Preferential Utilization of Rocky Coastline Habitat by Herring Gulls (Larus argentatus)

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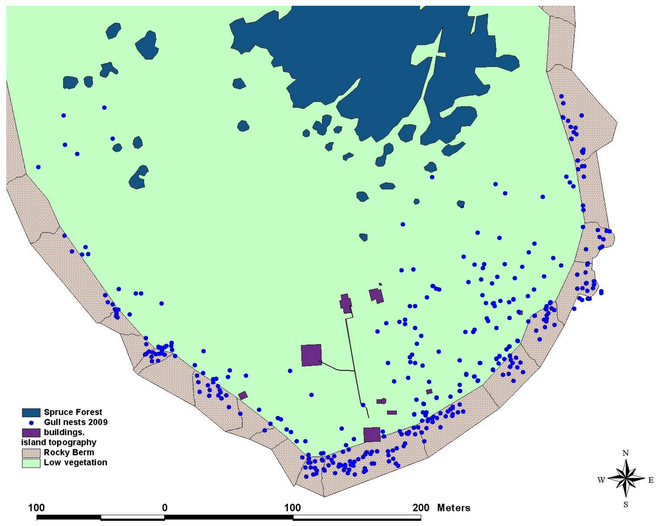
Introduction

The Herring Gull (Larus argentatus) has an extensive Holarctic distribution encompassing many habitat types. Previous studies have been conducted on the reproductive success of Herring Gulls nesting in vegetated versus open areas (Parsons, 1982, Burger, 1984). To our knowledge, research into the utilization of rocky habitats available in the northern range of the Herring Gulls' distribution has not been as widely pursued. On Great Duck Island, Maine (44 – 09' N. Lat. 68 – 15' W. Long.) a breeding population of approximately 1500 Herring Gulls occupies both vegetated meadow and rocky berm habitats. In addition to a large population of nesting Herring Gulls, there are a pair Bald Eagles (Haliaeetus leucocephala), numerous corvids, and Great Black-backed Gulls (Larus marinus) nesting on Great Duck Island, which have been known to prey on both adult and juvenile gulls. In order to isolate possible factors contributing to nesting site selection, this study analyzed the effects of territoriality concerns, presence of nesting Great Black-backed Gulls, and chick survivorship as a function of habitat choice.



Methods

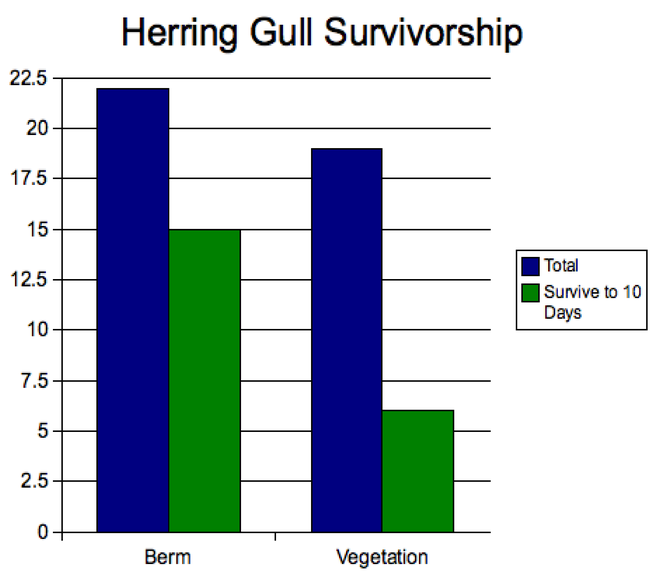
The study was conducted on Great Duck Island, Maine. The island had been previously mapped into a GIS datatbase including basic substrate types, vegetation, and nesting area. In 2009 the southern colony of gulls was mapped using a Trimble differentially correcting GPS accurate to 0.70 m. 30 15x15 m. quadrats containing a total of 62 occupied nests were randomly selected using ArcMap. For the 40 pairs of nearest neighbors to these nests elevation and presence of any visual obstructions were recorded. Territory size was determined as nearest neighbor inter-nest distance calculated by the AlaskaPak module for ArcMap.

Methods Continued

Elevation of nests were measured from sea level using a total station and prism accurate to 0.01 m. A laser pointer mounted at standing Herring Gull eye height and target were used to identify obstructions between nearest neighbor nests. These results were analyzed in relation to the inter-nest distance to determine any degree of correlation.
For all 15m x 15m quadrats occupied in either 2008 or 2009, the density of nests, the presence or absence of Great Black-backed Gull nests in the quadrat, and the habitat type (vegetation or berm) were recorded. 41 Herring Gull chicks were haphazardly selected, and banded upon hatching. 22 of the chicks were from berm habitat nests and 19 from vegetation habitat nests. Daily weight measurements were taken if a chick could be found. For the purposes of analysis, survival was defined as a chick being found on or after the tenth day from hatching.
Statistical analyses were conducting using Systat 12.0.

Results

Herring Gulls showed a statistically significant preference for berm habitat for nesting (χ^2= , df=1, P<.01). Average nearest neighbor inter-nest distances (±SD) were were 3.056m ±1.573m in the rocky berm habitat as compared to 7.336m ± 2.805m in the vegetated habitat. This was a statistically significant difference (K= , P<.01)
Elevational differences were not found to significantly correlate with inter-nest distances (ñ=.147, P>0.05). Presence of obstructions did not significantly predict inter-nest distance (K= , P=.08). Neither presence of a Great Black-backed Gull nest in 2009 or in 2008 accurately predicted nesting density (K= P=.156 and K= P=.184, respectively). Of the original 22 berm chicks, 15 survived to 10 days. Out of 19 banded vegetation habitat chicks, 6 survived to 10 days. The berm habitat chicks were very significantly more likely to survive than the chicks from vegetation nests (χ^2= , df=1, P=.019).



Discussion

Analysis of historical and current nesting distribution indicates that Herring Gulls settle preferentially in the rocky coastline habitat. In 2009, sixty-four percent of the southern colony's nests were located on granite slabs or among boulders, although this habitat type represents less than twenty-five percent of the total colony area. Herring Gulls nested at higher density, even in the presence of the predatory Great Black-backed Gulls, while selecting this habitat. A possible explanation for this is better protection from extreme weather and predators, including Bald Eagles and corvids. Observation of predation by Eagles indicated it could be as high as five predation attempts per day. Experience with trying to locate chicks illustrated the greater usefulness of rocky substrate for hiding over the vegetation. The statistically significant higher rate of survivorship of chicks from the rocky habitat indicates there is a reproductive benefit to utilizing this habitat type not previously seen in studies of Herring Gulls nesting in more southern locations including Massachusetts and New Jersey.

Acknowledgments

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