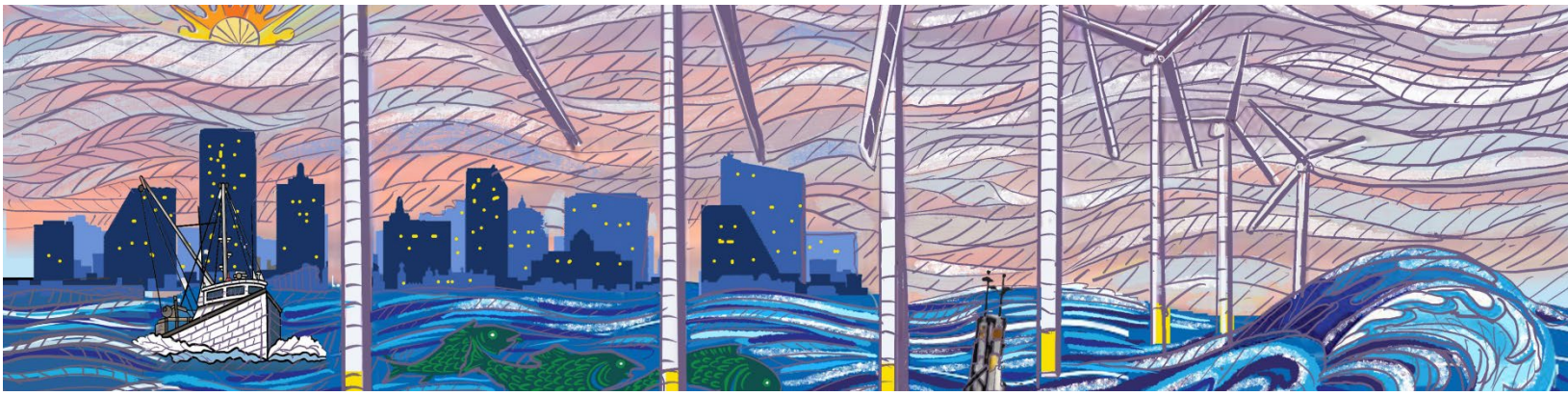

Appendix II-L2

Marine Mammal and Sea Turtle Presence
Atlantic Shores Lease Area OCS-A 0499: Digital Aerial Survey Data

May 2024

MARINE MAMMAL AND SEA TURTLE PRESENCE IN ATLANTIC SHORES LEASE AREA OCS-A 0499:

A report on digital aerial survey data

August 2022

Report to:

Environmental Design and Research
217 Montgomery Street
Syracuse, NY 13202

Report from:

Biodiversity Research Institute
276 Canco Road
Portland, ME 04103

SUMMARY

- Thirty-eight species of marine mammals and four species of sea turtles occur regularly within the Northwest Atlantic Outer Continental Shelf and may use waters in the vicinity of Atlantic Shores Lease Area OCS-A 0499 (Lease Area).
- To document the species within the Lease Area, as well as seasonal variation in their occurrence, digital aerial surveys were flown by APEM across the Lease Area from October 2020 to May 2021 in spring, fall and winter.
- APEM processed and screened all images and classified potential detections to the species level or next higher taxonomic grouping.
- For this analysis, naïve densities of each species/taxonomic grouping were calculated based on effort and examined across seasons.
- Mean group size of each marine mammal species/taxonomic grouping was also calculated.
- For marine mammals, common dolphins were generally most common in the Lease Area and found in the largest groups, while fin whales were the least common.
- For sea turtles, Kemp's ridley turtle were generally most common in the Lease Area.
- Results must be interpreted carefully given certain limitations in the analyses, including a lack of total seasonal coverage.

1. BACKGROUND

Marine Mammals

Thirty-eight species of marine mammals are known to use waters within the Northwest Atlantic Outer Continental Shelf Region (Northwest OCS), which contains Atlantic Shores Lease Area OCS-A 0499 (Lease Area). These waters support a variety of activities for marine mammals, including migration (e.g., Brown and Marx 2000), foraging (e.g., Thorne et al. 2017), and mating (e.g., Cole et al. 2013). The 38 species include six mysticetes (baleen whales), 28 odontocetes (toothed whales, e.g., dolphins and porpoises) and four pinnipeds (Hayes et al. 2021). For some species, such as blue whales, harp seals and Atlantic spotted dolphins, peak occurrence within the Northwest OCS varies seasonally, while others such as fin whales and bottlenose dolphins may be found in similar densities year-round (Kenney and Vigness-Raposa 2010). In addition, some species are considered rare are in the Northwest OCS, such as striped dolphins, while others such as humpback whales are considered common (Northeast Fisheries Science Center (NEFSC) and Southeast Fisheries Science Center (SEFSC) 2018). Of the 38 species, blue, fin, North Atlantic right, sei and sperm whales are listed as endangered under the Endangered Species Act (ESA) and considered strategic under the Marine Mammal Protection Act (MMPA) (Hayes et al. 2021). Stocks of short- and long-finned pilot whales and 14 stocks of bottlenose dolphins are also considered strategic under the MMPA.

Most of the information on the distribution, abundance, ecology and behavior of marine mammals within the Northwest OCS has been derived from ship-based or aerial surveys conducted between 2011 and 2019 by the Atlantic Marine Assessment Program for Protected Species (AMAPPS), although more of the effort was directed outside of the Lease Area. Habitat-based cetacean density models developed by Duke University Marine Geospatial Lab in 2016 and updated in 2017, 2018, 2019 and 2020 (Roberts et al. 2016, 2017, 2018, 2020; Curtice et al. 2019) are considered the best information currently available for marine mammal densities in the Northwest OCS. Ship-based and aerial surveys have also specifically targeted waters within and around the Lease Area, such as those conducted by New Jersey Department of Environmental Protection between 2008 and 2009.

Sea Turtles

Four species of sea turtles are known to regularly use waters within the Northwest OCS, including loggerhead, leatherback, Kemp's ridley and green sea turtles[1]. All species are listed under the ESA. Sea turtles overwinter in U.S. waters south of Virginia and may travel as far north as New England during other times of the year. Movement patterns of sea turtles are primarily driven by water temperature, with turtles only occupying waters off of New Jersey when water temperatures exceed 59°F (NJDEP 2010), and so the four species could inhabit the Lease Area during the spring (March-May), summer (June-August), and/or fall (September-November). Sea turtles are unlikely to be found in the Lease Area after November 30.

2. METHODS

A series of eight digital aerial surveys were flown by APEM across the Lease Area, from October 2020 to May 2021, with varying effort across the Lease Area and across seasons (Table 1, Figure 1). It is worth noting that no surveys were flown in summer months. Approximately 40% of the Lease Area plus a 2.5-

[1] While hawksbill sea turtles have occurred in the Northwest OCS, they were not expected to be sighted in the Lease Area, as the species prefers tropical waters and there are no documented observations of hawksbill turtles within New Jersey coastal waters (Conserve Wildlife Foundation of New Jersey 2021).

nautical mile (4-km) buffer was surveyed; but only a quarter of the resulting images (representing ~10% of the Lease Area) were analyzed. These surveys were flown at an altitude of 1,360 ft (415 m) and collected photographic imagery at a resolution of 0.6 in (1.5 cm) ground sampling distance (GSD). Using APEM's Shearwater III camera system, each image footprint was approximately 17.28 acres (0.070 km^2). Surveys were conducted in weather conditions that did not limit the ability to identify marine fauna at or near the water surface – cloud base >1,400 ft (427 m), visibility >3 mi (5 km), wind speed <30 knots (35 mph), and a Beaufort Scale sea state of 3 (small waves with few whitecaps) or less, ideally 2 (small waves with no whitecaps) or less to maximize accuracy of identifications. On days with little cloud cover, surveys avoided the middle of the day to minimize glint (strong reflected light off the sea) that makes finding and subsequently identifying the marine fauna recorded in the images more difficult. The onboard camera technician continuously monitored the images collected and, if they ceased to be of sufficient quality, surveys were ceased until suitable conditions returned.

On completion of each survey flight, all images were saved and backed up locally. Management of the data was overseen in the United States with a secondary data manager in the United Kingdom. Once the images had been processed and screened for potential targets, data was examined by APEM taxonomic experts for completion of species identifications and associated QA/QC. Sightings were initially scored as "Definite", "Probable" or "Possible" based on the expert's certainty of species identification. In some cases, if the expert could not identify a marine mammal detection to the species level, it was classified as one of the following taxonomic groupings: "Unknown dolphin species", "Unknown seal species", or "Unknown marine mammal species". For this analysis, those detections scored at the species level but as "Possible" were reclassified into the next higher taxonomic grouping. For example, a "Possible" bottlenose dolphin was reclassified as a "Probable" "Unknown dolphin species".

For the analysis presented here, marine mammals detected in images within two seconds of each other were considered to be in a group. For those sightings that contained multiple animals in a group, the location of the group was determined based on the average longitude and latitude coordinates of the individuals in the group. The number of animals in the group was associated with each sighting, and each sighting was also binned by group size, with 1 for sightings with one animal, 2 for sightings with two animals, and 3 for sightings with three or more animals.

Marine mammal and turtle detections were plotted in QGIS version 3.26.1 by season, species and group size, with the size of each point location for marine mammals relative to the group size bin. Seasonal naïve densities of each species/taxonomic grouping were examined, and mean group size for each marine mammal species/taxonomic grouping across sightings was also calculated.

3. RESULTS

Marine Mammals

Over the course of the eight digital surveys, four species of marine mammals were conclusively identified in the Atlantic Shores Lease Area OCS-A 0499, including harbor porpoises, common dolphins, bottlenose dolphins, and ESA-listed fin whales. Common dolphins constituted the greatest proportion of the detections (n= 34, 32%), while fin whales constituted the smallest proportion (n=1, 1%). Over a third of the sightings could not be identified to the species level, and were instead classified into the taxonomic groupings as described previously. Across all detections, those classified as "Probable" constituted a greater proportion of the sightings than "Definite" detections (n=57 and 48, respectively).

As shown in Figures 2a-2c, not all marine mammal species or taxonomic groupings were detected in the Lease Area in each of the surveyed seasons. In spring, all species and taxonomic groupings were detected, including the one sighting of a fin whale (Figure 2a), which was verified by a second taxonomic expert. Pinnipeds and fin whales were not detected in the Lease Area in the fall, with detections made only of dolphin species (Figure 2b). In winter, the taxonomic classifications are generally ambiguous, as the majority of the seven winter detections were of an unknown dolphin, seal or marine mammal (Figure 2c).

Naïve densities of each marine mammal species and taxonomic group also varied across seasons when detections were corrected for effort (Figure 4). In spring and fall, common dolphins were found in higher densities than the other species and taxonomic groups, while in winter, harbor porpoises were found in higher densities.

Finally, when marine mammal group size was assessed by species/taxonomic grouping (Figure 5), common dolphins occurred in the largest mean group sizes ($\bar{x}$ = 4.9 animals, sd= 3.5, n=34), followed by bottlenose dolphins ($\bar{x}$ = 1.9 animals, sd= 1.9, n=13).

Sea Turtles

Over the course of the eight digital surveys, three species of sea turtles were identified in the Atlantic Shores Lease Area OCS-A 0499 based on classifications made by APEM, including ESA-listed leatherback, loggerhead, and Kemp's ridley turtles. Kemp's ridley turtles constituted the greatest proportion of the detections (n=22, 76%), while Leatherback turtles constituted the smallest proportion (n=3, 10%). Across all detections, those classified as "Probable" constituted a greater proportion of the sightings than "Definite" detections (n=18 and 11, respectively).

Furthermore, sea turtles were only detected in the Lease Area in the fall; no observations of either of the three species were made in either spring or winter. Sea turtle detections were generally distributed across the southern section of Lease Area, with fewer detections made in the northern section (Figure 3).

Naïve densities of each species also varied across seasons when detections were corrected for effort, as density values were zero for each of the species in spring and winter (Figure 3). Density values for Kemp's ridley turtles were considerably greater than those for leatherback or loggerhead turtles during the fall months.

4. DISCUSSION

These results offer a basic understanding of the marine mammal and sea turtle species that may occur in the Atlantic Shores Lease Area OCS-A 0499 and provide some insight into when and how often they may occur in the Lease Area and for marine mammals, in what sized groups. Of the marine mammal species observed, common dolphins generally were most common in the Lease Area and found in the largest groups, while fin whales were the least common. Of the sea turtle species observed, APEM-identified Kemp's ridley turtles were considerably more common in the Lease Area than the other two species detected during the surveys. However, it is important to note there was some uncertainty in the classification of the detections to species or taxonomic grouping, with more probable detections than definite ones. In addition, many of the marine mammal sightings could not be classified to the species level, and thus one must be careful when drawing comparisons between the occurrence of the different species and taxonomic groupings.

Most critically, survey effort across the Lease Area and across seasons was not consistent, and surveys were not conducted during the summer, during which peak abundances of fin whales may occur within

U.S. Northeast and Southeast continental waters (Bureau of Ocean Energy Management (BOEM) 2022). Furthermore, detectability of species was not factored into these findings, as subsurface individuals would have been missed in the images.

Table 1: Digital aerial survey dates.

Survey	Year	Date	Season
1	2020	15 October	fall
2		07 November	
3		03 December	winter
4	2021	06 January	
5		06 March	spring
6		20 March	
7		20 April	
8		07 May	

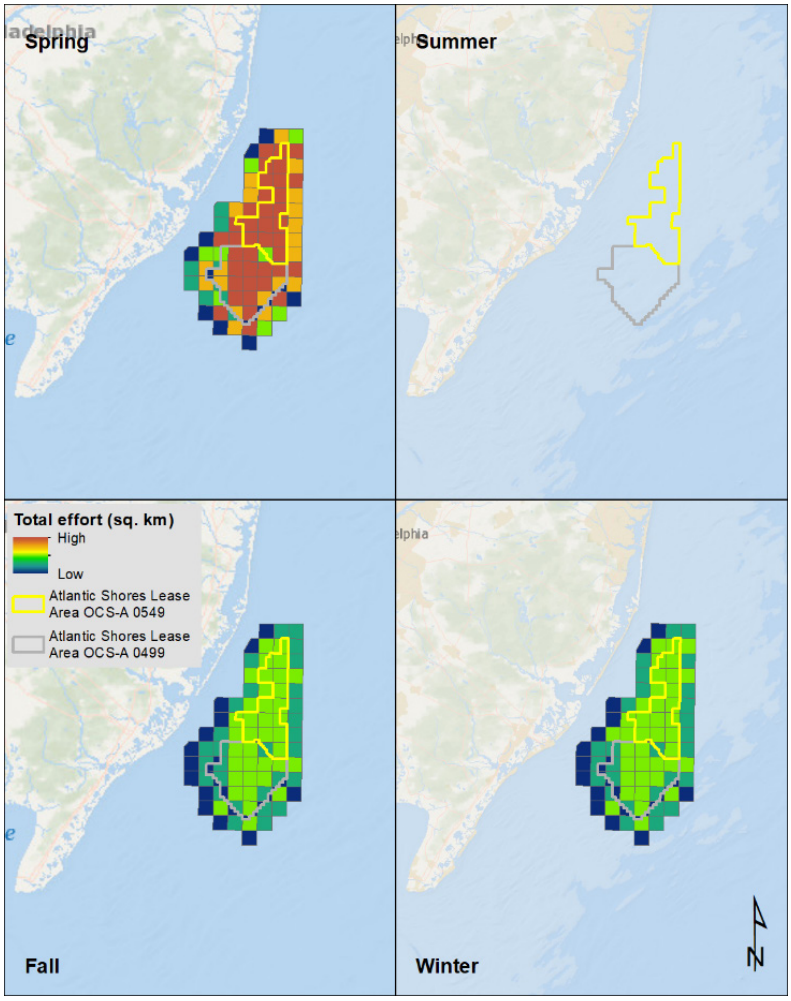

Figure 1: Seasonal survey effort of Atlantic Shores APEM digital aerial surveys. Survey effort totaled within each full or partial lease block.

Note: The seasonal effort is the total number of km^2 of effort flown in each lease block in each season. Since there was unbalanced effort seasonally, there is greater effort in spring and none in summer. The season definitions and effort are detailed in Table 1.

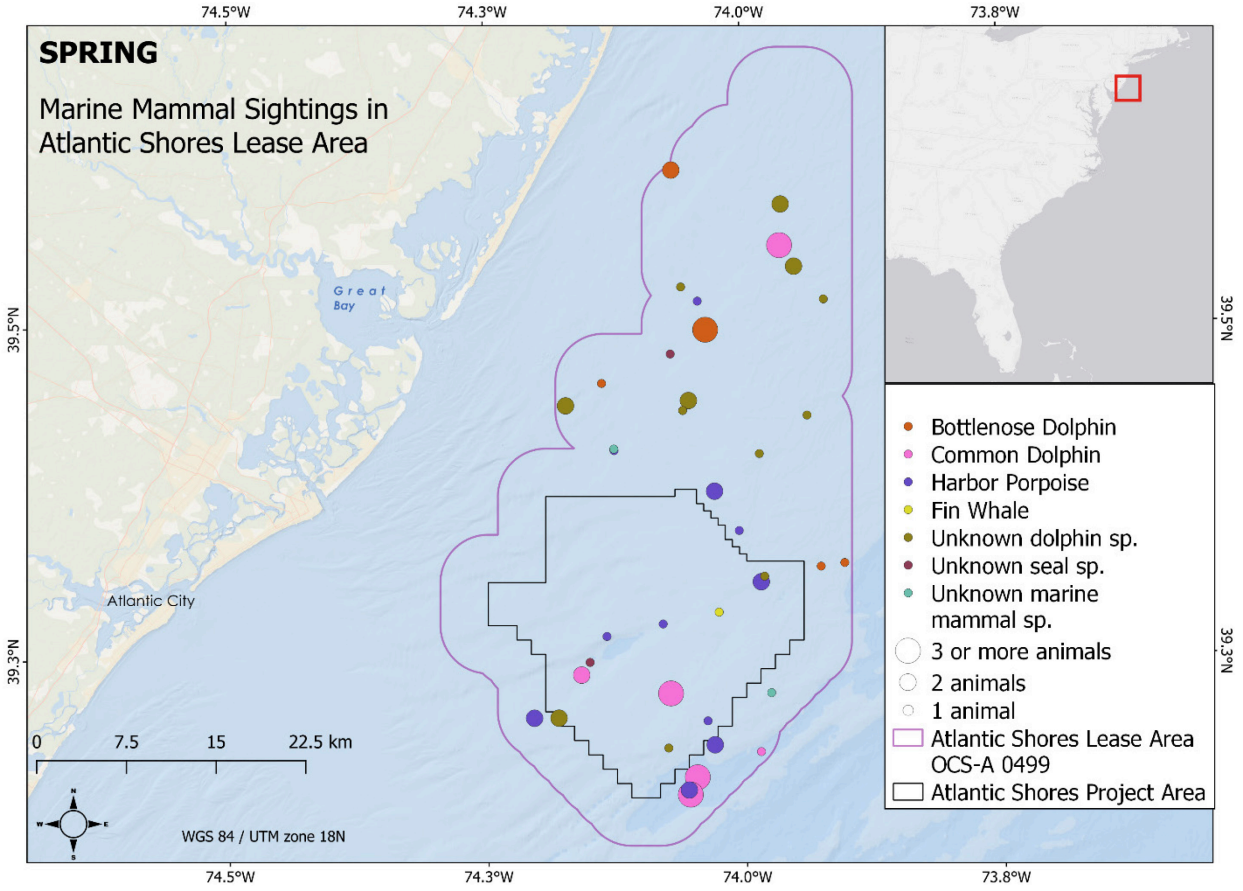

Figure 2a: Marine mammal detections from Atlantic Shores APEM digital aerial surveys conducted in spring. Point size corresponds to the number of individuals in a group at that location. Note in Figure 1 that there was greater survey effort in spring than fall or winter.

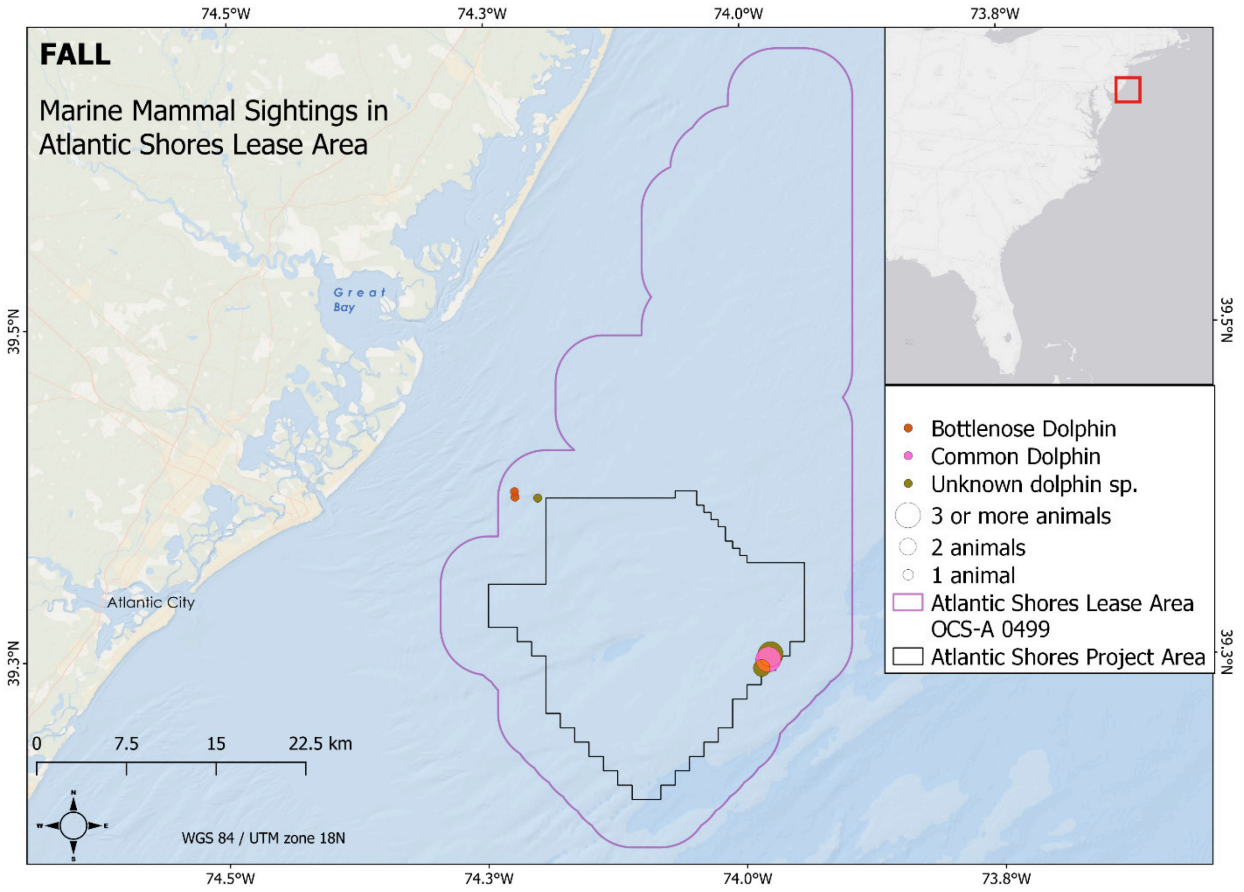

Figure 2b: Marine mammal detections from Atlantic Shores APEM digital aerial surveys conducted in fall. Point size corresponds to the number of individuals in a group at that location. Note in Figure 1 that there was less survey effort in fall than spring.

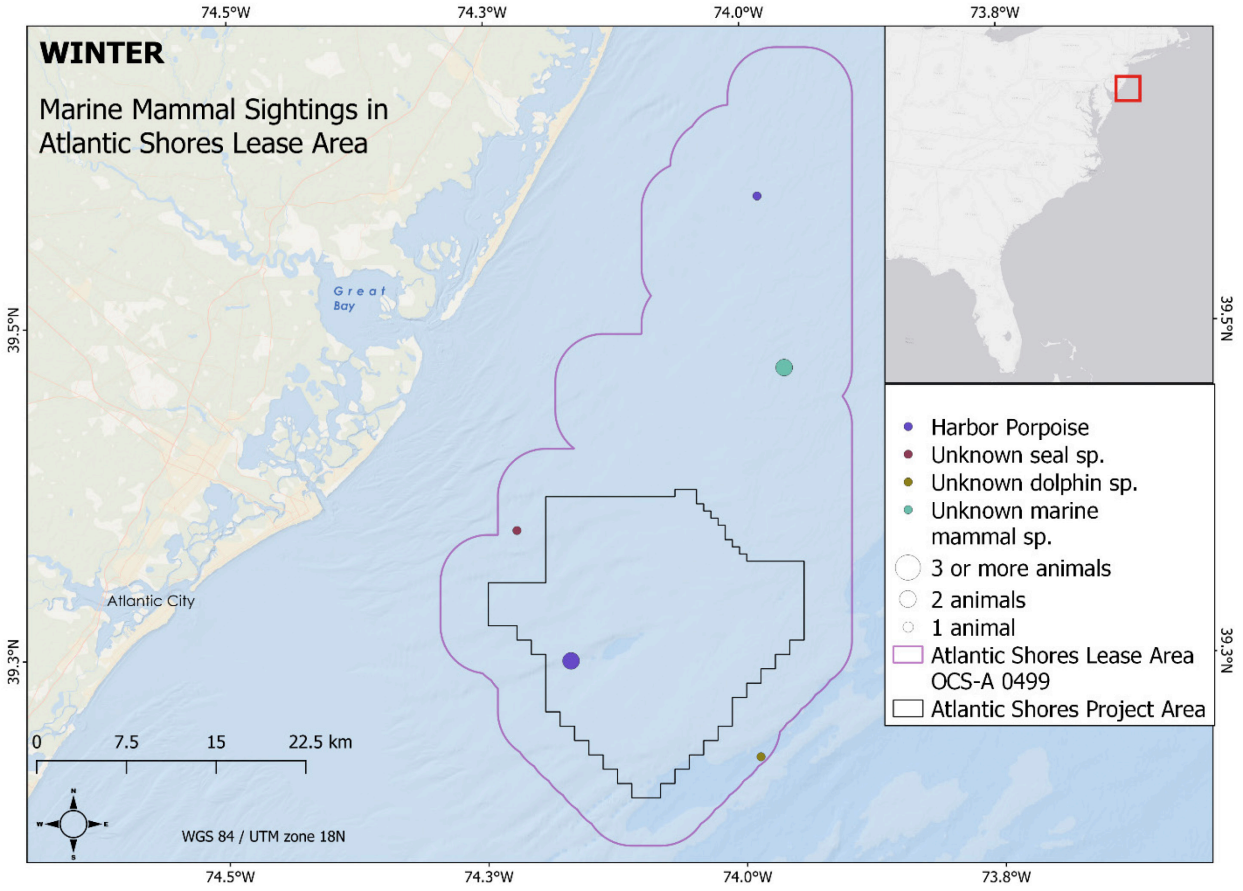

Figure 2c: Marine mammal detections from Atlantic Shores APEM digital aerial surveys conducted in winter. Point size corresponds to the number of individuals in a group at that location. Note in Figure 1 that there was less survey effort in winter than spring.

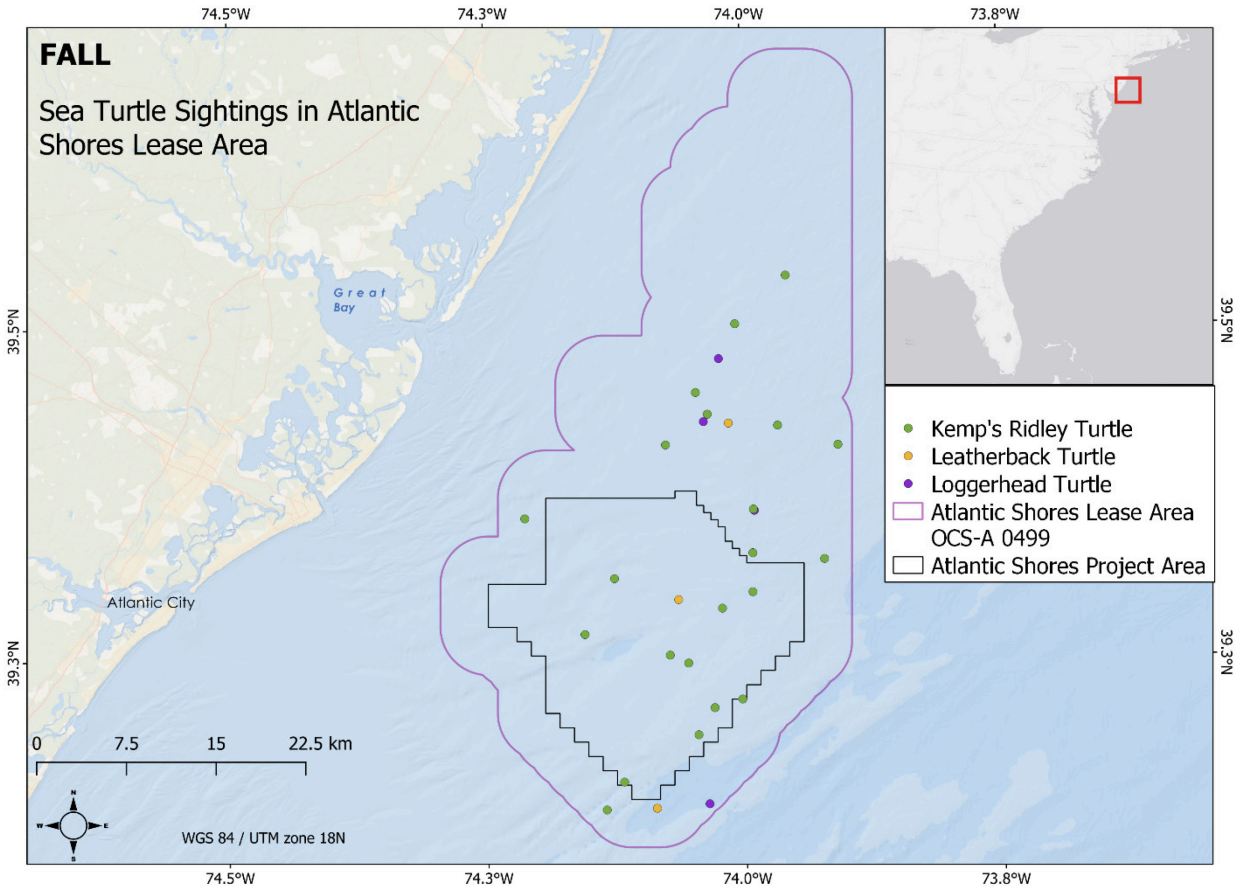

Figure 3: Sea turtle detections from Atlantic Shores APEM digital aerial surveys conducted in fall. No sea turtles were detected during spring or winter. Note in Figure 1 that there was less survey effort in fall than spring.

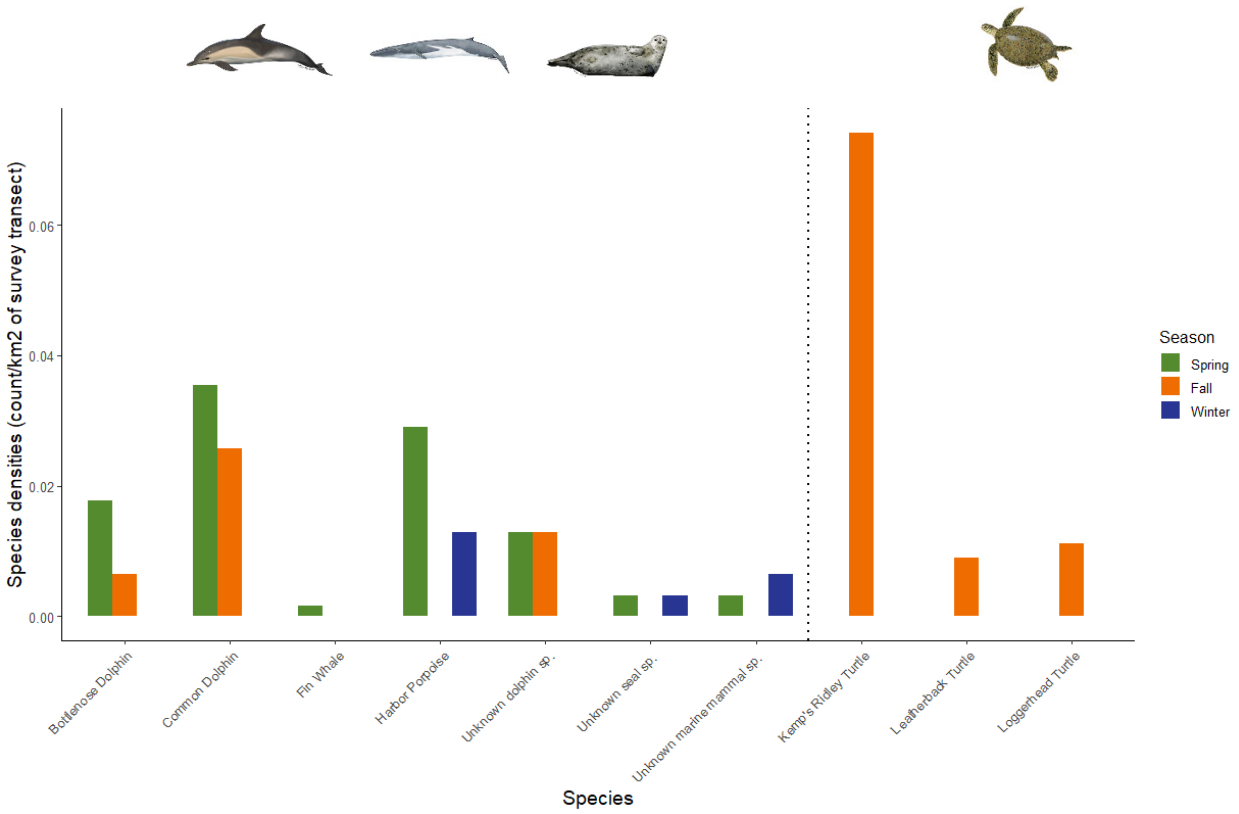

Figure 4: Seasonal marine mammal species naive densities (uncorrected count/km^2 of survey transect) in the Atlantic Shores Lease Area OCS-A 0499.

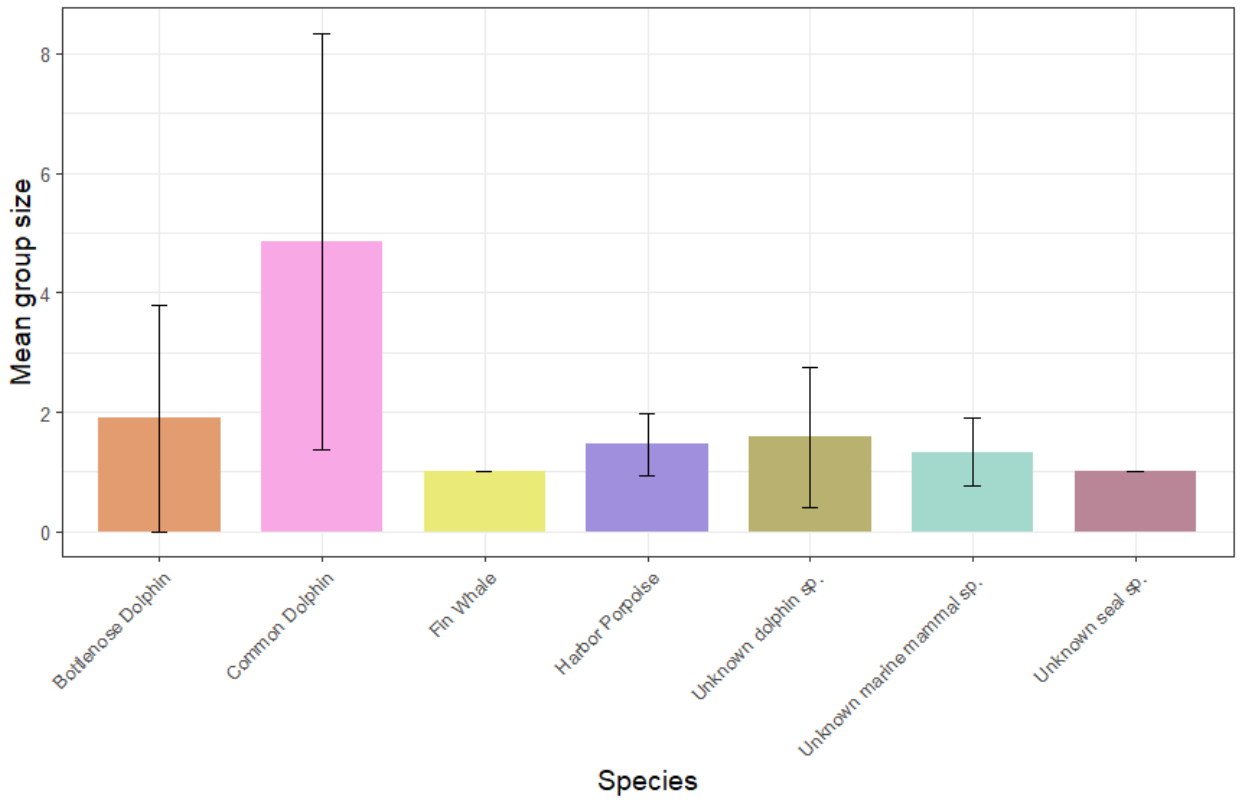

Figure 5: Mean group size across marine mammal species and taxonomic groupings in the Atlantic Shores Lease Area OCS-A 0499. Standard deviation bars are also displayed.

5. REFERENCES

Brown, M. W. and M. K. Marx. 2000. Surveillance, monitoring and management of North Atlantic right whales, *Eubalaena glacialis*, in Cape Cod Bay, Massachusetts: January to mid-May, 2000. Final report. Division of Marine Fisheries, Boston, Massachusetts. 52pp. Available: https://www.mass.gov/doc/surveillance-monitoring-and-management-of-north-atlantic-right-whales-eubalaena-glacialis-in-1/download. Accessed 11 August 2022.

Cole, T. V. N., Hamilton, P., Henry, A.G., Duley, P., Pace, R. M. III, White, B.N., and T. Frasier. 2013. Evidence of a North Atlantic right whale *Eubalaena glacialis* mating ground. Endangered Species Research 21:55–64.

Conserve Wildlife Foundation of New Jersey. 2021. New Jersey Endangered and Threatened Species Field Guide. Available: http://www.conservewildlifenj.org/species/fieldguide/. Accessed: 20 August 2022.

Bureau of Ocean Energy Management (BOEM). 2022. Ocean Wind 1 Offshore Wind Farm Draft Environmental Impact Statement. Office of Renewable Energy Programs. Available: https://www.boem.gov/renewable-energy/state-activities/ocean-wind-1-draft-environmental-impact-statement-deis-commercial. Accessed 10 August 2022.

Curtice, C., J. Cleary, E. Shumchenia, and P. N. Halpin. 2019. Marine-life Data and Analysis Team (MDAT) technical report on the methods and development of marine-life data to support regional ocean planning and management. Prepared on behalf of the Marine-life Data and Analysis Team (MDAT). Available: http://seamap.env.duke.edu/models/mdat/MDAT-Technical-Report.pdf. Accessed 11 August 2022.

Hayes, S. E., Josephson, E., Maze-Foley, K., Rosel, P. E., and J. Wallace, eds. 2022. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2021. U.S. Department of Commerce. National Oceanic and Atmospheric Administration. National Marine Fisheries Service. Northeast Fisheries Science Center. Woods Hole, MA. Available at: https://media.fisheries.noaa.gov/2022-08/U.S.%20Atlantic%20and%20Gulf%20of%20Mexico%202021%20Stock%20Assessment%20Report.pdf. Accessed: 11 August 2022.

Kenney, R. D., and K. J. Vigness-Raposa. 2010. Marine mammals and sea turtles of Narragansett Bay, Block Island Sound, Rhode Island Sound, and nearby waters: an analysis of existing data for the Rhode Island Ocean Special Area Management Plan. In: Ocean SAMP, Vol 2. Rhode Island Coastal Resources Management Council, Wakefield, RI.

New Jersey Department of Environmental Protection (NJDEP). 2010. Ocean/Wind Power Ecological Baseline Studies January 2008–December 2009. Final Report. Prepared for New Jersey Department of Environmental Protection Office of Science by Geo-Marine, Inc., Plano, Texas. Available: https://dspace.njstatelib.org/xmlui/handle/10929/68435. Accessed: 23 August 2022.

Northeast Fisheries Science Center (NEFSC) and Southeast Fisheries Science Center (SEFSC). 2018. 2017 Annual Report of a Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in US Waters of the Western North Atlantic Ocean – AMAPPS II. Prepared by NMFS-NEFSC, Woods Hole, Massachusetts and NMFS-SEFSC, Miami, Florida.

Roberts J. J., R. S. Schick, and P. N. Halpin. 2020. Final Project Report: Marine Species Density Data Gap Assessments and Update for the AFTT Study Area, 2018–2020 (Option Year 3). Document version 1.4. Report prepared for Naval Facilities Engineering Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, NC.

Roberts, J. J., B. D. Best, L. Mannocci, E. Fujioka, P. N. Halpin, D. L. Palka, L. P. Garrison, K. D. Mullin, T. V. Cole, C. B. Khan, and W. A. McLellan. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports 6:22615.

Roberts, J. J., L. Mannocci, and P. N. Halpin. 2017. Final Project Report: Marine Species Density Data Gap Assessments and Update for the AFTT Study Area, 2016–2017 (Opt. Year 1). Document version 1.4. Report prepared for Naval Facilities Engineering Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, NC.

Roberts, J. J., L. Mannocci, R. S. Schick, and P. N. Halpin. 2018. Final Project Report: Marine Species Density Data Gap Assessments and Update for the AFTT Study Area, 2017–2018 (Opt. Year 2). Document version 1.2 - 2018-09-21. Report prepared for Naval Facilities Engineering Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, NC.

Thorne, L. H., Foley, H. J., Baird, R. W., Webster, D. L., Swaim, Z. T., and A.J. Read. 2017. Movement and foraging behavior of short-finned pilot whales in the Mid-Atlantic Bight: Importance of bathymetric features and implications for management. Marine Ecology Progress Series 584:245–257.