



The Impact of Bald Eagle Predation on Herring Gull Survivorship in Maine, USA

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INTRODUCTION

Local Herring Gull (*Larus argentatus*) populations in Maine declined over 60% between 1996 and 2008, with several in-shore nesting colonies being completely abandoned (Anonymous 2008). In the same time period, Maine's Bald Eagle (*Haliaeetus leucocephalus*) population more than doubled to 450 breeding pairs which concentrate along the coast (Todd and Meehan 2010). Bald eagles living on the coast rely primarily on seabirds for food, and take advantage of the chicks of these other species for easy prey (Todd et al. 1982, Anonymous 2008). I assessed the role of Bald Eagle presence and predation in the decline of Herring Gull colonies throughout mid-coast Maine, using one island in particular to observe eagle and gull behavior.

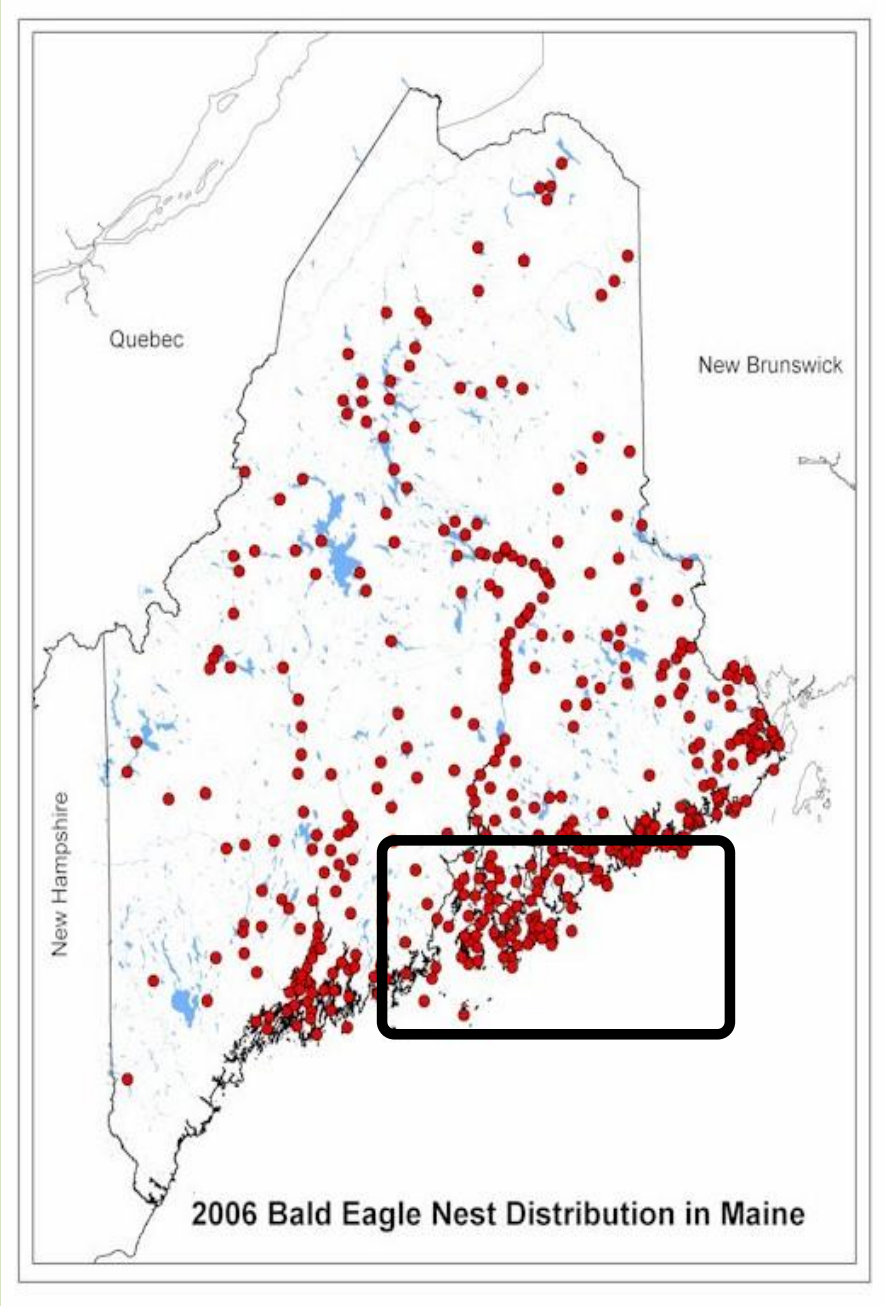


Figure 1. Red dots mark eagle nest locations, and the black box outlines my study area. Image from www.maine.gov/ifw.

METHODS

Regional Trends

50 years of gull population estimates were assembled for nine islands in mid-coast Maine. Each of these islands was surveyed by 3 to 9 people who walked in a line through a colony and counted all eggs and chicks present. Ground counts were conducted in 2011 and 2012 while the gulls were still incubating eggs, and some islands were revisited late in the breeding season to assess chick survivorship.

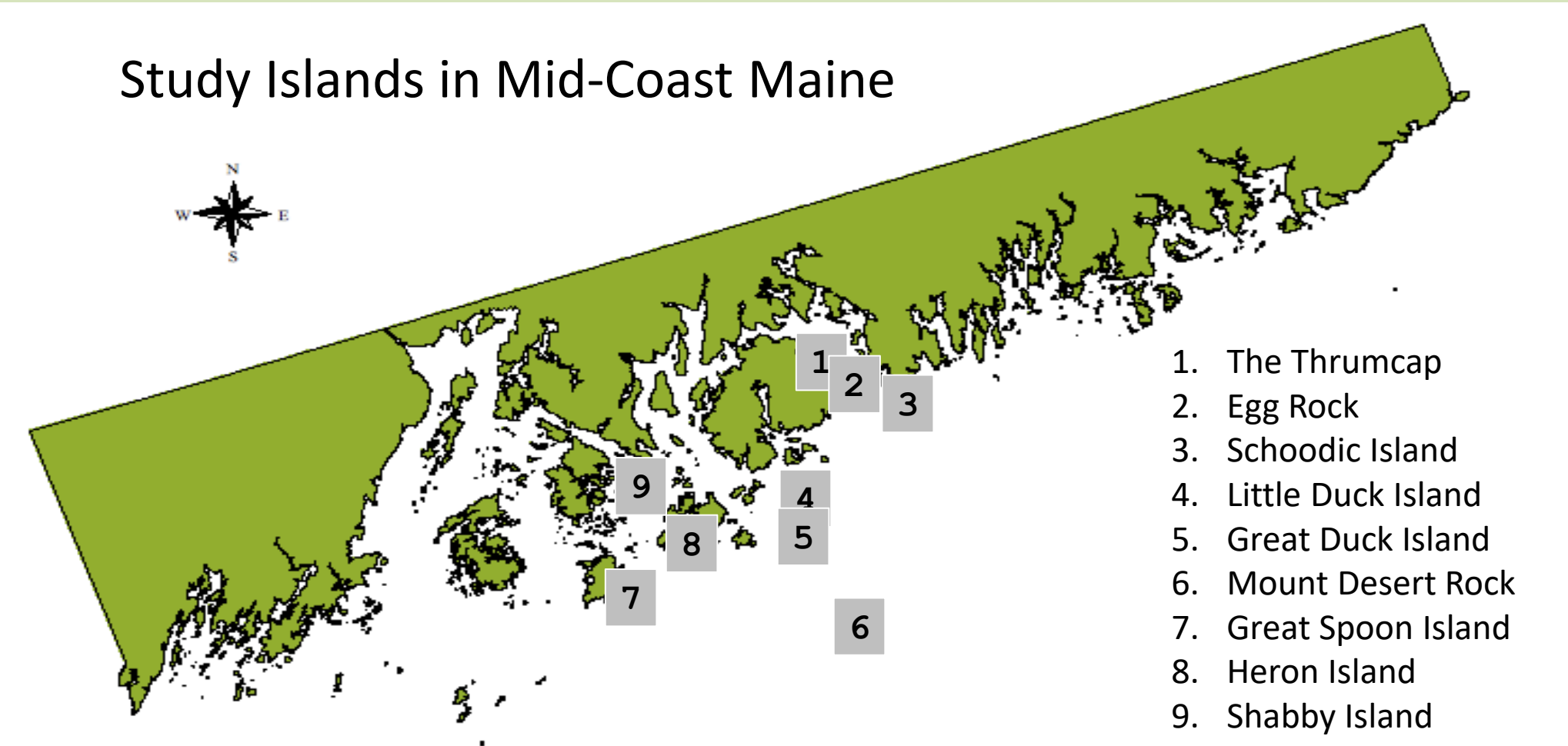


Figure 2 shows all islands surveyed in 2011 and 2012.

Case Study: Great Duck Island

Great Duck, one of the 9 islands analyzed for changes in gull population, is where our field crew was stationed for the summers of 2011 and 2012. It is 220 acres, located 12 miles offshore, and has maintained a steady gull population (approximately 1,100 pairs) over the past decade. One pair of eagles has intermittently occupied the island since 1984. Over 15 weeks in 2011 and 2012, gull chick weight was recorded every other day at 63 focal nests and gull behavior was observed from a tower or blind for up to eight hours per day, primarily at dawn and dusk. The number of eagle sightings in the southern half of the island was also tracked, and eagle behavior was noted.

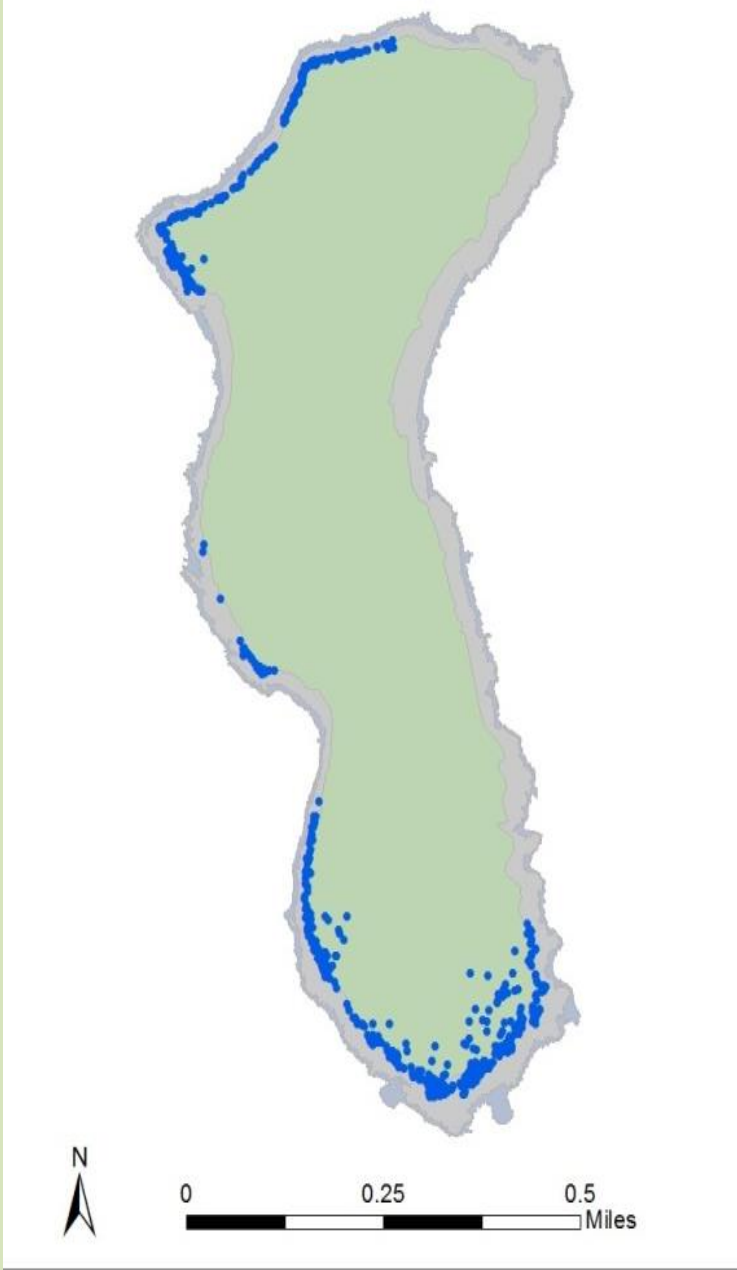


Figure 3. Great Duck Island, Frenchboro, ME. The blue dots mark gull nests.



Figure 4. A Bald Eagle flies low over a gull colony on Great Duck Island.

RESULTS

Regional Trends

Of the 9 islands surveyed, 7 have declining gull colonies as compared to surveys conducted by Korschgen (1978) and Anonymous (2008). Of these, 3 have collapsed entirely—gulls laid eggs at the start of the season but chick survivorship was <20%; in all cases, chick remains provided clear evidence of predation, and eagles were seen consistently on 8 of the islands with up to 9 individuals at a time. Mount Desert Rock, the most remote and the only island without a record of eagle sightings, has the fastest growing gull colony.

Observations from Great Duck Island

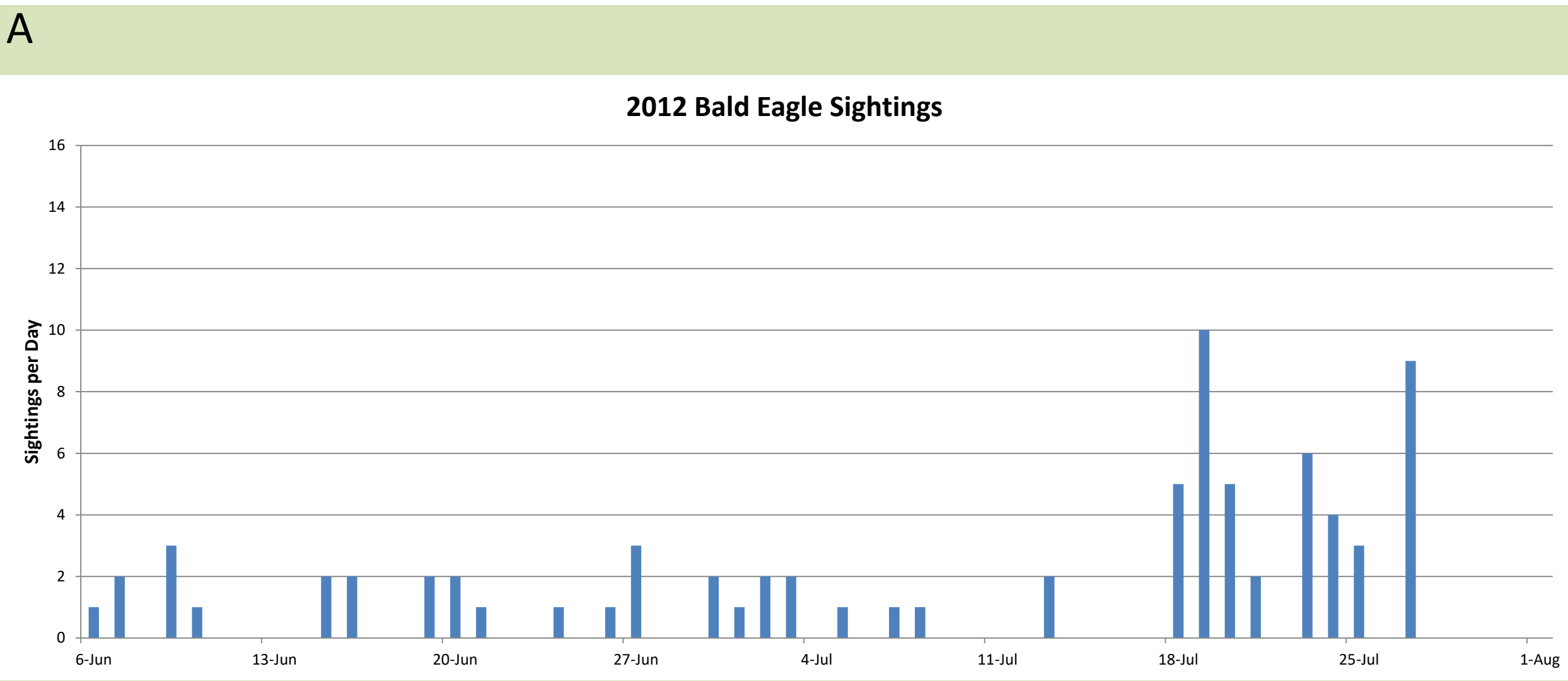
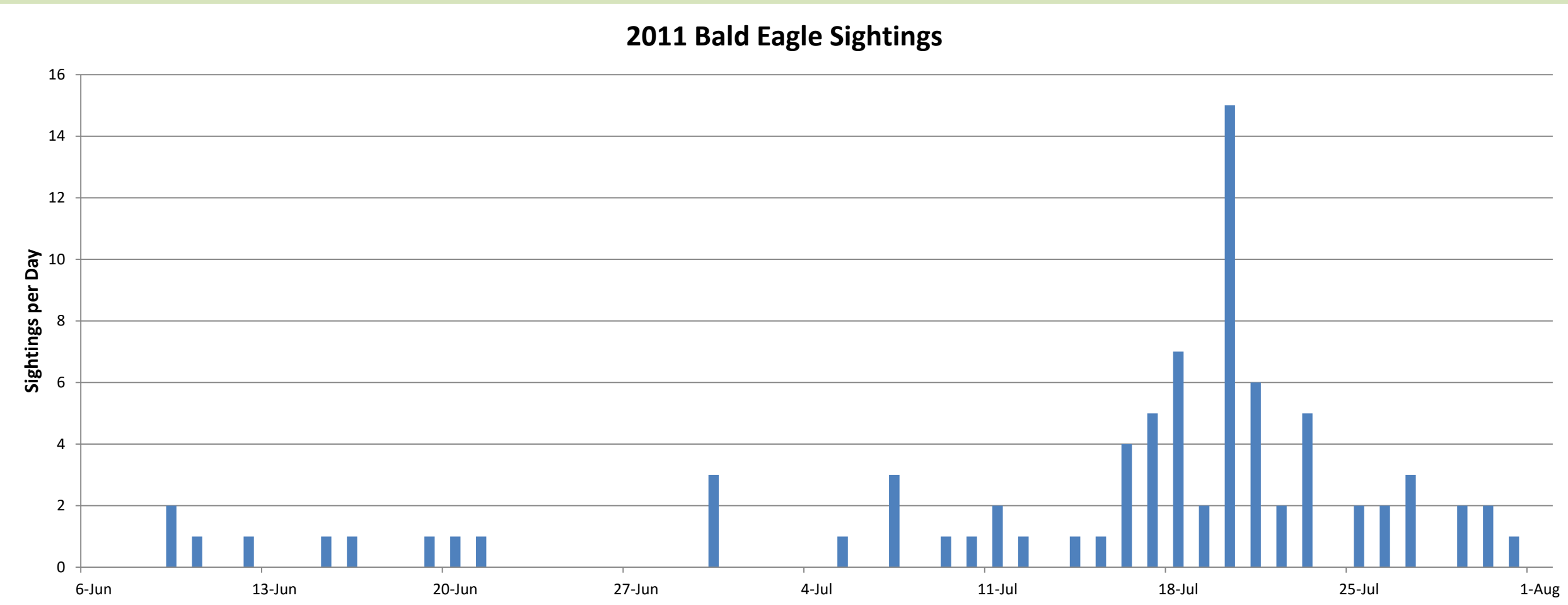


Figure 5A shows the number of eagle sightings recorded at the south end of Great Duck Island in 2011, and 5B shows the number of sightings in 2012. During both years, eagle presence peaked in late July when gull chicks were nearly full-grown.

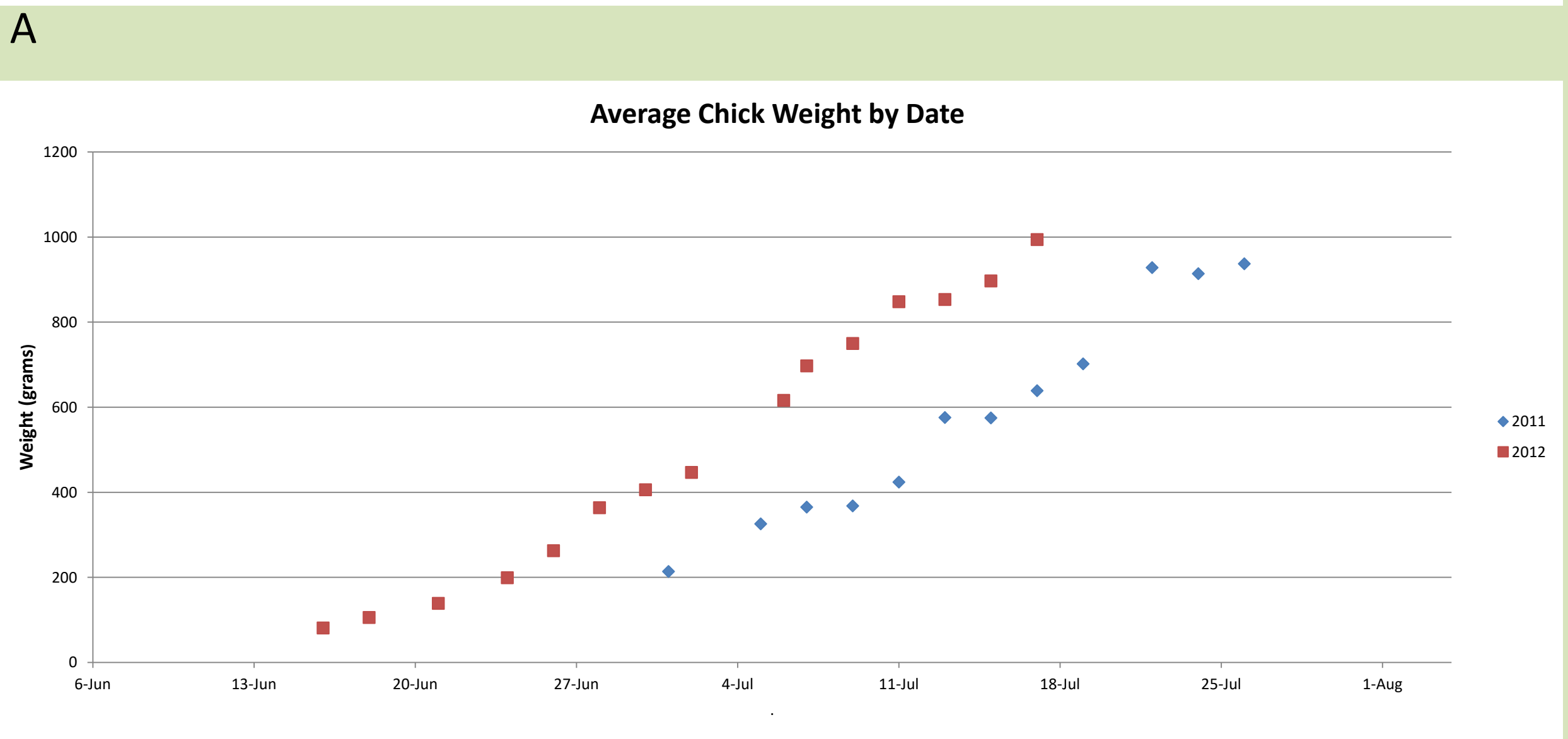
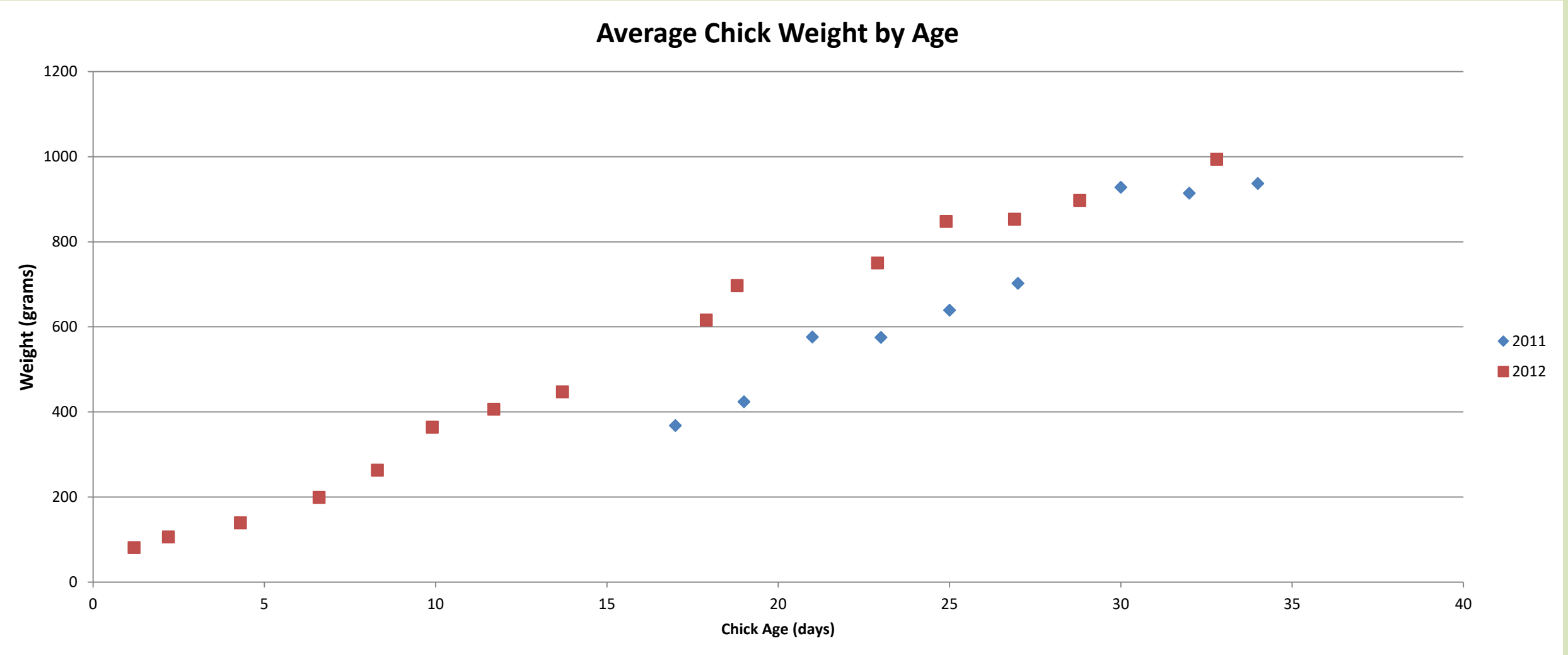


Figure 6A compares average gull chick weight by chick age in 2011 versus 2012; At any given age, chicks weighed more in 2012. Figure 6B compares average gull chick weight by date in 2011 versus 2012; chicks weighed up to 300g more for a given date in 2012.



Figures 7 and 8. The adult Herring Gull died of a puncture wound and was found near 7 dead pre-fledglings after an eagle landed in the colony.



DISCUSSION

Population surveys in mid-coast Maine suggest that gulls are declining rapidly. Bald Eagle predation clearly contributes to this decline, as evidenced by the total collapse of 3 out of 9 colonies surveyed in 2011-2012. Another possible explanation for the decrease in gull numbers is the decline in food sources. 94% of landfills closed in Maine between 1987 and 2000 (Anonymous 2008), removing these sites as a potential feeding grounds. By-catch from fishing was also an important source of food for nesting gulls, but the industry has declined with the collapse of certain fish species and fewer fisherman are throwing bait over the side of the boats because the bait itself has become very expensive.

These changes in food surely have impacted the gull population, but it is not enough to explain the last decade's declines: the covering of landfills and altered fisheries practices have taken place over 25 years. Therefore I suggest that the rising eagle population is having an increasingly significant impact on gull survivorship, especially for chicks. We can test this conclusion in coming years with continued population monitoring. Additionally, observations from Great Duck suggest that eagles stay near shore until the seabird colonies closest to the eagles' nests are depleted. Should these colonies continue to decline, I would predict that eagle sightings on Great Duck will peak earlier in the breeding season.

For 50 years, our land policies have favored the once-endangered Bald Eagle while limiting the population of "nuisance" gulls. The stated changes to eagle and gull populations call our current management practices into question.

ACKNOWLEDGEMENTS

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