INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

RESTRICTED

Serial No. 1879
(D.c. 11)

ICNAF Res.Doc. 67/83
(Seal Contrib. No. 1)

ANNUAL MEETING - JUNE 1967

ON THE DISTINCTNESS OF HOOD SEAL POPULATIONS

By D. E. Sergeant

Fisheries Research Board of Canada,
Arctic Biological Station,
Ste. Anne de Bellevue, Quebec.

The question of the relation between West Ice (East Greenland) and Newfoundland populations of hood seals Cystophora cristata Erxleben has not yet been settled. Tagging results are very few and equivocal; one juvenile male tagged at Newfoundland in 1951 was recovered 5 years later at Kap Farvel, Greenland (Rasmussen, 1960), which is a halfway point between the two whelping areas. One of 19 juveniles tagged at Newfoundland in 1964 was recovered in April, 1965 at Holsteinsborg, West Greenland (T. Øritsland, in litt., 16 July, 1966). No recoveries have shown movement in the reverse direction, but practically no immature hood seals are taken at Newfoundland. Further marking was carried out at Newfoundland in 1967 by Norwegian and Canadian investigators. Craniological and serological studies are understood to be under way by Norwegian investigators, with Canadian investigators loaning additional skull collections for the first study.

The approach used here is a study of mortality rates of adults of both populations of hood seals.

Samples of adult hood seals were obtained at the Newfoundland Front ice by Canadian investigators in March-April of 1953 and 1966. The daily sex composition of the later sample is shown in Table I. This shows that, as is typical of the catch of hood seals defending their young, the catch is composed largely of adult females. This would result in a greater mortality rate of adult females if the catch were consistently a large part of the population.

The age frequencies of these samples were constructed, from which mean mortality rates of adult males and females were calculated, as shown in Table II, using Heincke's method (Ricker, 1958, p. 41, equation 2.2). These mortality rates are compared with mortality rates of male and female hood seals of similar ages at the West Ice. It is generally agreed that this herd has been hunted heavily in recent years. Soviet-obtained age samples from the West Ice were published by Khuzin and Yakovenko (1963, Figure 6). Samples for 1962 and 1965 were kindly supplied by Mr. T. Øritsland, Fiskeridirektoratet, Bergen.

It can be seen from Table II that mortality rates of females are considerably greater than those of males at the West Ice, as would be expected in an intensively hunted stock. Also, mortality rates of both sexes of hood seals have increased between 1962 and 1965, confirming that hunting is intensive.

At Newfoundland, mortality rates of both sexes resemble those of males at the West Ice in 1962, and are lower than all rates of mortality for females at the West Ice. Mortality rates of hood seals at Newfoundland have not increased between 1953 and 1966. This is so in spite of heavy hunting at the Newfoundland ice fields. Most of the available young hood seals with a considerable fraction of the adult females are taken annually, when ice conditions permit.

I conclude that the hood seals available to hunting at present in the Newfoundland area (a) are not an offshoot of the West Ice stock and (b) are not an indigenous stock but the southern fringe of a larger stock. This stock can only extend northwards, i.e. into Davis Strait, presumably along the outer fringe of the pack ice.

Other inferential evidence pointing in support of (b) is that the catch of hood seals at Newfoundland fluctuates from year to year more greatly than that of harp seals, and also varies slowly with long-term climatic fluctuations, having been almost nil in the 1930's when the marine climate was warm at Greenland, (Rasmussen, 1960). Since 1945, catch and catch per effort have increased, and the increase has continued to a maximum in the latest years (Øritsland, 1966, ICNAF Serial No. 1760, Figure 2).

Direct evidence of hood seals occurring to the northward is sparse; a single sealing-industry-sponsored aerial survey in 1959 out of Frobisher Bay failed to reach the ice-edge. However, when the party from the wrecked United States ship Polaris drifted on the ice with whaleboats from Davis Strait to the Newfoundland sealing grounds in the spring of 1873, hood seals with pups were encountered near the ice edge in April about off Cape Chidley, Labrador (Davis, 1876).

I conclude that though the hood seal stock at Newfoundland appears to be under heavy pressure, in fact there are yet no signs of this. (The harp seal stock at the Front by contrast is under heavy pressure.) I have not here distinguished the Gulf from the Front hoods, supposing them to be essentially one and the same stock. There are generally few hood seals--a few hundreds--whelping in the southern Gulf of St. Lawrence. Since the whelping date here is the same as in more northern areas, i.e. about March 17, the success of whelping by the species in the southern Gulf may be limited by early disappearance of ice.

Summary

Mortality rates of adult male and female hood seals at Newfoundland are identical and are lower than mortality rates of adult males and much lower than those of adult females at the West Ice. These facts suggest that the stocks are distinct and that the Newfoundland stock is not yet under heavy pressure although it appears to be so. The Newfoundland stock must therefore receive annual immigration from further north, presumably from the ice edge in Davis Strait. This immigration is irregular but is related broadly to climatic change, few hood seals having moved south during a warm climatic period at Greenland in the 1930's.

Acknowledgements

The Canadian samples were collected during voyages on the commercial sealing ships Algerine of Bowring Bros. Ltd. and Theron of Christiansen Canadian Enterprises Ltd. to whom thanks are given. Dr. H. D. Fisher collected the larger part of the 1953 sample. I am grateful to Mr. T. Øritsland for the use of unpublished information from the West Ice.

References

Davis, C. H. (Ed.) Narrative of the North Polar Expedition. U.S. Ship Polaris, Captain Charles Francis Hall Commanding. U.S. Naval Observatory, 1876. Washington, Government Printing Office. 696 pp.

Khuzin, R. Sh., and M. Ya. Yakovenko. 1963. O raspredeleniya i biologii Khokhlacha grenlandskovo morya (Cystophora cristata, Erxl. 1777). Trudy PINRO, Murmansk 15: 251-261.

Rasmussen, Birger. 1960. Om Klappmyssbestanden i det nordlige Atlanterhavn. Fisken og Havet, Bergen, No. 1: pp. 23.

Ricker, W. E. 1958. Handbook of computations for biological statistics of fish populations. Fish. Res. Bd. Canada, Bull. 119, 300 pp.

Table I. Sex ratio of adult seals in catch of M.V. Theron 1966.

Date	Number			Per cent
	Females	Males	Total	Females
March 20	17	13	30	57
21	35	18	53	66
22	42	11	53	79
23	9	4	13	(--)
24	35	8	43	81
25	5	3	8	(--)
29	8	1	9	(--)
Overall	151	58	209	72

Table II. Arithmetic mean of mortality rates ($\hat{a}$) of male and female hood seals aged 5 to 17 years, Heincke's method.

Area of catch	Year	Males		Females	
		N	$\hat{a}$	N	$\hat{a}$
West Ice	1960	112	0.092	51	0.150
"	1961	195	0.134	162	0.167
"	1962	790	0.121	599	0.175
"	1965	540	0.144	308	0.197
Newfoundland	1953	37	0.124	112	0.125
"	1966	56	0.128	150	0.120

May 16, 1967.