

## CAPTURING COMMON EIDERS BY NIGHT-LIGHTING IN COASTAL MAINE

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Abstract.—From 1970 to 1973, 762 Common Eiders (*Somateria mollissima*) were captured by night-lighting from boats in the shoal waters of outer Penobscot Bay, Maine. An average of 38 eiders were banded per night (range: 4–141), with 95% of the birds being flightless young and the remainder adults or subadults. Eiders were most readily captured on calm, dark nights. Ducklings 2–6 weeks of age were easier to capture than older young and adults. More female than male ducklings were banded in three of the four years with an overall male to female ratio of 0.84:1 ( $P < 0.02$ ). Distribution of direct recoveries ( $n = 21$ ) shows that some young eiders moved east from Maine to southeastern Nova Scotia in late summer or early fall. Total recoveries ( $n = 52$ ) suggest that Maine eiders winter in coastal Maine or migrate south to Massachusetts, while others winter in Nova Scotia.

### CAPTURA DE INDIVIDUOS DE *SOMATERIA MOLLISSIMA* EN LA COSTA DE MAINE, UTILIZANDO LUCES DURANTE LA NOCHE

Sinopsis.—De 1970 a 1973, se capturaron en la bahía de Penobscot (Maine), 762 individuos de *Somateria mollissima*, utilizando la técnica de iluminar las aves desde botes durante la noche. Se anillaron un promedio de 38 aves por noche (alcance de 4 a 141), siendo el 95% de estas, individuos juvenes que no podían volar, y el restante adultos o subadultos. Los eideros se capturaron con mayor facilidad en noches calmadas y oscuras. Los patitos entre 2–6 semanas de edad, fueron capturados con mayor facilidad que juveniles de mayor edad y adultos. Se anillaron más hembras que machos en tres de los cuatro años de trabajo. La relación de machos a hembras resulto ser de 0.84:1 ( $P < 0.02$ ). La distribución de aves recobradas directamente ( $n = 21$ ) mostró que durante el final del verano y principios de otoño, algunos juveniles se mueven en dirección al este de Maine hasta llegar al sureste de Nova Scotia. Datos de aves recobradas en otras localidades ( $n = 52$ ) sugieren que los eideros de Maine pasan el invierno en la costa del área o migran al sur hasta Massachusetts, mientras que otros se mueven hasta Nova Scotia.

Night-lighting has long been used to capture inland waterfowl and other birds for banding (Cummings and Hewitt 1964, Bishop and Barratt 1969). However, this is the first report on the successful use of night-lighting to capture a sea duck. Our objectives are to (1) describe a night-lighting technique for capturing the American race of the Common Eider (*Somateria mollissima dresseri*), especially flightless young (i.e., Locals); (2) document sex ratios of Locals; and (3) document the band-recovery

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distributions resulting from these bandings. Eiders were banded from 1970 to 1973, and an initial analysis of recoveries was made by Wakeley (1973:31–32). Sufficient time has now elapsed so that few, if any, additional recoveries can be expected.

#### STUDY AREA AND METHODS

The study area consisted of 10 islands and adjacent shoal waters of outer Penobscot Bay, Maine. Summer tides in this area average slightly less than 3.0 m. Two islands were within 3.2 km of the mainland, whereas the other eight islands were at least 12.9 km offshore. Matinicus Island, the largest island used in this study, is inhabited by people year-round, and a number of the larger islands support summer homes or seasonal camps. During the breeding season, eiders nest in colonies on ledges and uninhabited islands throughout the area, but feed around all islands.

An "inboard/outboard" motor boat with open cockpit, and an open boat with a 150 HP outboard, were satisfactory for night-lighting eiders. Both boats were 5.8 m long, had decked-over bows with waist-high railings for safety, and were 0.9–1.2 m from deck to water line. The elevated decks provided the netters with greater visibility. Automobile headlights were run from the "inboard/outboard," whereas in the open boat iodine quartz lights were powered by a portable 1500-watt gasoline generator. The iodine quartz lights performed best. A deep net, which could be turned to prevent birds from swimming out, was attached to a hoop. Hoops were 46–61 cm in diameter and attached to spruce handles 3.7–4.3 m long.

Potential banding areas were scouted in daylight by boat or aircraft to locate adult females and concentrations of ducklings (> 100 birds). Efforts focused on creches to ensure that most birds were flightless, yet old enough to band (i.e., > 2 weeks of age). At night, eiders became disoriented by the lights and usually dove, but sometimes scooted to avoid the boat. About 50% of the birds captured were dipped from the surface or just under the water; occasionally birds were netted at depths of 2.4–3.1 m. Shoal waters were most easily searched at, or a few hours either side of, high tide. Birds were held in crates until enough captures were available for banding or until operators moved to a different area.

Banding and recovery information was obtained from the U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, Maryland. Recoveries reported here are those processed as of June 1988. Direct recoveries were those reported taken during the first hunting season following banding, before the spring migration. Indirect recoveries were banded eiders reported dead in years subsequent to the first fall or winter after banding. When captured, Locals (L) were flightless, although some were nearly capable of flight. After-hatching-year (AHY) eiders were birds 2 yr of age or older. Age estimates were based on plumage development (Palmer 1976). Sex was determined by cloacal examination (Hochbaum 1942).

The technique reported here was developed and implemented by the

senior author while employed as a U.S. Game Management Agent; the junior authors assisted primarily in data analysis and manuscript preparation.

#### RESULTS

A total of 762 eiders (722 L, 40 AHY) were banded during 20 nights, 1970–1973 (Table 1). Banding was usually conducted between mid-July and mid-August, depending on nesting chronology, with an average of 38 birds captured per night (range: 4–141). Weather was the primary factor determining good night-lighting conditions. Cloudy, moonless nights were optimal for night-lighting (cf. Cummings and Hewitt 1964), but such nights often were associated with storms and conditions too hazardous for nighttime work along Maine's offshore islands. Dark, stormless nights with calm seas were best.

Among captures of Locals, more females than males were banded in 3 out of 4 years (Table 2). A contingency analysis showed no yearly variation ( $\chi^2 = 7.71$ ,  $df = 3$ ,  $P > 0.05$ ). Total number of females and males observed (382 and 320) were compared to expected values assuming a 50:50 sex ratio (351 and 351). The analysis showed more females than males in the summer population of Locals ( $\chi^2 = 5.48$ ,  $df = 1$ ,  $P < 0.02$ ).

Our most recent recoveries were from two males banded in 1971, one Local and one adult, both reported recovered in 1985; and a Local male, banded in 1973 and recovered in 1986. Assuming the adult male was 3 yr old when banded (probable minimum age of acquiring adult plumage [Palmer 1976]), it was thus at least 17 yr of age when reported shot.

The overall direct recovery rate for Locals was 3.0% (males = 2.5%, females = 3.4%) whereas the total recovery rate was 7.4% (males = 6.6%, females = 8.1%). Of the 52 recoveries of Locals (21 direct, 31 indirect), 47 were reported shot and five were found dead.

Direct recoveries were reported from Nova Scotia (2 males, 8 females), Maine (5 males, 3 females), and Massachusetts (1 male, 2 females). Recoveries reported from Nova Scotia were taken nearly due east of where banded, on the southeastern shore of the province mostly within degree block 43–44°N, 64–65°W. Direct recoveries were taken throughout the fall, but mostly from mid-November to mid-December. Maine eiders usually have completed their fall migration by mid-November (Wakeley 1973; H. L. Mendall, unpubl. data). Thus, these late season recoveries suggest that at least some eiders hatched in coastal Maine winter in Nova Scotia. In contrast, indirect recoveries (hence AHY birds) showed less affinity for Nova Scotia (3 males, 1 female) with most of the recoveries from Maine (6 males, 12 females), Massachusetts (3 males, 5 females), and Quebec (1 male).

#### DISCUSSION

Two hundred and fourteen newly hatched ducklings (99 males, 115 females) examined by University of Maine graduate students on nesting islands in Penobscot Bay, 1973 and 1974 (H. L. Mendall, pers. comm.),

TABLE 1. Number of eiders night-lighted and effort expended in coastal Maine, 1970-1973.

Year	Inclusive dates of banding	Number captured		Captures per night (no. of nights worked)
		Local birds	AHY birds <sup>a</sup>	
1970	14 Jul.-5 Aug.	128	5	33.3 (4)
1971	7 Jul.-6 Aug.	364	16	54.3 (7)
1972	11 Jul.-9 Aug.	60	7	13.4 (5)
1973	16 Jul.-26 Aug.	170	12	45.5 (4)
Total		722	40 <sup>b</sup>	38.1 (20)

<sup>a</sup> AHY = After-hatching-year.

<sup>b</sup> 5 males, 35 females.

had a sex ratio (males: females) of 0.86:1 ( $\chi^2 = 1.20$ ,  $df = 1$ ,  $P < 0.30$ ). In another Maine sample, Stanton (1977) found a 1:1 ratio in 79 ducklings (40 males, 39 females) from eggs taken from Casco Bay and hatched in an incubator before release in Massachusetts. Numerically, males predominate in adult waterfowl (Bellrose et al. 1961). Various races of the Common Eider also show a preponderance of adult males (Belopolskii [1957, Barents Sea], Mendall [pers. comm., Maine]; also Milne [1974] and Baillie [1981] [Scotland]), although to a lesser extent than several species reported by Bellrose et al. (1961). Clearly, more data are needed on the sex ratios of Maine eiders before attempting to explain the variation in the sex ratios of ducklings.

The occurrence of a 322+ km one-way movement from Maine to Nova Scotia in late summer or early fall by young American Eiders cannot be fully explained. Recoveries were clumped in southeastern Nova Scotia although eider habitat and hunting occurs over a wide area southwest, north, and northeast of the recovery site. Additional banding of Local eiders in Maine and elsewhere is needed before the regularity and significance of the movements reported here can be assessed, although the clumped distribution of direct recoveries in Nova Scotia argues against random post-breeding dispersion.

Past banding of American Eiders has been largely limited to small numbers of nesting females (Reed 1975, Wakeley and Mendall 1976). Wakeley (1973:76-78) described use of drop-door traps and long-handled nets to capture nesting females in Maine. Wintering AHY eiders in Massachusetts have been captured with cannon-nets on loafing beaches, but could not be night-lighted on water (Moses 1968). Monofilament gillnets were used to mist-net AHY eiders (*S. m. dresseri* and *S. m. borealis*) in Labrador and northern Quebec in early spring as birds flew over points of land or beaches (Goudie 1989, Nakashima 1989). Our study demonstrated that Local American Eiders of both sexes can readily be captured by night-lighting. Alternatively, Milne (1963) and Baillie (1981), working with *S. m. mollissima* in Scotland, described a drive-trapping procedure to capture ducklings.

TABLE 2. Sex composition of duckling eiders banded in coastal Maine, 1970-1973.

Year	Locals <sup>a</sup>		Ratio of males : females
	Males	Females	
1970	50	78	0.64:1
1971	166	198	0.84:1
1972 <sup>b</sup>	14	26	0.54:1
1973	90	80	1:13:1
Total	320	382	0.84:1

<sup>a</sup> Defined as flightless young.

<sup>b</sup> Sex of 20 birds not determined.

Thus, with a combination of mist-netting or cannon-netting AHY's in early spring, and night-lighting or drive trapping ducklings during the summer, it is now technically feasible to band all eider age-sex classes. However, use of these techniques is difficult, expensive, and specific to local conditions. Thus, it is unlikely that enough birds can be banded to precisely measure annual recovery or survival rates (see Brownie et al. 1985). Nevertheless, a coordinated banding program of Common Eiders in eastern North America would clarify relationships between breeding and wintering ranges (see Reed and Erskine, 1986:161).

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