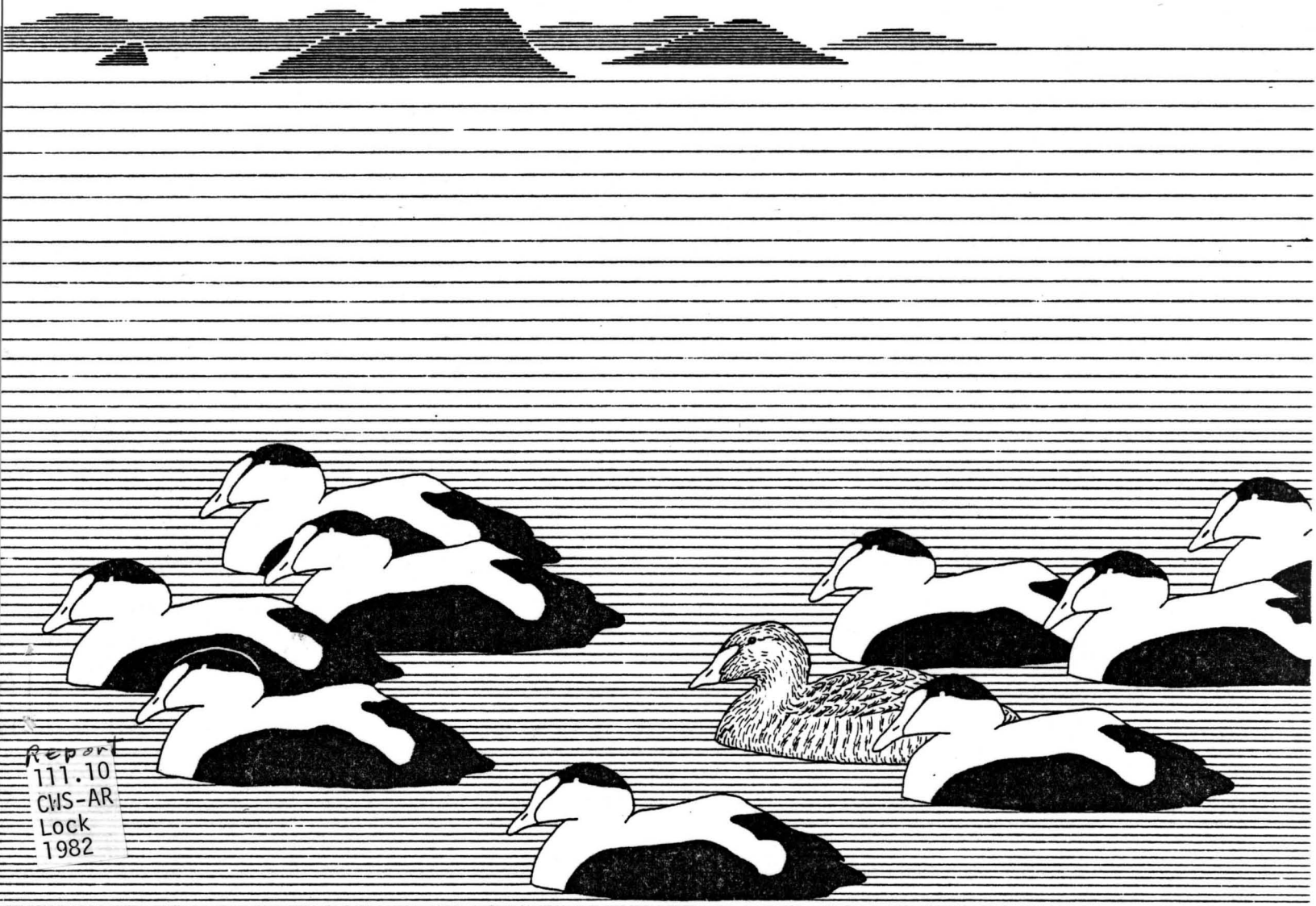
AN AERIAL CENSUS OF COMMON EIDER BREEDING POPULATIONS IN NOVA SCOTIA AND SOUTHWESTERN NEW BRUNSWICK



CANADIAN WILDLIFE SERVICE

AN AERIAL CENSUS OF COMMON EIDER BREEDING POPULATIONS IN NOVA SCOTIA AND SOUTHWESTERN NEW BRUNSWICK

A.R. Lock

September 1982

Canadian Wildlife Service
Bedford Institute of Oceanography
Dartmouth, Nova Scotia

Introduction

Common Eiders (Somateria mollissima) breed in varying numbers on the coasts of the Maritime Provinces with the greatest numbers on the Eastern Shore of Nova Scotia between Musquodoboit Harbour and Tor Bay, and in south-western New Brunswick between Beaver Harbour and the U.S. Border. Smaller numbers are known to breed in southeastern Cape Breton, southern Nova Scotia, Minas Basin and the Bay of Chaleur.

No adequate, complete census has been attempted of this breeding population though many of the breeding concentrations have been examined with sufficient care that approximations of the population size have been attempted (Erskine and Smith, in press).

Methods

Most species of waterfowl nest solitarily with a density determined primarily by the nature and availability of breeding habitat and it is difficult to determine the breeding population of a given region accurately or cheaply. Eiders, like most other seabirds breed in colonies of varying size on inshore islands and are consequently rather more easy to census accurately. The most accurate census is that based on an aerial inspection of suitable breeding habitat to find colonies followed by a ground count of nests. A more rapid, though necessarily less accurate census may be made by counting the highly visible adult male eiders shortly after the beginning of egg laying. Studies in Scandinavia (Almkvist and Andersson 1972) and Labrador (Lock 1982) have shown this to be a reliable census method.

Aerial counts on the Atlantic coast of Nova Scotia and in southwestern New Brunswick were made between May 18 and 23, 1982 requiring 29 hours of flying time in a Lake Amphibian. The aircraft was flown at a height of 75m

(250 ft.) and a speed of 160 kmph (100 mph) on a course 100m (350 ft.) offshore. Every bay and inlet was examined and the flight line extended to all offshore islands and shoals. The pilot located birds on his side of the flight path and made counts of smaller flocks, I counted all flocks of more than about 20 birds. The numbers and locations of birds were recorded on tape and the survey track was marked on 1/250,000 scale topographic maps.

All waterfowl observed were counted and areas of waterfowl habitat not immediately on the survey path were examined with 8 x 30 binoculars. All birds seen were counted carefully; by individuals in small flocks, by fives and tens in larger flocks. No guesses or vague estimates were made. Large flocks were circled at a suitable height and repeat counts were made of each flock to ensure accuracy. When mixed-sex flocks of eiders were encountered, adult males were counted first then either the adult females and immatures, which were together categorised as "brown" birds, were counted or their number was determined by subtracting the count of adult males from the count of the whole flock. If little time was available, the adult males were counted first, and the number of "brown" birds were derived from an estimation of the ratio of "brown birds to adult males in each flock.

Sabean (1972) noted that on Tobacco I. in eastern Nova Scotia, the peaks of clutch initiation were in the first week of May in 1970 and after the third week of May in 1971. The 1971 nesting was noted as being unusually late and the delay was ascribed to human disturbance. The census flights were planned to take place after all nests were initiated but before the majority of males had dispersed from the region of their colonies to moulting areas.

Results

Tables 1 and 2 summarize the aerial counts and the distributions of adult males are shown for Nova Scotia in Fig. 1 and for New Brunswick in Fig. 2.

Table 1. Numbers of Common Eiders counted during the Nova Scotia aerial census.

Census Block	No. of adult males	No. of "brown" birds	Ratio of adult males to "brown" birds
Cape Breton I.			
Sydney to Guyon I.	0	0	
Guyon I. to Pt. Michaud	114	224	0.51
Pt. Michaud to Eddy Pt.	43	90	0.48
	157	314	0.5
Eastern Shore			
Eddy Pt. to Cranberry I.	116	202	0.57
Cranberry I. to Berry Hd.	730	897	0.81
Berry Hd. to Cape St. Mary	877	954	0.92
Cape St. Mary to Sheet Hbr.	3178	1403	2.27
Sheet Hbr. to Jeddore Rock	1485	324	4.58
Jeddore Rock to Halifax	30	150	0.2
	6416	3930	
South Shore			
Halifax to Port Joli Hd.	282	421	0.67
Port Joli Hd. to Cape Sable	110	197	0.55
Cape Sable to Chebogue Hbr.	491	337	1.46
Chebogue Hbr. to Long I.	0	0	
Seal I. Group	580	564	1.03
Brier I.	83	158	0.53
Brier I. to Cape Split	0	0	
	1546	1677	0.92
Total	8119	5921	1.37

Table 2. Numbers of Common Eiders counted on the S.W. New Brunswick aerial census.

Census Block	No. of adult males	No. of "brown" birds	Ratio of adult males to "brown" birds
Grand Manan I. Group	2763	2150	1.29
The Wolves	1342	883	1.52
Passamaquoddy Bay and St. Croix River	1339	697	1.92
Campobello I. and Head Hbr. Passage to Blacks Hbr.	601	402	1.50
Blacks Hbr. to Pt. Lepreau	846	425	2.0
Manawagonish I.	21	6	3.5
Total	6912	4563	1.51

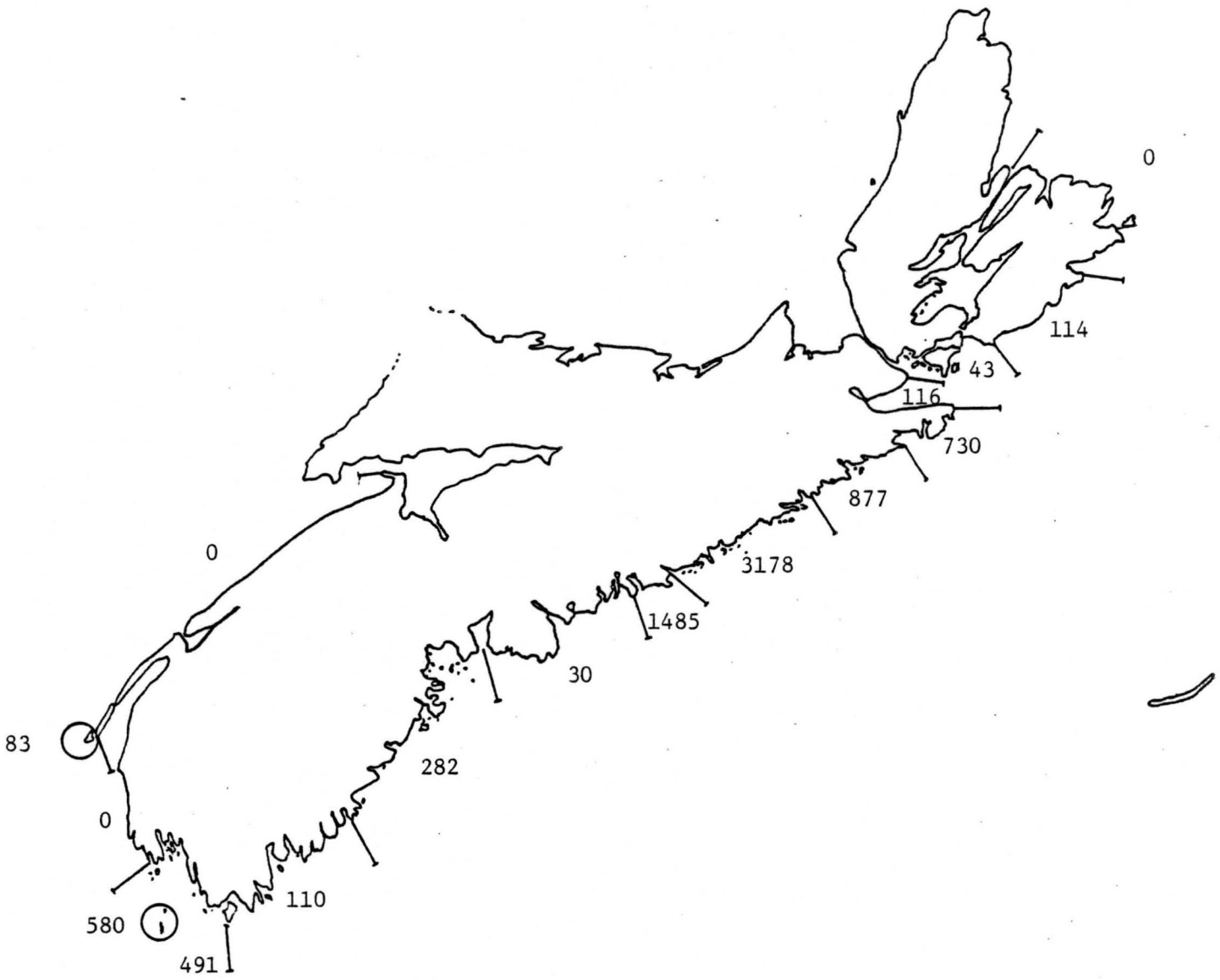


Fig. 1. Numbers of Adult Common Eiders counted in Nova Scotia.

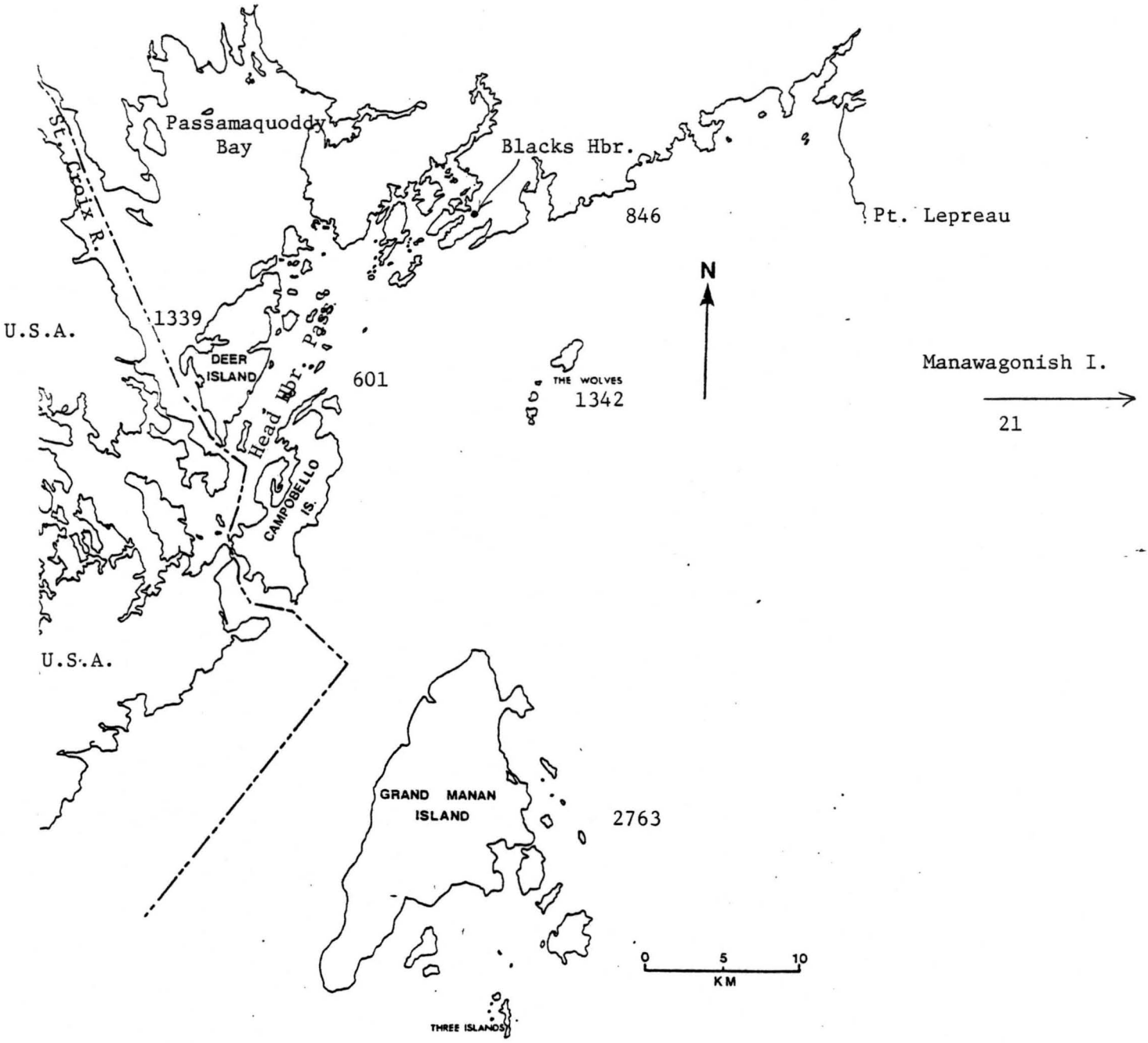


Fig. 2. Numbers of Adult Male Common Eiders counted in Southwestern New Brunswick.

Fig. 3 shows that the proportion of "brown" birds varied radically, they being most abundant in areas of low breeding density and proportionately least abundant in dense breeding areas.

The proportion of immature males in flocks of brown birds was usually not easily determined but the spot counts which were made, though not reported here, indicated that there is great variation between areas and between habitat types within areas.

Discussion

In northern Europe adult male eiders have been observed to gather in large flocks at the outer-most edges of archipelagos after females have started incubating (Almkvist and Andersson 1972). It was found possible to estimate the size of breeding populations by counting these flocks of highly-visible males and in 1981 this technique was used to assess the breeding eider population of Labrador (Lock 1982). In Labrador males did not assemble in large flocks as they had been observed to do in Scandinavia but remained in smaller, easily counted flocks around their breeding colonies. Collateral colony censuses there showed that the number of pairs breeding on two extended sections of coastline was equivalent to the number of adult males counted on aerial surveys and as the pattern of post-breeding dispersal of males in Nova Scotia and New Brunswick is similar to that in Labrador the technique was used here with some confidence.

At the time of the census flights (May 18-23) males were still gathered around their colonies dispersed in small easily counted flocks with varying numbers of "brown" birds. Because the coastline was flown so thoroughly, omitting no areas of suitable eider habitat, few birds are thought to have been missed.

Many males were roosting on the shores of islands and in open, grassy colonies like Pumpkin I. (Nova Scotia) and Kent I. (New Brunswick); significant numbers of males were seen attending females at the nest. Several authors have

Fig. 3. Ratio of adult male to "brown" eiders on the Atlantic coast of Nova Scotia, May 1982.

noted males attending incubating females as late as two weeks into incubation (Pettingill 1959, Munroe 1961); others (McKinney 1961, Milne 1963, Hilden 1964) noted this attendance ceased after egg laying. Sabean (1972), working on Tobacco I. on the eastern shore of Nova Scotia, noted that in the first year of his study, males attended females as late as 20 days into incubation. In the following year males did not attend females during incubation.

I have observed that male attendance on incubating females is most frequent and prolonged in open grassy colonies and relatively infrequent and short in colonies in heavy cover. On the few colonies of the former type, attendant males were visible and readily counted, and flushed from the nesting area during aerial counts. On the latter type males were readily counted basking on rocks at the sea edge but none were observed to be driven from dense cover even after repeated low passes of the aircraft. Consequently, though it is possible that some few males may have been invisible to the aerial censuser and the estimate of the breeding population correspondingly reduced, I do not think this constitutes a substantial error.

Unfortunately, colony nest counts have not been carried out over any substantial portion of the eider's breeding range in the Maritime provinces as it is not possible to correlate these aerial counts with accurate ground counts.

The distribution of "brown" birds is interesting. It is apparent that the proportion of "browns" is related inversely to the density of breeding birds (Table 1, Fig. 3) but it is worth noting the density of "brown" birds is approximately the same all along the eastern shore. The variations in the ratio of adult males to "brown" birds is due to local concentrations of breeding birds and there is no evidence of immatures being attracted to or excluded from breeding areas.

A total of 15,031 adult males were counted in the censused areas with

10,484 "brown" birds. A further 15,031 adult females can be considered to have been sequestered in the colonies, invisible on nests. Thus a minimum of 40,500 eiders can be considered to have been present in the censused areas in the breeding season of 1982.

Acknowledgements

In carrying out the aerial counts on which this report was based I was helped immeasurably by the enthusiasm and flying skills of my pilot, Jim Bickle, of Bridgewater, Nova Scotia.

References

Almkvist, B. and Andersson, A. 1972. Flygtaxering av gudingflockar Somateria mollissima - en metod att berakna hackande ejderbestånd. Vår fagelvarld 31: 237-240.

Hilden, O. 1964. Ecology of duck populations in the island group of Valassaaret, Gulf of Bothnia. Ann. Zool. Fenn. 1: 153-279.

Lock, A.R. 1982. An assessment of the Labrador breeding population of the Common Eider. Canadian Wildlife Service Unpublished Report. 33 pp.

McKinney, F. 1961. An analysis of the displays of the European Eider Somateria mollissima mollissima (Linnaeus) and the Pacific Eider, Somateria mollissima v-nigra (Bonaporte). Behaviour Suppl. 7: 1-124

Milne, H. 1963. Seasonal distribution and breeding biology of the eider, Somateria mollissima L. in the north-east of Scotland. Ph.D. Thesis, University of Aberdeen, Scotland. 235 pp.

Munroe, D.A. 1961. The Eider Farms of Iceland. Can. Geogr. Journal, August 1961: 59-63.

Pettingill, O.S. 1959. Puffins and eiders in Iceland. Maine Field-Nat. 15: 58-71.

Sabean, B.C. 1972. Breeding biology of the American Eider (Somateria mollissima dresseri Sharpe) on Tobacco Island, Nova Scotia. Unpubl. M.Sc. Thesis, Acadia University, Wolfville, Nova Scotia. 110 pp.