

The Case Against a Grey Seal Cull in Scotland

In 1977 the Department of Agriculture and Fisheries for Scotland announced a six-year plan to reduce the Scottish grey seal population to the mid-1960s level, a reduction in numbers of up to a third; 900 breeding females and their pups and 4000 moulted pups in Orkney and North Rona were to be killed in the first year, 1978. But protests from the public and from conservation and animal welfare groups were such that the kill was called off.

In October 1978 a deputation led by the Rt Hon Jo Grimond MP met the Secretary of State for Scotland, Mr Bruce Millar, who agreed to consider further information relevant to the kill before making any decision on a possible 1979 kill. Ten conservation bodies then formed a Grey Seal Group under the aegis of the Council for Nature and chaired by the Honorary Secretary of the FPS, Richard Fitter, to evaluate the case for a grey seal kill, examine the present state of knowledge and make proposals for a management policy.

The Group's report, sent to the Secretary of State for Scotland in May 1979, recommended emphatically against such a kill:

'The evidence available to Government and ourselves is so incomplete that no scientifically sound management policy for grey seals can be derived from it. To pursue a programme which involves the destruction of large numbers of adult grey seals and their pups without proper scientific evidence and without knowledge of its real effects for the industry, for commercial fish stocks, for other fish species, or even for the seals themselves, can only be considered arbitrary in the extreme. The only prudent course of action at present is to suspend killing operations during the close season unless:—

- (i) there are very sound conservation reasons for a kill, as the only way of protecting the grey seal population itself, other endangered species, or the habitat; or
- (ii) serious damage is incontrovertibly being caused by grey seals to fish stocks which would be available for commercial use.

The Council for Nature recommends this suspension and, in view of the existing great pressures for action, it stresses the urgency for research to be initiated to fill the gaps in our knowledge, at the earliest opportunity.'

The Report Summarised

The following is the main part of a summary of the report by Jon Barzdo:

So far as can be determined, there is no single document that can be described as a 'management plan' for Scottish grey seals. The plan to manage them was based on four documents, three from the International Council for the Exploration of the Sea, and one from the Natural Environment Research Council (NERC). Its arguments rely on three assumptions:

1. that grey seals eat commercially exploited species of fish in substantial quantities;
2. that a reduction of the grey seal population would lead to an increased yield for the fishing industry; and
3. that this increased yield would increase revenue for the industry.

Damage to Fisheries

Arguments for reducing grey seal numbers state that they are eating fish that would otherwise be available to man, that they damage salmon nets, and that they are hosts of, and thus perpetuate codworm. Certainly some animals damage nets, having learned to catch fish from or near them, and there is no objection to such animals being killed in the nets if it is done humanely. The incidence of codworm infestation in cod appears not to have increased since the 1960s despite the large increase in seal numbers, and is thus largely irrelevant. It was not central to the Government's case.

Diet

Grey seals eat a wide variety of marine species, including cod, salmon, sand eels, cephalopods and crustaceans, but the overall proportion of each type of food in the diet is not known. Examination of 563 grey-seal stomachs between 1958 and 1971 shows that the proportions vary according to location (probably according to the type of food available in any area). The predominance of commercially caught species reflects the biased sampling: 49 per cent of the animals whose stomachs were examined were killed or drowned in or near salmon nets, and 9 per cent in or near whitefish or herring nets, so they were likely to have been feeding on the species being fished. While it is incontestable that seals feed on commercially important fish, the seals have been increasing in number while the fish species have been heavily depleted. Since there is no evidence that seal numbers are being limited by food availability, the commercial species may be comparatively unimportant in their diet.

Commercially exploited fish are also eaten by other species, for example seabirds and fish, notably cod which eat virtually any available species, including other cod. Levels in the food chain other than predators also affect fish populations. However, the DAFS plan ignored all but the top trophic levels. So great is the complexity of the inter-relationships between marine species and so poor is the data on seals feeding at sea, that it is impossible to determine the extent to which grey seals compete with commercial fisheries for the desired species. A significant increase in the availability of the desirable fish species might well not result from a reduction in seal numbers.

Quantity Consumed

The almost total lack of data on seal behaviour at sea makes it impossible to calculate accurately how much they eat. Their daily consumption is poorly documented, mostly from research on captive animals. The figure for fish consumption at sea used by DAFS scientists is 15 lb; it is taken from a record in 1934 of the consumption of fish by common seals, and extrapolated to the larger grey seals. However, estimates for the daily consumption of fish range between 3 per cent and 10 per cent of the seal's body weight; moreover, adults and pups, males and females and pregnant females all have different food requirements. Furthermore, seals do not eat every day, and it is not known how often they do eat; they certainly consume very little during the breeding season. If we assume, as the Government does, that there are approximately 70,000 grey seals in British waters, that they eat from 3 per cent to 10 per cent of body weight each day of feeding, and that (as the evidence indicates) feeding days each year are 150-250 for pups, 280-320 for adults and 275-325 for immatures, their probable range of food consumption is somewhere between

64,794 and 253,623 tons a year, with a mean of 152,686 tons. Papers by DAFS scientists from 1960-1973 state that 168,000 tons of UK fish stocks are taken annually by grey seals, of which 112,000 tons are commercially exploited species, with no indication of the probable range of errors involved.

DAFS assume that any fish not eaten by seals will be available for man. However, direct competition for food may be considerably less than has been assumed because the areas where seals feed (largely within 20 miles of shore, so far as we know) and in which commercial fisheries operate (largely outside 10 miles of shore) are generally different. (Of course those who fish within 10 miles of shore are bound to be affected.) Furthermore, it is probable that many of the fish that would not be eaten because the seal population was reduced would die through competition for food or because of other predators.

Seal Numbers

Calculations of total consumption and the Government estimates of how much seals compete with commercial fisheries are based on the estimate that there are 70,000 grey seals in British waters. However, estimates of seal numbers can be obtained only indirectly. Probable mortality rates, fecundity rate (estimated from the change in width of cementum layer in the females' teeth) and a number of other assumptions are used to construct a population model. From this the total population corresponding to any given pup production can be estimated. The pup production is itself estimated from sample counts.

The Scottish stock of grey seals consists of a number of sub-populations, the data on some of which are very poor. For each of them the population can be estimated and limits of probable error placed on the estimate, taking into account the amount of data, the probable errors in counting pups and the indirect method of calculation. Thus, although the overall best estimate of British grey seals is indeed 69,000, the range of probable accuracy is from 43,000 to 114,800 animals, i.e. the estimate could be as much as 50 per cent inaccurate either way. The clear indication in these circumstances is that the basis of management of grey seal stocks is not sound.

Population Growth

In establishing its grey seal management plan the Government has assumed that the population is growing at the rate of 7 per cent per annum, a figure derived from two population estimates, one of 34,000 in 1966 and one of 69,000 in 1978. But, as already demonstrated, the latter estimate, although made with better information, may be as much as 50 per cent inaccurate; the first is presumably less inaccurate. A further complication arises from the fact that there are several sub-populations with different growth rates. In the Farne Islands, for example, it seems that the early (pre-1951) population growth rate (11 per cent per annum) was due to immigration. The subsequent decline to 6-7 per cent per annum, is probably partly due to a decline of immigration. This follows the general rule in population ecology that growth rate falls as the population rises. In the Orkneys, the grey seal population growth appears to have been at the rate of 2-3 per cent per annum since 1969. It has been stated that the Outer Hebridean population increase of 6½ per cent p.a. from 1970 to 1975 was exponential, but five years is too short a time to establish this, especially in a species whose females do not breed until they are over six years old, with an annual survival after that of 93 per cent.

By simple extrapolation, assuming exponential growth and ignoring the fact that different sub-populations appear to be growing at different rates, Summers claims that the Outer Hebrides and Orkney populations combined will increase from 50,000 in 1976 to 100,000 in 1985 if they are not controlled other than by the annual local kill.² This increase involves exponential growth at the rate of 7 per cent per annum. Yet there is no evidence to support the idea that growth is exponential, and every indication is that even undisturbed populations do not usually grow as fast as that.

The only factor known to limit population growth in relation to density is pup mortality: the higher the density, the greater the pup mortality. This does not mean that there are no other density-dependent factors, for with so little knowledge we have no idea how their mortality is affected in the sea. The past increase in Scottish grey-seal numbers is attributed largely to the legal protection given them by the 1914 and 1932 Acts, to depopulation of the islands, and to a decline in man's dependence on their products, resulting in reduced hunting pressure and an increase in breeding sites. The ultimate population size may depend on the number of available breeding sites, so the grey seal population still has potential to increase. But how fast it will do so, and to what level, is entirely unpredictable.

Certainly if the seal population increases, its consumption of fish will also increase. Nevertheless, the selection of the mid-1960s level as a suitable population level for commercial fisheries can scarcely be anything but arbitrary. What are the costs and benefits of this strategy compared with the alternatives of maintaining the present population level or allowing an increase for some years? The answers should be considered in revising the management plan for the future.

Yield to Fishermen

Inter-species reactions among the fish stocks in British waters are so complex that it is far from clear how a reduction in seal predation on these stocks will affect their performance in future years. Applying the 'rate of exploitation' currently applied to fish stocks, Parrish and Shearer estimate that half the grey seals' fish consumption can be regarded as a loss to the fishing industry.⁴ But this procedure is only valid where the reduction in the seals' consumption is reflected in an increase in fish stock sizes of exactly that amount. Alternative analyses using the DAFS figures indicate that only 30 per cent of fish eaten by grey seals can be considered a loss to the industry. However, both calculations also assume that no other predators would benefit by the reduction in seal numbers and that other mortality factors would not increase, and both assumptions are extremely unlikely to be valid: other predators would almost certainly consume part of the 'surplus' no longer eaten by seals, and the remaining seals would increase their rate of feeding unless they were already feeding at their maximum rate.

As a result of the very high rate of fish exploitation in British waters, the stock is dominated by young fish, which makes it difficult to assess the effect of reduced predation on stock size in subsequent years, and some knowledge of stock recruitment and relations between species is needed. The calculation would require so much guesswork of the parameters involved that it would not be of any quantitative value.

In the North Sea cod-like species are so heavily depleted that the stocks

consist of relatively young fish of only a few age groups. The stock size, and therefore the annual catches, depend on only one or two age groups. In haddock, for example, it has been shown that fluctuations in the number of fish of one age have considerable influence on the short-term fluctuations in the total number of animals. Since, for many species exploited in the North-east Atlantic, mortality from fishing would have to be reduced by as much as 50-60 per cent to achieve the maximum sustained catch, it is difficult to see how a reduction in seal predation would have any long-term benefits.

Revenue to Fishermen

In the event of an extra yield of fish the revenue cannot be calculated by a simplistic multiplication of the extra yield by a fixed price, as DAFS scientists have done. Generally, an increase in availability means a decrease in price, according to the elasticity of demand. From 1962 to 1977, with a fluctuation in the landings of cod in Britain, the average first-hand values have shown an upward trend. Using the Index of Retail Prices, the value per ton for each year can be corrected for inflation to establish the 'real value' for comparison with other years. Thus the relationship between the quantity of fish landed and the real value can be established, and the price of cod can be calculated for a variety of tonnages landed.

Making the calculation, at low levels of cod landing an increase in the yield may produce a small net increase in revenue. For example:

Yield: 170 thousand tons; predicted price £177.50/ton; total revenue: £30,175,000.

Yield: 220 thousand tons; predicted price £139.32/ton; total revenue: £30,646,000.

Hence there is an increase in revenue in spite of the decrease in unit value. But consider an increase from 200 to 250 and then to 300 thousand tons.

Yield: 200 thousand tons; predicted price £153.4/ton; total revenue: £30,680,000.

Yield: 250 thousand tons; predicted price £120.6/ton; total revenue: £30,150,000.

Yield: 300 thousand tons; predicted price £94.82/ton; total revenue: £28,446,000.

Hence an increase in yield at these high levels of catch could lead to a net loss to the fishermen. And the present catch of fish is at a very high level. The demand curve for cod is used here because it was the average price of cod that the DAFS scientists, Parrish and Shearer, chose to indicate the potential net gain to the fishery of a reduction in seal stocks.

In fact, of course, other species than cod are involved, and other nations would take part of any increased yield in fish stocks. In addition the benefits accruing would be dissipated at each level of commerce between the fisherman and the consumer. Any research for a proper management plan should quantify the benefits for different levels of seal reduction and compare these with the costs of the kill and the cost of maintaining the seal population at different levels. Furthermore, other strategies should not be ignored, such as that of allowing the seal populations to increase and then harvesting them at their maximum yield level. Nor should people's interests in seals be ignored. It could be well considered whether the benefits of the non-consumptive use of seals (e.g. for tourism) outweigh those of other alternatives.

Communication and Consultation

It has greatly concerned the conservation and animal welfare groups

represented on the Council for Nature Grey Seals group that many organisations with knowledge of, or concerned with, the killing of grey seals were not consulted for comments prior to the decision to reduce the seal population. Had they been consulted, many of the errors might have been avoided. Nor were the reasons for the DAFS policy well enough explained, either to the public or to the voluntary conservation bodies or for the benefit of scientists who had professional interests. It is the function of the Seals Advisory Committee to make recommendations to the Minister and the Secretary of State from a variety of sources, but some interests are not represented which could with advantage be included in order to provide the Government with a clearer and more comprehensive picture without making the Committee unwieldy.

At the very least the Seals Advisory Committee should include representatives from the appropriate statutory and semi-statutory bodies and departments, should have available the advice of independent experts and bodies, and should be willing to accept the participation of suitable voluntary conservation organisations. In addition to MAFF, DAFS, NERC and NCC, who are already members, the Highlands and Islands Development Board should be represented to provide guidance and practical assistance to the licensees involved in the annual local kill, and the Mammal Society and some Universities with particular expertise could also, with advantage, provide individuals as members.

Postscript

After receiving the report the Secretary of State for Scotland announced in October that the only seal cull in Scottish waters in 1970 would be the traditional Orkney pup cull. He also said he intended to consult with the major interested groups about future management of the Scottish grey seal population. The first of this new series of meetings was held on November 20, and FPS was represented, as part of the Council for Nature Grey Seals Group, by Professor Peter Jewell, an FPS Council member. Further consultation meetings will be held under the aegis of the Natural Environment Research Council before the grey seal management policy for 1980 is decided.

References

1. PARRISH, B.B., and W.M. SHEARER 1977. Effects of Seals on Fisheries. ICESCM 1977M 14 Anacat Committee. (Ref. Marine Mammals Committee).
2. SUMMERS, C.F. 1978. Trends in the size of British Grey Seal populations. *Journal of Applied Ecology* 15: 395-400.

The ten conservation bodies participating in the report were Fauna Preservation Society, Greenpeace, People's Trust for Endangered Species, Society for the Promotion of Nature Conservation, World Wildlife Fund (members); Friends of the Earth, Marine Action Centre, Mammal Society, Royal Society for the Prevention of Cruelty to Animals (observers); Scottish Wildlife Trust (contributor). The Technical Adviser was Dr J.R. Beddington, Biology Department, York University. Dr J.J.D. Greenwood (Scottish Wildlife Trust), Mr E.A. Smith and Miss H.A. Williams were Contributors.

The full version of this Summary of the Report can be obtained from the FPS office for 50p including postage.