MS Thesis
Department of Environmental Science and Policy
George Mason University

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Defense Location: Exploratory 3301

Title: An analysis of opportunistic data to investigate humpback whale (*Megaptera novaeangliae*) sighting patterns and vessel risk in the northwestern New York Bight

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ABSTRACT

This study formalizes data collected opportunistically on humpback whales in the northwestern New York Bight from 2011-2016. This area is of significance due to its proximity to New York City and the presence of high levels of anthropogenic activity. Previous data suggest that humpback whales were not historically common in this area. Therefore, documenting their presence is crucial for both short- and long-term management. The most current and consistent data that exist come from Gotham Whale, an organization that collects sightings through whale-watching and anecdotal reports. These opportunistic data were analyzed to better understand humpback whale sighting patterns and the risks posed to them from vessel traffic.

Linear regression showed that both sightings and the number of identified individuals increased significantly from 2011-2016. An analysis of individual sighting histories resulted in a mean occupancy length of 35.1 days, a mean occurrence rate of 3.93 days, and a mean site fidelity rate of 40% during the study period. Geospatial analyses were used to examine the

overlap between humpback whale sightings and vessel density maps created using AIS data. From this analysis, high-risk areas were identified in New York Harbor and in Ambrose Channel. High densities of sightings were also found along the south shore of western Long Island, NY, coinciding with high recreational vessel activity. To investigate population identity, photographs collected by Gotham Whale were compared to other catalogs in the North Atlantic. It was determined that 28% of humpback whales belong to the Gulf of Maine feeding population. Individuals were also matched regionally to Montauk, NY and Cape May, NJ.

This study supports the theory that the United States mid-Atlantic region is becoming increasingly important for humpback whales. Due to the likelihood of negative interactions between vessels and whales, it is essential that mitigation measures in the northwestern New York Bight be initiated as quickly as possible. A combination of vessel speed restrictions, passive acoustic monitoring, real-time sighting alerts, and educational programs for recreational boaters should all be considered in future management.