International Council for the
Exploration of the Sea

C.M. 1971/N:3
Marine Mammals Committee

COMMERCIAL DAMAGE AND FEEDING HABITS OF SEALS IN THE BALTIC; A PRELIMINARY REPORT.

by
Staffan Söderberg *

1. Feeding habits.

The investigation concerning the feeding habits of seals in the Baltic is based on the analysis of remaining contents in stomachs from a sample of seals killed in Sweden during the years 1968-1971.

At the time of writing this paper, the stomachs and (in most cases) intestines from in total 250 seals have been examined. The material comes from all the three species that occurs in the Baltic area, viz. the grey seal (Halichoerus grypus), the ringed seal (Pusa hispida botnica) and the harbour seal (Phoca vitulina vitulina).

No. of specimens examined:

grey seal:	175
ringed seal:	65
harbour seal:	10

When compared with the hunting-statistics for the whole country the share of grey seals in my material is proportionally very big. This is, however, explained by the fact that the main part of my deliverers carry on their hunting in the Central Baltic, south of the Åland sea. In this area the grey seal is the most abundant species. The geographical distribution of the material is shown in the map (Fig. 1).

The collection of material will be finished in June 1971. Then the investigation was started, in July 1968, an annual amount of 100 stomachs collected was estimated, which would have given a total sum of about 300 units. This result will probably not be attained, mainly because of the decrease in the sealhunting, which could then not be foreseen. The material investigated is unfortunately not quite representative then regarding the seals' predation and influence on the salmon-fishery, as the main part of it comes from animals that have been killed during the period May-September, i.e. then salmon-fishery is not on any larger scale carried out in the Baltic.

*Address: Swedish Museum of Natural History. Sect. f. vertebrates.
104 05 Stockholm 50

The examination of the content found in stomachs and intestines has given the following results. (One unit investigated consists of the stomach and intestines from one specimen.)

The food of the grey seal:

No. of units examined:	175	
" " " empty:	37	(21%)
" " " containing milk:	2	(1%)
" " " with other recognisable food:	136	(78%)
" and percentage feeding on: -		
Fish		
Perch (Perca fluviatilis)	7	5,1%
Ruffe (Acerina cernua)	2	1,5%
European sculpin (Acanthocottus scorpius)	3	2,2%
Lucky proach (Acanthocottus bubalis)	2	1,5%
Fourhorn sculpin (Acanthocottus quadricornis)	2	1,5%
Blenny (Zoarces viviparus)	2	1,5%
Sandeels (Ammodytes sp.)	2	1,5%
Dab (Limanda limanda)	4	2,9%
Turbot (Psetta maxima)	6	4,4%
Plaice (Pleuronectes platessa)	3	2,2%
Flounder (Platichtys flesus)	8	5,9%
Cod (Gadus callarias)	29	21,0%
Pike (Esox lucius)	5	3,7%
Eel (Anguilla anguilla)	7	5,1%
Herring & Baltic herring (Clupea harengus)	32	23,5%
Sprat (Clupea sprattus)	5	3,7%
Salmon (Salmo salar)	18	13,0%
Sea trout (Salmo trutta)	9	6,6%
White fish (Coregonus lavaratus)	4	2,9%
Vendace (Coregonus albula)	1	0,7%
Molluscs		
Mussels (Mytilus edulis)	2	1,5%

The food of the ringed seal:

No. of units examined:	65	
" " " empty:	13	(20%)
" " " with recognisable food:	52	(80%)
" and percentage feeding on: -		
Fish		
Ruffe (Acerina cernua)	3	(5,8%
European sculpin (Acanthocottus scorpius)	5	9,6%
Fourhorn sculpin (Acanthocottus quadricornis)	7	13,5%
Blenny (Zoarces viviparus)	3	5,8%
Sandeels (Ammodytes sp.)	3	5,8%
Cod (Gadus callarias)	4	7,7%
Eel (Anguilla anguilla)	2	3,8%
Herring & Baltic herring (Clupea harengus)	10	19,0%
Salmon (Salmo salar)	5	9,6%
Sea trout (Salmo trutta)	2	3,8%
White fish (Coregonus lavaratus)	6	11,5%
Vendace (Coregonus albula)	2	3,8%
Crustaceans		
- (Mysis relicta)	9	17,5%
- (Mesidothea entomon)	11	21,0%
Molluscs		
Mussels (Mytilus edulis)	3	5,8%

The food of the harbour seal:

No. of units examined:	10	
" " " empty:	2	(20%)
" " " containing milk:	1	(10%)
" " " with other recognisable food:	7	(70%)
" and percentage feeding on: -		
Fish		
Cod (Gadus callarias)	1	14,5%
Turbot (Psetta maxima)	1	14,5%
Flounder (Platichtys flesus)	2	29,0%
Eel (Anguilla anguilla)	3	43,0%
Molluscs		
Mussels (Mytilus edulis)	1	14,5%

From these tables it appears that the grey seal obviously to a greater extent than the ringed seal feeds on species that are economically important to mankind. The food of the ringed seal consists of a great portion of Crustaceans. The ringed seal, the fourhorn sculpin and the two Crustacean species are by the way all glacial relicts in the Baltic.

The number of harbour seals is too small to make any definite conclusions possible. It is, however, probable that the feeding habits of this species much resemble those of the grey seal in the southern Baltic area.

It should be remembered that the tables only show the type of food eaten by the seal at a certain occasion. Thus they do not show the amount of fishes eaten by each single seal. A seal who has eaten three salmons accordingly in those tables is equivalent to a specimen who has eaten one herring. On the contrary, as the average daily need of food for an adult grey seal is estimated to be about 8 kg. (harbour seal: 5 kg; ringed seal: 3,5 kg.) it is obvious that the seal has to eat much more herring than salmons to get the amount of food required.

Seasonal variations in the intensity of feeding do also occur. The percentage of empty stomachs in the material is relatively higher during the spring and summer, than in the autumn and winter. This probably depends on the necessity of building up a reserve of blubber to be used in the starvation periods during breeding and moult. Seasonal variations might also occur in the type of prey taken by the the seals.

2. Commercial damage

In my former ICES paper (C.M. 1969 / N:3. Marine Mammals Committee.) I quoted a statement by the Swedish fishermen's organisation concerning the damage of seals to the fishery. It reads:
"Average damage per year in Sweden, during the period 1959-61:

Damage to fishing-implements:	13 500	Swedish crowns.
Damage to catch:	207 000	" "

The corresponding figures given for 1964 were:

Damage to fishing implements:	41 000	" "
Damage to catch:	402 000	" "

The damage to the fishery, according to these sources, therefor would be of the order of 1-2% of the whole catch, annually landed at the Swedish eastcoast."

To get a more detailed view of the seals' influence on the salmon-fishery, which is of special interest in this case, an investigation has been carried out concerning the salmon-fishery of Gotland. (Some 75% of the damages done to the salmon-fishery by seals in Sweden, refer to the waters surrounding Gotland.) For this purpose, a number of fishermen received a "log-book" in which they could note the amount of salmons caught, how many that were damaged by seals, etc. This work was started in September 1968, and is now (June 1971) almost finished.

During the season 68/69 the crews of 13 participating boats caught in total 22 700 salmons, of which 220 were damaged by seals (=0,96%). In the season 69/70 the corresponding figures were 11 100 salmons caught by 10 boats. Only 36 salmons were reported to be damaged by seals (=0,32%). The exact figures for the season 70/71 are not yet available, but an estimation seems to give the result that the damage caused by seals is equally small. During the whole period investigated, the fishermen have stated that the damage to their gears has been very small or none.

According to this the damage at large to the fishery in the Baltic, caused by seals, can hardly be considered to be of a serious nature nowadays, although this might formerly have been the case.

Neither is it possible, as it has often happened, to assume that the ice-situation is an important factor affecting the intensity of damage by seals. The period investigated includes both a normal ice-winter (68/69), a severe ice-winter (69/70) and a very mild winter (70/71), and in spite of this the damage reported never is more than 1% of the whole catch landed.

It shall at last be pointed out that even if the seals' predation on the fish-stocks was eliminated, i.e. the seals were exterminated, this does not necessarily means that the fishermen's catch automatically gets higher to the same extent.

Fig. 1

The geographical distribution of the specimens investigated.