INTRODUCTION

• The Lower Chesapeake Bay and nearshore Virginia (VA) waters surrounding the mouth of the bay represent the busiest hub of naval activity on the United States (U.S.) east coast.
• In 2013, we initiated a sea turtle tagging project with the Virginia Aquarium & Marine Science Center (VaqF) for this east coast region. Loggerhead and Kemp’s ridley sea turtles were mainly targeted since they are the most abundant and regularly occurring species in VA [2]; [3]; [4].
• One of the primary objectives was to assess occurrence and habitat use for loggerhead and Kemp’s ridley turtles using acoustic telemetry.
• Acoustic tags (Vemco) were used to leverage the existing underwater acoustic receiver array (Figure 1) that is located within the Chesapeake Bay and off the VA coast. The array is maintained by the U.S. Navy and other members of the Atlantic Cooperative Telemetry Network.

METHODS: TAGGING

• Turtles were obtained in three ways between 2013-2017: direct capture by researchers (n=1), incidental capture in commercial fisheries (n=6), or rehabilitation and release of stranded animals (n=59).
• Only turtles deemed healthy/normal (e.g., no deformities, blindness, etc.) were tagged.
• Acoustic tags were attached to the caudal vertebral or marginal scutes of the carapace using just epoxy or both coated steel wire and epoxy (Figure 2). Several models of Vemco tags (V9, V13, and V16) were deployed; the specific model depended on the size of the turtle.

METHODS: COMPARATIVE SPECIES ANALYSIS

• Signals or ‘pings’ from the acoustic tags were recorded by receivers as turtles passed nearby (at a range of up to 700 meters- based on VAQF’s acoustic telemetry detection experiment [1]).
• Aside from receiver location, date and time for each detection was also recorded.
• Data were archived and downloaded from the array.
• Data were summarized by number of and percent detections per receiver/region/military zone in each season/year when the tagged turtles were present in the area for each species.
• Seasons were defined as Winter (January-March), Spring (April-June), Summer (July-September), and Fall (October-December).
• Calculated deployment duration (deployment date to last detection) and days detected for residency time analysis.

RESULTS

• A total of 66 turtles were tagged in 2013-2017 and 2017.
• Loggerheads: n=25
• Kemp’s ridleys: n=41
• 19 loggerheads and 31 Kemp’s ridleys were detected in the receiver array.

• On average, loggerheads were slightly detected more on days with more detections, and had a longer deployment duration (Table 1).
• There was no significant difference between the two species for number of detections (t=2.01, p=0.54), number of days detected (t=2.01, p=0.79), and deployment duration (t=2.06, p=0.30).
• 2 loggerheads were detected in two consecutive years (turtles migrate south of the study area after Fall of each year) – VAQF20131201: first detected in October 2013 and then again from May-June 2014 – VAQF20150203: first detected from July-October 2015 and then again from May-June 2016.

• Both species were initially detected in Spring, with detections recorded until Fall (Table 2).
  - Kemp’s ridleys were detected more (58% detections) during Summer.
  - 91% of loggerhead detections were in Summer and Fall.
  - Habitat use patterns by season (Figure 3):
    - Both species showed movement from the VA coast into the mouth of the Bay.
    - Kemp’s ridleys were detected more between Little Creek and Elizabeth River.
    - Loggerheads: detected more in southern part of the Bay and around James River.

• Calculated deployment duration (deployment date to last detection) and days detected for residency time analysis.
• Both species displayed movement from the VA coast into the mouth of the Bay.
• Differences in deployment duration indicate loggerheads may occur in VA across seasons and exhibit inter-annual site fidelity.
• Results indicate both species utilize the waters adjacent to U.S. Navy facilities in Virginia from Spring to Fall.
• High percent detections at certain military zones (e.g., Little Creek and Elizabeth River) compared to other zones could indicate potential hot spot areas.

• Increased knowledge of the movements, habitat utilization, and seasonality of the sea turtles found in the Lower Chesapeake Bay and nearshore mid-Atlantic will help the Navy with ongoing environmental compliance and conservation efforts.

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REFERENCES