

Using Pellet Collection and Chick Regurgitation to Determine the Diet of Herring Gulls (*Larus smithsonianus*) on Great Duck Island†

Caroline Brown† Island Research Center, College of the Atlantic, 105 Eden St, Bar Harbor, ME 04609
cbrown@coa.edu



Introduction

Great Duck Island is a nesting seabird island located in the Gulf of Maine occupied by over 1200 pairs of gulls. Its proximity to the mainland, 12 km offshore, provides ample opportunity for Herring gulls (*Larus smithsonianus*) to feed themselves and their offspring in intertidal and freshwater habitats. Its location is also close to several nearby fisheries, including those for lobster and tuna. During June and July 2016, I collected regurgitate samples from adults and juveniles and prey remains around nests during the pre-fledging and fledging period. Regurgitation samples were collected during handling of chicks for growth and banding studies. I used a protocol developed on the isles of Shoals (2016) which included five categories of prey for the Herring gulls of Great Duck Island, and examined the remains in greater detail.

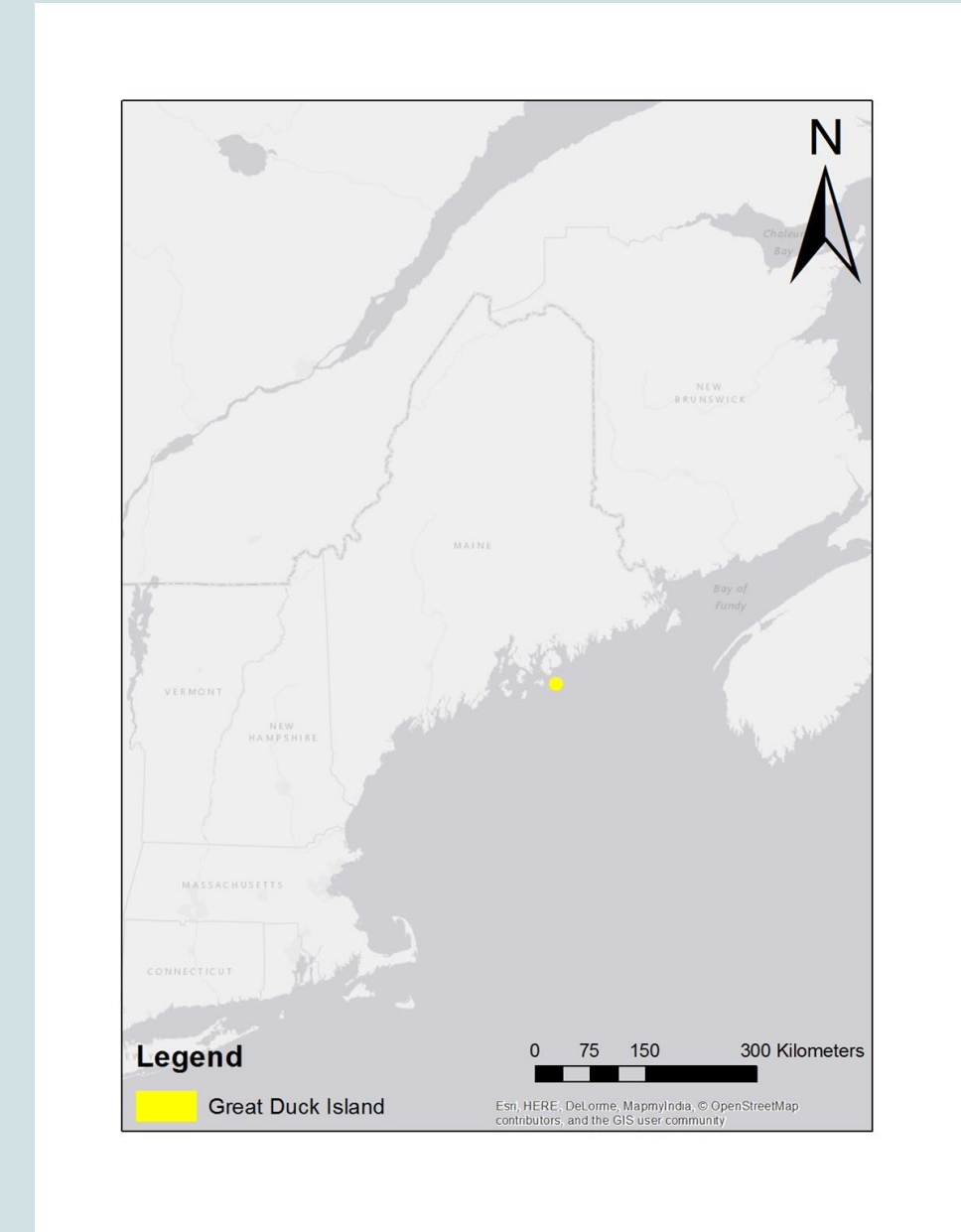


Figure 1. Location of Great Duck Island



Figure 2. Localized crab prey remains from Great Duck Island.

Materials/Methods

Part of my daily tasks included going into the gull colony and measuring the chick's weight and growth. During that time, I would collect samples of regurgitate from the chicks and prey remains from the nest.

Every day myself and the other students stationed at the research station would take shifts observing the gull colony during the daytime. We recorded foraging and feeding behavior throughout the tidal cycle as well as general gull interactions.

Results

I collected a total of 225 samples, of which 119 consisted of Marine Invertebrates. Different periods of chick growth affected what the chicks were being fed and what the adults were feeding on. During the pre-fledging period, adults fed on more local sources of food, including two species of *Cancer* crabs, Rock and Jonah, along with local fish species. Identified fish species adults and chicks fed on include: Pollock (*Pollachius virens*), Acadian redfish (*Sebastes fasciatus*), Rock gunnel (*Pholis gunnellus*), Ocean pout (*Zoarces americanus*), and Atlantic herring (*Clupea harengus*). Species identification was based on Collette *et al.* (2002).

During fledging period, I collected a wider range of remains and observed more instances of berry foraging by adults and chicks. While fish and crustaceans were still the primary food sources, the rapid growth of chicks made both adults and offspring turn to more food sources to supplement dietary needs.

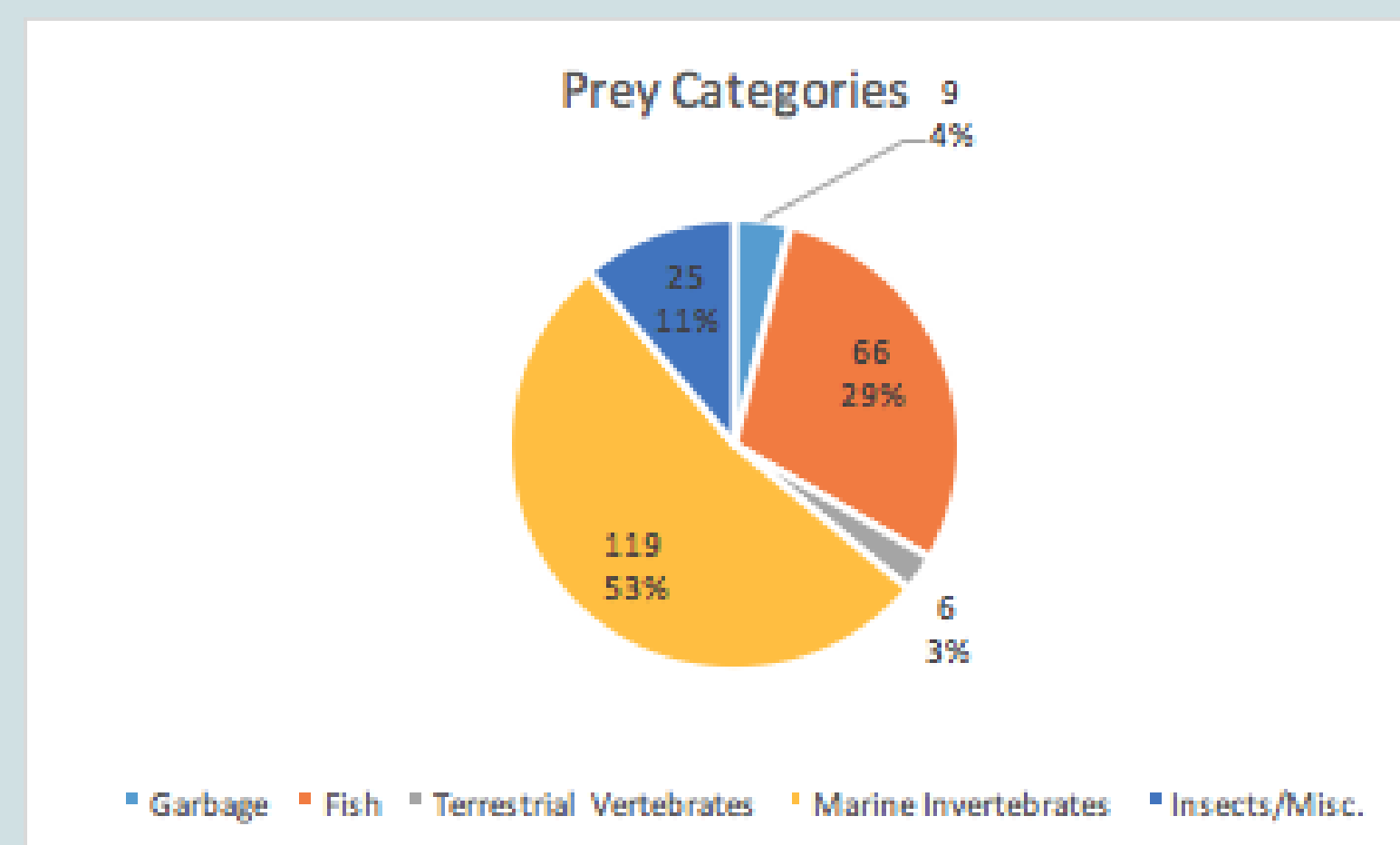


Figure 3. Percentage of prey samples collected.

Garbage	Fish	Terrestrial Vertebrates	Marine Invertebrates	Insects/Berries/Gastropods
fruit	rock gunnel	mammal bones	Jonah crab	maggots
vegetables	acadian redfish		Rock crab	beetle
meat scraps	pollock		Green crab	dragonfly
plastic	ocean pout		shrimp	gastropod
	atlantic herring (bait)		blue mussel	strawberries
	unknown		horse mussel	blueberries
			green urchin	
			dogwinkle	

Figure 4. Details of broad prey categories.

Crab Carapace Size

The main source of food collected from herring gulls on Great Duck Island in 2016 was the jona crab (*Cancer borealis*) represented by crab carapaces in nests and nesting areas. We also observed gulls foraging for crab along the intertidal. Because of the crab fishery, there is a concern for the future of this food source in the Gulf of Maine region. Regulations for the Maine fishery dictate that crabs no smaller than 120 mm can be harvested. While the spread of carapaces for *C. borealis* were for the most part smaller than that minimum (Figure 5), fisheries take of larger crabs will inevitably impact juvenile numbers. In addition there is concern in the Gulf of Maine over rising ocean temperatures and its effect on crustaceans.

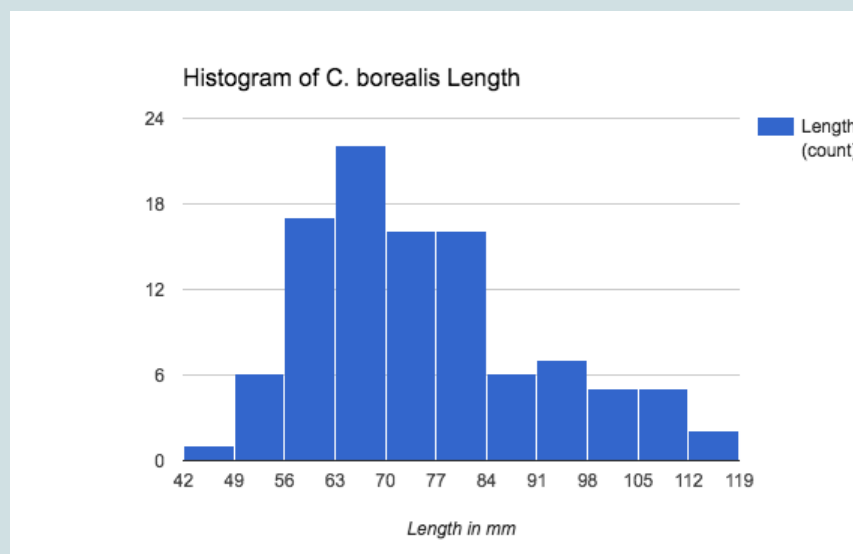


Figure 5. *C. borealis* carapace length.

Discussion

Herring gulls on Great Duck Island ate a variety of local food, collected both near and far. Early in the season, adult gulls fed largely on local food, with a greater use of more non-anthropogenic food sources, such as crab, fish, and shrimp. However, as chicks began to fledge, the diets became more diverse, with more samples of berries and garbage being collected or seen in our observations.

The herring gulls of Great Duck Island are opportunist feeders. The proximity of the island to nearby fishing grounds (I observed gulls around lobster boats within 200 m. of the colony) allowed adults to fly to fishing vessels and secure discarded bait fish for meals. Three times over the course of the 2016 field season I also observed gulls taking advantage of schools of fish being forced to the surface by harbor porpoise. While this is not as reliable a foraging strategy as the omnipresent lobster boats, it reveals the birds' ability to adapt to sudden local increases in available food.

Other literature (Hunt and Hunt, 1973) has noted the influence of man's waste as a source of food for herring gulls. While there was not as many garbage samples collected on the island and there was evidence of Great Duck Island adults visiting a nearby garbage transfer station through color band sightings and GPS tagging, there was little physical evidence in regurgitate of gulls feeding on non-anthropogenic sources other than bait.

Literature Cited

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