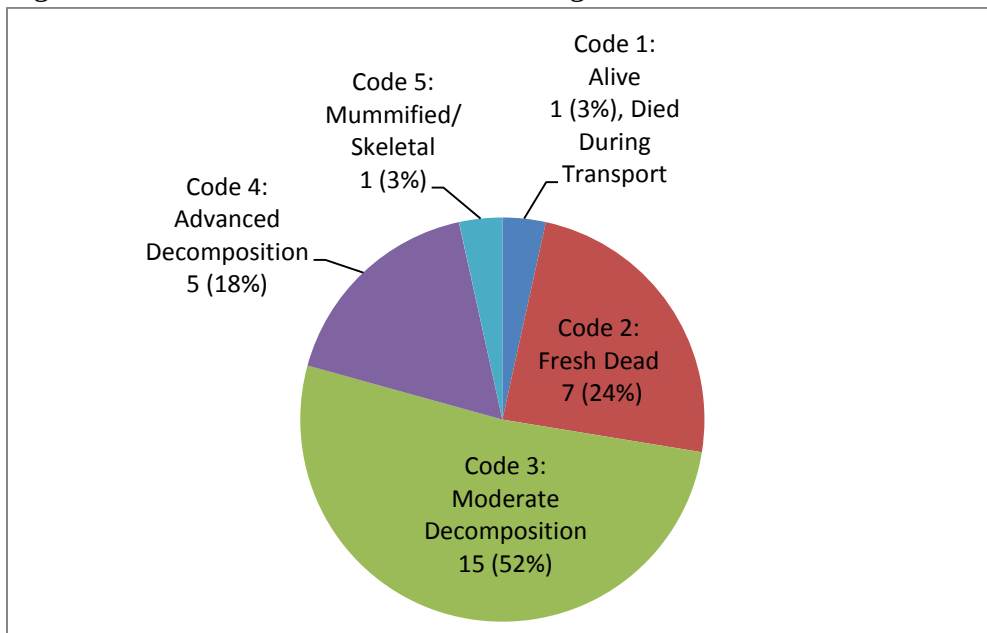


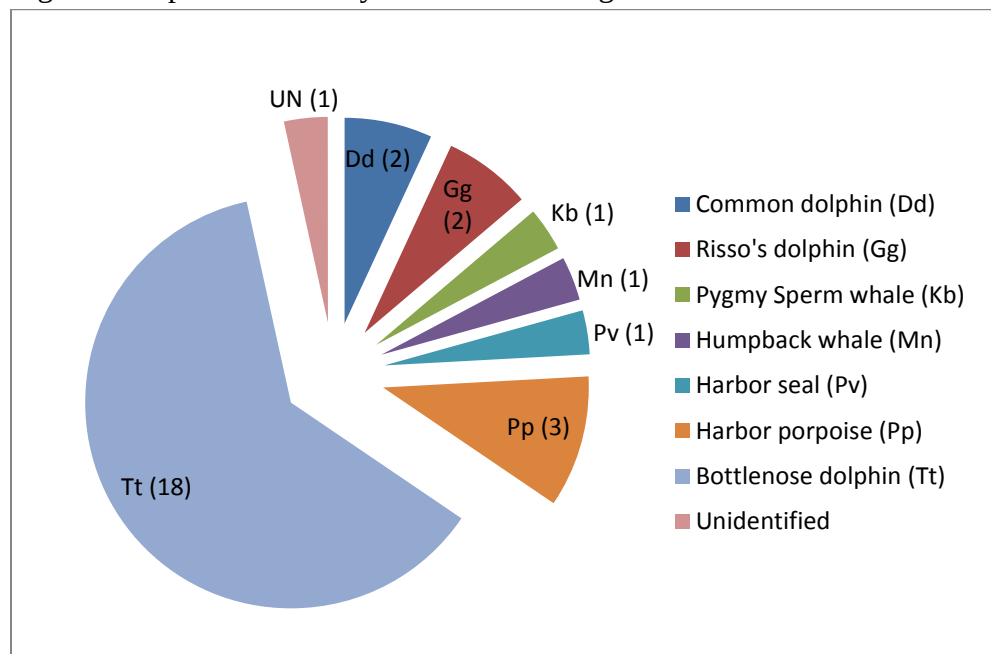
Figure 9. Condition Codes of 2009 Strandings.



Trends continue to show that Hatteras again received the brunt of the strandings, consisting of three-fourths of all strandings. This year the animals arrived on our beaches in generally bad condition; nearly 75% of animals showed some form of later stage decomposition. The rest were fresher and fortunately there was only one live animal. The live harbor seal was observed and

captured in February followed by transportation to the Virginia Aquarium; unfortunately it died 2-3 hours post arrival.

Figure 10. Species Diversity of 2009 Strandings.



The majority of stranded animals again fall into the Bottlenose dolphin category. Interestingly there was one large whale stranding; a humpback whale floating just off Oregon Inlet. In cooperation with NOAA, samples and photos were obtained. Overall, the species count is less than the previous year but once again the presence of Harbor porpoises is an indicator of decreases in water temperature.

Figure 11. 2009 CAHA Strandings Compared to the Entire Outer Banks.

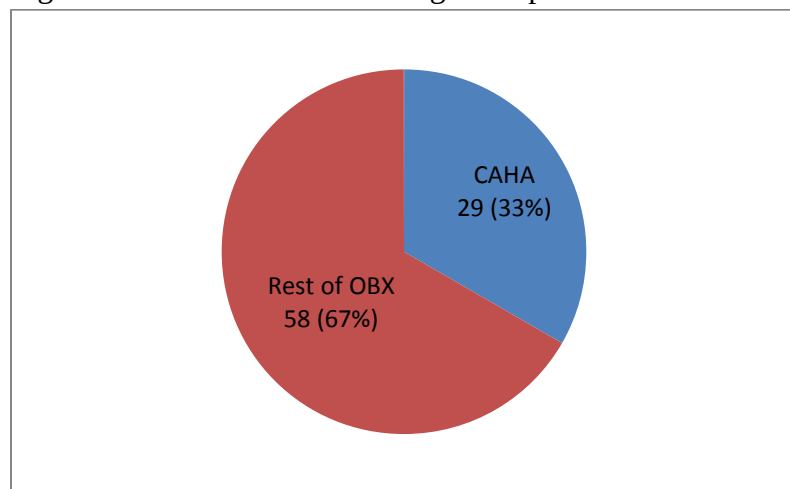
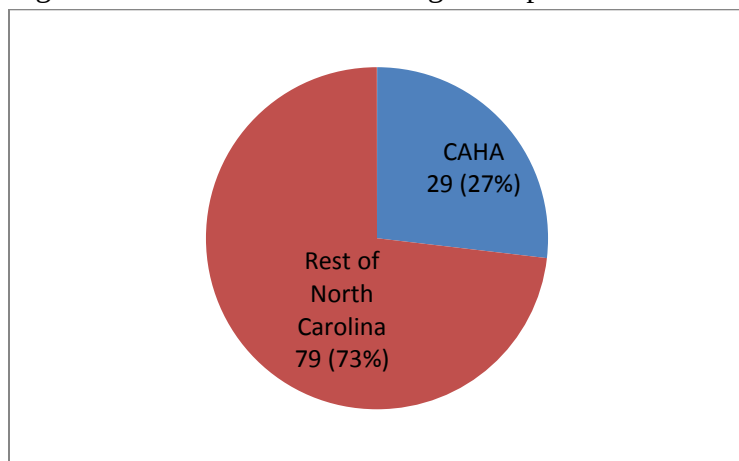


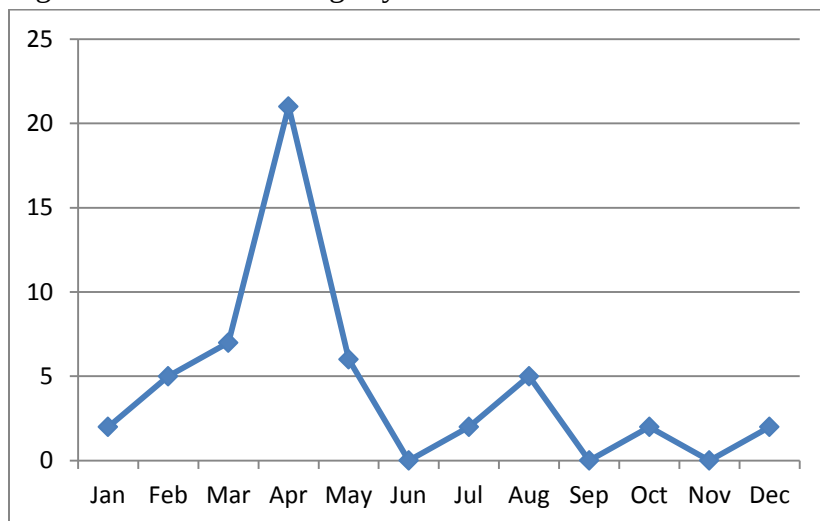
Figure 12. 2009 CAHA Strandings Compared to the Rest of North Carolina.



CAHA's numbers were slightly lower this year when compared to the rest of the Outer Banks and the state of North Carolina as a whole; comprised of roughly one-third of stranded animals. Human Interaction was a factor once again, and this year there was increase. There were eight cases (28%) observed, some of which grisly, of the total 29 stranded animals. Seven of eight animals were dolphins and there were two instances of mutilation. In one instance, the entire fluke (tail) was cut off, a flipper slice was evident, and there were healed fishery wounds. Another individual contained a mass of fishing gear at the base of the fluke, in addition to part of the fluke being severed. One dolphin showed a series of boat propeller wounds wrapping around the animal's body. One report from a fisherman's log indicated that an adult dolphin was incidentally caught in the webbing of a net and was dead when discovered. There were three cases of old, healed, fishery line impressions on various parts of the animal's body including the head, jaws, dorsal fin, and flukes. Lastly, the one live stranding of 2009 (Harbor seal) experienced inadvertent harassment from the public.

2010 Strandings

Figure 13. 2010 Strandings by Month



Excluding the usual three-month burst of activity in the spring, 2010 had fairly steady influx of animals every month. The huge burst of April animals once again occurred during calving season and there was also a mix some cold-water species such as porpoises and Harbor seals.

Figure 14. 2010 Strandings by Island.

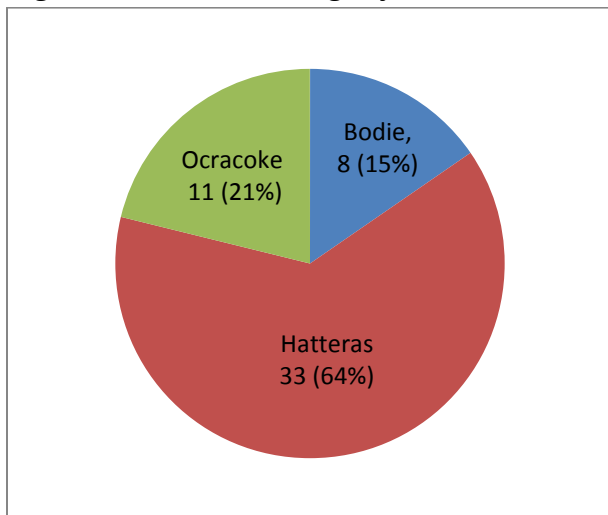
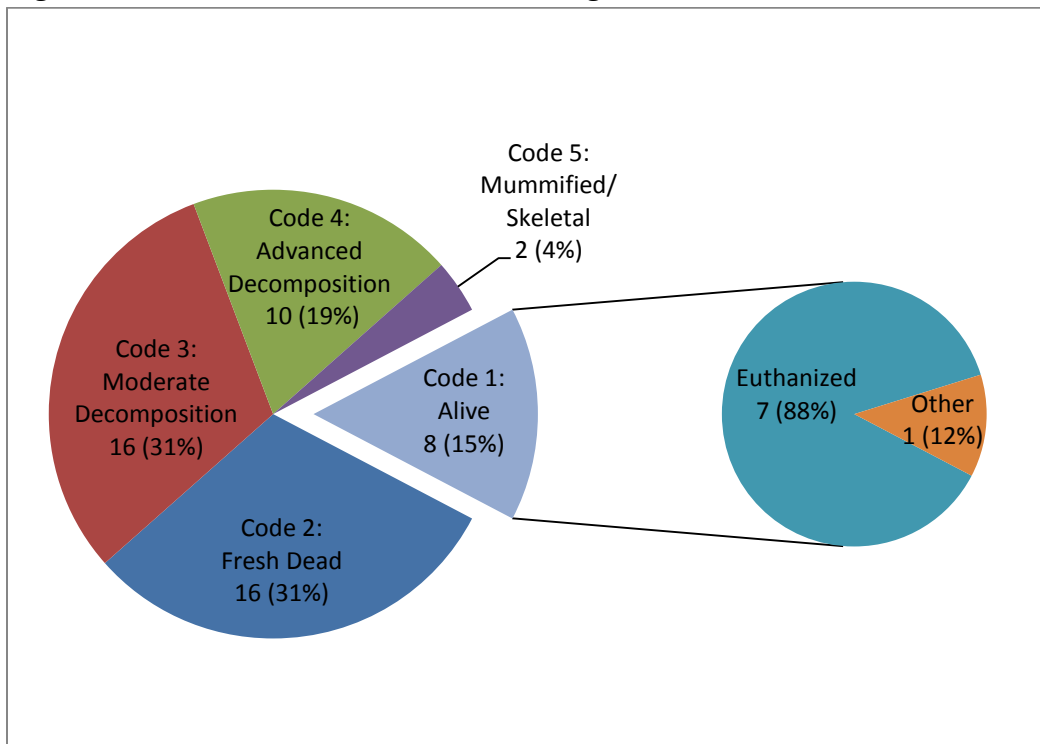


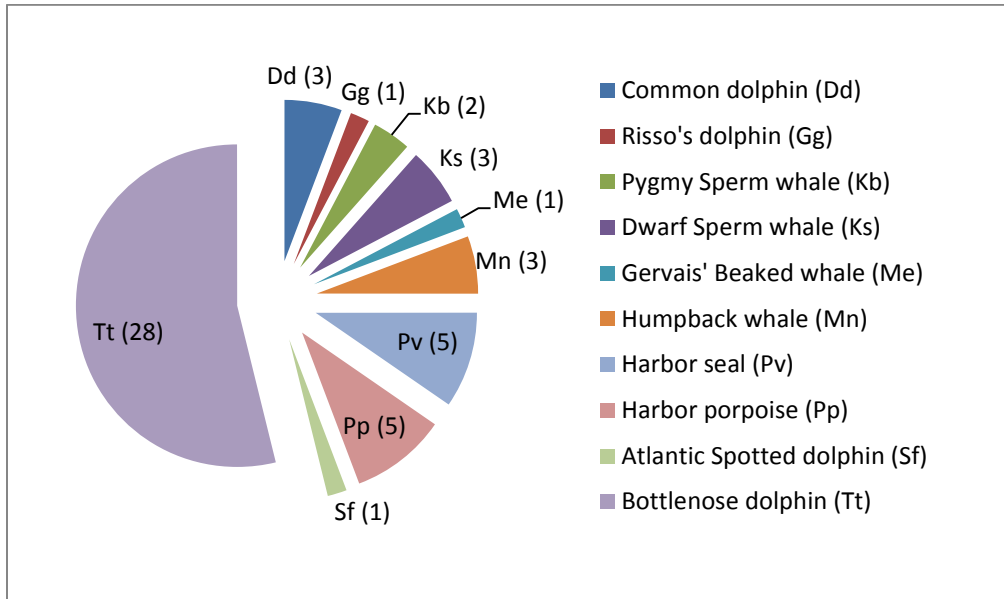
Figure 15. Condition Codes of 2010 Strandings.



Ocracoke and Bodie showed a bit more influence in the overall stranding numbers for 2010; accounting for over one-third of CAHA's animals. Hatteras Island remains a dominant stranding location. Nearly half of the total strandings were in fresh, if not alive, condition which is

favorable for necropsies. All live animals stranded within the first 5 months of the year; three in Jan-Feb and five in Apr-May. Fortunately, all but one animal were successfully euthanized. A harbor seal that stranded in January was transferred to the Virginia Aquarium where it died the next day.

Figure 16. Species Diversity of 2010 Strandings.



Over half of the strandings were again dominated by the bottlenose dolphin, while the other half saw a mixture of nine other species. Interestingly, there were three large-whale cases; all humpback whales. One was documented as floating just offshore from Cape Point but was inaccessible. The other two stranded near or in Hatteras Inlet. The whale in Hatteras Inlet stranded alive, was successfully euthanized by UNCW personnel, and was towed to land for full necropsy. Another notable stranding was that of a larger beaked whale, from which the entire skeleton was sent to the Smithsonian Institution in Washington D.C.

Figure 17. 2010 CAHA Strandings Compared to the Entire Outer Banks.

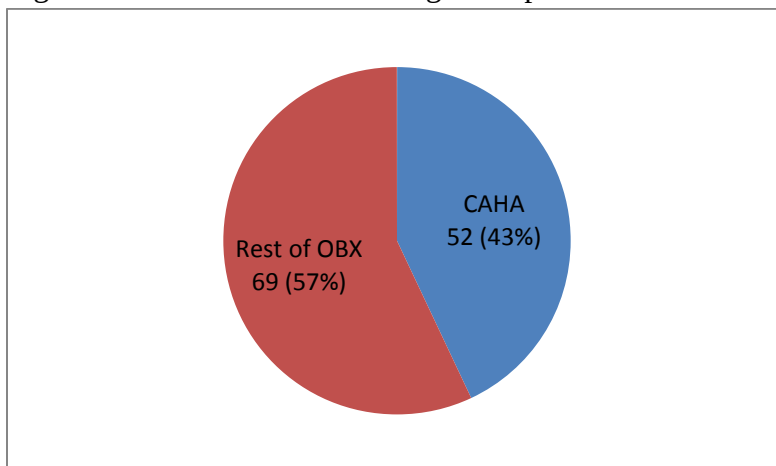
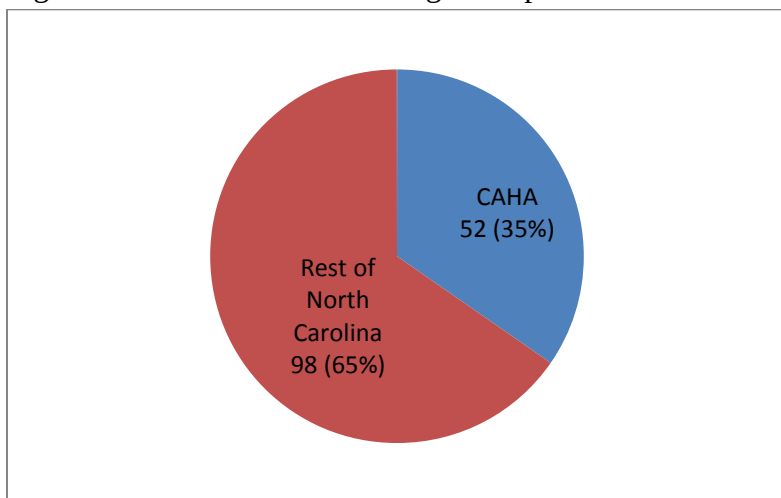


Figure 18. 2010 CAHA Strandings Compared to the Rest of North Carolina.

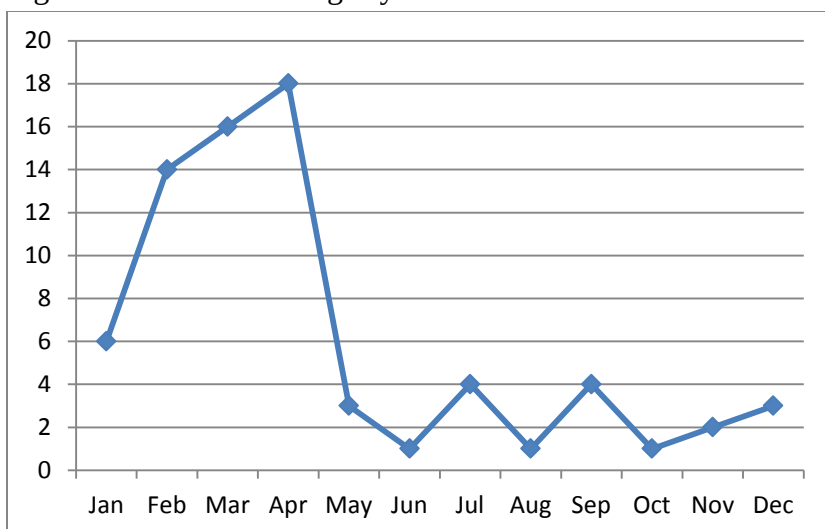


This year CAHA played a larger role in overall numbers; taking in nearly half of all Outer Banks strandings and over one-third of the state. Fortunately the Human Interaction factor was a bit less severe in 2010. There were four cases (8%) of the 52 total animals. The beaked whale fell into this group when a plastic cap was discovered inside the stomach. The other three cases were fishery interactions. The live stranded humpback had healing entanglement abrasions on its peduncle and fluke. One bottlenose dolphin showed rope abrasions on one flipper, the dorsal fin, flukes and monofilament scarring at the mouth and head.

An additional notable occurrence in 2010 was a Dwarf Sperm whale mass stranding that took place in August. Two males and a female stranded within one day of each other and in close proximity; the female was lactating indicative of recent calving. Mass strandings can generate a large number of animals at one time but fortunately this was not the case.

2011 Strandings

Figure 19. 2011 Strandings by Month.



This year's trend is not too different from 2010; with the exception of a more intense winter to spring transition. Of the five stranding years in subject, 2011 was the only one that saw a stranding in each of the 12 months. Interestingly, the Outer Banks and CAHA were ravaged by Hurricane Earl in late August. It is not unusual to see more animals stranding after strong storms such as hurricanes and nor'easters. Fortunately, the stranding pace was not significantly altered by Earl.

Figure 20. 2011 Strandings by Island.

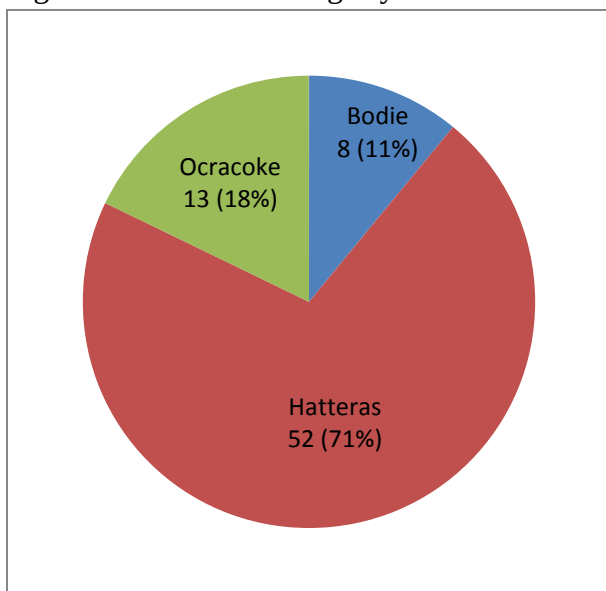
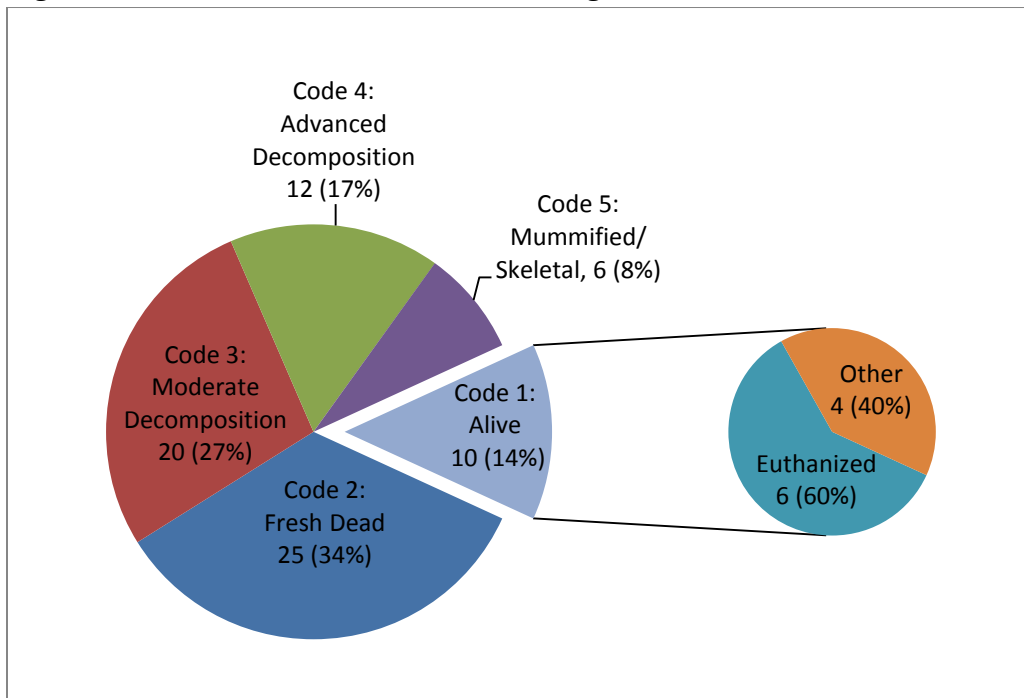
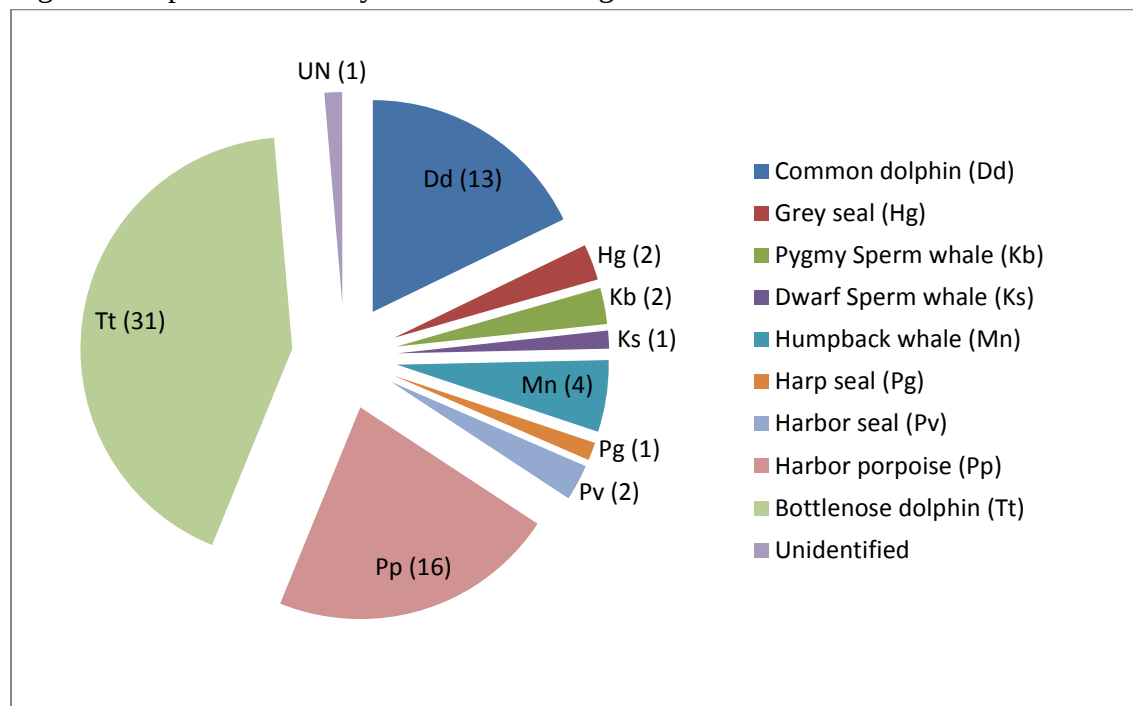


Figure 21. Condition Codes of 2011 Strandings.



Island trends are very similar to the previous year except that the number animals increased significantly by 21 individuals. Half of the animals arrived on the beach in good condition while the other half saw varied stages of decomposition. Most of the live animals were euthanized and occurred in 3-month bursts throughout the year; six animals were observed Jan-Mar while four occurred Jun-Aug. There were two cases of entangled humpback whales just offshore from Rodanthe and Oregon Inlet; both animals were eventually left at the site due to logistical issues and were never seen again. Another live case was an entangled Harbor seal that was captured near Frisco; the animal was deemed releasable after the gear was removed. Also, a Grey seal died during transport en route to the Virginia Aquarium for rehabilitation.

Figure 22. Species Diversity of 2011 Strandings



This was an interesting year in terms of species due to some uncommon occurrences. Bottlenose dolphins continue to be the majority but only account for about one-third of the animals. The 2011 winter was especially cold, so the correlation of air and water temperature reduction was evident given the species that arrived on CAHA beaches. In 2011, CAHA received an unusually high number of Harbor porpoises and Common dolphins. There was one Common dolphin mass stranding event that occurred in late January and consisted of four animals. One cow and calf pair of Pygmy Sperm whales was also documented in Avon. Also, there were four large-whale cases; all humpbacks.

Figure 23. 2011 CAHA Strandings Compared to the Entire Outer Banks.

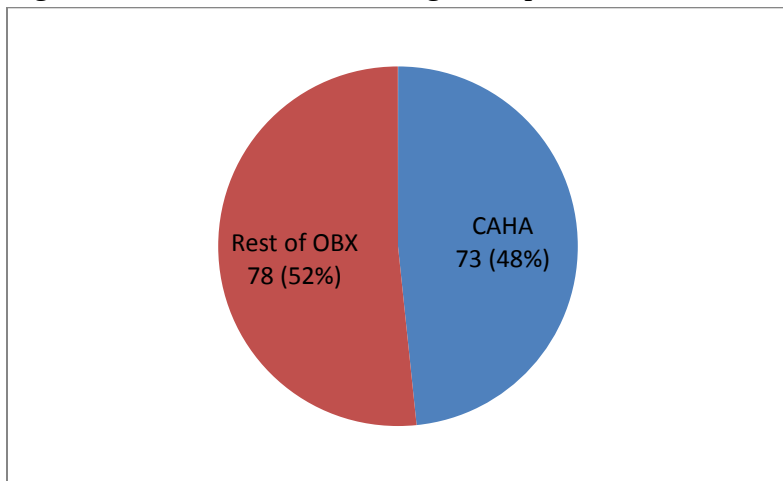
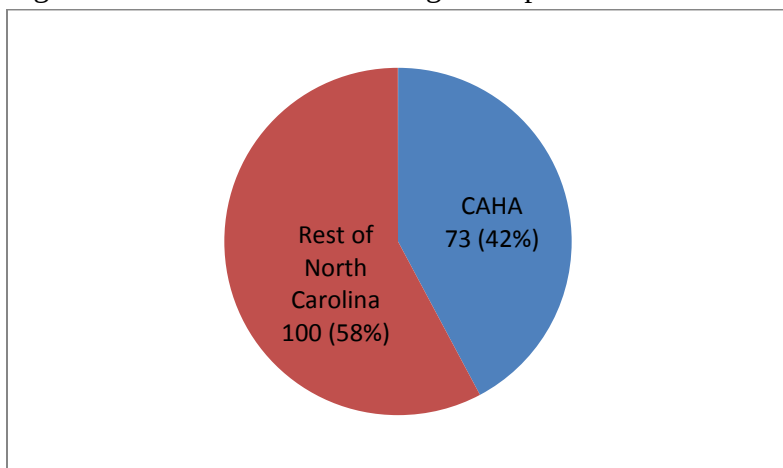


Figure 24. 2011 CAHA Strandings Compared to the Rest of North Carolina.



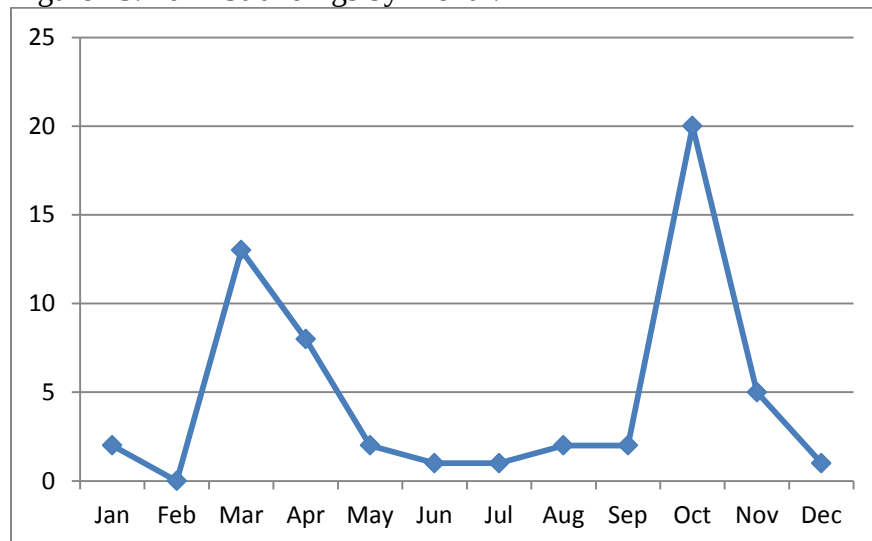
The increased number of strandings in 2011 boosted the significance of CAHA in terms of overall numbers; CAHA accounted for half of the animals on the Outer Banks and nearly half of the entire state. The Human interaction factor was once again on the low end; accounting for 6 animals (8%) of the total 73 strandings. This includes the previously mentioned entangled humpback near Oregon Inlet and the Harbor seal near Frisco that was released post disentanglement. The remaining four cases were all Bottlenose dolphins. Two dolphins were deemed Fishery Interactions, containing multiple impressions or lacerations and abrasions on various parts of the body. One dolphin contained multiple healed lesions and the final animal had been reported by a fisherman who had tied a rope around the fluke and towed the dolphin farther into the ocean (rope abrasions evident).

Seal sightings in 2011 were significantly greater than any previous years. The formation of a new seal haul-out site on Green Island was discovered in January; this was one of the first known seal haul-out sights in North Carolina and was comprised of adult and sub-adult Harbor seals. Most sightings occurred in February; with a peak count of 33 individuals. Also unique to this year, was

the return of Harp seals in the area. Previously in NC, there have only been two other adult Harp sightings documented.

2012 Strandings

Figure 25. 2012 Strandings by Month.



The 2012 stranding season did not fail to produce an influx of animals during the spring. Again, it was during dolphin calving season, thus the higher numbers in March. In the heart of hurricane season, the Outer Banks and CAHA were rocked by yet another hurricane for a second consecutive season. Unlike 2011, Hurricane Sandy brought the horror of a mass stranding to CAHA. On October 31, a total of 18 Atlantic Spotted dolphins stranded in and around Hatteras Inlet; causing an otherwise normal stranding month to intensify dramatically. The last time a mass stranding of this magnitude occurred on CAHA beaches was in 2005 when 31 pilot whales stranded on Bodie spit.

Figure 26. 2012 Strandings by Island

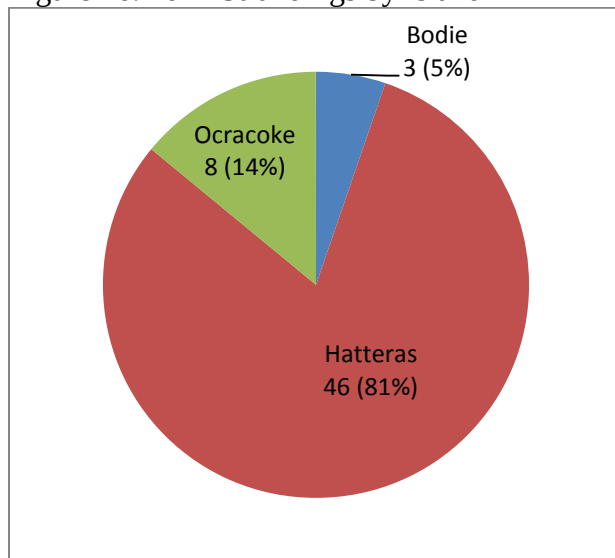
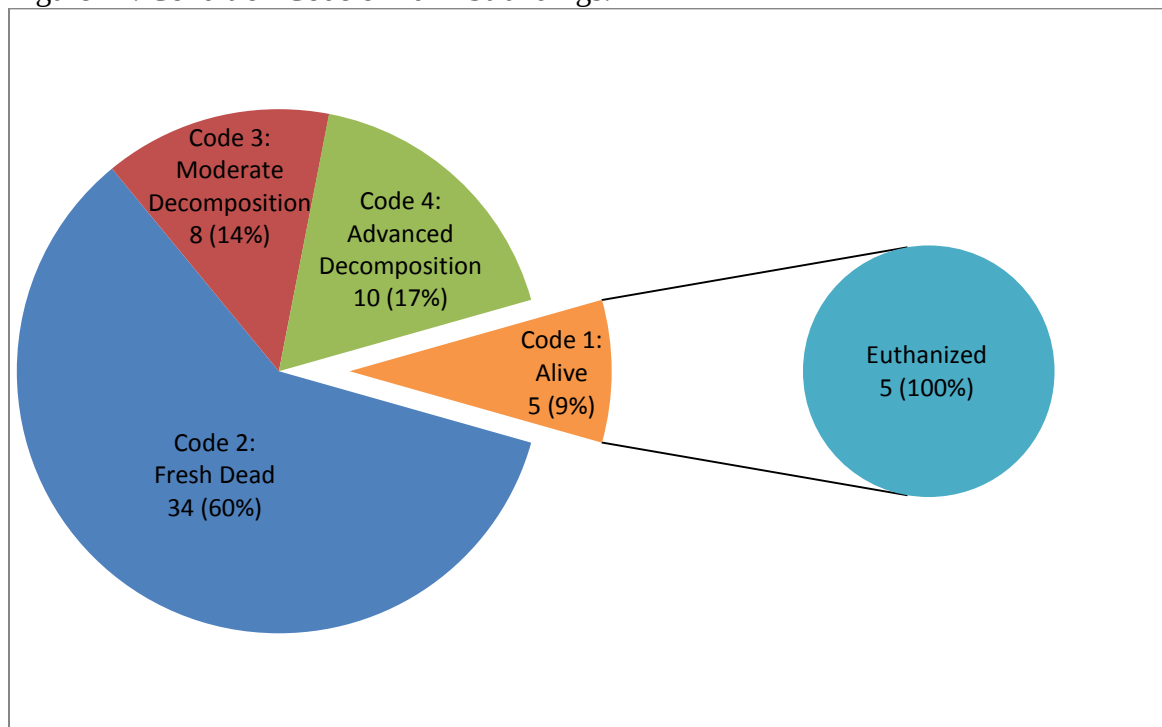
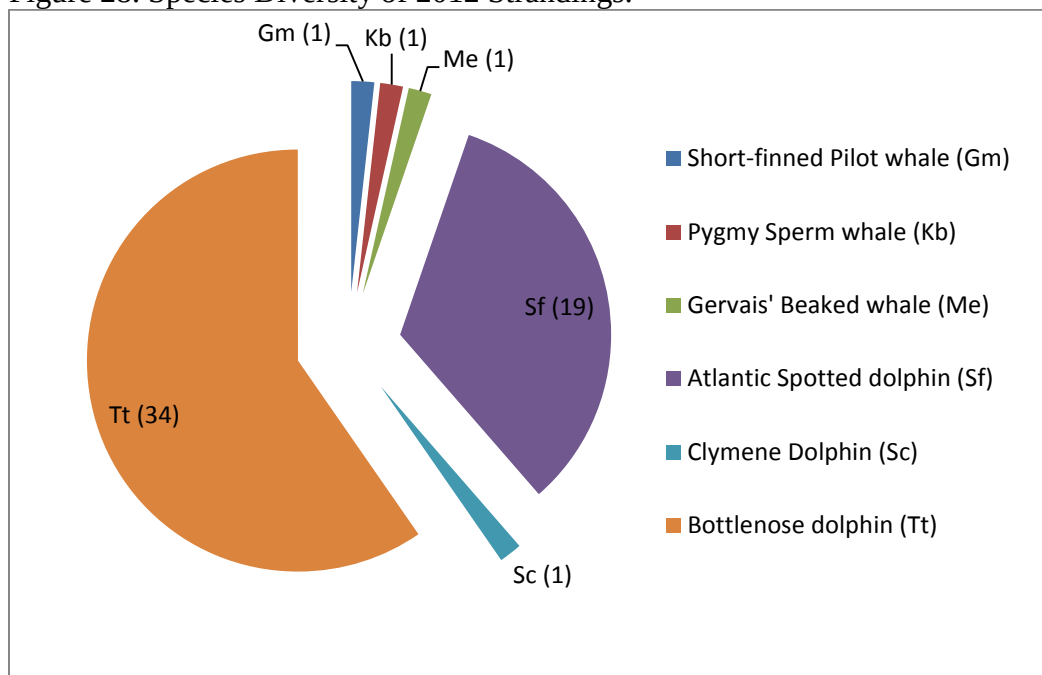


Figure 27. Condition Code of 2012 Strandings.



The fall mass stranding event greatly increased the numbers for animals on Hatteras Island and animals that were fresh dead. Only one-fourth of strandings showed some level of decomposition. Fortunately, all five live animals were successfully euthanized and only two came from the mass stranding. The five live animals were scattered throughout the year; two in spring, one in summer and two in the fall.

Figure 28. Species Diversity of 2012 Strandings.



As the Bottlenose dolphins again constitute the majority; the spotted dolphins from the mass stranding also played a huge role. Both species combined for a total of 92% of 2012 strandings. This year can be labeled as the least diverse within the five-year focus period, but not the most common either. One rare and interesting species that graced CAHA was the Clymene dolphin and another notable was the presence of a beaked whale.

Figure 29. 2012 CAHA Strandings Compared to the Entire Outer Banks.

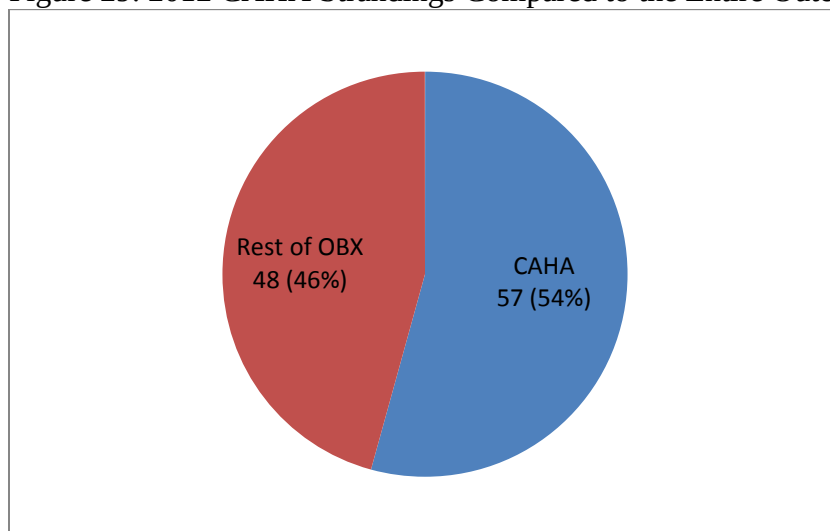
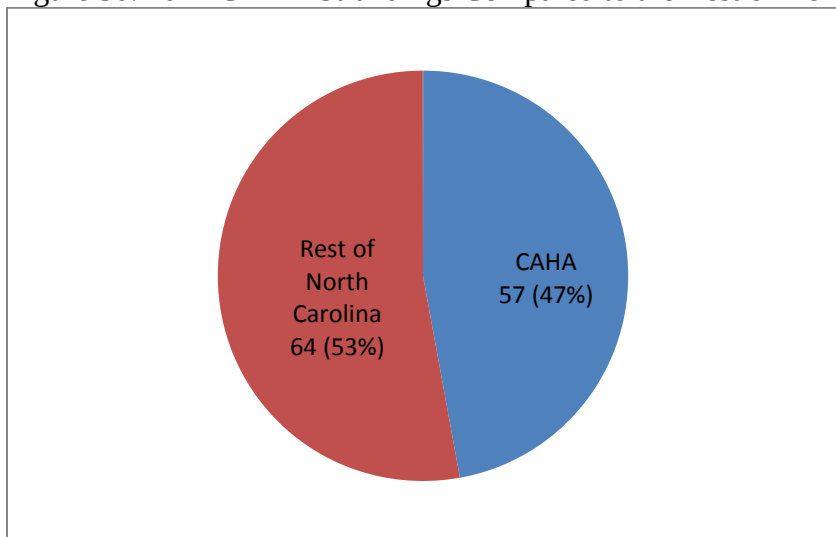


Figure 30. 2012 CAHA Strandings Compared to the Rest of North Carolina.



Over one-half of all Outer Banks animals in 2012 were logged on CAHA beaches and this translates into nearly one-half of the entire state's animals. A higher than normal occurrence of Human Interaction cases was documented this year, 9 cases (16%) of the total 57 animals. All but two species were Bottlenose dolphins; the Clymene dolphin and Short-finned pilot whale both showed signs of old, healed Fishery Interaction scarring. Also, three other dolphins were documented with healed line impressions. Four dolphin cases were of much more severe actions; two dolphins were found with the fluke completely severed and additional lacerations; one dolphin had multiple lacerations on the fluke and the right portion was severed; one dolphin had five large slices on the left body and a continuous ventral slice that exposed internal organs.

Seal sightings were much less frequent compared to last year. A most likely explanation is the fact that the Outer Banks experienced a much more mild winter than the previous. Thus the ocean water was not allowed to stabilize at a cold temperature. Only five instances were documented of seals hauled-out on Green Island. A maximum of 5 seals was observed, four instances were within Jan-Feb and one instance on March 1st.

Five-Year Summary and Historical Data

Figure 31. Five-year Stranding History of CAHA Compared to the Rest of the Outer Banks.

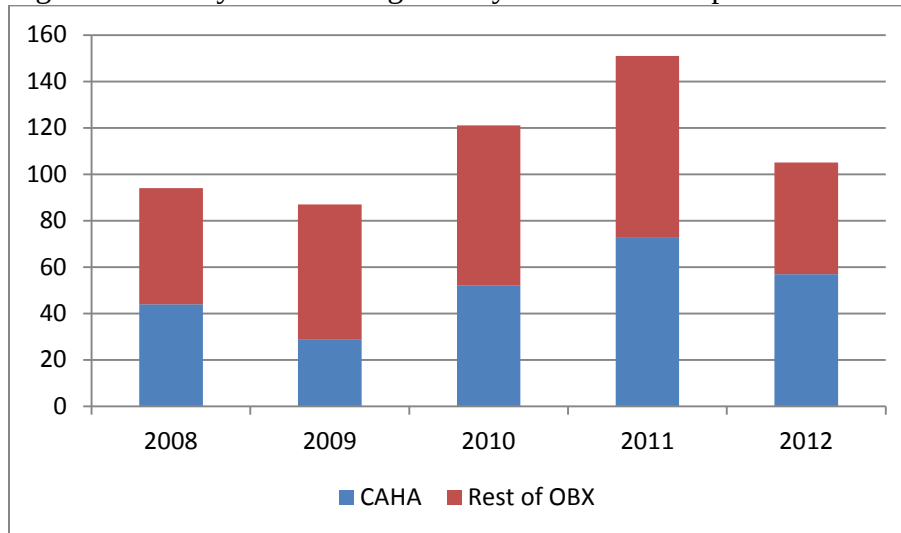
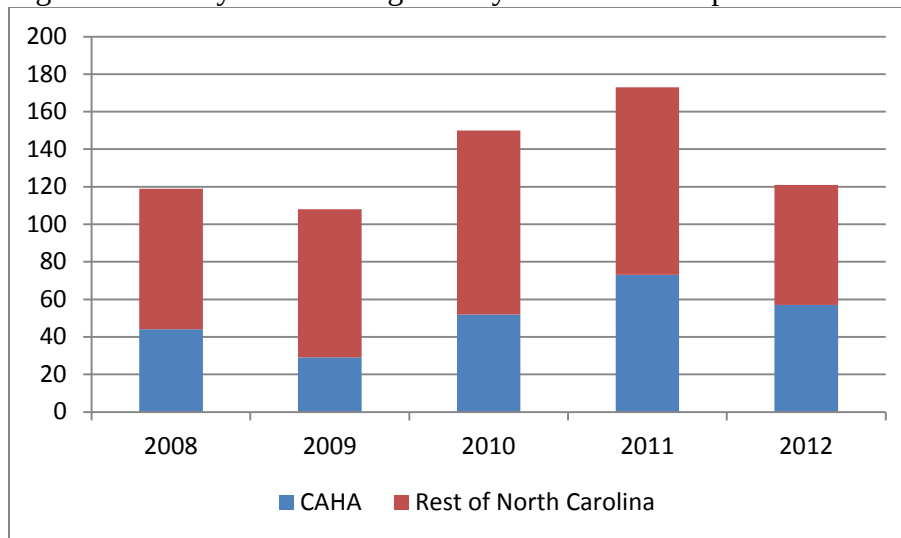
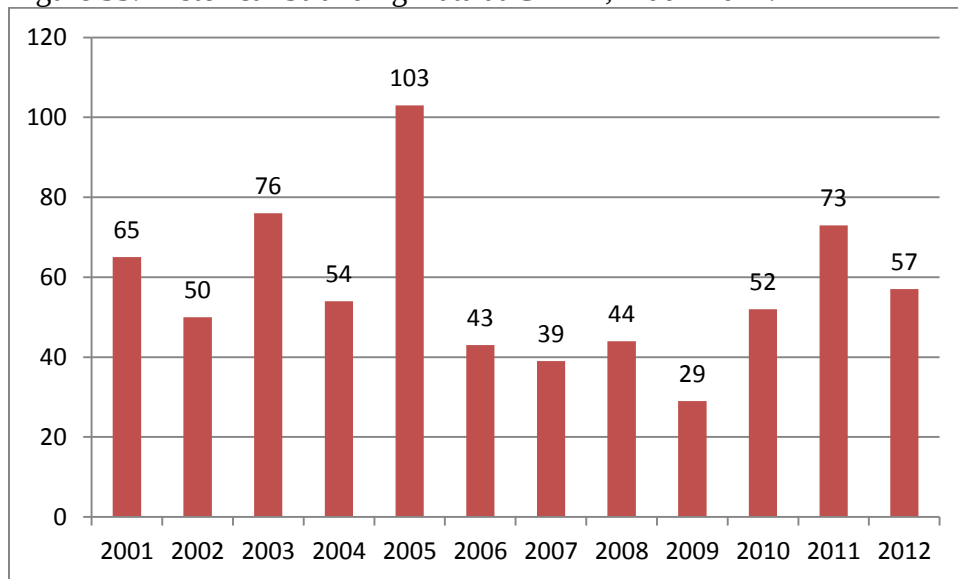


Figure 32. Five-year Stranding History of CAHA Compared to the Rest of North Carolina.



The data suggests that CAHA is a major contributor to the overall stranding numbers of the Outer Banks and the state of North Carolina. CAHA strandings account for an average 51 individual animals, or averaging 45% of all strandings on the Outer Banks during the five-year period and an average of 38% of the entire state's numbers.

Figure 33. Historical Stranding Data at CAHA, 2001-2012.



Over the 12-year period presented in Figure 33, it is evident that CAHA’s trend of generally high stranding numbers will continue with time so long as the geographical characteristics of the park remain the same. The average number of strandings over this period is 53 animals. There is one clear outlier amongst this list; in 2005 the mass stranding event on Bodie spit of Short-finned Pilot whales produced an additional 31 animals, without which the annual number would have fallen into the “normal” range with 72 animals.

APPENDICES

APPENDIX A: MAPS

- Map 1: *Stenella frontalis* Mass Stranding Event, South Hatteras Island and Pamlico Sound, 2012
- Map 2: Bodie Island Marine Mammal Strandings, 2012
- Map 3: North Hatteras Island Marine Mammal Strandings, 2012
- Map 4: South Hatteras Island Marine Mammal Strandings, 2012
- Map 5: Ocracoke Island Marine Mammal Strandings, 2012
- Map 6: Bodie Island and Green Island Seal Sightings, 2010-2012
- Map 7: North Hatteras Island Seal Sightings, 2010-2012
- Map 8: South Hatteras Island Seal Sightings, 2010-2012
- Map 9: Cape Hatteras National Seashore Seal Strandings, 2008-2012