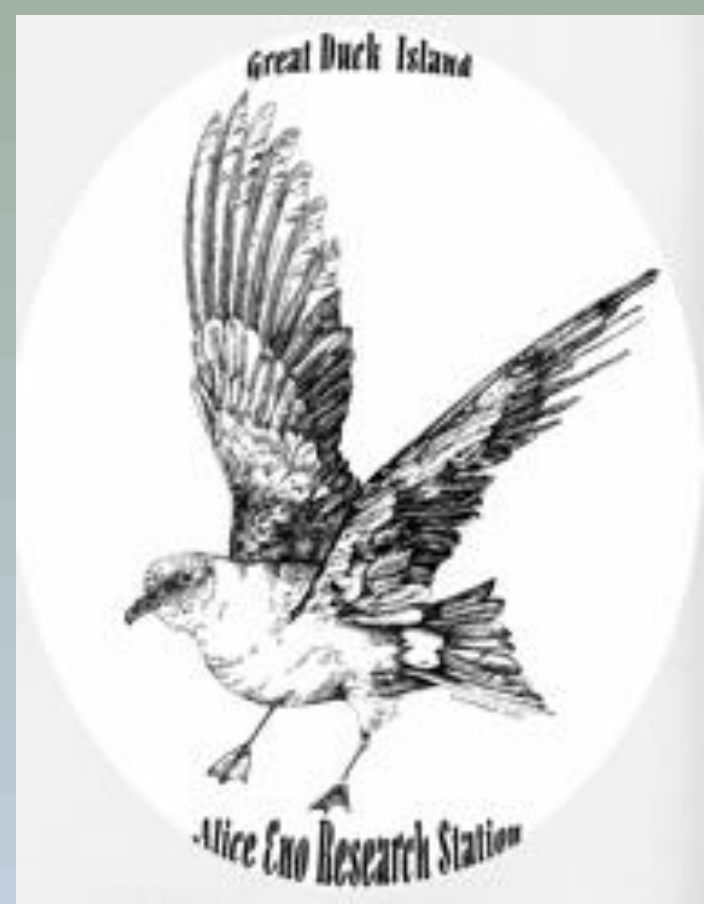




Colony collapse in Herring and Great Black-backed Gulls: an assessment of possible causes and consequences.

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Introduction

Islands in the Gulf of Maine currently provide nesting sites to as much as 50% of seabirds nesting in the contiguous United States east of the Mississippi. Species include Herring and Black-backed Gulls, Black Guillemots, Double-crested and Great Cormorants, several species of terns, and Leach's Storm Petrels. Herring and Black-backed Gull (*Larus argentatus* and *L. marinus*) populations in parts of the northeastern United States have declined significantly over the past quarter century. Aerial surveys conducted by the U.S. Fish and Wildlife Service in Maine in 1995-6 and 2008 suggest that this decline is non-uniform, with some colonies increasing while others decrease or are eliminated entirely. In general a pattern of near-shore losses is only partially compensated for by off-shore increases. Boat and nest counts of 8 colonies in mid-coast Maine indicate that this trend is continuing. Colonies recorded as healthy or even increasing in 2008 had been abandoned by 2012, or showed few or no fledglings. In some cases colonies that had persisted for decades were completely abandoned during the course of a single season, while others declined more gradually.

Methods

Islands were selected as part of an ongoing collaborative study with the U.S. National Park Service on the impacts of sea-level rise on seabird populations. Data on previous gull populations were obtained from counts in Erwin and Korschgen (1979) Schauffler (1998) and Anonymous 2010. Herring and Black-backed Gull nests were "lumped" for counts as precise determination of species can be problematic. The majority of gulls on all islands consisted of Herring Gulls. Preliminary estimates of recent populations were obtained by boat counts in June 2011. These counts were supplemented in June 2012 by ground nest counts in which a team of 3-8 individuals moved in line across all nesting areas for a given island recording clutch size and/or the presence of hatchlings. Counts were timed to coincide with peak nesting based on results from previous years. Only nests with eggs or hatchlings were included in nesting population estimates. Census methodology varied somewhat between prior counts, with some islands being counted from the air and others with ground counts. This renders precise comparisons problematic, but it seems safe to assume that all counts are within an order of magnitude of actual numbers. For analytical purposes, islands were classified as "inshore" –within bays and/or less than 1km, "near-shore" –located 1-5 km from major landmasses, and "offshore" –greater than 5km from another island or coast.

Results

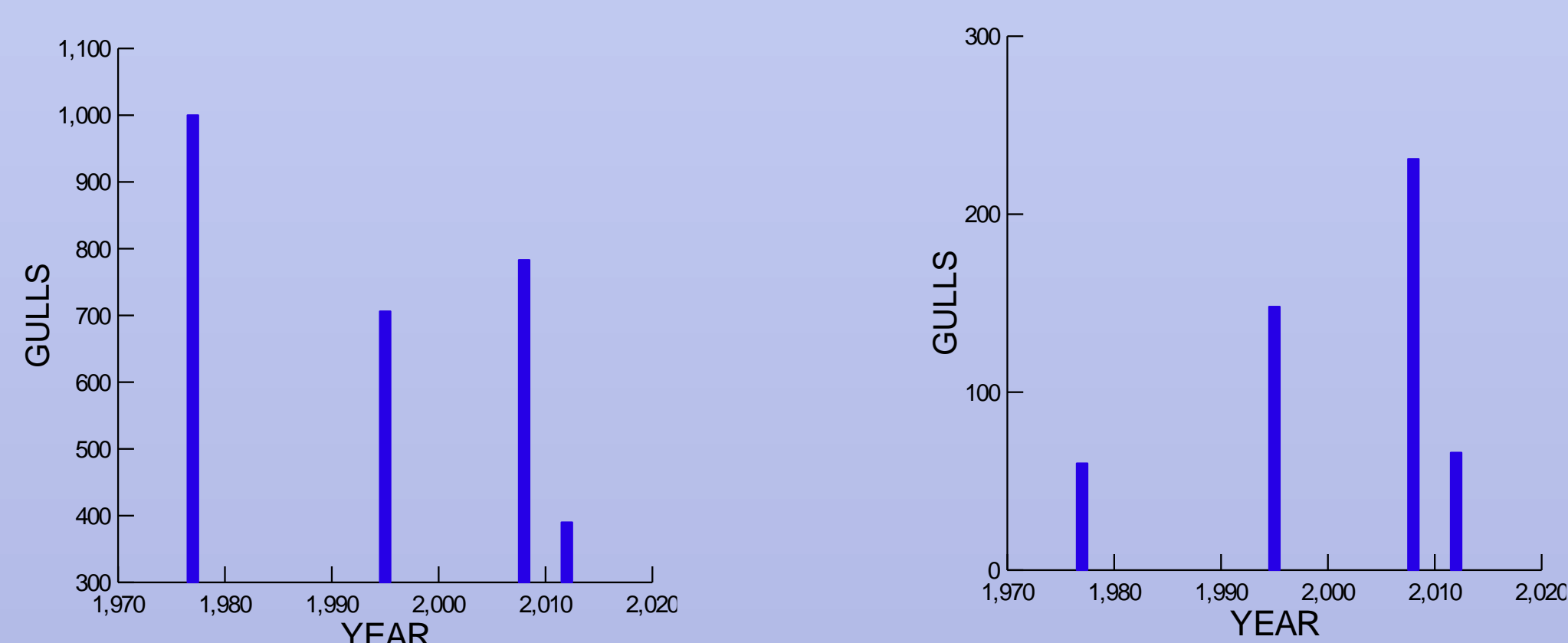


Figure 1a. Thrumcap and Schoodic islands. Both islands are near-shore--within 1km of the coast.

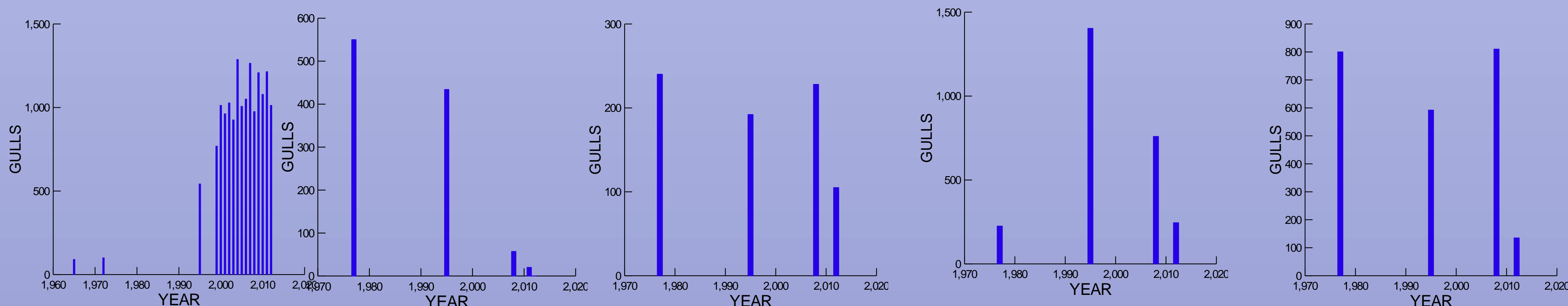


Fig 1b. Great Duck, Little Duck, Shabby, Heron and Great Spoon islands. All are between 1 and 5 km of other islands or the coast. Great Duck is the furthest off shore, Great Spoon the closest to other islands

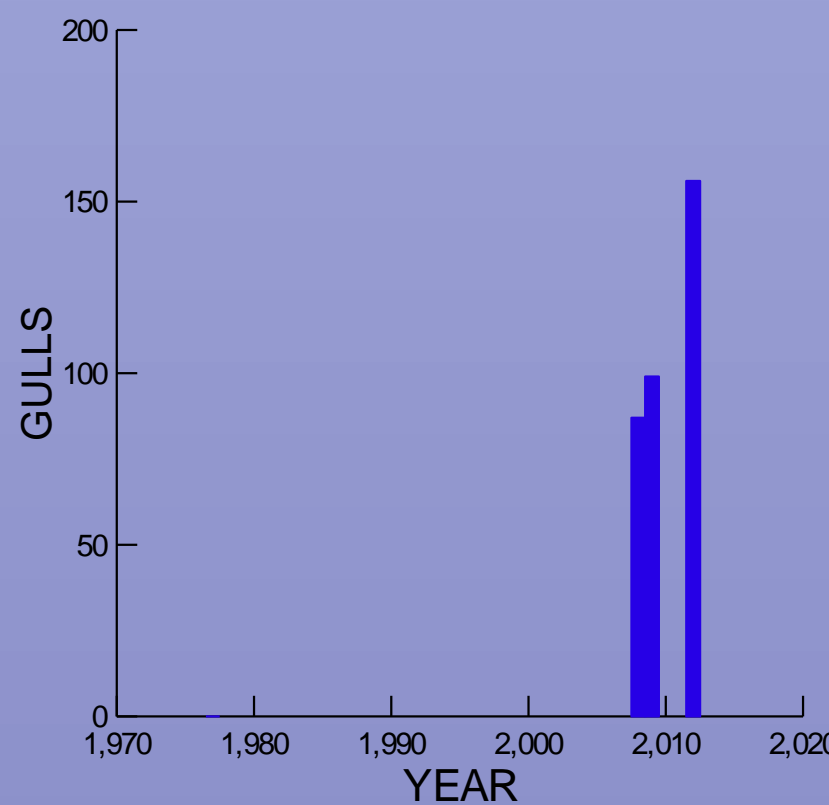


Fig 1c. Mount Desert Rock. Located 18 km from the nearest island and 30 km from the mainland. Prior to 2000, gulls were prevented from nesting on the island.

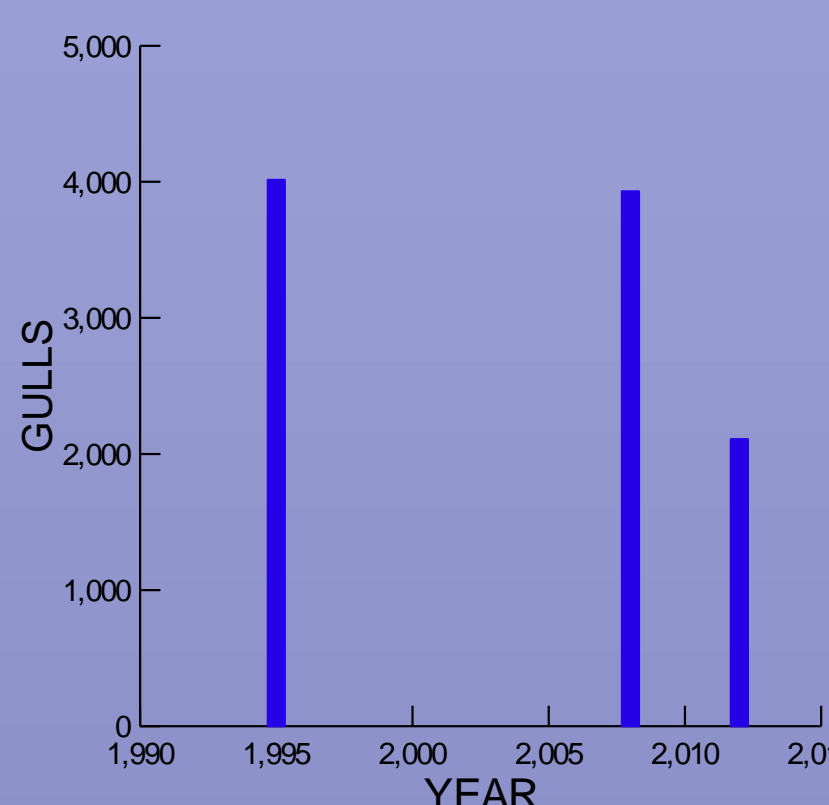


Fig 1d. All Islands combined.

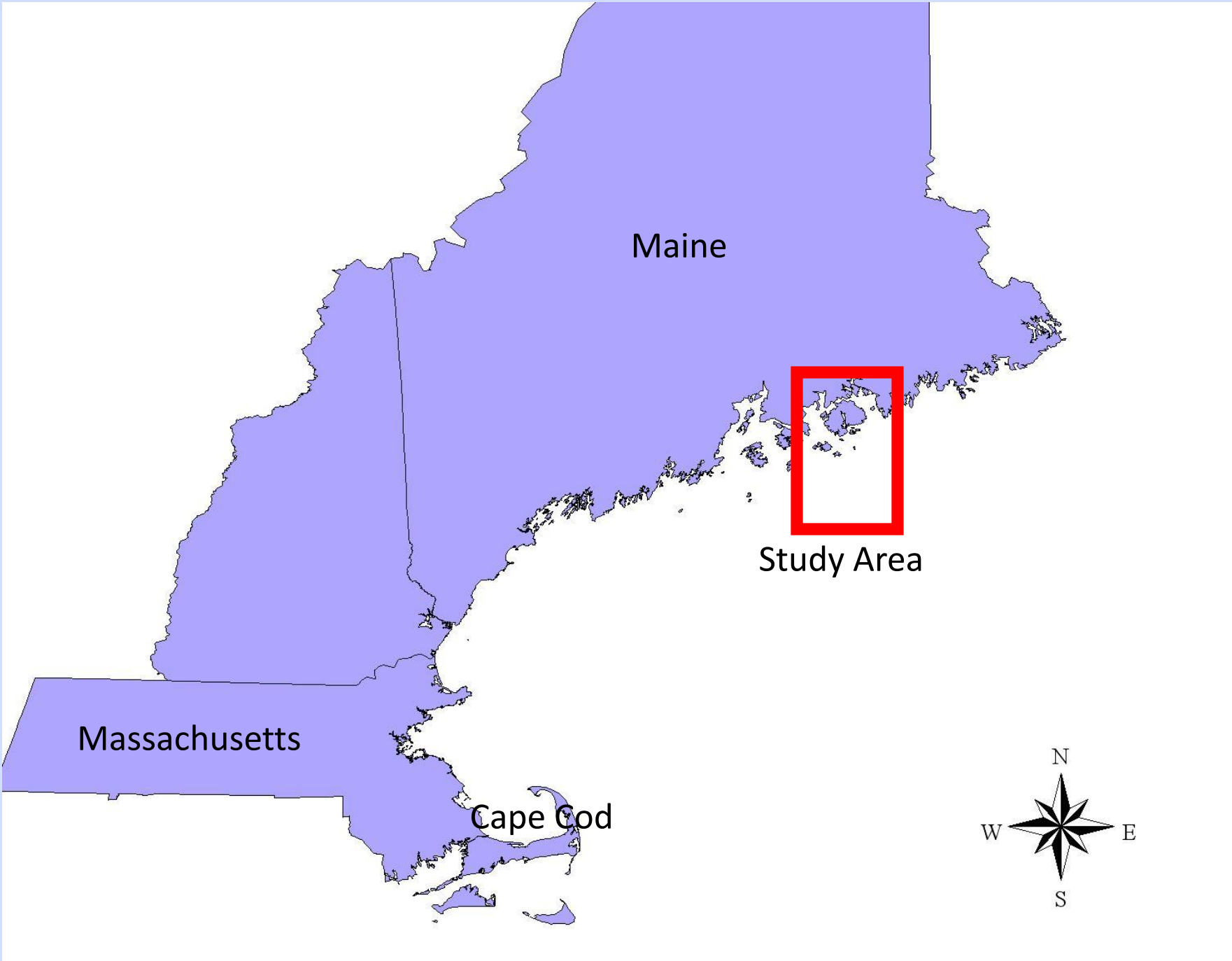


Fig 2a Location of Study

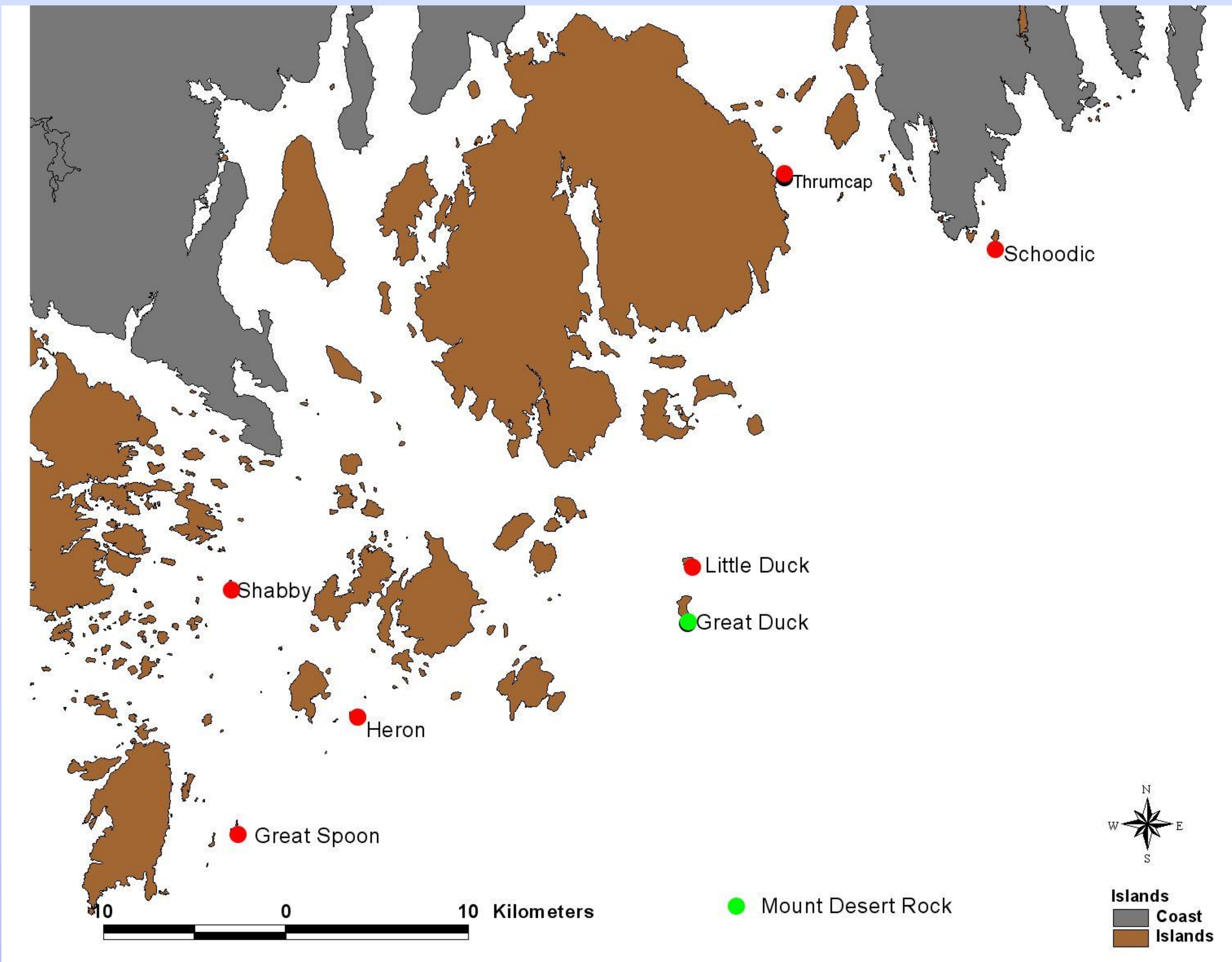


Fig. 2b Study islands. Islands in red lost gulls between 1995 and 2012, Islands in green gained gulls in the same period



Fig 3a. Gulls feeding around lobster boats, early 2000s. Recently many lobstermen have begun recycling bait, thus eliminating a significant gull food source.



Figure 3b. Bald Eagle attack on a gull on Great Duck island

Discussion

Overall, gull numbers within the study islands declined by nearly 50% between 1995 and 2012. Some of this decline may be explained by differing survey methods, but the overall trend is clearly downward. In islands that declined, the pattern of loss differed somewhat, although in each case the greatest decreases occurred in the last four years and in some cases (e.g. Little Duck) involved the near extirpation of nesting gulls. Estimates of the impact of declines on future recruitment into the regional gull population are problematic, as only Great Duck, Mount Desert Rock, and Thrumcap were systematically surveyed later in the season for fledgling survivorship. Of these, both Great Duck and Mount Desert Rock (the two most remote islands in the study) showed significant productivity, by contrast only two fledglings were seen on Thrumcap from a beginning-of-season total of 66 nests.

Causes for the decline in nesting gulls are subject to debate. It is generally assumed that the dramatic increases seen in gull numbers during the first part of the 20th century were due to a combination of an end to significant human hunting and eggging, and a dramatic increase in available food in the form of fish "by-catch" and open landfills. It seems reasonable to assume that the current decline in gulls might be explained by a loss of food and/or increase in predation. According to Anonymous (2010), 94% of municipal landfills in Maine were closed between 1987 and 2000. It thus seems unlikely that loss of this food source could adequately explain gull declines that in some cases occurred up to 25 years later. Of perhaps greater relevance to the present situation is the increasingly common practice of lobstermen to "recycle" lobster-bait, rather than simply throwing it overboard where it can be eaten by gulls. Declines in regional herring populations both reduce the availability of "wild caught" prey for gulls and increase the price of lobster bait to a point where recycling becomes the sensible option. Future studies on the frequency with which lobstermen now dump old bait would seem in order. Arguing against the indictment of declining food availability as a fully explanatory factor is the high productivity seen on Great Duck and Mount Desert Rock, where many gulls raised two or even three chicks in 2012.

Besides the potential decline in available food sources, the dramatic increase in Bald Eagle (*Haliaeetus leucocephalus*) numbers in the past 20 years seems likely to play a significant role in gull declines. Eagles were seen on all active gull colonies in every visit in 2011 and 2012. Many of these birds were immature, although mixed groups of up to 9 mature and immature birds were seen on Schoodic Island. As many as 4 eagles were seen on Thrumcap, and clearly predated birds were found on this and other islands. Although the majority of predated birds were fledglings, we also discovered mature gulls (in one case with the remains of an egg in her oviduct) at colony sites. It seems likely that nesting gulls will move after repeated attacks and attempt to nest elsewhere either within the season or in subsequent years.

The overall pattern of in-shore declines and off-shore increases has been noted by Anonymous (2010) and seems to support the predation hypothesis. Many of the gulls nesting on Mount Desert Rock initiated breeding on site nearly a month later than at other islands. One cannot but wonder if these are not refugees from in-shore colonies that failed due to predation in May or June. Looking into the future, it seems entirely possible that if the study islands prove representative of Coastal Maine in general we may see a general collapse of gull populations in the in-shore waters within the immediate future. At the same time, the importance of off-shore islands to gull conservation will only increase.

Acknowledgements

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Literature Cited

Anonymous. 2010 Maine coastwide census for gulls and cormorants. USFWS Maine Coastal Islands NWR.
Erwin, R. M. and C.E. Korschgen. 1979. Coastal Waterbird Colonies; Maine to Virginia, 1977. U.S. FWS/OBS-79/08.
Schauffler, R. 1998. An estimate of the number of breeding Herring and Black-Backed Gulls on the coast of Maine and a comparison of methods used to count them. Thesis submitted to the faculty, Univ. of Mass. Amherst, MA USA