

International Council for
the Exploration of Seas

C. M. 1991/N:14
Marine Mammals Committee



STOCK STATUS OF HARP SEALS IN THE
NORTH-EAST ATLANTIC

Digitalization sponsored
by Thünen-Institut

by

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ABSTRACT

The report is the continuation of the analysis concerning stock status of harp seals of the Greenland Sea (Potelov, 1990) including original materials provided by science-research vessel "TERIBERKA" and "VARZUGA" in 1990-1991. The results of the research prove seal reproduction rate of Jan Mayen population in 80-th was high, and the White Sea population - low. One of the main reasons of this difference is the polar bear, eating up thousands of harp seal pups, feeding themselves.

INTRODUCTION

For more than 30 years soviet and norwegian scientists observe the harp seals; taking into consideration the changes of stock in the North-East Atlantic. A brief summary of the analysis concerning seals of the Greenland Sea was carried out by soviet scientists and published by ICES in 1990 (Potelov, 1990). In the report below the results of analysis of some research materials collected in the Greenland Sea on board the research vessels "TERIBERKA" (1990) and "VARZUGA" (1991)

RESULTS OF RESEARCH ACTIVITY

According to the data of aerial photographing carried out by plane IL-18 DORR and research on board the vessels the stock of harp seal pups in 1988 was approximately 60 000 (Potelov, 1990). The author admits that because of the not perfect photographing this number is not exact. That's why in the quoted report and in given report a special attention is paid to the analysis of the other characteristics of the harp seal stock status; in particular, the analysing of the alterations taking place in the age-group structure of the population.

At the result of the great catch decreasing in 60-th, 70-th, 80-th, the shortening periods of sealing, new periods of sealing in attitude to the mature female seals and pups on breeding grounds the essential alterations took place in the age-group structure of seal population both on the moulting and breeding grounds (Tables 1, 2, 3).

Thus, the average age of the female seals on breeding grounds increased from 10,08 in 1965 till 16,10 in 1986. In 1988 the average age was 13,8.

As seen from the Table 1 and 3 in 1991 the average age of female seals decreased: 11,65. These alterations took place due to re-distribution in the age structure of the mature female seals of separate age groups. In particular, in 1988 - 1991 the number of "young" female seals (aged 4-10) increased. As a result, the portion of such female seals in catches increased, and the portion of the "old" female seals (aged 20 and older) and "middle-aged" decreased (Table 1).

The data concerning seal age structure on moulting grounds in 1990 are given in Table 2. According to these data, the number of seals born in 1989 was the biggest, the number of seals born in 1987 and 1988 was small, the number of seals born in 1980 - 1986 rather big. The Norwegian scientists also reported about small number of seals in the generations of 1987 and 1988. According to the Soviet aerial observation, in 1987 in the Greenland Sea and in the White Sea the synchronous decreasing, evaluated as a catastrophical decreasing of mature female seals on breeding grounds took place.

Ground formations began 7 - 9 days later of the usual period of whelping, breeding grounds looked like seal aggregations located on the vast sea-area. The number of female seals was not big.

According to seal breeding ground research in the Greenland Sea in 1988 the ground formation took place at a usual period of year (17.03 - 22.03) The square of the grounds and the number of seals were big. Taking into considerations these data, it is possible to suppose that in 1988 there were another factors unfluencing the seal stock, than in 1987.

In 80-th the sea area covered with ice was not vast. Under these conditions an unusual ice situation during the seal whelping was exactly in 1987 - 1988.

1987.

The ice-covering in the Greenland Sea was typical for this period of the year, except some phenomenae, which didn't take place from 1961 to 1991. Thus, unlikely the previous years all the sea area was covered with ice. Only eastern and southern fringe areas, influenced by swell, were covered with drifting ice-floes. The process of ice-breccia formation went on till the middle of the third decade of May. On this reason a lot of females, which produced pups, occurred to be on the north-east fringe of a vast ice-field.

1988.

At the first decade of March the ice-condition was like an average annual one. But at the end of the first and at the beginning of the second decade the ice aggregations were shifted to the south by the storm winds of northern direction. As a result, on the place of the "Ice Cape" an "Ice Bay" formed. It was filled up with thinned out ice density 2-4. This ice was being constantly broken by swell. These alterations of ice-condition took place during the formation of whelping grounds. Naturally, due to that the condition of feeding the pups with milk were poor.

In April - July the sea area, covered with ice, was much more vast than the average annual (the top of the Ice Cape prolonged up to 10 deg. E long.)

The seal stock fluctuations (other animals also) depend mainly upon what quantity of seals aged 1 survives when they start feeding themselves (except still not examined the problem of mature harp seal female stock decreasing in 1987.)

The rate of harp seal pups natural mortality, feeding themselves, depends upon their natural habitat in May - September. If the areas of pup distribution at this time coincide with the great number of polar bears areas, the seals are eaten up by the bears. According to the observation on board the vessel and planes, the greatest number of polar bears in the north-east Atlantic in May - September occurs to be on the border of drifting ice in the northern and eastern parts of the Barents Sea. Exactly these regions are the main natural habitats of the Jan-Mayen and the White Sea harp seal pup populations in summer and in autumn.

When ice-cover of the Greenland Sea is not very vast, the pups of Jan-Mayen population stay close to the border of the drifting ice. In 80-th the repetitions of the years of not vast ice-cover in the Greenland Sea took place much more often than in 60-th and in 70-th. Due to that thousands of pups were not eaten up by polar bear and the Jan-Mayen harp seal population was filled up with young animals very quickly.

At that time harp seal pups of the Greenland population were under the influence of polar bear; it led to the annual decreasing of the process of filling up the population with young animals.

In 80-th, in comparison with the previous ten-year periods, the ringed seal and bearded seal stocks (the main kind of polar bear food) decreased very much. One of the arguments proving ringed seals are greatly influenced by polar bear, is the estimation of ringed seal stock in 1984 in the Kara Sea. When estimating the stock of ringed seal pups, it was mentioned polar bear ate up 40 % of the pups in their first days of life.

It was very difficult to estimate the number of eaten up pups, started feeding themselves. However, taking into consideration great number of polar bears near the unfrozen patches of water along the outer fringes of coastal ice in the regions of ringed seal concentration, it is possible to suppose that the number of pups, being

killed by polar bear, is rather essential.

After the ringed seal and bearded seal stocks decreased, harp seal pups became the main kind of polar bear's food.

GRATITUDE

The author is very thankful to the norwegian scientist Byorn Bergfledt for the help in collecting the materials concerning harp seals of the Greenland Sea in 1987 on board the soviet research vessel of "MEZEN"

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APPENDIX

Table 1: Age-group frequencies of female harp seals on pup grounds in the Greenland Sea.

Year	Average age	4-10 yr.	11-20 yr.	20 yr.and older
1961	12,24	0,39	0,57	0,04
1965	10,08	0,70	0,28	0,02
1977	14,27	0,30	0,51	0,19
1982	14,30	0,30	0,53	0,17
1986	16,10	0,20	0,51	0,29
1988	13,80	0,36	0,50	0,14
1991	11,65	0,49	0,44	0,07

Table 2. Age-group frequencies of harp seals collected on the moulting grounds in the Greenland Sea (1990-05-09-06.01)

Age-group	Males		Females	
1	63	0*	55	0*
2	17	0	10	0
3	25	0	16	0
4	41	0	19	0
5	32	0	25	0
6	34	0	26	0
7	14	0	16	1
8	25	1	24	5
9	25	3	18	1
10	14	4	12	16
11	10	2	13	0
12	13	4	8	0
13	14	3	2	0
14	7	2	5	0
15	3	1	6	1
16	5	4	4	0
17	7	0	4	0
18	3	6	2	0
19	3	1	2	0
20	5	3	3	1
21	2	0	1	0
22	3	2	0	0
23	1	0	0	0
24	2	0	1	1
25	1	1	1	1
26	4	1	2	2
27	0	1	0	0
28	2	1	0	0
29	1	0	0	0
30	2	0	1	1
31	1	0	0	0
32	1	0	0	0
Sum:	380	40	276	30
Mean age:	7.0	15.9	6.9	12.7

* Age determined not precisely

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Table 3. Age-group frequencies of female harp seals collected on the breeding grounds in the Greenland Sea (1991.03.19-03.28)

Age-group	Ground 1		Ground 2		Sum	
4	0	0*	1	0*	1	0*
5	6	0	7	0	13	0
6	13	0	16	0	29	0
7	29	0	19	0	48	0
8	37	1	24	0	61	1
9	17	1	18	0	35	1
10	25	1	16	4	41	5
11	13	1	26	0	39	1
12	17	2	18	0	35	2
13	8	0	20	0	28	0
14	14	2	12	0	26	2
15	5	1	10	0	15	1
16	6	0	11	1	12	1
17	5	1	11	2	17	3
18	1	0	12	0	17	0
19	4	0	7	0	8	0
20	2	2	1	0	5	2
21	2	0	7	1	9	1
22	3	0	3	0	5	0
23	0	0	2	3	5	3
24	0	0	0	0	0	0
25	3	0	1	0	1	0
26	0	0	0	0	3	3
27	0	0	2	2	2	2
28	0	0	0	1	0	1
29	0	0	2	0	2	0
30	0	0	0	0	0	0
31	1	0	1	0	2	1
32	0	0	0	0	0	0
33	0	0	0	0	0	0
34	0	0	1	0	1	1
35	0	0	0	0	0	0
Sum:	212	12	248	14	460	31
Mean age:	10.86	13.5	12.32	18.71	11.65	18.29

* Age determined not precisely