Late 19th Century Abundance Trends of the Eskimo Curlew on Nantucket Island, Massachusetts

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Abstract.—The Eskimo Curlew (*Numenius borealis*), now near extinction, was intensively hunted during fall migration along the Atlantic coast from Labrador to Long Island through the late 19th century. Scores of post-1850 records from this region have been gleaned from the literature but the rate of population decline has never been assessed. George H. MacKay's shooting journal, which has been largely overlooked, includes quantitative data on curlew abundance trends from 1875 to 1897 on Nantucket Island, Massachusetts. MacKay observed 650 curlews and his party bagged 87 during 231 hunting days logged during the flight period (21 August-2 October) over 22 hunting seasons. The last major flights were observed in 1881. Although he continued to hunt enthusiastically through the early 1890s, annual totals of curlews observed by MacKay declined significantly ($r_s = 0.40$, $p < 0.05$) from 1875 to 1897, as did annual bag totals ($r_s = -0.41$, $p < 0.05$). Annual bag totals of American Golden Plovers (*Pluvialis dominica*), which often associated with Eskimo Curlews, also declined precipitously during the period ($r_s = 0.51$, $p < 0.01$). Journal entries suggest that MacKay abandoned shorebird hunting after a string of disappointing seasons in the 1890s. MacKay's journal offers a unique historical perspective on the decline of the Eskimo Curlew, a species about which little additional historical information is likely to be learned. *Received 26 August 2009, accepted 2 January 2010.*

Key words.—American Golden Plover, Eskimo Curlew, Nantucket Island, *Numenius borealis*, *Pluvialis dominica*.

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The Eskimo Curlew (*Numenius borealis*), once abundant, is on the verge of extinction if it is not already extinct (Banks 1977; Gollop *et al.* 1986; Gill *et al.* 1998). The curlew exhibited an elliptical migratory route connecting its Arctic breeding grounds in North America to its wintering range in southern South America. Vast numbers migrated northward through the Mississippi Valley in spring and southward along the Atlantic coast from Labrador to Long Island during fall migration. Steep population declines during the later decades of the 19th century are believed to have stemmed primarily from market hunting in the Mississippi Valley during spring migration. Suppression of prairie fires, conversion of prairie to agriculture, habitat modifications on the wintering grounds and climate change have also been hypothesized as important factors contributing to the decline (Banks 1977; Gill *et al.* 1998). Furthermore, curlews were subjected to intense sport and market hunting during fall migration (Cahoon 1888; Forbush 1912; Swenk 1915), particularly in New England (MacKay 1892:16):

> "At this season [during fall migration] they are considered by epicures the finest eating of any of our birds, and consequently they are watched for and sought after by sportsmen with great perseverance during the very short period that they are expected to pass along this coast during their migration southward."

Although scores of post-1850 records from Labrador to Long Island have been gleaned from the literature (Forbush 1912; Swenk 1915; Gollop *et al.* 1986; Gill *et al.* 1998), it is difficult to determine the rate of population decline because of the scattered and idiosyncratic nature of data sources.

George H. MacKay (1843-1937), an ardent sportsman and conservationist, systematically recorded observations of Eskimo Curlew and American Golden Plover (*Pluvialis dominica*) on Nantucket Island, Massachusetts, from 1872 to 1897 (MacKay 1891; MacKay 1892; MacKay 1893; MacKay 1894; MacKay 1895; MacKay 1896; MacKay 1897; MacKay 1898; MacKay 1899). These publica-

tions have been thoroughly reviewed (Forbush 1912; Swenk 1915; Banks 1977; Gollop *et al.* 1986; Gill *et al.* 1998). Less widely known, MacKay (1929) published a shooting journal which contained data from Nantucket Island that never appeared in his earlier papers or in later compilations. Daily journal entries indicated not only the number of curlews and plovers observed but also the number of birds shot by MacKay's hunting party. As such, MacKay's shooting journal represents a unique historical perspective on the decline of the Eskimo Curlew, a species about which little additional historical information is likely to be learned.

Here, I present a quantitative analysis of McKay's observations and bag totals for Eskimo Curlew with comparative data for American Golden Plover. Numerous entries in MacKay's journal (1929) indicated that curlews and plovers preferred similar habitat, often flocked together, and frequently responded to the same sets of decoys. Analyses of bag totals of American Golden Plover provide a useful index of MacKay's field effort and the continuity of his interest in shorebird hunting after the Eskimo Curlew became rare on Nantucket.

METHODS

MacKay presented his shooting journal in 1926 to John C. Phillips who made a few punctuation and minor wording changes and had 300 copies privately printed (MacKay 1929). An original copy was examined in the library of the Division of Birds, National Museum of Natural History, Smithsonian Institution. Dated journal entries ranged from 1 October 1865 to 16 August 1922, incorporating a 24-year hiatus between 29 August 1897 and 7 October 1921 during which MacKay did not hunt. MacKay hunted shorebirds on Nantucket Island annually from 1872 through 1897 (except 1873 and 1876). Daily journal entries varied from a few sentences to extensive narratives. MacKay often mentioned his hunting companions, weather conditions, hunting itinerary, departure and return times, decoy use and hunting techniques, the number of shorebirds observed, a bag total for his hunting party and observations on the success of other hunters. MacKay was a keen naturalist and readily distinguished in the field the Eskimo Curlew (also referred to as "Dough bird" and "Doe bird") from the larger Whimbrel (*Numenius phaeopus*) by appearance and call notes. During his sporting career, MacKay examined a considerable number of Eskimo Curlew and Whimbrel in the hand. He likewise distinguished the American Golden Plover from Black-bellied Plover (*Pluvialis squatarola*) and often commented on the age of individuals.

I analyzed 270 daily journal entries from 1875 to 1897 (1 August-10 October) in which MacKay indicated he had hunted for Eskimo Curlew and American Golden Plover on Nantucket Island. MacKay made several trips there each fall, each lasting a few days to two or more weeks. He generally returned to Boston after the last major flights of American Golden Plover passed in September but he occasionally lingered on Nantucket until October. MacKay's field effort could not be directly quantified because he frequently failed to record the number of hunting hours in daily entries. On the other hand, MacKay faithfully recorded his daily bag totals, noted his hunting partners by name, and routinely voiced his frustration when plovers and curlews were absent. Wounded but unrecovered birds were included in bag totals. MacKay's partners, some of whom might have been hired, assisted in building blinds, setting decoys and flushing birds. Journal entries indicated that MacKay performed the bulk of the gunning. He hunted solo on 81 days, with a partner on 176 days, and with two partners on 13 days. MacKay generally recorded the exact number of individual plovers and curlews in smaller flocks (<20) but rounded the number of individuals in larger flocks (>20) to the nearest five. Numbers reported here represent birds observed or shot by MacKay's hunting party. Journal dates of significant flights of curlews and plovers differed in several instances (by one day) from those reported in MacKay's published papers (cf. MacKay 1892). In a few cases, curlews reported as shot in MacKay's published papers did not appear in his shooting journal and vice versa. In all cases, analyses were based on shooting journal data (MacKay 1929). Second-hand observations reported to MacKay as well as the few observations made on nearby Tuckernuck Island were omitted.

In order to illustrate annual trends in bag totals and observations, log-transformed annual totals [$\log_{10}(n + 1)$] and regression lines (ordinary least square, OLS) were projected on bivariate scatterplots. The number of birds observed or shot per hunting day [$\log_{10}(n + 1/\text{number of hunting days})$], from data summed by year, was similarly plotted. Because of the subjective nature of MacKay's estimates of larger flock size and uncertainties about the normality of data, Spearman rank correlation coefficients (r_s) were used to evaluate the strength of temporal trends in bag totals and numbers of curlews observed. All *P*-values are one-tailed ($\sigma = 0.05$).

RESULTS

MacKay hunted shorebirds intensively on Nantucket during fall migration (1 August-10 October) in the 1870s (61 hunting days), 1880s (121 days) and 1890s (88 days). MacKay listed 23 shorebird species in daily bag totals but much of his hunting effort was focused on American Golden Plover and Eskimo Curlew, which were prized above all other species. Most hunting days occurred in the curlews' flight period (21 August-2 October): 1870s (47 hunting days); 1880s (107 days) and 1890s (77 days) (Fig. 1).

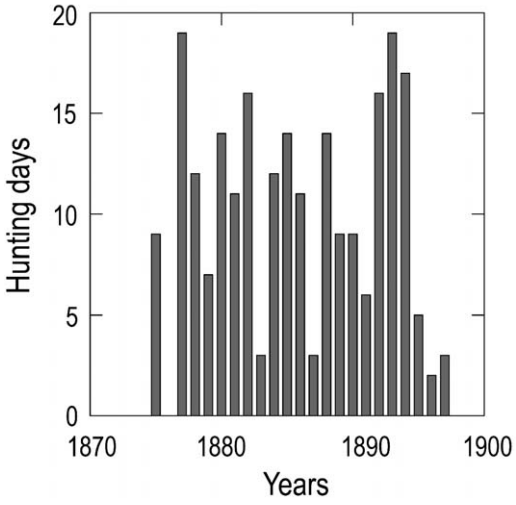

Figure 1. Number of hunting days logged by George H. MacKay during the flight period of the Eskimo Curlew (21 August-2 October) on Nantucket Island.

Eskimo Curlews were observed on 23% of hunting days logged during the flight period in the 1870s, 19% of days in the 1880s, but only 4% of days in the 1890s. MacKay observed a total of 650 curlews on 38 days from 1877 to 1893. Larger flocks were recorded on 27 August 1877 ($n = 250$), 29 August 1877 ($n = 100$), 26 August 1878 ($n = 70$), 2 September 1881 ($n = 50$) and 4 September 1881 ($n = 70$).

Relative abundance trends are most easily illustrated by annual statistics (Fig. 2). Annual totals of observed curlews declined significantly ($r_s = 0.40$, $p < 0.04$, $n = 22$ years; Fig. 2a) from 1875 to 1897, as did annual bag totals ($r_s = -0.41$, $p < 0.04$, $n = 22$ years; Fig. 2c). Annual totals of curlews observed and shot were highly correlated ($r_s = 0.95$, $p < 0.0001$, $n = 22$ years). The number of curlews observed per hunting day, by year, declined significantly during the flight season (21 August-2 October) from 1875 to 1897 ($r_s = -0.40$, $p < 0.04$, $n = 22$ years; Fig. 2b). The number bagged per hunting day ($r_s = -0.44$, $p < 0.03$, $n = 22$ years; Fig. 2d) decreased similarly. The last major curlew flight occurred in 1881 and subsequent counts varied from 0 to 17 individuals per year. MacKay observed only five in 77 hunting days during the flight season in the 1890s, shooting the last one he observed on 21 August 1893. Temporal trends in abundance were statistically insignificant when analyses were restricted to the later years (1882-1897).

MacKay turned toward American Golden Plover as his major quarry after the last major curlew flight in 1881. A total of 927 plovers were shot on 138 days from 9 August to 9 October. Daily bag totals of ≥30 plovers were recorded in 1880 (7 September, 8 September), 1882 (26 September) and 1885 (1 September). In parallel with curlew abundance trends, annual bag totals of plovers ($r_s = 0.51$, $p < 0.01$, $n = 22$ years; Fig. 2e) and the number of plovers bagged per hunting day ($r_s = 0.52$, $p < 0.01$, $n = 22$ years; Fig. 2f) declined steeply during the later decades of the 19th century.

DISCUSSION

Eskimo Curlew and American Golden Plover exhibited similar abundance trends from 1875 to 1897 on Nantucket Island. Historical contingencies and differences in natural history that permitted plover populations to rebound a century later (Morrison *et al.* 2006) while the curlew vanished are largely unknown. Curlew populations collapsed so rapidly that many authorities still considered the species to be common or abundant in the late 1890s when in fact it was exceptionally rare by then. Chapman (1899:171) perfunctorily remarked that the curlew was "far more common in the interior than on the Atlantic coast." Coues (1896:646) noted that it was "extraordinarily abundant in some places during migration, as in Labrador where it fairly swarms in August," whereas Maynard (1896:216) stated that it was "common in autumn on the coast of the Northern States."

MacKay (1891, 1898, 1929) was the first naturalist to foretell the extinction of Eskimo Curlew. As such his writings deserve wider recognition in the history of conservation biology. Passages from his shooting journal reflect his bleak assessment of the status of curlew and plover populations on Nantucket in the 1890s:

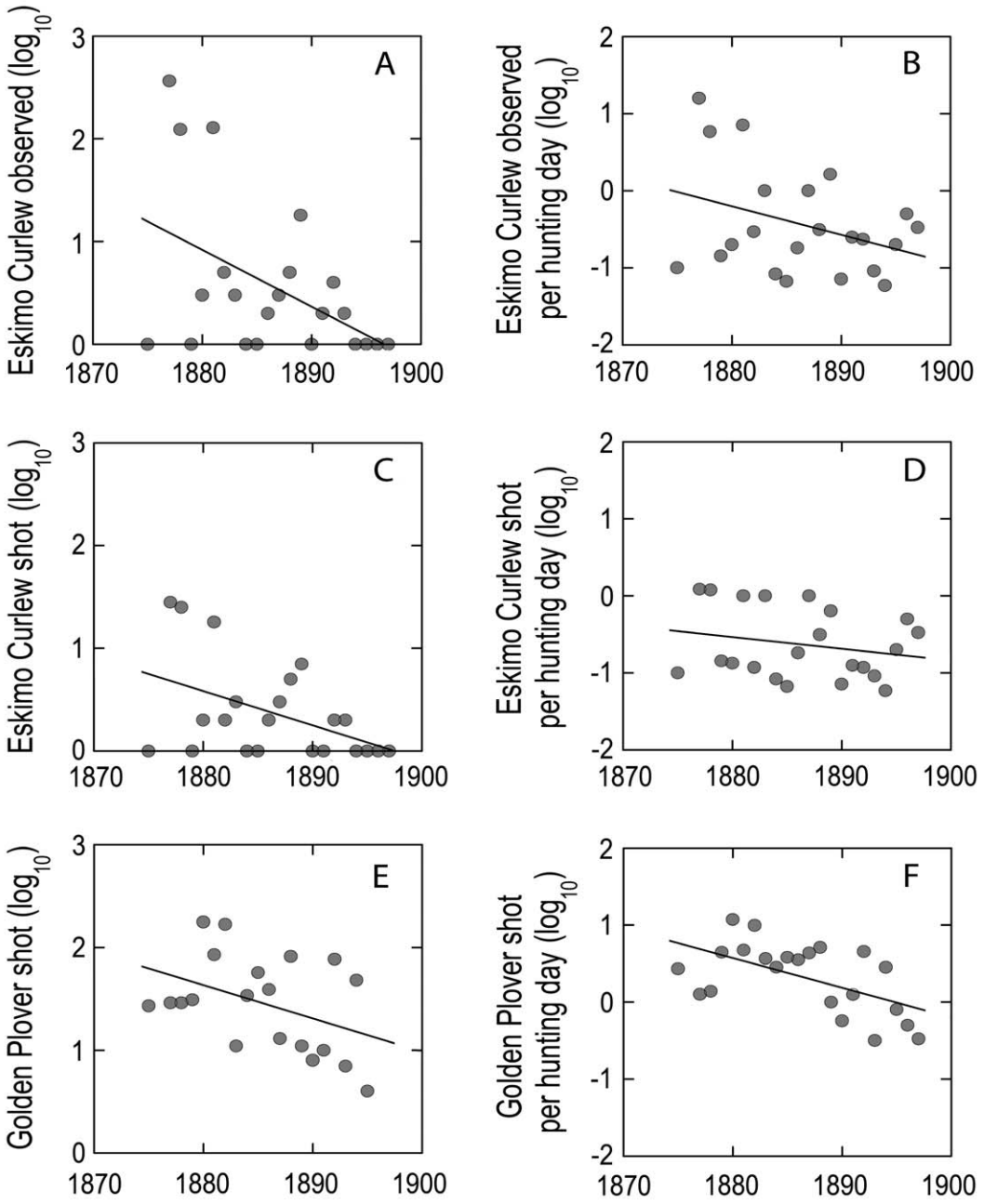

Figure 2. Annual trends in the number of Eskimo Curlews (21 August-2 October) and Golden Plovers (1 August-10 October) observed and shot on Nantucket Island by George H. MacKay during the later decades of the 19th century. OLS regression coefficients: A. $y = 104.82 - 0.055$ (year); B. $y = 69.53 - 0.037$ (year); C. $y = 63.33 - 0.033$ (year); D. $y = 28.04 - 0.015$ (year); E. $y = 108.38 - 0.057$ (year); F. $y = 73.09 - 0.039$ (year).

(MacKay 1929: 279) . . . "September 29, 1890 . . . This is my last day of shooting on Nantucket for this season, and it has been without exception the poorest in my experience on this Island. It seemed impossible to get the necessary combination of weather and birds at the same time, to make them land."

(MacKay 1929: 295-296) . . . "September 6, 1891 . . . It is first rate bird weather for Plover to land in, but there are evidently none passing. Up to date this is the poorest year I have ever known on the Island . . ."

(MacKay 1929: 343) . . . "September 16, 1893 . . . This is the *poorest* year for birds that I have known on Nantucket (some twenty years)."

(MacKay 1929: 345) . . . "September 29, 1893 . . . The season (on Martha's Vineyard) was the same as at Nantucket, a great failure. Personally, I do not think I have ever seen so poor a one during the years I have been shooting on Nantucket . . ."

MacKay attributed the scarcity of curlews on Nantucket during the 1894-1897 seasons, in part, to the lack of strong weather fronts or nor'easters during the flight period. That fall flights of American Golden Plover and Eskimo Curlew were heaviest during stormy weather and easterly or northeasterly winds was common knowledge among 19th century gunners in New England (MacKay 1929). MacKay recognized that curlews on Nantucket represented residual fractions of much larger flights that passed undetected offshore along their usual migratory pathways from Labrador to the Lesser Antilles and South America:

MacKay (1892:16-17) "In most years they are far from being abundant, in fact are rather the reverse. I am inclined to the opinion that these birds generally pass our coast much further from land than has been usually supposed, for it rarely happens that any large numbers of them are deflected over the land by ordinary storms, very severe thunder and lightning with heavy rain, or dense fogs, apparently being required to drive them from their customary line of flight and force them to seek land until more favorable conditions for migrating take place, for they are unusually strong and high fliers with great endurance. I believe also, that it is only in exceptional years that we see a portion of the principal movement of these birds while making their southern migration."

The absence of strong weather fronts may have played a role in the diminished numbers of curlews and plovers on Nantucket from 1894 to 1897. However, the decline in abundance was apparent a decade earlier in MacKay's annual bag totals (Fig. 2). MacKay never indicated in his publications why he gave up shorebird hunting after the 1897 season (at the age of 54) although increasingly poor bags might have been instrumental in his decision to quit. MacKay hypothesized with good justification that the decline in curlew and plover populations was caused primarily by spring market hunting in the Mississippi Valley.

(MacKay 1891:24): "To those interested in this direction I give the following result of some inquiry I made recently of two game dealers in Boston. About four years ago the shipment of Golden Plover, Eskimo Curlew, and Bartramian Sandpipers [Upland Sandpiper] first commenced in the spring, and it has been on the increase up to date. Last spring (1890) these two firms received from Nebraska (principally), Saint Louis, and Texas (Fort Worth) *twenty barrels* of birds, one third of which were Golden Plover, two thirds Bartramian Sandpipers; *eight barrels* of Eskimo Curlew; *twelve* barrels of Eskimo Curlew and Golden Plover. As there are *twenty-five dozen* Curlew, and *sixty dozen* Plover each to a barrel, it will be realized what this means, if other large cities are similarly supplied. All were killed on their northern migration to their breeding grounds. Therefore while we may not be able now to answer the question: are they fewer than formerly, we shall be ably fitted to do so in a few years.

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