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Research on Hooded Seals

Cystophora cristata Erxleben in 1976

by

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1. Hood Seals Whelping in Davis Strait

a. Location and Date

Whelping hooded seals were relocated in Davis Strait on March 22 and 24, 1976 close to the location where they had been found on March 25, 1974 (Fig. 1). Whelping appeared well advanced on March 22 with very little blood on the ice. By March 24 the ice was much broken up and it could not be determined for certain whether the patch observed on that date was the same as seen on March 22, or a new one. Survey was again carried out by long-range Argus aircraft of the Canadian Armed Forces.

b. Numbers

Six photographic strips were run of the patch on March 22, although only three made a mosaic, and because of featureless ice the mosaic could not be joined for obtaining an accurate area estimate. Area estimation was therefore done from a scale map. Density of adult seals was calculated from photographs taken at 1000 ft (300 m).

Results of the calculation, shown on Table 1, give about 4,200 hooded seals for this patch. "Eyeball" estimates were higher: from 5,000 to 10,000. It is not known if all patches of seals in the area were surveyed; one observer believed that the dispersed patch observed on March 24 was a different one, based on calculated drift under wind and ice conditions in the intervening two days.

Low level photographs (200 ft = 60 m) showed the following breakdown of seals: 7 adult females; seven pups, and two adult males. The total number of (adult) seals determined above must therefore be reduced, as shown in Table 1, to some 3,317.

2. Tag and Brand Recoveries

One new tag recovery can be reported. Canadian tag # 976 placed on a young hooded seal in the Gulf of St. Lawrence on 20 March 1975 was recovered at 60°37'N, 45°55'W - near Julianehaab - on 29 March 1976, i.e. at one year of age. There are now 5 recoveries of hooded seals marked at Newfoundland from extreme SW, Greenland and one from SE Greenland (see Sergeant, 1974, Fig. 1). A close connection with the stock hunted at SW Greenland can therefore be believed in, though the extent of the connexion between animals whelping at Newfoundland and moulting animals on the ice of Denmark Strait is not yet clear. It is interesting that a rise in catch (and therefore presumably in abundance) has been observed at both Newfoundland and southwest Greenland since about 1965 (see Table 2 and Kapel, MS 1972).

3. Calculation of Production and Yield

a. Material

A sample of teeth from 368 whelping hooded seals, 162 males and 208 females, was collected at the Newfoundland "Front" ice between March 22 and 30, 1976 from M/V Arctic Explorer. Only the females have been aged (Table 3) since these reach nearly full maturity at five years, males not till 10 years. Therefore females are more useful for studying recruitment in relation to catch. Aging was done from the number of dentinal or, rarely cementum, layers. The data were put together with five years similar data from Norway, collected in 1967 and 1971 to 1974, and two years data collected in Canada in 1953 and 1966 for a total time series of 8 years. (A further sample from 1975 from Norway will doubtless become available).

Table 4 shows sample sizes, percent of five year old female seals in the samples, and catch of young of the equivalent year class (from ICNAF statistics of catch of young hooded seals each year).

b. Results

Percent five year old females are plotted against catch of young of the same year class in Figure 2.

Five points, representing year classes 1966-1971, fall on a straight line which intercepts the catch axis at 27,000 young hooded seals. This is therefore an estimate of production in this period.

Three points from the earlier period (year classes 1948, 1961-1962) fall in lower positions, indicating a lower percent of 5 year old female hooded seals to total adults in the early period. Either, then, production was lower or the intensity of catching was lower at this early period.

One cannot choose between these two possibilities. However, statistics of catch at Newfoundland by five year periods (Table 4) show an increasing catch and therefore probably an increasing availability of hooded seals, since about 1965 (A quota of 15,000 hooded seals was only applied in 1975).

Moreover the fact that points since 1966 fall on a straight line suggest that the intensity of catching is now high since, otherwise, fluctuations in natural mortality between birth and 5 years would be expected to produce greater fluctuations in recruitment.

From my calculations, production is estimated at 27,000 and the mean catch from 1966 to 1975 (Table 2) has been 7,369 young and 5,370 older hooded seals - mostly adult females. From what has been said above, this is close to sustainable yield. However, the catch will have decreased slightly with a quota of 15,000, (in force since 1975) since catches in excess of 15,000 cannot now be taken. Moreover, sustainable yield could be increased by a program to catch more young hooded seals and fewer adults, especially females.

4. Discussion

Increasing availability of hooded seals at Newfoundland and at southwest Greenland since about 1965 suggests an increasing population in the area - the pack ice of the northwest Atlantic west of Kap Farvel. F.O. Kapel (MS, 1972) suggests that this putative increase may be linked to the protection given to moulting hooded seals at the Denmark Strait since 1961. This suggestion would require a demonstrated connection between the Denmark Strait moulters and the western breeding

groups. It is understood that results of Norwegian tagging at the Denmark Strait have shown such a connexion.

5. Acknowledgments

Mr. Wybrand Hoek carried out the aerial survey of Davis Strait in 1976 and was assisted by Mr. Robin Best of Guelph University. Great thanks are given to Major Denis Thomas, Captain Sandy Duff, Warrant Officer George Baptie and their crew of the 405 "Eagles" Squadron Canadian Armed Forces. Messrs. Brian Emmett and Brian McCullough collected the "Front" sample of hooded seals. Their voyage was made thanks to Carino C. Ltd., Captain Ulf Snarby and crew of Arctic Explorer.

6. References

Kapel, F. O. MS 1972. Age Analysis of Hooded Seals in South Greenland. ICNAF Res. Doc. 72/85 (Serial No. 2818) Mimeo, 21 pp.

Sergeant, D. E. 1974. A Rediscovered Whelping Population of Hooded Seals Cystophora cristata Erxleben and its Possible Relationship to Other Populations. Polarforschung 44, 1-7, Münster.

Table 1. Calculation of Number of Hooded Seals in a Patch in Davis Strait, March 22, 1976.

Area of Patch (from map) = 124 square nautical miles.

Mean Density of Adult Seals = 0.928 per frame.

To calculate area of frame.

Altitude = 1000 ft. Focal length = 3" = 0.25 ft.

Therefore scale = 0.25:1,000

= 1:4,000

Area of frame = 3" x 3"

= 0.25 x 0-25 ft.

Scaled area of frame $= \frac{(4000)^2}{16} = 10^6$ sq ft.

$= \frac{10^6}{(6080)^2}$ sq nautical miles

= 0.02705 sq nautical miles

Density of seals $= \frac{0.928}{0.02705}$

= 34.3 per sq nautical mile

Total seals = 34.3 x 124 = 4,253

Subsample females to total adults = $\frac{7}{9}$ = 0.778

∴ Total adult females = 4,253 x 0.778

= 3,317

Table 2. Mean Catch of Hooded Seals at Newfoundland, by Five Year Periods

Period	Young	Older	Total	Percent Young
1946 - 1950	4,457	2,405	6,862	65
1951 - 1955	4,442	1,530	5,972	74
1956 - 1960	3,747	1,704	6,451	58
1961 - 1965	3,088	1,955	5,043	61
1966 - 1970	8,096	5,430	13,526	60
1971 - 1975	6,642	5,309	11,951	56
overall	5,078	3,222	8,300	61

Table 3. Age frequency of 208 adult female hooded seals, Newfoundland, March 1976.

Years	No.	Years	No.
1		11	6
2		12	8
3	3	13	1
4	27	14	3
5	31	15	5
6	33	16	3
7	29	17	4
8	21	18	
9	21	19	1
10	11	20	1
		N	208

Table 4. Five Year Old Females as Percent Age Sample and Catch of Same Age Class as Young, Newfoundland.

Sample Year	Sample Size	Five Yr Olds %	Year Class Young	Catch of Yg x 10^{-3}	Provenance Canada/Norway
1953	112	8.0	1948	8.6	C
1966	150	10.0	1961	2.3	C
1967	149	13.4	1962	1.1	N
1971	368	9.2	1966	16.8	N
1972	563	13.6	1967	8.4	N
1973	199	22.1	1968	1.2	N
1974	576	16.7	1969	8.8	N
1975					
1976	208	14.9	1971	8.0	C

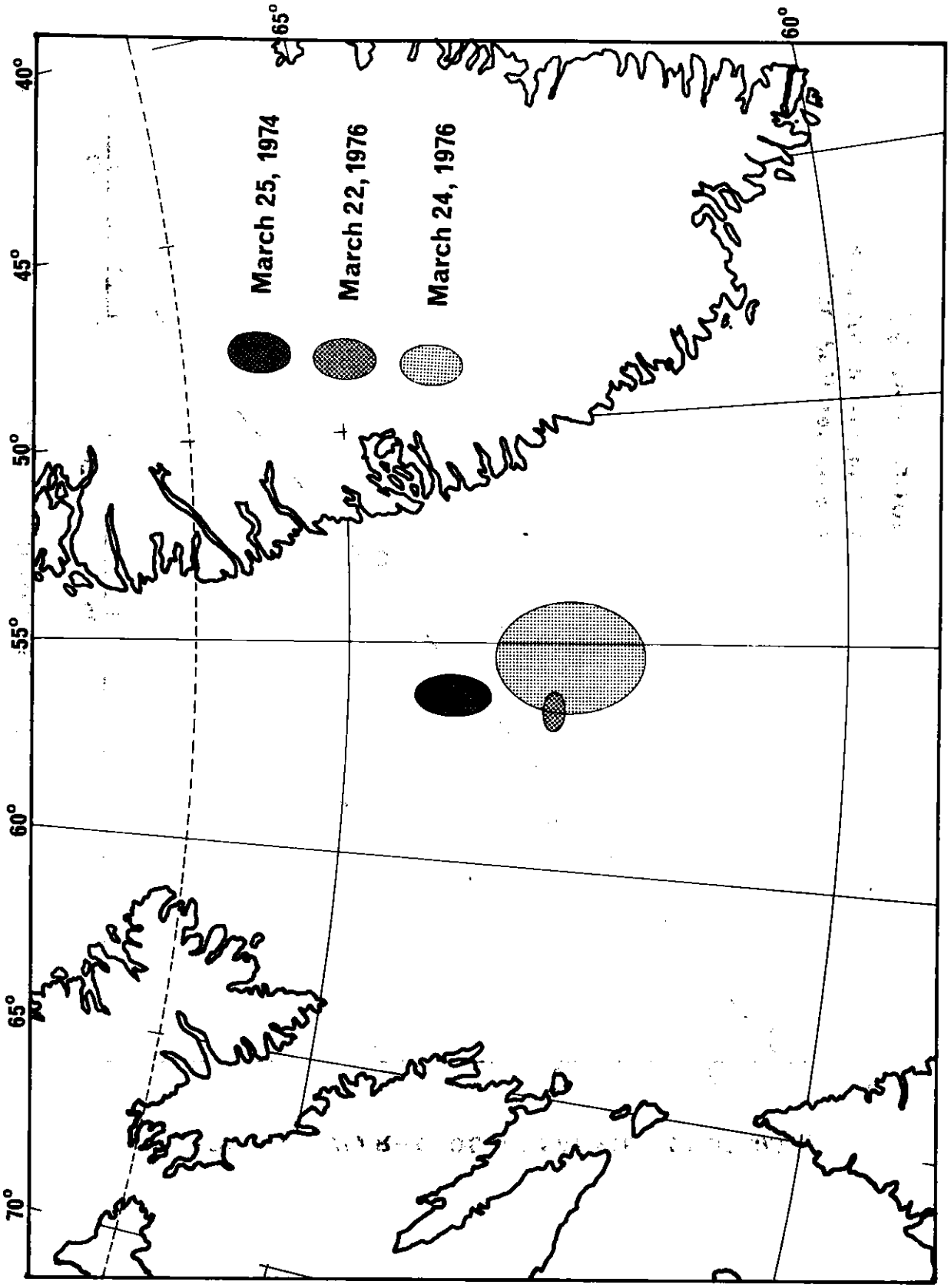

Fig. 1. Davis Strait showing locations of recently discovered whelping patches of hooded seals.

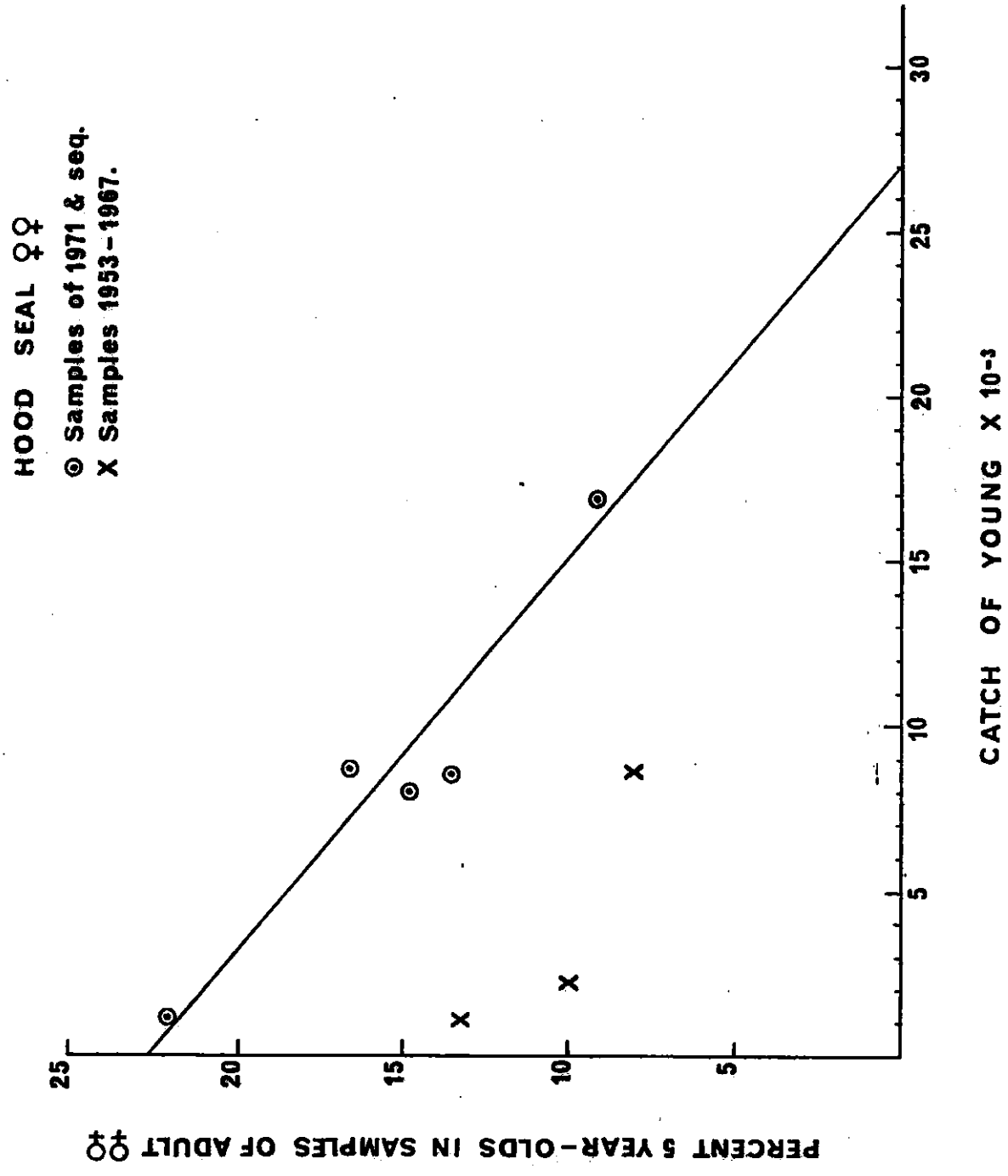
HOOD SEAL ♀♀
⊙ Samples of 1971 & seq.
X Samples 1953–1967.
PERCENT 5 YEAR-OLDS IN SAMPLES OF ADULT ♀♀
25
20
15
10
5
5
10
15
20
25
30
CATCH OF YOUNG X 10⁻³

Fig. 2.