Department of Fisheries and Oceans

Brief

Submitted to

The Royal Commission

on

Seals and the Sealing Industry in Canada

VOLUME II

VOLUME I Brief
VOLUMES II-V Appendices

May 1985

Department of Fisheries and Oceans

Brief

Submitted to

The Royal Commission

on

Seals and the Sealing Industry in Canada

VOLUME II

VOLUME I Brief
VOLUMES II-V Appendices

May 1985

APPENDIX I

Fisheries and Oceans | Pêches et Océans

Information

CANADA'S POLICY ON SEALS AND SEALING

The Canadian government's policy on seals and sealing is consistent with its policies on the management of other fishery resources. Seals are considered a natural renewable resource available to be humanely harvested like many other species. The harvesting of this resource is permitted only within the limits of sound conservation principles, taking into account its role in the ecosystem. The government's objective is to gain the maximum socio-economic benefits for Canadians in general and those who depend directly on the resource in particular.

Sealing on Canada's Atlantic coast began before the arrival of the first European explorers. Jacques Cartier found Labrador Indians taking seals in the Strait of Belle Isle in 1534. By the end of the 16th century, Basque, Norman and Breton fishermen made annual expeditions to the Magdalen Islands in the Gulf of St. Lawrence, where seals formed an important part of their catches.

Since that time, wherever seals have regularly occurred on the rugged coasts of Newfoundland and in the Gulf of St. Lawrence, they have formed an important part of the harvested resources of the sea, fundamental to the year-round settlement of some areas. Seal meat, oil, leather and fur remain important items of trade and commerce.

Protection and Conservation of the Species

The harp seal is the world's third most abundant species of seal. Consistent with its policies on the management of other fish and wildlife species, the Government of Canada allows humane harvesting of seals at levels that are sustainable over the long term, based upon principles which ensure the maintenance of adequate breeding populations, and which take into account the relationships between the species and their competitors, predators and prey. The catches of harp seals within the last decade have been restricted to levels which have allowed the Northwest Atlantic population to increase from its low point, estimated at slightly over one million animals in the early 70s to the present level estimated to be close to two million. The total world population of harp seals is now estimated at approximately three and one quarter million animals.

Each year, seal specialists of several nations meet in the Scientific Council of the Northwest Atlantic Fisheries Organization (NAFO) to consider the most recent scientific data on seal populations, and to formulate advice to Canada on the scientific management of seal stocks. In 1982, additionally, Canada and the European Economic Community (EEC) Commission addressed a joint request to the International Council for the Exploration of the Sea (ICES) for scientific advice on aspects of the population dynamics and state of seal stocks in the Northwest Atlantic. An Ad Hoc Working Group was set up by ICES to respond to this request, comprising eminent experts from the U.S.A., United Kingdom, Norway, Netherlands, Federal Republic of Germany, Denmark and Canada, including academic scientists. It is significant to note that the harp seal

.../2

pup production figures given for the late 1970's in the opinion of the unanimous report of the ICES Working Group are substantially higher than those which were provided for the same period by NAFO. This is strong evidence that the scientific advice Canada has been receiving has been prudent, and that conservation measures followed since the early 1970's have been effective in increasing the harp seal population. Further, it provides substantive confirmation of the more recent NAFO advice projecting a 1983 population size in excess of 2 million animals. The 1983 total allowable catch in waters within Canadian jurisdiction is 186,000, the same level as 1982, well below the mid-range of the replacement yield and therefore, likely to ensure the continued, gradual increase in population size of this stock.

Although the Ad Hoc Working Group of ICES noted the increased availability of hooded seals - borne out by increasing catches in Greenland and by Norwegian vessels at the Front - it concluded that available data are insufficient to provide sufficiently reliable estimates of stock size, pup production and vital rates to warrant the formulation of a definitive opinion on trends in abundance. In view of the doubts implicit in this advice, and as a precautionary measure, Canada proposed a reduction in the total allowable catch for this species in 1983, to be shared by Canada, Norway and Greenland. In past years the total allowable catch for this species within Canadian waters was set at 15,000 shared by Canada and Norway, with Greenlanders catching an additional 5,000 to 6,000 in the unregulated catch along their coasts.

Humane Methods

The Canadian government is constantly seeking better, and if possible, more humane methods for harvesting seals. Strict regulations have been established to ensure that seals are harvested with a minimum of suffering. Several studies have concluded that the killing techniques practised by Canadian sealers in harvesting whitecoats are as humane as any developed to date.

Tests have been carried out within the last few years, using a firearm developed by a member of the Committee on Seals and Sealing, specifically for use in the harvesting of young seals. Extensive field trials with this weapon scheduled for the 1982 season had to be cancelled early, since it did not quite meet the stringent criteria of efficiency in producing instant brain death. Modifications of the design of the pistol and characteristics of its ammunition carried out by the manufacturer appear to have resolved the problems which became apparent in the field in 1982, and it is planned in 1983 to subject the instrument to rigorous testing. Indications are that it may have advantages over current techniques of stunning; it will, however, have to meet or exceed the level of efficiency and humaneness already attained by the club or hakkapik, before it can be accepted under the regulations as an approved killing instrument.

The Canadian Government's policy requires every commercial sealer to obtain a licence to participate in the hunt. The Department of Fisheries and Oceans organizes lectures and courses of instruction for sealers. These training courses are prepared in conjunction with experts from societies and agencies concerned with animal care, to ensure that seals are killed in the most humane manner possible, and to assist sealers in producing high quality seal meat and skins.

.../2

Canada's policy also supports the presence on the sealing grounds of reasonable numbers of independent observers such as veterinarians, veterinary pathologists, biologists and humane organization observers. Numerous national and international organizations concerned with the humane treatment of animals have sent observers to the seal hunt. The reports of many of these have been made publicly available.

INFORMATION leaflets are issued by the Department of Fisheries and Oceans to describe and explain departmental policies, programs and activities.

Published by:

Communications Directorate
Department of Fisheries and Oceans
Ottawa, Ontario
K1A 0E6

I-HQ-83-09E

APPENDIX II

Cover Photo: Brian Roberts

Published By:
Communications Directorate
Department of Fisheries and Oceans
Ottawa, Ontario
K1A 0E6

DFO/1791
Minister of Supply and Services
Canada 1984
Catalogue Number Fs 23-57/1984/E
ISBN 0-662-13338-2

Disponible en Français

In recent years, the Canadian sealing industry has been the subject of widespread controversy.

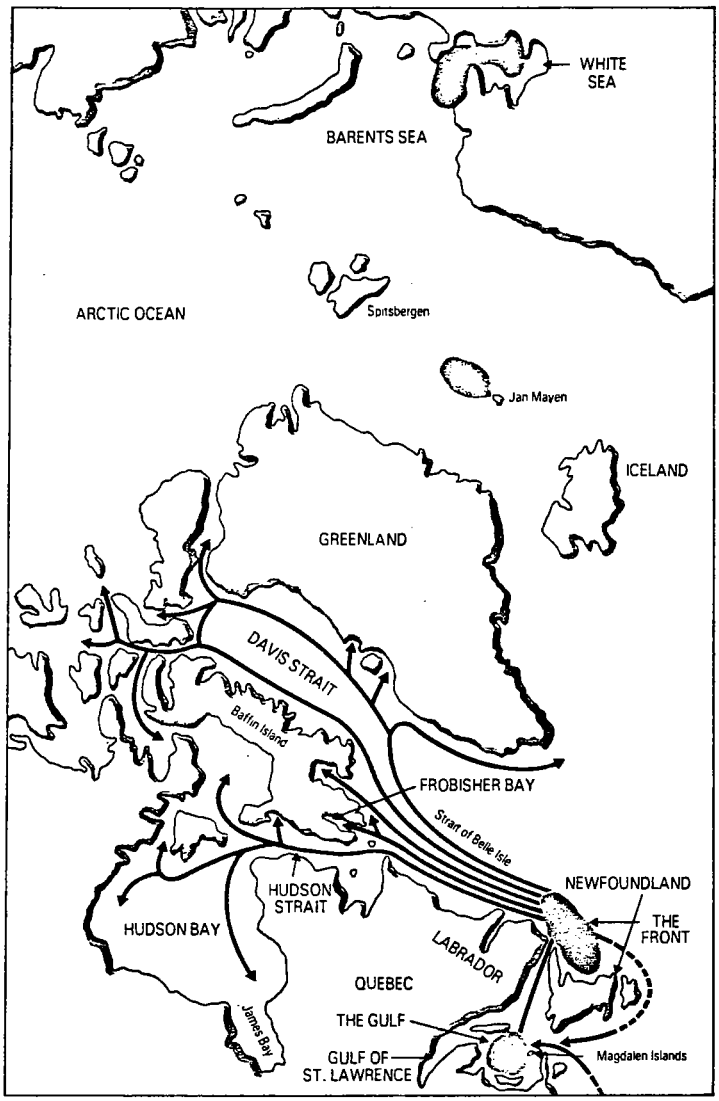
Well-funded campaigns have been mounted in an effort to bring this 400-year-old industry to an end. They have focused largely on the visual appeal of the harp seal pup or whitecoat, the image of which has influenced millions of people.

While photographs of seal pups are very appealing and some aspects of sealing seem shocking to many people, the future of the seal industry cannot be based on such subjective reactions.

There are serious issues that must not be overlooked – including the role animals play in supporting human life, the relationship between seals and other components of the Atlantic fishery, the importance of sealing to the livelihood of many Canadians, and the obligation to base resource management decisions upon the best scientific evidence.

This booklet will provide the reader with a greater understanding of the Canadian sealing industry, its importance to Canada, and the basis upon which Canada's marine species management policies are made.

Six species of seals inhabit Canadian waters – bearded seals, grey seals, harbour seals, harp seals, hooded seals and ringed seals. Most are hunted by the native people of Canada's Arctic and sub-Arctic regions to furnish food, oil, clothing and income through the sale of seal products.



Breeding and moulting areas, and principal migration routes of the harp seal population.

Traditionally however, two species – the harp seal and the hooded seal – have comprised the bulk of the seals taken during the annual Atlantic seal hunt off the east coast of Canada.

Here, every March, vast numbers of harp seals and a smaller number of hooded seals gather on ice floes to give birth to their young and, a few weeks later, to breed.

The harp seal is the principal species hunted, both because of easier accessibility and greater abundance. The harp seal is, in fact, the third most abundant species of seal in the world, with a total population of more than 3 million animals.

There are three distinct stocks of harp seals. The White Sea and the Jan Mayen stocks are found in the Northeast Atlantic. The Northwest Atlantic stock, the largest of the three, is found in Canadian and Greenland waters.

This population is further sub-divided into two herds, based on breeding areas. The Front herd breeds on heavy Arctic ice floes off the coasts of Newfoundland and Labrador. The Gulf herd breeds on floating pack ice in the Gulf of St. Lawrence near the Magdalen Islands.

Hooded seals also range throughout Arctic and sub-Arctic Atlantic waters, whelping on more scattered ice floes further off the eastern coast of Newfoundland. Hooded seal population estimates vary greatly because of difficulties in accurately measuring the more scattered herd. However, hooded seals have played a relatively unimportant role in the Atlantic seal industry. Because of greater abundance, easier accessibility, and greater market demand, harp seals account for more than 90 percent of sealing activity during the annual regulated hunt. (See tables on page 7)

There is no evidence that harp seals as a species are in any way endangered.
Recent scientific advice has confirmed the cautious nature of Canada's management regime for harp seals. A 1982 study by the International Council for the Exploration of the Sea (ICES) concluded that **annual** pup production for the period between 1977-1980 was likely to have been in the range of 380,000-500,000 with a corresponding population of harp seals older than one year in the range of 1.5-2.0 million.

The 1983 report of the Scientific Council of the ~~13~~-nation Northwest Atlantic Fisheries Organization (NAFO) corroborated these findings and predicted that the harp seal population would increase from 1983-1984.

At the 1983 biennial meeting of the parties to the Convention on International Trade in Endangered Species (CITES), a proposal to include harp and hooded seals in an Annex to the Convention was not approved, indicating that continued unregulated trade in the products of these animals does not endanger the survival of the species. The CITES Convention has been ratified by 86 nations.

Life cycle of a harp seal

Seals of the Front and Gulf herds spend their summers feeding in Arctic waters along the coasts of Baffin Island and Greenland, ranging as far as Hudson Bay and Ellesmere Island. As winter approaches, they migrate south in advance of the descending pack ice to their whelping and breeding grounds off the coast of Newfoundland and in the Gulf of St. Lawrence.

Pups in the Gulf herd are usually born on the ice floes from late February to early March, with whelping taking place slightly later at the Front. Females whelp at some distance from the edge of large ice fields, on rough contoured ice surfaces that afford protection from the wind.

Pups weigh about 7 kg at birth and gain weight rapidly to about 30 kg after approximately 10 days of nursing – the shortest-known nursing period of any mammal. Within 10 to 14 days, pups are weaned and abandoned by their mothers. After leaving their pups, the females mate with the males and feed heavily on fish for several weeks before moulting and commencing the long journey northwards with the retreat of the pack ice.

After weaning, the pup begins its first moult. At the age of approximately 12 days the "whitecoat" becomes an "overgang" when its silver-grey "beater" coat begins to appear. A few days later it becomes a "tanner" as its white hair loosens and begins to fall out. During the last stage of this moult, any remaining white hair is very loose and the pup is called a "ragged-jacket".

Fully moulted at four weeks of age, the beaters enter the water and begin to feed, gradually moving northwards to the main summer feeding grounds off the coast of Greenland.

Harp seals are long-lived and often reach ages of 30 years or more. Females become sexually mature between 4 and 5 years of age.

Harp seals consume vast quantities of fish – estimated to be more than 1.5 tonnes per animal annually. At current population levels, the Front and Gulf herds consume more fish than are caught by all countries fishing in the Northwest Atlantic. The most important species of fish eaten by weight is the capelin, a small fish that is also an important food source for cod, sea-birds and whales.

Harp seals have few natural predators except sharks, killer whales and polar bears.

Management of seal herds

Canada's policy on the management of seal herds is consistent with policies on the management of other living renewable resources. Humane harvesting of seals is allowed at levels which will sustain the total population over the long term. Seal quotas are based on sound conservation principles which ensure the maintenance of adequate breeding populations.

The Canadian Government's current policy allows a slow increase in harp seal population, providing scientists with an opportunity to measure the impact of population growth.

To provide a scientific basis for management, extensive research has been carried out by government and independent scientists since 1950.

1982 and 1983 Allocations

Harp Seals	Quotas 1982	1983
Canadian landsmen	74,000	74,000
Canadian large vessels	77,000	77,000
Norwegian large vessels	24,000	24,000
Northern Native allowance*	11,000	11,000
Total Allowable Catch	**186,000**	**186,000**
(Canadian waters)		
Greenland sealers**	13,000	13,000

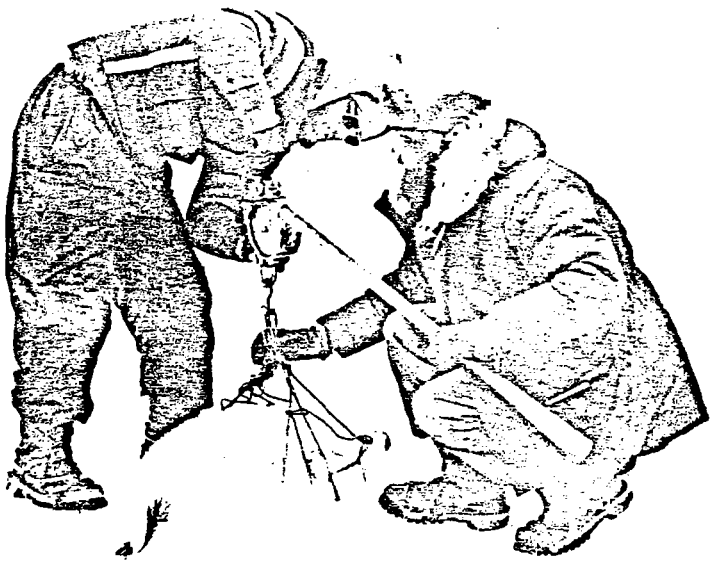
Hooded Seals	Quotas 1982	1983
Canadian large vessels	7,500	6,000
Norwegian large vessels	7,500	6,000
Total Allowable Catch	**15,000**	**12,000**
(Canadian waters)		
Greenland sealers**	5-6,000	5-6,000

*Seal hunting by Northern Natives is a year-round activity which is not subject to a fixed quota. The allowance is based on the estimated historical catch.

**The TAC makes allowance for the estimated catch by Greenland sealers, although this estimate is not included in the total.

Several methods are used to estimate the size of seal populations and the population growth rate, including aerial photography, tag and recapture analysis, examination of age distribution within sample populations, intensive biological studies,and first-hand information from fishermen. Data from field research is used to develop complex mathematical models which provide the scientific basis for management of seal herds.

Determining the population size and growth rate for a marine species depends upon estimation. For this reason, quotas are based upon conservative estimates of population size. These estimates are revised annually by scientists of independent organizations, including the International Council for the Exploration of the Sea (ICES) and the Northwest Atlantic Fisheries Organization (NAFO).



DFO

Landmarks in the history of Canadian sealing

1534 French explorer Jacques Cartier noted Labrador Indians taking seals in the Strait of Belle Isle. By the end of the 16th century, seals formed an important part of the catch of Basque, Norman and Breton fishermen on their annual expedition to Canada's rich fishing grounds. Inhabitants of coastal fishing villages also harvested seals from shore.

1794 Wooden schooners introduced to Newfoundland waters allowed extensive hunting on the breeding grounds. By the mid-1800's the annual hunt was a major industry, employing a large percentage of the Newfoundland population. The yearly take often exceeded 500,000 seals.

1895 Concern over dwindling seal populations led to laws, enacted in Newfoundland, to protect animals of breeding age by prohibiting sealing ships from making more than one trip a year to the ice.

1945 Prior to 1940, seal meat and oil products were more important than pelts. After 1945, this relationship was reversed as international market demands made seal pelts increasingly valuable.

1949 Newfoundland became a province of Canada. With the inclusion of this former British colony into Canada's Atlantic fishery, extensive Canadian Government research on harp seals began.

1961 A closing date was imposed for the first time on the annual seal hunt to protect adult females in moulting concentrations.

1964 Increasing public interest in harp and hooded seals led to more population studies, better control of hunt procedures, and research into humane killing methods.

1967 The International Commission for the Northwest Atlantic Fisheries (ICNAF), representing most countries fishing in North Atlantic waters, began gathering scientific data on harp and hooded seal populations.

1970 The use of aircraft to hunt seals was banned.

1971 The first quotas were introduced. The 1971 TAC for harp seals was 245,000. This was reduced to 150,000 from 1972 to 1975.

The Committee on Seals and Sealing (COSS) was established to provide the Canadian Government with an independent source of management advice. Made up of scientists, veterinarians and executive members of Canadian and international humane societies, COSS has examined the socio-economic, ecological and humane aspects of the sealing industry over the years, and recommended various changes to seal management policies.

1975 Analysis of harp seal population studies led to divergent opinions on natural mortality rates. As a precautionary measure, the TAC in 1976 was further reduced to 127,000.

1977 Canada extended its fishery jurisdiction to a 200-mile limit from the previous 12-mile limit, bringing the Atlantic sealing industry effectively under Canadian control. Stricter conservation measures were instituted and catches by Northern Native hunters were included in TAC calculations.

1982 The International Council for the Exploration of the Sea (ICES) reviewed 23 seal population studies, concluding that the harp seal population likely exceeded figures used to establish quotas during the 1970's.

1983 The biennial meeting of parties to the Convention on International Trade in Endangered Species (CITES), held in April in Botswana, concluded that continued unregulated trade in the products of harp and hooded seals does not threaten the survival of these animals.

Responding to intensive lobbying, the Council of the European Economic Community (EEC) approved a directive banning the importation of skins of harp and hooded seal pups for a two-year period, effective Oct. 1, 1983. The combination of this temporary ban and the worldwide reduction in prices for all furs resulted in a reduced demand for seal products and a significant reduction in Canadian and Norwegian sealing activity during the 1983 season.

Fishing provides the economic base for many Atlantic coastal communities. With their survival depending on a single industry, fishermen harvest all the marine resources available on a seasonal basis.

Winter is a difficult time for most inshore fishermen. With boats locked in ice-choked harbours, unemployment in some communities soars to more than 90 percent. The annual seal harvest is, therefore, a welcome beginning to a new fishing season, providing both food for the table and a timely source of money to prepare boats, nets and gear for other commercial fishing activities which will follow.

The landsmen

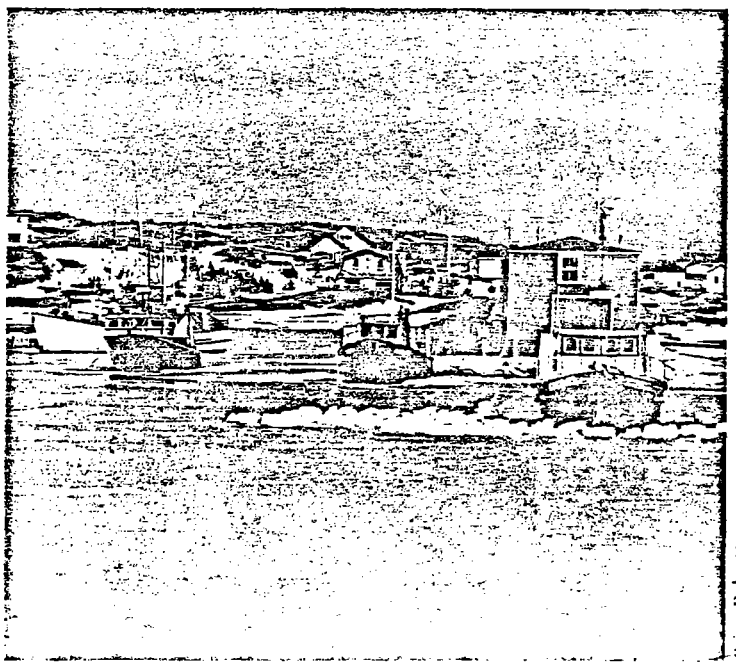
The vast majority of sealers are landsmen, predominantly inshore fishermen from isolated bays and inlets of Northern Newfoundland and the Magdalen Islands, who usually hunt within a few kilometres of their home communities.

Most landsmen go sealing on foot or from small boats, using rifles or clubs. When the ice is firm, landsmen can venture several kilometres from shore in pursuit of migrating seals.

Other landsmen travel further afield in larger fishing boats, known as longliners. These boats are capable of following the seals out to sea, where larger concentrations frequently occur.

In recent years, approximately 6,000 landsmen, including longliner sealers, have participated annually in sealing both in the Gulf and on the Front. Most took seals for commercial purposes, although some hunted primarily for meat, taking only a few seals.

Landsmen take harp seals and hooded seals of all ages, including whitecoats. More than 80 percent of the total catch taken by landsmen, however, are harp seal beaters, bedlamers and adults.



Brian Roberts

The number of active sealers is always less than the number of sealing licences issued annually, reflecting the vagaries of seal hunting – the often severe weather and ice conditions and the frequent difficulty of reaching migrating seals.

The large vessels

Large vessel sealing is a concentrated harvest which involves vessels more than 150 tonnes and longer than 20 metres, on the ice floes at the Front and in the Gulf where the seals gather to whelp.

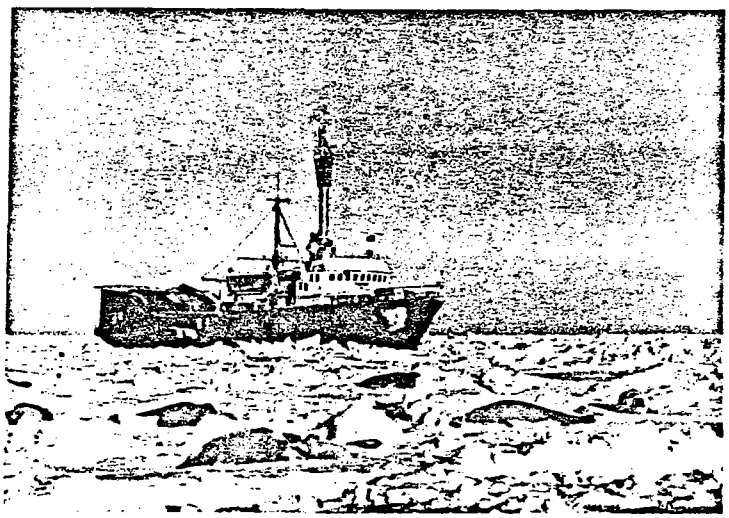
In 1982, 204 fishermen, mostly from Newfoundland, participated in large vessel sealing from 8 Canadian ships. There were also 3 Norwegian vessels.

Large vessel sealers took about 56,000 whitecoats and 3,900 beaters, bedlamers, older harp seals and hooded seals at the Front in 1982. Close to 20,000 whitecoats were taken in the Gulf.

The estimated average return for large vessel sealers in 1982 was $5,100, with the sale of oil and meat accounting for about 25 percent of the total.

The 1983 hunt was severely curtailed due to the worldwide economic recession and the European ban on the importation of pelts from harp and hooded seal pups. European sales have traditionally accounted for about 80 percent of the final market for harp and hooded seal products.

The large vessel whitecoat hunt is the aspect of the industry most often condemned by seal hunt opponents. Yet, the growth of the harp seal population depends more on adults of breeding age than on immature seals – which have a high natural mortality rate. As a conservation measure, it is preferable to concentrate harvesting on a younger segment of population rather than on breeding stock. This principle holds true for any animal population managed for human consumption.



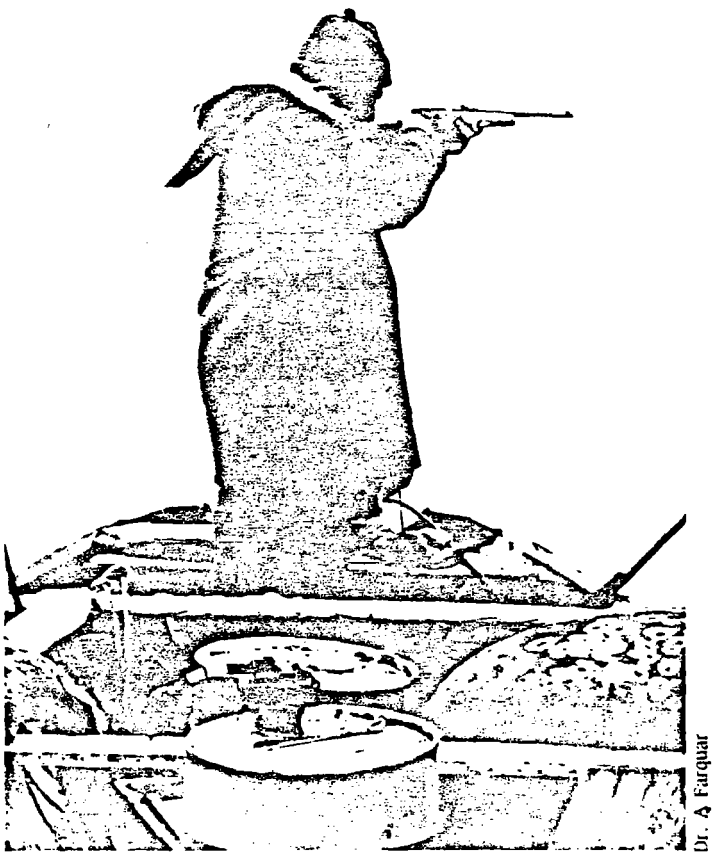
Jim Winter

Native hunting

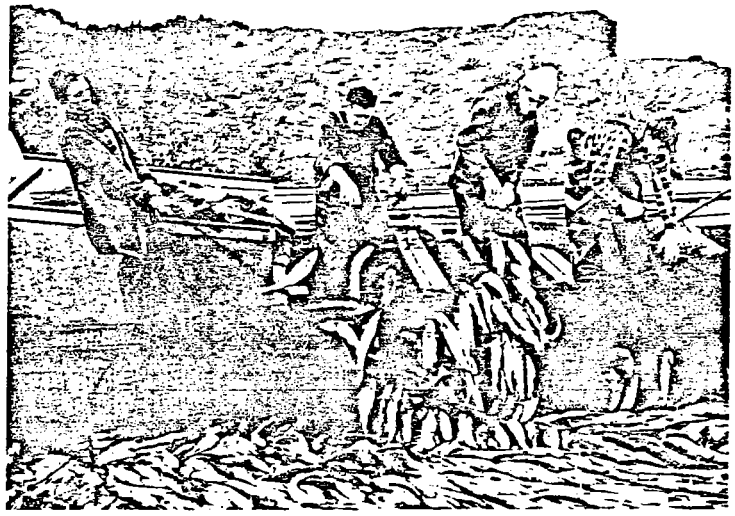
Like the fishermen of Newfoundland's coastal communities, the Inuit of Canada's far North have always depended on available resources for their existence. In the bleak landscape of the eastern Arctic and northern Labrador, hunting, trapping and fishing have provided the means of survival for thousands of years. Seals, in particular, have played a key role in the traditional Inuit way of life – furnishing meat for food, oil for cooking and warmth, and skins for clothing, shelters and boats.

In recent years, cash sales of seal pelts and handicraft products have eased the hardships of subsistence living, providing a means to purchase food, fuel, clothing and modern equipment. In 1981, the value of seal products to the Arctic economy exceeded $1 million. The 35,000 seals taken in 1981 (mostly ringed seals) provided up to one-third of the total income of about 2,000 active Inuit hunters. In many communities, seals have been the principal source of earned income.

The European ban on harp and hooded seal pup pelts, opposition to the Atlantic seal fishery from some vocal interest groups, and uncertainty in the marketplace have led to depressed prices for all seal products, including those taken by Inuit hunters. This has had a devastating effect on the economic well-being of many Inuit communities.



Dr. A Farquar



Crombie McNeill

Economic contribution of sealing

Canada is the leading fish exporting country in the world. Despite this fact, the financial returns to many individual fishermen are modest.

In 1982, the estimated average income of Newfoundland fishermen who sealed was only $9,180 – less than half the average annual earnings of Canadian workers in manufacturing industries. The average return from sealing was $851 – accounting for almost one-tenth of average annual income. For some fishermen, however, the money received from sealing can represent a third or more of annual income. This money comes, moreover, at a time when other employment opportunities are unavailable.

In 1982, more than 6,000 people were involved in the Canadian Atlantic seal industry, including sealers, agents, workers in processing plants, and seasonal workers employed in the canning of seal meat.

Some people have suggested that sealing could be replaced by other employment – even jobs in artificial fur factories. Such proposals fail to recognize the isolated nature of many fishing communities and their dependence on only one resource base – the fisheries.

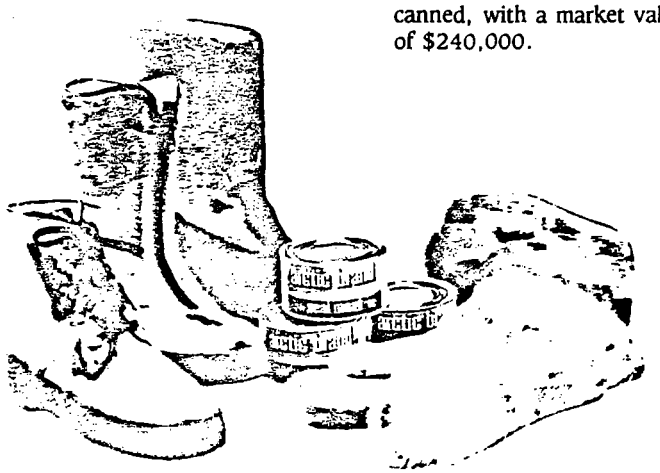
Compensation for not hunting seals has also been proposed. However, most fishermen are determined to maintain their traditional independent livelihood, harvesting the fish and other marine species brought to Atlantic shores with the perennial change of the seasons – a vital economic activity with a centuries-old heritage.

Value of seal products

The total value-added contribution of the sealing industry to the Canadian economy in recent years has been in excess of $12 million annually. This amount is determined by measuring the net economic stimulation to the Atlantic region from all sealing-related activities. There is the potential for an even greater contribution in future years with the development of increased domestic secondary processing and expanded markets for seal products.

The value of major primary products is listed below:

Oil Seal oil, rendered from blubber, had an export value of $700,000 in 1982. Seal oil is exported for processing into machinery lubricants, edible oil products and cosmetics.

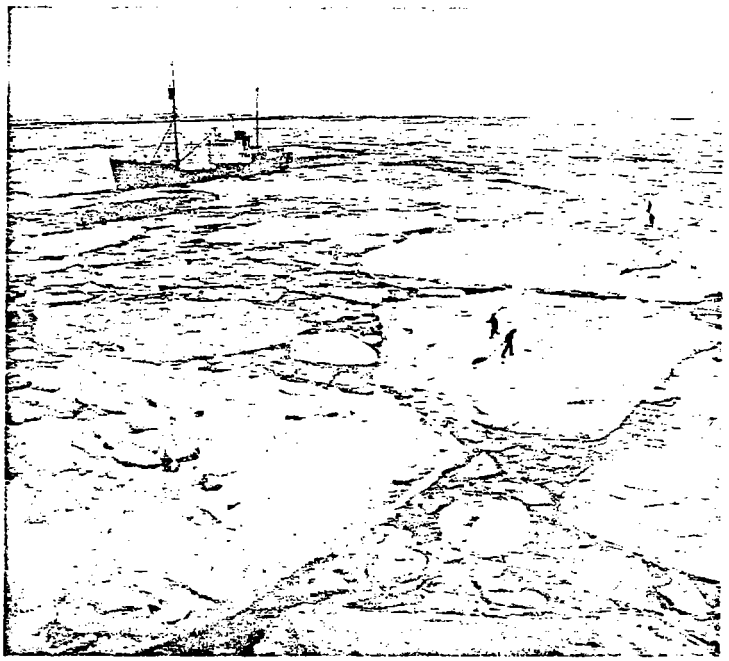


Pelts In 1982, the landed value of Atlantic coast seal pelts (the amount received from dock-side sale to processors) was approximately $3.7 million. The export value after primary processing was about $4.5 million. The value of pelts and manufactured goods to the Inuit economy was about $1 million. Pelts are processed to remove blubber and meat, and then exported to be made into a variety of clothing articles, including coats, jackets, hats, boots, shoes, handbags and belts.

Meat Seal meat is consumed extensively throughout the Atlantic region, although commercial sale of fresh and frozen meat is confined primarily to Newfoundland. In 1982, meat sales in Newfoundland exceeded $500,000. In addition 6,000 cases of seal meat were canned, with a market value of $240,000.

No aspect of the industry has aroused as much controversy as the methods used to cull harp seal pups. While a large percentage of seals taken annually are killed with rifles, sensational media coverage and emotional brochures by anti-sealing groups have focused almost exclusively on the clubbing of seal pups – depicting the killing methods as savage, brutal and inhumane.

Certainly, the clubbing of seals is not a pleasant sight to watch. Nor, for that matter, is any other slaughtering operation. Nevertheless, the methods used by sealers as they move across the ice are humane.



Brian Roberts

This is in contrast to the methods used in many commercial abattoirs. A 1977 study of 22 representative European abattoirs by the Directorate General of Agriculture of the European Economic Community found, in all cases, the killing procedures for calves to be unsatisfactory. In 50 percent of the abattoirs, the slaughter of pigs and chickens failed to meet prescribed standards of humane killing. Humane killing is defined as bringing a rapid and efficient death to an animal with the absence or absolute minimum of physical pain or psychological distress.

The humaneness of seal clubbing has been attested to by qualified veterinarians, animal pathologists and biologists who have observed the hunt first-hand on numerous occasions.

All sealers taking seal pups on the ice floes must conform to provisions of the Canadian Seal Protection Regulations which stipulate that seal pups must be clubbed on the forehead until the skull is crushed. This must be done with a regulation club or hakkapik and causes irreversible brain death.

Clubbing must be followed immediately by exsanguination (bleeding out) through severing the main blood vessels to the flippers. A sealer may not remove the pelt of any seal until both these requirements have been satisfactorily completed.

Report of an independent veterinarian

In 1979, G.B. Taylor, Chief Veterinary Officer and Scientific Consultant for the International Society for the Protection of Animals (ISPA), headquartered in England, observed the annual hunt in conjunction with three members of the Canadian Veterinary Medical Association.

Their observation of more than 150 seal pups being clubbed and subsequent postmortem examinations of 13 skulls indicated to them that none of the seals was exsanguinated while conscious or skinned while still alive. Every skull showed evidence of extensive brain haemorrhaging.

In his conclusions on the 1979 hunt Dr. Taylor stated, "In my considered opinion, the club, used as I saw it, produced a satisfactory level of unconciousness, so that the seal pup is not sentient of the pain caused by the sealer's knife when exsanguination is carried out . . . and pelting can be carried out without pain – since the seal is dead."

Dr. Taylor further observed that sealers could be compared to "slaughtermen in an abattoir doing a job as well as they could." All of Dr. Taylor's findings were unanimously supported by his colleagues on the hunt observation.

While the clubbing and exsanguination procedure has proven to be the most humane killing method available so far, extensive research into other methods continues to be carried out.

Between 1969 and 1972, the United States Government, responding to concerns over the clubbing of North Pacific fur seals on Alaska's Pribilof Islands, commissioned a number of studies into alternate seal killing methods including acoustical shock, injectable drugs, and shooting. None proved as rapid, as efficient or as humane as clubbing and exsanguination.

Nevertheless, due to the continued emotional opposition to the use of the club, research is being sponsored by the Canadian Government to develop alternate methods which will efficiently kill a seal pup at close range, but still be safe to use. Prototype hand-guns have been tested during the 1979, 1980, 1982 and 1983 hunts. These prototypes have yet to be proven as efficient as the clubbing techniques.

Why sealers must kill humanely

The idea of inflicting unnecessary pain on an animal and, particularly, the idea of skinning an animal while still alive are repugnant to every commercial sealer.

Sealers receive instruction on proper sealing practices from Fisheries officials. The Seal Protection Regulations are also rigourously enforced by Fishery Officers during the hunt. Between 1980 and 1982, more than 30 sealers had their licences suspended and were fined for various infractions.

Sealing is a commercial industry. The economic return to sealers depends upon the quality of the pelts taken. To meet the highest grades, and earn the highest returns, sealers must remove pelts with a clean, straight cut along the underside of the seal, taking off the pelt in one piece.

Sealers work with a razor sharp knife (known as a sculping knife) and pride themselves on the speed and accuracy with which they work. Sealers and other experts agree it would be impossible to quickly or accurately skin a still-conscious seal.

It has been noted that, after clubbing, some seal pups go into an automatic "swimming reflex," a motion caused by the pressure of the spinal fluid on the spinal cord. To the uninformed, the clubbed seal may appear to be writhing in pain. In fact, the opposite is true. These automatic muscle spasms are sure signs of death.

Access to the hunt

Sealing is a dangerous activity. It takes place for the most part on unstable, shifting ice floes in the open Atlantic or Gulf of St. Lawrence. Even experienced sealers sometimes lose their footing and end up in the freezing water.

Nevertheless, interested individuals can apply to visit the area of the hunt by submitting a request to Canada's Minister of Fisheries and Oceans, outlining the reasons why they wish to observe the hunt.

Requests by legitimate scientific observers and representatives of major news organizations are accommodated within the ability of Fisheries officials to monitor safety.

Requests by others to visit the hunt are considered on their individual merits.

Female harp seals and pups

Many people are convinced that harp seals are regularly killed in the presence of their mothers.

In reality, this very seldom happens. According to observations by independent scientists and representatives of humane organizations who have witnessed the hunt, most female harp seals enter the water through holes in the ice when humans approach. On the rare occasion when a dam does defend her pup, the sealer will usually leave it alone and move to another area.

Scientists have concluded that the relationship between a dam and her pup is predominantly hormonal and ceases rapidly after weaning or loss of the pup. In fact, females abandon their pups entirely within two weeks of birth.

Emotional reports by one anti-sealing organization describe female harp seals "with great tears flowing from their grieving eyes." All seals' eyes are kept moist by the continuous secretion of a viscous fluid which protects them both underwater and in the air, and which overflows onto their cheeks when they haul themselves out of the water onto the ice or the land. This natural protective mechanism bears no relationship whatsoever to "crying" in the human sense.

"Ragged-Jacket" DFO

Why has the annual Atlantic seal hunt aroused such international controversy?

Harp seals are not an endangered species – a fact that has been amply established with extensive scientific research.

The hunt is closely regulated and the killing methods are humane.

Sealing provides an important source of both food and income to many Atlantic fishermen and to native Canadians.

Yet, in spite of all these facts, pressure groups continue to attack the seal industry. Why?

Is it because harp seal pups are so appealing? Anti-sealing groups have focused largely on the whitecoat hunt, taking great advantage of the photogenic qualities of seal pups, and have even equated them with human babies. The fishermen who kill these "innocent, gentle babies" are depicted as brutish, bloodthirsty and even barbaric.

Such interpretations and inferences are grossly unfair to sealers and, by implication, to all others engaged in killing animals for food and clothing. It is ironic, however, that a lamb, a calf or a piglet is just as endearing as a seal pup, yet their killing is accepted without question by most members of society.

Distorting the seal industry with emotionalism is also counter-productive to understanding man's true responsiblities to nature. Decisions about the management and protection of any species cannot be based upon what the animal looks like, but must be guided by sound scientific advice. Otherwise truly endangered, but less photogenic, species (such as the Nile crocodile) risk having their plight ignored because people have difficulty forming sentimental attachments to them.

Is the concern over the seal hunt due to the end use of the products? People have been eating seal meat, using the oil from seal fat, and making articles of clothing from seal pelts for centuries. Seals are a naturally renewable resource whose use is fully in step with an ecologically conscious world.

Opponents of the industry have suggested otherwise, questioning the morality of killing wildlife for human use and stating that seal products can be easily replaced with man-made substitutes. Such views reflect the attitudes of a highly-urbanized society where the harvesting and use of natural products – and even an understanding of nature – seem increasingly out of place.

For the people engaged in Canada's sealing industry, however, survival is directly dependent upon weather, tides and the bounty of the sea. Far removed from the world of artificial and packaged convenience, the livelihood of the fisherman depends entirely upon the uncertainties of nature and changing market conditions, upon what he can catch and how much his catch is worth. The fisherman has the greatest vested interest in ensuring the stocks he harvests do not decline in abundance.

Carino Co. Ltd.

Canada's record of environmental management

Even though wildlife and environmental organizations have achieved a great deal in recent years to raise public awareness of wildlife and ecology, Canada's understanding of the need to protect native species is not a recent development. In 1885, the first of Canada's 28 national parks was established as a wildlife sanctuary and conservation area. National parks and other wildlife preserves now encompass more than 32 million acres – an area greater than the land mass of England.

In addition to setting aside vast areas of land for wildlife preservation, numerous endangered species of animals and plants (including bowhead whales, right whales and sea otters) are now protected by the Government of Canada. Tough measures have also been taken on issues such as acid rain, the use of toxic chemicals, and other problems which threaten the environment.

Sealing is consistent with all these environmental and animal protection measures. Regarding harp seals, as respected an organization as the World Wildlife Fund has stated that "utilization of the species is compatible to their conservation, provided such utilization is sustainable."

This statement is entirely in accord with Canadian seal management policies.

Keith Hay

Distorting the issues

The seal hunt has become a cause célèbre for many organizations. While some of these groups may be involved in promoting the protection of species which are truly endangered, many of their fund-raising and publicity activities are based purely on opposition to the seal hunt. There is, in fact, a vested interest in maintaining public awareness of the hunt that extends far beyond the interests of the seals themselves.

Brochures often depict sealers as "merciless killers" who sometimes hunt just to satisfy a "dark lust to kill." It is suggested that animals are "tortured beyond belief" and frequently skinned alive. Harp seals are regularly referred to as an endangered species. All of these outlandish claims are patently untrue.

Beyond the factual distortions, the efforts of seal hunt protesters have taken attention and funds away from legitimate wildlife concerns and propelled the issue of animal resource management into a realm of charged emotional rhetoric and media grandstanding.

The Canadian perspective

Sealing has been an important economic activity for both the Inuit and Atlantic fishermen for centuries.

The hunt is humane and there is no evidence that harp seals are in any way endangered. Rather, the best scientific evidence indicates a gradual increase in population size, consistent with Canada's policy of allowing herds to expand by setting conservative annual quotas.

Based on all these facts, Canada will continue to manage seal populations in the same manner as all other renewable marine resources: to provide the greatest long-term benefits to Canadians within the limits of sound conservation principles.

Whitecoat	a harp seal pup from 3 to 10 days old, named for its distinctive long white hair.
Overgang	a weaned harp seal pup during the preparatory stage of its first moult; long white hair is still firmly attached but silver-grey beater coat has begun to appear at approximately 12 days of age.
Tanner	a weaned harp seal pup during mid-stage of its first moult, white hair is loose and can be easily pulled out at approximately 16 days of age. Tanner pelts are used exclusively for the production of leather.
Ragged-jacket	a weaned harp seal pup during the last stages of its first moult, from 2 1/2 to 4 weeks old.
Beater	a fully moulted harp seal pup from 3 1/2 weeks to 1 year old. Beaters have short-haired, dark-spotted, silver-grey coats.
Bedlamer	an immature harp seal from 1 to 5 years old with a spotted coat. The distinctive saddle or harp-shaped markings of the adult harp seal develop gradually.
Blueback	a hooded seal pup up to 1 year old with a short hair coat ranging from darkish blue grey on the back to cream on the belly.
Landsmen	fishermen who go sealing on foot or from small open boats.
Longliners	a generic term for decked fishing boats between 11 and 20 metres in length, but weighing less than 150 tonnes. Sealing from these vessels is part of the landsmen harvest with sealers using rifles to take primarily beaters and older seals.
Large Vessels	vessels greater than 150 tonnes and longer than 20 metres, built to withstand heavy ice and used predominantly to take whitecoats at the Front and in the Gulf.
The Front	an area of open water and ice along the northeast coast of Newfoundland, the east coast of Labrador, and the Strait of Belle Isle where the largest concentration of harp seal whelping and breeding takes place.
The Gulf	the Gulf of St. Lawrence, principally around the Magdalen Islands, where a smaller population of harp seals gathers to whelp and breed.
Whelp	the act of giving birth.
Total Allowable Catch (TAC)	the sum of the allocations to the various sealing sectors and the maximum number of seals that can be taken by all sealers in any one year. TAC includes the allowance set aside for natives of the Canadian Arctic.
Allocation	a particular portion of the TAC reserved for one group of sealers and not to be exceeded.

APPENDIX III

The Atlantic Seal Hunt

■ Aboriginal and commercial seal fisheries form part of the history of Canada's development. Survival of the northern Eskimo population has long been associated with the seal, providing as it does both food and clothing.

However it was the demand for skins for the luxury clothing trade in the 1800's that sparked the development of commercial seal fisheries. At the present time these fisheries exploit a variety of seal populations in wide-ranging areas of the world's oceans.

In the North Pacific exploitation of the Pacific Fur Seal *(Callorhinus ursinus)* was initiated in the late 1700's by Russia which later sold the main rookeries (Pribilof Islands) to the United States; the hunt continues today under the aegis of the North Pacific Fur Seal Commission. In the Antarctic the Weddell Seal *(Leptonychotes weddelli)* has seen increasing hunting effort diverted to it in the last two decades.

The North Atlantic supports fisheries on two species of seals: the Harp Seal *(Pagophilus groenlandicus)* and the Hooded Seal *(Cystophora cristata)*. The Harp seal fisheries exploit three non-intermixing populations breeding in the White Sea, the "West Ice" southwest of Spitsbergen, and on pack ice around Newfoundland and greatly outnumber the two breeding populations of Hooded seals (West Ice and the Gulf and Front areas of Canada) which intermingle in a common moulting area off East Greenland.

Life History of the Harp Seal

■ The harp seal is an earless hair seal which migrates in approximately a north-south pattern in Canadian waters throughout its life. After spending the summer on the coast of West Greenland and in the eastern Canadian Arctic, in autumn the seals begin to migrate southwards and by early January have reached the Strait of Belle Isle where the migration divides. About one-third passes through the Straits to the Gulf of St. Lawrence, while the remainder migrates southwards along the east coast of Newfoundland. In February the east coast or "Front" herd turns northward and moves on to the advancing ice, usually in the general region east of the Strait of Belle Isle ("Front") where they produce their young. The Gulf females usually whelp in the area between Prince Edward Island, Gaspé, the Magdalens and Anticosti.

Whelping (pupping) lasts from late February to mid-March with each sexually mature female bearing one pup (whitecoat) annually; multiple births are rare, as are still-borns ("cats"). The whitecoats are born close together in large patches on relatively few square miles of ice and average 36 inches long and 15 pounds in weight; they gain weight rapidly during suckling (the milk contains ten times as much fat and three times as much protein as cow's milk) and weigh 60-70 pounds in two weeks. Of this, two thirds is skin and blubber. The white silky fur begins to shed after one week and by the end of the suckling period (3-4 weeks) the moult is complete, the white natal fur being replaced by coarse shorter hair. These moulted young are called beaters and begin to enter the water towards the end of March, at which time the mature females begin mating activities.

Beginning in late March and continuing into early May, the Front herd occupies the ice east of Newfoundland to moult; the Gulf population also moults at this time, partly in the water. The bedlamers (immature harps) and adults continue moulting farther and farther northwards as the ice disintegrates, and by June are usually north of Belle Isle. They then begin the northward migration to summer feeding areas.

The female harp begins to produce young at 3-7 years of age and may produce young until 30 years of age or older. The mean whelping age for the Front and Gulf populations combined was formerly 6.5 years but dropped to 5.5 years in the 1960's, apparently in response to population attrition due to heavy hunting. In any one year over 90 per cent of the adult females produce young in a 50:50 sex ratio; in the adult population females now dominate as a result of regulations protecting whelping females.

Seals in the Northwest Atlantic Ecosystem

■ Harp seals are opportunistic feeders, exploiting a wide food spectrum consisting of the larger zooplankton, pelagic fish, bottom-living crustacea and groundfish. The size of the organisms on which they feed increases with the size of the seal, as does the depth of diving. At current population levels food consumption of harp seals is estimated to be one million tons per annum, of which 25 per cent or 250,000 tons is comprised of capelin. Significant quantities (approximately 15,000 tons annually) of herring are also consumed, particularly in the Magdalens area; other commercial species in the diet of harp seals are shrimps, cod and redfish.

Food limitation may be an important factor in harp seal population change and reproductive rate. Fat thickness and pelt condition have significantly improved since the early 1950's when the harp seal population was at a high level; maturation rates have also increased indicating faster growth due to improved prey availability per seal. Substantial increases in the harp seal population of the Northwest Atlantic would probably reverse these changes, particularly in view of a developing capelin fishery and a regenerating population of cod, its major predator.

Environment Canada Environnement Canada
Fisheries and Marine Service
Service des pêches et des sciences de la mer

Various methods have been used to estimate harp seal production, including aerial census, mark-recapture experiments, regression of pup catch on survival, greatest kill, and natural population analysis. Aerial surveys of herd size were begun in the early 1950's using conventional black-and-white photography which can detect bedlamers and adults, but not whitecoats on the ice. Counts of adults in the whelping patches were initially equated with pup production but more recently a correction factor has been applied to account for adult females in the water. Nevertheless aerial censuses have wide variances and generally underestimate pup production due to such factors as incomplete censusing, varying proportion of females in the water (between and within days) and varying proportion of males in or near whelping patches.

Recently ultraviolet photography which can detect white pups on white ice has been introduced, but its use for census purposes still requires finding all whelping patches, accurate estimation of the proportion of females that have whelped when the survey is carried out, and also estimates of the percentage of the young hidden in rough or rafted ice.

From the mid-1840's to the 1930's there was a gradual decline in the seal catch, despite intensive hunting and conversion of vessels from sail to steam and from wood to iron. This suggests a decline in the seal herd during this period as a result of a moderate but persistent overexploitation that began in the 1830's. The reduction in the catch rates during the late 1930's and 1940's allowed the herd to build up; recent estimates indicate that by the early 1950's pup production was between 500,000-600,000 animals out of a total herd of three million seals. By the early 1960's pup production had declined to approximately 400,000 and to 350,000 in 1970; in 1975 empirical estimates based on a mean whelping age of 5.5 years indicate a further decline to about 270,000 pups, representing a total herd (bedlamers plus adults) of about 1.2 million animals.

The decline in pup production since the early 1950's has been the result of excessive exploitation of both pups and adults, the effects of which will continue until the late 1970's when ameliorating effects of the quota system, introduced in 1972, become evident. Pup exploitation rates which averaged about 55 per cent in the 1950's and 1960's have been reduced to about 41 per cent since 1972, a level slightly less than current estimates of sustainable yield (45 per cent) but equivalent to the 1976 predicted exploitation rate. Empirical models indicate that such an exploitation rate, if not exceeded, should allow a gradual recovery of the harp seal population in the 1980's.

The Harp Seal Fishery

■ Hunting of Northwest Atlantic harp seals can be classified into two categories: (a) a primary-needs kill by the aboriginal peoples of West Greenland and the Canadian Arctic archipelago; (b) commercial hunt which may be divided into distant-water vessels taking mainly, though not exclusively, animals from whelping and moulting concentrations off northeastern Newfoundland (Front), and hunting by landsmen using a variety of gear including nets during the open water season and small boats among loose ice floes, and involving the inhabitants of Labrador, Newfoundland, the North Shore of Quebec, Prince Edward Island, Cape Breton and the Magdalens.

Offshore sealing began in Newfoundland during the early 1800's and developed rapidly from about 80,000 pelts in 1805 to more than 280,000 in 1819; from 1830-1839 the average Newfoundland take exceeded 450,000 pelts including a peak catch of 687,000 in 1831. The average harvest remained around 450,000 pelts until the 1860's when it dropped to about 310,000 pelts, remaining around that level until World War 1. From 1920-1939 the Newfoundland hunt produced an average of 150,000 pelts declining to about 35,000 during World War 11. The above figures refer only to the Newfoundland hunt on the Front and as such do not include seals taken by aboriginals or by landsmen of the Maritime provinces in the Gulf which did not have a large-vessel hunt until 1951.

In 1946 Norway re-entered the fishery after making small catches in 1938 and 1939 and since 1952 has taken more than half the vessel catch. In 1949 Nova Scotian vessels entered the fishery and since 1954 their catch has considerably exceeded that of Newfoundland vessels. Total harvest rose from negligible levels during World War 11 to an average of 283,000 pelts in 1951-60, and 280,000 during 1961-70, and peaking to more than 400,000 in both 1951 and 1956. During the 1970's quota regulations have reduced the average take to 150,000 animals. In 1976, the quota was reduced to 127,000.

Previous to the 1930's all sealing was for oil and leather, which resulted in a concentration of hunting effort on the fat whitecoats. Refinement of processing techniques for furs in the last 30-40 years changed the emphasis on pelt preferences to some extent, resulting in an increased proportion of bedlamers and adults in the catches during the 1950's and 1960's.

During the last ten years regulations protecting whelping females and shortened hunting seasons have reversed this trend to a large degree.

Conservation and Regulations

■ In the 1950's and 1960's conservation measures were based on evidence of overexploitation rather than precise knowledge of population size, productivity and compatible exploitation levels. The first significant regulation, agreed mutually by Canada and Norway, was the introduction of opening and closing dates for the Gulf and Front areas in 1961. In 1965 adult females were protected in the whelping patches, the Norwegians withdrew from the Gulf and Canada imposed a 50,000 quota on Canadian vessels hunting in that area.

In 1967 harp seal management in the northwest Atlantic came under the supervision of the International Commission for the Northwest Atlantic Fishery (ICNAF), specifically a special sealing committee (Panel A) including representatives of Canada, Norway and Denmark. In advance of Panel A meetings, scientists from the three countries analyze available data and make recommendations for total allowable catches and other conservation measures which are subsequently reviewed by the Panel who then make the appropriate recommendations to the Commission regarding measures for the forthcoming season.

In 1971 the Canada-Norway Sealing Agreement was concluded to provide for continued Norwegian sealing operations within certain parts of the Canadian territorial sea and fishing zones, and to provide a forum for bilateral consultations regarding conservation of the stocks and development of domestic regulations by both countries for conduct of the hunt.

The first harp seal quotas were introduced by ICNAF in 1971 (245,000 animals) and were reduced on the basis of more thorough scientific analyses in 1972.

In 1971 the federal Minister of Environment appointed a Committee on Seals and Sealing (COSS), composed of scientists and executive members of international humane societies to examine and report to him on all aspects of sealing in the Northwest Atlantic. Specifically, its terms of reference were to investigate the economic, sociological, ecological and humanitarian aspects of the seal hunt as well as to recommend measures to ensure the maintenance of the seal herd in the future. Members of COSS are: Chairman, Professor Keith Ronald, Dean of the College of Biological Science, University of Guelph; T. Hughes, Director, Ontario Humane Society, Toronto; T.H. Scott, International Society for the Protection of Animals, London, England; Dr. H. Rowsell, Canadian Council of Animal Care, University of Ottawa; Kjell Hendriksen, North Sydney, N.S., Canadian member of ICNAF Panel A (Seals); and Professor H.D. Fisher, Dept. of Zoology, University of British Columbia, Vancouver.

Humane Harvesting

■ In addition to supporting conservation measures designed to ensure the continuance of harp seals in perpetuity, the Canadian Government has also placed much emphasis on humane methods of killing. Veterinarians and representatives of humane societies have frequently observed killing practices in the field and with rare exceptions, expressed approval of the methods employed; various alternate harvesting methods — guns, drugs, carbon dioxide, skinning and concussion bolts — have been critically tested and evaluated. As a result of such tests, the traditional Newfoundland gaff was prohibited in 1972 in favour of a hardwood bat of specific dimensions. A more recent study conducted in 1975 by Dr. Rowsell of COSS suggests, however, that the Newfoundland gaff (equivalent to the Norwegian hakapik) is the most effective killing agent, the bat being suitable only for very young (new born) pups.

Economic Value

■ In 1975 the landed value of harp seal pelts in Canada was about $2.3 million, plus a substantial but unknown amount accrued from the sale of carcasses and flippers (flippers averaged $15-$18 per dozen, whereas carcasses brought $4-$7 each in 1975). Earnings tend to vary considerably between vessels, and between landsmen and vessel crews, but are significant relative to total annual income in a number of isolated areas. The vessel crews are mainly Newfoundlanders (about 400) and most of the landsmen catch is also taken by Newfoundlanders mainly on the northeast coast of Newfoundland.

Canadian Conservation Policy

■ The continuing approach of the Canadian Government to the harvesting of seals is similar to that for the harvest of other renewable resources, i.e., to achieve the maximum sustainable productivity of the seal resource so that the seal population can be brought to and maintained at the levels which will provide the greatest long-term yield, compatible with the relationship of seals to the productivity of other living marine resources. Of particular importance in this regard is the competitive balance between seals and cod for capelin, the dominant prey of each species, and the role played by seals as carriers of the codworm disease.

Hooded Seals

■ The hooded seal *(Crystophora cristata)* or bladdernose belongs to the same family of hair seals as the harp and together they inhabit drifting pack ice of the North Atlantic. It differs ecologically from the harp seal in diving more deeply and feeding on larger food organisms, including squid *(Gonatus fabricii)* and redfish *(Sebastes marinus)*. It is less abundant than the harp and is usually found on heavier ice to seaward of the breeding herds of harp seals on the Front.

Life History

■ Until recently only two breeding concentrations were known – around Jan Mayen Island and at the Newfoundland Front. In 1974 a third breeding patch, first observed by whalers in the 19th century was rediscovered in Davis Strait, although its constancy from year to year is unknown. The other two herds have been exploited for over a century although their abundance in Newfoundland waters has fluctuated greatly apparently in response to warming and cooling trends. Since the mid-1960's a resurgence in hooded seal abundance has been observed at the Front.

Whelping occurs during the second half of March both at the Front and Jan Mayen, after which there is a general migration northwards and southwards of the respective breeding groups to a common moulting area off East Greenland. Unlike harp seals, the hooded male is monogamous, aggressive and is often found together with the female and newborn pup (blueback) which is suckled for 8-10 days.

Female hooded seals produce their first pup at an average age of four years, i.e., earlier than harp seals. Production is consequently higher than harp seals as are mortality rates (above 0.16 for adult females, 0.23 for adult males). Lifespan is therefore shorter than harp seals, hooded seals commonly reaching 20 years but not 30 years as is the case with harps.

Fishery for Hooded Seals

■ The West Ice breeding concentrations have been much more heavily exploited than the Front population; in the 1950's and 1960's Norway took an average of 70,000 per year, including 38,000 bluebacks and additional takes were made by the Soviets and native Greenlanders. In the Front area uncertain ice conditions and difficulties of locating breeding seals in some years have produced marked fluctuations in the catch; catches averaged 5,400 from 1949-1965 and have more than doubled since then. Recently, hooded seals have been placed under quota regulations both at the Front (1975) and the West Ice (1972), being 15,000 and 30,000 respectively in 1976.

Because less is known of their biology, management of hooded seals in the western North Atlantic is at an earlier stage than that of harp seals. Research efforts are therefore being intensified particularly with regard to the degree of mixing of West Ice and Front breeding populations, and whether or not the rediscovered breeding patch in Davis Strait is an isolated population.

Prepared by the
Fisheries and Marine Service
Department of the Environment
Ottawa

March, 1976

APPENDIX IV

Statement on action taken by the Department of Fisheries on the sealing operation in the Gulf of St. Lawrence

During the last two years, 1965 and 1966, the Department of Fisheries has been directly and keenly interested in the introduction of measures which would prevent any occurrence of cruelty in Canadian sealing operations in the Gulf of St. Lawrence and off the coasts of northern Newfoundland and Labrador. This is additional to the important matter of conservation.

Conservation measures, laws included in the Seal Protection Regulations made under Section 34 of the Fisheries Act, are based on conclusive scientific evidence resulting from more than twenty years' work by the Fisheries Research Board, and preclude the possibility of decimating Atlantic seal herds migrating to the Gulf of St. Lawrence each year. In fact, the regulations there are designed to increase the herds.

The sealing operations first came under general public observation with the introduction of aircraft into the activities in the Gulf of St. Lawrence. Ships with their large crews of sealers have been operating for years from Newfoundland and the Maritimes. The men on these vessels were of course experienced sealers. Sealers who were engaged by aircraft operators for the Gulf of St. Lawrence were, for the most part, inexperienced. Through lack of knowledge of the operation and careless attitudes, there was certainly much activity of a nature which left a great deal to be desired.

The sealing operations in the Gulf and elsewhere in the Atlantic were unsupervised over all the years until these undesirable occurrences took place in the Gulf. Lack of supervision in those days is explained by the fact that until recent years the ship operations by our nationals did not present an acute problem. Even when it became apparent that conservation regulations should be introduced, we were not in a position to make restrictions on Canadian sealers which would not apply to sealers of other nations operating on the high seas. Informal agreements were made with Norway about opening and closing dates of sealing seasons. In time the conservation need became apparent through research conducted by the Fisheries Research Board of Canada.

Canada proposed to the International Commission for the Northwest Atlantic Fisheries that a protocol to the Convention be introduced relating to harp and hood seals in order to bring the operation under international control. The resolution was adopted by the Commission in 1961 and

the Protocol opened for signature to the member nations in 1963. It was finally ratified by all member nations by the spring of 1966, in time to be included in the agenda for the Annual Meeting of this Commission in Madrid, Spain, in June of this year. A panel with membership from interested nations was established, and there has been a further meeting of this panel this fall in Copenhagen, Denmark. These discussions will lead to international conservation measures in areas outside the Gulf of St. Lawrence. Inside the Gulf, the fishery in 1965 and 1966 was exclusively Canadian.

In 1964, as a preliminary control measure, sealing vessels and aircraft engaged in sealing were licensed by the Department of Fisheries. There was very little supervision of their activities but a number of observations were made.

Consultations with the industry and with humane society representatives followed and a new set of sealing regulations governing sealing off the Atlantic Coast was developed in the fall of 1964 to apply in 1965. Open and closed seasons for operations from ships and aircraft were retained as before, but a number of control measures were introduced in addition.

For conservation purposes a quota was applied to a large area of the Gulf of St. Lawrence limiting the kill of harp seals of less than a year in age by sealers operating from ships and aircraft to 50,000. There was a new prohibition against the killing of hood seals in this same part of the Gulf. The killing of adult seals in breeding patches was prohibited. Aircraft were permitted in the area of the Gulf of St. Lawrence where they had already established an operation but not elsewhere. The Norwegians also agreed not to use aircraft in the actual sealing operation off Newfoundland and Labrador.

In addition to these conservation regulations, new regulations came into force defining minimum weight and length of a club for killing seals, prohibiting the taking of seals by longline, and prohibiting the skinning of a seal until it is dead. There was a new regulation limiting the time that sealskins could be left on the ice before removal to a base of operations.

After experience in enforcement of these new regulations in 1965, there were further meetings with industry and with representatives of the conservation and humane societies with a view to regulation improvement.

Amendments were introduced to include an extension of the area to which the quota applies to cover waters some distance to the east of the Gulf of St. Lawrence. There is a prohibition against moving a live seal from where it is found except with the permission of the Minister. Killing methods have been rigidly defined and the regulations prohibit the use of other methods. The approved methods specify lengths and weights of gaffs and clubs; they define the ballistics of acceptable rifle calibres and the types of cartridge that may be used for killing the older seals.

Every person engaged in sealing must now obtain a licence, including those operating from shore or from small boats.

During the 1965 and 1966 operations every sealing ship has had aboard a Fishery Officer to see that the regulations are carried out. In addition, Fishery Officers patrolled the ice where operations were being carried out by sealers both from ships and aircraft. Officers were also available to check on quotas at aircraft landing points. These officers worked long hours at all times of the day and from all reports have been dedicated to their task.

Observations have been carried out with assistance from the Department by representatives of conservation and humane societies during the sealing seasons in 1965 and 1966. Their recommendations have been taken into account in drawing up amendments to the regulations in recent years.

During the 1966 operations the Ontario Humane Society representative and others working with him experimented under special permit in an evaluation of killing methods other than those stipulated by regulation, using such implements as the captive bolt pistol and plastic filled cartridges fired from standard weapons. Under the weather and other conditions prevailing none of these was found to be satisfactory. In their report they stated the view that a suitable club, properly handled, remains the most effective and humane way of killing the young seals. Experiments will continue, but in the meantime a new regulation is proposed stipulating that young seals may be killed only with a heavy hardwood club of specified dimensions. The long and unwieldly gaff is to be prohibited as a killing instrument, although of course sealers will be permitted to carry such an implement for personal safety. The new amendments proposed for next season will prohibit the killing of young seals by any method other than with the specified club.

Indeed the proposed regulations go farther, in that they will prohibit the striking of any live seal with any implement other than the approved club. They will also prohibit the commencement of any operation toward skinning the seal until there is no doubt that it is dead.

Other regulations proposed will stipulate that the master of a ship or pilot of an aircraft is responsible for ensuring that every person engaged in sealing from the ship or aircraft concerned is in possession of a licence, the proper means of identification issued with the licence, and is in possession of a proper killing weapon as described in the appropriate section of the regulations.

A prohibition on sealing during darkness is proposed, between 6:00 p.m. and 6:00 a.m. We are also considering a regulation which will give any Fishery Officer authority to suspend the licence of any licensee and require him to return to his ship or aircraft, or to shore, when the licensee is found to be contravening the provisions of the Seal Protection Regulations.

We are studying a means of identifying licensed sealers on the ice more readily, by use of a disc or arm band which will include the licence or identification number.

There are of course factions among the S.P.C.A. movements who are now advocating total abolition of sealing by Canadians. Among these is the New Brunswick S.P.C.A., represented by Brian Davies. The Canadian S.P.C.A. of Montreal has officially called for cessation of the killing of baby seals, although its representative on the ice this year, Mr. J.J. Vallee, does not suggest this in his report which, by and large, shows up the Department of Fisheries' operations in a favourable light. The remaining humane society and conservation society representatives in their preliminary report expressed satisfaction with the progress being made.

On October 21 I stated in the House of Commons that I could not accept the recommendation of the small number of members of the S.P.C.A. who have advocated total abolition of sealing by Canadians. I have the responsibility for management of fisheries generally, and seals, by definition in the Fisheries Act, are included. I regard the seal hunt, properly conducted, as a necessary part of the overall management program.

The publicity given the sealing operations has been unfortunate. Much of it has been exaggerated; much of it has been incorrect. It has been determined, for example, that films shown on television here and abroad included lurid scenes staged for the purpose, some by persons who were not sealers at all, and all this was done before the season opened in 1964.

I met with representatives of the conservation and humane societies as well as members of the sealing industry on June 1, 1966. For the occasion I invited also a number of the Fishery Officers who had taken part in the enforcement program on the ice in the spring. In drafting the proposed amendments the reports and recommendations made by the humane and conservation society representatives were given all possible consideration. The Fishery Officers' views and recommendations from our Regional Directors for the Atlantic were also studied. The proposed regulation amendments were sent out to the representatives who attended the June 1 meeting, and each was asked to comment by mid-November. These comments are in Ottawa now and are under study with a view to early passing of a new set of amendments for the Seal Protection Regulations.

It is our intention too to deploy a larger force of Fishery Officers on the sealing grounds with more equipment for supervision of the sealing operations.

November 22, 1966

APPENDIX V

AGREED MINUTE

Delegations from Canada and the EEC, headed by Dr. A.W. May and Mr. M. Marcussen respectively, met in Ottawa on December 5 and 10, 1979 to discuss in accordance with Article IV of their Agreement on Fisheries the management of harp and hooded seals in 1980 in the Northwest Atlantic occurring both within the Canadian fishery zone and the fishery zone of the Community.

Harp Seals:

The parties noted the advice from the Scientific Council of NAFO on the status of the seal stocks. The Scientific Council's Report, dated November 19, 1979, indicated that the Northwest Atlantic harp seal population currently numbers 1.26-1.38 million individuals aged one or older with a long-term sustainable yield in the range of 205-237,000 and a replacement yield in 1980 of 205,000. Advice from the Scientific Council indicates that the population is growing and that the annual biological yield could be increased by allowing further population growth.

It was agreed by the parties that the interim target population level of age one or older animals established in 1978 at 1.6 million is still appropriate and that catches be restricted to levels below the replacement yield until this target is achieved.

Taking into consideration the scientific advice noted above:

- The Community side estimated that the hunt by Greendlanders in 1980 would not exceed approximately 10,000 seals.

- The Canadian side indicated that in 1980 it would establish a total regulated harvest at the 1978 and 1979 levels of 170,000 including the take by northern indigenous peoples in Canada.

Hooded Seals:

The parties noted that the Scientific Council of NAFO had no new scientific information to offer beyond that put forward by STACRES at its 1978 meetings and accordingly advised that it could not recommend any changes in the TAC of 15,000 at the Front.

Taking into consideration this scientific advice:

.../2..

- The Community side estimated that the hunt by Greenlanders in 1980 would not exceed approximately 6,000 seals in East and West Greenland.

- The Canadian side indicated that in 1980 it would establish a TAC of 15,000 at the Front.

The two sides agreed to prohibit the hunting of whelping hooded seals in Davis Strait by vessels of over 50 gross tons in 1980.

M. Marcussen

A. Campbell

Ottawa, Ontario
December 10, 1979

1. Harp seals :

The parties noted the advice from STACRES on the status of the seal stocks. STACRES indicated that the Northwest Atlantic harp seal population currently numbers 1.3 - 1.4 million individuals aged one or older with a long-term sustainable yield in the range 220-240,000. Because of the age structure of the population the replacement yield in 1979 was estimated at 198-205,000. Advice from STACRES indicates that the population is growing and that the annual biological yield could be increased by allowing further population growth.

It was agreed by the parties that :

- an interim target population level of age one and older animals be established at 1.6 million and that catches be restricted to levels below the replacement yield until this target is achieved;
- the total regulated harvest in 1979 be established at the 1978 level of 170,000, not including the estimated annual harvest by Northern indigenous peoples of approximately 10,000. A total take of 180,000 in 1979 would constitute 90 % of the current replacement yield. Recent projections indicate that, at this annual catch limit, the interim target population level would be reached within 5-10 years.

2. Hooded seals :

The parties noted that STACRES indicated a sustainable yield in the range 15-20,000 and advised that it could not recommend any change in the TAC of 15,000. The parties thus agreed to set the TAC at 15,000 for 1979 on the understanding that the figure does not include the traditional take by Northern indigenous peoples. The parties also agreed to prohibit the hunting of whelping hooded seals in Davis Strait by vessels of over 50 gross tons in 1979.

Brussels, 29 November 1978

R. SIMONNET

A. MAY

Arctic Catches - Harp Seals

1976		
	West Greenland	7,747
	East Greenland	287
	Canada	2,017
	Total	10,051
1977		
	West Greenland	6,257
	East Greenland	84
	Canada	1,508
	Total	7,849
1978		
	West Greenland	7,662
	East Greenland	225
	Canada	2,129
	Total	10,016
1979		
	West Greenland	8,891
	East Greenland	132
	Canada	
1980		
	West Greenland est. >	10,000
	East Greenland	
	Canada prelim.	2,856

APPENDIX VI

International Council for the
Exploration of the Sea

REPORT ON THE MEETING OF THE AD HOC WORKING GROUP ON ASSESSMENT OF HARP AND HOODED SEALS IN THE NORTHWEST ATLANTIC

ICES Headquarters, 4-7 October 1982

1. ORIGIN AND TERMS OF REFERENCE

The Working Group was convened in response to a request by the Government of Canada and the EEC Commission for scientific advice from ICES on aspects of the population dynamics and state of the harp and hooded seal stocks in the Northwest Atlantic, with particular reference to:

"1. Current stock size and pup production, and recent trends in these parameters.

2. Replacement yield and sustainable yield at present stock size and in the long term, under varying options of age compositions in the catch, including that which has recently prevailed.

3. Foreseeable trends in population size based upon different levels of total allowable catch incorporating quota regulation of all removals except that by traditional hunting in the Canadian Arctic and in Greenland.

4. The effects of recent changes in the food supply available to harp seals on the current status of the stocks and on the predictability of future population trends.

5. The confidence limits to the above-mentioned estimates."

The Working Group, comprising scientists from Canada, Denmark, Federal Republic of Germany, Netherlands, Norway, United Kingdom and USA met at ICES headquarters from 4-7 October 1982. A list of the participants is given in Appendix I.

In pursuing its main task, as set out in the above terms of reference, the Working Group reviewed the relevant scientific information on harp and hooded seals contained in published papers and other documents including those presented in recent years to meetings of ICNAF/NAFO scientific committees. In addition, new information was given in documents presented at the present meeting, a list of which is given in Appendix II. No new assessments were made at this meeting. All estimates apply to the Northwest Atlantic only, and do not refer to any other harp or hooded seal stock.

The Working Group points out that estimates of abundance presented at this meeting were scrutinized in terms of their reliability and robustness under possible violations of assumptions as well as sampling error. This robustness was taken into account in formulating the Working Group's advice. The methodological discussions are summarized below, followed by the Working Group's consideration of the specific items on which ICES advice had been sought.

Precise definitions of technical terms are provided in the Glossary (Appendix III).

2. METHODS

Four main groups of assessment techniques have been used in the past and were also available at the meeting. The first two rely heavily on catches at age and are:-

(i) calculations of a pup production independent of assumptions about the magnitude of the natural mortality rate (M);

TABLE OF CONTENTS

(ii) calculations of pup production levels over time, or of a single pup production level and M;

The two other groups are:-

(iii) mark and recapture analyses;

(iv) direct census techniques, such as aerial surveys.

2.1 Estimation of Pup Production Independent of Natural Mortality

The original Survival Index method (see Appendix III) has often provided a basis for past assessments (eg Winters, 1978). However, various workers have criticized the method and alternatives have been suggested. Note was made of the extensive list of assumptions on which the Survival Index is premised (see Goodman - this meeting).

Goodman presented a paper which showed that, even if the assumptions of the Survival Index method were met, estimates from it would theoretically contain an upward bias owing to underlying non-linearity in the relationship. This is consistent with the simulation studies of Beddington and Williams (1980). As an illustration, a particular non-linear functional form was substituted in the fitting procedure. This gave a lower estimate of pup production than the linear form. The intention of the argument, however, was to recommend the abandonment of Survival Index calculations in the future rather than to suggest further attempts at correction or modification. During the Working Group's discussions strategies of analysis which did not suffer from the bias of the Survival Index, and which required less stringent assumptions, were put forward (Cooke, Jacobsen, Ugland - this meeting).

Goodman also provided sample calculations of population size and population projections under various assumptions, purely for example. Estimates of current pup production for hooded seals required projections from the estimates for the mid-1960's. Even a modest uncertainty about these estimates would compound into a large uncertainty about the present value of pup production.

A paper by Cooke (this meeting) described two further methods for estimating pup production from catch at age data. The methods utilize the basic idea of the Survival Index method in a formal mathematical way. One technique is based upon maximizing a likelihood function, the other on minimizing the sums of square of differences between observed and expected catches at age. Cooke's paper describes simulation trials which indicate that the estimates are sensitive to random fluctuations in pup production, and errors in ageing.

The Monte Carlo trials were designed to utilize the catch history and likely range of pup production of the Northwest Atlantic harp seals. Cooke emphasized that the reliability of his estimation techniques with different catch histories would require further examination.

Cooke modified the technique to allow for errors in ageing using the information in Doubleday and Owen (1980). He emphasized that their error matrix involved only the minimum level of error as it was concerned solely with inter-reader variations.

The paper investigated the sensitivity of the estimate to violation in the underlying assumption that pup production was constant. Cooke concluded that if pup production was increasing or declining the estimate obtained would be an overestimate of new pup production and be close to the value associated with the pup production in the higher years.

Although Cooke had calculated confidence regions for his estimates, he indicated that these were underestimates of the true levels.

Ugland (this meeting) described a similar method for calculating pup production independent of an estimate of M, which differed mainly in the way in which selectivities were calculated. This method is described in more detail in Section 2.2.

2.2 Estimates of Pup Production and Trend or Natural Mortality

These techniques fall into two groups.

The first group uses statistics from catches at age data to obtain estimates of parameters such as pup production and M using a dynamic population model. These methods include the work of Beddington and Williams (1980) and, at this meeting, Jacobsen, Ugland, and De La Mare.

Beddington reported on simulation studies carried out by De La Mare (this meeting) on the problem of jointly estimating M and pup production. The results indicated that estimates of pup production and mortality were confounded. Accordingly he recommended that estimates based on such joint estimation techniques were unreliable. Recognizing this confounding, the Working Group considered that previously reported estimates of M by such methods should not be considered.

Ugland (this meeting) described a least squares method which seeks a population trajectory giving the best fit to the observed age group frequencies in the catch. Each age group is assigned a selectivity coefficient (see Appendix III). The method may be used to estimate either average pup production and rate of change in pup production, or initial pup production and average M. The selectivities are expressed as functions of the chosen parameters and are not free variables in the minimization of the sum of squares.

Simulations showed that the estimate of the average pup production is robust and almost independent of M, but the estimate of the rate of change in pup production is not robust. In order to estimate M and the current trend in pup production, the method requires at least two sets of age samples separated in time.

The second group of methods uses statistics derived from catches at age and independent estimates of abundance, to estimate pup production and M.

Roff and Bowen (this meeting) presented a revised version of their previous analysis (Ross and Bowen, 1981) without substantial change. The basis of the method is an estimation of likelihood values across combinations of M and 1967 pup production. For every trajectory there is an associated probability density based on the probability density functions for estimates of pup productions in 1978 and 1979, and for estimates of the ratio of pup escapements in 1967/68 and 1971/72.

The 1967 age distribution of the population was estimated by calculating correction factors for the catches at age in the years preceding 1967, and by adjusting for the pup kills in these years. The sensitivity of this analysis to the initial age distribution was examined by projection using two different 1967 age distributions. The Working Group concluded that more work is required to establish the statistical properties of the method of obtaining the initial age structure, and that, as indicated by the authors, their confidence intervals for the estimates of pup production and M were too narrow.

3 Mark and Recapture Analyses

Bowen and Sergeant (this meeting) reviewed estimates of harp seal pup production using a modified Peterson mark and recapture method. Major tagging experiments aimed at estimating pup production were conducted in March 1978, 1979 and 1980. In addition, tags were applied in the Gulf of St Lawrence in 1977 to study migration patterns. Model assumptions were tested where possible, and estimates were corrected for tag loss and non-reporting of recovered tags. Estimates of confidence intervals accommodated variability in the estimates of these corrections. Estimates from recoveries of tags in the year of tagging were shown by the authors to be unreliable due to non-random mixing of tagged and untagged seals. Based on tests for differing recapture ratios of seals tagged on the Front and in the Gulf, the authors considered estimates of production based on long-term recoveries to be more reliable. From these long-term recoveries, pup production was estimated for 1978, 1979 and 1980. A pup production estimate for 1977 was also provided, but was considered to be unreliable by the authors. Both the authors and the Working Group noted that the calculated confidence limits did not accommodate errors in estimated catches of 1, 2 and 3-year-old seals. The Working Group noted that the test of the assumption of random sampling of long-term recoveries was not as powerful as that applied to recoveries within the year of tagging.

4 Aerial Surveys

The results of ultraviolet photographic surveys for harp seal pups in 1975 and 1977 (Lavigne, et al 1980) were considered. Their figure of 250,000 for pup production was the sum of an estimate of 204,000 from an aerial survey of the Front in 1977 and an estimate of 46,000 from an aerial survey of the Gulf in 1975. The Working Group agreed with the authors' observation that this combination of estimates assumes no difference in the proportion of harp seals in the Front and Gulf areas in 1975 and 1977 and does not account for any changes in the number of seals whelping in the Gulf which may have occurred since 1975. If the foregoing assumptions are correct, the total estimate must be low since 48,748 young of the year were caught in the Gulf in 1978 and more than 4,000 tagged pups escaped the hunt.

The Working Group noted that the particular aerial survey technique used in 1975 and 1977 underestimates pup production unless all patches of pups are located and photographed and suitable adjustments are made for the completeness of whelping in the patches surveyed. The difficulties of controlling all sources of error in such surveys are illustrated by the failure to photograph a concentration in the Gulf in 1977 due to navigational error.

The Working Group noted that visible spectrum aerial surveys for hooded seals were carried out in the Davis Strait by MacLaren Marex Inc. (1979) - see Section 3.2 of this report.

Recognizing the potential bias of the available estimates from these surveys, and having no means to determine its extent, the Working Group did not consider them further.

3. HARP AND HOODED SEAL ASSESSMENTS

The Working Group considered the specific questions set out in the terms of reference for harp and hooded seals separately. The results of these considerations are dealt with below.

3.1 Harp Seals (Phoca groenlandica)

3.1.1 History of Exploitation

Harp seals have been hunted commercially in the northwest Atlantic since the 16th century. The offshore hunt began in 1794 and reached a peak between 1825 and 1860 with catches exceeding 500,000 animals (including some hooded seals) in eleven of those years. From 1863 to 1894 the catches dropped to an average of 341,000 (again including some hooded seals). From 1895 to 1911 catches of harp seals averaged 249,000, between 1912 and 1940, 159,000, and between 1949 and 1961, 310,000 animals. The harvest declined to an average of 287,000 from 1961 to 1970. Quota management was introduced in 1971, leading to reduced catches, which averaged 172,000, including 133,000 pups, up to 1981.

In the West Greenland area, catches of harp seals were high in the middle of the 19th century (estimated at 27,000-37,000 animals annually), but they apparently declined towards the turn of the century. During the first decades of the 20th century, catches increased again, reaching a level of approximately 20,000 in the 1930's and 1940's (Kapel 1978). The average catch was 16,400 in the 1950's, 11,000 in the early 1960's, 6,500 in the years 1965-1971 and 7,600 in 1972-77. Preliminary figures indicate that catches have increased to more than 10,000 in the most recent years 1978-1981.

3.1.2 Pup production and population abundance

Estimates of pup production and, hence, population abundance were available for the 1950's and 1970's. Inferences about the 1982 abundance of harp seals involve projections from the late 1970's. Accordingly, the Working Group considered that the questions of yield levels and trends in abundance were best addressed by comparing pup production and abundance estimates for the late 1950's and for the years 1977-80.

Abundance estimates for the late 1950's

The Working Group considered published estimates of pup production by Benjaminsen and Øritsland (1975), Winters (1978), and Lett et al (1979). It noted that Benjaminsen and Øritsland's lower estimate of 300,000 approximated the estimated catch of the 1957 year class.

New estimates were also presented at this meeting. In his paper, Cooke indicated that, if the assumption of constant pup production was violated by a decreasing trend, his estimate would be

associated with an early year class in the series analysed and if there had been an increasing trend, with a later year class. Accordingly, it was agreed that the upper confidence limits that Cooke obtained for the 1958-77 year classes could be considered as an upper bound for pup production in the late 1960's. Ugland's analysis, which did not assume a constant pup production, gave a similar upper bound. It was thus agreed that a likely range for pup production in the late 1960's was 320-420,000, a range that includes all the point estimates shown in the following table. The Working Group recognised that doubt had been cast on the reliability of the estimates which used the traditional Survival Index method, but noted that these estimates fall within the above range.

Estimates of Pup Production in the late 1960's

Source	Point Estimate	Upper	Lower
Lett et al (1979)	363	-	-
Winters (1978)	393[1]	-	-
Benjaminsen & Øritsland (1975)	380[1]	-	300[2]
Roff & Bowen	380	-	-
Cooke	293-374	410	270
Ugland	400	428	372

[1] From Survival Indices

[2] Catch of 1967 year class

These pup production estimates were multiplied by 3.75, a very coarse approximate figure derived from the Roff and Bowen analysis, to give a corresponding range of 1.2-1.6 million for the 1+ population size in the late 1960's.

Abundance estimates for the late 1970's

Point estimates of pup production for 1977-80 from Lavigne et al (1980) and presented at this meeting are given below:

Estimates of Pup Production in the period 1977 to 1980

Source	Point Estimate	Upper	Lower	
Ugland	390	-	-	
Lavigne et al	250	-	-	
Bowen and Sergeant	455-516	629	337	(1978-80)
pooled	438	497	379[1]	(1977-80)
pooled	496	570	422[1]	(1978-80)

[1] Modified to accommodate age sampling errors

It was agreed that the mark and recapture figures provided acceptable estimates. Bowen and Sergeant (this meeting) had given plausible reasons why their estimate of pup production for 1977 applied only to a portion of the total population. However, the Working Group concluded that the basis for this conclusion could not be rigorously established. Therefore pooled estimates for the periods 1977-80 and 1978-80 were calculated, weighting each estimate by the reciprocal of its calculated variance. As noted in Section 2.3, the variances calculated by Bowen and Sergeant did not accommodate the fact that the size of the recapture sample had been estimated. New confidence limits were calculated on the assumption that allowance for this extra source of variation would increase the variance by 30% (Harwood and Hiby - this meeting). For the reasons discussed in Section 2.4, the estimate of 250,000 from the aerial survey was considered to be an underestimate.

Thus, the Working Group concluded that pup production for the period 1977-80 was likely to be in the range 380-500,000. These pup production estimates were multiplied by 4.0, a very coarse approximate figure derived from the Roff and Bowen analysis, to give a corresponding range of 1.5 million to 2.0 million for the 1+ population in 1977-80.

3.1.3 Trends in pup production and population size

The Working Group considered the implications of the above estimates of pup production for the late 1950's and for 1977-80 on trends in pup production and population size. As indicated below, the ranges of pup production and population size overlap.

Year	Pups (thousands)	1+ (millions)
Late 1950's (modified survival indices)	320-420	1.2-1.6
1977-80 (mark and recapture)	380-500	1.5-2.0

The Working Group noted that the estimates of Cooke and Ugland and the mark and recapture estimates have what statisticians call a central tendency. This means that estimates close to the calculated value are more likely than are estimates far from it. However, the Working Group noted that both estimators are subject to unknown biases which may be in opposite directions. Thus, while the extreme values are not considered as likely as intermediate values, the Working Group did not attempt to quantify this tendency in probability terms.

Recognizing that comparisons between the two ranges of estimates must be made in the context of possible unknown biases in both methods of estimation, the Working Group concluded that the pup production in 1977-80 and 1+ population was likely to have been larger than the late 1950's pup production and 1+ population, but the possibility of no increase or a slight decline is not negligible.

The Working Group noted that the reduction in catches from 1972 onwards would not be expected to influence trends in pup production until 1977 and onwards, as the more abundant post-1972 year classes became sexually mature. The Working Group also noted that anecdotal information from Greenland hunters and catch statistics presented by

Kapel (this meeting) indicate that harp seals were becoming more readily available at West Greenland. Further, analysis of the age structure of catches of harp seals at Northwest Greenland since 1972 indicate good survival of year classes in the late 1970's.

.1.4 Replacement yield

Replacement yield estimates are sensitive to the specific population trajectory from 1967. In order for the trajectory to pass through the late 1960's and 1977-80 ranges of stock size, various ranges of M are implied. Other values would cause the trajectories to be either too high or too low in later years. The range of feasible values of M is about 0.08 to 0.11.

An equation to calculate replacement yield is given by Roff and Bowen (1981 eq. 26). For this, stock size, pup production, M_{1+}, and M_0 (see Appendix III) are needed. If pup production is taken as the highest (500,000) and lowest (380,000) values of the 1977-80 range, for various combinations of M_{1+} and M_0, the corresponding replacement yields for 1977-80, assuming the continuation of the current 80:20 proportions of pups to 1+ animals in the harvest, are given below:

Pup Production (thousands)	M_{1+}	M_0	Replacement Yield (thousands) 1977-80
500	0.08	0.08	330
500	0.08	0.24	290
380	0.11	0.11	201
380	0.11	0.312	165
380	0.10	0.30	175

These figures are intended to illustrate combinations of M_{1+}, M_0, and pup productions for 1978 which are consistent with the advised ranges of pup production in the late 1960's and in 1977-80. In the years 1977-80, actual harp seal catches ranged between 167,000-187,000 seals.

.1.5 Sustainable yield

The Working Group considered that it was not feasible to calculate estimates of sustainable yields at this meeting. There were two principals reasons for this. Firstly, forecasts of future vital rates were not available so that assumptions must be made regarding trends in vital rates. Secondly, the Working Group did not have access to the necessary computer programs. Nor was it considered feasible to calculate the implications of its advice concerning population size in the late 1960's and 1977-80 on trends in population size and replacement yield in 1982 and beyond. Thus,

Item 3 of the Terms of Reference was not addressed. However, the Working Group noted that, if the vital rates prevalent in the early 1970's continued to apply indefinitely, then sustainable yield would be greater than the replacement yields calculated for the late 1970's. This is due to the increased number of surviving pups in 1972 and onwards (relative to earlier years) which began to enter the mature population in 1977, so that the population age distributions of the late 1970's had a higher proportion of immature animals than does the stable age distribution with the same schedule of vital rates.

3.2 Hooded Seals (Cystophora cristata)

The Working Group considered the available data relating to the demography of the hooded seal in the Northwest Atlantic.

3.2.1 History of exploitation

Historical catches at Newfoundland fluctuated around 15,000 from 1900 to 1920, but thereafter declined to about 1,000 per year until the 1950's when catches fluctuating about 11,000 were again common. Catches at West Greenland were estimated at about 15,000 in the period 1880-1900, declining to around 4,000 in the 1920's, 1,200 in the 1940's and 300 in the 1950's (Kapel, 1973). Norwegian catches at moulting areas in the Denmark Strait fluctuated around 15,000 from 1945 until 1960, when the fishery was closed apart from some relatively small catches by Greenland.

Recent catches, including those at Greenland, have averaged approximately 15,000 animals, comprising about 60% pups and 30% 1+ females. Annual removals of females have declined from about 4,000 animals prior to the introduction of limitations on the kill in 1977, to about 2,000 animals since then.

3.2.2 Stock relations

Available data on recoveries of tagged hooded seals indicate movements between Newfoundland, Greenland and the moulting patches in the Denmark Strait. Limited tagging of hooded seals at Jan Mayen has not demonstrated any movements of seals from that stock westwards beyond the Denmark Strait.

In 1974 an additional breeding herd of hooded seals was rediscovered in the Davis Strait. Its presence has subsequently been confirmed by aerial surveys but its relation to the harvested population is unknown.

3.2.3 Mortality, pup production and population trends

The Working Group reviewed a variety of documents relating to the the production and mortality of Northwest Atlantic hooded seals. Pup production estimates from techniques using catches at age were not available for the 1970's. Several point estimates for pup production in the mid-1960's, from a variety of techniques, were presented (Jacobsen and Øritsland, 1982; Goodman, Winters et al - this meeting). Individual estimates ranged from 27,000 to 41,000. Confidence intervals for these estimates, where they had been calculated, were very wide.

Estimates of total instantaneous mortality for breeding females during the period 1956-1980 varied between 0.19 and 0.25. Estimated mortality rates levels decreased substantially in most recent years and this is consistent with the reduced kill of breeding females since 1977.

MacLaren Marex Inc. (1979) carried out visual spectrum photographic surveys of hooded seals in the Davis Strait in March 1977 and 1978. They estimated that one patch in 1977 had 13,000 pups. A corresponding estimate for 1978 was 11,700 pups. The Working Group had no opportunity to discuss these surveys.

The Working Group considered various sources of ancillary data relating to possible trends in hooded seal abundance. Catches of hooded seals from Greenland have increased since the 1960's and Kapel reported anecdotal information from hunters on increased abundance at Greenland in recent years. Interpretation of this information is not clear, however, because changes in availability (as a result of distributional changes) rather than abundance could also produce increased catches. Winters reported that catch rates of Norwegian vessels at the Front, adjusted for known changes in hunting efficiency, have increased steadily in the past several decades.

The Working Group concluded unanimously that the analyses of available data are insufficient to provide reliable estimates of current pup production, stock size and vital rates for the hooded seals population in the Northwest Atlantic; and hence to determine population trends on that basis. This conclusion also applies to the evaluation of the present management measures in the Denmark Strait and the Northwest Atlantic.

EFFECTS OF CHANGES IN FOOD SUPPLY

The request for advice on this topic seems to be prompted by two concerns: a general concern that the vital rates of harp and hooded seals are unlikely to remain constant if the food supply available per capita changes; and a specific concern because stocks of capelin (Mallotus villosus) - a species commonly consumed by harp seals - in the Northwest Atlantic suffered a major decline in the late 1970's.

There may no longer be a cause for the latter concern. The most recent meeting of NAFO's Scientific Council (NAFO SCS Doc. 82/VI/13) advised that by 1982 capelin stocks in NAFO areas 2J and 3K - a major feeding locality for harp seals in the period before and after whelping - will have recovered to their levels in the 1960's. No assessments have been made for capelin stocks in the Gulf of St Lawrence and off West Greenland. The Working Group noted that capelin is a species with a short life span, so that natural fluctuations in recruitment will be reflected in the stock biomass level.

Stomach samples of hooded and harp seals from Newfoundland, Greenland and the Northeast Atlantic indicate that both species are opportunistic feeders and may be able to compensate for changes in the relative abundance of their preferred food species. However, it is extremely difficult to quantify the diet throughout their entire feeding range.

With current knowledge, reliable prediction of trends in the vital rates of harp and hooded seals is not feasible. It is therefore important that monitoring of vital rates should continue. This is especially important for hooded seals where estimates of vital rates are based on smaller sample sizes than for harp seals.

5. FUTURE RESEARCH

5.1 Statistics of Estimation

All estimation schemes are based upon simplifying assumptions, which may may be violated. For procedures using catches at age, these include constant natural mortality rates and age-specific sampling selectivities. For mark and recapture studies, they include uniform mixing of tagged and untagged animals, constant return rate of tags recovered, and equal survival probabilities of tagged and untagged animals. It is difficult to assess the magnitude of deviations from such assumptions, and their effects upon estimation schemes.

A commonly accepted practice has been to test only the null hypothesis of no significant deviations from such assumptions. Such a procedure neglects such deviations, unless the evidence to the contrary is statistically significant. A more rigorous approach is as follows: test a family of hypotheses, which depend upon a parameter d. The case $d = 0$ would correspond to the null hypothesis of no deviation from the assumption.

Increasing magnitude of d would correspond to increasing deviation from the assumption. A significance test can be employed to reject values of d outside an interval (d_1, d_2). Then the performance of the estimation scheme (bias, efficiency) can be assessed for all values of d between d_1 and d_2. Ordinarily, this will be done by means of simulation studies (see below). The result of such a revised procedure is to examine the effects of wide deviations from the assumptions when there is little information on their validity, and to narrow down the possibilities where warranted.

The Working Group concluded that simulation trials are an effective means of assessing the sensitivity of estimation procedures to departures from assumptions. Although mathematical derivations are desirable in order to compare schemes and evaluate their properties, the ultimate test requires an assessment of robustness. It is recommended that the magnitudes of likely deviations from simplifying assumptions be estimated as indicated above. Then the consequences of such deviations can in turn be assessed by simulation studies. It is recommended that a standardized set of such simulations be employed in the future.

5.2 Population Estimation

5.2.1 General

It was noted that the modified Survival Index methods using maximum likelihood or least squares techniques were sensitive to catch history. This rendered them sensitive in varying degrees to such problems as ageing error and trends in pup production. The Group recommended that a sensitivity analysis along the lines indicated above would increase the usefulness of these techniques. Similarly it was noted that the confidence regions obtained by these techniques were approximate and that simulation studies should be extended to assess these limits more closely.

It was noted that modified Survival Index methods could be used to estimate population abundance in different periods and that a method similar to Roff and Bowen's might then be used to estimate trend or M during the intervening period. Such methods, which utilize estimates from different groups of techniques (as described in Section 2) are vulnerable, in principle, to opposing biases in the different estimates.

5.2.2 Harp seals

It was noted that a continuation of the age sampling programmes and of the mark and recapture studies is essential to the future assessment of the population.

5.2.3 Hooded seals

The modified Survival Index methods of population assessment are dependent on catch at age samples and a variable catch history for pups. The particular catch history for hooded seals in the Northwest Atlantic has not permitted a reliable population assessment. Increased variability in the pup kills would improve the accuracy of such estimates in future; a similar argument applies for harp seals. The Working Group emphasizes that continued sampling of the catch is essential if the status of the stock is to be evaluated in the future.

It was noted that an aerial survey was planned in the Newfoundland area in the coming season. The Working Group strongly endorsed this plan. The Davis Strait breeding herd may have significant implications for the management of the Northwest Atlantic hooded seal stock, and therefore increased research on this herd is desirable. This should include extension of the Newfoundland aerial survey to include the Davis Strait, as well as tagging experiments and the collection of biological samples.

Vital Rates

Estimates of replacement yield and sustainable yields depend on values for vital rates and their trends. As noted in Section 4, these cannot be predicted at present. Therefore the Working Group repeats its recommendations that monitoring of vital rates by biological sampling for both species should continue. It further recommends that, because the survival rate of pups is difficult to monitor directly, analysis of the condition of pups should continue.

APPENDIX I

List of Participants

W D Bowen	Canada
W G Doubleday	"
D Ludwig	"
D A Roff	"
G H Winters	"
F O Kapel	Denmark
F Larsen	"
H E Drescher	Federal Republic of Germany
P J H Reijnders	Netherlands
N O Jacobsen	Norway
T Øritsland	"
K I Ugland	"
J R Beddington	United Kingdom
J Harwood	" "
J W Horwood	" "
B B Parrish (Chairman)	" "
D Goodman	USA
Ch. Fowler	"

APPENDIX II

References

Papers presented to the Working Group meeting*

Goodman, D. Analysis of the harp seal management models.

Goodman, D. An assessment of the status of the Northwest Atlantic stocks of hooded seals.

De La Mare, W K. The estimation of the dynamics of exploited seal populations from the analysis of age data.

Cooke, J G. Application of the modified survival index method to Northwest Atlantic hooded seals.

Cooke, J G. An investigation of the survival index method of population estimation with particular reference to Northwest Atlantic harp seals.

Kapel, F O. Trends in catches of harp seals in West Greenland.

Ugland, K I. Abundance estimation of the Northwestern Atlantic harp seal population.

Jacobsen, N O. Estimates of pup production, age at first parturition and natural mortality for hooded seals in the West Ice.

Winters, G H, Hay, K and Bowen, W D. Review of the demography of hooded seals (Cystophora cristata) in the Northwest Atlantic.

Harwood, J and Hiby, A R. Comments on recent estimates of the size and status of the Northwest Atlantic harp seal stock.

Roff, D A and Bowen, W D. A maximum likelihood method for estimation of population size and natural mortality of harp seals.

Bowen, W D and Sergeant, D E. Mark-recapture estimates of harp seal pup production in the NW Atlantic.

Ugland, K I. Mathematical justification of the survival index method.

Anon. 1982. Recommendations and status report on harp and hooded seals. Revision of the 1981 report. EUR 7317. In: Nature Conservancy Council, UK.

Additional papers referred to in the Report

Beddington, J R and Williams, H A (1980). The status and management of the harp seal in the Northwest Atlantic: a review and evaluation. US Marine Mammal Commission Rep., No. MMC-79/03.

Benjaminsen, T and Øritsland, T (1975). The survival of year classes and estimates of production and sustainable yield of Northwest Atlantic harp seals. ICNAF Res. Doc. 75/1.

Doubleday, W G and Bowen, W D (1980). Inconsistencies in reading the age of harp seals (Pagophilus groenlandicus) teeth, their consequences and a means of reducing resulting biases. NAFO SCR Doc. 80/XI/160.

Jacobsen, N O and Øritsland, T (1982). Provisional estimates of production and natural mortality for Newfoundland hooded seals. NAFO SCR Doc. 82/6/71.

Kapel, F O (1978). Present catches of harp and hooded seals in West Greenland, and a note on the level of catches in previous periods. ICNAF Res. Doc. 78/XI/98.

Lavigne, D M, Innes, S, Barchard, W and Doubleday, W G (1980). The 1977 census of Northwest Atlantic harp seals, Pagophilus groenlandicus. ICNAF selected papers. 6:55-70.

Lett, P F, Mohn, R K and Gray, D F (1979). Density-dependent processes and management strategy for the Northwest Atlantic harp seal population. ICNAF Selected Papers, 5:61-79.

MacLaren Marex Inc. (1979). Report on aerial surveys of marine mammals and birds in Southern Davis Strait and Eastern Hudson Strait in March 1978. MacLaren Marex Inc. Project No. 145. January 1979.

Roff, D A and Bowen, W D (1981). Population dynamics of harp seals, 1967-91. NAFO SCR Doc 81/XI/166 (revised).

Winters, G H (1978). Production, mortality and sustainable yield of Northwest Atlantic harp seals (Pagophilus groenlandicus). J. Fish. Res. Bd Can., 35:1249-1261.

Readers of the report wishing access to any of these papers should contact the authors concerned.

APPENDIX III

Glossary

Refers to total population immediately prior to whelping (February)

Instantaneous annual relative natural mortality rate for all ages

As for M, but applying only to pups

As for M, but applying only to animals aged one and older

ivity - at age i refers to proportion of age i in catch divided by roportion of age group i in 1+ population

ement yield - Catch which may be taken during one year to result in ame 1+ population in the following year

al Index - A series of indices are calculated for a year class at uccessive ages i in successive years t as

$$S_i = \frac{A \cdot \Sigma B}{\Sigma B_t \cdot \Sigma A}$$

here A = catch of age i seals in year t

ΣB_t = catch of all ages 1 and older in year t

ΣA = total catch of age i for all years

ΣB = total catch of all ages 1 and above for all years

he survival index for the year class is a weighted average of the S_i's.

APPENDIX VII

Northwest Atlantic Fisheries Organization

Serial No. N951

NAFO SCS Doc. 85/1/2

PROVISIONAL REPORT OF SCIENTIFIC COUNCIL

January 1985 Meeting

CONTENTS

PROVISIONAL REPORT OF SCIENTIFIC COUNCIL*

January 1985 Meeting

Acting Chairman: J. Messtorff Rapporteur: V. M. Hodder

The Council met at the Greenland Fisheries and Environmental Research Institute, Copenhagen, Denmark, during 16-22 January 1985, to provide scientific advice for 1985 on the management of the shrimp stocks in Subareas 0 and 1, as requested by Canada and the EEC (European Economic Community), and the shrimp stock in Denmark Strait at the request of the EEC. In addition, at the joint request of Canada and the EEC, the Council reviewed the status of the harp and hooded seal stocks in the Northwest Atlantic. Representatives attended from Canada, EEC (Denmark, France, Federal Republic of Germany, United Kingdom, and Commission of the European Communities), Iceland and Norway. In the absence of the Chairman (Dr. V. A. Rikhter) who could not attend this meeting, Dr. J. Messtorff acted as Chairman.

At the opening session, the Council participants were welcomed to Copenhagen by the Director of the Institute (Sv. As. Horsted). The Council regretfully noted the recent death of E. Poulsen, who served as Executive Secretary of ICNAF (International Commission for the Northwest Atlantic Fisheries) during 1952-63.

The stock assessments were undertaken by the Standing Committee on Fishery Science (STACFIS), whose report, as approved by the Council at this meeting is at Appendix I. The agenda for the meeting, the list of relevant documents and the list of participants are given in Appendices II, III and IV respectively. Brief summaries of the stock assessments and other matters considered by the Council are given below.

I. STOCK ASSESSMENTS

1. Assessment of Seal Stocks

a) Harp seals

As in 1983, the 1984 catch of 30,900 seals was substantially below the TAC (total allowable catch) of 186,000 due to poor market conditions. Large vessels from Canada and Norway did not participate in the harp seal harvest in 1984. There is a continuing trend of increasing harp seal catches at West Greenland. However, in the absence of effort data, it is not possible to evaluate whether this trend could be explained by changes in hunting methods or could be taken as evidence of increased abundance at Greenland.

From a mark-recapture study in March 1983, pup production in the Northwest Atlantic was estimated to be about 534,000 animals in 1983. This estimate was not significantly different from that derived from 1978-80 mark-recapture studies, although the 1983 estimate was based on recoveries in the year of marking rather than of age 1 and older seals. These new results support the conclusion that pup production has probably increased since the late 1960's.

Estimates of replacement yield in 1985 ranged from 210,000 to 510,000 animals. For a catch of 186,000 seals (TAC for 1984) plus 20,000 for Arctic Canada and West Greenland in 1985, the population will increase unless the actual replacement yield is close to the lowest value of the range.

b) Hooded seals

Due to poor market conditions and the absence of hunting by large vessels, the catches of hooded seals at Newfoundland in 1983 and 1984 (128 and 140 respectively) were only about 1% of the average annual yield from the area during 1975-82.

---

* Only pages 3-6 are provisional, as the Report of the Standing Committee on Fishery Science (Appendix I) was adopted by the Council on 22 January 1985.

Pup production of hooded seals in the Northwest Atlantic was assessed by aerial surveys of the Front and Davis Strait areas in March 1984. The surveys were designed to estimate production in whelping patches and in areas outside the patches (scattered pups) to provide total production in each area. In Davis Strait, consolidated pack ice prevented seals from leaving the ice prior to 24 March, and the result of the helicopter survey of the only known whelping patch (18,600 pups) was considered to be a reliable estimate of production. At the Front, the total number of pups born in the single whelping patch was estimated to be about 54,700. In addition, about 7,400 pups were attributed to production by scattered seals outside the whelping patch. Thus, the total production at the Front was about 62,000 pups in 1984. If pup production in the late 1960's was about 30,000 animals (based on the survival index method), the hooded seal population in the Northwest Atlantic has probably increased in recent years.

Estimates of replacement yield in 1985 ranged from 15,500 to 64,700 animals, depending on the value of natural mortality. If the catch of hooded seals in 1985 is the same as that in 1983 (4,300), the population will increase for all values within the range of replacement yield estimates.

c) Future research on seals

The Council endorsed the recommendations of STACFIS regarding future research on the harp and hooded seal populations of the Northwest Atlantic.

2. Assessment of Shrimp Stock in Subareas 0 and 1

In 1979 and 1980, the offshore shrimp fishery in Davis Strait was regulated by an overall TAC of 29,500 tons, the nominal catches being 27,000 and 37,000 tons respectively in these years. The same TAC was advised for 1981-84 inclusive, but allowable catches of 35,000, 34,800, 34,625 and 34,925 tons respectively were set by the coastal states involved. Provisional statistics for 1984 indicate an offshore catch of about 37,000 tons (Table 1). The shrimp fishery in 1984 was severely hampered by ice in the first 5 months of the year. From May to November, Greenland vessels fished west and north of Store Hellefiske Bank (Div. 1B). However, more effort was expended in Div. 1C and 1D during this period than in the previous year. The distribution of fishing effort by Greenland vessels in 1984, as in the 2 previous years, did not exhibit the northward shift that was evident in 1980 and 1981.

Table 1. Nominal catches (metric tons) of shrimp in Subarea 0 and the offshore part of Subarea 1 in 1975-84, with the corresponding TACs for 1977-84.

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Catch	29,190	42,766	34,300	26,869	27,087	36,652	37,300	36,827	38,115[1]	37,224[1]
Advised TAC	-	-	40,000	40,000	29,500	29,500	29,500	29,500	29,500	29,500
Effective TAC[2]	-	-	36,000	40,000	29,500	29,500	35,000[3]	34,800[3]	35,625[3]	34,925[3]

[1] Provisional data.
[2] Total of Canada and EEC TACs.
[3] Includes TAC of 5,000 tons in Subarea 0.

All available biological information on length distribution and sexual components of the catches and all data on trends in catch rates and biomass estimates were considered in advising on management of the fishery in 1985. After the decline in abundance which was observed during 1976-78, there was a general upward trend in overall catch rates during 1979-82 and stability since then. However, the catch rates for recent years may be biased upward due to increased efficiency

of gear and the effects of ice conditions, but the effects of these factors cannot be estimated. Since these effects could account for the observed increase in catch rates, it is quite possible that the stock did not increase in the early 1980's.

A TAC of 40,000 tons was advised for 1977 and 1978. The advised TAC for 1979 was reduced by about 26% to 29,500 to reflect the decrease in abundance from 1976 to 1978. Since 1979, an increase in the TAC was not advised because of interpretation of the catch-rate series and because of concerns about recruitment prospects for the stock. Despite the concerns about recruitment, catch rates have not decreased. However, quantitative estimates of recruitment for 1985 were not available. Because of the apparent stability of the stock and the fact that higher-than-advised yields have been realized during this period of stability, the Council advises that the overall TAC for the offshore grounds of Subarea 1 and adjacent parts of Subarea 0 in 1985 should not exceed 36,000 tons, which corresponds to the average catch during 1979-84.

In order to improve the basis for assessing this stock, the Council endorsed the recommendations of STACFIS regarding future research requirements (see Appendix I).

3. Assessment of the Shrimp Stock in Denmark Strait

The shrimp fishery in this area expanded rapidly from 1977 to 1980. The total catch on both sides of the midline between Greenland and Iceland was about 8,300 tons in 1980 (Table 2) and declined sharply to 4,800 tons in 1981 when the fishery was regulated by a TAC of 8,000 tons which was set by the EEC for the area west of the midline. TACs of 4,500, 5,725 and 5,245 tons were set by the EEC for 1982, 1983 and 1984 respectively. Catches in Denmark Strait in these years were 4,900, 4,200 and 6,400 tons.

Table 2. Nominal catches (metric tons) of shrimp in Denmark Strait in 1978-84, with corresponding TACs for 1981-84.

	1978	1979	1980	1981	1982	1983	1984
Catch	363	1,285	8,260	4,792	4,902	4,175	6,353[1]
Advised TAC	-	-	-	-	4,200	4,200	4,200
Effective TAC[2]	-	-	-	8,000	4,500	5,725	5,245

[1] Provisional data.
[2] On western side of midline.

The fishery in 1984 took place in the area of Strede and Dohrn Banks and on the slopes of Storfyord Dyb. Ice conditions in the early part of the fishing season were variable, hindering access to the northern and eastern parts of the fishing grounds, but the ice cover later in the season did not influence the distribution of the fishing fleet as in previous years. Ice conditions varied considerably from month to month throughout the years, thereby affecting the distribution of fishing effort and making the evaluation of catch-per-unit-effort data difficult. Although it was not possible in previous assessments to reach a conclusion on the reasons for the trends in catch rates, the inclusion of data for 1984 indicates stability of the stock.

Shrimp less than 20 mm (carapace length) were scarce in all of the length frequencies of samples in 1984, supporting the earlier conclusion that young shrimp are not abundant on the fishing grounds.

In view of the apparent stability of the stock, the Council advises that the overall TAC for 1985 should not exceed 5,000 tons, which corresponds to the average level of catch during 1981-84.

In order to improve the basis for assessing this stock, the Council endorsed the recommendations of STACFIS regarding future research requirements (see Appendix I).

II. COLLABORATION WITH OTHER ORGANIZATIONS

1. Coordination of Research on North Atlantic Seal Stocks

The Council was informed, through a letter from the General Secretary of ICES, about the establishment of an ICES Working Group on Harp and Hooded Seals in the Greenland Sea, which will hold its first meeting during 9-13 September 1985 (Chairman: F. O. Kapel), with the following terms of reference:

a) Assess the stock size and pup production of harp and hooded seals;
b) Consider sustainable yields at present stock sizes and in the long term under varying options of age compositions of the catches;
c) Consider effects of recent changes in the food supply and the possible interaction with other marine living resources in the area;
d) Review the available data to assess the state of the stocks and give proposals for future research programs;
e) Give advice on catch options for the 1986 sealing season.

Since the terms of reference of this ICES Working Group have much in common with corresponding work on harp and hooded seals in the Northwest Atlantic, the Council considered it advantageous that both organizations coordinate their work. In this respect, the Council agreed that the feasibility of joint meetings of the respective working groups or the establishment of a joint ICES/NAFO working group should be considered and a firm proposal developed at the June 1985 Meeting for consideration by ICES at its Statutory Meeting in October 1985.

III. FUTURE SCIENTIFIC MEETINGS

1. Scientific Council Meeting, June 1985

The Council confirmed that its next meeting will be held at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada, during 5-20 June 1985, to deal with its regular business, involving the work of the three standing committees (STACFIS, STACREC and STACPUB) and associated subcommittees and working groups.

2. Annual Meeting, September 1985

The Council noted that arrangements are being made to hold the Seventh Annual Meeting in Cuba during 16-20 September 1985. As agreed by the Council in September 1984 (NAFO Sci. Coun. Rep., 1984, page 86), the Special Session on "Design and Evaluation of Biological Surveys in Relation to Stock Assessments" will be held at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada, in the week preceding the Annual Meeting, namely, during 10-12 September 1985.

IV. ADJOURNMENT

On behalf of the Council, the Acting Chairman expressed his thanks to the Director and Staff of the Greenland Fisheries and Environmental Research Institute for the excellent meeting facilities. He also thanked the participants for their cooperation and support during the course of the meeting and acknowledged the indispensible assistance of the NAFO Secretariat and the secretarial staff assigned to the Secretariat by the Institute. The participants expressed their appreciation to the Vice-chairman (Dr. J. Messtorff) for chairing the Council sessions in the absence of the Chairman. The meeting was adjourned at 1600 hr on 22 January 1985.

APPENDIX I. REPORT OF STANDING COMMITTEE ON FISHERY SCIENCE (STACFIS)

Chairman: J. E. Carscadden Rapporteurs: Various

The Committee met at the Greenland Fisheries and Environmental Research Institute, Copenhagen, Denmark, during 16-22 January 1985 to review the status of the shrimp stock in Subareas 0 and 1, as referred to it by the Scientific Council, based on the requests of Canada and the European Economic Community (EEC) (Appendix II, Annexes 1 and 2). As requested by the EEC, the Committee reviewed the status of the shrimp stock in Denmark Strait (Appendix II, Annex 2). In addition, as requested by Canada and the EEC (Appendix II, Annex 3), the Committee reviewed the status of the harp and hooded seal stocks in Subareas 0, 1, 2, 3 and 4. Scientists attended from Canada, EEC (Denmark, France, Federal Republic of Germany, United Kingdom and the Commission of the European Communities), Iceland and Norway.

Meetings of the ad hoc Working Group on Shrimp (convened by J. E. Carscadden) and the Working Group on Seals (convened by W. D. Bowen) were held concurrently, and the results of the assessments are given in Sections I and II below.

I. ASSESSMENT OF SEAL STOCKS

1. Introduction

The ad hoc Working Group on Seals met during 16-21 January 1985 at the request of STACFIS, with W. D. Bowen (Canada) as Convener, to consider the joint request by Canada and EEC for advice on management in 1985 of the seal stocks in the Northwest Atlantic. Scientists attended from Canada (W. D. Bowen, K. Hay and R. A. Myers), EEC (J. Harwood, W. Wijnstekers and F. Kapel), and Norway (T. Øritsland and N. Øien). K. Hay was appointed rapporteur.

2. Harp Seals

a) Review of fishery trends (SCR Doc. 85/I/9; SCS Doc. 85/I/1)

Recent catches of harp seals in the Northwest Atlantic are given in Table 1, including updated catch statistics for West Greenland during 1978-83. As in 1983, the 1984 catch of 30,900 was substantially below the TAC (186,000) due to reduced effort at Newfoundland and in the Canadian Arctic. The number of hunters producing sealskins in the Canadian Arctic has declined from 2,129 in 1980 to 730 in 1982. Effort statistics for 1983 are not yet available.

Table 1. Harp seal catches (numbers of animals) in the Northwest Atlantic, 1977-84. (... indicates data not available.)

Year	West Greenland	Northwest Territories	Labrador N. of 54°	Northern Quebec	Regulated Catch	Total Catch
1977	9,938	1,508	254	-	155,143	166,843
1978	10,540	2,129	1,263	-	161,723	175,655
1979	12,774	3,620	619	87	160,541	177,641
1980	12,270	6,350	3,335	109	171,929	193,993
1981	13,605	4,672	10,863	...	189,731	218,871[1]
1982	17,244	4,268	...	...	169,484	190,996[1]
1983	18,739	1,287	...	...	57,889[2]	77,915[1]
1984	...	...	...	...	30,900[2]	30,900[1]

1 Partial statistics
2 Norway did not participate in the seal hunt in 1983 and 1984.

Large vessels from Canada and Norway did not participate in the harp seal harvest at Newfoundland in 1984. However, 627 harp seals were taken by large chartered vessels in March and April for scientific study.

The available statistical information for West Greenland (SCR Doc. 85/I/9) indicates that the total catch decreased from a level of 20,000-25,000 in the early 1940's to 5,000-7,000 annually in the late 1960's and early 1970's. Since 1975, the catch of harp seals at West Greenland has increased, reaching a level of 17,000-19,000 in 1982-83. The causes for this development were discussed, and it was agreed that the data presented in SCR Doc. 85/I/9 did not allow an unambiguous interpretation of the increasing trend observed for the most recent decade. It was not possible to evaluate whether this trend could be explained solely by changes in hunting methods or could be taken as evidence of increased abundance of harp seals at Greenland. However, interviews with hunters and unsolicited comments from residents in Greenland leave the impression of increased abundance of harp seals in recent years. For example, the phenomenan known as "amissut" (i.e. mass occurrence of schooling harp seals) was rarely observed during the 1960's and early 1970's, but is now seen frequently.

b) Research conducted in 1984

A Canadian study of the relationships between pup size, growth rate and female condition was concluded in 1984. Morphometric measurements were sampled from 24 mother-pup pairs throughout the lactation period. In addition, daily weight gain of 44 harp seal pups of known age was determined and milk consumption was estimated for 8 pups using labelled water (D_2O) methods. Studies were also conducted on changes in milk composition and energy content throughout lactation. In April 1984, 545 seals (age 1 and older) were sampled from molting concentrations at the Front for studies on growth, reproduction and population dynamics. A sample of 49 beaters was taken during April and May for studies on growth and feeding.

c) Tag recoveries at Greenland (SCR Doc. 85/I/13)

Between 1981 and 1984, a total of 195 harp seals tagged at Newfoundland have been recaptured in Greenland: 8 in East Greenland and 187 along the west coast of Greenland. Although these 195 new recoveries constitute a significiant addition to previous material, they do not alter the general pattern of seasonal and regional distribution described in previous analyses.

d) Estimation of parameters (SCR Doc. 85/I/1)

i) Pup production

A mark-recapture study was conducted in March 1983 to estimate harp seal pup production in the Northwest Atlantic. As in similar studies between 1978 and 1980 (Bowen and Sergeant, 1983)[1], a Petersen model modified to correct for tag loss and reporting rate of recovered tags was used to estimate production. The experimental design followed the same procedure with two important differences: (1) the absence of an offshore hunt for whitecoats in the Gulf and Front areas enabled researchers to distribute tags more uniformly throughout the whelping concentrations; and (2) the numbers of seals tagged in the Gulf and Front areas were similar to estimates of historical production in those areas, resulting in more uniform tagging density throughout the population than in previous investigations.

Two types of estimates were considered: those derived from recoveries in the year of marking (short-term estimates), and those based on recoveries of seals aged 1 and older (long-term estimates).

ii) Stock size and replacement yield

Harp seal population size and replacement yield in 1985 were calculated by using the population model described in Roff and Bowen (1983)[2]. The catch-at-age matrix was up-

[1] BOWEN, W. D., and D. E. SERGEANT. 1983. Mark-recapture estimates of harp seal (Phoca groenlandica) pup production in the Northwest Atlantic. Can. J. Fish. Aquat. Sci., 40: 728-742.

[2] ROFF, D. A., and W. D. BOWEN. 1983. Population dynamics and management of the Northwest Atlantic harp seal (Phoca groenlandica). Can. J. Fish. Aquat. Sci., 40: 919-932.

dated to include regulated Canadian catches during 1983 and 1984 and estimated catches at West Greenland from the most recent data available prior to this meeting.

e) Assessment results (SCR Doc. 85/I/1, 2)

i) Vital rates

No new information on harp seal vital rates was presented at this meeting.

ii) Pup production

Over 12,000 harp seal whitecoats were tagged in the Gulf of St. Lawrence and at the Front in March 1983 (Table 2). To estimate tag loss, 1,282 pups were double-tagged. Estimated tag loss at 1 to 3 months of age (the period of short-term estimates) was 1% based on 145 returns. Tag loss up to about 1 year of age was estimated at 4% based on 14 recoveries (SCR Doc. 85/I/1).

Table 2. Numbers of harp seal pups (whitecoats) tagged in the Gulf and Front areas in March 1983.

Date	Area	Tagged		
		Single	Double	Total
March 6-17	Gulf	3,369	493	3,862
March 10-25	Front	7,612	789	8,401
	Total	10,981	1,282	12,263

An estimate of the reporting rate of recovered harp seal tags from pups marked in March 1983 was obtained from a stratified-random survey of 51 Newfoundland communities in September 1983 after the hunting season had ended (SCR Doc. 85/I/2). About 53% of 1,894 licensed sealers were interviewed and were paid a reward for each harp seal tag which they held. An estimated 295 ± 49 (1 SD) tags from Front-marked pups had not been returned for reward in the 211 Newfoundland communities in which licensed sealers were known to reside. Prior to the survey, a total of 665 tags from beaters had been returned for the reward. Thus, the reporting rate was estimated at 0.693 ± 0.034 (1 SD). This value, similar to that found by Bowen and Sergeant (1983), was used to correct the Petersen estimate of pup production.

The estimate of pup production in 1983, based on short-term recoveries, was 534,000 ± 33,000 (1 SE). The estimate of 136,000 pups based on recoveries at age 1 was considered to be unreliable because of changes in the structure of the hunt in 1984 which resulted in a substantially greater proportion of the catch being taken by landsmen. In addition, the estimate was believed to be negatively biased because 34 of the 75 recoveries of Front-tagged animals were made in mid-April from a small area of Bonavista Bay, Newfoundland, implying that hunters had selectively hunted for tagged animals. The unusual ice conditons in Bonavista Bay at this time made such selection possible.

The Committee considered three types of estimates of pup production in the last 20 years: the cumulative catch from the 1967 cohort (ICES, 1983)[3]; modified survival index estiamtes for the 1968-77 and 1960-72 periods (ICES, 1983); and mark-recapture estimates for 1978, 1979 and 1980 (Bowen and Sergeant, 1983) and 1983 (SCR Doc. 85/I/1). The estimates for the late 1960's and early 1970's are as follows:

[3] ICES. 1983. Report on the meeting of an ad hoc working group on assessment of harp and hooded seals in the Northwest Atlantic. ICES Coop. Res. Rep., No. 121, 16 p.

Period	Estimated pup production	95% confidence limits
1967	302,000	-
1968-77	293,000-374,000	270,000-410,000
1960-72	400,000	372,000-428,000

The Committee noted that the 1983 mark-recapture estimate was entirely consistent with, and not significantly different from, the value for 1978-80, although it was based on recaptures in the year of marking rather than on age 1 and older animals. This adds weight to the conclusion of the ICES Working Group (ICES, 1983) that pup production had probably increased since the late 1960's. However, the Committee noted that the calculated confidence intervals for the estimates from the late 1960's and early 1970's were almost certainly underestimated, and that the cumulative catch and survival index estimates could be biased downward whereas the mark-recapture estimates could be biased upward. Thus, unequivocal evidence for an increase in pup production could come from a mark-recapture experiment in 1986 or later, when the predicted increase in pup production is sufficient to be detected, given the precision of the estimation technique.

iii) Stock size and replacement yield

Replacement yield in 1985 and corresponding stock size of seals (age 1 and older) were calculated using the probable range of pup production for the late 1960's (320,000-420,000) (ICES, 1983) and a range corresponding to the calculated 95% confidence limits for pup production in 1983 derived from the 1983 mark-recapture experiment (SCR Doc. 85/I/1). The range of replacement yield in 1985, with a catch of 80% young of the year and consistent with the above ranges of pup production, is shown in Table 3.

Table 3. Estimates of harp seal population size (age 1 and older) and replacement yield in 1985 for different values of M and 1967 pup production that are consistent with pup production in 1983 from mark-recapture studies. (Initial age distribution and other parameters from Roff and Bowen, 1983.)

Pup production (000)		Natural mortality[1]		1985 estimates (000)	
1967	1983	M_0	M_{1+}	Population age 1 & older	Replacement yield
320	600	0.1575	0.0525	3,300	510
370	590	0.0750	0.0750	3,200	430
380	590	0.2175	0.0725	3,100	400
390	540	0.0850	0.0850	2,800	355
430	470	0.2850	0.0950	2,200	225
430	450	0.2000	0.1000	2,200	225
420	440	0.2850	0.0950	2,000	210

[1] M_0 = pup mortality; M_{1+} = mortality (age 1 and older).

The 1983 catch statistics indicate that the proportion of seals (age 1 and older) in the catch has not changed significantly. Final catch statistics were not available for 1984.

With a catch of about 78,000 animals in 1983 (Table 1) and the approximate catch of about 50,000 animals (including 20,000 for Arctic Canada and Greenland) in 1984, the harp seal population will increase from 1984 to 1985. With a catch of 186,000 animals (total allowable regulated catch in 1984) plus about 20,000 for Arctic Canada and Greenland in 1985, the population would increase unless the true replacement yield was close

to the lowest value of the range, in which case the population will likely remain at the 1985 level.

The Committee was not able to provide reliable estimates of sustainable yield in 1985 because of uncertainty in the relationship between vital rates and population size.

f) Future research requirements

STACFIS recommends

i) that a mark-recapture experiment to estimate pup production be repeated at the Front and in the Gulf of St. Lawrence during 1986;

ii) that a large number of female harp seals (at least 250) be sampled to determine near-term age-specific pregnancy rates;

iii) that the analysis of the 1983 aerial survey of two harp seal patches at the Front be completed; and

iv) that the mark-recapture data be reanalyzed to determine the effects of hunting method and catch location on the estimate of pup production.

3. Hooded Seals

a) Review of the fishery (SCR Doc. 85/1/9; SCS Doc. 85/I/1)

Hooded seal catches in the Northwest Atlantic during 1975-84 are summarized in Table 4. Due to poor markets for pelts, catches at Newfoundland declined greatly after 1982. The total catch of hooded seals by Canadian vessels in the Northwest Atlantic during 1984 was 444, comprising 202 bluebacks (pups) and 242 animals age 1 and older. Of this catch, 388 animals (202 bluebacks, 186 older seals) were taken primarily in Davis Strait for research purposes. Landsmen took 56 seals. No hooded seals were taken at the Front by large vessels during 1984. Catch statistics for hooded seals at Greenland during 1984 are not yet available, but the total catch at West and East Greenland during 1983 was 5,485 (SCR Doc. 85/I/9).

Table 4. Hooded seal catches (number of animals) in the Northwest Atlantic, 1975-84. (... indicates data not available.)

	Newfoundland			Davis Strait	W. Greenland	Northwest Atlantic		
Year	Pups	Age 1+	Total	Total	Total	Pups	Age 1+	Total
1975	7,646	7,965	15,611	-	3,679	7,646	11,644	19,290
1976	6,540	5,845	12,385	-	4,230	6,540	10,075	16,615
1977	8,970	3,123	12,093	-	3,751	8,970	6,874	15,844
1978	7,966	2,538	10,504	-	3,635	7,966	6,173	14,139
1979	11,948	3,177	15,125	-	3,612	11,948	6,789	18,737
1980	10,661	1,963	13,116	-	3,779	11,153	5,742	16,895
1981	10,661	3,015	13,676	-	3,745	10,661	6,760	17,421
1982	7,757	2,636	10,393	-	4,398	7,757	7,034	14,791
1983	-	128	128	-	4,155	-	4,283	4,283
1984	68	72	140	304	...	...	...	... [1]

[1] Partial statistics.

Prior to 1939, Greenland hunting statistics did not specify individual seal species, but the available evidence indicates that the catch of hooded seals at West Greenland decreased from 10,000-15,000 annually at the turn of the century to 500-1,000 around 1960. In the mid-1960's, the catch statistics show a sudden increase to a level of 1,400-2,200 for West Greenland, and between 1971 and 1975 the catch increased to around 4,000 and has remained at this level. Annual catches at East Greenland were 200-700 in the 1950's and 1960's, but increased rapidly during the 1970's to a level of 2,500 in 1980. Catches in East Greenland have been lower in the most recent years (average of 2,000 annually).

The significant increase in catches at West and East Greenland may in part be due to changes

in hunting methods. However, evidence from local residents indicates that hooded seals have become more abundant at Greenland in recent years.

b) Research in 1984

During March 1984, a tagging program was carried out at the Front and in Davis Strait to elucidate the interrelationship between these two whelping groups. The program involved tagging of 414 hooded seal pups at the Front, 1,465 in Davis Strait, and 194 in the Gulf. Growth, duration of lactation, pup growth rates, milk consumption, energetics, and changes in female condition during lactation were studied at the Front during March-April 1984. Biological samples were obtained from 304 hooded seals taken in Davis Strait as part of a cooperative Canadian-Danish research project. Data and material collected were standard morphometrics and weights, lower jaws for age determination, reproductive organs, stomach contents, blood for haematological analyses, and tissues for analyses of heavy metals and chlorinated hydrocarbons.

c) Survey methods (SCR Doc. 85/I/14)

Pup production of hooded seals in the Northwest Atlantic was assessed by aerial survey (visual and photographic), with simultaneous collection of ground-truth data. Surveys were carried out both at the Front and in Davis Strait. Because of a short lactation period (4 days) compared to a protracted pupping season (about 10 March to 5 April), instantaneous pup abundance estimates must be corrected for those pups which have left the ice and those which are yet to be born. These corrections require estimates of the durations of the following pup developmental stages: newborn, thin blueback, fat blueback, and solitary (weaned). Stage durations were determined at the Front by direct observation of tagged pups of known age from birth to weaning.

Historical data for the Front allowed definition of three survey strata: (i) the region where pups occur in relatively high densities (51°-53°N) but excluding the whelping patches, (ii) the whelping patches, and (iii) the regions where pups occur in very low densities (south of 51°N and north of 53°N). There were insufficient data to define survey strata for Davis Strait.

At the Front, a fixed-wing aircraft flew along transects at an altitude of 1,000 ft (305 m) from near the coast to the seaward edge of heavy pack ice (that preferred by whelping hooded seals), with a transect spacing of 10 nm (18.5 km) in Stratum 3 and an interval of 5 nm (9.3 km) in Stratum 1. Transect spacing was about 15 nm (28 km) in Davis Strait. On transects flown at the Front from 19-26 March, vertical photographs (23 cm × 23 cm) were taken at intervals of about 2 nm (3.7 km), whereas, on the transects flown in Davis Strait during 26-27 March, photographs were taken at intervals of about 4 nm (7.4 km). Counts of hooded seals on these spot-photographs were used to determine the density of pups in strata outside the whelping concentrations (i.e. scattered pups).

A single large whelping patch was located in each region. Both fixed-wing photographic and helicopter sighting surveys were used to determine the number of pups present in the whelping patches (SCR Doc. 85/I/14). Fixed-wing photographic surveys consisted of a series of parallel transects flown systematically across the whelping patches with 20% overlap between successive frames. Transect width was about 450 m. Whelping concentrations were relocated by using radio transmitters placed on the ice. Pup abundance for each whelping patch was also determined by helicopter sighting surveys flown at an altitude of 100 ft (31 m), using a total strip width of 200 m. Transects were spaced systematically at an interval of 1 nm (1.85 km). Loran-C navigation was used for helicopter surveys at the Front, whereas dead-reckoning

navigation, with allowance for wind direction and speed, was used in helicopter surveys in Davis Strait. Observers counted all pups seen within their respective 100-m wide strips and classified each pup into one of the four developmental stages (defined above). The number of pups present in each whelping patch was calculated by using Jolly's strip survey method for unequal-sized sampling units (Caughley, 1977)[4].

d) Estimation of pup production (SCR Doc. 85/I/14)

i) Scattered seals

Abundance of scattered seals was estimated by multiplying the area surveyed by the average density of seals in the spot-photographs. Confidence limits were obtained by a bootstrap estimator (Effron, 1979)[5].

ii) Whelping patches

A maximum likelihood method was used to combine estimates of abundance from several surveys with estimates of the number of pups in each developmental stage to obtain an estimate of total pup production. The maximum likelihood method weighted each survey point estimate of pup abundance by the estimated sampling variance and each estimate of the proportion of pups in each stage by the sample size corrected for loss of degrees of freedom associated with the sampling design. Adequacy of the model fit was investigated by examining the pattern of residuals and the covariance matrix of the estimated parameters.

The newborn stage was estimated to last 3 hours. The thin blueback stage was estimated to last 1.5 days. The fat blueback stage was assumed to be variable in the model and was estimated to last 1.5 days, 2.5 days and 3.5 days for 11%, 66% and 23% of the pups respectively. The duration of the solitary stage could not be determined from observations of pups of known age and was therefore estimated in the model.

e) Assessment results (SCR Doc. 85/I/14)

i) Vital rates

Using the method of Chapman and Robson (1960)[6], total mortality rate was calculated from an age distribution of 147 adult females sampled in Davis Strait during March 1984. The result was Z = 0.142 with a 95% confidence interval of 0.115-0.166.

ii) Scattered pups

At the Front, 12 hooded seal pups were seen on the 472 spot-photographs in Stratum 1. This provided an estimate of 7,400 scattered pups on the ice (density = 0.12 pups/km^2) with 95% confidence interval of 2,700-14,400. There was insufficient information to correct this estimate for the number of pups which had already left the ice or were yet to be born. No pups which could unambiguously be attributed to production outside the whelping patch were seen in Davis Strait, but the spot-photographs were taken only on 26-27 March when most pups in this area had left the ice.

iii) Whelping patches

For the Front herd, four parameters were estimated simultaneously in the model: total pup production, mean birth date, variance in the birth date, and duration of the solitary stage. Due to weather and logistical constraints, all fixed-wing surveys of the Front patch were incomplete, and, therefore, the results were not used in the final assessments. Pup abundance estimates from complete helicopter sighting surveys were 35,300

---

[4] CAUGHLEY, G. 1977. Analysis of vertebrate populations. John Wiley and Sons, London.

[5] EFFRON, B. 1979. Computing and theory of statistics: thinking the unthinkable. Soc. Ind. Appl. Math. Reivew, 21: 460-80.

[6] CHAPMAN, D. G., and D. S. ROBSON, 1960. The analysis of a catch curve. Biometrics, 16: 354-369.

on 21 March (95% confidence interval of 24,900–45,600) and 24,000 on 25 March (95% confidence interval of 18,900–29,200).

Estimates of total pup production at the Front were calculated by assuming that births were normally distributed throughout the season. The resulting estimate of total pup production (54,700) indicated that a significant correction was needed to account for pups that had already left the ice or were yet to be born. The 95% confidence limits for total pup production were ± 17,500, if the other three parameters are correctly estimated. Uncertainty in the estimate of the other three parameters will not alter each 95% confidence limit by more than 2,500 pups. To investigate the effect of asymmetry in the distribution of births on the estimate of total pup production, births were alternatively assumed to follow a gamma distribution, the resulting estimate of pup production being 48,700. However, there was insufficient information to independently estimate all of the necessary parameters of this alternative model, and, therefore, this result must be considered less reliable than that based on the normal distribution.

In Davis Strait, consolidated pack ice prevented seals from leaving the ice prior to 24 March. Therefore, the result of the complete helicopter survey of 24 March (18,600 pups, with 95% confidence interval of 13,800–23,400) was considered to be a reliable estimate of pup production in this area. Although this estimate is probably biased downwards, it is unlikely that many pups were born after 24 March.

The total pup production estimates for the Front and Davis Strait areas are probably underestimates for three reasons: whelping patches within the survey area could have been missed because of the wide interval between search transects, ice suitable for pupping was available outside the area surveyed, and no correction was made for the scattered pups that had left the ice or were yet to be born.

iv) Trends in pup production

The estimates of hooded seal pup production in the Northwest Atlantic from the 1984 aerial surveys are substantially higher than those which were previously assumed (NAFO Sci. Coun. Rep., 1983, pages 60–61). It is difficult to compare results from the 1984 survey of Davis Strait with previous surveys, which did not provide an estimate of abundance of pups outside the patches and did not account for those pups which had left the ice or were yet to be born. The difference between the estimate of 18,600 (with 95% confidence interval of 13,800–23,400) and previous estimates of around 10,000 might easily be accounted for by differences in survey design. Thus, it is not possible to determine recent trends in pup production in Davis Strait from the available data. The 1984 estimate of 62,000 pups (95% confidence interval of 40,000–87,000) at the Front is the only reliable estimate of total production for this area in recent years.

Earlier estimates of hooded seal pup production in the Northwest Atlantic (about 30,000 during the late 1960's) have all been based on the survival index method and depend heavily on the 1966 data point (SCR Doc. 85/I/14). If it is accepted that pup production in the late 1960's was in the neighbourhood of 30,000, the hooded seal population has probably increased in recent years, whether the value of 30,000 represents total Northwest Atlantic production or Front production alone.

v) Replacement yield

Projections to 1990 were calculated for hooded seals at the Front, involving three hunting scenarios: with a Greenland catch of 6,000 (32% females), catches at the Front were assumed to be zero, 3,000 and 12,000 seals. The age and sex composition of these

catches were taken from average levels at Greenland and at the Front in recent years. The projections began in 1979 by using the age structure which was calculated from the sample of females collected at the Front in that year, corrected for the proportion of whelping animals and assuming constant pup production in 1976-79.

Using the estimated catch history of the population for 1979-83 and two levels of natural mortality (0.07 and 0.13), which were previously considered to be a feasible range of M (NAFO Sci. Coun. Rep., 1983, pages 60-61), population trajectories consistent with the point estimate and 95% confidence limits on Front production in 1984 were calculated. These trajectories were carried forward to 1990 by using the estimated structure of the 1984 catch and the three hunting scenarios described above. These projections (Table 5) and replacement yields (Table 6) are conservative because they assume that Greenland catches are derived only from seals born at the Front. However, six new recaptures of tagged hooded seals in Greenland were reported at the meeting, five of these being

Table 5. Projected pup production for hooded seals at the Front, 1985-90, for three different levels of 1984 production, two levels of M, and three different hunting scenarios (numbers in thousands)[1].

Pup production (1984)	Year	M = 0.07			M = 0.13		
		G	12+G	3+G	G	12+G	3+G
39.9	1985	43.4	43.4	43.4	41.0	41.0	41.0
	1986	48.5	48.0	48.4	43.2	42.7	43.1
	1987	55.4	54.4	55.1	46.2	45.3	46.0
	1988	63.3	61.0	62.7	49.6	47.6	49.1
	1989	72.1	67.2	70.9	52.9	48.9	51.9
	1990	82.1	73.8	80.0	56.5	50.0	54.9
62.1	1985	68.9	68.9	68.9	65.1	65.1	65.1
	1986	78.0	77.5	77.8	69.3	68.8	69.2
	1987	89.3	88.3	89.1	74.5	73.6	74.3
	1988	102.4	100.1	101.8	80.3	78.3	79.8
	1989	117.1	112.2	115.9	86.3	82.2	85.2
	1990	133.9	125.6	131.8	92.6	86.1	91.0
86.6	1985	97.1	97.1	97.1	91.7	91.7	91.7
	1986	110.5	110.0	110.3	98.1	97.6	97.9
	1987	126.7	125.8	126.5	105.8	104.9	105.6
	1988	145.5	143.2	144.9	114.2	112.2	113.7
	1989	166.7	161.8	165.5	123.0	118.9	122.0
	1990	191.0	182.8	188.9	132.5	126.0	130.9

[1] G = Greenland catch of 6,000 only; 12+G = Front catch of 12,000 plus Greenland catch; 3+G = Front catch of 3,000 plus Greenland catch.

Table 6. Estimates of replacement yield of hooded seals at the Front in 1985 for three levels of 1984 pup production and two levels of M. (These replacement yields assume a catch with same age structure as that at Greenland; variation in catch age structure is unlikely to affect replacement yield by more than ±5%.)

Pup production (1984)	Replacement yield	
	M = 0.07	M = 0.13
39,900	28,800	15,500
62,100	45,900	24,700
86,600	64,700	34,900

bluebacks which were tagged in Davis Strait during March 1984. Previously, five hooded seals tagged at the Front and nine in the Gulf of St. Lawrence were recovered in West and East Greenland (Kapel, 1982)[7]. Thus, pups born in Davis Strait must contribute to catches at Greenland.

vi) Stock identity

Comparison of the age distribution of 140 females (age 6 and older) from Davis Strait in 1984 with that of 174 females from the Front in 1982 (Table 7) indicates that the two groups have experienced substantially different mortality patterns over at least the past 10 years. Future recoveries, in the whelping areas, of seals tagged at Newfoundland and in Davis Strait may clarify further the relationship between these two breeding herds.

Table 7. Percentage age composition of female hooded seals (age 6 and older) from the Front and Davis Strait areas.

Area	Age (years)											Z	95% confid. interval
	6	7	8	9	10	11	12	13	14	15	16+		
Front (1982)	14.9	16.1	13.2	8.6	10.9	11.5	5.2	4.0	4.0	2.3	9.2	0.221	0.188-0.254
Davis Strait (1984)	13.6	7.1	9.3	5.7	5.7	7.1	5.7	10.0	7.9	5.0	22.9	0.142	0.115-0.166

f) Future research requirements

STACFIS recommends

i) that additional research be carried out to estimate the seasonal distribution of births within patches and to quantify the variability of pup developmental stages;

ii) that simultaneous aerial (fixed-wing aircraft and helicopter) surveys of the Front and Davis Strait regions be carried out to provide additional estimates of pup production for both regions, with increased effort to assess pup production outside the whelping patches and to study effects of variation in strip width and inter-observer variability for helicopter surveys;

iii) that biological sampling of hooded seal catches at Greenland should be continued, with particular emphasis on age composition; and

iv) that attempts be made to collect detailed hunting effort statistics for Greenland to aid in the interpretation of trends in the catch data.

4. Coordination with the ICES Working Group on Harp and Hooded Seals in the Greenland Sea

STACFIS noted that a permanent ICES Working Group on harp and hooded seals in the Greenland Sea has been established, and agreed that liaison and cooperation with this Working Group would be of benefit to seal stock assessments and the planning of coordinated research within the NAFO Scientific Council. In order to achieve this, STACFIS proposes that a procedure should be established to exchange reports of special NAFO Scientific Council meetings on seals and reports of ICES Working Group meetings on a regular basis through the Secretariats of the two organizations. STACFIS also proposes that joint meetings should be considered in order to further improve coordination of future assessments and research related to harp and hooded seals in the North Atlantic.

[7] KAPEL, F. O. 1982. Studies on the hooded seal, Cystophora cristata, in Greenland, 1970-80. NAFO Sci. Coun. Studies, 3: 67-75.

II. ASSESSMENT OF SHRIMP STOCKS

1. Introduction

The ad hoc Working Group on Shrimp met during 16-21 January 1985 at the request of STACFIS, with J. E. Carscadden as Convener, to consider the requests of the coastal states involved for advice on management in 1985 of the shrimp stocks in Davis Strait and Denmark Strait. Scientists attended from Canada (J. E. Carscadden and D. G. Parsons), EEC (D. M. Carlsson, P. Kanneworff, J. C. Poulard and R. Noé), Iceland (I. Halgrimsson), and Norway (O. M. Smedstad).

2. Assessment of Shrimp in Davis Strait (Subareas 0 and 1)

a) Fishery trends (SCR Doc. 85/I/3, 4, 6)

The nominal catch of shrimp in Subareas 0 and 1 increased from less than 10,000 tons prior to 1973 to almost 50,000 tons in 1976, decreased to about 35,000 tons in 1978 and 1979 and increased to about 45,000 tons annually in 1981-83 (Table 8). Preliminary statistics for 1984 indicate a total catch of about 45,000 tons, of which 38,000 tons were taken on the offshore grounds. The West Greenland inshore fishery has been relatively stable with estimated catches of 7,000-8,000 tons annually since 1972 (except 10,000 tons in 1974).

The offshore fishery has been regulated by TAC (total allowable catch) since 1977. In 1977 and 1978, the total offshore catches in the Davis Strait region were about 34,000 and 27,000 tons, compared with TACs of 36,000 and 40,000 tons respectively. In 1979 and 1980, the offshore fishery was regulated by a TAC of 29,500 tons, with the nominal catch being 27,000 and 37,000 tons respectively. Since 1981, Canada and the EEC have set separate TACs for Subareas 0 and 1 respectively. The TAC for Subarea 0 was 5,000 tons annually during 1981-84, whereas the TACs in Subarea 1 were in the range of 29,625-30,000 tons during 1981-84 (Table 8). For the same period, the Scientific Council advised that the TAC for Subarea 1 and adjacent parts of Subarea 0 should not exceed 29,500 tons.

Severe ice conditions in the spring of 1982, 1983 and 1984 caused delayed achievement of the allowable catch and a change in the distribution of the shrimp fishery, compared to the situation in the years preceding 1982. Ice severely hampered the fishery in the first 5 months of 1984, but, from May to October, Greenland vessels fished west and north of Store Hellefiske Bank (Div. 1B). More effort was expended in Div. 1C and 1D during this period than in 1983. The distribution of fishing effort by Greenland vessels in 1984, as in the previous 2 years, did not exhibit the northward shift that was evident in 1980 and 1981. Danish, Faroese, French and Norwegian vessels also fished in Subarea 1 in 1984, with slightly less effort than in 1983. Canadian vessels fished mainly between 58°W and 59°W and 67°N and 68°N in Div. 0A, as in previous years. Norwegian vessels expended some effort in Div. 1C and 1D, but most activity occurred in Div. 1B. There was no information available on the distribution of fishing effort by the other countries.

In Subarea 1, a total of 47 vessels (>80 GRT) participated in the fishery in 1984, compared to 48 in 1983 and 56 in 1982. In Subarea 0, a total of 8 vessels participated in the fishery in 1984 compared to 9 in 1983.

b) Input data

i) Commercial fishery data (SCR Doc. 85/I/ 3, 4, 6)

CPUE. Catch and effort information about the shrimp fishery in 1984 included Canadian data based on logbook records and observer reports for Subarea 0, Norwegian data based on logbook records for Subarea 1, and Greenland data based on logbook records and corresponding landings for Subarea 1.

Table 8. Nominal catches and TACs (metric tons) of shrimp (Pandalus borealis) in Subareas 0 and 1, 1975-1984.

		1975	1976	1977	1978	1979	1980	1981	1982	1983[1]	1984[1]
SA 0	Canada	-	-	-	-	-	59	1,590	858	2,030	420
	Denmark	-	-	68	86	67	-	1,923	946	1,359	223
	Faroes	-	-	239	-	115	-	1,686	-	757	555
	France	-	-	-	21	7	-	-	-	-	417
	Greenland	-	-	-	-	149	815	85	8	-	477
	Norway	-	65	150	15	791	-	-	-	-	-
	Spain	-	327	-	-	-	-	-	-	-	-
	Total	-	392	457	122	1,129	874	5,284	1,812	4,146	2,092
SA 1	Canada	-	-	-	-	245	590	-	-	-	-
	Denmark	1,142	2,717	5,842	3,382	1,327	872	995	959	451	390
	Faroes	5,300	11,179	12,612	8,070	6,867	3,554	1,234	530	475	383
	France	-	803	924	805	353	247	535	672	418	405
	F. R. Germany	-	-	31	-	-	-	-	-	-	-
	Greenland(a)[2]	8,700	7,300	7,800	7,600	7,500	7,500	7,500	7,500	7,500	7,500
	Greenland(b)[2]	1,089	2,478	7,081	5,531	12,527	27,501	28,197	32,016	32,108	33,500[3]
	Japan	-	146	-	-	-	-	-	-	-	-
	Norway	8,678	11,658	7,353	8,959	4,639	3,014	1,055	838	517	454
	Spain	6,948	6,925	-	-	-	-	-	-	-	-
	USSR	6,033	6,468	-	-	-	-	-	-	-	-
	Total	37,890	49,674	41,643	34,347	33,458	43,278	39,516	42,515	41,469	42,632
	Offshore	29,190	42,374	33,843	26,747	25,958	35,778	32,016	35,015	33,969	35,132
SA 0+1	Offshore catch	29,190	42,766	34,300	26,869	27,087	36,652	37,300	36,827	38,115	37,224
SA 0+1	Advised TAC	-	-	40,000	40,000	29,500[4]	29,500	29,500	29,500	29,500	29,500
SA 0+1	Effective TAC	-	-	36,000	40,000	29,500	29,500	35,000[5]	34,800[5]	34,625[6]	34,925[5]

[1] Provisional data.
[2] a = inshore (estimated from the total for Greenland), and b = offshore catches.
[3] Based on reporting to Greenland authorities of vessels greater than 80 GRT plus an estimate of 3,200 for vessels less than 80 GRT.
[4] Based on advice for a reduction in TAC of 20-32% of the 1978 TAC (ICNAF Redbook, 1979, p. 19).
[5] Includes TAC of 5,000 tons in Subarea 0.

Canadian logbook data showed a decrease in the July-September catch rate from 1983 to 1984. However, the data for 1984 covered only a small portion of the total catch in Subarea 0. Observer reports, which covered a greater part of the fishery in the area, showed similar catch rates in both years. Norwegian logbook data for Div. 1B showed a small increase in CPUE for the same period from 1983 to 1984, but, because of ice, no fishing occurred in Div. 1B during January-March and ice still hindered access to the fishing grounds in the northern part of the area during April-June. The catch rates of Greenland trawlers (630-722 GRT) were about the same level in April, May and June, but showed a typical seasonal decline from June to September. Spring catch rates were not as high as in earlier years. The Greenland data showed that more fishing occurred in Div. 1C in 1984 than in previous years, and catch rates in this division increased from 1983 to 1984 (SCR Doc. 85/I/3).

Indices of mean catch rates in the July-September period of 1976-84 for the different national fisheries in Div. 1B (standardized to 1976) and for the Canadian fishery in Div. 0A (standardized to the average of the other indices in 1980) are given in Table 9 and the Greenland data are illustrated in Fig. 1. In general, all indices declined by about the same proportion from 1976 to 1979 and fluctuated similarly from 1980 to 1984, except for the abnormally high 1981 value for the French fishery (no CPUE index was available for 1983 and 1984) and the stabilization of the Norwegian index from 1982 to 1983. For both countries, however, the indices were derived from ralatively small catches.

Table 9. CPUE indices (July-September) for Greenland, Norwegian and French fisheries for shrimp in Div. 1B and the Canadian fishery in Div. 0A, 1976-1984.

	Div.	1976	1977	1978	1979	1980	1981	1982	1983	1984
Greenland	1B	1.00	0.74	0.67	0.51	0.63	0.59	0.74	0.66	0.67
Norway	1B	1.00	0.84	0.60	0.47	0.60	0.43	0.57[1]	0.56	0.61[1]
French[1]	1B	1.00	1.13	0.61	0.48	0.58	0.80	0.60	-	-
Canada[2]	0A	-	-	-	-	0.60	0.66	0.78	0.63	0.64

[1] July only.
[2] Div. 0A (1980 is average of the other 3 indices).

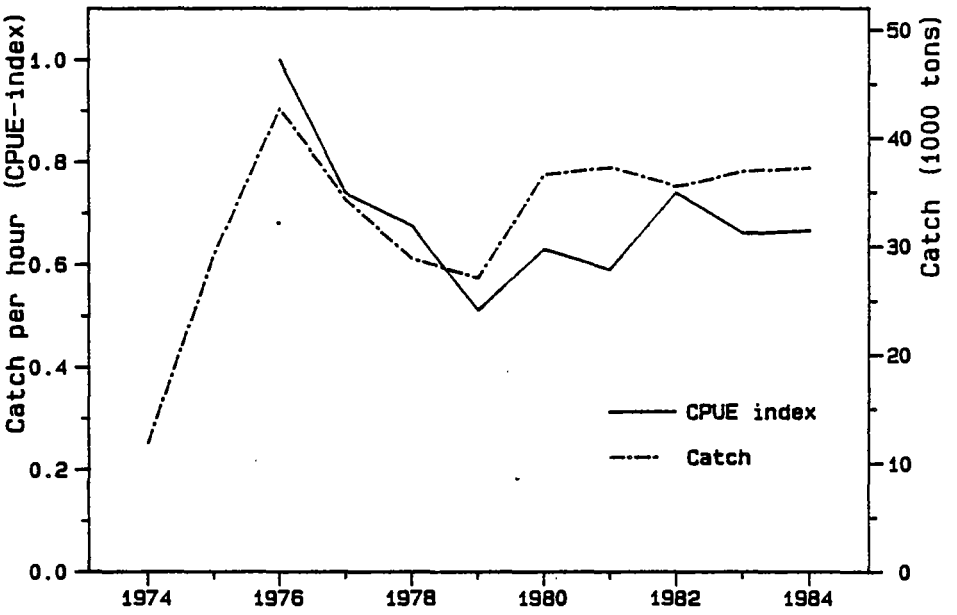


Fig. 1. Indices for mean CPUE for the period July-September, 1976-84 in Div. 1B compared to total offshore catches in Subareas 0 and 1. (Mean catch rates are based on logbook information for seven trawlers (630-722 GRT) of the Royal Greenland Trade Department. Offshore catch in 1984 is provisional).

No new information was available on the influence of the introduction by some countries of more efficient gears in the shrimp fishery around 1980 and their effect on CPUE indices. The late opening of the fishery in 1982, 1983 and 1984 due to ice resulted in a reduction of fishing pressure on spring concentrations of berried females. This might have resulted in higher than normal abundance later in the season. Therefore, it was agreed that the CPUE indices for July-September 1982-84 may be biased upwards, but it was not possible to quantify either of these factors.

Biological data. Shrimp samples from the Canadian fishery in Div. 0A in 1984 were analyzed for sex, maturity and age interpretation. The data showed that 9% of females in the sample would not have spawned in 1984. This value was higher than that observed in samples of previous years (SCR Doc. 85/I/4), when less than 5% failed to spawn. Four age groups were identified in the commercial sample, two of males and two of females, with more than 40% belonging to the oldest male group. It was agreed that further

ageing of shrimp should be continued to determine the age composition of the yearly catches. However, before this can be done, the present interpretation of ages should be verified.

Length frequencies from the Canadian (SCR Doc. 85/I/4) and Norwegian (SCR Doc. 85/I/6) fisheries in Subarea 0 and 1 respectively showed that shrimp greater than 18 mm dominated in the catches. The Canadian data from Div. 0A showed that the smaller of the two male age groups was more abundant in October and November 1984 than in previous years.

Shrimp discards. The observed discarding of shrimp in Div. 0A during 1984 was higher in most months than in the previous 3 years. More than 5% of the total shrimp catch was discarded in most months. Size distributions of discarded shrimp showed two modal groups around 19 mm and 21-22 mm. No change in size of discards was noted between months or at different depths. The size range of discards (18-24 mm) was similar to the size range of males in the catches.

The observed discarding of shrimp by one Norwegian trawler in Div. 1B varied from haul to haul (2.1 to 16.7%), with an average of about 6% of the total shrimp catch being discarded. The size distribution of discarded shrimp from catches at Holsteinsborg Dyb showed the same bimodality as the discards in Div. 0A, whereas the discards from catches at Sukkertoppen Dyb showed unimodality at 20 mm. However, there was no information on the level of discarding and the reasons for discarding by the majority of the fleet.

By-catches. Generally, by-catches in the shrimp fishery of Subarea 0 and 1 do not appear to be a problem. Logbook records from eight Greenland trawlers showed a by-catch of 2% in 1984, compared to about 1% in the previous 3 years. The dominant species in the by-catch was redfish. Small redfish also dominated in the Nowegian by-catch, but the by-catch rate was lower than in the last 2 years. In the 1984 Canadian fishery in Div. 0A, the by-catch increased from about 6% in July to 36% in November. Most of this increase was attributed to increased incidence of Greenland sharks. The dominant commercial species in the catches was redfish which comprised less than 5% of the total catch in most months.

ii) Research vessel surveys (SCR Doc. 85/I/3, 8)

Abundance estimates from photographic surveys. Data from photographic surveys have been incorporated into a shrimp distribution model to derive biomass estimates for 1981-84 in the region from 66°00'N to 69°30'N (SCR Doc. 85/I/8). STACFIS considered that the results of the present version of the model were more reliable than those of earlier versions, but suggested that these results should be treated with caution because only half of the data that are included in the model have been reassigned to new size groups.

The trends in biomass estimates are in good agreement with CPUE indices for the seven trawlers of the Royal Greenland Trade Department (Fig. 2), except for the 1984 biomass estimate which shows a decline from the previous year. However, the analysis of the photographic data indicates that this decline is caused by a lower abundance of the smallest size group of shrimp in the southern part of the surveyed area. Because this group is not fully recruited to the fishable stock, a change in its abundance will not be reflected in the CPUE indices from the commercial fishery. In addition, data from the commercial fishery indicate that the biomass which was estimated for the area around Holsteinsborg Dyb (Div. 1B and 1C) may be underestimated. STACFIS noted that

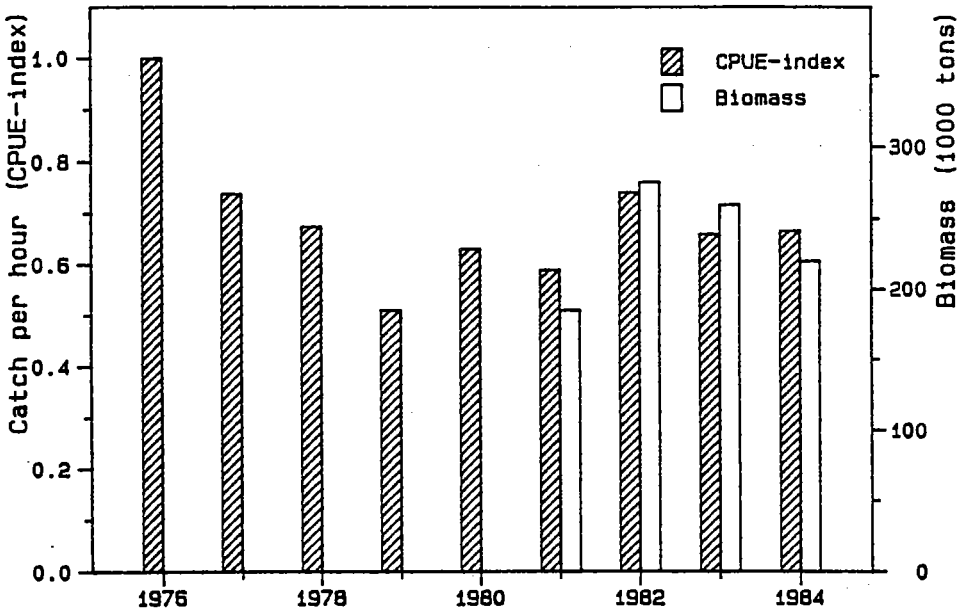


Fig. 2. Estimates of total biomass from photographic surveys in the area of 66°00'N-69°30'N, in depths 100-600 m, and average CPUE indices for commercial trawlers (July-September) in Div. 1B.

improvement of the input to the model has been achieved and that a good agreement now exists between the estimates from the model and the CPUE indices.

Bottom temperature has been regarded as one of the most important factors governing the distribution of shrimp. The photographic model indicates that there is a relationship between abundance and observed bottom temperature in the area 2 and 3 years earlier. It was noted that bottom temperatures in the area have been declining in recent years, which may affect the productivity of the stock, but STACFIS was unable to evaluate this possibility.

Biological data. Length compositions of shrimp samples from a Danish research survey in July-August were analyzed for sex and maturity (SCR Doc. 85/I/3). Trawling was carried out on the photographic stations wherever bottom conditions permitted. The data showed that males generally dominated in areas south and west of Store Hellefiske Bank (Div. 1B) and in Godhavn Rende (Div. 1A) to the northeast. In these areas, females were noticeably lacking. At some stations on the northern slope of Store Hellefiske Bank (Div. 1B), higher proportions of large shrimp (transitionals and females) were found. An examination of a small number of samples from 1983 and 1984 showed that, in the northern and southern areas, the proportion of non-spawning females was similar in the 2 years. At one offshore station on western Store Hellefiske Bank (Div. 1B), where there was a high proportion of females, an increase in non-spawners was observed, similar to observations from the Canadian fishery in the adjacent Div. 0A (SCR Doc. 85/I/4). It was noted that the available samples were difficult to interpret because of the lack of a time series. STACFIS proposed that similar samples over a series of years be examined to detect changes in distributional patterns and that an attempt should be made to relate such changes to abundance estimates.

c) Prognoses

Catch rates from the Canadian fishery in Div. 0A (observer data) for the July-September period were approximately the same in 1983 and 1984. The same pattern was evident in catch-rate data for the Greenland and Norwegian fisheries in Div. 1B. Although the CPUE indices indicate that the stock showed an increasing trend from 1979 to 1982 and stability since then, these indices may be biased upwards in recent years because of possible influences of improved trawl design since 1980 and unfavorable ice conditions in 1982, 1983 and 1984 (see CPUE section). Although the effects of these factors cannot be estimated, it is quite possible that they could account for the observed increase and subsequent stability of the stock, and that the stock may not have increased since 1979 (Fig. 1).

In 1976, STACRES advised a TAC of 40,000 tons for 1977, based on a strategy to maintain the spawning stock level at 50% of the virgin spawning stock size (ICNAF Redbook, 1977, page 15). However, in 1978, it was advised that the 1979 TAC be set at a level in the range of 20-32% below the advised 1978 TAC of 40,000 tons to reflect decreases in abundance between 1976 and 1978 (ICNAF Redbook, 1979, page 19). STACFIS has not advised increases in the TAC of 29,500 tons since 1979 because of the interpretation of the catch-rate series, as discussed above, and because of concerns over the recruitment prospects for the stock. Although concerns about recruitment have been expressed by STACFIS in recent years, catch rates have not declined. From the data available at this meeting, it was not possible to provide quantitative estimates of recruitment for 1985. Because of the apparent stability of the stock and the fact that higher-than-advised yields have been realized during this period of stability, STACFIS advises that the overall TAC for the offshore grounds in Subarea 1 and the adjacent parts of Subarea 0 in 1985 should not exceed 36,000 tons which corresponds to the average catch during 1979-84.

STACFIS emphasizes that this advice to increase the TAC is not based on evidence of an increase in the stock since 1979 but rather on a reevaluation of a longer data series. Furthermore, because little is known about the effects of the environment on growth, survival, recruitment and distribution of shrimp, STACFIS is concerned about the possibility of poor recruitment due to adverse environmental conditions, as evident by declining bottom temperatures. Although this shrimp stock appears to have been stable in recent years, other P. borealis stocks (e.g. Alaska, Gulf of Maine) have collapsed due to the combined effects of overfishing and changes in environmental parameters.

d) Future research requirements

STACFIS noted that some of the recommendations from the January 1984 Meeting (NAFO Sci. Coun. Rep., 1984, page 15) were addressed during the year. Danish scientists redefined size categories of shrimp in the photographic model for most years, with the remainder to be completed in 1985. Also, observer programs were continued in 1984, providing length frequencies, biological samples and estimates of by-catch and discards. However, some other recommendations were not addressed, and it was agreed that these be reiterated. Special note was made of the inability to initiate a time series of stratified-random trawl surveys. It was agreed that such a series is essential to compare with the other abundance indices from the photographic surveys and CPUE data, as well as provide more quantitative information on recruitment. Concern was expressed that estimates of discards have not been representative of the fishery and that catches have been underestimated. STACFIS therefore recommends

i) that stratified-random trawl surveys be conducted on a seasonal basis for a number of years to determine seasonal and annual changes in distribution and abundance;

ii) that the annual photographic survey be continued;

iii) that observer programs be continued and extended to cover a greater portion of the fleet;

iv) that reporting of discards be closely monitored to ensure reliability and consistency with observer reports;

v) that countries participating in the shrimp fishery ensure that fishing vessel logbooks are completed and copies made available to scientists as soon as possible;

vi) that a study be undertaken to determine the relative efficiency of gear types used in the Davis Strait shrimp fishery in an attempt to quantify the effects of recent changes in gear on CPUE indices;

vii) that the present interpretation of age and growth of shrimp be verified and an attempt made to separate shrimp catches into year-classes.

3. Assessment of Shrimp in Denmark Strait (ICES Div. XIVb and Va)

a) Fishery trends (SCR Doc. 85/I/7, 10, 11, 12)

The shrimp fishery in Denmark Strait began in 1978 by an Icelandic vessel on the eastern side of the midline between Greenland and Iceland (Table 10). Nominal catches increased to 1,300 tons in 1979 when Norwegian trawlers participated in the fishery, and exceeded 8,200 tons in 1980 with the additional involvement of Danish, Faroese, French and Greenland vessels. In 1981, the total catch on both sides of the midline declined to 4,800 tons, well below the level of 8,000 tons aimed at by the EEC for regulation of the fishery in the area west of the midline. For 1982, a TAC of 4,500 tons was set by the EEC for the western side of the midline, whereas the Scientific Council advised an overall TAC of 4,200 tons; the reported catch in 1982 totalled 4,900 tons. For 1983, the EEC set a TAC of 5,725 tons, whereas the Scientific Council advised an overall TAC of 4,200 tons (as in 1982); the reported catch totalled 4,200 tons. In 1984, the EEC set a TAC of 5,245 tons, the Scientific Council advised an overall TAC of 4,200 tons as previously, and the reported catch totalled 6,400 tons.

Table 10. Nominal catches and TAC (metric tons) of shrimp (Pandalus borealis) in Denmark Strait, 1978-84.

Country	1978	1979	1980	1981	1982	1983	1984[1]
Denmark	-	-	702	581	740	204	443
Faroes	-	-	4,233	713	737	443	668
France	-	-	50	353	414	291	500
Greenland	-	-	200	1,004	1,115	1,467	2,250
Iceland	363	485	614	125	-	43	363
Norway	-	800	2,461	2,016	1,896	1,727	2,128
Total	363	1,285	8,260	4,792	4,902	4,175	6,352
Advised NAFO TAC	-	-	-	-	4,200	4,200	4,200
Effective EEC TAC[2]	-	-	-	8,000	4,500	5,725	5,245

1 Provisional data

2 On the western side of the midline

The shrimp fishery in Denmark Strait in 1984 took place in the area of Strede and Dohrn Banks as well as on the slopes of the Storfjord Dyb. Ice conditions early in the fishing season were variable, hindering the access to more northern and eastern areas, but, later in the season, the ice cover did not influence the distribution of the fishing fleet as in previous years. For 1983, available information indicated that the bulk of the catch was coming from south of 66°N, whereas the main fishery in 1984 was conducted north of 66°N at depths ranging from 300 to 500 m.

In 1983, the overall fishing period (except for one vessel) extended from March to November, with the main fishing period from March to June when about 80% of the catch was taken. In 1984, the fishing periods west and east of the Greenland-Iceland midline differed considerably. West of the midline, the fishing period extended from January to May, when about 5,800 tons (approximately 92% of the total catch) were taken, and in November-December when Faroese vessels caught about 90 tons. East of the midline, on the other hand, the fishing period extended from June to December, the main fishing period being in September and October when about 70% of the total catch east of the midline was taken. As in 1983, 41 vessels (excluding Icelandic vessels) participated in the fishery.

b) Input data

i) Commercial fishery data (SCR Doc. 85/I/7, 10, 11, 12)

CPUE. Monthly catch rates and corresponding fishing effort, based on logbook data for the Danish, French, Greenland, Icelandic and Norwegian fisheries in 1980-84, are listed in Table 11. In 1980 and 1981, catch rates were highest during March-April, whereas in 1982 catch rates were highest in May. In 1983 and 1984, the highest catch rates were from the Greenland fishery in March and January respectively. The January 1984 catch rate for Greenland vessels was almost as high as the highest catch rate observed for Danish and Greenland vessels (April 1980), but then declined through February and March. The catch rates for the French vessels were considerably higher in April and May in 1981 and 1984, compared to the same months in 1982 and 1983. The Norwegian catch rates in 1982 and 1983 were lower than the catch rates in 1980 and 1981. In April 1984, Norwegian catch rates showed an increase compared to April 1983, whereas the catch rates in May were considerably lower in 1984 compared to the year before. The Icelandic catch rates were stable in June from 1980 to 1983 (except 1982, when no fishing took place), but declined in 1984. The October and November catch rates also declined from 1983 to 1984.

Ice conditions differed considerably from month to month throughout the years and thereby affected the distribution of the fishery, making the evaluation of CPUE data difficult. This difficulty was compounded by incomplete data on catch location and fishing effort for a substantial portion of the fleet. Although it was not possible in previous assessments to reach a conclusion on the reasons for the trends observed in catch rates in recent years, the inclusion of the data for 1984 indicates stability in the stock. Despite this indication of stability from the CPUE series, it was agreed that a more detailed analysis of the existing data was needed. Such an analysis might include standardization by gear, tonnage class and season to obtain a representative abundance index for the stock.

Biological data. Data on the biology of shrimp in Denmark Strait were available from Greenland, Norwegian, French and Icelandic trawlers in 1984. Length distributions of catches from trawlers of the four countries were similar, the size range of shrimp being 20-35 mm with the dominant mode in all samples at approximately 29 mm. The sample from the French trawler, however, had proportionately fewer shrimp between 20 and 25 mm.

Samples obtained from Greenland vessels in February north of 66°N were comprised mostly of 25-33 mm females, with the males being mainly 20-28 mm. Females dominated in two samples taken in March south of 66°N, but the more westerly sample contained a higher proportion of males than that from further east. The size ranges of shrimp in these

Table 11. Monthly catch rates (kg per hour trawling) and corresponding effort (hours trawling) from the logbooks available from the shrimp fishery off East Greenland, 1980-84.

Year	Month	Denmark and Greenland[1] CPUE	Denmark and Greenland[1] Effort	France CPUE	France Effort	Iceland[2] CPUE	Iceland[2] Effort	Norway CPUE	Norway Effort
1980	Mar	-	-	-	-	-	-	904	398
	Apr	672	35	-	-	-	-	704	793
	May	392	1,295	-	-	125	1,425	378	1,071
	Jun	139	315	-	-	90	1,478	98	714
	Jul	71	60	62	40	104	1,176	-	-
	Aug	17	32	-	-	123	851	95	874
	Sep	181	482	-	-	96	806	145	2,883
	Oct	107	1,165	-	-	-	-	99	3,071
	Nov	145	465	-	-	-	-	160	1,181
1981	Mar	-	-	-	-	-	-	364	137
	Apr	486	1,343	433	157	-	-	296	3,848
	May	263	914	261	522	-	-	161	4,057
	Jun	123	6	144	257	99	688	119	1,101
	Jul	-	-	-	-	78	603	-	-
	Aug	-	-	-	-	39	245	42	167
	Sep	-	-	-	-	-	-	46	65
1982	Mar	160	763	-	-	-	-	197	1,548
	Apr	195	1,570	216	331	-	-	171	4,450
	May	280	1,394	264	563	-	-	248	3,339
	Jun	-	-	185	238	-	-	-	-
1983	Mar	345	484	-	-	-	-	-	-
	Apr	160	457	165	248	-	-	128	2,734
	May	-	-	254	245	50	2	255	1,439
	Jun	-	-	162	206	99	52	143	1,797
	Jul	-	-	-	-	-	-	133	45
	Aug	-	-	-	-	-	-	98	622
	Sep	-	-	-	-	-	-	-	-
	Oct	-	-	-	-	172	80	-	-
	Nov	-	-	-	-	155	158	-	-
1984	Jan	600	105	-	-	-	-	-	-
	Feb	356	312	-	-	-	-	208	183
	Mar	224	281	316	132	-	-	229	2,104
	Apr	-	-	487	723	-	-	184	3,701
	May	-	-	304	349	-	-	161	2,699
	Jun	-	-	-	-	42	59	-	-
	Jul	-	-	-	-	68	283	-	-
	Aug	-	-	-	-	75	62	-	-
	Sep	-	-	-	-	99	1,280	-	-
	Oct	-	-	-	-	125	1,000	-	-
	Nov	-	-	-	-	70	952	-	-
	Dec	-	-	-	-	100	273	-	-

[1] Data based on logbooks from Danish and Greenland trawlers in 1980, 1981 and 1982. Since 1983 only Greenland logbooks have been available.

[2] Data from Iceland side of midlilne; data from other countries from the Greenland side of the midline.

samples were similar to those in the February samples, and the proportion of transitionals was low in both months.

Norwegian samples in April south of 66°N showed that all shrimp were females, 92% of which were ovigerous. North of 66°N, 37% of the sample were males, 15% transitionals and 48% females. French samples showed a predominance of females (93%) around the same time of year in the area of 66°N. Males ranged in size from 20 to 29 mm. Transitionals and females with sternal spines ranged from 25 to 32 mm, and females with no spines from 22 to 34 mm.

Icelandic samples in October-November indicated slow development of ovaries of females in this region where bottom temperatures were just over 0°C. A separation of a November sample by sex indicated three year-classes of males, a single mode of females with spines and possibly two year-classes of older females without spines.

Shrimp less than 20 mm were scarce in all the 1984 samples, including the Norwegian discard data. This supports the conclusion that young shrimp are not abundant on the fishing grounds and likely inhabit other areas, some of which may not be accessible to fishing. It was noted, however, that both the Greenland (February-March) and Icelandic (November) samples contained a higher proportion of male shrimp than observed in samples of the catches in former years.

Shrimp discards. Observations on one Norwegian trawler indicated discarding rates of 0.7% to 5.9%. On an average, 3.4% of the total catch was discarded in 1984, compared to 0.8% in 1983, 3.7% in 1982 and 11.5% in 1981. For one French trawler, discarding was reported to be 0.7%, and an observer on board a Greenland trawler reported that discarding was minimal. The Norwegian data showed a size range of discards of 17-29 mm with a mode at 24 mm. It was noted that information on discarding of shrimp was very minimal, making year-to-year comparisons difficult.

By-catches. Data on by-catches of fish in the shrimp fishery were reported for French, Greenland and Norwegian vessels. The by-catch of French vessels were comprised mainly of redfish and Greenland halibut and was less than 1% of the total catch. The by-catch of a Greenland vessel was 9.1% by weight in 1984, compared to 2.0% in 1983, the increase being mainly due to small redfish. On the Norwegian vessel, the by-catch increased from 1983 to 1984, the mean numbers of fish caught per kg of shrimp being 0.18 and 0.24 respectively. The increase was mainly due to Greenland halibut which was the dominant species in the by-catch.

ii) Data from research surveys (SCR Doc. 85/I/5)

Biological data. The Norwegian research cruise to Denmark Strait in September 1984 provided additional information on the biology of this shrimp stock. Males dominated in the outer part of the survey area, whereas females were more abundant near Dohrn Bank (around 66°N, 30°W) where they comprised 90% of the catches. Fifty percent of females in the outer part of the area lacked roe, whereas 90% of the shrimp in the area around Dohrn Bank had roe. Shrimp were smallest in the north and west and largest around Dohrn Bank.

c) Estimation of parameters

i) General production model (SCR Doc. 85/I/15)

A general production model (Fox, 1970)[8] was used to calculate maximum sustainable yield. Data for all countries involved in the fishery were used, except for the first

[8] FOX, W. W. 1970. An exponential surplus-yield model for optimizing exploited fish population. Trans. Amer. Fish. Soc., 99(1): 80-88.

2 years (1978 and 1979) when only the Icelandic catch and effort data were available. Monthly effort for each country was calculated by dividing catch by catch rate, and the monthly estimates for all countries were combined to yield an annual catch rate. The 1978 and 1979 catch rates from Icelandic data were adjusted by a constant (2.22), which was calculated by dividing the catch rate of all countries in 1980 and 1981 by the Icelandic catch rate for the same years. Moving averages of 2 and 3 years were used in the model.

d) Assessment results

i) General production model (SCR Doc. 85/I/15)

The maximum sustainable yields calculated from the general production model were 4,900 tons (3-year moving average) and 5,400 tons (2-year moving average), but the fit was slightly better for the 3-year moving average.

STACFIS noted that a similar analysis had been presented several years earlier and had been used, in the absence of other information, as a guide in assessing the yield from the stock. However, even with additional data, this model provided only a very approximate estimate of the maximum sustainable yield of the stock, because of the short time-series and the adjustments that were made in the data from the early years.

e) Prognoses

Sampling from the Norwegian survey of Denmark Strait in September 1984 was insufficient to estimate biomass. Catch-per-unit-effort data for Greenland and Norwegian trawlers indicated some stability in abundance since 1981, but data from two French trawlers showed a substantial increase in 1984. The catch rates of these vessels for 15-30 April were the highest reported during the 1981-1984 period. Icelandic catch-rate data were inconclusive.

Observations on aspects of the biology of shrimp in the Denmark Strait that had been considered in previous years were again discussed. The Committee noted that there is at least 5 years of growth from the larval stage to the spawning female, and the effects of exploiting the spawning stock on future recruitment are not yet measurable. It was also noted that this stock may be living under extreme and unstable environmental conditions.

Although the general production analysis indicated a sustainable yield of approximately 5,000 tons, STACFIS agreed that such an analysis should be used only to provide an approximate estimate of the maximum sustainable yield. STACFIS noted that the catch-rate data indicate stability in the stock, and therefore advises that the overall TAC for 1985 should not exceed 5,000 tons, which corresponds to the average catch during the 1981-84 period. It was further noted that allowing the catches to exceed the advised TAC (as has occurred since 1981) would add further pressure on the stock in 1985, which in turn may adversely affect the stock in future years.

f) Future research requirements

More information on biological characteristics of shrimp in Denmark Strait was contained in the Greenland, Norwegian, French and Icelandic data, but its usefulness in assessing the stock was limited by the lack of information on a year-round basis. STACFIS noted that there was a Norwegian research vessel survey in September 1984 but was concerned that few data were available on the environmental and biological questions outlined at the Janaury 1983 Meeting (NAFO Sci. Coun. Rep., 1983, page 16). STACFIS therefore recommends

i) that catch-rate data and biological samples be obtained from all components of the fishery in Denmark Strait;

ii) that research vessel surveys in the area be continued and that plankton surveys be carried out to observe the distribution of shrimp larvae;

iii) that a study on environmental conditions be undertaken, including ice and currents in the area;

iv) that the Icelandic samples collected from 1976 to 1984 be analyzed in greater detail to determine seasonal changes in maturity; and

v) that countries participating in the shrimp fishery ensure that fishing vessel logbooks are completed and copies made available to scientists as soon as possible.

III. OTHER MATTERS

1. **Acknowledgements**

There being no further business, the Chairman thanked the participants for their interest and cooperation in making this meeting a successful one, and especially W. D. Bowen for his involvement as Convener of the ad hoc Working Group on Seals. He expressed his appreciation to the NAFO Secretariat and the staff of the Greenland Fisheries and Environmental Research Institute for their support during the course of the meeting.

APPENDIX II. AGENDA FOR JANUARY 1985 MEETING

I. Opening (Vice-chairman: J. Messtorff)

1. Appointment of rapporteur
2. Adoption of agenda
3. Plan of work

II. Fishery Science (STACFIS Chairman: J. E. Carscadden)

1. Assessment of Shrimp Stocks

   a) Shrimp in Subareas 0 and 1 (Annexes 1 and 2)

      i) Review of fishery trends
      ii) Distribution and biology
      iii) Catch and effort
      iv) By-catches in shrimp fishery
      v) Biomass estimates
      vi) Total allowable catches
      vii) Future research needs

   b) Shrimp at East Greenland (Annex 2)

      (Items (i) to (vii) as in 1(a) above)

2. Assessment of Seal Stocks (Annex 3)

   a) Northwest Atlantic harp seals

      i) Review of fishery trends
      ii) Population assessment
      iii) Distribution and biology
      iv) Future research requirements

   b) Northwest Atlantic hooded seals

      (Items (i) to (iv) as in 2(a) above)

III. Other Matters

1. Review of Future Meeting Arrangements (if needed)

2. Adjournment

ANNEX I. CANADIAN REQUEST FOR SCIENTIFIC ADVICE ON MANAGEMENT IN 1985

OF CERTAIN STOCKS IN SUBAREAS 0 TO 4

1. Canada requests that the Scientific Council, at its meeting in advance of the 1984 Annual Meeting, provide advice on the scientific basis for the management of the following fish and invertebrate stocks in 1985:

Cod (Div. 2J, 3K and 3L; Div. 3N and 3O, Div. 3Ps)
Redfish (Div. 3L and 3N)
American plaice (Div. 3L, 3N and 3O)
Witch flounder (Div. 3N and 3O)
Yellowtail flounder (Div. 3L, 3N and 3O)
Greenland halibut (Subarea 2 and Div. 3K and 3L)
Roundnose grenadier (Subareas 2 and 3)
Silver hake (Div. 4V, 4W and 4X)
Capelin (Div. 3L, Div. 3N and 3O)
Squid (Subareas 3 and 4)

It is further suggested that, subject to the concurrence of the other coastal states concerned, the Scientific Council, prior to the 1984 Annual Meeting of NAFO, provide advice on the scientific basis for management in 1985 of the following stocks:

Shrimp (Subareas 0 and 1)
Greenland halibut (Subareas 0 and 1)
Roundnose grenadier (Subareas 0 and 1)

2. Canada requests the Scientific Council to consider the following options in assessing and projecting future stock levels for those stocks listed above and for the Flemish Cap (Div. 3M) stocks:

a) For those stocks subject to analytical dynamic-pool type assessments, the status of the stock should be reviewed and management options evaluated in terms of their implications for fishable stock size in both the short and long term. In those cases where present spawning stock size is a matter of scientific concern in relation to the continuing productive potential of the stock, management options should be evaluated in relation to spawning stock size. As a general reference point, the implications of continuing to fish at $F_{0.1}$ in 1985 and subsequent years should be evaluated. The present stock size should be described in relation to those observed historically and those expected at the $F_{0.1}$ level. Opinions of the Scientific Council should be expressed in regard to stock sizes, catch rates, and TACs implied by these management strategies for 1985 and the long term.

b) For those stocks subject to general production-type assessments, the status of the stock should be reviewed and management options evaluated in the way described above to the extent possible. In this case, the general reference point should be the level of fishing effort (F) which is two thirds that calculated to be required to take the MSY catch in the long term.

c) For those resources on which only general biological and/or catch data are available, no standard criteria on which to base advice can be established. The evidence on stock status should, however, be weighed against a strategy of optimum yield management and maintenance of stock biomasss at levels of about two-thirds that of the virgin stock.

L. S. Parsons
Assistant Deputy Minister
for Atlantic Fisheries
Dept. of Fisheries and Oceans
Ottawa, Canada

ANNEX 2. EEC REQUEST FOR SCIENTIFIC ADVICE ON MANAGEMENT IN 1985 OF CERTAIN STOCKS IN SUBAREAS 0 AND 1

1. The EEC requests the Scientific Council of NAFO to provide advice for the following stocks:

   a) Stocks occurring in Subareas 0 and 1:

      Greenland halibut
      Roundnose grenadier
      Northern shrimp

   b) Stocks occurring in Subarea 1:

      Atlantic cod
      Atlantic redfish
      Wolffish (catfish)

2. For the above mentioned stocks, the present state of exploitation should be reviewed and options for management in 1985 given. Where possible, these should be expressed graphically in terms of catch in 1985 and the size of the spawning stock biomass on 1 January 1986 for a range of values of F which covers at least -50% to +25% of F in 1983.

3. For cod in Subarea 1, it is requested that catches for each year up to and including 1987 and spawning stock biomasses for each year up to and including 1988 are calculated for maintaining F at the following levels from 1985 onwards: $F = F_{0.1}$, $F = F_{max}$ and F_{1982}. All values of F refer to that on the most heavily exploited age groups.

   Catches should also be calculated for the option of maintaining the spawning stock biomass at 175,000 tons and the resultant F estimated.

   It is also requested that F in each year up to and including 1987 and spawning stock biomasses for each year up to and including 1988 and calculated for:

   - maintaining until 1987 a constant catch equal to that in 1983;
   - maintaining until 1987 a constant catch equal to that in 1984 if the stock were fished at $F_{0.1}$ in 1984;
   - maintaining until 1987 a constant catch of 68,500 tons

   The agreed TAC for 1984 is 68,500 tons.

   Advice is requested on the effects of increasing the mesh size from the existing regulation 130 mm to 140 mm, 150 mm and 160 mm respectively. From September 1984, the fishery by Greenland fishermen will use 140 mm mesh size.

4. Management options for shrimp at East Greenland should also be given in coordination with ICES.

E. Gallagher, Director General
Directorate General for the Fisheries
Commission for the European Communities
Brussels, Belgium

ANNEX 3. JOINT CANADA-EEC REQUEST FOR ADVICE ON HARP AND HOODED SEALS

1. The Government of Canada and the European Economic Community request advice, before February 15, 1985, of the NAFO Scientific Council on the scientific basis for management in 1985 of harp seals and hooded seals within national fishery limits in NAFO Subarea 0, 1, 2, 3 and 4. Specifically the Scientific Council is requested to review the results of recently completed programs and advise on the following:

a) Northwest Atlantic Harp Seals

i) Current stock size and pup population and recent trends in these parameters.

ii) Current replacement yield and substainable yield at present stock size and in long term and under varying options of age compositions in the catch, including that recently occurring, specifically, how has the replacement yield changed with the changes in the age composition of the catch recently observed?

iii) Trends in population size based upon differing levels of catch assuming quota regulations of all removals except that by traditional hunting in the Canadian Arctic and at Greenland.

iv) Trends in catches in Canada, North of 60°N latitude and at Greenland.

v) Future research requirements and need for coordination with ICES.

b) Northwest Atlantic Hooded Seals

i) Interrelationships between Davis Strait and Front herds.

ii) Current stock size and pup population.

iii) Current replacement yield and substainable yield at present stock size and in long term.

iv) Trends in population size over the next five years, assuming a continuation of the current harvesting regime at Greenland and differing levels of catches in Canadian waters, including those occurring in the recent past.

v) Future research requirements.

L. S. Parsons
Assistant Deputy-Minister
for Atlantic Fisheries
Dept. of Fisheries and Oceans
Ottawa, Canada

E. Gallagher, Director General
Directorate General for the Fisheries
Commission for the European Communities
Brussels, Belgium

APPENDIX III. LIST OF RESEARCH AND SUMMARY DOCUMENTS

RESEARCH DOCUMENTS

SCR No.	Serial #	Title
85/I/1	N935	BOWEN, W. D., and D. E. SERGEANT. A mark-recapture estimate of 1983 harp seal pup production in the Northwest Atlantic.
85/I/2	N936	BOWEN, W. D. An estimate of the proportion of recovered harp seal tags not returned for reward: the 1983 mark-recapture experiment.
85/I/3	N937	CARLSSON, D. M. Data on the shrimp fishery in NAFO Subarea 1 in 1983 and 1984.
85/I/4	N938	PARSONS, D. G., P. J. VEITCH, and G. E. TUCKER. Catch, effort, CPUE and biological data from the Canadian fishery for shrimp (Pandalus borealis) in Division 0A, 1984.
85/I/5	N939	SMEDSTAD, O. M. Preliminary report of a cruise with M/T Masi to East Greenland waters in September 1984.
86/I/6	N940	SMEDSTAD, O. M., and S. TORHEIM. Norwegian investigations on shrimp (Pandalus borealis) off West Greenland in 1984.
85/I/7	N941	SMEDSTAD, O. M., and S. TORHEIM. Norwegian investigations on shrimp (Pandalus borealis) in East Greenland waters in 1984.
85/I/8	N942	KANNEWORFF, P. Biomass of shrimp (Pandalus borealis) in NAFO Subarea 1 in 1981-84, estimated by means of bottom photography.
85/I/9	N943	KAPEL, F. O. Trends in catches of harp and hooded seals in Greenland, 1939-83.
85/I/10	N944	POULARD, J. C,, and B. FONTAINE. Catch, effort and biological data of shrimp (Pandalus borealis) in the French fishery off East Greenland in 1984.
85/I/11	N945	HALLGRIMSSON, I., and U. SKÚLADÓTTIR. The Icelandic shrimp (Pandalus borealis) fishery in Denmark Strait in 1984.
85/I/12	N946	CARLSSON, D. M. Data on the shrimp fishery at East Greenland in 1984 compared to earlier years.
85/I/13	N947	LARSEN, F. Report on harp seal recoveries in Greenland, 1981-84.
85/I/14	N948	HAY, K., R. A. MYERS, and W. D. BOWEN. Estimation of pup production of hooded seals (Cystophora cristata) in the Northwest Atlantic during March 1984.
85/I/15	N949	SKÚLADÓTTIR, U. The sustainable yield of Pandalus borealis in the Denmark Strait area.

SUMMARY DOCUMENTS

SCS No.	Serial #	
85/I/1	N950	NAFO SECRETARIAT. Provisional sealing statistics for 1984.
85/I/2	N951	NAFO. Provisional report of Scientific Council Meeting, January 1985.

APPENDIX IV. LIST OF PARTICIPANTS

CANADA

Bowen, W. D.	Department of Fisheries and Oceans, Marine Fish Division, BIO, P. O. Box 1006, Dartmouth, Nova Scotia
Carscadden, J. E.	Department of Fisheries and Oceans, Fisheries Research Branch, P. O. Box 5667, St. John's, Newfoundland
Hay, K.	" " " " "
Myers, R. A.	" " " " "
Parsons, D. G.	" " " " "
Rowsell, H. C.	Department of Pathology, University of Ottawa, 451, Smyth Road, Ottawa, Ontario

EUROPEAN ECONOMIC COMMUNITY (EEC)

Noé R.	Directorate General for Fisheries, Commission of the European Communities, 200 Rue de la Loi, 1049 Brussels, Belgium
Wijnstekers, W.	Directorate General for Environment and Protection of Consumers, Commission of the European Communities, 200 Rue de la Loi, 1049 Brussels, Belgium
Carlsson, D. M.	Greenland Fisheries and Environment Research Institute, Tagensvej 135, DK-2200 Copenhagen, Denmark
Horsted, Sv. Aa.	" " " " "
Kanneworff, P.	" " " " "
Kapel, F. O.	" " " " "
Poulard, J. C.	Institut Francais de Recherche pour l'Exploitation de la Mer, Station de Saint-Pierre, B. P. 4240, Saint-Pierre et Miquelon, France
Messtorff, J.	Institut fur Seefischerei, Fischkai, Bremerhaven 29, Federal Republic of Germany
Harwood, J.	Sea Mammal Research Unit, c/o British Antarctic Survey, Madingley Road, Cambridge, United Kingdom

ICELAND

Hallgrimsson, I.	Marine Research Institute, P. O. Box 390, 121 Reykjavik

NORWAY

Smedstad, O. M.	Institute of Marine Research, P. O. Box 1870-72, Gergen-Nordnes
Øien, N.	" " " " "
Øritsland, T.	" " " " "

NAFO SECRETARIAT

Cardoso, J. C. E.	Executive Secretary P. O. Box 638, Dartmouth, Nova Scotia, Canada
Hodder, V. M.	Assistant Executive Secretary P. O. Box 638, Dartmouth, Nova Scotia, Canada
Auby, D.	Secretary-typist P. O. Box 638, Dartmouth, Nova Scotia, Canada
Vilner, E.	Secretariat assistants, Greenland Fisheries and Environmental Research Institute, 135 Tagensvej, Copenhagen, Denmark
Oloffsson, B.	" " " " "
Larsen, B.	" " " " "
Düring, E.	" " " " "
Rose, S.	" " " " "

APPENDIX VIII

CITES Status Report for the Hooded Seal, Cystophora cristata (Erxleben 1777)

DISTINGUISHING FEATURES

Hooded seals are large phocids, with no external pinnae. Adult pelage is grey to blue-black with an overlay pattern of irregular black spots. The face is black to behind the eyes. (Reeves and Ling 1981). Adult males have an average length of 234 cm and average weight in excess of 300 kg (Mansfield 1967). They are characterized by their large elastic nasal cavity which is often inflated during antagonistic encounters to form a round crest which looks like a black rubbery football, extending from the nostrils to the forehead. Relaxed, this inflatable bladder or "hood", appears wrinkled, overhanging the upper lip. Males can also extrude the red nasal septum, through one of the nostrils to form a bubble-gum-like balloon when the hood deflates. Females and immature males lack the inflatable hood and extrusible nasal septum. Sexual dimorphism is apparent at birth. Adult females have an average length of 203 cm, slightly shorter in the Jan Mayen herd. Female weights rarely exceed 300 kg (Mansfield 1967). The pup moults in utero and has a neonatal coat of slate or silver-blue-grey dorsally, shading abruptly to silver grey on the sides and ventrum (Mansfield 1967).

1. TAXONOMY

1.1 Class: Mammalia

1.2 Order: Carnivora

1.3 Suborder: Pinnipedia

1.4 Family: Phocidae

1.5 Subfamily: Phocinae

1.6 Scientific Name: Cystophora cristata (Erxleben 1777)

1.7 Common Names: Danish: Klapmyds
Dutch: Klapmuts
English: Hooded seal, hood seal, crested seal, bladder nose seal.
French: Phoque à capuchon
German: Klappmütze, Mützenrobbt
Groenlandic: Natserssuag
Inuit: (Baffin Island) apak, nettivuk (b)
Italian: Cistofora crestata
Norwegian: Klappmyss
Spanish: Foca encapuchada
Swedish: Klappmyts, blassäl

1.8 ISIS Number 530141300200100l001

2. BIOLOGICAL DATA

2.1 Distribution

Hooded seals are distributed along the coast of Greenland and into the Canadian eastern Arctic, south to the shores of Newfoundland and into the Gulf of St. Lawrence (Fig. 1). Subadults have been reported in the western Beaufort Sea, but hooded seals are not common west of Baffin Bay and the Davis Strait. Adults and young are commonly found in pack ice northeast of Greenland to about 77°N. They have been reported as far east as the Yenisey River (Ognev, 1935) and regularly breed in small numbers in the Barents Sea, and the Kara Sea. Extralimital recoveries, especially of juveniles, have been recorded at Montreal on the St. Lawrence River, in Florida (Sergeant 1974) and on the coast of Europe to the Bay of Biscay (King, 1964). Stray females have pupped successfully on the Maine coast as recently as 1974 (Richardson, 1975).

Hooded seal range and relative abundance may be considerably influenced by changes in ice cover and climate. Rasmussen (1960) has suggested that changes in the catch at Newfoundland and Jan Mayen are inter-related, showing that a reduction in abundance at Newfoundland coincides with an increased availability at Jan Mayen. He suggested this was related to availability of suitable ice for whelping and breeding. Vibe (1967) agreed with the conclusion that ice conditions influenced hooded seal distribution after examining historical catch data from south and west Greenland and the Davis Strait. Alternately, Kapel (1975) interpreted such changes as evidence of the effectiveness of management measures enforced in the Denmark Strait moulting aggregations.

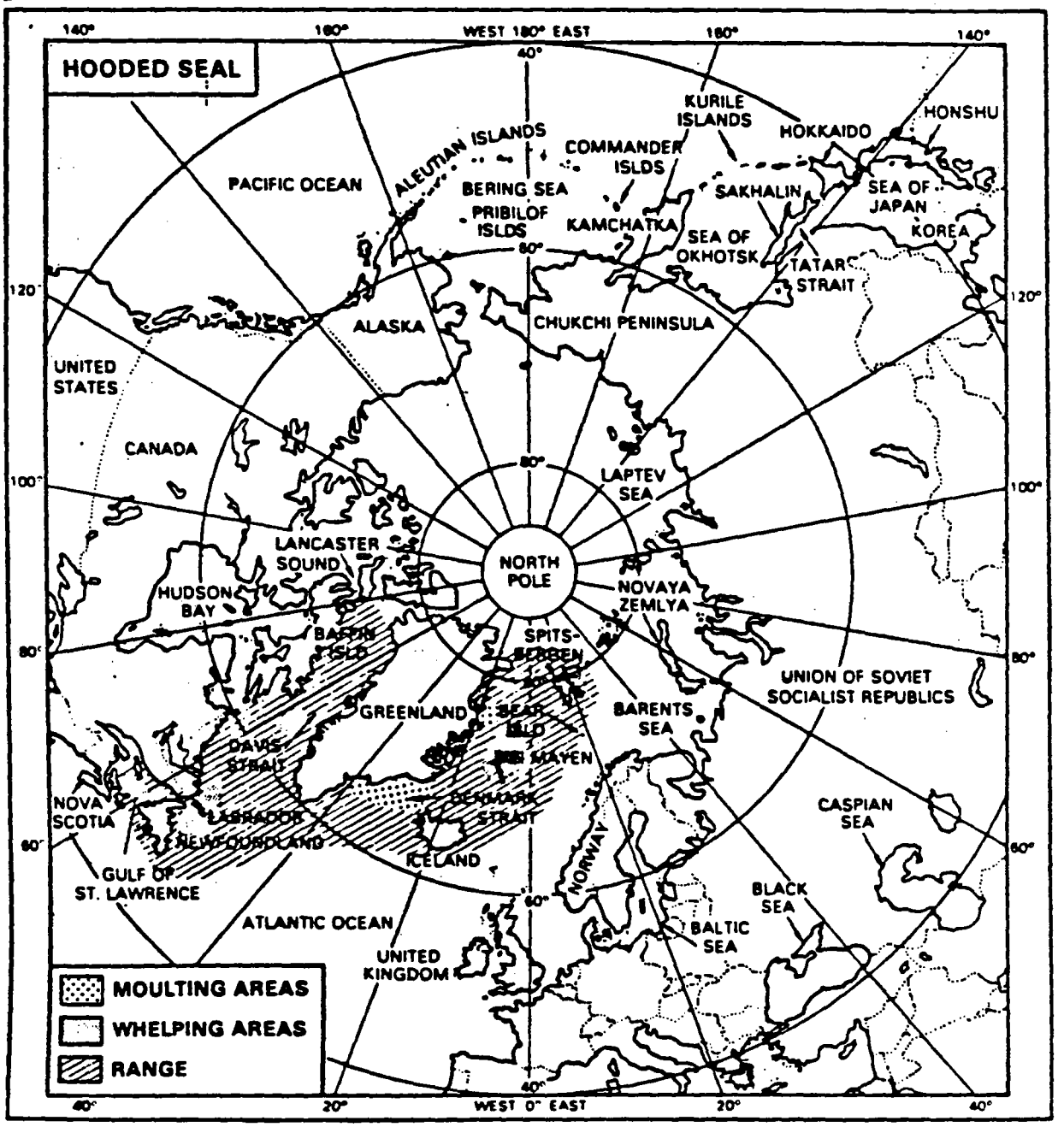


Figure 1: Map showing distribution of Hooded seals (Reeves and Ling 1981, modified)

Annual distribution is dependent on seasonal migratory patterns. There is a general southward migration with the onset of winter (Sergeant 1976a). The largest congregation of adults is thought to form for moulting in the Denmark Strait during summer between 66° to 68°N (Øritsland 1976) with others forming east of Greenland at 72° to 78°N (Sergeant 1974) and in northern Baffin Bay (Øritsland 1976). Peak abundance is from mid-June to mid-July. Although tagging studies fail to confirm this (Sergeant 1978, Jacobsen 1979), it is commonly held that the moulting patches may represent the total population (Øritsland 1976, Rasmussen 1960).

At the completion of moulting, the population disperses, presumably to feed. From hunting records in Greenland (Kapel 1975, 1980, 1981), there is gradual movement along the coast of Southeast Greenland, around Cape Farewell and up to northwest Greenland, north of Disko Bay, at first involving juveniles and males, followed later by adult females (Kapel 1981).

Winter distribution is poorly known but a general southerly migration for the Newfoundland stock is suggested by sightings on the Grand Banks off Newfoundland (Rasmussen 1960) and capture of juveniles off Labrador and northeastern Newfoundland in early winter (Sergeant 1976a).

Starting in February, gravid females and mature males concentrate near heavy ice in preparation for whelping and breeding in the latter half of March. Three major whelping areas have been identified; the 'West Ice' near Jan Mayen, the 'Front' off Newfoundland and Labrador and Gulf of St. Lawrence, and around 62°-64°N, 56°-60°W in the Davis Strait (Sergeant 1974, MacLaren Marex Inc. 1979). Small numbers also breed regularly in the Kara Sea and Barents Sea. The breeding distribution is not limited but rather extensive (from the Gulf of St. Lawrence to the West Ice) and evidence (Rasmussen 1960) suggests that broad scale shifts in breeding areas have occurred in response to cyclic change in marine climate.

After breeding, migration towards the moulting areas commences, coincident with heavy feeding en route. Large concentrations of hooded seals appear of South Greenland around May and June, consisting first of juveniles and males, and later, of mature females (Kapel 1975, 1980, 1981).

Tagging studies (Sergeant 1978, Jacobsen 1979, Kapel 1982) link seals in Newfoundland with those in the Denmark Strait, but no tag returns link the West Ice population to those at Newfoundland, although the West Ice hoods are known to moult in the Denmark Strait also (Øritsland 1976). This may indicate that seals born in these two areas return to their respective birth regions to whelp and breed. Other studies concerning biochemistry (Naevdal 1971), anatomy and timing of whelping (Sergeant 1974) provide no insight on the degree of intermixing. Little is known of the nature and extent

of interactions between the Davis Strait herd and those off Newfoundland and Jan Mayen. However, tagging studies conducted in 1984 indicate that seals from Davis Strait migrate to Greenland and therefore pups born in Davis Strait contribute to Greenland catches (Anon. 1985). As seals tagged off Newfoundland in late winter are also recaptured along the Greenland coast in summer, and since Davis Strait is on the migration path, it seems likely that the Newfoundland and Davis Strait herds may also interact.

2.2 Population

The relationships and degree of mixing of the animals between Newfoundland, Davis Strait and Jan Mayen populations are not well understood. Rasmussen (1960) showed that fluctuations in catch and catch per unit effort of hooded seals for Newfoundland were greater than for harp seals (Phoca groenlandica) and he attributed this to movement of the seals in relation to change in ice cover and climate. Furthermore, he demonstrated (Rasmussen 1960) that reductions in availability in Newfoundland were related to increases in availability in Jan Mayen. Sergeant (1974) felt that the Newfoundland population could not be discrete or it would have been extripated or severely depleted by the period of exploitation from 1964 to 1973. Tagging studies have shown that seals tagged off Newfoundland, Davis Strait and the Gulf of St. Lawrence have been recaptured off east and west Greenland (Sergeant 1974, 1978, Anon. 1985) which suggests an integraton of hooded seals at Denmark Strait, Davis Strait or Newfoundland during the non-breeding period. Seals tagged at Denmark Strait have been recaptured at west Greenland and Newfoundland (Hay et al 1985). However, no seals tagged at Jan Mayen had been recovered at Denmark Strait, Davis Strait or Newfoundland (Øritsland as cited by Hay et al 1985). Bergflodt and Øritsland (1983) found no significant difference in the number of supernumerary teeth of hooded seals from Newfoundland or Denmark Strait but the pooled sample did differ from animals collected at Jan Mayen. These data are comparable to the tagging studies and suggest genetic isolation of West Ice and Northwest Atlantic stocks. Wiig and Lie (1984), however, found no morphological difference and concluded that there were few genetic differences in the two stocks.

Concern over the effect of hunting on population trends has been generated not only by the uncertainty of stock relationships, but also by the imprecision of abundance estimates. Commercial hunting of hooded seals in Newfoundland goes back to the 18th century and they were hunted on the moulting grounds in Denmark Strait as early as 1874, although there was no intensive effort at Jan Mayen until the 1920's (Reeves and Ling 1981). Commercial sealing has not occurred at whelping concentrations in the Davis Strait although some animals may be taken in Inuit subsistence hunts and by Greenlanders along the West Greenland coast and in Denmark Strait. Commercial hunting in the Denmark Strait was ended in the 1960's following evidence of a population decline (Rasmussen 1960).

Interestingly, catch per unit effort subsequently increased in Newfoundland evidencing an increase in population (Øritsland 1966, 1972) in line with Rasmussen's (1960) hypothesis that the North Atlantic was represented by a single population of hooded seals - the stock having separate breeding areas at Newfoundland and Jan Mayen, and a common moulting area in the Denmark Strait.

Prior to 1939 little distinction was made between hooded seals and harp seals in the annual hunts off Newfoundland and Greenland, as there was little difference in their relative value. However, it is known that fewer hooded seals were taken at the 'Front' because of lower abundance relative to harp seals, and the fact that the females do not aggregate but are dispersed over a wide area (Sergeant 1976a). Following the development of a process which permitted the manufacture of fur from hair seal pelts (Sergeant 1976a), blueback pelts (young hooded seals 2-5 days old) became the most valuable of the various hair seal furs (McMillan as cited by Native Conservancy Council 1979, 1982) and hunting effort was increased on the species.

The first Canadian catch limits and the TAC (Total Allowable Catch were introduced in 1974, although regulations were in place before that time to enforce opening and closing dates, locations, catch equipment, etc. (see Section 4, Protection Status). The Norwegian catches in Canadian waters since 1979 have been part of the Canadian TAC recommended by NAFO and agreed to in separate meetings between Canada and Norway. Norway had also undertaken some regulatory measures (see Section 4.1.2). Although Denmark ceased commercial hunting of hooded seals in 1960, the Greenland hunt remains unregulated; supposedly an aboriginal subsistence hunt. The 1974 Front quota of 15,000 was arbitrarily set based on an assumed need for conservation (Anon. 1972) and the belief that the 1966 harvest of 16,000 pups was too high and the quota should be less than the 1966 harvest.

Historically, assessments of the hooded seal populations (Table 1) in the Northwest Atlantic were restricted to the 'Front' herd and sustainable yield calculations were not made until 1975. However, these and subsequent estimates depended on an estimate of average pup production for the 1960's, as estimated by a survival index model (Øritsland and Benjaminsen 1975a, Sergeant 1975, Winters and Bergflødt 1978) and were then subject to ever increasing error as the estimates had to be extrapolated to obtain current stock size estimates (Doubleday and Bowen 1980, Beddington and Williams 1980, Roff and Bowen 1981, Ugland 1982, Anon. 1983).

Given that the only independent estimate of pup production was a survival estimate from the 1960's (see Hay et al 1985), that this value depended on one data point, that in only two years between 1974-1982 had the hooded seal quota been taken and that estimate indicated a declining population (Table 1), a comprehensive review

Table 1. Estimates of Pup Production and Total Population Size for Hooded Seals from various sources.

Year	Area	Estimate	Confidence Intervals	Estimation Method	Reference
A. Pup Production					
1955	West Ice	120,000	-	Catch/ship	Øritsland 1976
1960-1978	Front	-	24,000-30,000	SI*	Anon. 1979a
Late 1960's	Front	40,000	-	SI	Anon. 1981
1966-1971	Front	27,000	-	SI	Sergeant 1976b
1970	West Ice	70,000	-	Catch/ship	Øritsland 1976
1971-1978	Front	26,000	-	SPA°	Winters and Bergflødt 1978
1975	Davis Str.	13,000	-	Aerial census	MacLaren Marex Inc. 1979
1977	Front	25,000	-	SI	Sergeant 1977
1977	Davis Str.	-	3-4,000	Aerial census	Sergeant 1977
1978	Davis Str.	11,300	-	Aerial census	Sergeant 1977
1977	Front	38,000	-	SPA	Anon. 1978
1979	Front	34,000	-	Unknown	Anon. 1978
1979	West Ice	50,000	-	SP	Jacobsen 1979, 1984
1984	Front	62,000	40,000-87,000	Aerial census/	Hay et. al.1985
1984	Davis Str.	18,600	13,800-23,400	Ground truthing	Hay et. al.1985
B. Total Population					
1946	West Ice	244,000++		SPA	Jacobsen 1984
1959	Total+	230,000	-	Aerial census	Øritsland 1959
1960	Total	505,000	-	Unknown	Øritsland 1960
1960	Total	500,000	-	Unknown	Rasmussen 1960
1960-1978	Front	-	48,000-55,000+	SPA	Anon. 1979a
Late 1960's	Front	53,000°°	-	Unknown	Anon. 1978
1962-1978	Front	100,000	-	SI/SPA	Winters and Bergflødt 1978
1975	Davis Str.	42,000**	-	Aerial census	MacLaren Marex Inc. 1979
1977	Front	77,000°°	-	Unknown	Anon. 1978
1978	Davis Str.	34,000**	-	Aerial census	MacLaren Marex Inc. 1979
1979	West Ice	70,000++	-	SPA	Jacobsen 1984
1984	Front	310,000***	-	Aerial census	Winters pers. comm.
	Davis Str.	93,000***	-		" "
	West Ice	74,000++	-	SPA	Jacobsen 1984

* Survival Index (Sergeant 1971).
° Sequential Population Analysis (Ricker 1975).
\+ Assumed total population moulted in Denmark Strait.
°° Adult females only.
** Extrapolated from pup census.
*** 1+ animals - extrapolated from pup census.
++ 1+ females only

of the hooded seal data base, requested jointly by Canada and the European Economic Community (EEC) was conducted by the ICES Working Group on harp and hooded seals in 1982. ICES (1983) concluded that the analyses of available data were not sufficient to produce reliable estimates of current population size, pup production or population abundance trends. Various sources of ancillary information such as recent catch levels in Greenland and catch per unit effort on Norwegian vessels at the front provided evidence of increasing availability of hooded seals (ICES 1983). However, in view of the uncertainties brought to light in the review, the TAC in Canadian waters was reduced to 12,000 animals for 1983.

In 1984 aerial surveys of both the Davis Strait and 'Front' herds were successfully conducted (Anon. 1985) and pup production at the 'Front' for 1984 was estimated at 62,000 pups (95% C.I. 40,000 - 87,000) and for Davis Strait was 18,600 pups (95% C.I. 13,800 - 23,400) (Anon. 1985, Hay et al 1985). The results of these sureys were reviewed by the Standing Committee on Fisheries Science (STACFIS) of NAFO in Copenhagen, Denmark in January 1985. It was considered that the Davis Strait and Front estimates were biased downward due to the distinct possibility of whelping patches missed by the survey and because no correction had been applied for pups that had left the ice or were yet to be born (Anon. 1985). Comparison of mortality rates of the two stocks (Davis Strait and Front) suggested that the two had been exposed to substantially different exploitation histories, at least in the last 10 years (Anon. 1985, Hay et al 1985). Comparison of 1984 estimates of pup production to previous estimates of 30,000 pups for the late 1960's indicated that the hooded seal population had probably increased in recent years whether the value of 30,000 represented total Northwest Atlantic production or Front production alone (Anon. 1985).

Replacement yields of 1985 based on Front production alone ranged from 15,500 to 64,700 animals depending on the 95% C.I. and a range of M (Instantaneous Annual Natural Mortality) from 0.07 to 0.13 which was previously considered to be a feasible range of M (Anon. 1983). Projections of pup production to 1990 at the Front were also calculated using three different hunting scenarios (a Greenland catch of 6,000 animals and catches at the Front of 0, 3,000 and 12,000 seals) from which STACFIS concluded that pup production and populations would continue to increase over the next five years (Anon. 1985).

There is less information available for the West Ice whelping aggregation. Øritsland (1976) used catch statistics and the relative strength of year classes in age analyses to arrive at an estimate of pup production at the West Ice of about 120,000 around 1955. The reduction in catches per ship suggested that availability of hooded seals was reduced by about 40% from 1955 to around 1970, and it was assumed that pup roduction was correspondingly reduced (Ulltang and Oritsland, 1971). Jacobsen (1979, 1984) attempted a sequential population analysis estimate for this area using

estimates of vital rates from the Front. The results of this analysis suggest that pup production was approximately 50,000 pups in 1979, from a population of 100,000 females, but these figures are sensitive to the estimate of natural mortality.

As all estimates of adult abundance are derived from estimates of pup production, they are subject to the same uncertainty as those of the pup production estimates. Winters and Bergflødt (1978) suggest the Front stock of hooded seals was stable at approximately 100,000 animals between 1962 and 1978. Estimates of stock size for the Davis Strait population ranged between 34,000 and 42,000 for 1978 and 1975, respectively (MacLaren Marex Inc. 1979). Winters (pers. comm.) has estimated current stock size of the Davis Strait population to range from 69,000 - 117,000 age 1+ animals and of the Front population from 200,000 - 435,000 age 1+ animals. There are no current estimates of adult or pup abundance for the Western Ice stock and without a knowledge of the degree of mixing between these stocks, it is not possible to place such estimates into the context of the total populations.

Vital Rates

Delayed implantation of the blastocyst occurs in the hooded seal, possibly as late as late July or early August (Øritsland 1964, Born 1980); that is, after the seals have dispersed following their aggregatory phases to whelp and breed (late March - early April) and to moult (June to August). Sampling of females for the determination of fertility rates and reproductive success has been carried out during the aggregatory phases, but remains to be accomplished in significant numbers during the dispersal phase after implantation has occurred. It has consequently not been possible from these samples to directly estimate fertility rates and reproductive success through actual observation of foetuses, since implantation and the start of foetal development occur only after August.

Age at sexual maturity in female hooded seals was studied in detail by Øritsland (1964, 1975). The method used by Øritsland was to sample mature and immature females collected partly at the West Ice (Jan Mayen area) during the breeding season and partly at the Denmark Strait in moulting aggregations, making the assumption that corpora albicantia present in the ovaries persist for at least two years. By counting the number of corpora albicantia present and back-calculating against the age of the animal as determined by tooth sectioning, the age at which first ovulation occurred can be determined for females which have matured within the last two years before capture. Sexual maturity as indicated by age at first ovulation in his sample was determined to have occurred at ages of from 2 (7.1%) to 8 (1.2%) years, with more than 50% have matured at age 3 years, giving birth to the first pup at 4 years.

Assuming that corpora lutea of pregnancy or lactation are criteria of pregnancy, study of the ovaries revealed that about 95% of the sexually mature females became pregnant every year. Fecundity in mature females was found to increase to a maximum (approaching 100%) in the 5 year age class, declining to 98% at age 8 when all females are mature.

In a study based on ovaries and teeth collected from lactating females obtained at the Front off Newfoundland/Labrador, Øritsland (1964, 1971, 1975) calculated the distribution of age at maturity of all 3-13 year old females in his sample which had attained sexual maturity within the three preceding breeding seasons. Making the assumption that sexually mature female hooded seals have a regular 1-year reproductive cycle, producing one pup every year, that only one ovum is released and only one corpus luteum is formed at conception every year, that the two ovaries alternate so that each is active every second year, and that corpora persist as recognizable scar tissue or corpora albicantia for at least three years after they are formed, demonstrating a regular size sequence alternating between the two ovaries, Øritsland also calculated the rate of presumed pregnancies of his sample. Breaks in the regular size sequence of corpora alternating between the two ovaries, over the three years preceding capture were taken to indicate missed pregnancies. The results of this study indicated that sexual maturity was attained at ages ranging from 2 years (12%) to 9 years (2%), with 50% of the females reaching maturity at 2.8 years. The incidence of missed pregnancies was higher in young than in older animals: the pregancy rate amongst 3-10 year old females was calculated to be 0.969, while for 11-34 year old females it was 0.988, with an overall rate for the 3-34 year old sample of 0.973. Oritsland suggested a rate of 0.95 as a conservative estimate of average reproductive success of mature female hooded seals in the Northwest Atlantic.

Born (1980) examined reproductive tracts from both mature and immature female hooded seals caught from April to late July in 1970-71 at South and Southeast Greenland. From the distribution of age at first ovulation in that portion of his sample which had first ovulated within three years prior to capture, he found that sexual maturity is attained from 2 years (19.6%) to 9 years (4.3%) of age, with 3.2 years as the median age of sexual maturity. Reproductive success or pregnancy rate was calculated according to three different methods: 1) the determination of the ratio of animals with a corpus luteum to all mature animals in the sample; 2) the determination of the ratio of the number of mature animals with large normal-looking corpus albicans associated with a uterine horn displaying post-artum changes to that of animals with corpora albicantia associated with immature uterine horns; 3) Øritsland's (1971 and 1975) technique based upon the determination of "missing" corpora within the last three breeding cycles. These yielded an estimate of production of 0.936 young per year for mature females 3 to 22 years of age. None of the three estimates of reproductive success differed significantly and Born concluded that the pregnancy

rate of 0.95 suggested by Øritsland is realistic for management purposes. Although Born's study did indicate that varying regression rates of corpora albicantia may influence the significance of a break in their normal size sequence, he concluded that the average reproductive success may well be estimated from the sequence of corpora albicantia.

Catch curve analysis of populations is a common method to determine mortality rates (Ricker 1975). However, the most common mode of analysis, that of fitting a regression to the right, downward sloping segment of the curve, may be biased (Chapman and Robson 1960). They recommend use of ratios between sequential age classes to arrive at an unbiased estimate of total instantaneous mortality (Z).

Separation of total mortality into its components: that caused by hunting (F), and that resulting from all other causes (M), requires a knowledge of the nature of the hunting effort and its effect on mortality rate of the populations (Ricker 1975). Note that M is normally defined as the instantaneous rate of natural mortality.

In the case of seals, hunting effort is not well related to hunting mortality, so estimates of F are difficult, if possible at all. All of the estimates reported here (Table 2) are based on assumptions or techniques open to criticism for one reason or another (Anon. 1979, Beddington and Williams 1980, Roff and Bowen 1981, Ugland 1982). Theoretically, any value for M between 0.05 and

Table 2. Summary of Estimates of Instantaneous Total Mortality (Z) and Instantaneous Natural Mortality (M) for Hooded Seals. Values are from Various Sources Using the Stated Methods.

Year	Area	Z	Confidence Limits	M	Confidence Limits	Method	Reference
1960-77	Front	-	-	0.1241	-	Catch Curve	Anon. 1978
1964-72	Front	-	-	0.13	-	Catch Curve	Winters and Bergflødt 1978
1971-76	Front	0.27	0.19-0.35	0.135	0.055-0.215	Catch Curve	Winters and Bergflødt 1978
1975	West Ice	0.22	-	-	0.09-0.15	Mean Age	Flipse and Veling 1981
1975	West Ice	-	-	0.12	-	SPA°	Jacobsen 1979 1984
1979	Front	-	0.218-0.24*	-	0.11-0.131	Various	Anon. 1981
1984	Davis Str.	0.142	0.115-0.166	-	-	Catch Curve	Anon. 1985

* Adult females only.
° Sequential Population Analysis (Ricker 1975).

0.15 is feasible for a marine mammal the size of a hooded seal (Roff and Bowen 1981) so that none of the reported estimates are impossible.

Using the method of Chapman and Robson (1960), total mortality rate was calculated for the Davis Strait population at Z(Instantaneous Total Mortality) = 0.142(95% C.I. 0.115-0.166) and M taken at 0.07-0.13 as accepted previously (Anon. 1983).

Suffice it to say that this aspect of hooded seal biology requires further research. The estimation of natural mortality is difficult for any natural population and no less difficult for pinnipeds.

Life History

Whelping occurs on thick pack ice in late March to early April. The nursing period is short and intensive, perhaps 8 days/or less, after which the pup can quickly move into the water (Bowen, pers. comm.).

The sex ratio at birth is very close to 1:1 (Øritsland 1964, Øritsland and Benjaminsen 1975a, b). Since females are more likely to defend the pups vigorously, they have, before the introduction of specific regulations protecting them, comprised the larger proportion of the adult catch (Øritsland and Benjaminsen 1975a, b). This may account for the slight preponderance of males noted by Øritsland (1964) in moulting patches in Denmark Strait.

Breeding behaviour commences at weaning, with dominant males defending the right to mate with females by agonistic displays and aggressive actions towards competitors. The 'family group' commonly described consists of the mother and her nursing pup and a male protecting the female from other male attention (Sergeant 1976a, b, Stewart pers. comm.). It is presently not known whether the hooded seal is polygamous or monogamous although indirect evidence would suggest that males are opportunistically polygynous (Stewart pers. comm.).

After breeding season is completed, adults migrate northward following the pack ice, feeding as they go. Sergeant (1976a) argues that hooded seals tend to deeper water for their food, taking fish such as redfish (Sebastes sp.) and Greenland halibut (Rheinhardtius hippoglossoides) at depths of up to 200 m. Pelagic fish such as capelin (Mallotus villosus) and polar cod (Boreogadus saida), crustacea and mollusca such as squid (Gonatus fabricii) are also food items. Little is known of the variation in diet throughout the year or by age and sex.

Based upon analysis of catches at Greenland (Kapel 1981), it seems that females may lag behind the males and juveniles in their migration towards the moulting areas. Moulting concentrations begin

to form in June, a few animals remaining to the end of July (Rasmussen 1960).

Upon completion of moulting the seals disperse to feed. Little is known of their life history during the period of the year between moulting and congregation for whelping and breeding in the spring although they are thought to be solitary (Stewart pers. comm.).

2.3 Habitat

The habitat of the hooded seal includes considerable portions of the Northwest Atlantic and the Arctic Ocean along both east and west coasts of Greenland (Figure 1).

They are known to inhabit the edge of heavy pack ice for breeding and moulting, and have been found in association with the ice edge at other times of the year (Stewart pers. comm., MacLaren Marex Inc. 1979). Hooded seal distribution is thus considered to be influenced by climatic factors, to the extent that the latter determine the presence and distribution of pack ice (Rasmussen 1960, Vibe 1967, Sergeant 1974, 1976a).

Little of the area frequented by hooded seals has been strongly influenced by human activity; human population is sparse and ocean currents tend to flow towards populated areas rather than carry effluent into these waters. Major industrial activity is limited to oil and gas exploration in the Davis Strait, along the Labrador Coast and off the Grand Banks area (and the marine transport of oil and gas if production occurs). Such activity is closely regulated by both federal and provincial levels of the Canadian government.

Regardless of the fact that there is little human contact with the population for most of the year, high levels of mercury have been recovered in a small sample of hooded seals (Sergeant and Armstrong 1973). More recent studies of other pinnipeds from a similar area, ring seals (Phoca hispida) and bearded seals (Erignathus barbatus), have shown that the mercury is present in a harmless, inorganic form (Smith and Armstrong 1978). there is some question as to whether the mercury is of industrial origin or naturally occurring (Ronald et al. unpublished report), but there is no industry in Greenland or Baffin Island which would be a potential source.

3. TRADE AND MANAGEMENT

3.1 National Utilization

Local consumption of seal products and international trade are inter-related since pelts of hooded seals are usually sold to companies engaged in international trade even in those instances in which seals are hunted principally for local subsistence purposes.

Canadian sealers generally save all the flippers, and a certain proportion of the carcasses for food for themselves and their families, and for sale. Male hooded seals, adults in particular, provide "seal sticks" (penes) for which there is a ready market in the Orient. As is the case with harp seals harvested in the commercial hunt, pelts are sold with blubber which is removed at the processing plant and rendered to oil. In the Arctic and in Northern Labrador, Canadian Inuit generally prepare stretched, dried skins which are sold to the Hudson's Bay Company; in this instance, the blubber is carefully removed, and retained for their own use along with the meat. The same prevails in Greenland. Until the Gulf of St. Lawrence was closed to the hooded seal hunt, landsmen and small boat operators sold their pelts to the major sealing companies, making the same utilization of other products as in the other sectors of the commercial hunt.

3.2 Legal international trade

Young hooded seals, known as bluebacks, until recently provided the most valuable pelts in the hair seal fur trade. Although numerically accounting for only about 30% of the catch, they represented about half the total value of the seals caught by Norwegian sealers (Sergeant 1976). Since most of the skins of hooded seals are traded, the available catch statistics are presented below, followed by an indication of present trade patterns.

Newfoundland herd: Catch figures at the turn of the century averaged about 20,000, with a high of close to 62,000 in 1901. A decline to catches averaging around 1,000 occurred from 1920 through to the 1940's, probably due to decreasing abundance consequent to the lack of adequate whelping conditions for hooded seals during the warm period at Greenland, which prevailed during these two decades (Rasmussen 1960, Sergeant 1976a). Simultaneous increase in catches at the Jan Mayen breeding ground is interpreted as evidence that the bulk of the stock had relocated from west to east (Rasmussen, 1960).

Catches picked up from the mid-1940's, but with marked fluctuations, until 1970, with a low of less than 200 in 1957, a high of 25,000 in 1966, and an average slightly below 9,000. From 1946 to 1950, Canadian sealers accounted for most of the hooded seals caught off Canadian coasts, averaging about 6,500 per year as against well under 500 for Norwegian sealers. From 1951 to 1974, the relative importance of hooded seals to the two fleets was reversed. Canadian sealers

averaging less than 1,500 per year while Norwegian sealers caught about 6,800 per year. These discrepancies reflect differences in capability related to characteristics of the vessels employed at the hunt.

Since 1970, total catches in Canadian waters (exclusive of 1983 and 1984) have been less variable, averaging slightly over 11,300, with a high of 15,000 in 1971. Since quotas were introduced in 1974, Canadian catches have averaged about 4,500 and Norwegian catches, included in the quota for Canadian waters have average 7,200. The catchability of hooded seals at the Front is strongly influenced by ice conditions; the figures for 1979 and 1982 reflect good and bad years respectively in the total catch figures by Canadian and Norwegian sealers in the waters off Newfoundland/Labrador:

	Canada	Norway	Total
1971	432	14,514	14,946
1972	422	12,178	12,600
1973	312	6,255	6,567
1974	204	9,796	10,000
1975	5,385	10,226	15,611
1976	3,867	8,518	12,385
1977	6,044	6,049	12,093
1978	4,189	6,315	10,504
1979	6,819	8,306	15,125
1980	7,346	5,707	13,053
1981	8,319	5,367	13,686
1982	5,665	4,404	10,069
1983	128	-	128
1984	140	-	140

From 1970 to 1977 Canadian catches consisted of 63.2% bluebacks and 36.8% adults while the Norwegian catch during the same period had 57.1% and 42.9% respectively. Regulations were introduced in 1977 establishing a ceiling on the number of adult females killed for self protection at 10% of the total catch. This was progressively reduced to 5% in 1979.

Since 1980 (1980-82) the proportion of adults in the total catch by Canada is 19%, while that for Norway is 21%, with the adult female component far below 5% in both cases. Since the introduction of measures to protect adult females, it has been a management objective to

increase the adult female to male ratio since age/sex studies have shown this ratio to have been less than 1:1.

Following the EEC Directive of March 28, 1983 (EEC 1983) imposing a ban on the importation of white coat (young harp seal) and blueback pelts into common market communities, markets for blueback pelts have fallen dramatically and the Norwegians did not participate in the 1983 or 1984 hunt at the Front. No bluebacks were taken for commercial purposes by Canada in either 1983 or 1984.

Greenland catch:

Upon leaving the Front, hooded seals migrate northward along the West coast of Greeland where they are caught from late spring to the fall. Smaller numbers are caught on the East coast, believed to originate principally from the Jan Mayen herd. Recent catch statistics for Greenland (Kapel 1981, 1985) follow:

	GREENLAND		
	West	East	Total
1954-63 average	816	323	1,139
1967-70 average	1,729	470	2,199
1971	1,634	744	2,378
1972	2,383	1,827	4,210
1973	2,654	673	3,327
1974	2,801	1,218	4,019
1975	3,679	1,085	4,764
1976	4,230	833	5,063
1977	3,751	2,258	6,009
1978	3,635	2,769	6,404
1979	3,612	2,304	5,916
1980	3,779	2,637	6,416
1981	3,745	2,452	6,197
1982	4,398	2,015	6,413
1983	4,155	1,330	5,485

(1984 figures not available)

Prior to 1939 Greenland catch statistics did not separate seal species, but available evidence indicates that the hooded seal catches were 10,000 - 15,000 animals at the turn of the century (Anon. 1985). These had declined to 500 - 1,000 by the the 1960's and then began to increase to a level of 1,400 - 2,200 for West Greenland, reaching about 4,000 between 1971-1975. The catches in East Greenland have always been lower, probably 200 - 700 in the

1950's and 1960's, but have increased to about 2,000 recently. The Greenland catch is predominately of mature animals and contains a high ratio of males.

This recent increase in utilization of hooded seals by Greenland hunters may reflect changing hunting methods, increasing populations or increasing availability of the species. The Greenland hunt is said to be mainly a subsistence hunt, although a "unique trade" exists and Greenland enjoys an exception under the Common Market Ban as an aboriginal community.

Jan Mayen herd (West Ice):

Most northern European nations took part in the seal hunt at Jan Mayen in the late 18th and early 19th centuries. By the 1880's the hunt was in the hands of the Norwegians. Soviet sealers entered the Jan Mayen ice fields in 1958-1966 and from 1975 onward, subsequent to a Soviet/Norwegian agreement passed in 1958. A decision, taken in 1969 to gradually reduce total sealing effort while keeping catches below estimated substainable yields, was followed in 1971 by the setting of a formal quota of 30,000, with defined allocations to each ship. quotas have subsequently been altered up and down, the latest (1984) being set at 8,000. Regulations protecting breeding females, except for self protection, were introduced in 1969. In 1980, the maximum number of adult females which could be taken under the emergency clause was regulated not to exceed 2% of the pup quota allocated, with one pup being deducted for each female taken; sub-adults were also protected. In 1981 the emergency clause was strengthened by introducing a deduction of two pups for each adult female taken. In the period 1971-77, 28% of all animals taken were adults, 72% bluebacks. Protection of adult females has reduced recent catches of these to well below 2% (1% in 1981 - Øritsland pers. comm.). The catching of adult males is encouraged in order to redress the ratio of females to males. Recent total catch figures by sealers from Norway and from the U.S.S.R. are as follows (Øritsland 1980, pers. comm.):

1971:	30,250	1978:	19,036
1972:	20,216	1979:	23,545
1973:	26,449	1980:	11,400

1974:	26,395	1981:	12,074
1975:	27,195	1982:	25,864
1976:	7,296	1983:	1,108
1977:	18,833	1984:	86

* USSR catch statistics for 1984 not available.

Moulting concentrations, to the East of Greenland, the largest of which forms in the Denmark Strait during June and July (Rasmussen 1960) have in the past been hunted by Norwegian sealers. Norwegian activity here ended in 1960. A single vessel from Greenland hunted at the moulting patch from 1959 to 1967. The cessation of hunting in the Denmark Strait was a significant conservation measure which was undoubtedly beneficial to the Jan Mayen breeding stock. Quinquennial averages, with ranges in brackets, preceding cessation of the hunt were as follows:

1946 - 1950	13,851	(1,494 - 17,767)
1951 - 1955	19,189	(2,907 - 47,607)
1956 - 1960	12,962	(6,894 - 21,425)
1961 - 1966[1]	739	(360 - 967)
1967 only	358	

[1] There was no hunting by the Greenland vessel in 1965.

3.2.2 Trade in Pelts:

Mr. L.J. McMillan (Conservation Officer of the International Fur Trade Federation) has provided the following comments:

"Skins of all stages of the hooded seal are clearly identifiable from the skins of all other species. Two products are manufactured from hooded seal skins: those for fur purposes and those for shoes and industrial purposes, with hair on. Blueback pelts are almost exclusively used for fur, and their value lies in their very attractive, unmistakable natural markings, being silvery-white with a broad blue dorsal band extending from head to tail-base. They are not often dyed today. The only seal used for true leather (i.e., skin without hair) is the late stage whitecoat of the harp seal called "tanner seal" when the hair is patchy and prior to reaching the beater coat. Only a very limited number are used for this purpose. It is the only stage able to produce fine grain leather. It is used for small leather goods such as brief cases and pocket books. There is only one tanner in the world, located in Germany, able and actively engaged in tanning these

few skins which in the past amounted to approximately 2,000 per year. Adult harp and hooded skins are not used for leather because the hides are greatly scarred from fighting and lack any grain essential for quality hair suitable for boots, belts and handbags, and similar articles. In recent years the take of adults has been diminishing, so that they form a relatively small part of the trade.

International Trade:

Import/export statistics of hair seal skins do not differentiate between species, except those of Norway, which are broken down into "whitecoat", "bluebacks" and "other". Consequently, the actual catch figures for hooded seals provide more accurate quantitative indications that can be deduced from trade statistics.

Canada: Virtually all Canadian-caught hooded seal skins have been exported as raw pelts, after preliminary processing at the plants of one of the two principal buyers of seal pelts, located in Eastern Canada. Blubber is removed at the plant and rendered into seal oil, which is not differentiated from that of harp seals or of other species. Flippers of practically all seals are saved for local consumption. A substantial proportion of the carcasses is also used for local consumption, and for preservation or canning for year round use as food. Export of seal meat outside sealing areas is negligible.

Until the late 1940's seals were hunted principally for oil and leather, and this is reflected in the fact that sculps (pelts with attached blubber) were sold by weight. Prices paid from 1920 to 1945 averaged about $5/cwt for pups (range $3.00 to $8.00). Catches of hooded seals from the Newfoundland herd were highly erratic during this period, being well under 1,000 for 16 of the 25 years during which the hunt was pursued. Hooded seals have been relatively less important than harp seals to Canadian sealers, the catch rarely attaining 10% of the latter.

Coinciding with the recession of the warm period of the previous few decades at Greenland, and with the development of an increased demand for blueback furs, Canadian catches gradually increased from 1946 onward, fluctuating widely until 1974, around an average slightly under 2,500/year. Catches by Canadian sealers have been much less variable (coinciding with the introduction of quotas) and from 1975 to 1982 averaging close to 6,000/year. Since the imposition of the EEC ban on the importation of whitecoat and blueback pelts into the European Community, the market for hooded seal pelts has virtually collapsed and catches since 1983 have fallen to

below 200 animals, most of which were taken for scientific research.

Throughout recent decades, blueback seal pelts have been the most valuable of the hair seal furs. Prior to 1984, virtually all Canadian caught hooded seal skins were exported, principally to Norway, and in smaller numbers to the Federal Republic of Germany and the United Kingdom.

Seal oil is used both domestically, and exported. the principal export markets are in Northern Europe, frequently Norway. Shipments to the FRG and the Netherlands (an important consumer of seal oil) amounted to $800,000 in 1982, mostly from harp seals and since then, as indicated previously, hooded seals have not been utilized for oil.

Canadian Inuit on Baffin Island and in Northern Labrador may take some hooded seal, particularly from the Davis Strait population. However, for the most part, except for the occasional animal which may wander close to the coast, the species is unavailable to these subsistence hunters. The role of hooded seals in the Canadian Inuit lifestyle is therefore not an important one and catch statistics are not available as the only distinctions made between species for the Inuit catches are between harp and ringed seals (Phoca hispida).

Norway: Norwegian-caught hooded seal skins from Newfoundland and the West Ice are landed in Norway, where most of them are processed and subsequently distributed to European markets, including FRG, USSR, France, Denmark, Italy, U.K., Spain, Austria. A small proportion of the Norwegian take were exported as raw skins to the FRG, Finland, Denmark, Sweden, U.K. and France where they subsequently processed into dressed skins.

Norway also imported about 50% of the Canadian seal catch, including most of its hooded seals, exporting small numbers of dressed skins back to Canada. Small numbers have also been occasionally imported from the USSR. About 20,000 to 30,000 hooded seal skins entered international trade via Norway every year.

Norwegian catches in the North Atlantic accounted for 72.7% of total catches of hooded seals in the period 1975-1979, or an annual average close to 25,000 out of 34,454 (Oritsland 1980). Norwegian catches at the Front off Newfoundland from 1974 to 1982 averaged about 7,000, (the Norwegians have not participated in the hunt at the Front since 1982) while the average take at the West Ice from 1974-1980 amounted to about 17,000 per year. Average

combined Norwegian and Soviet catches at the West Ice from 1975 to 1982 amounted to 18,155 per year. Very small numbers of hooded seals (usually less than 10/year) were taken until 1978 at the East Ice (southeastern Barents Sea) but the species has been protected there since 1979 upon recommendation of the Norway-Soviet Sealing Commission. From 1946 to 1955, Norwegian sealers caught an average of about 1,500 summering seals per year at the North Ice (the ice pack in Svalbard waters). Prohibition of second trips, and the setting of closing dates for West and North Ice sealing in 1955 permanently closed down this hunt. Sealing at the Denmark Strait moulting patches terminated in 1960.

The effects of the EEC ban on whitecoat and blueback pelts has had a dramatic effect on the worldwide market for seal pelts. Norway has not participated in the Front hunt since 1982, and has also decreased its catch of hooded seals on the West Ice since then.

Greenland and Denmark: Hooded seal skins taken by Greenlanders, if not used for domestic purposes are sold to the Royal Greenland Trade Department (KGH) for trade domestically or internationally. KGH auctions the skins in Copenhagen once a year. Of 11,024 hooded seal skins sold between 1970 and 1977, 25% were bluebacks (Barzdo 1980). Recent sales (1979-1981) have averaged about 2,500 annually (Barzdo and Caldwell 1982).

Catches of hooded seals at Greenland (supposedly an aboriginе subsistence hunt) have steadily increased since the 1950's, rising from an average of about 1,000/year to recent averages in excess of 5,000/year. The majority of the animals caught are of breeding age, and there is a predominance of males, most evident in North and Central West Greenland, least so in Southeast Greenland (Kapel 1980).

Seal oil which is not used domestically, is marketed through the RGTD. As is the case in Canada and Norway, seal oil is not identified as to species of origin, the oil of all species being lumped together in rendering and refining. Greenland seal oil may therefore, contain some proportion of hooded seal oil but its bulk originates from ringed seals. Recent exports (1979-1981) have been to Norway and the Netherlands (Barzdo and Caldwell 1982).

Seal meat is purchased by RGTD for sale within Greenland, and also occasionally to Greenlanders in Denmark.

Denmark imported raw skins from other countries as well as from Greenland. Most of these have in the past come from

or through FRG and Iceland, with small amounts from U.K., Canada and Norway. Denmark, itself a major consumer of sealskins and seal garment manufacture is an important industry here. Although there are several dressers and tanners in Denmark, and many of the skins imported raw, leave the country dressed, the country is a net importer of dressed skins, most of the latter coming from Norway, Sweden and some from Greenland. Small numbers of dressed skins are exported to Austria, FRG, Italy, Norway, Poland and Sweden. (Barzdo 1980).

3.2.3. Other products:

Historically oil and leather were the most important commercial products of the seal hunt. Improvements in fur processing techniques in the 1950's resulted in an increasing demand for skins to be used as furs, in the garment industry. Meat has always been an important, and in some places, essential product, used locally as food by residents of sealing communities and for their dogs, upon whom they depended for much of their transportation. Virtually all hooded seal pelts are now used as fur, which has outstripped other products in relative value, although the value of the latter has kept pace with economic trends.

3.2.4 Illegal Trade:

None reported.

3.4 Potential trade threats

From 1970 to 1977, the value of hooded seal skins fluctuated considerably in real value, dropping to a low point in 1976 (Barzdo 1980), corresponding to a bottoming-out in value of short-hair seal skins of other species which seriously affected Canadian Inuit communities in 1976 and 1977. This may have been due in large part to anti-sealing campaigns and propaganda, although fashion trends and the play of supply versus demand may have played a role. Increasing demand from 1978 to 1981 was reflected in increasing value of hooded seal pelts, especially bluebacks, which command the highest price of all hair seal skins.

The intensification of highly emotional anti-sealing propaganda campaigns, specifically directed at harp seal whitecoats and hooded seal blueback pups, especially in Europe, has resulted in a ban on the importation of whitecoat and blueback pelts into the European community until 1985. This ban paralyzed the market for all seal pelts and dramatically lowered prices.

Hooded seal skins can readily be differentiated from those of other species. The seals themselves are easily identifiable and cannot be confused with other hair or fur seals.

4. PROTECTION STATUS

4.1 National Protection Status

4.1.1 Canada

The Federal Department of Fisheries and Oceans (DFO) is responsible for the management and regulation of marine renewable resources, including seals, in three oceans (Pacific, Arctic and Atlantic) under the terms of the Fisheries Act of 1867 and the Sealing Protection Regulations of 1949 and amendments.

The Fish and Marine Mammals Subcommittee of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has considered the status of hooded seals in Canada and found the species to be neither rare or endangered in Canadian waters.

The stated policy of DFO is that seals are considered a natural renewable resource which may be humanely harvested within the limits of sound conservation. To that end, the Federal Government has committed resources to monitoring, managing, and researching the harp and hooded seal stocks within Canadian jurisdiction.

In 1966, harp and hoded seals were placed under the auspices of the International Commission for the Northwest Atlantic Fisheries (ICNAF), whose special scientific panel on seals reviewed the status of seal stocks annually and, based on presented and sponsored scientific information, annually recommended allowable catch levels (since 1971 for harp seals, and 1974 for hooded seals). ICNAF has since been replaced by the Northwest Atlantic Fisheries Organization (NAFO), whose special scientific panel on seals includes scientists from Canada and other sealing countries, and from the EEC. TACs for seals in the Northwest Atlantic, and allocations and allowances for Canada and Greenland have since 1979 (1982-1984 excepted) been set in joint consultation by Canada and the EEC, based upon the above scientific advice.

In addition, Canada entered into bilateral agreements with Norway on harp and hooded seal management in 1971 which were amended and extended in 1975. The agreement provides for a Commission to coordinate research, measures to ensure the conservation of stocks, the setting of national quotas, inspection and control procedures, humane hunting methods and the prevention of cruelty or suffering to animals.

Sealing activities and catch levels by all components are closely monitored through on-the-spot surveillance throughout the hunt by Fisheries Officers. A sectorial management scheme providing for closure by zones upon attainment of sub-allocations ensures that quotas and allocations are respected.

A complete statement of Canadian management measures concerning seals was presented (Mercer 1979) and discussed as part of an

International workshop on harp seals. In its summary statement the workshop noted, "that the current government policy is to harvest below replacment yield and permit slow increase of the stock, and that the policy is not aimed at achieving any maximum sustainable yield". (Anon. 1979b).

Consistent with Canada's commitment to rational exploitation of its natural resources, the hooded seal research program has been expanded. The program has recently committed more permanent staff for programs to collect and analyse food species interactions and conducted an aerial census of the breeding grounds off Newfoundland in the 1984 season.

Canadian scientists also participated in the 1983 workshop held in Norway to consider all known data on hooded seals.

In 1984, Canada together with Denmark, conducted extensive research on the Davis Stait and Front populations using aerial surveys and ground truthing procedures to provide reliable estimates of pup production. Tagging studies were undertaken to elucidate elucidate population movements and relationships with other stocks. As well other ongoing joint Canadian/Danish studies were initiated to further elucidate relationships of the various stocks.

The various regulations and management measures which Canada has employed for the protection of seals in Canadian waters are summarized below.

Colony of Newfoundland (United Kingdom)

1895 - "Second trips" prohibited to prevent capture of older seals.

Canada

1949 - "Seal Protection Regulations" (SPR) passed for the purposes of conservation of seals in Northern Canada.

1961 - "Gulf" (of St. Lawrence) and "Front" (off Newfoundland) Areas defined.
- Closed seasons defined for Gulf and Front Areas.
- Licensing of sealing vessels introduced.

1962 - Helicopters or other aircraft could be used for sealing, except for spotting or observation, only under license.

1964 - SPR prohibit the use of aircraft in sealing.
- Conditions are defined to ensure humane killing.
- Hunting of hooded seals prohibited in Southern Gulf of St. Lawrence.
- The killing of adult seals is prohibited in whelping patches.

- Sealers licenses are introduced.

1966 - Detailed specifications are given applying to approved killing instruments.
- The taking or moving of a live seal is prohibited without a permit.
- The use of long lines in sealing is prohibited.
- All sealers are required to have a license.
- Hunting of hooded seals in the Northwest Atlantic placed under the auspices of ICNAF.

1967 - Fisheries officers empowered to suspend a license for 30 days in the case of any offence under SPR.
- The shooting of seals in the Gulf is prohibited between 6:00 p.m. an 6:00 a.m. to reduce chances of wounding seals.

1968 - Open season was defined from March 12 to April 25.

1970 - Access to sealing is limited to local residents on the coasts of the Front and Gulf Areas.
- Open season was defined from March 20 to April 23.
- Use of helicopters and aircraft for sealing was banned.

1971 - An independent Committee on Seals and Sealing is established to advise the Minister of Fisheries on matters relating to seals and sealing.

1973 - A catch limit equal to the average annual kill for the period 1966-70 (15,000) was imposed as an interim limit on the exploitation rate.

1974 - Prohibition applying to unregulated landing of helicopters within ½ mile of seals introduced, to protect seals in whelping areas from injurious disturbance.
- TAC set at 15,000.

1975 - TAC set at 15,000 based on the same rationale of 1973/74.

1976 - Conditions defined for eligibility to "sealers" or "assistant sealers" license.
- Sustainable yield estimated to be 23,800 animals, but TAC to remain at 15,000.
- Shooting of seals between sunset and sunrise banned to limit wounding loss.

1977 - No new evidence to alter previous advice; a continuation of the 15,000 TAC was accepted; breeding females were limited to 10% of the total catch by large vessels. Shooting of seals in the water was prohibited.

1978 - Sequential population analyses indicated that population levels had increased since the mid-1960's and that current vital parameter rates suggested a sustainable yield of 22,000 animals, assuming that breeding females were restricted to 10% or less of the kill. Because of the data uncertainties the continuation of the TAC of 15,000 was recommended and female restrictions were reduced to 7.5%.

1979 - Based on existing data, the best estimate of sustainable yield was considered to be between 15,000-20,000 animals. The TAC of 15,000 animals was continued and females further reduced to 5% of the total catch.
- ICNAF replaced by NAFO.

1980 - No new data were available to previous advice re continuation of the 15,000 TAC. Also a 5% limit on breeding females was continued.

1981 - No new analyses were presented to change the TAC of 15,000 animals, or 5% female restriction.

1982 - Same as 1981.

1983 - Joint ICES-NAFO Working Group had concluded in 1982 that the analyses of available data were insufficient to provide reliable estimates of current stock size, pup production, and sustainable yield. This was reiterated by the NAFO Scientific Council in 1983 and the TAC reduced to 12,000.

1984 - Useful estimates of sustainable yields could not be provided because of uncertainties in the vital population parameters of pup production and natural mortality; replacement yields varied from 3,500 to 23,000 depending on the natural mortality rate and various illustration levels of pup production. TAC reduced to 2,340.

1985 - Aerial survey results provide estimates of 62,000 pups at the Front and 18,600 pups in Davis Strait; these were substantially higher than previously assumed. Based on the 95% confidence limits of Front production and ranges of natural mortality, replacement yields for 1985 were estimated to range from 15,500 animals to 34,900 animals. TAC set at 2,340. (16)

4.1.2 Norway

Norwegian efforts to regulate seal hunting date back to 1876 when the first regulations for the protection of seals were passed.

Since that time, various measures have been undertaken which have involved regulation of opening and closing dates for the hunts at Jan Mayen and the Denmark Strait and the restriction and licensing of ships and sealers (Oritsland 1974). Nowegian hunting in Denmark Strait was ended in 1961 (Oritsland 1974) and the taking of females on the West Ice restricted since 1969. A more complete summary of Norwegian regulatory and management practices is summarized below.

1876 - The first law on the protection of seals passed.

1910 - Opening date for West Ice hunt (Jan Mayen Area) set April 1.

1935 - Revised law on protection of seals passed.
- West Ice date changed to March 22.

1947 - Opening date for Norwegian sealers at the Front set March 10.

1951 - New sealing act passed.
- Dates set for sailing, and for the start and closure of sealing at Jan Mayen and Denmark Strait.

1953 - Sealing Council established to advise Ministry of Fisheries on matters relating to seals and sealing.

1954 - West Ice opening date changed to March 23; closing date set May 15.
- Second trips to West Ice prohibited.

1961 - Norwegian sealing for hooded seals stopped in the Denmark Strait moulting patches.

1965 - Norwegian sealers abstain from sealing in the Gulf of St. Lawrence.
- Breeding females protected.

1968 - Regulations prescribing sealing and killing methods estabished for Norwegian sealing in all areas.

1969 - Decision made to gradually reduce total sealing effort, keeping catches below estimated or assumed sustainable yields.
- Licensing of Norwegian sealing vessels introduced.

1971 - Quotas set and allocated to each ship at the West Ice.
- No transfers allowed between ships or seasons.

1984 - Quotas on Jan Mayen hunt reduced to 8,000 animals.

1985 - Same as 1984.

4.2 International Protection Status

The International management of hooded seals was largely by "gentlemens' agreement" prior to the Norway-Russia Sealing Agreement of 1958 and the formation of the International Commission for the Northwest Atlantic Fisheries (ICNAF) in 1966. ICNAF was subsequently replaced by the Northwest Atlantic Fisheries Organization (NAFO) in 1979. STACFIS has reveiwed hooded seal stocks annually, and since 1974, has recommended TACs based on presented and sponsored scientific information. TACs in the Northwest Atlantic and allocations for Canada and Greenland have been set since 1979 (1982-1984 excepted) in joint consultation by Canada and the EEC. A separate meeting between Canada and Norway under the terms of their 1974 agreement allocated Norway's share of the Northwest Atlantic quota of hooded seals until 1983.

The Netherlands have had a voluntary boycott of the imporation of juvenile seal pelts since 1969 and has formulated a ban on trade in seal products. A ban on the trade of hooded seal pelts was effected in the U.S.A. under the terms of the Marine Mammal Protection Act of 1972, and New Zealand enacted an import ban on seal products in 1978. Italy controls the import of seal pelts under Ministerial Decree and the importation of seal pelts was voluntarily banned in 1982 by agreement of the traders. The European Community has adopted a ban on the importation of blueback pelts from October 1, 1983 to October 1, 1985 pending clarification of the status of populations.

Various other international agreements and arrangements affecting the Front and West Ice are summarized below.

4.2.1 Newfoundland Hunt

1952 - Opening date for Newfoundland hunt set by "gentlemen's agreement" between Norway and Canada.

1965 - Adult seals protected in breeding patches at Newfoundland.

1966 - ICNAF seal panel established.

1968 - Canada and Norway set opening date for hooded seal hunt.

1971 - Ratification of sealing agreement between Canada and Norway, for the Northwest Atlantic.

1973 - First meeting of the Canada/Norway Sealing Commission.

1974 - Quota of 15,000 set for hooded seals.
- Opening date delayed until 20 March for hooded seal hunt.

1976 - Ban on shooting seals in the Gulf Area between 1800 hours and 0600 hours, Atlantic Standard Time, or in the Front Area from March 12 to March 31, between 1930 hours and 0630 hours; from April 1 to April 24, between 2030 hours and 0530 hours, Newfoundland Standard Time, in order to limit loss due to wounding seals.

1977 - The maximum number of adult females allowed to be killed limited to 10% of catch.
- Total quota set at 15,000.

1978 - Female kill reduced to maximum of 7.5% of vessel catch.

1979 - Female kill reduced to maximum of 5% of vessel catch.
- NAFO replaces ICNAF.

1982 - Canada proposes a reduction in the TAC to be jointly agreed upon and shared with Norway and the EEC (Greenland).

1983 - Canada proposes joint research for 1984 between Canada and the EEC on the Davis Strait whelping population, to include aerial photographic estimation of population size and "ground truthing"; tagging of pups to determine interactions and population size; biological sampling of older animals to determine population parameters both at the Davis Strait whelping herd and at the Greenland hunt.

4.2.2 Jan Mayen and Barents Sea

1876 - International agreement on opening date (April 3) for sealing in the West Ice (Jan Mayen area).

1958 - Ratification of sealing agreement between Norway and Soviet Union.
- Commission established to recommend sealing regulations coordinate research and control measures.

1969 - Breeding females protected in West Ice, except in emergency (for self protection).

1979 - Hooded seals protected in the Barents Sea.

1980 - Maximum permissible number of adult females which can be taken under emergency clause at West Ice not to exceed 2% of pup quotas allocated.
- One pup deducted from quota for each female taken.
- Sub-adults protected.

1981 - Two pups deducted from allocations to West Ice ships for each female taken under emergency clause.

1984 - Quota set at 8,000 animals.

5. REFERENCES

5.1 Personal Communications

Bowen, W.D., Research Scientist, Canada, Department of Fisheries and Oceans, St. John's, Newfoundland.

Øritsland, T., Marine Research Institute, Fisheries Directorate, Bergen - Nordner, Norway.

Stewart, R.E.A., Research Scientist, Canada, Department of Fisheries and Oceans, Winnipeg, Manitoba.

Winters, G.H., Research Scientist, Canada, Department of Fisheries and Oceans, St. John's, Newfoundland.

5.2 Literature Cited

Anonymous. 1972. Proceedings of the 22nd Annual Meeting. ICNAF Proc. No. 8.

Anonymous. 1978. Report of the Ad Hoc Working Group on Seals. ICNAF Redbook 1978: 17-20.

Anonymous. 1979a. Report of Standing Committee on Research and Statistics (STACRES). Special Meeting on Seals and Shrimp, November 1978. ICNAF Redbook 1979: 5-26.

Anonymous. 1979b. Workshop Report. International Workshop on Biology and Management of Northwest Atlantic Harp Seals (IUCN/WWF) University of Guelph, Guelph, Ontario, Canada 3-6 Dec. 1979.

Anonymous. 1981. Special Meeting of Scientific Council - 1981. NAFO SCS Doc. 81/XI/29.

Anonymous. 1983. Scientiic Council Reports 1983. NAFO SCS Doc. 83/I/1.

Anonymous. 1985. Report of Study Committee on Fisheries Science (STACFIS). Sci. Council Meeting NAFO Jan. 1985. NAFO SCS Doc. 85/I/1.

Barzdo, J. 1980. International Trade in harp and hooded seals. Fauna and Flora Preservation Society (David Heldon ed.) London.

Barzdo, J. and J. Caldwell. 1982. A review of international trade in marine mammals. IUCN Traffic Bull. iv: 40-59.

Beddington, J.R. and H.A. Williams. 1980. The status and management of the harp seal in the Northwest Atlantic: a review and evaluation. U.S. Marine Mammal Commission. Nat. Tech. Info. Soc. U.S. Dept. Comm. Springfield, Va. Rep. No. MMC/79/03.

Bergflødt, B. and T. Øritsland. 1983. Frequencies of supernumerary teeth in the lower jaws of North Atlantic hooded and harp seals. Hooded Seal Workshop. Bergen, Norway 1983. Doc. 4SW-83/13.

Born, E.W. 1980. Age of Sexual Maturity and Reproductive Performance of the Female Hooded Seal (Cystophora cristata Erxleben) in South Greenland. NAFO SCR. Doc. 80/XI/158.

Chapman, D.G. and D.S. Robson. 1960. The Analysis of a Catch Curve. Biometrics 16:354-368.

EEC. 1983. Council of the European Economic Community, Council Directive 83/29/EEC. J. Eur. Comm. No. L91/30:

Flipse, E. and E.J.M. Veling. 1981. An Application of the Leslie Matrix Model to the Population Dynamics of the Hooded Seal. (Cystophora cristata Erxleben). MS. Stichting Mathematisch Centrum. Paper Antwerp TN101/81.

Hay, K.A., Myers and W.D. Bowen. 1985. Estimation of pup production of Hooded Seals (Cystophora cristata) in the Northwest Atlantic during March 1984. NAFO SCR Doc. 85/I/14.

ICES. 1983. Report on the meeting of the Ad Hoc Working Group on assessment of harp and hooded seals in the Northwest Atlantic. International Council for the Exploration of the Sea. Coop. Res. Rep. No. 121.

Jacobsen, N.O. 1979. [Pup Production, Age at First Pupping and Natural Mortality of Hooded Seals in the West Ice], Produksjon, alder ved forste gangs kasting og naturlig dodelighet hos klappmyss, Cytophora cristata (Erxleben, 1777) I. vesterisen. MS Institutt for fiskeribiologi, Universitetet i Bergen, Veren 1979.

Jacobsen, N.O. 1984. Estimates of pup production, age at first parturition and natural mortality for hooded seals in the West Ice. FiskDir. Ser. HavUnders, 17: 483-498.

Kapel, F.O. 1975. Recent Research on Seals and Seal Hunting in Greenland. Rapp. P.-V. Réun. cons. Int. Explor. Mer. 169: 462-478.

Kapel, F.O. 1980. Review of Studies of Hooded Seal in Greenland, 1970-1979. NAFO SCR. Doc. 80/XI/170.

Kapel, F.O. 1981. Studies of Hooded Seal in Greenland, 1970-1980. NAFO SCR. Doc. 81/XI/150.

Kapel, F.O. 1982. Studies on the Hooded Seal, Cystophora cristata, in Greenland, 1975-1980. NAFO Sci. Coun. Studies 3:67-75.

Kapel, F.O. 1985. Trends in catches of harp and hooded seals in Greenland, 1939-83. NAFO SCR. Doc. 85/I/9.

King, J. 1964. Seals of the World, British Museum, Natural History, London.

MacLaren Marex Inc. 1979. Report on Aerial Surveys of Marine Mammals and Birds in Southern Davis Strait and Eastern Hudson Strait in March 1978 for Esso Resources Canada Ltd., Aquitaine Co. of Canada Ltd. and Canada Cities Services Ltd., Arctic Petroleum Operators Association.

Mansfield, A.W. 1967. Seals of Arctic and Eastern Canada, Fish. Res. Brd. Can., Ottawa.

Mercer, M.C. 1979. Management of Northwest Atlantic Harp Seals International Workshop on Biology and Management of Northwest Atlantic Harp Seals (IUCN/WWF) University of Guelph. WP8.

Nature Conservancy Council of Great Britain. 1979. Preliminary Status Report on the Marine Mammals of Major Relevance to Europe. Prepared for, Environment and Consumer Protection Service of the Commission of the European Communities.

Nature Conservancy Council of Great Britain. 1982. Recommendations and Status Reports on Harp and Hooded Seals - Revision of the 1981 Report EUR 7317 EN. Prepared for the Enviroment and Consumer Protection Service of the Commission of the European Communities.

Naevdal, G. 1971. Serological Studies on Marine Mammals. Rapp. P.-V. Réun. Cons. Int. Explor. Mer. 161: 136-138.

Ognev, S.I. 1935. Mammals of the U.S.S.R. and Adjacent Countries. Vol. III: Carnivora (Fissipedia and Pinnipedia). Israel Program for Scientific Translations. Jerusalem 1962.

Øritsland, T. 1959. Klappmyss (Hood Seal). Fauna, Oslo 12: 70-90.

Øritsland, T. 1960. Flyletting etter Klappmyss pa langsfelte i Danmark stredet. Fauna, Oslo 13: 153-162.

Øritsland, T. 1964. Klappmysshunnens Forplantingsbiologi. (The Breeding Biology of Female Hooded Seals). Fiskets Gang 50: 5-19.

Øritsland, T. 1966. Norwegian catch and effort statistics for harp and hooded seals in the Front area and the Gulf area, 1937-1966. ICNAF contribution No. 8 to panel A. Ser. No. 1760.

Øritsland, T. 1971. The Status of Norwegian Studies of Harp Seals at Newfoundland. ICNAF Redbook III: 157-183.

Øritsland, T. 1972. Norwegian Catches of Hooded Seals (Cystophora cristata) in the Denmark Strait. 1945-1960. Rep. Inst. Marine Res., Bergen, 2 Feb. 1972:1

Øritsland, T. 1975. Sexual Maturity and Reproductive Performance of Female Hooded Seals at Newfoundland. ICNAF Res. Bull. 11: 37-41.

Øritsland, T. 1976. The Management of Harp and Hooded Seals in the West Ice. ICES C.M. 1976/N:17, 12 pp.

Øritsland, T. 1980. Quotas and catches of hooded seals in the West Ice. Rep. Inst. Marine Res., Bergen, 18 Sept. 1980:1.

Øritsland, T. and T. Benjamisen. 1975a. Additional data on the sex ratio, age composition and mortality of Newfoundland hooded seals, with an estimate of pup production and sustainable yield. ICNAF Res. Doc. 75/122.

Øritsland, T. and T. Benjaminsen. 1975b. Sex ratio, age, composition and mortality of hooded seals at Newfoundland. ICNAF Res. Bull. 11:135-143.

Rasmussen, B. 1960. Om Klapmyssbestanden i det nordlige Atlanterhav. (On the stock of hooded seals in the North Atlantic). Fish oz Havet 1: (Fish. Res. Brd. Can. Transl. Ser. No. 387).

Reeves, R.R. and J.K. Ling. 1981. Hooded seal, Cystophora cristata Erxleben, 1777. In: Handbook of Marine Mammals, Vol. 2 - Seals. S.H. Ridgeway and R.J. Harrison [Eds.]. Academic Press, London: 171-194.

Richardson, D.T. 1975. Hooded seal whelps at South Brookville, Maine. J. Mammol. 56: 698-699.

Ricker, W.E. 1975. Mortality and production of harp seals with reference to a paper on Benjaminsen and Oritsland (1975). ICNAF Res. Doc. 75/XII/143.

Roff, D.A. and W.D. Bowen. 1981. Population dynamics of harp seals, 1967-1991. NAFO SCR Doc. 81/XI/166.

Ronald, K., R.J. Frank, J. Dougan, R. Frank and H.E. Brown. Biocides Chap. 20.

Sergeant, D.E. 1971. Calculation of production of harp seals in the western North Atlantic. ICNAF Redbook 1971, Part 3: 157-184.

Sergeant, D.E. 1974. A rediscovered Whelping Population of Hooded Seals, Cystophora cristata Erxleben, and Its Possible Relationship to other populations. Polarforschung 44(10: 1-7.

Sergeant, D.E. 1975. Comments on new estimates of production and sustainable yield of harp and hooded seals. ICNAF Res. Doc. 75/147.

Sergeant, D.E. 1976a. History and Present Status of Populations of Harp and Hooded Seals. Biol. Conserv. 10: 95-118.

Sergeant, D.E. 1976b. Research on Hood Seals Cystophora cristata Erxleben in 1976. ICNAF Res. Doc. 76/X/126 (revised).

Sergeant, D.E. 1977. Research on Hood Seals in the Western North Atlantic in 1977. ICNAF Res. Doc. 77/XI/57.

Sergeant, D.E. 1978. Results of Tagging and Branding of Hooded Seals 1972-1978. ICNAF Res. Doc. 78/XI/86.

Sergeant, D.E. and F.A.J. Armstrong. 1973. Mercury in Seals from Eastern Canada. J. Fish. Res. Brd. Can. 30: 843-846.

Smith, T.G. and F.A.J. Armstrong. 1978. Mercury and Selenium in Ringed and Bearded Seal Tissue from Arctic Canada. Arctic 31: 76-84.

Ugland, K.I. 1982. Abundance Estimation of the North Western Atlantic Harp Seal Population. NAFO SCR. Working Paper 82/24.

Ulltang, O. and T. Øritsland. 1971. (Stock size and exploitation of harp and hooded seals in the West Ice). Bestand og bestkatning av gronlandsel og klapmyss i Vesterisen. Notat Fiskeridir. Hav Forskn. Inst. Nov. 1971: 1-7.

Vibe, C. 1967. Arctic Animals in Relation to Climatic Fluctuations. Medd. Gronl. 170(5): 1-227.

Wiig, O. and R.W. Lie. 1984. An analysis of the morphological relationships between the hooded seals (Cytophora cristata) of Newfoundland, the Denmark Strait and Jan Mayen. J. Zool. 203: 227-240.

Winters, G.H. and B. Bergflødt. 1978. Mortality and Productivity of the Newfoundland Hooded Seal Stock. ICNAF Res. Doc. 78/IX/91.

APPENDIX IX

Remarks by Hon. H.J. Robichaud
at opening of meeting on the
Atlantic Seal Fishery - June 1, 1966

I find it most commendable that so many of you have accepted the invitation to attend this meeting. I have had many manifestations of your interest in Atlantic sealing operations and your attendance here today is a further indication of the importance that this subject holds for you.

May I suggest that you, on the other hand, regard this occasion as evidence of the continuing grave concern that the officials of my Department and I attach to the conservation of the harp and hood seal stocks of the Northwest Atlantic and to the development of the most suitable, humane methods for harvesting them. I say continuing because, as you are aware, beginning with the 1965 season and again in 1966, we have introduced regulations designed to achieve both of these goals.

From the outset, in studying and formulating more effective and practical control measures for the sealfishery, we have acted in consultation with representatives of the industry and of humane and conservation groups. We have not only co-operated but, indeed, have taken the initiative in inviting qualified representatives to observe sealing operations at the icefields and have provided the facilities to make this possible. While in some cases the arrangements may not have been completely up to your expectations, yet I think you will agree that under the prevailing circumstances no effort was spared to assist you, in the way of material and personnel, in carrying out your observations. We have also provided you with all the information at our disposal to assist you in your own assessment of the operations.

We have done these things not only to ensure your being completely cognizant of all facets of the sealing operations but also to benefit from your knowledge and views. Your representations and advice receive very careful consideration and, in fact, are a valuable supplement to the information compiled

...2

by our scientists from their studies of the Atlantic seal herds in the past twenty years as well as the knowledge and experience of our fisheries protection officers and administrators.

Earlier this year in the House of Commons I stated that, to assure those who have expressed concern about the sealing operations, additional steps are to be taken to improve the enforcement procedures and even more fishery officers will be at the scene of operations during next season to ensure that regulations are obeyed. I added that it was my intention to arrange further visits to the ice in 1967 of representatives of humane societies and associated agencies, and to have more consultation with them in a continuing effort to see that the most humane methods possible are used.

This meeting is the fulfilment of that statement and I can assure you that your views will again be taken into account along with those of our own Departmental officers in formulating new measures to make sealing operations as humane as they can possibly be.

Another statement which I made a short while ago in the House was to the effect that at no time would I consider cancelling seal hunting altogether because it is necessary and has to be carried on. I mention this statement now so that you may be fully aware of the course we shall pursue. I would ask you to bear this in mind in making your representations so that the meeting can give adequate consideration to improving control measures on operations to ensure the most effective conservation and humane practices. This is our aim, it is our objective.

At today's meeting we have invited representatives not only of humane societies and associated agencies, but we have here also representatives of the industry including operators and fishermen. If we are to proceed with the implementation of adequate regulations in order to assure full protection and control of sealing operations, we need the full co-operation of all concerned.

I am personally deeply grateful for the expressions of good understanding and the attitude taken so far by most of the representatives of SPCA and other humane societies who have acted as responsible citizens fully aware of the problems we have to meet in dealing with a situation so complicated and involving such personal emotion. It is with regret that I must deplore the position taken by a few who by their lack of understanding of the situation and of the problems involved are using their position or their connection with certain societies to create unwarranted objections to an operation which must be allowed to proceed in the best interest of the area affected.

Certain statements made in relation to this operation have been most irresponsible and have been damaging to the image of Canada here and abroad. I shall not mention names, but certain articles have been unfair, untrue and do not represent the facts.

I admit that there have been abuses, there has been evidence of undue cruelty in some cases, and it is our duty and responsibility to put a stop at once to such abuses and to enforce methods of killing that will prevent any attempt of cruelty in the sealing operation.

One further item of importance I should like to mention is that our efforts to promote conservation of the Northwest Atlantic seal stocks, particularly those exploited by other countries along with Canada, are bearing fruit. I am referring to the advice we recently received that our proposal to have these herds brought within the sphere of responsibility of the International Commission for the Northwest Atlantic Fisheries has been finally ratified by all thirteen member countries. This means that in conjunction with other ICNAF countries, and particularly with those having a direct interest in the seal fishery, we shall now be able to attack the problems of developing and managing the seal herds on a broader basis and with more effectiveness, I confidently expect, than in the past.

Gentlemen, I assure you that I shall be looking forward to the results of your meeting with the keenest interest.

12

APPENDIX X

THE MINISTER OF FISHERIES

CANADA

LE MINISTRE DES PÊCHERIES

Your interest in Canadian sealing operations is much appreciated and I am enclosing for your information a statement on action taken by my Department with respect to the sealing operation in the Gulf of St. Lawrence and off the coasts of Newfoundland and Labrador.

Amongst other things, the statement indicates that substantial changes are being made to the regulations which are aimed at conserving the seal populations and achieving the use of humane killing methods. You may be assured that every effort will be made to ensure that there is adherence to the new regulations.

Yours sincerely,

H. J. Robichaud.

H. J. Robichaud.

encl.

STATEMENT ON ATLANTIC SEAL FISH

BY THE HON. H.J. ROBICHAUD

MINISTER OF FISHERIES.

For the past two years a widespread campaign has been conducted to discredit the seal fishery of our Atlantic coast. This campaign has been waged not only in Canada but in several countries in Europe. Further evidence of this has just come to my attention in the form of an editorial in the Daily Mirror of London, England, referring to the seal fishery. This editorial cites the opinion of Dr. Elizabeth Simpson that seals were skinned alive and her belief that there is no way in which the seal hunt could be made humane and that it should be stopped.

The editorial goes on to state: "It is up to the Canadian government to answer the charges which are now being made by eye-witnesses and experts".

Again, as you are well aware, I have on many occasions given answers to these charges. Moreover, the action that has been taken by myself and officials of my Department, at the suggestion of not one but several experts of humane and conservation organizations, to regulate and control the sealfishery, constitutes a very tangible and realistic answer to these charges.

It would appear, however, that these answers have either not come to the attention of certain news media or that they are ignored when their drawing power as headline material is equated with the inaccurate, distorted and vicious charges that are being made against a group of Canadians, and Canada herself, in the name of humanitarianism.

One cannot but be awed by the intensity of the campaign that is currently being waged by a group of people, led by Mr. Brian Davies of the New Brunswick S.P.C.A. which is blackening the Canadian image both here and in other countries. Adopting the stand that the seal fishery, an old and important industry to many parts of our Atlantic community, must be abolished, they have pursued every means possible to distort the true situation and to inflame public opinion in an effort to justify the stand they have taken.

The action that we have taken to regulate the sealing operations and control the catch in the Gulf of St. Lawrence is well known to everybody who has cared to look more than superficially into this matter. In the three sealing seasons of 1965, 1966 and 1967, qualified representatives of a number of Canadian, and one international, humane and conservation societies have, at my invitation, conducted on-the-spot observations of this operation. As a result of their observations in the first two years they were able to make recommendations which were of great assistance to us in formulating regulations to govern the taking of seals.

The result was that in 1967 the Canadian sealfishery was the most tightly regulated operation of its kind anywhere in the world. The regulations specified the method by which the animals could be killed, the type and specifications of the club that could be used in taking the young, and the types of firearms and ammunition that could be used in killing older seals. It was clearly emphasized that the flensing operation was not to be started until the animal was, without doubt, dead, and that sealing operations could only be carried out between 6 a.m. and 6 p.m., that is, during daylight hours. A system of licensing and identification of sealers was also brought in. Moreover, special responsibilities were placed on sealing ship captains and aerial operators to have the regulations adhered to.

As for supervision of the sealing operations, we assigned a larger force of fishery officers than ever before to this responsibility. There were two officers on each ship, officers at all drop points where planes landed seals, and other officers constantly patrolling the sealing area in helicopters.

The observations conducted by the official observers in 1967 were both extensive and thorough. This is indicated in the reports that they submitted as well as in the reports of our officers who arranged their transportation to and from the sealing areas. They consisted of Mr. T.I. Hughes, General Manager of the Ontario Humane Society; Dr. Forbes MacLeod, Managing

Director of the Saint John, New Brunswick, S.P.C.A., Dr. Douglas H. Pimlott, of the Department of Zoology of the University of Toronto and a Director of the Canadian Audubon Society, Mr. James St. Onge, Director of Animal Welfare of the Canadian Society for the Prevention of Cruelty to Animals, Montreal, and Mr. John Walsh, Assistant Director of the International Society for the Protection of Animals, from Boston.

After their observations of the sealfishery in the Gulf of St. Lawrence this year, these gentlemen jointly prepared a report from which I quote the following:

1. Evidence of cruelty was minimal compared with 1966.
2. There was a general improvement in the operation compared with 1966. (Mr. St. Onge was not present in 1966.)
3. The level of enforcement of regulations by the Department of Fisheries was greatly increased and did result in an improvement.
4. Compliance with the regulations was generally satisfactory under the circumstances.

The group also made a number of recommendations for regulation amendments in 1968, and these, I can assure you, will be given every consideration.

I would suggest that the foregoing constitutes another answer .. the independent, objective and expert opinion of experienced and qualified observers .. to the editorial which appeared in the Daily Mirror. It is also a clear refutation of a further statement by Dr. Simpson, in a report which has gained some notoriety that: "... I can only conclude that as far as reduction in cruelty is concerned there is very little difference between the 1966 seal hunt in the Gulf of St. Lawrence and the seal hunt in 1967".

In her observations of the seal hunt during 1966, Dr. Simpson was one of the group with Mr. Davies and again this year she accompanied the Davies group. It is in the light of his undeviating and ill-founded position on abolition and the fanatical manner in which he has advocated this measure, that I would ask you to compare her opinions with those in the statement of the qualified persons which I have just quoted. I would ask you to compare them further with the findings in the individual reports submitted by some of the experts who have made personal observations of the sealfishery.

For example, to justify her claims of cruelty in the sealfishery, Dr. Simpson claims in her report that of the total of 154 carcasses she examined in 1967, 56 of them, or 36%, did not have fractured skulls. To her this is an indication that skinning is commenced on animals with unfractured skulls before they are dead.

On the other hand, Dr. McLeod states in his personal report that of over 700 carcasses examined by himself, or under his direction and in close proximity to him, less than ten per cent had uncrushed skulls. Of this number, he adds, he was unable to find any evidence to indicate that the animals had been subjected to cruelty.

Dr. McLeod goes on to say: "Much has been said about seals being 'skinned alive'". I have strenuously objected to the use of these words. Lately the statement has been modified to suggest that, 'seals are alive when the skinning operation is commenced'. There still seems to be the suggestion that this indicates cruelty. I don't doubt that some seals are still technically alive - unconscious from a blow to the head but with the heart pulsating - when the skinning operation is commenced. But as the seal dies within thirty seconds from loss of blood, I fail to agree that cruelty is involved. This same procedure is used in the slaughter of food animals - the animal is rendered senseless, but is still alive when slashed for bleeding purposes".

Mr. Hughes, in his personal report, also comments on the incidence of

uncrushed skulls in carcasses which he examined. On the opening morning of the seal hunt he examined approximately 227 carcasses; in seven the skulls were intact, in twelve there was partial damage, while the remaining 208 skulls had all been completely crushed indicating, as he stated, "beyond all doubt that these animals had been killed before any attempt had been made to commence skinning."

Mr. Hughes added: "During the afternoon I checked approximately one hundred and twenty-four skulls and found no evidence of improper methods being used. The skulls had all been completely crushed or had suffered major fractures of the skulls."

During another day spent on the ice, when he observed operations in several different locations, Mr. Hughes reported that he checked 335 skulls of seals that had been killed that day. He found eleven skulls that appeared to be completely intact. Again, however, he states, it was obvious that the majority had been crushed completely and very effectively.

Of the operation as a whole Mr. Hughes states: "Equally there is no doubt that the killing of whitecoat harp seals in Area 2 of the Gulf of St. Lawrence by Canadians is now as humane as the average slaughter house operation in most parts of Canada." And he goes on to say: "I am confident that a force of specially trained, physically fit Fishery Officers, with improved equipment and with further experience, can ensure that the hunting of whitecoats in the Gulf of St. Lawrence by Canadians will be as consistently humane as any slaughter house operation in Canada or, for that matter, in Europe". Dr. McLeod, in his report, expresses a similar opinion.

In addition to these reports, another was received from Dr. Arne Johanssen, a veterinarian, who was sent to the hunt by the Canadian Society for the Prevention of Cruelty to Animals. Dr. Johanssen, as did the other experts I have mentioned, commented at length on various aspects of the sealing

method as well as the behaviour of the animals. The final conclusions of his report are:

"1. The harvest of seal pups, if properly done, cannot be condemned on the basis of humane considerations.

2. Presently, it is mainly an enforcement problem".

Another facet of this campaign to discredit the sealfishery is the charge that the seal herds were being depleted and here the proponents of this theory have made fanciful comparisons to the extinction of a number of creatures of nature in the past.

The answer here is that since 1965 in the Gulf of St. Lawrence there has been a quota of 50,000 on the number of young seals that may be taken by ship and aerial operations. Along with this conservation measure a prohibition was also placed on the killing of adult seals during the whelping and breeding periods when they are most vulnerable. I might add that the quota on young seals is based on the results of many years of scientific research and the studies by our biologists since 1965 have indicated that this is a realistic figure.

I cannot think of any industry involving the utilization of animals, for food or other purposes, that has been so intensively investigated as the seal fishery in the past three years, nor one in which the results of these investigations have been so widely made known. A great deal of sentiment has been aroused and the same would occur, I am sure, were the legitimate operations of establishments such as abbatoirs so widely publicized and misrepresented. A large number of well meaning people have seen fit to express concern about the seal fishery as the result of the presentation to them of distorted and inaccurate descriptions of the operations. I respect their good intentions but I regret that they were not based on facts, such as I previously indicated.

I hold firmly to the basic tenet that in the utilization of any creature for our welfare, the utmost attention should be given to handling them in the most humane ways possible, and to their continuance as a species in perpetuity.

This is the objective we have set for ourselves and which we are achieving in the harvesting of our Atlantic seal resources.

- 30 -

May 16, 1967.

APPENDIX XI

EXTRACTS FROM REPORTS RECEIVED
FROM SCIENTISTS & OTHER COMPETENT
PERSONS WHO ATTENDED THE SEAL HUNT
IN THE GULF OF ST. LAWRENCE IN 1969

Professor Henry P. SCHNEIDER,
Hahnemann Medical College & Hospital,
Philadelphia, U.S.A.

With the exception of one or two observers, it is generally agreed that the present method of rendering seal pups instantaneously insensitive to pain is the most humane method - after having examined most of the weapons developed in attempts to replace the regulation hardwood bat, I would suggest that the bat be retained as the only acceptable instrument to render seal pups unconscious.

An evaluation of the damage to the skulls of seal carcasses following removal of the pelt revealed a complete destruction of the dorsal and lateral portions of the brain case which encloses the brain in the cranial cavity.

Professor M. FISCHBERG,
Director, Zoological Institute,
University of Geneva,
Geneva, Switzerland.

Only 5 to 10 per cent of mother seals stay with their young and defend them when approached. I have observed that while the large majority of young seals are killed by hunters, these latter do not often kill the seal pups defended by their mothers, probably because it takes them too much time to chase the mother away and to be exposed to attack by the mother seals while skinning the pups.....although we are certain the young do not suffer while being killed and skinned, we are not certain whether mothers do or do not suffer by the fact that they lose their young.

Summarizing, we can say that killing of the young seals is brutal but not cruel in respect to the young seals being killed...further research is necessary to arrive at a good estimation of the number of seals (pups excluded) in and around Canadian waters, I propose that the Canadian Government continues the rigorous control of the hunt.

To declare the Gulf of St. Lawrence a sanctuary for seals would certainly represent a very attractive solution but this would have to be accompanied by a profound study of its effect on local fishermen and seal hunters. Their financial loss would have to be covered by other means of gain.

Professor Jacques MATON,
State University of Ghent,
Belgium.

In the different places where we landed, I have been able to watch the killing of the young pups. I have nowhere seen that regulations were not observed. Either a young animal was killed by one, two or three blows on the head before being bled out completely by severing the vessels in the forearms and being skinned.

The very small areas on the snow stained by the blood proved that the pups had not moved while being skinned and so were dead or at least unconscious from a blow on the head while being skinned.

The behaviour of the mothers does not seem to be much influenced by the act of killing pups. One gets the impression that the greatest number of the mothers are quite indifferent.

Dr. Keith RONALD,
University of Guelph,
Guelph, Ontario.

It can be definitely stated that the club is a first class instrument for killing pups.

The enforcement methods are fast, accurate, and leave no leeway for ignorance of the regulations on the part of the sealers.

No inhumane methods of sealing were ever seen, even in the case of a man who had to protect himself against a highly irate mother.

The female harp seals were continually disturbed by (a) aircraft, private, commercial, air force; helicopters, private, press, commercial, and even humane society groups; (b) atrocious weather in which many pups were pres[illegible]lost.

APPENDIX XII

REPORT BY

HUMANE PRACTICES COMMITTEE

OF THE

CANADIAN VETERINARY MEDICAL ASSOCIATION

ON

HARP SEALING OPERATIONS

1979 - 1980

MAY, 1980.

OBSERVATIONS BY HUMANE PRACTICES COMMITTEE OF THE CANADIAN VETERINARY MEDICAL ASSOCIATION ON SEALING OPERATIONS IN THE GULF 1979-1980 AND ON THE FRONT 1980

SUMMARY

The Humane Practices Committee observed the harvesting of harp seal pups in the Gulf of St. Lawrence and off the coast of Labrador (The Front). The Committee assessed the use of the regulation club and hakapik in respect of rendering seal pups unconscious and dead in a rapid humane manner.

The Committee considers these two instruments to be effective in rendering seal pups unconscious when used in the prescribed manner. The Committee is thus confident that seal pups are unconscious after the first properly applied blow. The Committee further supports the additional safety and assurance factors embodied in the recommended three blows and subsequent exsanguination. The Committee recommends that Fisheries-Canada continues to educate sealers, including the landsmen, in the practices of humane sealing.

The Committee assessed some behavioural reactions of bitch-pup relationships during the sealing operations. The Committee recommends that when a sealer confronts a bitch which is protective of a pup, that the sealer neither molest the bitch nor kill the pup.

The Committee observed the use of a firearm, developed by Mr. T.I. Hughes of the Committee on Seals and Sealing, under ideal weather conditions with young seal pups. The proper use of the low-powered firearm was aesthetically more acceptable than the club or hakapik. Hence, the Committee recommends that research be initiated to determine whether or not this device is, or could be made, as humane as other regulated instruments under variable conditions of

weather, pup size, operator skill, and safety.

CANADIAN VETERINARY MEDICAL ASSOCIATION
HUMANE PRACTICES COMMITTEE

Dr. R.W. Stonehouse	-	Chairman C.V.M.A. Humane Practices Committee, Private Small Animal Practitioner, Toronto, Ontario.
Dr. J.P. Quine	-	Member C.V.M.A. Humane Practices Committee, Large and Small Animal Practitioner, Calgary, Alberta.
Dr. R.G. Thomson	-	Special Member C.V.M.A. Humane Practices Committee for Sealing Project, Planning Co-ordinator, Proposed Atlantic Regional Veterinary College, Charlottetown, P.E.I.
Dr. J.S. Ashman	-	Member C.V.M.A. Humane Practices Committee, Supervisor, Animal Care Program, Veterinary Services Branch, Ontario Ministry of Agriculture and Food, Toronto, Ontario
Dr. R.G. Urquhart	-	Member C.V.M.A. Humane Practices Committee, Director, Regulatory and Communicable Diseases Section, Veterinary Services Branch, Ontario Ministry of Agriculture and Food, Toronto, Ontario.

INTRODUCTION

The C.V.M.A. Humane Practices Committee sent five veterinarians to the sealing operation in 1979 and 1980. The team included expertise in animal care, regulatory, both small and large animal practice, and pathology.

In 1979, Drs. Stonehouse, Quine, and Thomson observed the sealing operation in the Gulf. Drs. Urquhart and Ashman waited five days (in St. Anthony, Newfoundland) for adequate helicopter flying weather, but were unsuccessful in joining the sealing operation on the Front.

In view of the fact that a portion of the Committee was unable to observe sealing in 1979, the Committee restricted itself to a confidential interim report.

To assure that all members of the Committee had the opportunity to observe the sealing operation in 1980, the schedule was set up such that all members would observe the sealing operation in the Gulf together. Drs. Urquhart and Ashman then left the Gulf for St. Anthony, Newfoundland, to board the C.S.S. Hudson enroute to "The Front". They made observations of the bitches and pups in whelping patches for four days prior to sealing. The assessment of the hunt was of two and one-half days duration.

PURPOSE

(a) To assess the current methods of killing harp seal pups and to determine whether or not the methods prescribed and in use complies with the principles of a humane death.

(b) To assess the method of killing harp seal pups with a firearm in the shooting trial sponsored by the Committee on Seals and Sealing and directed by Mr. T.I. Hughes.

(c) To assess the behavioural reactions in respect of the bitch-pup relationship during the sealing operation.

PROCEDURE

1. All members of the C.V.M.A. Humane Practices Committee assessed the effectiveness of the regulation club as used in the Gulf. On the Front, two members assessed the effectiveness of the hakapik as used there.

2. Assessment of the killing method included:

   a) The location, number, and effectiveness of blows.

   b) Skull and brain pathology related to unconsciousness and number of blows.

   c) The effectiveness of a single blow.

3. All members of the Humane Practices Committee assessed the effectiveness of the firearm being tested by Mr. T.I. Hughes for and of the Committee on Seals and Sealing by observing:

   1. The shooting of seal pups.

   2. The location of wounds.

   3. Post mortem examinations of skulls and concomitant brain damage.

4. All members of the Humane Practices Committee observed and assessed:

   a) The approach of sealers to bitches and pups.

   b) The reaction of the bitch and pup to the sealer.

   c) The post-slaughter behaviour of the bitch.

OBSERVATIONS

EFFECTIVENESS OF REGULATION CLUB IN THE GULF AND ON THE FRONT

The sealers observed, both in 1979 and 1980, were competent in rendering the seal pups unconscious with the regulation club applied to the cranium of the seal pups.

In most cases, sealers were applying the recommended three blows directly to the top of the cranium. A few sealers were observed to deliver more than three blows and one individual consistently delivered five to eight blows per pup. Also, on a few occasions sealers were observed to hit the pup less than the recommended three times or were observed to deliver the first blow to the side of the head with follow-up blows to the dorsal surface.

Most skulls exhibited massive depression fractures causing extensive compression and tearing of the brain. Post mortem examinations were purposely carried out on skulls which exhibited minor evidence of cranial fractures. It was the opinion of the Committee that the level of direct and contrecoup hemorrhage was such that immediate unconsciousness was assured and the seal pups were insensitive to pain prior to exsanguination. The regulation club is considered by the Committee to be an effective means of rendering a seal pup unconsciousness and dead. The first blow is effective as evidenced by the clinical loss of blinking reflex.

EFFECTIVENESS OF THE HAKAPIK ON THE FRONT

The observations of two members of the team on the effectiveness of the hakapik is consistent and supportive of the observations made with the regulation club.

The hakapik is generally handled and swung in a manner different to the club due to its length. A two-hand overhead swing is the natural and most convenient for the sealer, thus making the top of the head the easiest striking point. The "nippled" side of the steel head is a most effective stunning instrument. As much skull damage was achieved with the hakapik as with the club.

In the open ice conditions experienced during day two and three on the Front, the hakapik was a useful instrument of safety for the sealers.

In the course of examining seal carcasses, skulls and brains over the two years in the Gulf and on the Front, only one skull was found which did not exhibit sufficient gross hemorrhage and damage to assure that the seal pup was rendered unconscious forthwith. Microscopic examination would have been required to evaluate this specimen. This carcass was found on the Front.

EFFECTIVENESS OF SHOOTING PROCEDURES

In 1979, the members of the Humane Practices Committee in the Gulf observed two pup kills with a firearm in a trial being carried out by Mr. T.I. Hughes. The first kill was made with a .22 calibre bullet and the second with another type of cartridge. The second attempt was considered unsuccessful as the pup was conscious after shooting and was immediately clubbed.

In 1980, the entire Committee observed parts of a second trial which was sponsored by the Committee on Seals and Sealing and directed by Mr. T.I. Hughes. This trial was carried out under ideal weather and ice conditions for walking and handling firearms and ammunition. Sawed-off single shot .22 rifles were used to discharge Winchester Super X long rifle, rim fire cartridges containing no. 12 shot.

The ten seal pups observed and shot on March 3, 1980, were smaller and younger than the two shot the previous year. Their skulls were examined and photographed by the C.V.M.A. Humane Practices Committee in the Fisheries Laboratory in Grindstone. The initial post mortem examinations revealed that the most effective kills, judged by the amount of damage and hemorrhage to the brain, had been made when the shot entered the skull on the midline approximately 3" posterior to the medial canthus of the eye. Pups which were shot anterior to this did not exhibit as much hemorrhage or damage to the brain although there was sufficient to render the animal unconscious. In all cases examined in the laboratory, the shot was retained within the tissues of the seal and did not penetrate into the ice. The C.V.M.A. Humane Practices Committee made a recommendation to Mr. T.I. Hughes that all pups be shot 3" posterior to the medial canthus of the eye.

Aesthetically the use of the low-powered firearm was superior to either the club or hakapik. The firearm and ammunition used in 1980 produced a dull "pop" rather than a normal "crack" of a rifle shot. Given the ideal weather conditions in which to handle the gun and ammunition, the firearm was faster than the club due to the fact that one shot replaced three blows. The gun does leave a black gun powder mark and hole in the pelt.

The Committee observed that most seal pups can be approached so as to permit close range shooting if the approach is made in a calm, quiet and sensitive manner.

The sealer who we observed testing the gun was sensitive in his approach to the seals and pups. His manner together with the ideal weather conditions produced a favourable trial of the low-powered firearm. Pups shot in this manner on the second day, were rendered unconscious in a manner which was as rapid and humane as the club or hakapik.

BEHAVIOUR OF BITCH AND SEAL PUP

All members of the C.V.M.A. Humane Practices Committee observed the behaviour of the bitches and pups during the hunt in the Gulf.

In addition, Drs. Urquhart and Ashman had the opportunity to examine the behaviour of bitches and pups for four days prior to the hunt and for two and one half days during the hunt on the Front.

During the core daylight hours or productive hours in the sealing operation of both hunts, the Committee members felt that at any given time, a clear majority of the bitches have left or leave their pups alone on the ice as observers approach. Some bitches were on the ice to nurse. The majority of these will leave the pup and enter the water when approached by a sealer. Although the majority of the pups are alone or deserted by the bitch on approach by the sealer, there remains a small percentage of bitches which will adopt a variety of temporary or persistent aggressive postures directed towards the sealer.

A temporary aggressive posture may be one which is adopted for several seconds before the bitch makes a retreat into the water. One aggressive stance in which the back is arched and the mouth open may or may not be accompanied by vocalization. Some seal bitches made aggressive movement toward the sealer or observer and made lunging and/or biting motions. They demonstrated varying degrees of persistence. Some seal bitches backed off after a minute or so and some persisted in her defence of the pup.

As an alternative to the above behaviour, some bitches led their pups off in a direction opposite to the approaching sealers. This would usually occur when the sealers were at least 100 feet away and before the immediate territory of the bitch had been invaded.

In the course of observations in the Gulf and on the Front, there were two episodes observed by the Humane Practices Committee in which the resistence of the bitches was intensified when the sealers attempted to scare off the bitch by swinging their clubs, yelling, or running at the bitch or pup. An occasional bitch would chase a sealer.

In the opinion of the Humane Practices Committee these actions provoked the bitches in the immediate vicinity into defending their pups. These two groups of sealers wasted a great deal of time on this activity.

The members of the Committee observed approximately half a dozen episodes where some form of maternal bonding was exhibited after the pup had been killed. The attachment appeared to be directed to the dead pup, skinned carcass, or pelt. Several bitches were observed returning to the carcass, lie beside it, crawl on top of it, or roll into nursing position beside it. In several cases, the attachment to a carcass or pelt persisted long enough for the anterior portion of the chest and belly of the bitch to be stained with blood.

CONCLUSIONS

1. The regulation club or hakapik as prescribed in the Fisheries Regulation constituted an effective humane means of producing unconsciousness and death prior to exsanguination.
2. The low-powered firearm trial sponsored by the Committee on Seals and Sealing and directed by Mr. T.I. Hughes constituted an effective humane means of producing unconsciousness and death prior to exsanguination under the ideal conditions which were present.
3. The Committee observed maternal-pup bonding. In the past, maternal-pup bonding has not been adequately acknowledged as a significant factor in the assessment of the humaneness of the hunt.

RECOMMENDATIONS

1. That the regulation club and hakapik be retained as rapid, effective, and humane means of rendering seal pups unconscious and dead prior to exsanguination.
2. That the evaluation of the use of a firearm to kill a seal pup be continued. The next study should be subjected to scientific methodology and include such variables as weather, pup size, ammunition, multiple discharge magazines or clips, and operators.
3. That a regulation be prepared such that when a sealer confronts a bitch which is protective of a pup, that the sealer neither molest the bitch nor kill the pup.
4. That the sealer education program of the Department be intensified and expanded. The program should include basic information on biology of the harp seal, maternal instinct, animal stunning procedures, exsanguination, etc. Films and/or video cassettes should be provided to local Fisheries Officers as education and public relations tools.
5. That Fisheries Officers continue foot patrols on the ice during sealing operations for educational as well as enforcement purposes.

APPENDIX XIII

REPORT TO THE CANADIAN VETERINARY MEDICAL ASSOCIATION ON A FIELD TRIAL OF A .38 CALIBRE PISTOL USED IN SHOOTING A HARP SEAL BEATER - MARCH 27, 1983

INTRODUCTION

On March 26, 1983, Drs. Reg Thompson of Saskatoon, and R.W. Stonehouse of Toronto, accompanied Mr. Tom Hughes of the Committee on Seals and Sealing (C.O.S.S.) to carry out a final test of firearms used for killing seals this year.

We travelled from Toronto to Montreal to Moncton by air and then on Sunday the 27th at daybreak, travelled by land and helicopter to the sealing area off the coast of Cape Breton.

Our activities of the day were delayed by what appeared to be improper notification of the local fishery officers as to what our task was to be that day and secondly, by a desire of the fishery officers to keep the air and ice free of visitors during the commandeering of the Sea Shepherd which occurred at approximately 2:30 that afternoon.

OBSERVATIONS

In spite of scattered seal conditions and the previously mentioned delays, we were able to observe the use of the .38 calibre pistol on a Beater Seal. The observations are listed below:

1) Seals of this age are quite large and readily mobile.

2) They recognize with general apprehension, an approaching human, in that their first reflex is to crawl away.

3) When finally confronted, they assume the posture, as we have seen in previous years in younger seals and mothers, (shown in the accompanying photographs), of defense and aggression.

4) The seal was able to be shot with one shot efficiently and very substantial damage was done to the brain tissue and surrounding skull to convince us that immediate unconsciousness was the result.

5) It is important to note that on a seal of this size, there was no ventral escape of the shot.

CONCLUSION

On this trial, which was limited to one seal, it is our conclusion that the .38 calibre pistol could well be a suitable alternative to the club in that is produced a humane death encompassing all of our generally accepted standards.

CONCLUSIONS

The analysis of the overall results of the testing of the efficacy of the .22 pistol indicate that in order to produce a rapid and humane death a considerable degree of accuracy of aim is necessary. A charge of this calibre can injure portions of the brain without necessarily producing unconsciousness or death. The authors opinion is that such accuracy is not consistently possible under field conditions where unpredictable movements of the animals and treacherous footing produce variables which argue against precise placing of the shot.

The .38 charge is capable of producing such extensive destruction of the skull and brain tissue that the requirement for accuracy is markedly reduced. All six subjects exposed to shot from this calibre pistol suffered immediate and irreversible unconsciousness and death.

TABLE 3 - AUTOPSY RESULTS - .22 CALIBRE

Seal #	
1	Shot entry 5 cm posterior to margin of eye orbit on the midline of cranium. Fractures present on the floor of cranial vault. Extensive sub dural hemorrhage.
2	Shot entry 2 cm from posterior edge of eye orbit to right of midline of cranium. Bone fragments impacted in mid brain. The shot ricochetted off the floor of the cranium vault and terminated in the cerebellum.
3	Two shot entries - 1) 3 cm posterior to orbit and slightly right of midline 2) 8 cm posterior to orbit and slightly left of midline Pellets penetrated approximately 2 cm into cerebral cortex producing extensive hemorrhage - no fracture in cranial vault.
4	Shot passed from 1 cm to left of midline near the occipital crest and terminated near sella turcica. Massive sub dural hemorrhage and fracture near the floor of cerebellar vault.
5	Two shot entries - 1) 1 cm posterior to orbit on the midline 2) 1 cm posterior to orbit and 1 cm right of midline Fractures of the walls of both left and right eye orbits were present with massive retro bulbar hemorrhage.

TABLE 4 - AUTOPSY RESULTS - .38 CALIBRE

6	The .38 calibre shot produced massive and extensive fracture of the roof of the cranium and passed through brain tissue to fracture the floor of the cranial vault. Damage to brain tissue can only be described as shattering, completely destroying the architecture of the organ. Pellets were not observed to pass through the skin on the side opposite the shot entry.
7	As Above
8	As Above
9	As Above
10	As Above
11	As Above
12	As Above

TABLE 1 - SUBJECTS SHOT WITH .22 PISTOL WITH 6" BARREL FIRING #11 SHOT

No.	Est. Age	Est. Weight Kg.	Shot Entry	Eyeblink Reflex	Caudal Reflex	Remarks
1	4-5 days	25 kg	Midline of skull 5 cm posterior to eye orbit	Persisted for 5 secs.	10-20 secs.	1st shot misfire 2nd shot fast kill
2	7 days	45 kg	2 cm posterior to eye orbit 1 cm to right of midline	immediate loss	55 secs.	Fast kill No respirations
3	9 days	35 kg	2 shots a) 3 cm caudal to rt. orbit b) 8 cm caudal to lt. orbit	immediate loss	5 mins & 15 secs	Recovered from 1st shot after 2 mins 20 secs. & vocalised, was shot again
4	7 days	30 kg	1 cm to left of midline near occipital crest	immediate loss	3 mins & 35 secs	Fast kill No respirations
5	9 days	40 kg	3 shots 0 - 15 - 45 secs All entered 1 cm posterior to eye orbits	not observed	4 mins & 15 secs.	First two shots wounded animal - third shot fatal
6	9 days	35 kg	2 shots not located 1 .22 calibre 1 .38 calibre	present	6 mins & 35 secs	First shot animal appeared conscious - shot 40 secs later with .38. Extreme swimming action to 5 mins & 35 secs.

TABLE 2 - SUBJECTS SHOT WITH .38 CALIBRE PISTOL

No.	Est. Age	Est. Weight Kg.	Shot Entry	Eyeblink Reflex	Caudal Reflex	Remarks
7	10 days	40 kg	Dorsal cranium	immediate loss	2 mins & 30 secs	Clean kill, respiration ceased
8	7 days	30 kg	Dorsal cranium	immediate loss	3 mins & 30 secs	Extensive bleeding from nose and wound, respiration ceased
9	10 days	45 kg	Throat 6" posterior to mandibular symphysis	immediate loss	5 mins	2 mins 30 secs irregualr respiratory activity at 4 mins corneal reflex returned
10	8 days	40 kg	2" post to orbit on midline	immediate loss	30 secs	Fast kill, no respirations Gunner slipped on ice and fell
11	8 days	40 kg	posterior cranium	immediate loss	5 mins & 10 secs	Extensive hemorrhage, no respirations, positive kill
12	7 days	35 kg	2" posterior to left eye orbit	immediate loss	2 mins & 20 secs	Positive kill, severe hemorrhage, no respirations

PROCEDURE

Based on discussion with Mr. T. Hughes and Prof. K. Ronald of the Committee of Seals and Sealing and Mr. Robert E. Brown (the developer of the firearms) a decision was reached to proceed to the ice northeast of Prince Edward Island and there shoot six pups with .22 long barrel pistol. An agreement was made that if the results were not entirely satisfactory to the members of the C.V.M.A. Committee then a further six pups were to be shot using a .38 calibre pistol. Mr. B .Webb, an inspector with the Ontario Humane Society, was on hand to perform the shooting. Parameters to evaluate the animals physiological status following shooting were established as:

a) Presence or absence of any eye blink reflex

b) Presence or absence of organized respiration

c) Existence of a spinal swimming reflex either spontaneously or in response to a flipper pinch or knife prick.

The heads of all subjects were removed and taken to the Provincial Veterinary Laboratory in Charlottetown for examination by the Committee under the supervision of Dr. D. Galt, Veterinary Pathologist.

REPORT TO THE CANADIAN VETERINARY MEDICAL ASSOCIATION ON A FIELD TRIAL OF TWO PISTOLS OF DIFFERENT CALIBRE USED IN SHOOTING HARP SEAL PUPS - MARCH 15, 1983

ABSTRACT

Drs. J. Ashman, D. Galt and J. Quine representing the Canadian Veterinary Medical Association attempted to evaluate the efficiency of two different pistols in producing immediate and terminal unconsciousness of seal pups. These pistols were developed for this purpose under the direction of Mr. T. Hughes, member of the Committee on Seals and Sealing. Previously documented research was carried out in March 1982. Also preliminary investigations focussing primarily on the feasibility of using a firearm as an alternative to clubbing seals, were carried out in 1980 and 1981.

The current evaluation was undertaken because previous studies failed to demonstrate the capability of the .22 calibre pistol to consistently produce immediate and terminal unconsciousness in the seal subjects.

Despite recent modification to the .22 pistol (i.e. lengthening the barrel to six inches (b) modifications to allow the pistol to accept #11 maxi mag shot), it again failed to produce desired results. In view of this, a larger pistol of .38 calibre was substituted for the .22. The .38 calibre produced consistent terminal unconsciousness in seal pup subjects.

LIMITATIONS OF THIS STUDY

The limitations of this study should be noted. In addition to time constraints, they are as follows:

a) The small number of animals in the trial restrict the scope of this study to the status of a preliminary trial of the .38 pistol.

b) The Committee was not informed well beforehand of the intention to use the .38 pistol and the protocol was developed on site.

c) As noted in Table 2 the gunner slipped on the ice while carrying the pistol. A larger trial would reveal the potential for other hazards - and produce recommendations such as the compulsory use of crampons on questionable footing.

d) Only one animal was shot in a non-conventional anatomical site (Table 2, #9). Further observations should be made to observe the variables inherent in large scale use of the .38 pistol.

...../2

CANADIAN VETERINARY MEDICAL ASSOCIATION

Adhoc Committee on Sealing

1982 REPORT

This year the CVMA Committee on Sealing was asked to participate as an observer at the annual sealhunt by the Department of Fisheries. The task was specifically to evaluate the efficiency and humaneness of the modified firearm which was developed from a prototype that had been used in preliminary testing at the 1980 and 1981 sealhunts.

The Committee (Drs. Quine, Thomson, Ashman and Stonehouse) assembled on March 1st, 1982 for a first trip to the hunt. They met with British M.P.s and politicians from Newfoundland in Halifax on March 2nd and proceeded to the Iles-de-la-Madeleine for observation as requested. After a series of delays caused by transportation and communication problems and a delayed sighting of the seals, the entire committee was finally able to watch the new firearm being used.

After eighteen seals were shot, the testing of this gun was halted by the CVMA Committee on the basis that the firearm was inadequate. That evening skulls were taken by helicopter to the provincial laboratories where they were examined and it was demonstrated to the fishery officers and humane officials and international representatives that the penetration of the skulls was not adequate and brain damage not sufficient for this instrument to be tested further. The Committee returned to Toronto, having completed its task.

Shortly thereafter the Chairman was contacted by both the Department of Fisheries and Mr. Hughes of the Committee on Seals and Sealing. Their desire was to have the ammunition changed to result in an increase in firepower. If this could be done, they asked that, if at all possible, the Committee return to observe further testing. The Department of Fisheries had had 10,000 rounds of ammunition specially prepared and packed in England for this test. It was their desire to have 100-200 rounds tested so that an entire year's time would not elapse before further testing could be carried out.

At this point in time the CVMA Committee was asked if they could participate and all but Dr. Thomson were able to make the second trip to the ice. As a result, Drs. Quine, Ashman and Stonehouse did return to the ice and observed a further 35 seals being slaughtered with the altered ammunition.

At this time the Committee found that, of course, the seal pups were large and, as they were older, their awareness of their surroundings and their defense mechanisms were more developed than the Committee had previously experienced in the first three years to the ice.

It is the Committee's understanding that, due to the pressure in Canada of the international community for possible banning of the sealhunt and/or banning of seal products in Europe, the Department of Fisheries will officially ask the CVMA to allow the Committee to participate in the 1983 hunt. The CVMA's participation has been indicated to be in the area of:

1) further evaluation of the new firearm;
2) further evaluation of the slaughter techniques of older pups;
3) of hosting international scientists and veterinarians invited for the 1983 hunt by the Department of Fisheries to represent the European community.

APPENDIX XIV

FINAL RESEARCH REPORT

on

CONCEPT SCRUTINY, PROTOTYPE DEVELOPMENT, AND FIELD EVALUATION OF IMPROVED FUR SEAL SLAUGHTERING TECHNIQUES

to

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

January 15, 1973

R. A. Williams, C. R. Hassler, J. D. Helmer,
and K. E. Hughes

BATTELLE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

FINAL RESEARCH REPORT

on

CONCEPT SCRUTINY, PROTOTYPE DEVELOPMENT, AND FIELD EVALUATION OF IMPROVED FUR SEAL SLAUGHTERING TECHNIQUES

to

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

from

BATTELLE
Columbus Laboratories

R. A. Williams, C. R. Hassler, J. D. Helmer
and K. E. Hughes

January 15, 1973

INTRODUCTION

The northern fur seal (callorhinus ursinus) was first described in 1742, and has subsequently been widely harvested by many nations for its valuable fur. The early sealing efforts were indiscriminate and excessive, and at several periods the seal herd was threatened by annihilation. By 1911, the fur seal population reached its low ebb of about 200,000. Realization of the seriousness of the situation prompted an agreement for international protection in the same year. This agreement, signed by Canada, Japan, Russia, and the United States, marked the beginning of a very successful wildlife management program which has used various controls to restore the herd to the present [illegible] population of nearly one and one-quarter million. Even so, the management program allowed [illegible] selective harvesting which averaged nearly 60,000 yearly between 19[illegible] and 1967.(1)

The remarkable management program has benefited greatly from extensive research on fur seal population dynamics to determine the level at which the population will produce a sustained excess of animals for harvest.(3) This research [illegible] and under the direction of the National Marine Fisheries Ser[illegible] has conducted numerous studies designed

TABLE OF CONTENTS

LIST OF FIGURES

to measure the health of the herd by establishing cause of death in pups, and through continuous surveillance of harvested animals.[7][4][3] In accordance with the North Pacific Fur Seal Treaty, NMFS also conducts research at sea each year to determine pregnancy rates, feeding habits, and population distribution.

The effectiveness of the management program is indisputable, yet the animal harvest has been the object of increasing criticism over recent years by several animal protection groups and the general public. A portion of the criticism is attributed to misinformation and confusion between the northern fur seal harvest on the Pribilof Islands and the taking of baby harp seals in the Northwest Atlantic. The precise motives behind the criticism are not entirely clear, but the target has been almost exclusively the slaughtering technique. Most critics oppose the use of the generally accepted and widely used concept of stun and stick as being brutal and barbaric. The technique, as used in the Pribilof harvest, employs a large hardwood club for the stunning operation which is quickly followed by exsanguination via cardiac puncture.

Recognizing that the clubbing is aesthetically unpleasing, NMFS has sponsored several research programs,[10][11][12][14] with the objective of finding a more acceptable technique. To date, no reasonable alternative which is consistent with the requirements of mass harvesting has been developed. Accordingly, this research program was established to objectively consider a number of alternatives as a further attempt to improve the slaughtering technique.

OBJECTIVES AND SCOPE

As implied by the program title, three primary objectives were addressed in this research. These are:

(1) To evaluate a variety of concepts having potential as an improved slaughtering technique

(2) To develop one or more prototype devices judged to have potential as an alternative approach

(3) To evaluate the prototype devices under field conditions on St. Paul Island, Alaska, during the 1972 harvest.

Time requirements dictated an early decision on the type of prototype devices which could be designed, developed, fabricated, and tested prior to actual field evaluation during the 1972 harvest. Accordingly, it was proposed to develop several impaction devices which emerged as promising concepts during our preliminary concept screening. Even though many "blue sky" concepts were given initial consideration, the concepts considered at length consisted only of those which could reasonably be considered as suitable alternatives. Accordingly, techniques such as laser guns were eliminated because the necessary output from such a device would obviously require an unreasonable level of sophistication and support equipment. Further, the evaluation of a concept was made only in the context of suitability for the fur seal slaughtering under the conditions present on the Pribilof Islands. Therefore, application of the analysis to slaughtering techniques in general or to other seal harvests is not necessarily justified. This is true largely because of the unique physiology of the fur seal as well as the extreme environmental conditions encountered.

BACKGROUND INFORMATION

While a comprehensive review of the migrational habits and harvesting techniques is beyond the scope of this program, a brief summary is included to aid understanding. Several sources of detailed information are available, and should be closely studied to avoid misunderstanding.[4][13]

Northern fur seals are in all respects wild animals. They spend the majority of their time in the open waters of the Pacific Ocean. They migrate from their breeding grounds in the Bering Sea to their winter home on the high sea, where they are observed offshore between the coasts of California and Japan.

In May and early June, harem bulls or beachmasters return to the breeding rookeries on the Pribilof Islands. These bulls, which weigh as much as 500 pounds, establish stations and await the arrival of females from mid to late June. The cow seals, which average about 100 pounds, form harems with the beachmasters. The harem size varies, but averages about 40 females. Shortly after their arrival, the females give birth to their pups which typically weigh about 10 pounds, and are born in a one-to-one sex ratio. By early August, mating has been completed and the harems begin to break up.

The harem formation provides a natural segregation of young males which are not yet capable of establishing a harem. The young male seals congregate on areas adjacent to the rookeries called hauling grounds, and it is these three to four year old males which are annually harvested for their commercially valuable fur. Accordingly, only male seals are currently harvested, and the pups which remain in the harem area are not disturbed. The harvesting operation, which is conducted by resident Aleut workers under the direction of NMFS, may be divided into four basic operations.

(1) The drive from the hauling grounds.

(2) Stunning and bleeding.

(3) Skinning.

(4) Carcass and skin processing.

The first two of these processes have received the brunt of the criticism addressed at the overall harvest. The drive consists of a herding operation, followed by a movement to the killing fields. Critics have attacked the rough terrain over which the seals are driven, the length of the drive, the potential overheating of the animals, and the general excitement induced in the seals.

The actual slaughtering has been criticized largely because stunning is accomplished by striking the seals on the skull with a hardwood club. The clubs are about 5 to 6 feet long and weigh approximately 8 pounds. In appearance, they resemble oversized baseball bats. In practice, a small group or pod (6 to 8) of seals are separated from the larger herd and are presented to the clubbers. There are 6 to 8 clubbers and they rapidly (less than 20 seconds per pod or 1-3 seconds per seal)[12] dispatch the desired animals in the pod and reject undesirables; i.e., females, poor skins, and older males. It should be emphasized that the stunning blow is not intended to be lethal. The animals are merely rendered unconscious for the bleeding via cardiac puncture and severing of other great vessels in the thoracic cavity. The exsanguination is the actual cause of death.

The efficient skinning operation quickly follows the bleeding, and the animal carcasses and skins are neatly arranged for subsequent pick up and further processing. The carcasses are totally utilized as mink food after they are suitably processed and frozen at the by-products facility on St. Paul Island. The skins are blubbered, cured, and packed in barrels for

subsequent shipment to the Fouke Company in Greenville, South Carolina, for final processing and sale under government contract.

CONCEPT DEVELOPMENT AND SCRUTINY

An important portion of the research on this program involved the development and scrutiny of a wide variety of alternative slaughtering techniques. Before the merits of any concept can be objectively considered, one must have a thorough understanding of the problem to be tackled. This understanding on our part was obtained through field observation by two Battelle scientists during the 1971 harvest, and by review of pertinent literature and research reports. The field observations provided us with a first hand familiarization with the currently employed harvesting techniques, as well as many of the unusual considerations resulting from the climate and animal species under investigation. Extensive photographic documentation of the harvest was obtained for continued reference throughout the program as well as for the edification of those not observing the kill first hand.

Our concept development was augmented by discussions with numerous engineers and life scientists who were not intimately acquainted with the harvest. As a result, a large number of basic concepts as well as "blue sky" approaches were given initial consideration. It should be noted that concepts which would require alterations in the killing techniques other than replacement of the club with an alternate device were also considered, but the fact that practicability requires a continued overall efficiency was kept constantly in mind.

Criteria for Alternative Fur Seal Slaughtering Techniques

As a result of our observations, we felt that a comprehensive list of criteria should be developed for screening alternative proposals. Such a list allows any proposed concept to be objectively evaluated and rated by rigid application of each of the criteria entries. Our criteria for a suitable technique are presented and discussed below.

(1) Technique Must be Humane. Any alternative technique must not allow the humane aspects of the slaughter to be compromised. The animals must not be subjected to

unnecessary pain, anxiety, emotional stress, physical abuse, excessive fatigue, or exhaustion.

(2) Technique Must be Aesthetically Acceptable. It is evident from the criticism resulting from utilization of the club that untrained individuals place heavy emphasis on the appearance of the kill. Accordingly, only a limited amount of bleeding, muscular contractions, and vocal response is acceptable. Further, any restraining approach must likewise not be visibly undesirable.

(3) Technique Must be Rapid and Effective. The slaughtering procedure must be efficient in total as well as in parts. Excessive delays or "bottlenecks" quickly compromise various humane considerations. Complicated multi-step procedures, excessive support equipment, or additional personnel requirements are likewise undesirable. Production of immediate and continued unconsciousness of the seal is highly desirable.

(4) Technique Must Allow for Selectivity. Success of the management program requires close attention to the type of seals being harvested. The unnecessary killing of females, or animals with undesirable pelts is unjustified and wasteful. Even though nature provides a built in selection mechanism by segregating the desirable seals from the harem area, provision for further selection on the killing field is also mandatory.

(5) Technique Must be Safe. A harvest of this magnitude under field conditions requires a smoothly operating multiple-man multiple-team effort. The personal safety of those participating as well as of observers must not be unreasonably jeopardized. Nevertheless, some potential for personal injury is implicit and must be accepted in any occupational environment. Personnel safety often requires rigid adherence to safety regulations, and any concept implemented must be accompanied by instructions for safe use and identification of pertinent cautions.

(6) Technique Must not Damage Seal Skin. The primary objective of the harvest is to obtain the valuable seal skin. Therefore, any procedures which would degrade its quality are undesirable.

(7) Equipment Required Must be Rugged and Reliable. Efficient slaughtering requires equipment dependability. The climate and field use subjects the equipment to many stresses which must be considered during design and development. The need to frequently adjust, refill, etc., in the field is time consuming and undesirable.

(8) Equipment Must be Suitable for Use with a Minimum of Training. While Aleut clubbers and other harvesting personnel are highly skilled in their work and would quickly adapt to the physical operation of any alternative device, it is unreasonable for the device to require specialized technical training for satisfactory operation.

(9) Technique Implementation Maintenance and Operating Costs Must be Reasonable. Any alternative slaughtering technique will likely result in an increased cost as compared with the present clubbing technique. However, a reasonable increase in cost would be justified if an acceptable alternative is found. Implementation cost must be fairly amortized over projected life time, but maintenance and operating cost should be fixed and reasonable.

(10) The Carcass Should not be Rendered Unfit for Consumption. While the seal carcass is not a profitable commodity, its use as an animal food provides for total utilization of the seal and eliminates the carcass disposal problem. Furthermore, there is some human consumption by the Aleut population on St. Paul Island. Accordingly, use of a technique (drug or gas) which would taint the meat or render it toxic should be avoided. Consideration should still be given to concepts which violate this criteria since alternative disposal techniques may be feasible.

(11) Technique Should Require Minimal Animal Herding and/or Driving. Herding and driving of seals on land produces excessive fatigue and excitement. Further, attempting to drive seals into a chute arrangement is not desirable since they tend to turn and pile up as well as fight excessively among themselves as a result of their forced close contact.

(12) Stunning Operations Should be Effective for a Period of at Least Two Minutes. If a seal is to be stunned or anesthetized, the procedure should be effective for a minimum of 2 minutes. This period is required to humanely carry out the sticking operation as well as to assure safety of the sticking personnel.

Concept Analysis

During our research effort, a number of alternative slaughtering concepts were considered. Each of these concepts received varying degrees of consideration depending on how reasonably they met the criteria established for an acceptable approach. This section discusses the pros and cons of a number of alternatives.

Acoustical Shock

High intensity acoustical shock waves can be generated which could produce concussion of the animal's skull. These waves could be directed to some extent toward the animal's skull, and transmission of sufficient energy to stun the seals could be accomplished over short distances in air.

This approach has several disadvantages which leads us to conclude that it does not merit further consideration. These are:

(1) Excessive noise associated with the shock wave would frighten other seals.

(2) Potential personnel safety hazards due to the possibility of rupture of tympanic membranes.

(3) Excessive equipment costs.

Chamber Techniques

There are many possible euthanasia agents which could be used in conjunction with an exposure chamber. In fact, considerable research effort

has been exerted on agents which would require a chamber approach.[10] This work involved the use of carbon dioxide (CO_2) and nitrogen (N_2) as agents for producing hypoxic environments. The results essentially confirmed what one would expect when exposing diving mammals whose basic physiology makes them relatively resistant to such environments - i.e., long time periods (nearly 9 minutes on the average) were required to dispatch the animals. The unusual physiology which makes this approach undesirable concerns the seal's unique breath-holding capability and accompanying cardiovascular adjustments which allow extended and deep dives.

Application of a vacuum to a suitable chamber would appear at first glance to be a possibility. Using this concept, a chamber would be evacuated to a simulated high altitude with a concomitant reduced O_2 tension which would result in the animal's death after a fairly lengthy period of time (10-20 minutes). Such systems have been used as a euthanasia technique by animal shelters, but would be unacceptable under the field conditions present on the Pribilofs. Accordingly, this concept which suffers from all of the disadvantages of any chamber technique, plus several of its own, should not be given further consideration.

Use of any chamber approach would require a change in the entire harvest scenario so that prior sorting could be effected to insure that only desirable animals are slaughtered. This process would likely introduce numerous undesirable and criteria-violating conditions such as excessive anxiety and fatigue to the animals. These disadvantages are in addition to those associated with the chamber approach itself which has deficiencies in areas covered by criteria 3, 4, 9, and 11.

Accordingly, we conclude that any chamber technique and especially those employing hypoxic environments are low priority approaches and do not constitute a reasonable technique for slaughtering fur seals.

Decapitation

Decapitation is a euthanasia technique which is routinely used in certain laboratory research programs and some slaughtering operations. We considered various decapitating devices such as guillotines and steel music wire snares, but the aesthetic qualities of such devices render them obviously unacceptable.

Electrocution

The use of electrical shock as a stunning technique presents some desirable qualities. The most effective electrical stunning operation would result from a bipolar electrode applied transcranially since heavy concentrations of current could be confined to the brain. To produce sufficient stunning currents, a relatively high voltage would be required. This is due, in part, to the unusual electrical insulating properties of the seal's fur. Accurate application of a bipolar electrode to the skull of the seal, however, may be somewhat difficult. This was evident from field trials performed by us and discussed below. Therefore, consideration should be given to a monopolar system which uses the ground plane as a return pathway, and would therefore require less accurate positioning. Whether sufficient current can be effectively applied to the brain with such a system needs to be determined.

Each of these approaches could conceivably produce aesthetic instantaneous stunning, but both have inherent personnel safety hazards. This is especially true for the monopolar system. Proper design and rigid adherence to pertinent safety regulations could reduce these hazards to a reasonable level, however.

Because of the promising nature of this approach, it was chosen as a concept for initial development during the prototype development and evaluation phases of this program.

Gaseous Anesthetics

Gaseous anesthetics were considered as a possible step in an euthanasia technique. Inhalation of several agents are known to rapidly cause analgesia and loss of consciousness. The effectiveness of these anesthetics is dependent upon the partial pressure of the anesthetic agent in the brain, and therefore the rate of induction is determined by the rate at which the agent can get to the brain. This, in turn, is controlled by many factors: blood flow, respiratory rate, rate of gas transfer across the alveoli, and loss of the agent from arterial blood to all the other tissues of the body.

A few of the commonly used gaseous anesthetics would cause reasonably rapid anesthesia. These include vinyl ether, chloroform, cyclopropane, and halothane. All of these agents in an ideal system would be relatively fast

acting - cyclopropane being able to produce general anesthesia within two to three minutes, vinyl ether perhaps a little faster, and halothane being the slowest, requiring as long as ten minutes.

Utilization of these drugs for euthanasia of seals hinges upon the ability to deliver sufficient gaseous agent to the animal. Chamber techniques, of course, present one possibility, but the problems associated with that technique have been discussed previously. Another alternative would be individual administration, and the possibilities of doing this are discussed later. One advantage of gaseous anesthetics to the workers in the field is their reversibility. Diffusion would rapidly reduce the agent in an accidentally exposed human, and death of the victim could probably be prevented by exposure to fresh air and/or artificial respiration. However, this property of gaseous anesthetics would make it difficult to keep the seals anesthetized for long enough periods to permit exsanguination. Most general anesthetics are not expected to be lethal to the animal except in extremely high concentrations. This is especially true since there would not be a highly efficient system for delivering the gas to the animal. When compared to injectable anesthetics, the gaseous anesthetics, which appear no faster acting, do not seem to be a practical choice for use in the seal harvest. This is especially true when the administration difficulties are taken into account.

Gunshot

Marksmen armed with appropriate weapons could kill seals by shooting them in the head. This approach does not satisfy a number of the criteria, however, and must be considered undesirable. The reasons are:

(1) Inaccurate shots may merely wound the seals of interest or others in the pod.

(2) Harvest personnel would be subjected to unreasonable danger.

(3) The report from a weapon of this sort would induce unnecessary anxiety in other seals.

(4) The cost of killing as many as 60,000 animals per year could be significant, depending on weapon choice.

(5) Brain stem damage may result in violent muscular contractions and produce an aesthetically unpleasing kill. Therefore, accurate placement of the shots within the brain is also important.

Impaction Techniques

Because the seal's skull is exceptionally thin, it is exceedingly vulnerable to any blow to the head. Seals have limited mobility on land, and for these reasons it is natural that the use of the club was found to be the most effective stunning procedure. Even though the club is considered by most experts to be a humane technique, the procedure is not generally considered to be aesthetically pleasing. Further, the accuracy of every blow cannot be guaranteed and occasional impact to some other portion of the anatomy is unavoidable. Nevertheless, the club is found to ideally meet other entries in the criteria list.

Since the concept of impaction is considered humane and satisfactorily meets the majority of the criteria, it is natural that a mechanized device which could more aesthetically and accurately deliver a suitable impact to the seal's skull was chosen as an avenue of development. It should be pointed out that even the clubbing has not been considered cruel or inhumane by nearly all of the tourists who have observed the harvest.(2)

Individual Administration of Gases

It was envisioned that a plastic container on the end of a long pole could be placed over the seal's head and attached using an inflatable cuff or drawstring mechanism. A suitable dose of a gaseous material would then be injected into the container. A number of gases could conceivably be administered in this manner (CO, CO_2, N_2O, halothane, ether, etc.) but the possibility of placing such a container over the seal's head is considered small. Individual administration of a gas is not considered practical for the following reasons:

(1) The technique of placing such a device over the head is impractical for mass slaughtering.

(2) The seal can tolerate hypoxic environments for lengthy periods, and excessive time would likely be required to induce unconsciousness.

(3) Some significant personnel safety haxards are possible depending on the choice of the gas.

(4) Some gases may contaminate the carcass.

Injectable Drugs

The idea of using injectable drugs for seal slaughtering, while not new, is attractive because it is generally considered aesthetically pleasing and humane. This is probably because most people are well acquainted with the use of anesthetics, tranquilizers, etc., in humans where rendering a person insensible to pain and/or unconscious is easily achieved.

Use of an injectable drug in the wild -- as in seal slaughtering -- presents an entirely different set of circumstances than those encountered in a controlled laboratory or hospital situation. Since the seal is unrestrained, simply injecting the animal can be a major task, and only a few of the common injection routes - intramuscular, intraperitoneal, subcutaneous, and intrathoracic - are available. The most common method of injection in wild animals is the intramuscular route. Muscles are fairly accessible, but they are separated from the skin in the seal by the blubber layer. This layer should be avoided because of its affinity for many agents, and their slow diffusion into the circulation from the blubber. Accordingly, a specially designed drug injection device is required which can deliver the proper dose to the seal. Use of a capture gun would be unacceptable since inaccurate shots would endanger personnel, and mass slaughtering would be severely hampered due to the relative slowness of the procedure. A suitable injection technique could be developed to deliver the drug. Even so, the possibility of accidental injection of harvest personnel remains. Accidental injection of a drug into a human could be as lethal as injection into the seal. Antagonists are available for a few drugs (e.g., M99 and barbiturates), but administration of these antagonists would require rapid and competent medical assistance.

Choice of a suitable drug is a difficult process, and a comprehensive scrutiny of this nature could comprise a research program in itself. It has been estimated that approximately 25,000 drugs and/or combinations could be used to anesthetize and tranquilize animals.(5) The choice is further complicated since the response to drugs can be dramatically different from species to species, and since most drugs have had limited or no application to fur seals. Some previous experimental work with drugs on fur seals and other animals was reviewed. Of special note, are the reports of

Peterson,[9] Keyes,[8] 1968 Task Force Report,[12] Virginia Mason Report,[10] and especially a monograph by Harthoorn[6] which covers the entire field of wild animal restraint. Most of the literature in this field deals with immobilization of wild animals for treatment, tagging, etc. This type of work was designed to avoid death of the animal. Our aim is to find an agent to induce death or at least an insensible state in the most humane method. It cannot be assumed that merely increasing the dosage of these agents to the lethal level will produce humane death.

Among the potential drugs discussed in this report are those which have been used on seals before and some new agents which show promise but have not, to our knowledge, been used in seals. The following categories of drugs are discussed.

(1) Barbiturates
(2) Narcotic analgesics
(3) Nonbarbiturates
(4) Muscle blocking agents.

Not included in this classification are combination drugs which have been used in animals including seals.[8]

Barbiturate Drugs. One class of agents generally utilized for anesthetic purposes are the barbiturates. Like many other anesthetics, the barbiturates produce unconsciousness by their central nervous system activity which is generally thought to affect the reticular activating system. There is also some analgesic effect from the barbiturate, but this is minimal.

Respiratory depression is also caused by direct depression of the medullary and pontine areas of respiratory control. Chemoreceptor reaction to partial pressures of carbon dioxide is also depressed and is actually abolished at anesthetic levels. Diaphragmatic breathing usually results after the intercostal muscles have become ineffective. The more commonly used barbiturates are slow acting drugs such as sodium pentabarbital and short acting drugs such as sodium thiopental or sodium thyamol. Pentabarbital is very slow to react when injected other than intravenously (I.V.), however, it can eventually produce anesthesia when injected by any route. On the other hand, sodium thiopental is relatively inefficient when injected other than I.V. This is presumably due to the rapid degradation of this drug. Peterson[9] found

this drug unsatisfactory for immobilization of seals. Small doses of barbiturates have been known to cause overexcitement instead of sedation to anesthesia in many patients. Therefore, a missed or partial dose could conceivably cause a hyperexcitable animal rather than a fully anesthetized or sedated animal. The main metabolic pathway of the barbiturates is via the liver enzymes. Destruction of these enzymes after death would present a greatly retarded degradation of the barbiturate agents. The barbiturate agent could be expected to remain intact within the carcass and the body after death.

Barbiturates have long been utilized as euthanasia drugs, especially in situations where the latent period of drug activity is not of importance. However, their slowness of action by intramuscular injection makes the barbiturates a poor choice for seal euthanasia.

Narcotic Analgesics. The major drugs in this category are morphine and morphine derivatives. The major analgesic effect of morphine is produced by depression upon the central nervous system. The exact action which produces the analgesia, drowsiness, etc., is not known. It is important to realize that analgesia often occurs before, and sometimes without, producing unconsciousness. However, pain and discomfort can be minimized to the patient. Morphine poisoning is nearly always due to respiratory arrest. This mechanism of action is thought to be due to the effect upon brain stem centers which monitor partial pressures of carbon dioxide. There are very little blood pressure or cardiovascular effects noted even with toxic doses of morphine. Due to slow degradation in a dead animal, the carcass would be contaminated with drug residue.

Other morphine type analgesics such as fentamyl are of interest. This agent has properties similar to morphine, but as an analgesic it is about 80 times more potent. Of even greater interest, is etorphine (M-99); this agent is an analgesic immobilizing agent used to capture large game.[15] [16] The immobilizing activity in M-99 is 1,000 times greater than morphine, and its analgesic activity can be up to 10,000 times greater. This drug is usually administered by the intramuscular route because of its great activity, and this makes it a very useful drug for immobilization of large animals.

Antagonists are available for this drug to reverse its actions when desired. Very small amounts are necessary to immobilize extremely large animals. A variable latent period between 3-25 minutes might be expected. It would be impossible to extrapolate from the data in the literature to the values necessary on a seal, because the dose necessary for maximal effect appears to be species related. When an aroused or excited animal is injected with M-99, the excitability can be perpetuated. It should be emphasized that the animal will not necessarily be unconscious when immobilized by M-99 or for that matter any other morphine drug. However, Harthoorn[6] reports that with overdoses of M-99 the animal lapses into unconsciousness before expiring from respiratory arrest. The questions of excitability and depth of anesthesia following M-99 impaction should be answered for seals before a positive recommendation can be made.

Nonbarbiturate Anesthetics. A fairly new group of nonbarbiturate drugs produces what is known as dissociative anesthesia. These drugs have been used as anesthetics. The first of these is phencyclidine. This drug is also a potent hallucinogen in humans. It was found to be excellent for immobilizing seals by Peterson.[9] Its primary action is inhibition of central nervous system sites that control sensory perception. In humans, the patient feels dissociated from his environment, including his own extremities. Analgesia and amnesia result, but the musculature relaxation is poor. Respiration and respiratory resistance are little affected, and the ventilatory response to carbon dioxide is normal. This drug has been known to cause a cataleptic state which continues for long periods. Certain animals such as the cat are known to never recover from the state of catalepsis caused by phencyclidine. Peterson[9] found that this agent was the best of the depressants he utilized for seals with a latent period of 5 minutes with doses between 0.09 and 0.30 mg/kg.

Another drug in this class is ketamine. This drug can be administered either intraveneously or intramuscularly, and it is also dissociative. However, the patients do not ordinarily have the hallucinations produced by phencyclidine. The compound is thought to act upon the cerebral cortex. In humans, intramuscular doses in the range of 9-13 mg/kg can produce a surgical anesthesia within 4 minutes. One disadvantage of the drug for euthanasia is that lethal doses are fairly high. LD_{50} in rats and mice is

approximately 20 times the average human intramuscular dose. However, respiratory depression may occur upon very rapid administration. The lethal or effective dose for the seal is not known for this agent, but lethal dose might not be necessary if the animal is exsanguinated after being anesthetized. The carcass would probably be contaminated with these drugs.

Of the drug classes surveyed above, it appears that one of the dissociative anesthetics such as phencyclidine or ketamine might serve well as a drug for seal slaughter. They are fairly rapid acting and provide anesthesia. Latency of action would still have to be considered a major factor. These drugs would require at least several minutes to affect the seal.

Muscle Blocking Agents. Another group of chemical agents which have been mentioned frequently for euthanasia are depolarizing and competitive blocking agents. The most commonly quoted of these drugs is succinylcholine, an ultrashort acting depolarizing muscle relaxant. Succinylcholine causes skeletal muscle paralysis by blocking neurotransmission at the myoneuro-junction. It competes with acetylcholine for the cholinergic receptor of the motor plate. Succinylcholine produces a depolarization following an initial transient muscle contraction which is often visible as fasiculations. Neuromuscular transmission then becomes inhibited and remains so as long as there is an adequate concentration of succinylcholine at the receptor sites. The paralysis caused by succinylcholine is of extremely brief duration due largely to rapid hydrolysis by pseudocholinesterase which breaks it down to metabolic waste products. With intramuscular injection, a paralyzing dose can be expected to act in 2 to 3 minutes. Similar to all drugs in this class, it has no known effect upon consciousness, pain threshold, or cerebration. Therefore, it can only be used in conjunction with adequate anesthesia. When drugs of this type were experimentally injected into humans at 2-1/2 times the necessary dose for paralysis, it was reported that all modalities such as pain thresholds, mental abilities, smell, hearing, neurological signs, ECG, pulse rate, blood pressure, and EEG remained constant. At no time was there evidence of lapse of consciousness or impairment of memory. From these experiments, it was concluded that this class of drugs had no significant anesthetic effect, and their sole action

value is on the peripheral effect upon skeletal muscles. At very high concentrations, some very complex effects upon central synaptic processes have been seen, but amelioration of pain is questionable. Death from these types of agents is usually caused by paralysis of the respiratory musculature. Whenever these agents are utilized on animals, it must be realized that they have no analgesic qualities, and therefore, by themselves should not be considered euthanasia agents. One advantage to succinylcholine is that it would not contaminate the animal carcass. Among the peripherally effective paralytic drugs, succinylcholine was found to be most useful by Peterson[9] for immobilization. However, he felt that considerable experience was necessary for using it. With the succinylcholine injected at levels in a range of 0.3 to 0.37 mg/kg, the latent period averaged 12 minutes. This period was reduced to 45 seconds with an intravenous injection.

Succinylcholine was again used by the Virginia Mason group in 1970 when they performed three experiments to find the efficient dosage. They utilized surgically instrumented seals so that parameters such as electrocardiogram, electroencephalogram, blood pressure, and heart rate, might be measured. The three seals had an approximate average weight of 27 kg, and 20 mg/kg of succinylcholine was used. Bradycardia resulted 105 seconds after injection; blood pressures fell to a minimum in 523 seconds; and blood flow reached zero 460 seconds after injection. Electroencephalogram fell to 1/10 of control 543 seconds after injection. These values are much longer than those associated with the traditional stunning method. For instance, bradycardia onset occurs 28 seconds after stunning the animal, blood flow falls to zero 112 seconds after sticking, and electroencephalogram falls to 1/10 of control value 109 seconds after stunning. It is assumed that the blood pressure immediately falls to zero.

Succinylcholine was also used during the 1971 trials by Richard Denney of the American Humane Society on the Pribilof Islands.[2] Animals were immobilized in an average time of 43-46 seconds. Denney repeated his work on the island in 1972 with a hand held injection device.

Succinylcholine by itself cannot be recommended for use as an euthanasia drug. In combination with an analgesic or anesthetics with properties fast enough to be useful, the use of the succinylcholine would probably be superfluous.

Thermal Destruction of Brain Function

The possibility of rendering the seal unconscious by rapidly increasing the temperature of the brain is intriguing. The most likely possibility for accomplishing this would be through the use of microwave energy. It is assumed that a temperature increase of 10 degrees fahrenheit would be sufficient to cause neuronal death. Based upon this temperature increase, and assuming a seal brain weight of 3 pounds and composition nearly like water, an input power of approximately 7 kilowatts would be required to achieve the 10 degree farenheit increase in 5 seconds. Poor efficiencies between the generating source and the brain, however, require quite involved and costly equipment. The device would require placement over the animal's head to insure personnel safety and to keep equipment requirements practical. The humaneness and aesthetics of such an approach should be acceptable, but the equipment requirements are prohibitive because of the poor efficiencies involved. For these reasons, we judge this concept impractical.

Ultrasonic and Laser Systems

Ultrasonic energy could conceivably be used to damage the brain, but excessive energy input would be required, and even reasonably low energy transfer would require direct contact with the skull or total immersion in a water chamber. Transfer of electrical energy to ultrasonic energy is relatively inefficient and would require unreasonable equipment needs to produce the required energy. Laser systems are likewise not practical because of the massive equipment requirements and the need to accurately focus the energy on the seal's skull. Accordingly, both of these concepts are impractical.

PROTOTYPE DEVELOPMENT

Field observations of the currently used stun and stick approach demonstrated the effectiveness of a sharp blow to the head as a stunning technique. Review of our photographic documentation also revealed that the critics' complaints about the appearance of the stunning are understandable. It should be emphasized, however, that viewing of motion picture accounts of the slaughter is, in a sense, out of context and does not fairly represent

the overall harvest. It is significant that recorded comments from tourists observing the kill indicate an almost unanimous feeling that the technique is not cruel or inhumane.[2] Similar feelings are reported by expert observers.[11]

We, likewise, agree that the harvest as conducted is humanely executed, but our objective was to consider alternative approaches which would also be humane, but would lack some of the characteristics currently being criticized. Because the concept of impacting the skull to produce stunning is effective and satisfactorily meets our criteria list, we chose to develop several pneumatic devices which could rapidly and accurately apply suitable stress to the skull without the undesirable appearances associated with clubbing.

Establishment of Design Criteria for Pneumatic Devices

Preliminary concept development indicated that two basic impaction techniques could reasonably be developed for evaluation under field conditions. The first basic concept considered was a compressive band approach. Basically what was envisioned was a circular head or flexible steel band attached to the end of a long tubular handle. By impulsively reducing the diameter of the steel band and applying circumferential compressive forces to the animal's skull, instantaneous stunning would be produced. A conceptual drawing of such a device is shown in Figure 1, which also includes basic ideas on the power system and positioning technique.

The first step in the design of the system was to develop a set of design parameters to insure optimization of important variables. Two "breadboard" systems were constructed so that approximate values for forces required to inflict varying degrees of skull and brain damage could be determined. The first of the breadboard systems, which was used to collect "quasi-static" force - displacement - skull damage relationships on cadaver animals, is shown in Figure 2. In operation, the skull of a cadaver animal is placed into the spring steel loop on the right of the device. The diameter of the spring steel loop can be reduced by manually turning a nut on the left end of a threaded rod which has both ends of the spring steel band attached to its opposite end. Reduction of the diameter in turn applies circumferential compressive forces to the skull. A load cell inserted in the

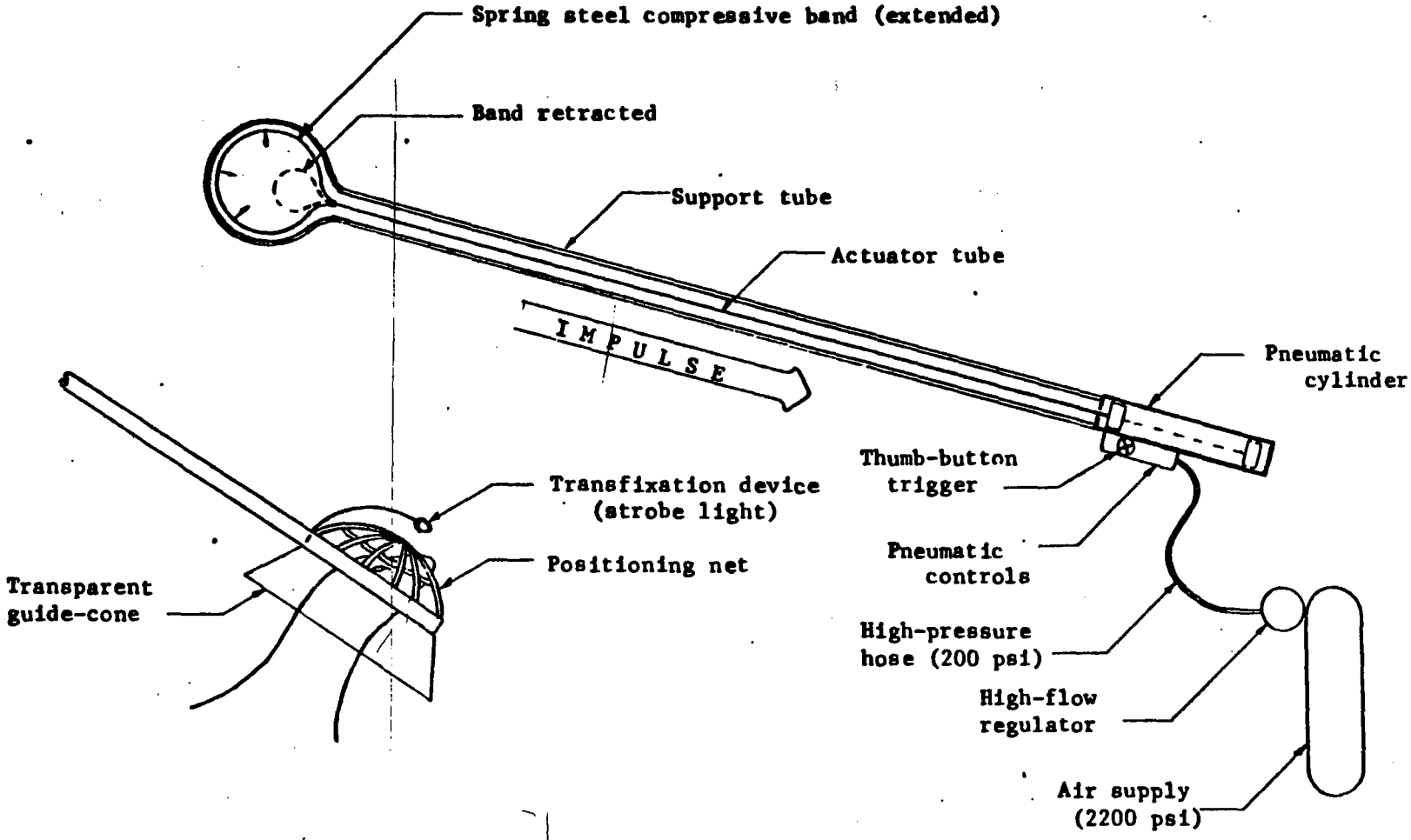


FIGURE 1. CONCEPTUAL DRAWING OF COMPRESSIVE BAND DEVICE AND OVERALL PNEUMATIC SYSTEM

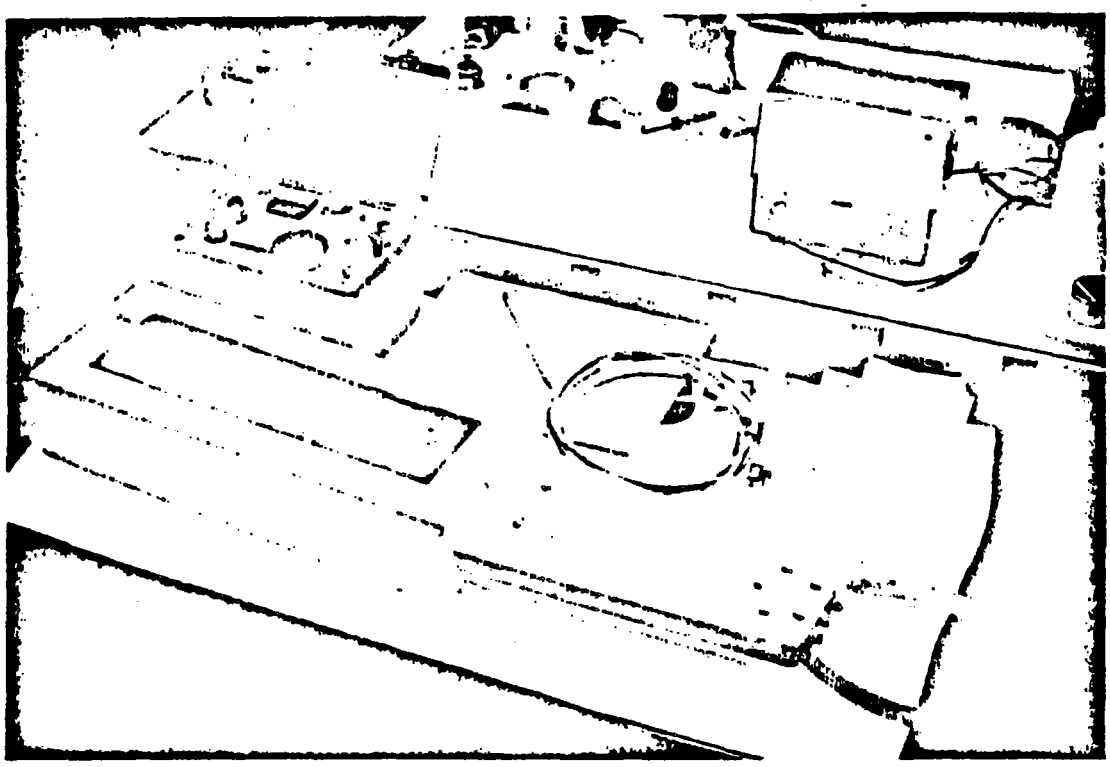


FIGURE 2. PHOTOGRAPH OF QUASI-STATIC DATA COLLECTION SYSTEM

rod assembly (center of photograph and associated readout on left) allowed continuous measurement of the tension applied to the ends of the spring steel band. Displacement was determined by noting the number of turns and knowing the pitch of the threads on the threaded rod (11/inch). This device was employed to obtain valuable design data from the skulls of cadaver dogs. A series of six animals were subjected to varying compressive forces, and the amount of skull and brain damage in each case was subsequently determined. Two fresh seal heads supplied by NMFS were also used experimentally in the device. These tests indicated, as expected, that less force was required to inflict significant skull and brain damage in the seal than in the dogs. It should be noted that the seal's skulls were subjected to X-ray examinations prior to the evaluation to insure the skulls had not been previously damaged.

The information obtained from the quasi-static experiments allowed selection of components for the initial data collection on a dynamic system. The dynamic system resulted from a modification of the quasi-static system and is pictured in Figure 3. This system is also a breadboard model which was used to obtain dynamic data to allow optimization of components to meet

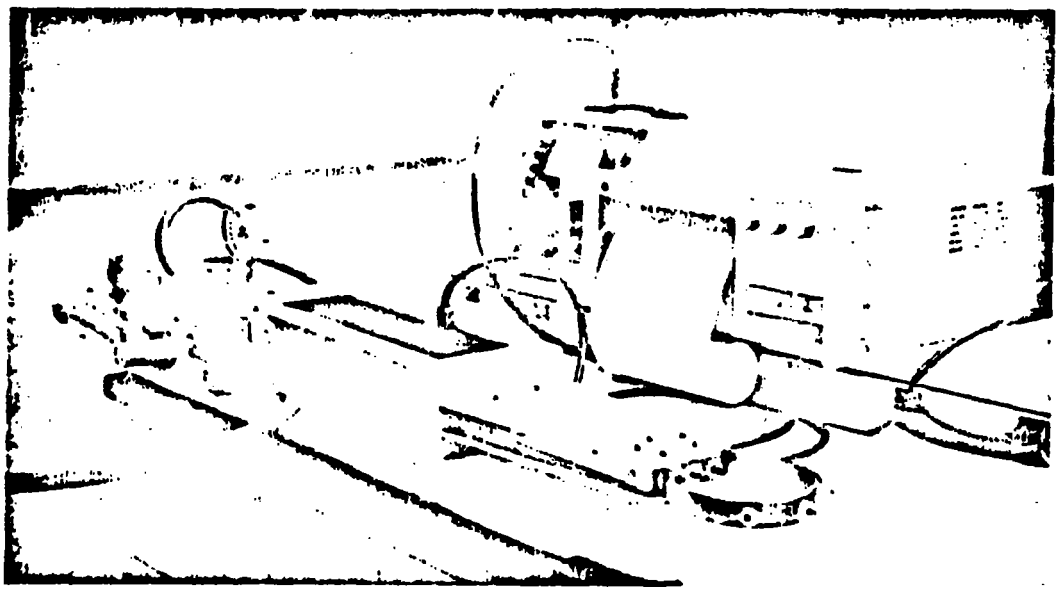


FIGURE 3. PHOTOGRAPH OF DYNAMIC DATA COLLECTION SYSTEM

our design objectives for the first of the portable field prototype models. The spring steel band on the right in Figure 3 is unchanged, but it is activated by the pneumatic cylinder, associated controls, and pressure gages on the left. Again, the load cell is inserted into the activating rod and used to monitor pertinent dynamic forces. The output of the load cell was fed to an optical recorder which produced a graphical record of the force -- time relationships of interest.

Experimentally, the dynamic system produced the desired force -- time-pressure -- skull damage information from the skulls of 6 cadaver dogs. As before, two fresh seal heads were used to insure that the data obtained from the dogs was reasonable.

The results of the static and dynamic evaluations showed that the required forces, speeds, and associated pressures were consistent with the design of pneumatically powered portable systems much like that originally envisioned and shown in Figure 1. It was found that utilization of a one inch steel band and light weight pneumatic cylinders could produce adequate forces to effectively crush the skull while allowing full displacement in less than 0.25 second. With this basic information in hand, we began the design and development of the prototype devices. This work is described in the next section.

Design and Fabrication of the Compressive Band Prototypes

The data collection activities confirmed our belief that a reasonably portable device could be developed for field evaluation during the 1972 harvest. With this information in hand, we began to consider other design objectives which would be required to make the overall system functional under field conditions.

Personnel safety dictated that the device be light weight, maneuverable, and of sufficient length to allow maintenance of reasonable separation between the operator and the animals. It was recognized early that the most likely problem area would be the ability to place the loop over the animal's head and to accurately position it to insure proper application of the compressive forces to the skull. This problem was reviewed with NMFS personnel, and

it was agreed that the problem would be difficult to solve satisfactorily. Nevertheless, a net positioning arrangement was pursued in an attempt to objectively evaluate the feasibility of such a technique.

To meet these objectives, lightweight but rugged materials were specified wherever possible, and most components were specified in thin aluminum sections. A long reach was provided through the use of cantilevered, concentric, thin-walled, aluminum tubes. The outer tube provides primary support while the inner tube performs the actuating function. The resultant long moment arm is counterbalanced by mounting the heavier components (pneumatic cylinder and control system) aft. This approach places the operator near the center of gravity of the device, and allows for easy manipulation.

Figure 4 shows an overall view of a completed unit with one of the alternatives for an air supply, the backpack system. As shown, the device is held with one hand forward of the center of gravity and the other hand grasping the handle. A thumb button near the handle triggers the device upon depression. Slow return of the actuator occurs when the spring loaded button is released. Total weight of the pneumatic device is 12 to 13 pounds depending on the components used. This weight may be partially supported by an optional canvas shoulder strap attached at the center of gravity.

An alternative source of air which eliminates the need to carry the 30 pound backpack system uses a length (typically 50 feet) of high pressure air hose attached to a remote air cylinder. This approach is shown photographically in Figure 5.

Figure 6 shows a close-up of a typical head assembly for the compressive band concept. As shown, a transparent funnel-like hoop is provided to assist in guiding the device over the animal's head. The removable funnel was molded from impact resistant polycarbonate and was secured to an extruded aluminum hoop which is welded to the forward end of the long reach tube. A heavy duty adjustable net (canvas webbing) is provided to allow proper positioning of the device on the animal's skull. In principle, the hoop is placed over the animal's head and moved downward until positive contact is made with the net. The operator then depresses the thumb button which instantaneously reduces the diameter of the compressive band. Several penetrating bolts, which were inserted into the band to avoid slipping and

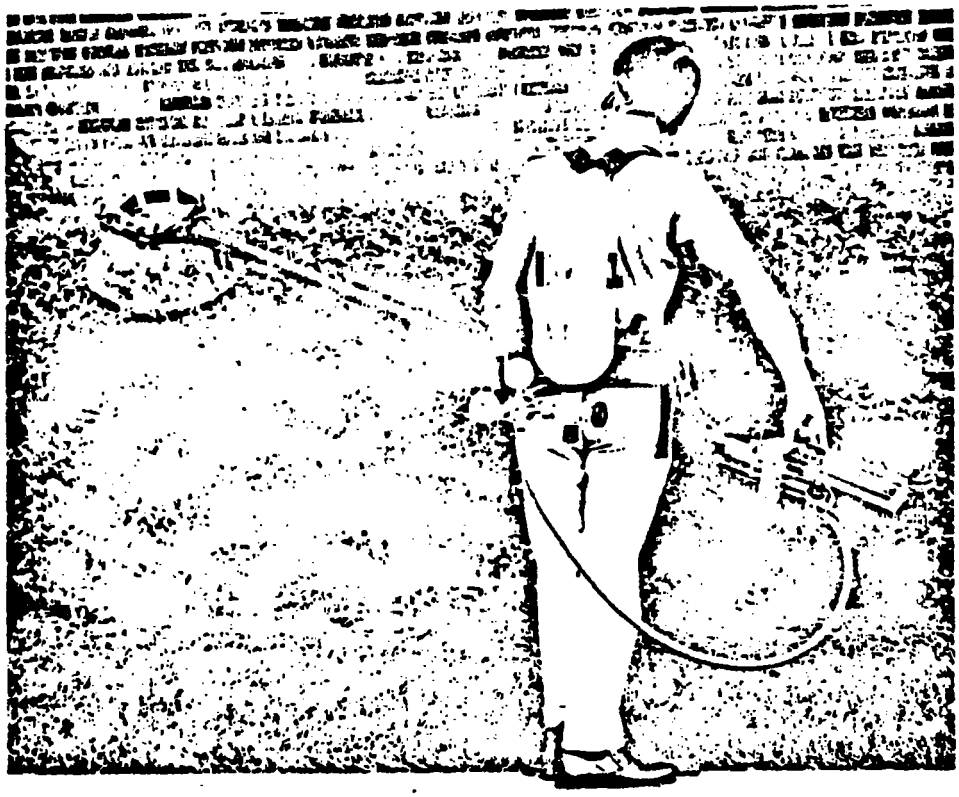


FIGURE 4. PHOTOGRAPH OF TYPICAL PROTOTYPE SYSTEM WITH BACKPACK AIR SUPPLY

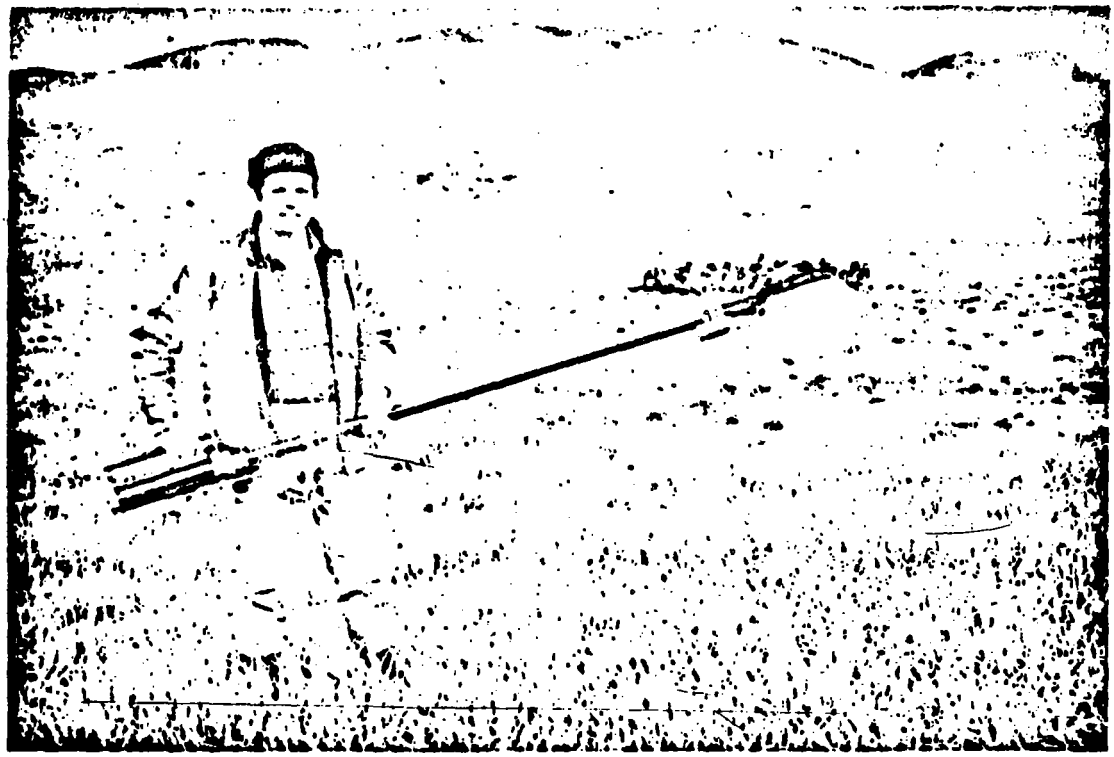


FIGURE 5. PHOTOGRAPH OF TYPICAL PROTOTYPE SYSTEM WITH REMOTE AIR SUPPLY

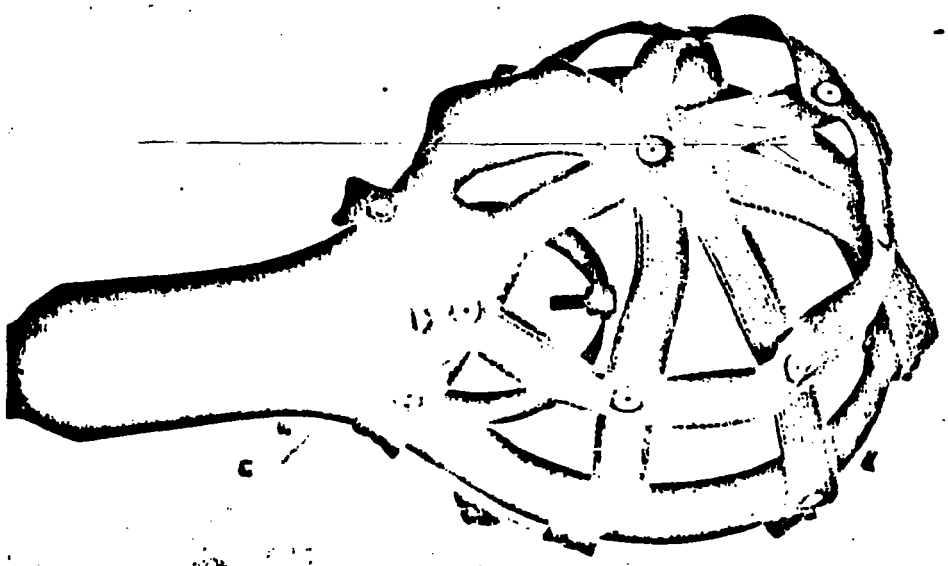


FIGURE 6. CLOSE-UP OF HEAD ASSEMBLY FOR TYPICAL COMPRESSIVE BAND PROTOTYPE

to provide high stress areas for positive skull penetration, can be seen in Figure 6.

Figure 7 shows a close-up of the head assembly with a high intensity strobe light attached. This strobe light was used in an attempt to momentarily transfix the seal to enhance the placement of the device over the head.

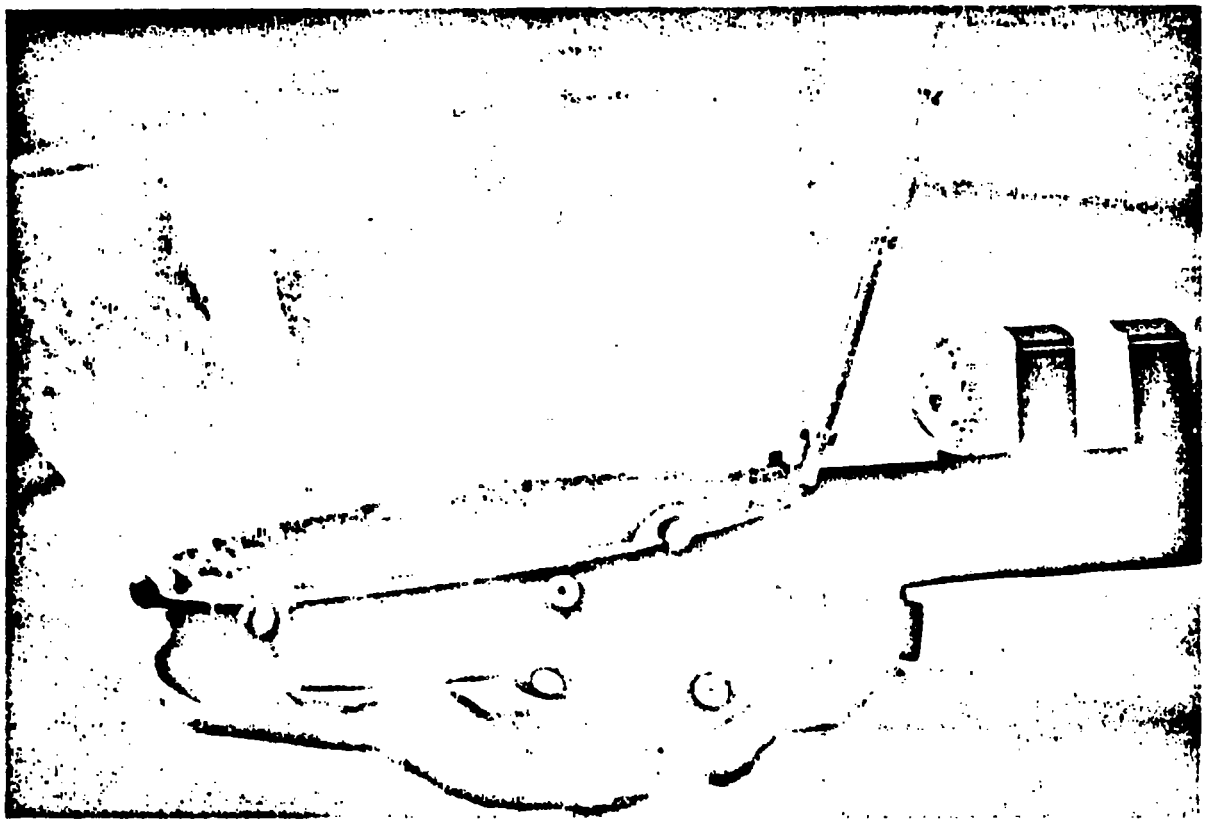


FIGURE 7. CLOSE-UP OF HEAD ASSEMBLY SHOWING STROBE LIGHT TRANSFIXATION DEVICE

Figure 8 shows a close-up of a typical handle and the pneumatic control system. Readily visible is the spring loaded actuation button, air supply port, and miniature pressure regulator for adjusting return speed. The bulk of the control system mounts compactly on the side of the air cylinder. One-half-inch-OD copper tubing provides air routing to the cylinder, and a miniature muffler effectively silences the exhausting high pressure air.

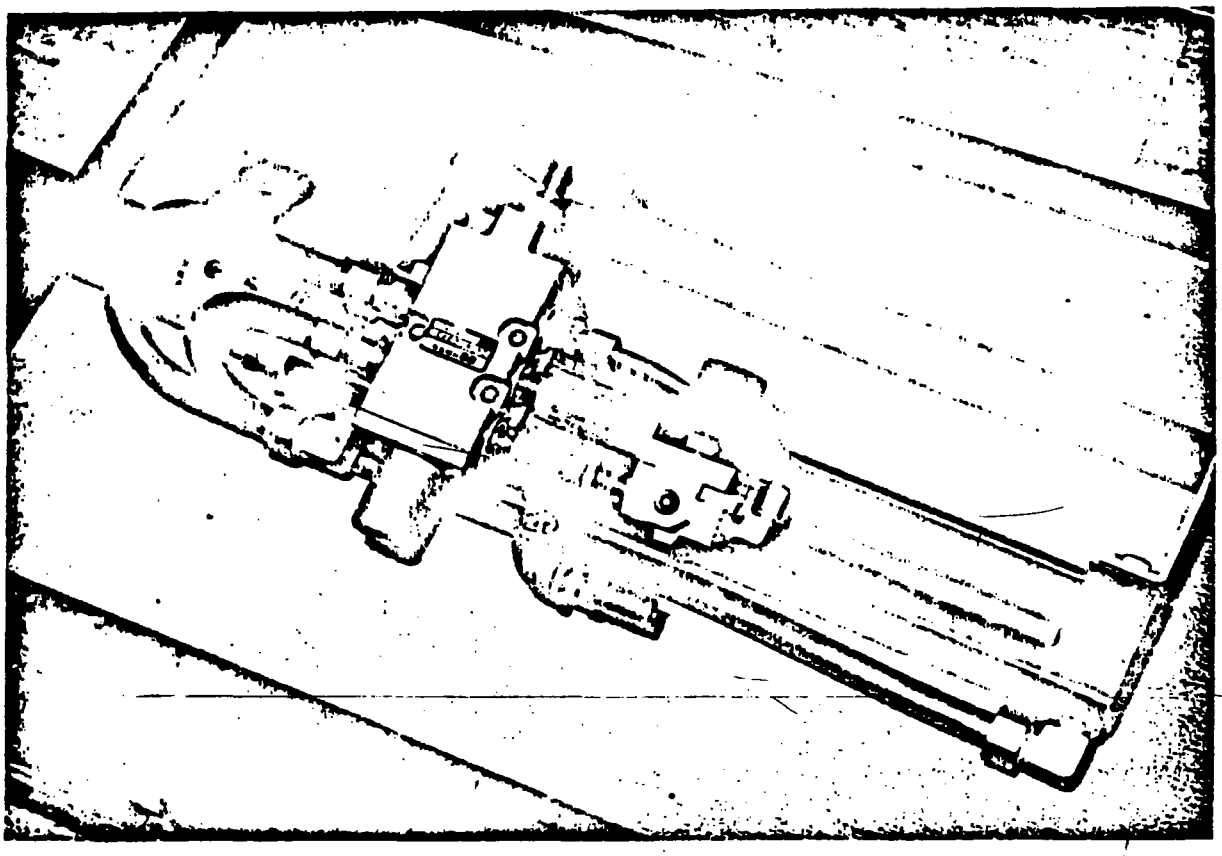


FIGURE 8. CLOSE-UP OF TYPICAL PROTOTYPE HANDLE AND PNEUMATIC CONTROL SYSTEM

Understanding of the entire pneumatic system can be more easily accomplished by referring to Figure 9 which is a schematic diagram for the entire system as used on the compressive device. Pneumatic power was chosen as the most practical energy system capable of meeting the requirements of long throw, fast response, portability, simplicity, and cost. The complete pneumatic system is composed of commercially available components and is designed to be compact and lightweight while meeting the performance requirements. The high flow regulator (Figure 9) was used to adjust the applied pressure to the cylinder through 1/2-inch-I.D. high-pressure hose. Accurate control of the applied pressure between 0 and 200 psi resulted in control over the amount of skull damage and response time. The miniature pressure regulator on the device handle (Figure 8) allows the return speed of the band to be adjusted. Figure 10 is a close-up of the entire pressure supply and pneumatic system. As shown, the 2200 psi backpack is pressure regulated by the high flow regulator which feeds the penumatic controls on the handle through the high pressure hose. Again, device actuation is accomplished by depressing the thumb button. Release of the spring loaded thumb button returns the system to the open mode. The 2200 psi, 45 cubic foot backpack air supply can provide 150 to 300 cycles of the system depending on the pneumatic cylinder size and the operating pressure being used.

To provide a greater degree of variability, two prototype models of the compressive band system were fabricated. One device had a maximum steel band diameter of 10 inches coupled to a pneumatic cylinder with a bore of 2-1/2 inches; and the second had a maximum diameter of 8 inches, and a cylinder bore of 1-3/4 inches. Cylinder stroke in all cases was 10 inches. In both models, the closed band diameter is adjustable between 3 and 5 inches by varying the length of the outer cantilevered aluminum tube or handle.

The effectiveness of each of these prototype models was found to be satisfactory by application to the skull of an anesthetized dog. One device was applied satisfactorily to the head of a fresh seal skull.

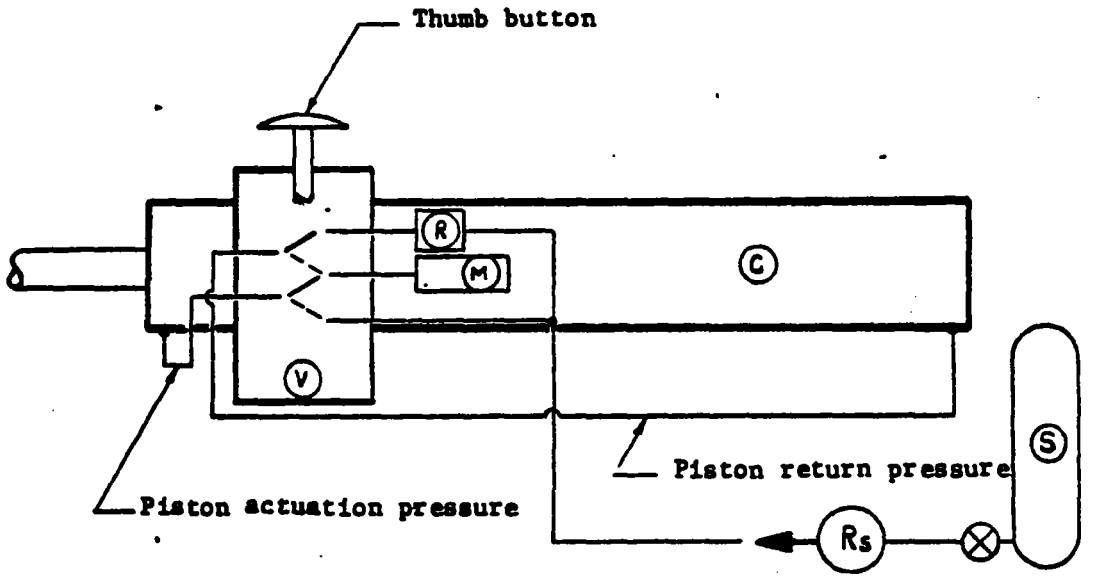


FIGURE 9. SCHEMATIC OF PNEUMATIC CONTROL SYSTEM FOR THE COMPRESSIVE BAND DEVICE

S - Back pack air cylinder, SURVIVAIR, 9151-45, or alternate high-pressure supply.

R_s - Regulator, high-pressure, Matheson 4-1340.

C - Cylinder, aluminum, air-operated, Parker-Hannifin
2-1/2 COC x 10" stroke, cushioned blind end, for compressive band
1-3/4 COC x 10" stroke, cushioned blind end, for compressive band
2-1/2 CCO x 10" stroke, cushioned rod end, for impactor
1-3/4 CCO x 10" stroke, cushioned rod end, for impactor

V - Valve, Ross 2426 A 2034, 2 position, 4 way, spring return.

R - Regulator, Ross 5211 A 2005 (low-pressure return air).

M - Muffler, Ross 5500 A 2001, 1/4 MPT.

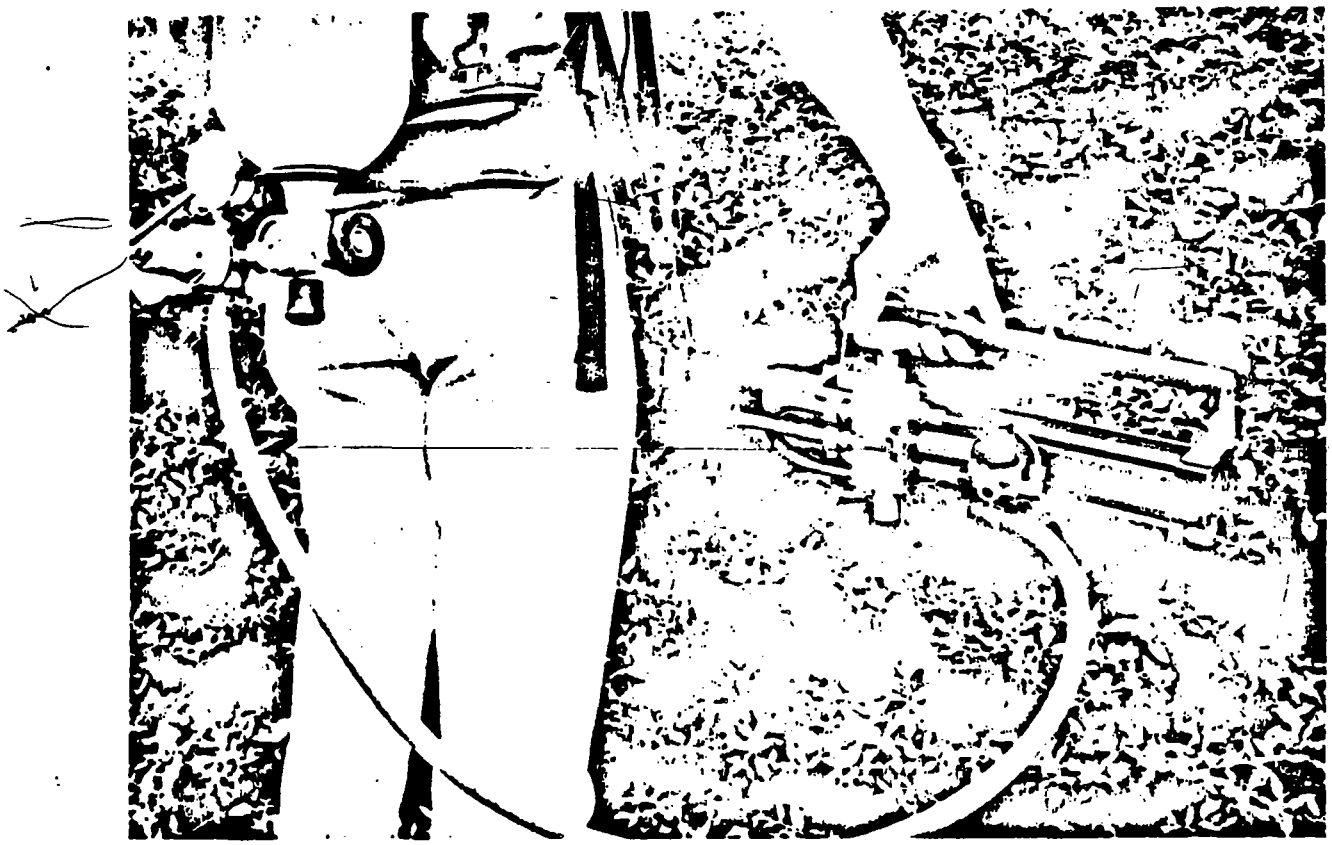


FIGURE 10. CLOSE-UP OF AIR SUPPLY, PRESSURE REGULATING, AND PNEUMATIC CONTROL SYSTEMS

Design and Fabrication of the Impaction Prototypes

A second pneumatic concept which takes advantage of the desirable qualities of a blow to the head as a stunning technique was also designed and fabricated. The overall system looks nearly identical to the device employing the compressive band (Figures 4 and 5), but this device uses a pneumatic cylinder which operates in the opposite mode. That is, the cylinder extends a shaft upon activation. Figure 11 shows a close-up of a typical impaction head complete with a polycarbonate cone and positioning net. In this device, a brass impaction block (triangular shaped component at end of tube in Figure 11) is quickly accelerated and delivers an impact to the suitably positioned seal skull. The blow delivered by the impaction head is similar to that delivered by the club, but with less barbaric overtones and hopefully consistent accuracy.

FIGURE 11. CLOSE-UP OF HEAD ASSEMBLY FOR TYPICAL IMPACTION PROTOTYPE

Two models, identical except for cylinder bore (2-1/2 inches and 1-3/4 inches, both 10 inch stroke), were fabricated to allow evaluation of a number of impaction head designs. Figure 12 illustrates the five alternative heads which may quickly be interchanged in the impaction prototypes. Two triangular models, a brass block, and a plastic block are shown on the left and right of Figure 12; and several stainless steel captive bolt designs are shown in the center of the figure.

As before, regulation of the pressure, as well as cylinder bore size, allows varying levels of impacts to be delivered. To a lesser degree, the various types of heads affect the impaction velocity and intensity. As before, the length of travel for the impactor heads may be varied by adjusting the length of the outer support tube.

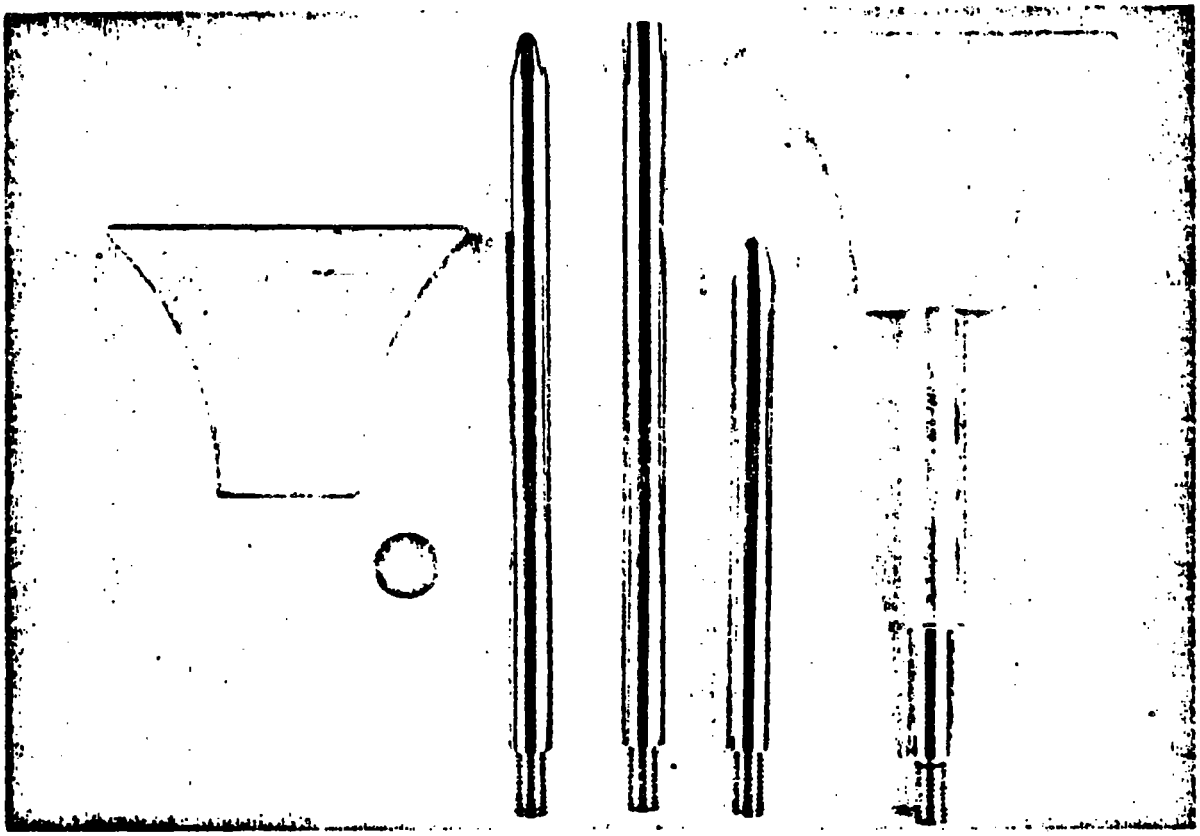


FIGURE 12. PHOTOGRAPH OF ALTERNATIVE INTERCHANGEABLE HEADS FOR THE IMPACTION PROTOTYPES

Design and Fabrication of Bipolar Electrocution Device

Another concept which satisfied a majority of the selection criteria was electrocution. Even though this approach had been explored by previous workers,[12] it was felt that an improved system utilizing a higher voltage would provide a promising alternative.

Personnel safety is a prime consideration in the design of an electrocution system of this nature, and extreme precautions were taken to keep this risk reasonable. Our design approach was to use a bipolar electrode configuration which would apply volatages of up to 1250 volts at current levels ranging to a maximum of 0.25 amp to the skull of the animal. We chose to keep the operator completely isolated by constructing the entire device from rugged polycarbonate which also provides excellent electrical insulation. Figure 13 shows an overall view of the electrocution prototype

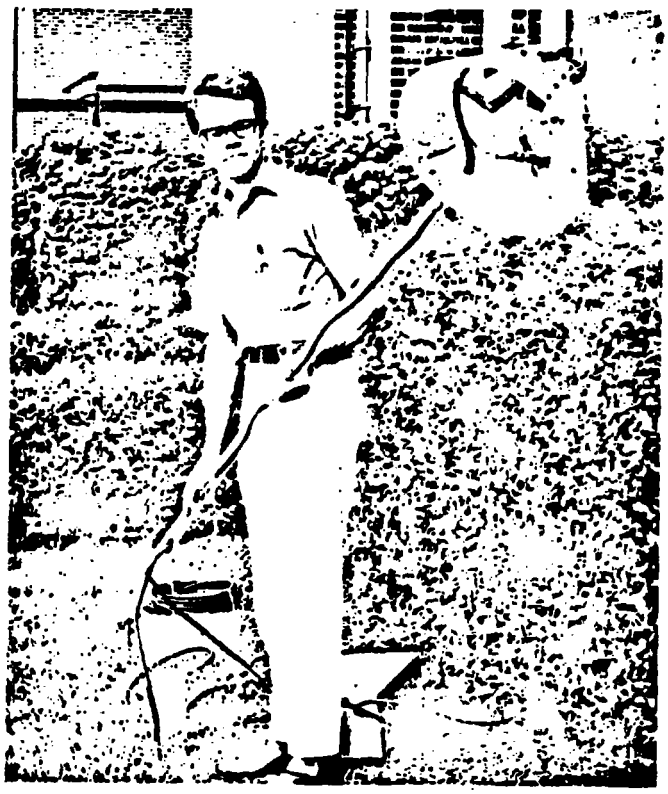


FIGURE 13. PHOTOGRAPH OF OVERALL ELECTROCUTION PROTOTYPE

including the electrical head, long polycarbonate tube, control box, and associated cable. Figure 14 shows a close-up of the bipolar electrocution head. As shown, a polycarbonate cone shaped head design was employed with the bipolar electrodes safely contained within. An adjustable restraining net was also provided to aid in proper positioning of the device.

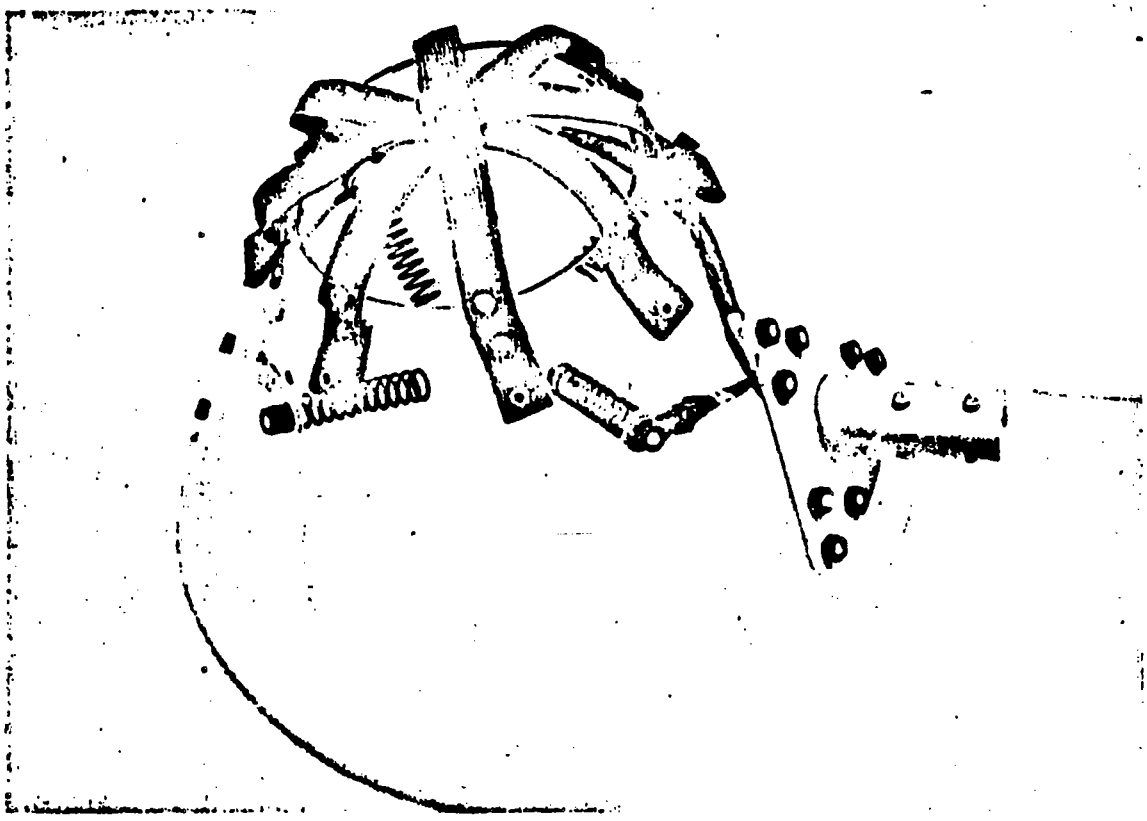


FIGURE 14. CLOSE-UP OF THE HEAD OF THE BIPOLAR ELECTROCUTION DEVICE

The electrical schematic (Figure 15) aids in understanding the device. As can be seen, the primary power source is a gasoline powered portable motor-generator set which supplies 120 volts ac at 60 cycles to the control box. The control box allows selection of the output voltage

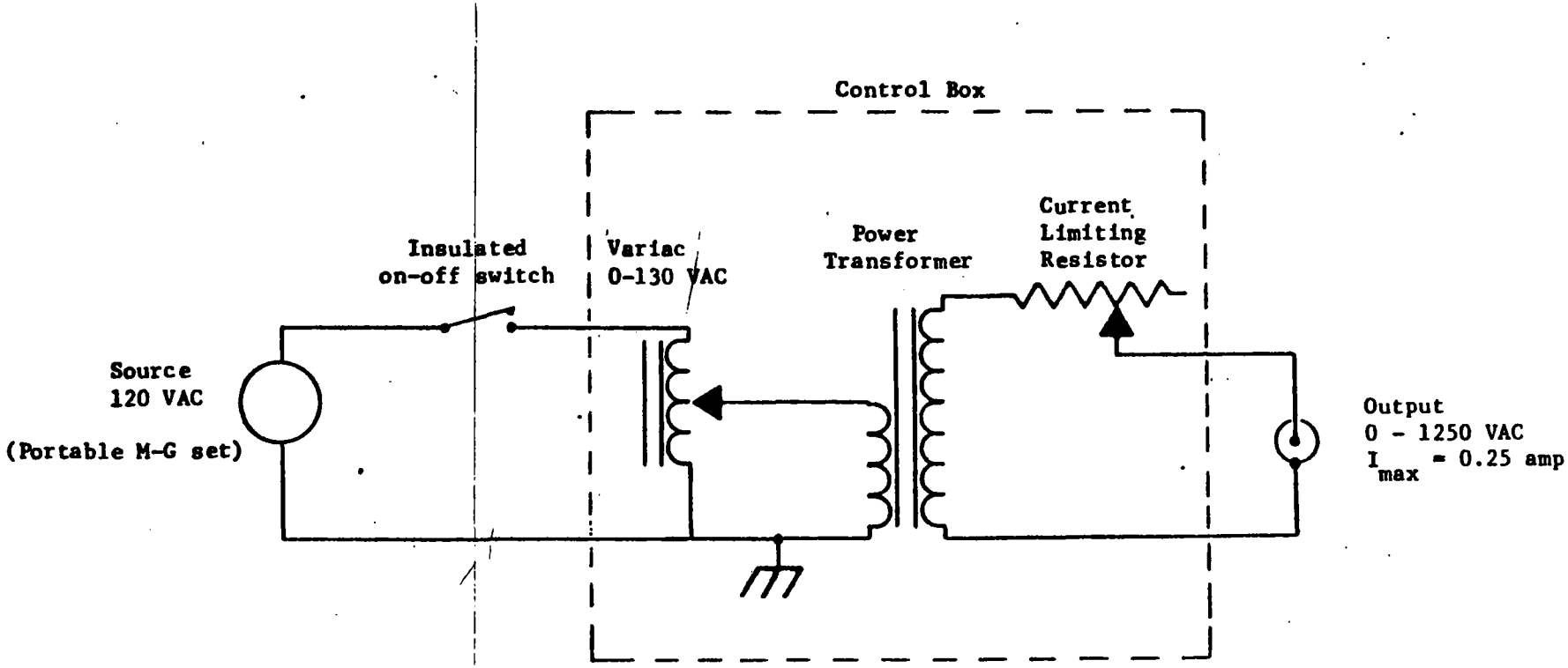


FIGURE 15. CIRCUIT DIAGRAM OF THE ELECTROCUTION DEVICE

between 0 and 1250 volts. Added personnel safety features include a coaxial cable system for all high voltage circuits and an insulated switch which controls the application of the high voltage by switching the lower voltage.

PROTOTYPE EVALUATION

In addition to the various laboratory evaluations performed on the prototype models, we performed a field evaluation under actual harvest conditions on St. Paul Island, Alaska. This evaluation was conducted during the period July 7, to July 15, 1972.

The following prototype devices and auxiliary equipment were shipped to St. Paul Island for the field evaluation phase.

- One pneumatic system with 10-in. compressive loop diameter and 2-1/2-in. bore, 10-in. stroke cylinder.
- One pneumatic system with 8 in. compressive loop diameter and 1-3/4 in. bore, 10 in. stroke cylinder.
- One pneumatic impaction system with 2-1/2 in. bore and 10-in. stroke cylinder.
- One pneumatic impaction system with 1-3/4 in. bore and 10 in. stroke cylinder.
- Five models of interchangeable heads for the impaction devices.
- One bipolar electrocution device and associated cables and control box.
- One backpack system for powering the pneumatic devices.

Each of the prototypes was used on three separate days during the harvest. Typically, a small group or pod of seals was separated to be used during our trials. The entire sealing crew was held to assist in restraining the pod and to protect the two inexperienced operators of the prototypes from an occasionally charging seal. The crew also dispatched the animals which were not effectively stunned with the prototypesand performed the required sticking and skinning operations. Figure 16 shows the pneumatic impaction device being used during the field evaluation, and Figure 17 shows the bipolar electrocution device being evaluated. In general, the impaction devices were not successful. This was true primarily because of the difficulty encountered in properly positioning the device over the seal's head.

FIGURE 16. PHOTOGRAPH OF FIELD UTILIZATION OF TYPICAL PNEUMATIC DEVICE

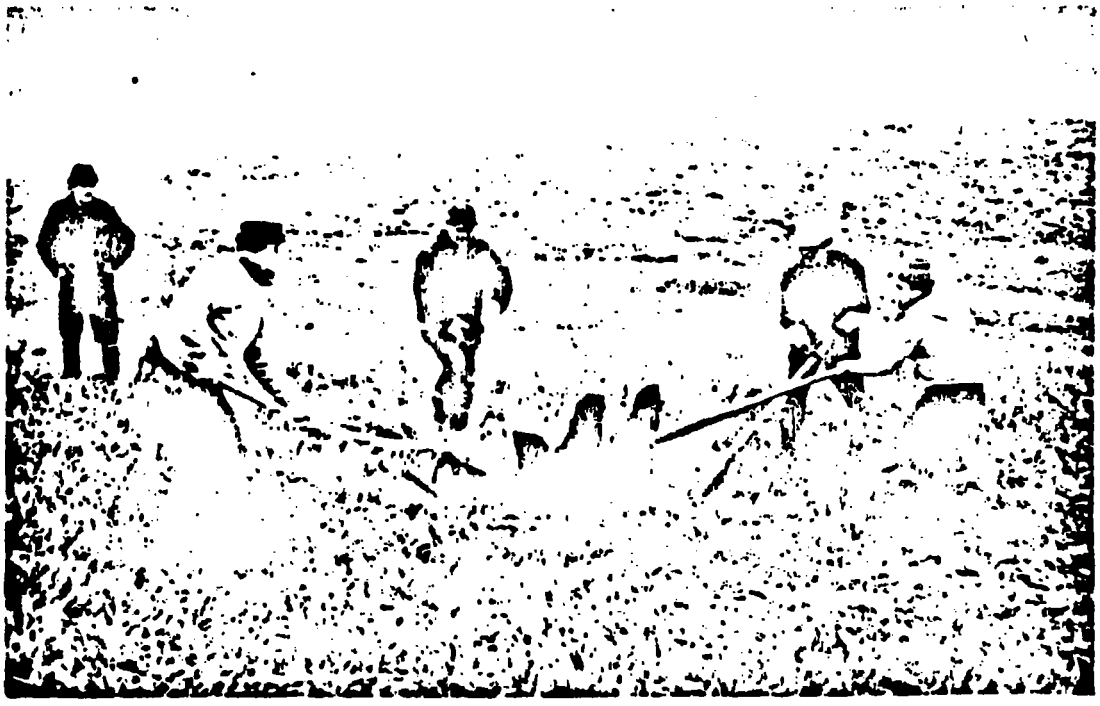


FIGURE 17. PHOTOGRAPH OF FIELD APPLICATION OF BIPOLAR ELECTROCUTION DEVICE

Even when the head was successfully snared with the polycarbonate cone, the seals would react by sharply bending their heads downward rather than exerting pressure on the positioning net. As a result, these prototype devices were not effective. The transfixation device attached to the head of one of the pneumatic prototypes did not hold the attention of the seals.

Use of the bipolar electrocution device encountered similar but somewhat less positioning difficulties. When suitably placed, however, the device with 1250 volts applied was observed to stun the seals for periods of 1-1/2 to 2-1/2 minutes, although considerable quivering and head movement was noted during the recovery. The difficulty in properly positioning the device was compounded by the excessive flexibility of the polycarbonate tube. Everything considered, the difficulty in placement for both concepts was not consistent with efficient mass harvesting, and indicates that the concept of placing a device over the seal's head is not practical.

An attempt was made to overcome some of the positioning difficulties encountered with the electrocution device by modifying the bipolar prototype to work as a monopolar system using the earth as an electrical return. This modified approach can be seen in use in Figure 18. As expected, the application of the monopolar electrode to the seal is considerably easier, but because the device was not designed to optimally operate in the monopolar mode, the stunning period was significantly reduced. The stunning period was also shortened because the current flow could not easily be concentrated in the cranial region. Nevertheless, stunning for periods of up to 30 seconds was induced with this system. It is felt that modification of these devices could provide a more effective system, but it is unlikely that they would be an improvement over the hardwood bat. Several ideas along these lines are discussed in the Recommendations for Future Research section.

SUMMARY AND CONCLUSIONS

Three primary objectives were addressed during this research program. The first of these objectives was to evaluate a variety of concepts having potential as an improved fur seal slaughtering technique. In order to perform the evaluation more objectively, a comprehensive criteria list was developed so that a point-by-point scrutiny could be applied to each concept. The criteria list contains twelve entries, and it should be

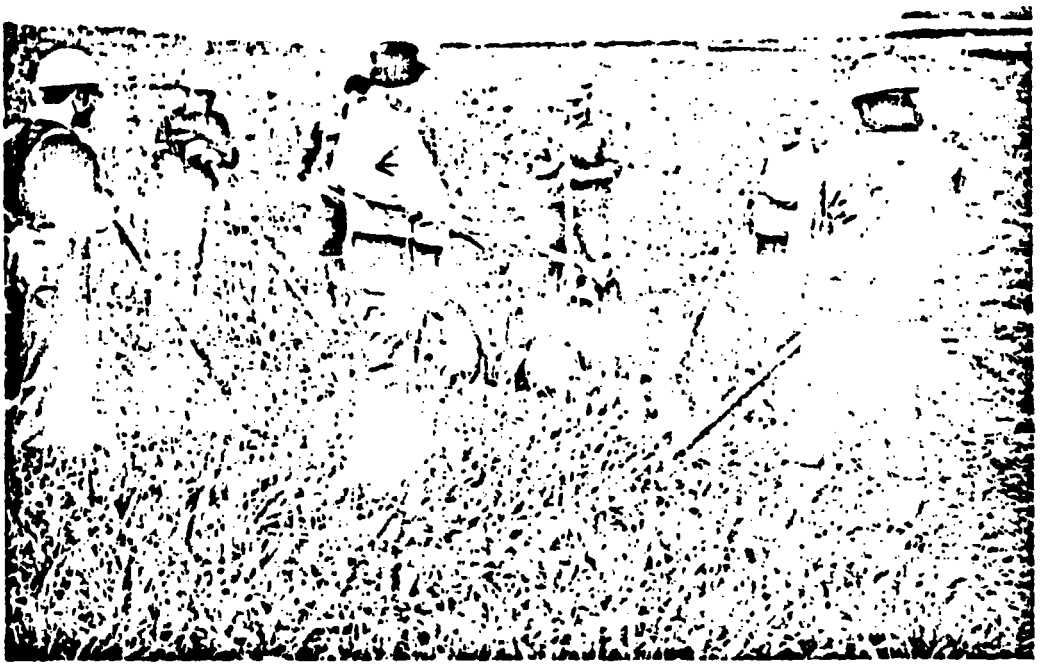


FIGURE 18. PHOTOGRAPH OF FIELD APPLICATION OF MONOPOLAR ELECTROCUTION DEVICE

emphasized that full appreciation of the rationale behind each can only be obtained by intimate acquaintance (preferably resulting from on-site observation) with the currently employed harvesting and processing techniques.

The criteria list was used to evaluate eleven alternative slaughtering techniques. Many of the concepts could employ several variations and/or agents, and an attempt was made to consider a reasonable number of these variations. Varying depths of discussion are presented for each of the concepts depending on their relative feasibility and possible variations.

The second objective of the program was to develop one or more prototype devices which offered promise as an alternative slaughtering technique. Our initial concept scrutiny indicated that a mechanized impaction device had merit. Accordingly, two basic approaches (compressive band, and impaction head) were designed and fabricated. Two models of each approach were constructed yielding a total of four pneumatic devices for field evaluation. In addition to the pneumatic devices, we designed and fabricated one model of an electrocution device, which used a bipolar electrode configuration capable of applying high voltages transcranially for stunning.

The final objective of this program involved field evaluation of the prototype devices under actual harvest conditions on St. Paul Island, Alaska. Each of the five prototype models (four pneumatic, one electrical) were evaluated in various configurations during this phase of the program.

The prototypes evaluated during the program cannot be considered suitable alternatives for the club. Further, our extensive analysis of the problem has failed to identify any concepts which could be judged to equally or better meet our criteria than the club. The club offers many advantages for use in the current harvest scenario even though it is rated low from an aesthetic viewpoint. We have identified only a few concepts which merit further investigation, and these ideas are presented in the"Recommendations for Future Research" section of this report. Objective consideration of the pros and cons of the possibilities presented shows that the clubbing technique remains the best available. Nevertheless, any proposed concept deserves objective consideration and frank application of each item of the criteria list.

RECOMMENDATIONS FOR FUTURE RESEARCH

The results of our research efforts indicated that two specific avenues of research would represent possible next steps in the development of improved fur seal slaughtering techniques. These are in order of priority

(1) Design of a "super club".

(2) Further research on an improved electrocution device.

Proposed research programs and probable outcomes in each of these areas are discussed in some detail below.

Design of a "Super Club"

In the final analysis, the club emerges as the best technique for stunning fur seals on a mass harvest basis. It is a safe, reliable, rapid, and effective technique. The club suffers in two respects: aesthetics and inaccurate blows. A reduction in the number of inaccurate blows should help improve the aesthetics. Accordingly, it is recommended that a serious analysis of the clubbing approach be undertaken to determine desirable qualities for fabrication of a "super club". It is felt that a properly designed club could improve the accuracy of the blows by offering a more maneuverable and less fatiguing device.

The "super club", which would be designed, fabricated, and field evaluated by Aleut clubbers, would be lightweight, rugged, and properly balanced for optimum impact delivery. It is felt that a greater portion of the club's weight should be concentrated near the impact area with an overall reduction in weight. This design would allow higher club velocity at impact and result in more efficient stunning. The analysis which leads to greater emphasis on velocity than mass is that kinetic energy (KE) is related to velocity (v) and mass (m) by the following equation:

$$KE = 1/2\ mv^2.$$

Since kinetic energy increases as the square of the velocity, it is of greater importance than mass in producing energy to be imparted to the seal's skull.

A composite material such as epoxy and fiber glass would be used to fabricate the super club. It is further envisioned that the prototype could be made field adjustable to obtain clubber feedback as to the best "feeling", weight, and balance. We feel this is the highest priority area for continued research because of the demonstrated effectiveness of the club.

Improved Electrocution Device

Our work with a prototype electrocution device employing high voltage indicated that the fur seal can be stunned by suitable application of electrical current to the cranial region. The use of a bipolar electrode system is considered best from both "ability to stun", and personnel safety standpoints. The personnel safety aspects of an electrocution device are, as was previously discussed, of great concern. Every caution must be taken in both the design and use of such a device to minimize the risks involved.

The concept of placing a bipolar electrode configuration over the head of a seal was shown to be impractical for mass slaughtering in our experiments. Therefore, we propose a completely portable bipolar electrocution system employing a coaxial electrode configuration which need only contact the seal's head and not encircle it. This approach should enhance the possibility of proper application. The overall concept is best understood by referring to the conceptual drawing in Figure 19. The device recommended for fabrication and evaluation would consist of a 6-foot plastic pole with a telescopic bipolar electrode on one end. An 8-foot electrical cable would connect the plastic pole to the portable wheel containing a rechargeable battery, and d-c to a-c inverter. It is envisioned that the system would be portable enough to allow the ease of movement required for effective operation. As shown in Figure 19, the electrocution pole will be hand held. Three electrical interlock switches would be incorporated in the pole. One switch would be activated when the outer coaxial electrode is depressed by contact with the seal. The other two switches would be manually activated by the operator. A double insulation grounded electrical system will insure reasonably safe operation by unskilled operators.

The bipolar coaxial electrode configuration on the distal end of the pole would consist of an electrically grounded and interlocked outer sleeve. The inner coaxial electrode would be activated only when the outer electrode is depressed and both hand switches are simultaneously closed. The actual electrocution would be accomplished by thrusting the end of the pole into contact with the seals' heads.

This program would represent what we feel is a logical improvement of our electrical prototype, but even if it functioned well, the technique would compromise many of the criteria and would not be better than the club.

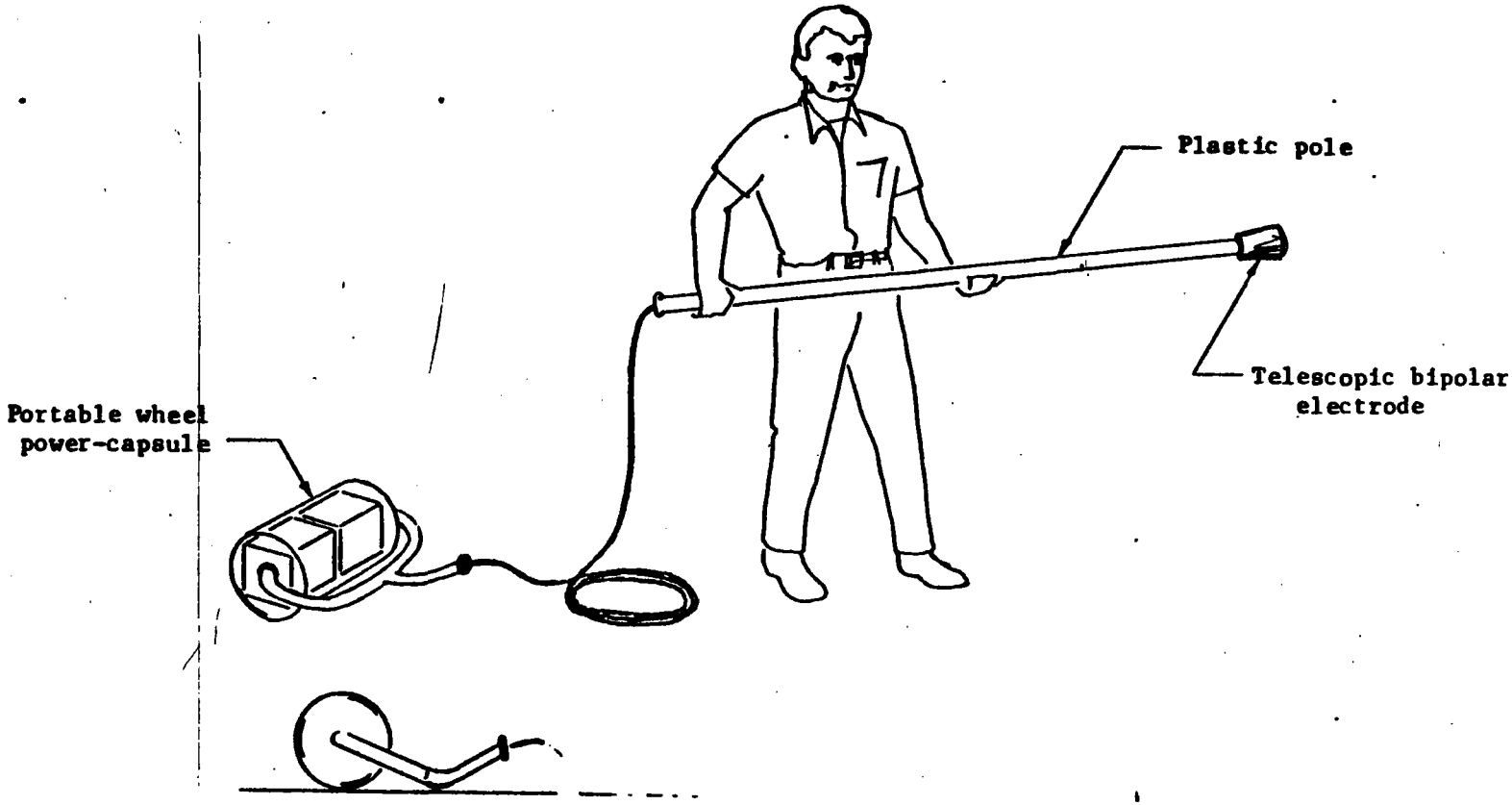


FIGURE 19. CONCEPTUAL DRAWING OF PROPOSED ELECTROCUTION DEVICE

REFERENCES

(1) Baker, R. C., Wilke, F., and Baltzo, C. H., The Northern Fur Seal, Department of the Interior Circular 336, April, 1970.

(2) Denney, R. N., The Annual Northern Fur Seal Harvest, St. Paul Island of the Pribilofs, Alaska, July 6-14, 1971. American Humane Association Report to the Secretary, U. S. Department of Commerce, 1971.

(3) Elden, C. A., Keyes, M. C., and Marshall, C. E., "Pineal Body of the Northern Fur Seal (Callorhinus ursinus): A Model for Studying Probable Function of the Mammalian Pineal Body", Am. J. of Vet. Res. 32(4): 639-647, 1971.

(4) Geraci, J. R., and Keyes, M. C., "Veterinary Medicine in Conservation and Management of Marine Mammal Resources", J.A.V.M.A. 157(11): 1970-1974, 1970.

(5) Hamlin, R. L., Ginaven, S. M., and Smith, C. R. "Fentonyl Citrate-Draperidal and Pentabarbital for Intravenous Anesthesia in Dogs", J.A.V.M.A. 152(4): 360-363, 1968.

(6) Harthoorn, A. M., "Application of Pharmacological and Physiological Principles in Restraint of Wild Animals" Wild Life Monographs, 14:1-78, 1965.

(7) Keyes, M. C., "Pathology of the Northern Fur Seal (Callorhinus ursinus)" J.A.V.M.A. 147 (10): 1090-1095, 1965.

(8) Keyes, M. C. "Immobilization, Tranquilizing, and Anesthetizing Drugs used on Fur Seals (Callorhinus ursinus)," Proceedings of the Third Annual Conference on Biological Sonar and Diving Mammals, 74-79, 1966.

(9) Peterson, R. S., "Drugs for Handling Fur Seals", J. of Wildlife Management 29(4): 688-693, 1965.

(10) Preliminary Report on Contract No. 14-17-0001-2234, Virginia Mason Research Center, Seattle, Washington, 1971.

(11) Preliminary Report of the Veterinary Panel Evaluating Humaneness of the Northern Fur Seal Harvest in the Pribilof Islands, 1971.

(12) Report of the Task Force to Study Alternate Methods of Harvesting Fur Seals, 1968.

(13) Roppel, A. Y. and Davey, S. P., "Evaluation of Fur Seal Management on the Pribilof Islands, J. of Wildlife Management 29:448-463, 1965.

(14) Simpson, Elizabeth, Report on Sealing on the Pribilof Islands. World Federation for the Protection of Animals, Zurich, Switzerland, 1967.

(15) Wallach, J. D., "Etorphine (M-99) A New Analgesic-Immobilizing Agent and its Antagonists", Veterinary Medicine Small Animal Clinician, January 1969, pp 53-58.

APPENDIX XV

Government of Canada / Gouvernement du Canada
Fisheries and Oceans / Pêches et Océans

information

HUMANE ASPECTS OF THE HARP SEAL HUNT

The death of any living creature cannot be made visually or aesthetically appealing and this fact has been exploited by groups with a vested interest in creating controversy and antipathy about the seal hunt.

Humane Killing

Given that an animal is to be killed, the prime objective of responsible humane organizations and the government regulatory bodies which control the operation, is to ensure that the method of killing is humane and effective. A humane death, whether for the seal or the other domestic and wild animals which our society uses, is defined as one which brings a rapid, efficient death to the animal with the absence or absolute minimum of physical pain or psychological distress.

Methods of Research

Historically, northern fur seals on the Pribilof Islands of the United States, as well as the harp seals off the Canadian Atlantic coast have been harvested by manual stunning (by a sharp blow to the head with a club) followed immediately by exsanguination (bleeding-out). As the skull bones of seals are thin and fragile the minimum effect which the clubbing technique

produces is a deep irreversible unconsciousness, instantaneously rendering the animal insensitive to pain. In the majority of cases, the cranium is entirely crushed, inflicting a swift neurological death. Stunning and exsanguination is the standard humane method of killing used in the majority of the developed world's abattoirs.

Considerable research has been conducted on the humaneness of alternate techniques for humane killing of seals. Between 1969 and 1972 the United States Government commissioned a number of scientific groups and humane organizations to investigate alternate methods of killing seals. These groups included representatives from the U.S. Department of Agriculture and other government bureaus, the American Academy of Sciences, the Humane Society of the United States, the Virginia Mason Research Centre, Washington, the Panel of Euthanasia of the American Veterinary Medical Association and the Battelle Columbus Laboratories, Ohio. A large variety of known methods were examined and additional mechanical prototypes for the humane killing of seals were developed. The methods investigated included electrocution, captive bolt pistols, gun shot, carbon dioxide and nitrogen asphyxiation, succinylcholine drug paralysis, acoustical shock, gas chamber techniques, decapitation, gaseous anaesthetics, pneumatic compression and impaction techniques, injectable drugs, thermal neurological destruction, ultrasonic and laser systems. These studies concluded that none of the more mechanical techniques was as adaptable to the harvest or more humane than the simple stunning and exsanguination technique. Further, gas hypoxia techniques and drug paralysis were found to have taken five to eight times longer to dispatch animals than the stunning and exsanguination method.

The clauses respecting humane killing in the Canadian Seal Protection Regulations are more stringent than the regulations governing the humane slaughter of domestic animals in either the United States or Canada. The clubbing/exsanguination technique is used countless times yearly in North American abattoirs to provide the food and hide products demanded by our society which are also the primary products of the harp seal harvest.

Considerable misinformation has been distributed regarding the humane aspects of the northwest Atlantic harp seal hunt. These statements have produced common misconceptions, for example, that the harp seal dam bereaves the loss of its pup as do dogs or domestic cattle during the first week of the young animal's life. Veterinary and scientific observers have concluded that dam-pup relationships in the seal are predominantly hormonal in nature and cease rapidly with either the weaning or loss of the pup. Most females have weaned their pups by the commencement date of the hunt, and with few exceptions, those that have not done so, leave upon the approach of the sealers and do not return to the whelping site.

Observers

The objective of humaneness has received Canadian government attention at the seal hunt since 1955, and considerable research by veterinarians, veterinary pathologists, biologists and humane organization observers has been directed towards the aspect of humane killing since that time. A review of reports from these scientists and observers at the seal hunt from 1964 to 1980 has resulted in a lack of substantiated reports indicating cruel or inhumane methods of killing seals. As early as 1969, an observer from the Canadian Federation of Humane Societies, Dr. K. Ronald, concluded that

there was a fantastically high incidence of humane killing (99.82 per cent) associated with the seal hunt. The extensive postmortem investigations of veterinary pathologists in 1971, 1975, and 1977 at the northwest Atlantic harp seal hunt have further confirmed the humaneness of the clubbing/exsanguination technique for the killing of harp seals.

Numerous organizations concerned with the humane treatment of animals have sent observers to the seal hunt, including the Canadian Federation of Humane Societies, the Society for the Prevention of Cruelty to Animals, the International Society for the Protection of Animals, the Ontario Humane Society, the Canadian Audubon Society, the Frankfurt Zoological Society, the Humane Society of the United States, and the Universities Federation for Animal Welfare. Their reports are publicly available.

The Canadian and Norwegian Atlantic sealing operations have been considered predominately humane for more than two decades, and with the refinement of techniques and the training of sealers in humane killing, observers from responsible humane organizations and veterinary pathologists have unequivocally stated that the whitecoat hunt is conducted in a humane manner.

INFORMATION leaflets are issued by the Department of Fisheries and Oceans to describe and explain departmental policies, programs and activities.

Published by:

Communications Branch
Department of Fisheries and Oceans
Ottawa, Ontario K1A 0E6

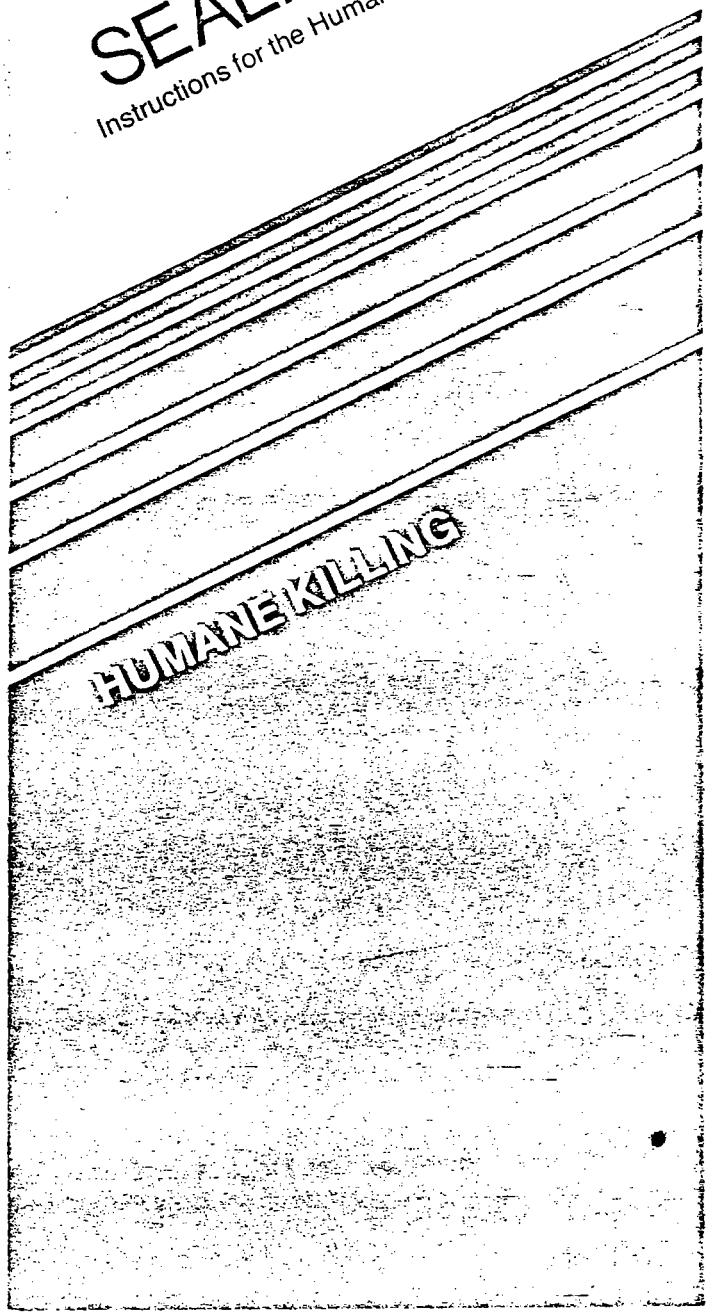
I-HQ-81-03E

Government of Canada
Fisheries and Oceans

Gouvernement du Canada
Pêches et Océans

SEALING

Instructions for the Humane Killing of Seals



Introduction

Sealing as a legitimate industry must be conducted in a professional manner as are our other fisheries. While the majority of our fishermen are well versed in proper killing methods, the following instructions are provided to ensure that seals are killed in the most humane and efficient manner possible.

Killing Methods

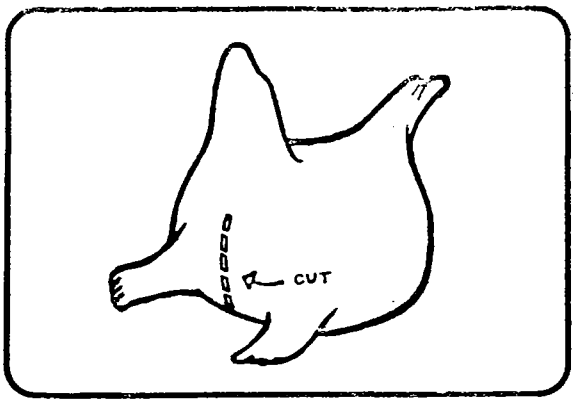
The seal's brain, located in its skull, is responsible for the sensation of pain. Therefore, this pain terminal should be destroyed as quickly as possible. Using the regulation club or hakapik, this can be done by striking the top of the animal's head three times or until the skull is crushed; using the regulation fire-arm, a bullet through the brain will also render the animal immediately unconscious so that it cannot feel any pain. In either case, the aim is to produce instantaneous unconsciousness.

Test for Unconsciousness

Never, ever attempt to skin a seal until you are sure it is irreversibly unconscious. This can and must be done by the simple procedure of touching the animal's eye. If the seal blinks, some reflexes remain and it must be struck again and the skull crushed in order to ensure brain death.

Bleeding

You **must** make sure that the blinking reflex has disappeared and the eye is glazed and staring, before attempting to skin a seal. As soon as you are sure the blinking reflex is gone, turn the seal over and bleed it by cutting the main blood vessels to the front flippers. When the animal is bled, complete the even cut from the lower jaw to the tail, and commence sculping.



"Swimming" Reflex

Some seals, even after the blinking response is gone, may move with a "swimming" motion. This is a spinal reflex action which is not produced by the brain and will quickly stop. If such movements occur, immediately recheck the blinking response of the eye. If it is gone, wait for the "swimming" movement to stop before proceeding with the sculping.

Humane Slaughter

Remember, sealing is similar to the slaughter house operation for our meat producing animals, and the production of rapid unconsciousness is the objective of humane slaughter procedures in both cases. Make sure the blinking response in the eye is gone then proceed to bleed and then skin the animal. You will produce a quality pelt which will give you the best price and you will ensure your critics — and yourself — that the most humane death has been produced. Remember, the most important factor in humane slaughter is the man doing the job. A crushed skull is the proof that the job was done correctly.

Further information available from:

Director-General
Newfoundland Region
Department of Fisheries and Oceans
P.O. Box 5667
St. John's, Newfoundland
A1C 5X1

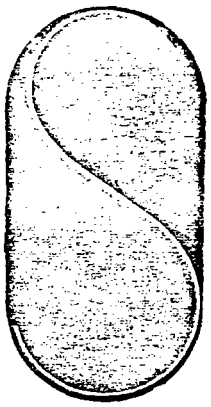
Director-General
Maritimes Region
Department of Fisheries and Oceans
P.O. Box 550
Halifax, Nova Scotia
B3J 2S7

Director-General
Quebec Region
Department of Fisheries and Oceans
901 Cap Diamant
P.O. Box 15,500
Quebec City, Quebec
G1K 7Y7

Published by Information Branch in collaboration with Fisheries Research Branch and the Newfoundland, Maritimes and Quebec Regions, Department of Fisheries and Oceans.

Pub. 80/001E

APPENDIX XVI



The Advisory Committee On Seals and Sealing

Progress Report

1971-1978

CONTENTS

THE ADVISORY COMMITTEE ON SEALS & SEALING
Appointed by the Minister of State for Fisheries, Canada

COMMITTEE MEMBERS

Chairman:	Prof. Keith Ronald, Dean College of Biological Science, University of Guelph
Secretary:	Mr. T.I. Hughes, Executive Vice-President of the Ontario Humane Society
	Mr. Trevor H. Scott, Executive Director, International Society for the Protection of Animals
	Mr. Kjell Henriksen, President Canadian Saltfish Corporation
	Prof. H.D. Fisher, Department of Zoology, University of British Columbia
	Dr. H.C. Rowsell, Executive Secretary, Canadian Council on Animal Care

FOREWORD

Between 1964 and 1971 when the Committee on Seals and Sealing was appointed, a great deal of work to protect seals against cruelty had been accomplished by the organized humane movement of Canada and, in particular, the Canadian Federation of Humane Societies, the Ontario Humane Society, and the International Society for the Protection of Animals.

The Federal "Seal Protection Regulations" were largely based on recommendations from representatives of humane societies. Based on tests carried on in the Gulf of St. Lawrence, the regulations prescribed the type of weapon to be used to kill seals and laid down minimum calibre and velocity for guns and the size and weight of clubs.

During those years the enforcement of the seal protection regulations was stepped up. As a conservation measure and/or means of preventing ill-trained or inexperienced persons from killing seals, the use of aircraft and helicopters both to locate and find seals and to transport sealers to the ice and pelts back to the shore and the ships, were prohibited.

Some specific protection for seals obtained prior to 1971 included:

1. The licencing of individual sealers.
2. The visual identification of sealers by numbered patches.
3. The prohibition of stock piling of pelts on the ice which resulted in large numbers of pelts being lost and as a result the animals' lives wasted.
4. The prohibition of hunting during the night which led to bad, sloppy, killing of animals and therefore unnecessary suffering.
5. The total protection of hood seals in the Gulf of St. Lawrence.
6. The prohibition of any interference or harassment of any adult seals in any way.
7. The requirement to kill seals humanely, and the provision that the seals must be "without doubt" dead before skinning commences.
8. The introduction of a quota system to control the total catch. Previously the size and extent of the kill was unrestricted and included all ages of seal.

The 'observers' at the 1971 seal hunt recognized that a more official channel to the Minister of Fisheries was needed if the recommendations of observers were to be quickly and efficiently formulated and communicated to the Minister without delay and with the maximum impact.

A delegation consisting of Mr. A. MacLaurin, President, Canadian Federation of Humane Societies, Professor K. Ronald, University of Guelph, Mr. T.I. Hughes, Executive Vice-President Ontario Humane Society, Mr. Trevor Scott, Executive Director, London, and Mr. John Walsh, Field Officer, Boston, representing the International Society for the Protection of Animals, met with the Federal Minister of Fisheries and Forestry, the Honourable Jack Davis, in the Minister's office in Ottawa on March 23, 1971.

As a result of the discussion the Minister requested the delegation to prepare a recommendation to establish a special committee which would advise him on seals and to outline the composition and terms of reference of the committee.

Acting on this request the delegation met in the Department of Fisheries offices later the same day and prepared the following recommendations:

Name of Committee: Special Advisory Committee to the Minister of Fisheries and Forestry on Seals.

Composition of the Committee:

Chairman: Professor K. Ronald, Department of Zoology, University of Guelph

1 representative from the Canadian Federation of Humane Societies

- Mr. T.I. Hughes, who would also act as secretary to the Committee.

1 representative from the International Society for the Protection of Animals

- Mr. T. Scott or his delegate.

4 representatives of the Department of Fisheries

- 2 from the Conservation and Protection Branch, 1 Statistics - Dr. Smith and 1 from the Arctic Biological Station - Dr. Mansfield.

1 representative of the Canadian Council of Animal Care

- Dr. H. Rowsell.

1 representative from industry - Mr. Kjell Henriksen

Professor H.D. Fisher, Department of Zoology, U.B.C.

TERMS OF REFERENCE

To investigate all aspects of the hunting of seals in the Northwest Atlantic and Arctic oceans and, in particular, to investigate the economic, sociological, ecological, and humanitarian aspects of the seal hunt and to recommend to the Minister of Fisheries and Forestry any changes in the present regulations which may be considered necessary.

Specific Objectives

a) Immediate: to recommend changes in quotas and seal hunting regulations for consideration by the Minister before the 1972 seal hunting; i.e. before June ICNAF meeting.

b) Long range: To observe various phases of seal hunting, both in the Gulf, Front, and other areas. To accurately evaluate the size and composition of the seal herd using such methods as may be considered necessary and desirable to produce accurate statistics. To examine the present method of gathering statistics and to recommend new systems if necessary. To study methods to take and kill seals in all regions by Canadians, Norwegians, and Danes (Greenland). In the case of the Canadian fishery, to recommend changes in these methods if considered necessary.

Organization

The Committee should be provided with secretarial assistance, the means to observe any phase of seal hunting in any region of the Northwest Atlantic and Arctic where seals are killed. The Committee should be compensated for any travelling expenses incurred and in accordance with normal practices of the Department for similar non-governmental advisory committees.

The Committee has concerned itself primarily with the following seals:

Harbour Seal, Phoca vitulina

Grey Seal, Halichoerus grypus

Harp Seal, Pagophilus groenlandicus

Hooded Seal, Cystophora cristata

However, the Committee's terms of reference extend to other seals and if necessary, the Committee would address itself to any problems which might develop from the hunting of these seals.

The Committee approached the problem in three basic areas: (a) ecological; (b) humanitarian; (c) economical.

ECOLOGICAL

The Committee has given considerable attention to the problem of obtaining more complete and reliable information on the size and composition of the harp seal herd in the North West Atlantic.

Supported by funds provided by the Government of Canada, the Committee has carried out extensive research projects including developing and implementing an aerial survey technique using ultra-violet photography. The result of this form of aerial census has produced valuable information.

In addition, the Committee has encouraged and supported, with funds provided by the Government of Canada, behavioural research designed to produce more information on the mother/pup relationship and other behavioural aspects of a unique marine mammal about which there is not enough information available at present.

In addition, the Committee has sponsored a research project designed to determine whether or not the North West Atlantic harp seal is divided into two distinct herds; (1) Gulf; (2) the Front. This information is important to enable the herd to be properly managed.

The Committee has developed extensive population models using the best expertise available and this work has stimulated interest in the population models on the part of government scientific personnel. The result is that present quotas are based on more reliable models than were previously available.

The Committee has recommended, and the Government has accepted and introduced, greatly extended tagging operations of harp seals which will further add to the validity of the population models.

....Continued

The Committee's concern that the harp seal is being overhunted was communicated to the Minister of Fisheries and to the International Commission for North Atlantic Fisheries in such a way that the early quotas were extensively cut and the quota on harp seals has been kept at a conservative level ever since.

In addition, The Minister of Fisheries decided to prevent large sealing vessels from entering the Gulf of St. Lawrence as one way of satisfying the concern expressed by the Committee.

Landsmen who were previously not subject to quota (an estimated "allowance" was used for modelling and quota purposes) have been brought under the total quota and, as a result, the quota now in force covers every aspect of sealing. In addition, regional or sub-quotas have been introduced which make it possible for the management of the harp seal to be more efficient.

More research work is necessary, particularly in the field of behaviour. This work will continue under the direct funding of the Federal Department of Fisheries.

Future aerial surveys may be carried out if considered necessary. These too will be carried out in future directly by the Federal Department of Fisheries utilizing the expertise of the personnel of the Committee on Seals & Sealing and the personnel from the University of Guelph who were involved in the original development of the technique.

The Committee has expressed its concern that the hood seal is being overhunted and has recommended either a moratorium on the hunting of hoods or, if this is not possible for political or economic reasons, that the number of female hoods killed be drastically reduced down to zero kill. This was achieved by stipulating that the maximum female kill be 10% of the total. This figure has now been reduced first to 7½% and now to 5%.

....Continued

The Committee's objective remains a zero kill of females.

The Committee has supported research to develop a means of restraining hood seals in order that they may be more extensively tagged. Useful information has been provided by this work.

GREY SEALS

The Committee has expressed concern for the state of the grey seal and, in particular, the colony which lives on Sable Island. The Committee became aware of the proposal to carry out a one hundred percent cull on grey seals on Sable Island.

The Committee recommended and the hunters agreed the seals on Sable Island should not be culled until such time as more complete and reliable information was available to indicate why a cull is necessary.

HUMANITARIAN

The prime objective of the Committee was to satisfy itself that seals are killed humanely. For the purpose of defining humane, the definition used in slaughter houses, animal shelters, etc. as developed by the Canadian Federation of Humane Societies was used.

The definition is:

> "A humane death is that in which the animal suffers neither panic nor pain. In practice, this may be achieved by instantaneous death of immediately rendering the animal unconscious with early and inevitable subsidence into death without the regaining of consciousness."

A considerable amount of work had already been done prior to the formation of the Committee by representatives of the humane movement in Canada to test all existing forms of guns, including special slaughter house guns.

....Continued

These tests led to recommendations which resulted in the Minister of Fisheries regulating the killing of seals and requiring that all seals be killed and that they be dead "beyond doubt" before skinning commenced. The regulations prescribed the calibre and velocity of guns to be used to kill seals and the length, dimensions and weight of a club. Previous tests had indicated that existing rifles, shotguns and special guns were inhumane, impractical or unsafe to be used to kill whitecoat seal pups on ice and that the most humane weapon at that time was the club, providing the specifications were complied with.

The Committee again re-assessed the methods used to kill seals and arranged for extensive pathological tests to be carried out to determine the effect on seal pups of the method then in use, i.e. the club.

In addition, the Committee authorized the investigation into a mechanical method which would provide an alternative to the club.

Since much of the danger of careless, or possibly inhumane, killing resulted (and still results) from the way sealing is carried on, the Committee addressed itself to thatproblem, and recommended a number of changes to the regulations designed to discourage the practices which could lead to inhumane killing.

In particular, the Committee recommended, and the Government accepted, the use of the "watch" system in which a number of individual sealers work as a team under the control of a senior or "master" sealer. This person, with the most to lose, is made responsible for the actions of his team.

Extensive education work has been carried on by government, on the recommendation of the Committee, to train sealers to understand the requirements of humane slaughter and the importance of meeting those requirements. In addition, extensive training of Fishery Officers has been carried out also as a result of the Committee's recommendations. This training is designed to ensure that Fishery Officers are skilled in recognizing evidence of

....Continued

inhumane slaughtering or breach of regulations. As a result of the criticism of sealing a number of sealers' organizations have come into existence and the opportunity has been taken to educate sealers through these associations to understand, accept, and comply with the "Seal Protection Regulations".

Certain practices that have been commonly followed were recognized as being potentially dangerous to the animals and recommendations have been made to eliminate or alter these practices. For example, the recovery of seals that have been shot in the water has been changed to require that these animals be killed by being struck by the hakapik to ensure that the animal is, in fact, dead before being recovered to a vessel.

The shooting of seals during the twilight hours of dusk and dawn has been abolished. Shooting is now restricted to full daylight hours.

Extensive tests have indicated that, although repulsive in appearance, the hakapik produces a more consistent level of humane death when used by experienced personnel than does the club. A form of hakapik adapted from the Norwegian model has been recommended to the Government and the regulations have been amended to require that this is the only method that can be used (other than the rifle) to kill seals on the Front.

The use of shotguns to kill seals by sealers operating from small boats off the Newfoundland coast has been of concern to the Committee and a recommendation has been made that the use of shotguns be prohibited and that the carrying of shotguns in small boats also be prohibited. Although this recommendation has not yet been accepted, the Minister has recognized the area of concern and has suggested that the objective could be achieved by increased implementation of existing regulations which restrict the use of shotguns to polycor or slugs.

The Committee is concerned with the degree of enforcement of the "Seal Protection Regulations:. The Committee has made recommendations to reduce the interference with the seal hunt by various groups which would have the

....Continued

effect of diminishing the ability of the Fishery Officers to carry out their responsibility of enforcing the regulations.

Because of the criticism of the present method of killing seals and the question of whether or not the method is humane, the Committee has arranged for extensive pathological testing to be carried out to determine whether or not the whitecoat harp seal pup is either killed immediately or rendered unconscious, followed by death from exsanguination in such a way that it does not suffer, by one or more blows of the regulation club.

The Committee recognizes that the killing of whitecoat pups by the club is visually and esthetically unpleasant but recognizes the danger that the natural revulsion to this form of killing may make it difficult for the general public to accept the fact that this form of killing is humane in the generally accepted meaning of "euthanasia".

The Committee is particularly concerned with the danger that seals may suffer in the process of being caught in set nets. The Committee has had some difficulty in developing satisfactory research into this technique. It is hoped that the necessary research will be carried out in the 1979/80 season.

ECONOMICAL

The Committee on Seals & Sealing does not pretend to be expert in the field of economics although individual members of the Committee have a wide experience in the economics of fisheries, including sealing. However, the Committee, from its inception, recognized the importance of gathering information on the economics of seal hunting so that the Committee could be better informed and this information could be passed on to the general public.

The Committee held a series of public meetings across Canada to gather information and invived to those meetings representatives of the sealing

....Continued

industry, but the Committee felt that the information it received in this way was inadequate and that more information was required before any assessment could be made of the economic necessity of sealing.

The Committee recommended to the Federal Government that the Government itself carry out an in-depth economic study of the sealing industry, both in Canada and offshore. This recommendation was accepted and a study carried out which resulted in the Government publishing a paper on the economics of seal hunting. The survey is now being updated and, very shortly, a new version of the study will be published by the Government.

In the meantime, the existing study provides valuable information on the importance of the seal hunt to those regions of Canada, i.e. Newfoundland and Quebec, where seal hunting is carried on.

The Committee has recommended that steps be taken by the Federal and Provincial Governments concerned to encourage the development of secondary treatment plants and a cottage industry which would allow those regions of Canada now involved in seal hunting to enjoy the maximum profits from this trade.

GENERAL

The Committee is satisfied that the results gained by the Committee since its inception clearly indicate the value of the Committee. The continuing need for supervision, surveillance and the availability of independent, expert advise for the Minister of Fisheries indicate, beyond all doubt, that the Committee's continuance is of vital importance to the humanitarian and ecological aspects of seal hunting.

Although a great deal of protection for seals has been obtained, much remains to be done and the Committee on Seals & Sealing can play a vital role in obtaining these objectives.

....Continued

The activities of some protest groups, particularly foreign groups, has re-emphasized the need for responsible, reliable and informed representations on this highly controversial and complex subject. The Advisory Committee on Seals & Sealing, which has the support of the Canadian Federation of Humane Societies, representing the major humane societies in Canada and the International Society for the Protection of Animals, provides a unique opportunity for this advice to be made available to the Government of Canada.

The Committee has made a number of recommendations, many have been accepted.

For the detailed recommendations of the Committee on Seals & Sealing since 1972 together with the reaction of the Minister of Fisheries to those recommendations, please consult the following pages.

1972

INTERIM REPORT TO THE MINISTER OF ENVIRONMENT
FROM THE COMMITTEE ON SEALS & SEALING

RECOMMENDATIONS

COSS recommendation #1 - NOT APPROVED

A moratorium should be placed on the hunting of harp seals except for those aboriginals (Canadian Arctic and Greenland) presently engaged in hunting the species. The moratorium should not be lifted until scientific evidence indicates the species would not be endangered by resumption of the sealing industry. Because of the seal's life cycle any moratorium should last a minimum of 6 years.

The moratorium should be carried out in the following manner:

1972 - 10,000 all ages, aboriginal (Canada and Greenland)

- 120,000 pups, vessels
- 30,000 majority pups, landsmen

1973 - 10,000 all ages, aboriginal

- 80,000 pups, vessels
- 30,000 majority pups, landsmen

1974 - 10,000 all ages, aboriginal

- 40,000 pups, vessels
- 30,000 majority pups, landsmen

1974 - and for at least six years

- 10,000 all ages, aboriginal

COSS recommendation #2 - APPROVED AND IMPLEMENTED

A research programme be instituted immediately in the following order of priorities:

a) A study of economic replacement for losses incurred by those presently involved in the sealing industry in Canada. This should include consideration of the development of alternative industries for those affected by the abolition of the seal hunt. The government might well consider some limited form of payment so as to allow landsmen and vessel owners the phase out of sealing.

b) Extensive expansion of the investigation of the biology, behaviour and population dynamics of harp and other species of seals in Canada.

c) If future killing is to be carried out, the seal herd should be managed under government auspices with strict regulation of personnel involved, methods of sealing and international agreement, in order to prevent

....Continued

over exploitation of this natural resource. Sealers should receive a thorough training in killing methods before they are allowed to resume the hunt.

d) Studies for the development of improved methods of killing both the adult and young seal.

COSS recommendation #3 - APPROVED AND IMPLEMENTED

Canada should not permit exploitation, by its nationals, of other species of marine mammals as a substitute for the harp or hood seals. This restriction should apply to all waters, especially those of Antarctica.

Examples: abolition of a bounty on the harbour seal and the prohibition of sport hunting of whales.

COSS recommendation #4 - APPROVED, RECOMMEND TO ICNAF, ACCEPTED BY ICNAF

This Committee has placed major emphasis on the harp seal and the Committee recommends that research be carried out on the hood seal, Cystophora cristata, similar to that proposed on the harp seal. The hood seal appears at present to be over exploited; however, since insufficient scientific evidence is available to determine the sustained yield, we recommend that Canada imposes to ICNAF a strict quota on the species, until such time that scientific data become available to determine the annual sustainable yield.

Reply from Minister, The Honourable Jack Davis

"I'm impressed by the quality of the report and quite certain the Government will be following it up with effective action of its own.

In anticipation of the report I have already banned the taking of seals in the Gulf of St. Lawrence in 1972. This ban relates to aircraft and the operations of the big vessel commercial sealing fleet.

This fits in 100% with the recommendations of the report.

Landsmen will be able to take seals as in the past, their historic catch being small as compared to that of the commercial fleet.

However, I am giving consideration to establishing sub-quotas and closing dates for the various areas in which the landsmen operate, and will limit the number of small longline vessels taking seals in 1972 to those which operated last year. I am studying the possibility of restricting entry of landsmen in the seal fishery to those who are experienced in this operation."

COSS RECOMMENDATIONS
AND REPLY FROM THE MINISTER

COSS recommendation: #1 - APPROVED

For 1974 the quota on harp seals taken by Canadian and Norwegians should not be changed.

COSS recommendation: #2 - APPROVED

The Gulf of St. Lawrence should not be opened to large vessel operations for the reasons outlined in a previous letter.

Minister's reply: #1 and #2

As you are aware, quotas for the harp seals in 1974 will remain the same and large vessels will not be operating in the Gulf.

COSS recommendation: #3 - NOT APPROVED

It might be advisable to consider the safety of men as well as the cost of helicopter time when allowing the small and unsuitable vessels into the ice surrounding the Magdalen Islands.

Minister's reply: #3

It would be extremely difficult to control the entry of small boats into the seal hunt. Any regulation prohibiting the use of small boats would mitigate against the viability of the hunt insofar as the landsmen are concerned and would force them to use other methods of reaching the seals which might involve even more risk. Within the confines of operational requirements, the helicopter will assist in search and rescue missions when requested to do so.

COSS recommendation: #4 - APPROVED

There is a potential upsurge in tourism (Swiss, American Playboy advertisement, and Canadian activities). It is felt that this should not be encouraged as it could:

a. upset critical breeding behaviour of herd and interfere with planned research.

b. place tourists in extremely dangerous situations.

Minister's reply: #4

While the subject of sight-seeing tours to the seal breeding grounds has been entertained, it is recognized that safeguards to the seals and the tourists themselves would be of prime concern. Indiscriminate harassment of the seals must be avoided and the safety of individuals would have to be assured before any large scale tourist operation was permitted.

....Continued

COSS recommendation: #5 - WILL CONSIDER

The harp seal quotas for 1975 should be decreased over those for 1973 and 1974. This is based on the new population model which shows that the present hunt is too high whereas a figure of 137,000 pups, 14,000 immatures, 9,000 adults would offer a sustainable yield. (These figures are the same as the number of seals taken in the 1973 hunt.)

Minister's reply: #5

Your recommendation of decreasing the quota for 1975 will be given further study in the light of stock assessments during the coming season. I trust your efforts in conjunction with the Arctic Biological Station will provide more accurate figures in this regard.

COSS recommendation: #6 - PASSED TO CANADA/NORWAY SEALING COMMISSION

We would again request (Interim Report) that consideration be given to the total population of the hood seal on the Front as well as in the Gulf. We would strongly advise you that the Canada/Norway Sealing Commission should be asked to introduce a moratorium on their hunting of hood seals by both Canada and Norway until such time as more information is know of the population dynamics of this species.

Minister's reply: #6

In regard to hood seals, your suggestion to introduce a moratorium on this species until more is known of their population dynamics will be passed to the Canadian representatives of the Canada/Norway Sealing Commission for further study.

COSS RECOMMENDATIONS

TO THE HONORABLE JACK DAVIS, MINISTER OF THE ENVIRONMENT

(No official reply was received by the Committee because of the resignation of Mr. Davis following a defeat in the general election - The Departmental response to COSS recommendations is noted following each recommendation.)

COSS recommendation, #A Adult Seal

It is impossible to define a whelping patch, and pupping, breeding, and mounlting are almost continuous operations. It is impossible to separate male, virgin female, pregnant female, or "spent" female harp seals, hence the killing of adult seals can cause the collapse of the northwest Atlantic herd. The club (bat) is totally inadequate for killing mature seals, but it is the legal weapon of the Gulf sealer. At present, regulations allow the sealers to kill all pups in a whelping patch and as there are no longer pups present, kill the adults as well, again a devastating condition for the herd's future. We recommend therefore that all hunting, in both the Gulf and Front be based on only the young of the year (first 30 days of life).

APPROVED: ADULT SEALS PROTECTED IN WHELPING PATCHES

COSS recommendation, #B Hooded Seal

In that there is no adequate knowledge of the source and numbers of hooded seals, as well as almost total ignorance of the seal's biology and behavior, procedures to protect the species be initiated. We recommend that immediate representation be made to all countries sealing the northwest Atlantic (Front) requesting agreement that a total of 7,500 animals be taken, and consideration be given protecting adults.

REFERRED TO ICNAF FOR CONSIDERATION

COSS recommendation, #C Sealing Methods

The present traditional style of killing harp seals by both terrestrial landsmen (those who walk on the ice) and aquatic landsmen (those who make use of vessels of 65' L.O.A. or less) be discontinued in the Magdalen Islands. The hunt at present is inefficient, uneconomical, dangerous, potentially inhumane, and not in the best interests of either the seals or the sealers. We recommend that if it is considered necessary for the harp seal in the Gulf of St. Lawrence to be managed, in order to maintain the herd at its present size, the landsmen of the Magdalen Islands be engaged by the government in order to carry out an effective humane kill. Experienced sealers should be hired-on annually to act as crew leaders or "captains". These senior personnel might be paid an annual retainer to ensure adequate training of "killers", "skinners", and "handlers". The culling crews should be paid on a bonus system in order to encourage effort, quality of product, and to maintain interest. We further recommend that in order to assist the federal government in disposing of the pelts,

....Continued

that the Quebec government be requested to establish a processing and wholesaling operation in the Magdalen Islands.

NOT APPROVED

COSS recommendation, #D Harp Seal Quota

Based on the best information available it appears that the harp seal herd of the northwest Atlantic may well be over-exploited. The hunt of the last two years has fallen short of the quota. We recommend that no more than 137,000 seals (all pups) be taken in 1975 as this appears to be the most accurate figure for a sustainable yield.

APPROVED: QUOTA REDUCED TO 137,000

COSS recommendation, #E Seal Censusing

The technique devised by the College of Biological Science of the University of Guelph for remote sensing seals has now shown itself to be highly accurate and far superior to any other available method in any country of the world. For the first time we can accurately count seal pups on the ice (the adults are only present on the ice for part of the day and are therefore of no use as indicators of population size, the pup on the other hand, remains on the ice for 2-3 weeks) using special photographic techniques and multispectral sensors. This pilot experiment has shown that the seal herd can be counted and hence managed adequately. There is urgency in obtaining accurate counts immediately on the Front and in the Gulf as cooperation so beneficially obtained from the Canadian Centre for Remote Sensing may be lost after 1975. We recommend that in order to make effective use of the techniques already developed by the University of Guelph that research in 1975 be carried out under the sole direction of C.O.S.S. in cooperation with, and wherever necessary, by officials of your Ministry. Specifically, we would request that a suitably equipped vessel with helicopter support, be made available for use in the ice for a period of 3-4 weeks (approximately February 26 - March 22). This vessel to act as:

i) A platform for the biological and behavioural investigations recommended by C.O.S.S. in its Interim and subsequent reports.

ii) A navigational and communications centre for the aerial multispectral sensing techniques.

iii) Ground truthing for the overflights.

iv) Tagging operations for harp and hooded seal population dynamics.

v) The vessel might also be used for a training ground for sealing crews (either government controlled cullers or the present landsmen).

APPROVED: AERIAL CENSUS COMMENCED IN 1975 SEASON

....Continued

COSS recommendation, #F Killing Instruments

Methods of killing seals should be constantly under development and appraisal. This can best be done under a controlled cull system. To this end C.O.S.S. has made some initial evaluations on all known, and some of its own weapons. We recommend that the hakapik of the Norwegian sealer, be the only instrument legally used by sealers (recommendation B. above banning the killing of adult hooded seals obviates the need for any other weapon for that species).

APPROVED FOR FRONT

COSS recommendation, #G

The C.O.S.S. has always received great cooperation from Ministry of the Environmment personnel, but because of weather, inadequacy of the range of fixed wing and helicopter aircraft in reaching the Front hunt, has been unable to carry out observations of the intensity and duration it felt necessary. We recommend that in 1975 a member of the Committee (Dr. H. Rowsell) be accommodated on one of the Canadian sealing vessels. He should be offered adequate space to set up a small field laboratory for studies of killing techniques as well as pathological studies of injuries incurred by various killing methods. He should also be able to rely on suitable helicopter relief to fly him to and from the vessel with reasonable notice.

APPROVED: Arrangements were made for Dr. Rowsell to have access to Front operations by helicopter and to spend as long as necessary on a Canadian sealing vessel.

1975

COSS RECOMMENDATIONS

COSS recommendation, #1 - APPROVED

Mr. Carroll be allowed to act as liaison contact with the Committee so that all matters on seals arising in the government that need the committee's attention (including prior notice of meetings of committees at the national and international level) are passed on to the Secretary of the C.O.S.S.

COSS recommendation, #2 - APPROVED

Fisheries officers should be instructed in the correct methods for checking insensibility and death in seals. At present unintentional cruelty may occur because seals are not killed before being brought on board. This is especially true on the Front where all seals should be hakapi ed as soon as reached.

COSS recommendation, #3 a) NOT APPROVED - b) APPROVED IN PART

a) That small vessels (less than 65' LOA) be banned from the Magdalen Island's hunt as in their present form they are not suited to entering or working on the ice edge.
b) We recommend that you convene a meeting of pertinent provincial and federal authorities to devise new methods of sealing by Magdalen Islands landsmen to clear up what in 1975, was a primitive hunt with cases of cruelty. We would recommend consideration should be given to:

(i) Master watch method of sealing, i.e. professional (= experienced) sealers be appointed to lead group of 4 - 5 persons. The "Master" would receive special training and because his seal products would be of reasonable quality benefit by better prices for his products.
(ii) Government cull, using Magdalen Islanders as the hunters. The whole hunt would be under the control of government personnel (i) might be the forerunner of (ii).
(iii) Consideration be given to the feasibility of establishing cottage industries in the Magdalen Islands for the primary and secondary processing of seal products. The Committee finds it difficult to accept the trouble Canada has experienced over the hunt and the 80% profit made by other countries on this renewable resource - the seal.

COSS recommendation, #4 - Front - A - APPROVED

A) No shooting of seals should occur before the sun is above and after the sun is below the horizon, these times can be officially fixed from government sun tables.

....Continued

COSS recommendation, #4 - Front - B - APPROVED

B) No hooded seals should be shot in the waters.

COSS recommendation, #4 - Front - C - NOT APPROVED

C) Only one person be allowed to shoot from one vessel at one time.

COSS recommendation, #5 - Front - D - NOT APPROVED

D) No adult female hooded seals should be killed, the hunt at present may well be depressing the reproductive potential of the herd. New techniques may have to be devised to take the hooded pup and male adult but we are assured by professional hunters and biologists that this is possible and has indeed been done.

COSS recommendation, #4 - Front - E - APPROVED

E) Finally, after many years of intensive investigation, we recommend that apart from the rifle (with restrictions as noted above) that the hakapic be the only instrument used to kill seals on the vessels hunting on the Front. The hakapik has better killing power for larger animals and offers a decided safety factor to the human beyond that available in the club. It should be noted that the nature of the Magdalen Islands' hunt does not allow us to recommend the hakapic for use in that area.

COSS recommendation, #5 - Davis Strait - APPROVED

We recognize the importance of scientific knowledge for all known seal stocks, we do feel however that we may be seeing an occasional breaking away of the base of the hooded seal herd, i.e. we believe the stock to be enclosed in a triangular area lying between Newfoundland, Labrador and West Greenland, in some years the triangular nature of the herd stays intact. In 1975 the herd possibly broke into two parts with the wide base of the triangle remaining in the Davis Strait, the smaller herd (in the pointed end of the triangle) was hunted on the Front. We therefore suspect there is only one herd as there has been for thousands of years. We know of no published data to suggest that there has been an increase in the size of the hooded seal herd in the last ten years. We would therefore view with great caution any suggestion that the hooded seal quota should be increased. We would recommend that you apply to the Canadian Armed Forces for help in flying the area of Davis Strait that might be the home for the herd. We would recommend that the flights be made in March.

COSS recommendation, #6 - Quotas for harps and hooded seals - APPROVED

Until the interpretation of the 1975 aerial survey is complete (most likely October-November 1975), it would be unwise to enter into discussion of increasing the quotas and/or national allotments. At present there is some evidence that, if we wish to maintain the herds at the

....Continued

present levels we might view the present quotas with great caution. We therefore recommend that as a decision as to quotas must be made at ICNAF in June that no changes be suggested by Canada for 1976. (137,000)

COSS RECOMMENDATIONS
AND
MINISTER'S REPLY (Honourable Romeo LeBlanc
Minister Fisheries and
Environment Canada)

COSS recommendation, Harp Seals #1 - APPROVED IN PRINCIPLE

All killing of Harp Seals be brought under quota, and strict management be applied against both landsmen and large vessels.

Minister's reply, Harp Seals #1

The arrangement which was agreed internationally for 1977 was as in previous years, to institute a quota for the large vessel hunt at the Front. An estimate was set aside for indigenous fishermen at Greenland and in the Canadian Arctic and the allocation to Canadian landsmen is also expressed in the form of an estimate.

You will note that, during the first four years that quotas on harp seals were in effect, these quotas were not achieved. However, during the past two years, because of high kills in the landsmen fisheries, the quotas have been exceeded. It was the conclusion of the Scientific Advisers to ICNAF Panel A (Seals) that, even with the overrun of the TAC which occurred last year, the seal stocks are currently increasing. It is nevertheless my intention to ensure that large overruns of the estimates do not take place again. Accordingly, the proportion of the Total Allowable Catch to be allocated to the inshore components of the industry has been increased from 30,000 in previous years to 63,000 for 1977. In only one year (1976) has such a large catch been achieved. As indicated below, we will be taking further management steps to ensure requisite limitation of the hunt.

COSS recommendation, Harp Seals #2 - NOT APPROVED

Total hunt should not exceed 150,000: composed of 10,000 - aboriginal hunt, 100,000 - large vessels (Canada and Norway), and a landsmen hunt not to exceed 40,000.

Minister's reply, Harp Seals #2

The Total Allowable Catch has been set at 170,100 allocated as follows: 10,000 as an estimate for indigenous fishermen at Greenland and in the Canadian Arctic; 35,000 to Norwegian vessels on the Front; and 125,000 to the Canadian elements, of which 62,000 will be designated as a quota for large vessels on the Front and 63,000 as an allocation to other components of the seal fishery. The remaining 100 seals are added, as a standard ICNAF practice, for other member countries.

Since your Committee held its deliverations and forwarded recommendations, the Scientific Advisers to ICNAF Panel A met in Copenhagen (October 11 - 12). There, the majority of the Advisers agreed that the sustainable

....Continued

yield of the current population lies between 190,000 and 125,000 animals, and that catches below this level would allow a continued population increase. The recommendation of the scientists was that the TAC be set at 170,000, only 13% higher than the figure recommended by your Committee. In adopting the figure recommended by ICNAF, I am pleased to note the rather close agreement between the ICNAF Advisers and your Committee on this matter.

With respect to allocations, you will note that the estimate for the aboriginal hunt recommended by your Committee (10,000) has been adopted. The total allocation of 97,100 to large vessels on the Front is actually marginally lower than the figure recommended by your Committee (100,000) in order that we may make a greater allocation to the other components of the Canadian seal fishery, as noted above.

COSS recommendation, Harp Seals #3 - APPROVED

Subquotas should be applied against the latter, e.g. 10,000 for Magdalen Islands.

Minister's reply, Harp Seals #3

The matter of internal allocation of the 63,000 seals among the various inshore components of the Canadian hunt is not a matter for international discussion and was not dealt with in the ICNAF forum. We are presently giving active consideration to the designation of sub-allotments by area so as to allow an equitable distribution of the landings. This will have to be done in a flexible fashion to permit internal reallocation on the basis of developments during the sealing season since availability of seals in different areas varies tremendously from year to year.

COSS recommendation, Harp Seals #4 - APPROVED IN PART

All sealing be concentrated on young of the year.

Minister's reply, Harp Seals #4

We have taken action to concentrate the hunt on young of the year by limiting the take of age 1 and older harp seals to 5% of catches taken by large vessels. We have also continued a total prohibition on the killing of adult harp seals on the whelping patches in both the Gulf and the Front areas.

COSS recommendation, Harp Seals #5 - NOT APPROVED

Due to our imprecise knowledge of geographical distribution of North West Atlantic herd, large vessels not be encouraged to enter the Gulf.

Minister's reply, Harp Seals #5

With respect to use of large vessels in the Gulf, I understand that your concern is to prevent too large of a proportion of the total landings to

....Continued

be made from the Gulf herd. The scientists agree that approximately 1/3 of the pups of any year are born in the Gulf and 2/3 are born on the Front. The kill of the young of the year on the Front last year was approximately 119,000 while only 14,000 were taken in the Gulf. It is realized that some of the beaters taken on the Front may have been born in the Gulf.

Combined with the consideration of sub-quotas which you have suggested under (3) above, we will also have to consider means by which such allocations could be taken. In this regard, I note that shorehunters leaving from the Magdalen Islands in 1976 took only 40 seals compared with, for instance, 14,661 in 1974. The tremendous year-to-year variability in catches at the Magdalen Islands relates to the nature of ice conditions and availability of seals near the shore. We will thus need to keep the sealing methods used in such circumstances under continuing review.

COSS recommendation, Harp Seals #6 - APPROVED

Further research be carried out to establish the intermixing of Gulf and Front herds to ensure adequate management.

Minister's reply, Harp Seals #6

It is my understanding that considerable tagging has already been conducted in an attempt to elucidate the problem of relationships between Gulf and Front herds and that further large-scale tagging will be conducted in 1976.

COSS recommendation, Harp Seals #7 - APPROVED

The landsmen regulations recently introduced (1976) should apply to the Madalen Islands only until such time as further recommendations can be formulated for other areas.

Minister's reply, Harp Seals #7

We have taken your advice on this matter and will be applying the 1976 licencing amendments to the regulations in the Magdalen Islands only, as you suggest.

COSS recommendation, Harp Seals #8 - APPROVED IN PRINCIPLE

The seal hunt should not open until March 20 on the Front so as to allow adequate aerial censusing of the population.

Minister's reply, Harp Seals #8

The arrangement made at ICNAF was to set the opening date at March 12 with the specific proviso that Canada and Norway could agree to defer opening to a later date. You will remember that the 1976 opening date

....Continued

was set at March 15 by a Canada/Norway arrangement and it is our intention to delay the opening date for 1977 as well. The date will be developed through consultations which are presently underway.

COSS recommendation, Harp Seals #9 - APPROVED IN PART

Consideration be given to an opening and closing date for all landsmen.

Minister's reply, Harp Seals #9

For 1976-77, we are instituting opening and closing dates of November 15 to May 14 for landsmen on the Front and in the Gulf north of 50°N.

COSS recommendation, Harp Seals #10 - APPROVED

We would request an evaluation of the present incidence of codworm in both seals and groundfish and a comparison with earlier published reports.

Minister's reply, Harp Seals #10

We realize the need for further research on the incidence of codworm in seals and groundfish and this will be pursued. In this regard, it is noted that the codworm problem relates primarily to grey seals rather than harp seals.

COSS recommendation, Harp Seals #11

Coss awaits with interest the requested evaluation of the economic value of sealing to Canada.

Minister's reply, Harp Seals #11

The field interview aspects of the study on the economic value of sealing on the Canadian Atlantic coast has recently been completed and analysis of the data has begun. A copy of the final report will be made available to your Committee when it has been completed.

COSS recommendation, Harp Seals #12 - APPROVED

The regulations on use of firearms for sealing be more strictly enforced.

Minister's reply, Harp Seals #12

It is our intention to take all necessary steps to enforce our regulations on the use of firearms for sealing. You should also note that the change in closing date for landsmen will also reduce loss due to sinkages late in the season.

COSS recommendation, Hood Seals #1 - NOT APPROVED

The quota should not exceed 12,000.

....Continued

Minister's reply, Hood Seals #1

The Total Allowable Catch for hood seals has been set at 15,100 in accordance with the advice of the Scientific Advisers who determined that there was no new evidence on which to recommend a reduction from the TAC in effect during previous years. In noting that the scientific data are not as firm for hood seals as for harps (the reason, I understand, for your recommendation that we lower the TAC), we have determined to increase our research effort in 1977.

COSS recommendation, Hood Seals #2

No adult females be killed.

Minister's reply, Hood Seals #2

In 1977, we are restricting the kill of adult females to a maximum of 10% of the catch. This compares with about 20% last year when this aspect was not regulated. At the October 1976 meeting of ICNAF Panel A, the Scientific Advisers indicated that this would imply an increase in sustainable yields from about 15,000 at present to approximately 20,000 in several years time. It thus represents a very significant conservation step.

COSS recommendation, Hood Seals #3 - APPROVED

Adults should be struck by hakapik to ensure they are dead before being hauled on board vessels.

Minister's reply, Hood Seals #3

A new regulation will be introduced this year requiring that all adult hood seals are struck by a hakapik prior to being hauled on board the vessels.

COSS recommendation, Hood Seals #4 - APPROVED

The shooting of seals be restricted to one half hour after sunrise to one half hour after sunset.

Minister's reply, Hood Seals #4

The hunting times have been changed such that the prohibition to kill hood seals in 1977 will be between the hours of 2200 GMT and 0900 GMT up to 31 March. This will ensure that the seals are shot under conditions of daylight adequate to ensure accuracy.

With reference to the last two points, I would like to indicate here that I particularly appreciate your continued and constructive advise on aspects of humane killing.

....Continued

COSS recommendation, Grey Seals #1

Any new data should be made available to COSS at least 60 days before we are asked for an opinion.

Minister's reply, Grey Seals #1

I understand that a first draft research document on the subject of grey seals was given to you in November and we are pleased that your Committee was able to participate at a meeting convened in Halifax on November 30 to discuss the status of grey seals on the Atlantic coast. I will be looking forward to receiving any advice which you may wish to make on grey seal management.

COSS recommendation, Harbour Seals - APPROVED

We commend the Ministry for its decision to cancel the bounty on this species.

Minister's reply, Harbour Seals #1

I am pleased that your Committee supports my decision to cancel the bounty on this species.

Quote from Minister

"Before closing, may I again express my appreciation to your Committee for its continued consideration of all aspects of the seal hunt and provision of advice on its regulation. I understand that you will be continuing a collaboration with our Department in research activities over the coming season and wish you every success in your studies."

1977

COSS RECOMMENDATIONS
AND
MINISTER's REPLY (Honourable Romeo LeBlanc
Minister Fisheries and
Environment Canada)

NEWFOUNDLAND, LABRADOR, AND OTHER SHORE OPERATIONS

COSS recommendation, #1 - APPROVED

When sealers are in speed boats, operating from longliners, or on the ice, they should strike seals with a hakapik before bringing them into their boats when there is evidence that the seal might be conscious. Such consciousness may be manifested by blinking, pulling the head in with eyes closed, as well as escape activity. No wounded animals should be brought into boats without first rendering them unconscious using the hakapik.

COSS recommendation, #2 - APPROVED

Each longliner should have a hakapik or bat on the deck where the seals are being boarded and all seals showing evidence of consciousness as described above, should be struck immediately with a hakapik or bat to render them unconscious.

Minister's reply: #1 and #2

Section 16 of the Seal Protection Regulations has been amended and now states:
"Section 16 (7). The master of a vessel engaged in a sealing operation shall have a club described in paragraph 1 (a) or a hakapik on board the vessel."
This amendment reinforces the other regulations on humane killing contained in Sections 16 and 17 of the Regulations.

COSS recommendation, #3 - APPROVED

The master sealer system vested in the master of the vessel, should be the order of authority and direction to ensure the humane killing of seals, both in the ship, and by those in the speed boats.

Minister's reply: #3

This recommendation, that the master sealer system vested in the master of the vessel, should be the order of authority and direction to ensure the humane killing of seals, has generated an amendment to Section 23 of the Seal Protection Regulations which now states:
"Section 23. The master of a vessel engaged in a sealing operation shall take steps to ensure that every person engaged in sealing from the vessel complies with these Regulations."

....Continued

COSS recommendation, #4 - APPROVED

All sealers on receipt of a licence should be given written instructions on how to assess whether or not an animal is unconscious and insensitive to pain. Because this is a slaughter operation, seals should be given the same consideration and concern given to domestic animals in the abattoir, therefore, those doing the killing must be able to assess when the animal is insensitive to pain and thus unconscious. The best place to present this information is when the sealer receives his licence. Also, if the animal is not unconscious, i.e., not glassy-eyed and staring without movement of the eyes, then instruction should be given of the action that the sealer must take, namely striking the animal on the head with a hakapik.

Minister's reply: #4

The recommendation that sealers should be given written instruction on how to assess whether or not an animal is unconscious, and thus insensitive to pain, has been acted upon by my officials and these instructions have been incorporated directly into Section 17 of the Seal Protection Regulations as follows: "Section 17 (2). For the purposes of Subsection (1) a seal is dead when the seal: (a) is glassy-eyed; (b) has a staring appearance; (c) has no blinking reflex when the eye is touched, and (d) is in a relaxed condition."
Further to this action, written instructions on the methods of effecting humane killing, based upon a suggested text provided by yourself, have been printed and distributed with sealing licences.

COSS recommendation, #5 - APPROVED

All new sealers should be given courses of instruction on humane killing of seals, such courses should be mandatory before the licence is issued and the competence of the apprentice sealer examined. This should include the proper use of a hakapik, the ability to assess unconsciousness, and the proper methods of skinning as well as a test for marksmanship. This latter test should be made from a ship based operation in which the sealer will be operating.

Minister's reply: #5

The recommendation that all new sealers should be given courses of instruction on the humane killing of seals including the proper use of a hakapik, the ability to assess unconsciousness, the proper methods of skinning as well as a test for marksmanship has been carefully considered and partially implemented during the 1978 sealing season. In the Magdalen Islands courses continue to be offered by fisheries officers on proper sealing practices. We believe that the provision of information on humane killing methods, combined with the master watch system as instituted in all sealing areas in 1978, has produced the desirable result of further educating sealers in this area.

....Continued

COSS recommendation, #6 - APPROVED

An important recommendation is that fisheries officers should be placed on longliners in a random fashion in order to spot check the operation to ensure humane practices are followed.

Minister's reply: #6

The recommendation that fisheries officers be placed on long-liners in a random fashion in order to spot-check their sealing operation has been implemented during the 1978 sealing season.

COSS recommendation, #7 - UNDER CONSIDERATION

Courses in humane killing, the use of rifles, nature of ammunition, marksmanship; all such related subjects should be given to Fisheries Conservation Officers. Such courses may be subject to support from the Federal Government using the resources of the College of Fisheries, St. John's, Newfoundland, or similar facilities. Officers following this training would then develop and operate instructional programmes in their local areas. It is important to emphasize even the good operation become better and more humane. This will benefit the sealer and ensure the prevention of unnecessary pain and distress in the target animal, the seal.

Minister's reply: #7

We have noted this recommendation and will be giving further consideration to implementation. Superior marksmanship is presently evident on the large sealing vessels and the accuracy of longliner marksmen is considered good as indicated in the Rowsell 1977 report to COSS and CFHS.

COSS recommendation, #8 - UNDER CONSIDERATION

It is highly recommended that the regulations be amended to prohibit the carrying of the shotgun on any vessel involved in sealing.

Minister's reply: #8

The recommendation that the Seal Protection Regulations be amended to prohibit the carrying of the shot-gun on any vessel involved in sealing may not be required, as the objective of humane killing may be served by rigorous enforcement of Section 16 (1) (c) of the present Seal Protection Regulations which states:
"Section 16 (1). No person shall take or kill seals in the Gulf area or Front area by any means other than by: (c) A shotgun not less than 20 gauge firing rifled or "Poly-Kor" slug shot-shells." We will continue to keep this matter under review, however.

....Continued

COSS recommendation, #9 - UNDER CONSIDERATION

Further study should be given to the calibre and velocity of any rifle used in sealing; special attention being given to the requirements to provide the humane killing of bedlamers and adult seals.

Minister's reply: #9

There may be an advantage in further investigation of the most appropriate firearms to be used in sealing. May I request that your Committee discuss the possibility of conducting such a study.

COSS recommendation, #10

There is a need to improve pelt quality, it is therefore recommended that all pelts be stamped, marked, or tagged with a government approved stamp so as to provide a better product to sealers and buyers.

Minister's reply: #10

We have distributed brochures containing information on methods of ensuring good pelt quality. In addition, the primary processors have implemented a system of tagging or marking individual pelts or groups of pelts from each supplier. By this method the industry will be able to pay for pelts according to quality.

COSS recommendation, #11 - APPROVED AND IMPLEMENTED

As the inshore fishery is becoming the main hunt, it is recommended that fisheries officers be assigned, where possible, to long-liners and speedboats. Such personnel should not be assigned to boats from their own domiciles. This is also true for enforcement officers on large vessels.

Minister's reply: #11

The assignment of fisheries officers to police operations on small vessels has been implemented as recommended. In the case of enforcement officers on large vessels, the varied origins of the sealing crew on these vessels result in a random chance that the enforcement staff would be from the same community as some of sealers. The familiarity which fisheries officers have with operations in their district and, indeed, their general responsibilities, require that they conduct observations on the local sealing operations.

.... Continued

MAGDALEN ISLANDS OPERATIONS

COSS recommendation, #1

That the regulation be changed for the watch size, e.g., 4 persons to 3, as most boats carry only three people.

Minister's reply: #1

After reviewing your report on the 1978 hunt we will consider implementation of this proposal for 1979.

COSS recommendation, #2 - APPROVED

We do not recommend that the hakapik be introduced to the Gulf in 1978.

Minister's reply: #2

Your recommendation that the hakapik not be introduced to the Gulf of St. Lawrence sealing operations in 1978 was accepted.

COSS recommendation, #3 - NOT APPROVED

We find no reason to change our previous recommendation that no large vessel (greater than 65' LOA) be allowed in the Gulf. This is associated with our belief that management has little, if any, information on which to evaluate whether there are two herds or one in the Northwest Atlantic (see Stock Separation below).

Minister's reply: #3

There is no reason why large vessels should not be permitted to take part of the Total Allowable Catch within the Gulf of St. Lawrence, within the limits of our scientific advice. The method of capture has no bearing on whether or not there are two herds of harp seals or one in the northwest Atlantic. Since there is uncertainty concerning stock relationships, the conservative approach, from a biological point of view, is to harvest roughly in proportion to abundance. This can only be accomplished effectively by allowing some use of larger vessels in the Gulf of St. Lawrence.

STOCK SEPARATION

COSS recommendation, #1 - APPROVED

The Committee recognizes the importance of determining whether or not herds are of one stock. To provide a possible solution, COSS will examine, by modern biochemical immunogenetic techniques, the make up of the two groups. It is presumed we will receive the cooperation of your scientists and field officers in such an investigation.

....Continued

Minister's reply: #1

Dr. D.M. Lavigne and associates of the University of Guelph have been funded by my Department, with COSS support, to conduct the recommended research. I understand that sufficient samples have been acquired in order to perform these analyses and that my regional staff assisted in the collection of these samples.

COSS recommendation, #2 - APPROVED

Further to 1. above, we once again recommend an extensive (4,000 animals) tagging programme of Gulf and possibly Front seals. The seals should be tagged in natural groups, (i.e., female groupings with their pups on ice) to further establish family and social group structures.

Minister's reply: #2

My staff tagged 3,800 pups in the Gulf and 5,000 at the Front in 1978. This experiment should be of value both with regard to the investigation of stock relationships and estimating pup production.

AERIAL SURVEYS

COSS recommendation, APPROVED

We support the continuation of the censusing techniques as being one of the most viable techniques available to management. The science has been developed, we therefore recommend that further surveys be carried out under the auspicies of government, using the resources of the Canadian Armed Forces, with Drs. D.M.Lavigne and C.K.Capstick as technical advisors. Further surveys not be carried out in competition with the actual hunt, but be given priority in that year. Such priority to be established 1-2 years ahead so as to allow industry to plan its collection strategy.

Minister's reply

The results of the 1977 aerial ultra-violet photographic census were reviewed by the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) and the ICNAF Standing Committee on Research and Statistics (STACRES) in both of which COSS was represented. Neither of the Committees, nor the principal investigator for the survey, recommended that an aerial survey be conducted in 1978. As you suggest, we will consider the possibility of repeating the survey in future. Your recommendation that planning be made well in advance of the survey in order to minimize disruption of the industry is most appropriate.

...Continued

RESTRICTED OBSERVATION OF THE HUNT

COSS recommendation - APPROVED

The Committee is in favour of legislation which would protect licenced sealers against interference or harassment. It does not believe that such legislation has yet been formulated.

Minister's reply:

In February 1978 we implemented a system of licencing those who wish to visit the sealing operations. The object of the enabling amendments to the Seal Protection Regulations is to permit responsible scrutiny by legitimate journalists, media personnel, scientists and humane society observers, but to prevent interference in legitimate sealing operations which characterized the 1977 hunt on the Front.

QUOTAS

COSS recommendation

Harp Seal

The Committee on Seals & Sealing has not received any new or additional information on the size or composition of the herd which would justify the Committee making any changes from its previous recommendation on quotas.

Hooded Seal

There is no further information available that would make COSS recommend an increase in the size of the hooded seal hunt, indeed, the Davis Strait herd seems limited in size, and offers little as a reservoir for the Front herd. Therefore, it was again recommended by the Committee that the hunt not exceed 12,000 animals, and with the adult female being totally protected.

Grey Seal - APPROVED

Our recommendation of 76 12 14* still stands, noting that the work recommended therein is not as yet completed. There is, therefore, no further evidence available to us to justify the Sable Island cull.

Minister's reply:

Harp Seal

This matter was dealt with in your advice of November 21, 1977 and my response of November 28, 1977.

.....Continued

Hooded Seal

Analysis conducted by STACRES in 1977 suggested that the 1977 quota of 15,000 hooded seals was indeed a conservative one since the most recent estimate of sustaining yield in the hooded seal population was 22,000 animals. We, nevertheless, reduced the portion of adult female seals for large vessels to 7.5% from the 10% in force for 1977.

Grey Seal

The breeding population of grey seals on Sable Island was not culled in 1978. Research continues with a massive pup tagging operation and biological sampling.

1978

COSS RECOMMENDATIONS
AND
MINISTER's REPLY (Honourable Romeo LeBlanc
Minister Fisheries and
Environment Canada)

COSS recommendation, #1 Aerial Survey - APPROVED

The Committee on Seals and Sealing reiterates its contention that an ultra-violet aerial survey has real value as a method to determine the harp seal population; however, we would remind you that a complete survey has not been made. However, in view of the technical difficulties involved, this form of survey should not be considered as a routine operation but as an occassional method of checking the status of the herd and confirming, (or otherwise,) the assessment of the observers, and the information produced by tagging. Where aerial census is carried out in the future, it should be conducted by the Government, using the very latest in navigational techniques and taking advantage of the experience of the personnel from the University of Guelph, who have acquired practical experience and knowledge of the problems involved.

Minister's reply: #1 Aerial Survey

The Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) Marine Mammals Subcommittee has considered, in great detail, the aerial ultra-violet photographic census technique to assess the northwest Atlantic harp seal population. This group, comprising scientists from both inside and outside the Government, recommended that, in view of the large body of existing scientific information on harp seals and the consistency in current estimates of population size and pup production, no scientific imperative exists for an immediate aerial photographic census. The subcommittee has formed a working group to examine the feasibility of serial censuses which recommend a number of refinements in the present techniques to increase the potential for success in any future surveys. This Working Group's report will be forwarded to COSS when available. This subcommittee's recommendations do not preclude future aerial surveys to provide other independent assessments of this harp seal population.

COSS Recommendation: #2 Quotas - APPROVED

Again the committee has chosen not to recommend any specific quotas. It is recommended to the Minister only that, in establishing quotas, a conservative approach be used in order to permit the harp and hooded seal populations to increase to a reasonable sustainable size.

....Continued

Minister's reply: #2 Quotas

The most contemporary scientific data on seals originating from Canadian scientists have been reviewed by CAFSAC. This information and that provided by the Norwegian and Danish scientists has recently been scrutinized by ICNAF Standing Committee on Research and Statistics (STACRES) in Bergen, Norway. As in past years, the scientific advice offered by STACRES will provide the basis for conservation-oriented management regime established for harp and hooded seals. It is unfortunate that the Committee on Seals and Sealing could not accept my invitation to attend the STACRES meeting, however, I enclose the report and scientific documents on seals considered therein.
(Note: Subsequently the 1978 quota was maintained in 1979)

COSS recommendation, #3 Reports by Observers - NOTED

With respect to reports by foreign animal welfare societies, the committee accepted with thanks the report of John Walsh of the International Society for the Protection of Animals (ISPA). However it recommends that the report by Dr. William Jordan, Wildlife Specialist of the Royal Society for the Prevention of Cruelty to Animals (RSPCA) published by that organization, be rejected as "without sufficient factual base, irresponsible & inaccurate, recommending it be read only in conjunction with the comments of the Acting Chairman and Secretary of the Committee on Seals and Sealing". These critiques have been widely distributed both to the RSPCA and to ISPA, to the Government of Canada and to any other organizations wishing copies.

Minister's reply: #3 Reports by Observers

My Department acknowledges your Committee's analysis of, and recommendations on, the reports on the 1978 sealing operations prepared by agents of foreign animal welfare societies. I would request that the comments of the Committee on Seals and Sealing on these reports be widely distributed, as appropriate, to interested organizations and individuals.

COSS recommendation, September 13: #4 A) Hooded Seals - Increased Population Study

The committee considers that the Hooded seal requires special attention and recommends that additional research be undertaken on herd dynamics of this species. Furthermore, a research undertaking by the Committee on Seals and Sealing indicates that it appears to be feasible to immobilize adult Hooded seals and carry out tagging of this species. Additionally, the committee recommends that the Hooded female be completely protected, i.e. a zero kill.

#4 B) Hooded Seals - APPROVED

There was evidence that some of the adult hooded seals after being shot, had been landed on vessels still with a blinking reflex, indicating that the animals were conscious and thus sensitive to pain during this process. The Committee reiterates its concern and desire that adult hooded seals must be rendered unconscious with the Hapapik before being landed aboard vessels and that Fisheries Officers be instructed to make certain that this regulation is complied with.

....Continued

Minister's reply: #4A) and B) Hooded Seals

An October 25 meeting of CAFSAC Marine Mammals Subcommittee reiterated the 1977 STACRES recommendation that age samples, segregated by sex, be collected from all adult hooded seals landed. We anticipate and intensification of population dynamics research on harp seals in 1979, and continuation of my department's hooded seal tagging program. At a September government-industry consultation on sealing Dr. Ronald of your Committee accepted a sealing industry proposal for a reduction in the proportion of adult female hooded seals harvested to 5 percent of daily on board catch of this species. All participants concurred that it was desirable to minimize the take of female hooded seals harvested. Present Seal Protection Regulations require that adult hooded seals must be rendered unconscious before being landed aboard sealing vessels. As in previous years, this regulation will be strictly enforced and it will be afforded special emphasis in 1979.

COSS recommendation, #5 Grey Seals - Study Continuing

In the belief that the bounty system of grey seals appears to be cruel and ineffective, the Committee recommends that the Government be encouraged to find other methods of controlling these animals. It is generally in favour of the present cull by Government Fisheries Officers; however, before agreeing to any increase in the size of the cull, the Committee must receive more adequate data on damage to Fishery gear. Additionally, the Committee again does not recommend any cull on Sable Island since this would be an extension to the existing cull. The Committee declines to support the recommendation of the Federal Department of Fisheries that the Government of Nova Scotia be asked, by regulation, to permit guns to be carried or used at any time to kill Grey seals. It is felt that this would result in an increase in unnecessary suffering to seals.

Minister's reply: #5 Grey Seals

Additional information on the damage to fishing gear by grey seals is presently being compiled. My Department will be reviewing the present management regime for grey seals within the context of this new information when it becomes available.

COSS recommendation, #6 Observation of the Hunt-
APPROVED IN PRINCIPLE

During the past year a new procedure has been introduced with respect to controlling access to seal hunting by protest groups and news media. The committee feels that seal hunting is an outdoor slaughter operation and that there is no necessity for the Government of Canada to provide unlimited, unrestricted, opportunities for the general public to view these operations. Instead, the committee believes observation of sealing should, be limited to the following:

....Continued

Members of the Committee on Seals and Sealing, in order to enable them to advise the Minister of Fisheries in accordance with their terms of references;
The humane movement as represented nationally by the Canadian Federation of Humane Societies, and internationally by the International Society for the Protection of Animals. These two bodies should have every opportunity to send one or at the most two observers to the Front and the Gulf, and these observers should be given every cooperation by Government. Furthermore, it is recommended that other humane societies both in Canada and elsewhere who may wish to observe sealing and obtain information, should be directed to obtain their information through these two above mentioned humane organizations.
It was agreed that members of the committee make every effort to ensure that major humane organizations receive accurate information and if this involves participating in the meetings of those groups, that this would be a legitimate activity of COSS.
Scientists, authorized by Government to carry out research projects on seals, both in the Gulf and on the Front, such individuals should have unrestricted access to the seals in order to enable them to carry out their studies.
News media, with the following stipulation: application for permission to view the hunt to be made to the Minister at least one month before the hunt commences; the number of personnel they wish to be covered by the permit, the area they wish to visit (the Front or the Gulf) and the date of their proposed visit to be included.
The committee recognizes that unlimited or unrestricted observance of the hunt by the news media could, in itself, constitute harrassment to the seals and to sealers. In order to avoid this, the committee recommends that the number of news media personnel allowed to visit any one part of the hunt at the same time should be limited by permit within the final jurisdiction of the Minister, and that the news media should be made well aware, in advance, of the conditions (re photography, etc.) of the Observers Permit. Furthermore the committee believes that Visitors or Observers Permits should be standardized and should be issued in a way which is consistent, both in the Front and the Gulf, and that in particular, the decision to issue the permit should be made by at least the Regional Director-General. It is the committee's opinion that the Government, in issuing permits to the media for access to the ice should issue permits to Canadian news agencies, but should consider restricting access to the ice when considering applications for permits for the international news media, to encourage the latter to obtain information from Canadian press sources.

Minister's reply: #6 Observation of the Hunt

The Committee on Seals and Sealing recommendations on controlling access to the sealing operations will receive every consideration by my Department during the development of policies in this regard for 1979. Certainly, every effort will be made to accommodate members of the Committee, representatives of Canadian and international humane movements, and scientists wishing to conduct valuable research and observations on seals and sealing.

....Continued

We are cognizant that some visitors to the sealing operations have previously engaged in activities to harass sealers in their pursuit of a legitimate livelihood. Whilst such harrassment cannot be condoned, we must permit responsible observation of the operations.

COSS recommendation, #7 Enforcement of seal protection regulations - APPROVED

It is recommended that the government should introduce additional programs or upgrade existing training programs for Fisheries, Conservation and Protection Officers (CPO) and for sealers. The committee commends the Federal Fisheries Department and the Fisheries Officers for training programs already introduced, but emphasize the need that these programs be stepped up and more emphasis given to them. The committee recommends the Regulations be amended to require that in humane killing, the seal after being rendered unconscious by one of the approved methods, be bled out immediately by cutting the auxillary blood vessels. The committee recommends an increase in the number of Fisheries Officers used to enforce the regulations in the Newfoundland Landsmen's operations. The committee recommends that Federal CPO's should enforce the Regulations more vigourously and, in particular, that those stationed aboard vessels should spend more time on the ice and should be required to take a more agressive and more positive attitude towards the Regulations in their relationships and discussions with sealers. The committee intends to meet with sealing captains, before the hunt commences, to discuss with them their attitude towards their part in the enforcement of Regulations.

Minister's reply: #7 Enforcement of seal protection regulations

My Department concurs with your recommendation respecting expansion of the existing training programs for Conservation and Protection Officers and sealers. To this end, a number of officers from the Fisheries and Marine Service will receive general enforcement training at the RCMP centre in Regina, Saskatchewan. In addition, we are examining the feasibility of conducting intensive training sessions on sealing for Conservation and Protection Officers. It is anticipated that appropriate members of COSS could contribute heavily to such a training program. These officers will, in turn, provide intensive instruction on our Seal Protection Regulations and particularly with regard to humane killing methods to all large vessel sealers. An instructional program for landsmen will involve the distribution of updated brochures on the same topics. The strict observance of the Seal Protection Regulations will be further emphasized during discussions with fishermen's groups prior to and during the 1979 sealing season and by community Fisheries Officers. I agree with your suggestion to incorporate more detailed descriptions of the current stunning/exsanguination humane killing technique into the Seal Protection Regulations. An increase in the number of Fisheries Officers used to enforce the Seal Protection Regulations in the Newfoundland landsmen's operations is unlikely for 1979 as a result of the current Government fiscal restraint program.

....Continued

It is anticipated, however, that the introduction of a more efficient statistics reporting system will permit officers assigned to the hunt to increase the time spent on enforcement of the Seal Protection Regulations in 1979.
The Committee's recommendation for even more vigorous and agressive enforcement of the Seal Protection Regulations will be effected in 1979. I would hope that COSS members and my officials would meet with sealing captains prior to the 1979 hunt.

COSS recommendation, #8 Behavioural Studies - APPROVED

The committee is concerned over the maternal behavioural aspects of the female Harp and Hooded seals and repeats a past recommendation that further behavioural studies should be carried out and supported by the Committee on Seals and Sealing.

Minister's reply: #8 Behavioural Studies

The September 19-30 and October 25 meeting of the CAFSAC Marine Mammals Subcommittee recommended intensification of current research on the social behaviour of harp and hooded seals, particularly pup-dam interactions. I understand that research proposals to this effect are to be submitted to the Fisheries and Marine Service of my Department for review and potential routes for funding are to be identified in consultation with my officials. I will look forward to receiving reports on the topic already funded within the COSS budget.

COSS recommendation, #9 Socio-Economic Aspects - APPROVED

The Committee on Seals and Sealing commends the Government for the preparation of the report by Dr. Allen concerning the Socio-Economic aspects of the seal fishery. However, the committee specifically recommends that the Government expand and update this study and make the information available to COSS as soon as possible.

Minister's reply: #9 Socio-economic Aspects

My Department is considering an update of the economic report on 1976 sealing operations, for 1980. As an interim measure, a minor update of the 1976 economic study is being performed on the 1978 operations.

COSS recommendation, #10 Alternative Killing Methods - APPROVED

It was agreed that the Committee on Seals and Sealing would explore and encourage others to investigate the development of alternative methods to the club e.g. use of the sealing pistol developed in 1967-68 by Mr. Hughes. A copy of the minutes of the meeting of the Committee on Seals and Sealing of June 20, 21, 1978 have been sent to Dr. Arthur May and contain subsidiary recommendations which we hope you will take into consideration.

....Continued

This year the Committee on Seals and Sealing will be preparing an "Annual Report". This will include observers' reports and other material approved by the committee, together with a copy of the recommendations made to you. The Committee on Seals and Sealing budget for April 1st, 1978 to March 31st, 1979 will be submitted in a separate letter. Once again we are deeply grateful to you and your Department for the cooperation and assistance that has been given to members of the committee during the past year.

Minister's reply: #10 Alternative Killing Methods

On October 25, the CAFSAC Marine Mammals Subcommittee supported the COSS recommendation for the commencement of research to examine alternate methods of humane killing for seals. My Department endorses this research and is presently examining methods whereby it might be expedited. The subsidiary recommendations forwarded to officials in my Department under separate cover will similarly receive careful consideration. My officials will be consulting with the Committee on these recommendations contained in the Minutes of the June 20-21, 1978 COSS meeting. The Committee will thus be kept informed of our progress in implementing its recommendations for 1979. COSS funding and budget for the period April 1, 1978 to March 31, 1979 have been discussed in a separate letter to the Committee dated November 16.

REGULATIONS RESPECTING THE PROTECTION OF SEALS

Short Title

1. These Regulations may be cited as the Seal Protection Regulations

Interpretation

2. (1) In these Regulations,

(a) "defined area" means the Canadian waters and territories north of 60' North Latitude and includes the whole of Ungava Bay, Hudson Bay and James Bay;

Rev. and new. P.C. 1970-449. Mar.13, 1970.

(b) "Front Area" means all Canadian waters and territories and waters of the Atlantic Ocean bounded on the north by Latitude 60' north and on the south by a straight line drawn due east from Cape Race, Newfoundland and on the west by the coast of Newfoundland and including all the waters of the Strait of Belle Isle southwest to a straight line drawn from the lighthouse at Amour Point to the lighthouse on Flowers Island in Flowers Cover, Newfoundland; and

P.C. 1970 - 449. Mar. 13, 1970.

(c) "Gulf Area" means all the waters of the St. Lawrence River, Chaleur Bay, Northumberland Strait, and the Gulf of St. Lawrence bounded on the north by a straight line drawn from the lighthouse at Amour Point, to the lighthouse on Flowers Island in Flowers Cove, Newfoundland, and all the waters of Cabot Strait and of the Atlantic Ocean seaward thereof and seaward of the east coast of Nova Scotia and bounded on the north by a straight line drawn due east from Cape Race, Newfoundland;

P.C.1978-500 Feb.23,1978

(c.1) "Lake Melville Area" means all the waters of Lake Melville west of a line drawn from Charley's Point on the north shore of Lake Melville to Frenchman's Point on the south shore of Lake Melville;

(c.2) "landsman" means a person engaged in sealing by any means other than from a vessel of more than sixty-five feet in overall length;

Vide.1968-69.c.28, s.99.

(d) "Minister" means the Minister of the Environment;

(e) "non-resident Canadian" means a Canadian citizen who is not a resident;

SEAL PROTECTION REGULATIONS

made under the

FISHERIES ACT

Regulations established by
P.C. 1966-904

(f) "person of mixed blood" means a person having no less than one quarter Indian or Eskimo blood;

P.C.1974.754 Apr. 2,1974

(g) "resident" means, in respect of a licence, a person who has resided continuously in the defined area of on the coasts of Ungava Bay, Hudson Bay or James Bay for a period of not less than twelve months immediately preceding the date of application for that licence.

P.C.1977.391 Feb.24,1977

(g.1) "Regional Director General" means the Regional Director General of Fisheries Management for the Quebec, Maritimes or Newfoundland Region of the Fisheries and Marine Service of the Department of the Environment;

P.C.1967-87, Jan.19,1967.

(h) "sealing" means the hunting for, killing and skinning of seals, the handling and transporting of raw seals pelts from the place where they are killed to the land and the transporting of persons engaged in sealing to and from the killing area, and includes searching for seals from helicopters and other aircraft;

P.C.1970-449, Mar.13, 1970

(i) "whitecoat" means a young harp seal that has not begun to moult; and

New, P.C.1971-546, Mar.23,1971

(j) "registered net tonnage", in the case of a vessel registered under the Canada Shipping Act, means the registered net tonnage shown on the vessel's Certificate of British Registry.

Amended P.C.1977.391, Feb.24,1977

(k) "hakapik" means an implement made of iron having a slightly bent spike of not more than five and one-half inches in length on one side of a ferrule and a blunt projection not more than one-half inch in length on the opposite side of the ferrule, the whole to weigh not less than three-quarters of a pound and having a head securely attached to a wooden handle not less than forty-two inches or more than sixty inches in length and with a diameter of not less than one and one-quarter inches or more than two inches

New P.C.1976.484 March 2, 1976

(1) "sealing group" means a hunting party consisting of not less than four or more than ten persons, one of whom has been designated by the group as group leader and who will be responsible for the sealing operations of that group.

New, P.C.,1967-87, Jan.19,1967

(2) For the purposes of these Regulations, a seal having a common name set out in Column I of an item of Schedule B is a seal of the species set out in Column II of that item.

3. Revoked. P.C. 1971-546, March 23, 1971.

Protection of Seals

4. Subject to these Regulations, no person shall take or kill seals in the defined area.

5. A resident may kill seals for food for himself, his family or his dogs.

6. A person authorized by the Minister may kill seals in the defined area for scientific purposes.

7. (1) Subject to subsections (2) and (4) a person may take or kill seals for sport in the defined area under a sport sealing licence issued by the Minister.

(2) A person shall not take or kill seals for sport in the defined area except where he

(a) employs a guide who is an Indian, an Eskimo or a person of mixed blood; and
(b) uses a boat belonging to his guide.

(2a) Notwithstanding subsection (2), a resident who holds a sport sealing licence may hunt or kill seals in the defined area without a guide and using any boat if he is accompanied by another resident who,

(a) holds a sport sealing licence, and

(b) complies with that subsection.

(3) A person who kills seals for sport shall not retain more than twenty-five pounds of meat from the seals killed and shall give all meat in excess of that amount to his guide.

(4) No person hunting seals for sport shall take or kill

(a) a bearded seal at any time; or

(b) more than two seals in any year.

8. No person shall sell or otherwise dispose of seal meat in the defined area to any person other than a traveller or a resident who requires the seal meat for food for himself or his dogs.

9. (1) No person shall take or kill seals in the Gulf Area or Front Area from or by means of a vessel that has an overall length of more than thirty feet except under authority of a vessel sealing licence issued by the Minister.

(2) A vessel sealing licence is subject to such terms and conditions as the Minister may prescribe.

(3) Except with the permission of the Minister, no vessel sealing licence shall be issued in respect of any vessel that is more than sixty-five feet in overall length unless such a licence was issued in respect of that vessel in 1970 or 1971.

P.C.1977-391
Feb.24,1977

10. No person shall take or kill hood seals at any time in the Gulf Area.

11. (1) Subject to subsection (5), no person shall take or kill seals of a kind set out in column I of an item of Schedule C in an area set out in column II of that item by a means described in column III of that item during

P.C.1978-500 Feb.23,1978

(a) the open season after notice is given by a Regional Director General that the quota set out in column IV of that item or the quota as varied pursuant to subsection (2) has been or is about to be reached; or

(b) the closed time set out in column V of that item or the closed time as varied pursuant to subsection (2).

C.P.1977-391 24 fev.1977

(2) A Regional Director General may, by notice, vary any closed time or seal quota set out in these Regulations.

P.C.1977-391 Feb.24,1977

(3) A notice referred to in subsection (1) or (2) shall be broadcast by maritime radio or published in a daily newspaper in the province or provinces adjacent to the area to which the notice applies.

(4) Except with a permit in writing from the Minister, no person shall take or kill harp seals in the Gulf area from or by means of a vessel that is more than sixty-five feet in overall length.

P.C.1978-500 Feb.23,1978

(5) A person who is a resident in that part of Labrador north of Cape Charles may take or kill seals in the Front Area at any time.

12. (1) No person shall use a helicopter or other aircraft in sealing except in searching for seals.

P.C.1970-449. Mar.13,1970

(2) No person shall use a helicopter or other aircraft in searching for seals unless he has an aircraft sealing licence issued by the Minister.

P.C.1970-449, Mar.13,1970

(3) An aircraft sealing licence may be issued only in respect of an aircraft registered in Canada under Part II of the Air Regulations made pursuant to the Aeronautics Act.

P.C.1970-449, Mar.13,1970

P.C.1970-449, Mar.13,1970

(4) An aircraft sealing licence is subject to such terms and conditions as the Minister may prescribe.

(5) Except with the permission of the Minister, no person shall

(a) land a helicopter or other aircraft less than one-half of a nautical mile from any seal that is on the ice in the Gulf Area or Front Area; or

P.C.1976-484, March 2,1976

(b) operate a helicopter or other aircraft over any seal on the ice at an altitude of less than two thousand feet, except for commercial flights operating on scheduled flight plans.

(6) No person shall, unless he is the holder of a licence or a permit, approach within half a nautical mile of any area in which a seal hunt is being carried out.

(7) Subsection (6) does not apply to

(a) commercial flights operating on scheduled flight plans;

(b) a peace officer employed by or assisting the Department of the Environment;

(c) scientists, technicians and observers employed by the Department of the Environment or are present at a seal hunt at the request of the Department of the Environment; and;

(d) commercial vessels transiting waters in which a seal hunt is being conducted.

P.C.1978-500 Feb.23,1978

(8) An application for a permit required pursuant to subsection (6) shall be in the Minister's office on or before the 20th day of February in respect of the year for which the permit is requested.

(9) An application for a permit required pursuant to subsection (6) shall contain

(a) the name, address, professional association and occupation of every person to be covered by the permit;

(b) a detailed statement of the reasons why the permit is required;

(c) the method of transportation that will be used to go to and from the area of the seal hunt;

(d) the name, number or description of the vehicle that will be used to go to and from the area of the seal hunt;

(e) the area and dates for which the permit is required; and

(f) such other information as may be required to verify or explain the information required in paragraphs (a) to (e).

P.C.1977-391
Feb.24,1977

13. No person who is a resident of a province adjacent to the Gulf Area or the Front Area who is operating from the shore or from a vessel having an overall length of sixty-five feet or less shall take or kill seals except in waters along the shore of that part of the province in which he resides.

13.1 No person other than a person who has been a resident of Labrador for the preceding twelve consecutive months shall take or kill ringed seals in the Lake Melville Area.

14. (1) No person shall engage in sealing by any means in the Gulf Area, Front Area or Lake Melville Area unless he

(a) has a sealer's licence or an assistant sealer's licence issued by the Minister;

(b) is wearing over or attached to his outer clothing so it is visible at all times the means of identification issued with the licence; and

Amended
P.C.1976-484
March 2,1976

(c) complies with any further direction respecting the wearing of the means of identification that may be given by a fishery officer who is present at the seal hunt.

(2) A sealer's licence shall not be issued to any person who

(a) is under eighteen years of age;

(b) has less than two years experience as a sealer; and

(c) is not a sealing group leader.

(3) An assistant sealer's licence shall not be issued to any person who is under fifteen years of age.

(4) An applicant for an assistant sealer's licence shall state the name of the licensed sealer with whom he will be sealing and such name shall be entered on his licenc.

(5) No person who has an assistant sealer's licence shall

(a) engage in sealing except under the supervision of the licensed sealer; or

(b) kill seals at any time except under the direct supervision of a licensed sealer.

15. No person shall take or kill seals at any time or in any area by means of long lines.

Rev. and new. P.C.1967-87, Jan.19,1967

16. (1) No person shall take or kill seals in the Gulf Area or Front Area by any means other than by

(a) a club made of hardwood not less than 24 inches or more than 30 inches in length and that for at least half of its length is not less than 2 inches in diameter;

(b) a rifle firing only centre fire cartridges, not made with metal cased hard point bullets, with

(i) a muzzle velocity of not less than 1800 feet per second, and

(ii) a muzzle energy of not less than 1100 foot pounds; or

(c) a shotgun not less than 20 gauge firing rifled or "Poly-Kor" slug shotshells.

P.C.1967-546, Jan.19,1967

(2) No person shall strike a live seal with any implement other than a club referred to in paragraph (a) of subsection (1), or on any part of its body except its forehead.

P.C.1971-546, Mar.23,1971

(3) Notwithstanding subsection (1) and subject to subsection (4), seals may be taken or killed by means of nets,

(a) in the Gulf Area; and

(b) in that part of the Front Area lying along the coast of Labrador and along that part of the coast of Newfoundland north and west of Cape Freels.

P.C.1971-546, Mar.23,1971

(4) No person shall take or kill seals pursuant to subsection (3) except in waters along the shore of that part of the province in which he resides.

P.C.1976-484 March 2,1976

(5) Notwithstanding subsection (1), a hakapik may be used, in the Front Area only, for killing seals in the manner described in subsection (2).

P.C.1977-391, Feb.24,1977

(6) Notwithstanding subsection (2), in the Front Area, hooded seals that are shot shall be struck with a hakapik in the manner described in that subsection before any attempt is made to skin, slash or remove the seal from the place where it was shot.

(7) The master of a vessel engaged in a sealing operation shall have a club described in paragraph (1)(a) or a hakapik on board the vessel.

P.C.1978-500, Feb.23,1978

16.1 No person shall take or kill ringed seals in the Lake Melville Area by any means other than

(a) a rifle that fires only centre fire cartridges that are not made with metal cased hard pointed bullets;

(b) a harpoon that is similar to the type of harpoon used by the residents of the Lake Melville Area; or

(c) nets that are set on the bed or in the water.

P.C.1976-484, March 2,1976

17. (1) No person shall hook, commence to skin, bleed, slash or make any incision on a seal with a knife or any implement until the seal is dead.

(2) For the purposes of subsection (1), a seal is dead when the seal

P.C.1978-500 Feb.23,1978

(a) is glassy eyed;

(b) has a staring appearance;

(c) has no blinking reflex when the eye is touched; and

(d) is in a relaxed condition.

P.C.1967-87 Jan.19,1967

18. No person shall kill adult harp seals in whelping or breeding patches.

19. (1) Every person who kills seals shall remove all seal skins from the ice to his base of operations within 24 hours from the day the seals are killed except that the Minister may, in any circumstances he considers to be unusual, extend the time for removal of any skins.

P.C.1967-87 Jan.19, 1967

(2) No person shall kill seals unless he or the persons engaged with him in the sealing operation as members of the crew of a ship, aircraft or other sealing operation have complied with subsection (1) and are actively engaged in removing from the ice to the base of operations the skins of seals killed the previous day.

20. (1) Except with the permission of the Minister, no person shall hunt or kill any seal in

(a) the waters of Murray Harbour or its tributaries in the Province of Prince Edward Island, inside a straight line drawn from the range light on Old Store Point at latitude 46'01'17" north and longitude 62 29'07" west from the 1st day of June to the

30th day of September, both dates inclusive; or

P.C.1977-2811 October 6,1977

(b) waters adjacent to the Gaspe coast in the Province of Quebec, inside or shoreward of a straight line drawn from Pointe au Renard to a point at latitude 49 00' north and longitude 64 05' west, thence to a point at latitude 48 25' north and longitude 64 05' west and thence to the lighthouse at Cap d'Espoir.

P.C.1978-500 Feb.23,1978

(2) Subject to subsection (1), any person may without a licence, kill grey seals at any time in an area in which the killing of grey seals is rewarded by a bounty from the Minister.

P.C.1976-484 March 2,1976

(3) Notwithstanding subsection (2), no person shall kill any grey seal during the period beginning on January 1st and ending on the last day of February in any year, except with the permission of the Minister.

21. Except with the permission of the Minister, no person shabl

Amended P.C.1976-484 March 2,1976

(a) take or move a live seal from the immediate vicinity in which it is found; or

(b) tag or mark, or attempt to tag or mark, a live seal in any manner.

P.C.1967-87, Jan.19,1967

22. The Minister may, upon application and payment of the fees set out in Schedule A, issue a licence or permit described in that Schedule in such form and upon such terms and conditions as the Minister may prescribe.

P.C.1978-500 Feb.23,1978

23. The master of a vessel engaged in a sealing operation shall take staps to ensure that every person engaged in sealing from the vessel complies with these Regulations.

24. No person shall hunt for or kill a seal during any day

P.C.1976-484
March 2,1976

(a) in the Gulf Area, during any period before 0600 hours or after 1900 hours, Atlantic Standard Time; or

(b) in the Front Area,

P.C.1978-500
Feb.23,1978

(i) during the period from March 10 to March 31 inclusive before 05:30 hours or after 18:30 hours, Newfoundland Standard Time, or

(ii) during the period from April 1 to April 24 inclusive, before 0530 hours or after 2030 hours, Newfoundland Standard Time.

P.C.1967-87
Jan.19,
1967

25. No person shall engage in sealing, unless he has on his person or on board the vessel, helicopter or other aircraft used in the sealing operation, the appropriate licences required by sections 9, 12, and 14.

New,
P.C.1967-
87,
Jan.19,
1967

26. Where a fishery officer finds a licensee committing an offence against the Act or these Regulations or believes, on reasonable grounds, that the licensee has committed such an offence, he may immediately suspend the licence of that licensee for a period not exceeding 30 days and shall thereupon notify the Minister of the facts of the case so that the Minister may determine whether the licence should be cancelled pursuant to section 9 of the Act.

APPENDIX XVII

Minister
Fisheries and Environment Canada

Ministre
Pêches et Environnement Canada

Ottawa, Ontario.
K1A 0E6

MAY 23 1978

Dr. H.C. Rowsell, D.V.M.,
A/Chairman,
Committee on Seals and Sealing,
151 Slater Street,
Ottawa, Ontario.
K1P 5H3

Dear Dr. Rowsell:

I should like to thank the Committee on Seals and Sealing for its detailed recommendations respecting my Department's management of the 1978 harp and hooded seal hunt. The recommendations, contained in Prof. Ronald's letter of August 30, 1977, provided the basis for a number of changes in our Seal Protection Regulations and other actions by my Department. While there has been a continuing dialogue between your Committee and my officials on several of these matters, I would now like to outline my Department's decisions and actions on your recommendations. I respond to the recommendations from the Committee on Seals and Sealing in the order in which they were presented.

Newfoundland, Labrador, and other Shore Operations

1-2. Section 16 of the Seal Protection Regulations has been amended and now states:

"Section 16 (7). The master of a vessel engaged in a sealing operation shall have a club described in paragraph 1 (a) or a hakapik on board the vessel."

This amendment reinforces the other regulations on humane killing contained in Sections 16 and 17 of the Regulations.

3. This recommendation, that the master sealer system vested in the master of the vessel, should be the order of authority

. . . 2

and direction to ensure the humane killing of seals, has generated an amendment to Section 23 of the Seal Protection Regulations which now states:

"Section 23. The master of a vessel engaged in a sealing operation shall take steps to ensure that every person engaged in sealing from the vessel complies with these Regulations."

4. The recommendation that sealers should be given written instruction on how to assess whether or not an animal is unconscious, and thus insensitive to pain, has been acted upon by my officials and these instructions have been incorporated directly into Section 17 of the Seal Protection Regulations as follows:

"Section 17 (2). For the purposes of Subsection (1) a seal is dead when the seal:

(a) is glassy-eyed;

(b) has a staring appearance;

(c) has no blinking reflex when the eye is touched, and

(d) is in a relaxed condition."

Further to this action, written instructions on the methods of effecting humane killing, based upon a suggested text provided by yourself, have been printed and distributed with sealing licences.

5. The recommendation that all new sealers should be given courses of instruction on the humane killing of seals including the proper use of a hakapik, the ability to assess unconsciousness, the proper methods of skinning as well as a test for marksmanship has been carefully considered and partially implemented during the 1978 sealing season. In the Magdalen Islands courses continue to be offered by fisheries officers on proper sealing practices. We believe that the provision of information on humane killing methods, combined with the master watch system as instituted in all sealing areas in 1978, has produced the desirable result of further educating sealers in this area.

6. The recommendation that fisheries officers be placed on longliners in a random fashion in order to spot-check their sealing operation has been implemented during the 1978 sealing season.

7. We have noted this recommendation and will be giving further consideration to implementation. Superior marksmanship is presently evident on the large sealing vessels and the accuracy of longliner marksmen is considered good as indicated in the Rowsell 1977 report to COSS and CFHS.

. . . 3

8. The recommendation that the Seal Protection Regulations be amended to prohibit the carrying of the shot-gun on any vessel involved in sealing may not be required, as the objective of humane killing may be served by rigorous enforcement of Section 16 (1) (c) of the present Seal Protection Regulations which states:

"Section 16 (1). No person shall take or kill seals in the Gulf area or Front area by any means other than by:

(c) A shotgun not less than 20 gauge firing rifled or "Poly-Kor" slug shot-shells."

We will continue to keep this matter under review, however.

9. There may be an advantage in further investigation of the most appropriate firearms to be used in sealing. May I request that your Committee discuss the possibility of conducting such a study.

10. We have distributed brochures containing information on methods of ensuring good pelt quality. In addition, the primary processors have implemented a system of tagging or marking individual pelts or groups of pelts from each supplier. By this method the industry will be able to pay for pelts according to quality.

11. The assignment of fisheries officers to police operations on small vessels has been implemented as recommended. In the case of enforcement officers on large vessels, the varied origins of the sealing crew on these vessels result in a random chance that the enforcement staff would be from the same community as some of the sealers. The familiarity which fisheries officers have with operations in their district and, indeed, their general responsibilities, require that they conduct observations on the local sealing operations. The senior enforcement officers for both the Gulf and Front were replaced in 1978 because of retirement and regional responsibilities.

Magdalen Islands Operations

1. After reviewing your report on the 1978 hunt we will consider implementation of this proposal for 1979.

2. Your recommendation that the hakapik not be introduced to the Gulf of St. Lawrence sealing operations in 1978 was accepted.

3. There is no reason why large vessels should not be permitted to take part of the Total Allowable Catch within the Gulf of St. Lawrence, within the limits of our scientific advice. The method of capture has no bearing on whether or not there are two herds of harp seals or one in the northwest Atlantic. Since there

. . . 4

is uncertainty concerning stock relationships, the conservative approach, from a biological point of view, is to harvest roughly in proportion to abundance. This can only be accomplished effectively by allowing some use of larger vessels in the Gulf of St. Lawrence.

4. There was careful observation of the landsmen's sealing operations in the Magdalen Islands in 1978 by Messrs. Scott and Hughes of COSS and by officials of my Department. I look forward to reviewing the reports of their observations.

5. This recommendation has been implemented.

Stock Separation

1. Dr. D.M. Lavigne and associates of the University of Guelph have been funded by my Department, with COSS support, to conduct the recommended research. I understand that sufficient samples have been acquired in order to perform these analyses and that my regional staff assisted in the collection of these samples.

2. My staff tagged 3,800 pups in the Gulf and 5,000 at the Front in 1978. This experiment should be of value both with regard to the investigation of stock relationships and estimating pup production.

Aerial Surveys

The results of the 1977 aerial ultra-violet photographic census were reviewed by the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) and the ICNAF Standing Committee on Research and Statistics (STACRES) in both of which COSS was represented. Neither of the Committees, nor the principal investigator for the survey, recommended that an aerial survey be conducted in 1978. As you suggest, we will consider the possibility of repeating the survey in future. Your recommendation that planning be made well in advance of the survey in order to minimize disruption of the industry is most appropriate.

Restricted Observation of the Hunt

In February 1978 we implemented a system of licensing those who wish to visit the sealing operations. The object of the enabling amendments to the Seal Protection Regulations is to permit responsible scrutiny by legitimate journalists, media personnel, scientists and humane society observers, but to prevent interference in legitimate sealing operations which characterized the 1977 hunt on the Front.

. . . 5

Quotas

Harp Seal

This matter was dealt with in your advice of November 21, 1977 and my response of November 28, 1977, copies of which are attached.

Hooded Seal

Analyses conducted by STACRES in 1977 suggested that the 1977 quota of 15,000 hooded seals was indeed a conservative one since the most recent estimate of sustainable yield in the hooded seal population was 22,000 animals. We nevertheless reduced the proportion of adult females to be taken in the large vessel catch to 7.5 per cent from the 10 per cent in force for 1977.

Grey Seal

The breeding population of grey seals on Sable Island was not culled in 1978. Research continued with a massive pup tagging operation and biological sampling.

Budget

I will be writing you separately on this matter.

In closing, I should like to take this opportunity to thank all the members of the Committee on Seals and Sealing for their continued advice and assistance.

Yours sincerely,

Original signed by
Original signé par

Roméo LeBlanc.

COPIES TO: Minister's Office - 2 copies
Mr. J.B. Seaborn
Mr. P. Liebel
Mr. K.C. Lucas
Mr. D.J. McEachran
Dr. A.W. May
Mr. L.S. Parsons
Mr. C.E. Button

LA FACULTÉ DE MÉDECINE DE L'UNIVERSITÉ D'OTTAWA
THE FACULTY OF MEDICINE OF UNIVERSITY OF OTTAWA
DÉPARTEMENT DE PATHOLOGIE · DEPARTMENT OF PATHOLOGY
OTTAWA, ONTARIO
CANADA K1N 9A9

September 13, 1978

Honourable Roméo Leblanc,
Minister of Fisheries,
Environment and Fisheries Canada,
Ottawa, Ontario

Dear Sir:

The Committee on Seals and Sealing (COSS) since it last wrote to you concerning its recommendations for the 1977-78 sealing season, has once again involved itself in all aspects of sealing in the Northwest Atlantic in accordance with its mandate. Members have participated in a wide variety of activities which have included regular meetings, meetings with your staff and international scientists, field observations and participation in public forums.

Our duties have been more onerous this year, in the absence of COSS chairman, Professor Keith Ronald (on sabbatical leave from his post at the University of Guelph). As Acting Chairman, I personally have had to work much harder in gaining an understanding of the various population models and the scientific evidence surrounding the establishment of the sealing quota.

On behalf of all members of the committee and myself, I would like to express our sincere appreciation to the personnel of your offices in Ottawa, Ste. Anne de Bellevue, Halifax and St. John's Nfld. Special mention must be made of the support and assistance given by members of the field operations in St. John's, and in the Magdalen Islands. Without this assistance and support, the work of our committee would be seriously impaired.

This year, as in the past, our recommendations have been arrived at following observation, discussion and critical analysis of all aspects of sealing. The committee would appreciate receiving a reply to these recommendations as soon as feasible, following receipt by you, but hopefully prior to the start of the 1979 sealing season. As your reply to last year's recommendations was received in May 1978, we were unable to take direct action in the current season.

RECOMMENDATIONS:

1. Aerial Survey

The Committee on Seals and Sealing reiterates its contention that an ultra-violet aerial survey has real value as a method to determine the Harp seal population; however, we would remind you that a complete survey has not been made. However, in view of the technical difficulties involved, this form of survey should not be considered as a routine operation but as an occasional method of checking the status of the herd and confirming, (or otherwise,) the assessments of the observers, and the information produced by tagging.

Where aerial census is carried out in the future, it should be conducted by the Government, using the very latest in navigational techniques and taking advantage of the experience of the personnel from the University of Guelph, who have acquired practical experience and knowledge of the problems involved in carrying out aerial surveys.

2. Quotas

Again the committee has chosen not to recommend any specific quotas. It is recommended to the Minister only that, in establishing quotas, a conservative approach be used in order to permit the Harp and Hooded seal populations to increase to a reasonable sustainable size.

3. Reports by Observers

With respect to reports by foreign animal welfare societies, the committee accepted with thanks the report of John Walsh of the International Society for the Protection of Animals (ISPA). However it recommends that the report by Dr. William Jordan, Wildlife Specialist of the Royal Society for the Prevention of Cruelty to Animals (RSPCA) published by that organization, be rejected as "without sufficient factual base, irresponsible and inaccurate, recommending it be read only in conjunction with the comments of the Acting Chairman and Secretary of the Committee on Seals and Sealing". These critiques have been widely distributed both to the RSPCA and to ISPA, to the Government of Canada and to any other organizations wishing copies.

4. Hooded seals

The committee considers that the Hooded seal requires special attention and recommends that additional research be undertaken on herd dynamics of this species. Furthermore, a research undertaking by the Committee on Seals and Sealing indicates that it appears to be feasible to immobilize adult Hooded seals and carry out tagging of this species.

Additionally, the committee recommends that the Hooded female be completely protected, i.e. a zero kill.

There was evidence that some of the adult Hooded seals after being shot, had been landed on the vessels still with a blinking reflex, indicating that the animals were conscious and thus sensitive to pain during this process. The committee reiterates its concern and desire that, in future, all sealers be advised that adult Hooded seals must be rendered unconscious with the Hakapik before being landed aboard vessels and that Fisheries Officers be instructed to make certain that this regulation is complied with.

5. Grey Seals

In the belief that the bounty system of Grey seals appears to be cruel and ineffective, the committee recommends that the Government be encouraged to find other methods of controlling these animals. It is generally in favour of the present cull by Government Fisheries Officers; however, before agreeing to any increase in the size of the cull, the committee must receive more adequate data on damage to Fishery gear.

Additionally, the committee again does not recommend any cull on Sable Island since this would be an extension to the existing cull.

Gun use on Grey Seals declines to support the recommendation of the Federal Department of Fisheries that the Government of Nova Scotia be asked, in regulations, to permit guns to be carried or used at any time to kill Grey seals. It is felt that this would result in an increase in unnecessary suffering to seals.

6. Observation of the Hunt

During the past year a new procedure has been introduced with respect to controlling access to seal hunting by protest groups and news media. The committee feels that seal hunting is an outdoor slaughter operation and that there is no necessity for the Government of Canada to provide unlimited, unrestricted, opportunities for the general public to view these operations. Instead, the committee believes observation of sealing should be limited to the following:

a) Members of the Committee on Seals and Sealing, in order to enable them to advise the Minister of Fisheries in accordance with their terms of reference;

b) The humane movement as represented nationally by the Canadian Federation of Humane Societies, and internationally by the International Society for the Protection of Animals. These two bodies should have every opportunity to send one or at the most two observers to the Front and the Gulf, and these observers should be given every cooperation by Government. Furthermore, it is recommended that other humane societies both in Canada and elsewhere who may wish to observe sealing and obtain information, should be directed to obtain their information through these two above mentioned humane organizations.

It was agreed that members of the committee make every effort to ensure that major humane organizations receive accurate information and if this involves participating in the meetings of those groups, that this would be a legitimate activity of COSS.

Scientists, authorized by Government to carry out research projects on seals, both in the Gulf and on the Front, such individuals should have unrestricted access to the seals in order to enable them to carry out their studies.

d) News media, with the following stipuation: application for permission to view the hunt to be made to the Minister at least one month before the hunt commences; the number of personnel they wish to be covered by the permit, the area they wish to visit (the Front or the Gulf) and the date of their proposed visit to be included.

The committee recognizes that unlimited or unrestricted observance of the hunt by the news media could, in itself, constitute harrassment to the seals and to sealers. In order to avoid this, the committee recommends that the number of news media personnel allowed to visit any one part of the hunt at the same time should be limited by permit within the final jurisdiction of the Minister, and that the news media should be made well aware, in advance, of the conditions (re photography, etc.) of the Observers Permit.

Furthermore the committee believes that Visitors or Observers Permits should be standardized and should be issued in a way which is consistent, both in the Front and the Gulf, and that in particular, the decision to issue the permit should be made by at least the Regional Director-General.

It is the committee's opinion that the Government, in issuing permits to the media for access to the ice should issue permits to Canadian news agencies, but should consider restricting access to the ice when considering applications for permits for the international news media, to encourage the latter to obtain information from Canadian press sources.

7. Enforcement of seal protection regulations.

It is recommended that the government should introduce additional programs or upgrade existing training programs for Fisheries, Conservation and Protection Officers (CPO) and for sealers. The committee commends the Federal Fisheries Department and the Fisheries Officers for training programs already introduced, but emphasize the need that these programs be stepped up and more emphasis given to them.

The committee recommends the Regulations be amended to require that in humane killing, the seal after being rendered unconscious by one of the approved methods, be bled out immediately by cutting the axillary blood vessels.

The committee recommends an increase in the number of Fisheries Officers used to enforce the regulations in the Newfoundland Landsmen's operations.

The committee recommends that Federal CPO's should enforce the Regulations more vigourously and, in particular, that those stationed aboard vessels should spend more time on the ice and should be required to take a more aggressive and more positive attitude towards the Regulations in their relationships and discussions with sealers.

The committee intends to meet with sealing captains, before the hunt commences, to discuss with them their attitude towards their part in the enforcement of Regulations.

8. Behavioural Studies

The committee is concerned over the maternal behavioural aspects of the female Harp and Hooded seals and repeats a past recommendation that further behavioural studies should be carried out and supported by the Committee on Seals and Sealing.

9. Socio-Economic Aspects

The Committee on Seals and Sealing commends the Government for the preparation of the report by Dr. Allen concerning the Socio-Economic aspects of the seal fishery. However, the committee specifically recommends that the Government expand and update this study and make the information available to COSS as soon as possible

10. Alternative Killing Methods

It was agreed that the Committee on Seals and Sealing would explore and encourage others to investigate the development of alternative methods to the club e.g. use of the sealing pistol developed in 1967-68 by Mr. Hughes.

A copy of the minutes of the meeting of the Committee on Seals and Sealing of June 20,21, 1978 have been sent to Dr. Arthur May and contain subsidiary recommendations which we hope you will take into consideration.

This year the Committee on Seals and Sealing will be preparing an "Annual Report". This will include observers' reports and other material approved by the committee, together with a copy of the recommendations made to you.

The Committee on Seals and Sealing budget for April 1st, 1978 to March 31st, 1979 will be submitted in a separate letter.

Once again we are deeply grateful to you and your Department for the cooperation and assistance that has been given to members of the committee during the past year.

Yours sincerely,

H.C. Rowsell, DVM., Ph.D.,
Acting Chairman,
Committee on Seals and Sealing

HCR;gm

Minister
Fisheries and Environment Canada

Ministre
Pêches et Environnement Canada

Ottawa, Ontario.
K1A 0H3

DEC 18 1978

Dr. H.C. Rowsell,
A/Chairman,
Committee on Seals and Sealing,
c/o Canadian Council on Animal Care,
151 Slater Street,
Ottawa, Ontario.
K1P 5H3

Dear Dr. Rowsell:

Thank you for your letter of September 13 providing the recommendations of the Committee on Seals and Sealing on my Department's management of the 1979 northwest Atlantic sealing operations.

I should like to address these recommendations in the order in which they were presented.

1. Aerial Survey

The Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) Marine Mammals Subcommittee has considered, in great detail, the aerial ultra-violet photographic census technique to assess the northwest Atlantic harp seal population. This group, comprising scientists from both inside and outside the Government, recommended that, in view of the large body of existing scientific information on harp seals and the consistency in current estimates of population size and pup production, no scientific imperative exists for an immediate aerial photographic census. The Subcommittee has formed a working group to examine the feasibility of aerial censuses which recommended a number of refinements in the present techniques to increase the potential for success in any future surveys. This Working Group's report will be forwarded to COSS when available.

This Subcommittee's recommendations do not preclude future aerial surveys to provide other independent assessments of this harp seal population.

.../2

2. Quotas.

The most contemporary scientific data on seals originating from Canadian scientists has been reviewed by CAFSAC. This information and that provided by Norwegian and Danish scientists has recently been scrutinized by the ICNAF Standing Committee on Research and Statistics (STACRES) in Bergen, Norway. As in past years, the scientific advice offered by STACRES will provide the basis for the conservation-oriented management regime established for harp and hooded seals. It is unfortunate that the Committee on Seals and Sealing could not accept my invitation to attend the STACRES meeting, however, I enclose the report and scientific documents on seals considered therein.

3. Reports by Observers.

My Department acknowledges your Committee's analysis of, and recommendations on, the reports on the 1978 sealing operations prepared by agents of foreign animal welfare societies. I would request that the comments of the Committee on Seals and Sealing on these reports be widely distributed, as appropriate, to interested organizations and individuals.

4. Hooded Seals.

An October 25 meeting of the CAFSAC Marine Mammals Subcommittee reiterated the 1977 STACRES recommendation that age samples, segregated by sex, be collected from all adult hooded seals landed. We anticipate an intensification of population dynamics research on harp seals in 1979, and a continuation of my Department's hooded seal tagging program.

At a September 15 government/industry consultation on sealing, Dr. Ronald of your Committee accepted a sealing industry proposal for a reduction in the proportion of adult female hooded seals harvested to 5% of daily on board catch of this species. All participants concurred that it was desirable to minimize the take of adult female hooded seals harvested.

Present Seal Protection Regulations require that adult hooded seals must be rendered unconscious before being landed aboard sealing vessels. As in previous years, this regulation will be strictly enforced and it will be afforded special emphasis in 1979.

. . . /3

5. Grey Seals.

Additional information on the damage to fishing gear by grey seals is presently being compiled. My Department will be reviewing the present management regime for grey seals within the context of this new information when it becomes available.

6. Observation of the Hunt.

The Committee on Seals and Sealing recommendations on controlling access to the sealing operations will receive every consideration by my Department during the development of policies in this regard for 1979. Certainly, every effort will be made to accommodate members of the Committee, representatives of Canadian and international humane movements, and scientists wishing to conduct valuable research and observations on seals and sealing. We are cognizant that some visitors to the sealing operations have previously engaged in activities to harass sealers in their pursuit of a legitimate livelihood. Whilst such harassment cannot be condoned, we must permit responsible observation of the operations.

7. Enforcement of Seal Protection Regulations.

My Department concurs with your recommendation respecting expansion of the existing training programs for Conservation and Protection Officers and sealers. To this end, a number of officers from the Fisheries and Marine Service will receive general enforcement training at the RCMP centre in Regina, Saskatchewan. In addition, we are examining the feasibility of conducting intensive training sessions on sealing for Conservation and Protection Officers. It is anticipated that appropriate members of COSS could contribute heavily to such a training program.

These officers will, in turn, provide intensive instruction on our Seal Protection Regulations and particularly with regard to humane killing methods to all large vessel sealers. An instructional program for landsmen will involve the distribution of updated brochures on the same topics. The strict observance of the Seal Protection Regulations will be further emphasized during discussions with fishermen's groups prior to and during the 1979 sealing season and by community Fisheries Officers.

I agree with your suggestion to incorporate more detailed descriptions of the current stunning/exsanguination humane killing technique into the Seal Protection Regulations.

. . . /4

An increase in the number of Fisheries Officers used to enforce the Seal Protection Regulations in the Newfoundland landsmen's operations is unlikely for 1979 as a result of the current Government fiscal restraint program. It is anticipated, however, that the introduction of a more efficient statistics reporting system will permit officers assigned to the hunt to increase the time spent on enforcement of the Seal Protection Regulations in 1979.

The Committee's recommendation for even more vigorous and aggressive enforcement of the Seal Protection Regulations will be effected in 1979.

I would hope that COSS members and my officials would meet with sealing captains prior to the 1979 hunt.

8. Behavioural Studies.

The September 19-30 and October 25 meeting of the CAFSAC Marine Mammals Subcommittee recommended intensification of current research on the social behaviour of harp and hooded seals, particularly pup-dam interactions. I understand that research proposals to this effect are to be submitted to the Fisheries and Marine Service of my Department for review and potential routes for funding are to be identified in consultation with my officials. I will look forward to receiving reports on the topic already funded within the COSS budget.

9. Socio-economic Aspects.

My Department is considering an update of the economic report on 1976 sealing operations, for 1980. As an interim measure, a minor update of the 1976 economic study is being performed on the 1978 operations.

10. Alternate Killing Methods.

On October 25, the CAFSAC Marine Mammals Subcommittee supported the COSS recommendation for the commencement of research to examine alternate methods of humane killing for seals. My Department endorses this research and is presently examining methods whereby it might be expedited.

The subsidiary recommendations forwarded to officials in my Department under separate cover will similarly receive careful consideration. My officials will be consulting with the Committee

. . . /5

on these recommendations contained in the Minutes of the June 20-21, 1978 COSS meeting. The Committee will thus be kept informed of our progress in implementing its recommendations for 1979. COSS funding and budget for the period April 1, 1978 to March 31, 1979 have been discussed in a separate letter to the Committee dated November 16.

Please convey to the Committee my appreciation for its continued advice on seals and sealing in Canada and the balanced perspective it has brought to this emotive topic.

Yours sincerely,

Roméo LeBlanc

Encs.

LA FACULTÉ DE MÉDECINE DE L'UNIVERSITÉ D'OTTAWA
THE FACULTY OF MEDICINE OF UNIVERSITY OF OTTAWA
DÉPARTEMENT DE PATHOLOGIE · DEPARTMENT OF PATHOLOGY

September 13, 1978

Honourable Roméo Leblanc,
Minister of Fisheries,
Environment and Fisheries Canada,
Ottawa, Ontario

Dear Sir:

The Committee on Seals and Sealing (COSS) since it last wrote to you concerning its recommendations for the 1977-78 sealing season, has once again involved itself in all aspects of sealing in the Northwest Atlantic in accordance with its mandate. Members have participated in a wide variety of activities which have included regular meetings, meetings with your staff and international scientists, field observations and participation in public forums.

Our duties have been more onerous this year, in the absence of COSS chairman, Professor Keith Ronald (on sabbatical leave from his post at the University of Guelph). As Acting Chairman, I personally have had to work much harder in gaining an understanding of the various population models and the scientific evidence surrounding the establishment of the sealing quota.

On behalf of all members of the committee and myself, I would like to express our sincere appreciation to the personnel of your offices in Ottawa, Ste. Anne de Bellevue, Halifax and St. John's Nfld. Special mention must be made of the support and assistance given by members of the field operations in St. John's, and in the Magdalen Islands. Without this assistance and support, the work of our committee would be seriously impaired.

This year, as in the past, our recommendations have been arrived at following observation, discussion and critical analysis of all aspects of sealing. The committee would appreciate receiving a reply to these recommendations as soon as feasible, following receipt by you, but hopefully prior to the start of the 1979 sealing season. As your reply to last year's recommendations was received in May 1978, we were unable to take direct action in the current season.

COMMENDATIONS:

1. Aerial Survey

The Committee on Seals and Sealing reiterates its contention that an ultra-violet aerial survey has real value as a method to determine the Harp seal population; however, we would remind you that a complete survey has not been made. However, in view of the technical difficulties involved, this form of survey should not be considered as a routine operation but as an occasional method of checking the status of the herd and confirming, (or otherwise,) the assessments of the observers, and the information produced by tagging.

Where aerial census is carried out in the future, it should be conducted by the Government, using the very latest in navigational techniques and taking advantage of the experience of the personnel from the University of Guelph, who have acquired practical experience and knowledge of the problems involved in carrying out aerial surveys.

2. Quotas

Again the committee has chosen not to recommend any specific quotas. It is recommended to the Minister only that, in establishing quotas, a conservative approach be used in order to permit the Harp and Hooded seal populations to increase to a reasonable sustainable size.

3. Reports by Observers

With respect to reports by foreign animal welfare societies, the committee accepted with thanks the report of John Walsh of the International Society for the Protection of Animals (ISPA). However it recommends that the report by Dr. William Jordan, Wildlife Specialist of the Royal Society for the Prevention of Cruelty to Animals (RSPCA) published by that organization, be rejected as "without sufficient factual base, irresponsible and inaccurate, recommending it be read only in conjunction with the comments of the Acting Chairman and Secretary of the Committee on Seals and Sealing". These critiques have been widely distributed both to the RSPCA and to ISPA, to the Government of Canada and to any other organizations wishing copies.

4. Hooded seals

The committee considers that the Hooded seal requires special attention and recommends that additional research be undertaken on herd dynamics of this species. Furthermore, a research undertaking by the Committee on Seals and Sealing indicates that it appears to be feasible to immobilize adult Hooded seals and carry out tagging of this species.

Additionally, the committee recommends that the Hooded female be completely protected, i.e. a zero kill.

There was evidence that some of the adult Hooded seals after being shot, had been landed on the vessels still with a blinking reflex, indicating that the animals were conscious and thus sensitive to pain during this process. The committee reiterates its concern and desire that, in future, all sealers be advised that adult Hooded seals must be rendered unconscious with the Hakapik before being landed aboard vessels and that Fisheries Officers be instructed to make certain that this regulation is complied with.

5. Grey Seals

In the belief that the bounty system of Grey seals appears to be cruel and ineffective, the committee recommends that the Government be encouraged to find other methods of controlling these animals. It is generally in favour of the present cull by Government Fisheries Officers; however, before agreeing to any increase in the size of the cull, the committee must receive more adequate data on damage to Fishery gear.

Additionally, the committee again does not recommend any cull on Sable Island since this would be an extension to the existing cull.

Gun use on Grey Seals declines to support the recommendation of the Federal Department of Fisheries that the Government of Nova Scotia be asked, in regulations, to permit guns to be carried or used at any time to kill Grey seals. It is felt that this would result in an increase in unnecessary suffering to seals.

6. Observation of the Hunt

During the past year a new procedure has been introduced with respect to controlling access to seal hunting by protest groups and news media. The committee feels that seal hunting is an outdoor slaughter operation and that there is no necessity for the Government of Canada to provide unlimited, unrestricted, opportunities for the general public to view these operations. Instead, the committee believes observation of sealing should be limited to the following:

a) Members of the Committee on Seals and Sealing, in order to enable them to advise the Minister of Fisheries in accordance with their terms of reference;

b) The humane movement as represented nationally by the Canadian Federation of Humane Societies, and internationally by the International Society for the Protection of Animals. These two bodies should have every opportunity to send one or at the most two observers to the Front and the Gulf, and these observers should be given every cooperation by Government. Furthermore, it is recommended that other humane societies both in Canada and elsewhere who may wish to observe sealing and obtain information, should be directed to obtain their information through these two above mentioned humane organizations.

It was agreed that members of the committee make every effort to ensure that major humane organizations receive accurate information and if this involves participating in the meetings of those groups, that this would be a legitimate activity of COSS.

c) Scientists, authorized by Government to carry out research projects on seals, both in the Gulf and on the Front, such individuals should have unrestricted access to the seals in order to enable them to carry out their studies.

d) News media, with the following stipuation: application for permission to view the hunt to be made to the Minister at least one month before the hunt commences; the number of personnel they wish to be covered by the permit, the area they wish to visit (the Front or the Gulf) and the date of their proposed visit to be included.

The committee recognizes that unlimited or unrestricted observance of the hunt by the news media could, in itself, constitute harrassment to the seals and to sealers. In order to avoid this, the committee recommends that the number of news media personnel allowed to visit any one part of the hunt at the same time should be limited by permit within the final jurisdiction of the Minister, and that the news media should be made well aware, in advance, of the conditions (re photography, etc.) of the Observers Permit.

Furthermore the committee believes that Visitors or Observers Permits should be standardized and should be issued in a way which is consistent, both in the Front and the Gulf, and that in particular, the decision to issue the permit should be made by at least the Regional Director-General.

It is the committee's opinion that the Government, in issuing permits to the media for access to the ice should issue permits to Canadian news agencies, but should consider restricting access to the ice when considering applications for permits for the international news media, to encourage the latter to obtain information from Canadian press sources.

7. Enforcement of seal protection regulations.

It is recommended that the government should introduce additional programs or upgrade existing training programs for Fisheries, Conservation and Protection Officers (CPO) and for sealers. The committee commends the Federal Fisheries Department and the Fisheries Officers for training programs already introduced, but emphasize the need that these programs be stepped up and more emphasis given to them.

The committee recommends the Regulations be amended to require that in humane killing, the seal after being rendered unconscious by one of the approved methods, be bled out immediately by cutting the axillary blood vessels.

The committee recommends an increase in the number of Fisheries Officers used to enforce the regulations in the Newfoundland Landsmen's operations.

The committee recommends that Federal CPO's should enforce the Regulations more vigourously and, in particular, that those stationed aboard vessels should spend more time on the ice and should be required to take a more aggressive and more positive attitude towards the Regulations in their relationships and discussions with sealers.

The committee intends to meet with sealing captains, before the hunt commences, to discuss with them their attitude towards their part in the enforcement of Regulations.

8. Behavioural Studies

The committee is concerned over the maternal behavioural aspects of the female Harp and Hooded seals and repeats a past recommendation that further behavioural studies should be carried out and supported by the Committee on Seals and Sealing.

9. Socio-Economic Aspects

The Committee on Seals and Sealing commends the Government for the preparation of the report by Dr. Allen concerning the Socio-Economic aspects of the seal fishery. However, the committee specifically recommends that the Government expand and update this study and make the information available to COSS as soon as possible

10. Alternative Killing Methods

It was agreed that the Committee on Seals and Sealing would explore and encourage others to investigate the development of alternative methods to the club e.g. use of the sealing pistol developed in 1967-68 by Mr. Hughes.

A copy of the minutes of the meeting of the Committee on Seals and Sealing of June 20,21, 1978 have been sent to Dr. Arthur May and contain subsidiary recommendations which we hope you will take into consideration.

This year the Committee on Seals and Sealing will be preparing an "Annual Report". This will include observers' reports and other material approved by the committee, together with a copy of the recommendations made to you.

The Committee on Seals and Sealing budget for April 1st, 1978 to March 31st, 1979 will be submitted in a separate letter.

Once again we are deeply grateful to you and your Department for the cooperation and assistance that has been given to members of the committee during the past year.

Yours sincerely,

H.C. Rowsell, DVM., Ph.D.,
Acting Chairman,
Committee on Seals and Sealing

HCR;gm

Minister
Fisheries and Environment Canada

Ministre
Pêches et Environnement Canada

Ottawa, Ontario.
K1A 0E6

FEB 2 1979

Professor Keith Ronald,
Chairman, Committee on Seals and Sealing,
Dean, College of Biological Sciences,
University of Guelph,
Guelph, Ontario.

Dear Professor Ronald:

It has now been two years since I have met personally with members of your Committee to discuss its work and to discuss your advice on seal management; perhaps since we have accepted nearly all of your recommendations there has been little need for extensive discussion of them. However I think it would now be appropriate for us to meet again in order that I may be able to receive at first hand your thoughts and recommendations on a wide range of subjects in relation to seal management. An appropriate time might be soon after the 1979 hunt when you will have new first hand observations to report. I will ask my officials to contact you with regard to setting up an appropriate meeting time, in consultation with my office.

I provide herewith letters of authority and recognition for your upcoming activities at the 1979 sealing operations as requested by Committee members during a December 20 meeting with my officials.

Please accept my personal best wishes for a successful field season as you go to the ice to conduct research and observe the hunt. I am pleased to assure you of my Department's every cooperation in the conduct of your observations this year as in the past.

Yours sincerely,

ORIGINAL SIGNED BY
A SIGNÉ L'ORIGINAL

Roméo LeBlanc.

c.c. Committee members

COPIES TO: Minister's Office
M.C. Mercer

Minister
Fisheries and Environment Canada

Ministre
Pêches et Environnement Canada

Ottawa, Ontario.
K1A 0E6

MAY 8 1979

Professor K. Ronald,
Chairman,
Committee on Seals and Sealing,
College of Biological Science,
Office of the Dean,
University of Guelph,
Guelph, Ontario.
N1G 2W1

Dear Professor Ronald:

Thank you for your letter of February 23, 1979 regarding an early meeting of the Committee on Seals and Sealing to review the 1979 seal hunt.

As I am sure you will appreciate my schedule for the next month is already a full one. For that reason a June meeting would be more realisitc - at least then life should be a little less hectic and I will be able to devote an appropriate amount of time to the Committee.

If this is acceptable to you, please advise me and I will ask my officials to make the appropriate arrangements in consultation with you.

Yours sincerely,

Original signed by
Original signé par

Roméo LeBlanc.

COPIES TO: Minister's Office - 2 copies
Mr. D.D. Tansley
Dr. A.W. May
Dr. G.L. Robins

University of Guelph
COLLEGE OF BIOLOGICAL SCIENCE
OFFICE OF THE DEAN

79 02 23

The Honourable Romeo LeBlanc
Minister
Fisheries and Environment Canada
Ottawa, Ontario K1A 0E6

Dear Mr. LeBlanc:

I would like to thank you for your letter of 79 02 02 in which you comment on the activities of the Committee on Seals and Sealing.

I, like you, think that we should meet in the near future and discuss the activities of the last few years and especially those which will occur at this year's seal hunt. I might suggest that sometime around mid-May would be an ideal time as, hopefully, we might then have some of the statistics on hand on which to base our discussions.

As of yesterday, some of our group left to carry out the behavioural work that is so essential to understanding the full biology of the harp seal and its young. I also feel that this may be the year in which we face the heaviest confrontation between the seals, sealers, and anti-sealing groups. The coming together of the R.S.P.C.A., and some of the larger conservation groups in North America and elsewhere, will have potentiating effects on the whole reaction to sealing. It is therefore essential that all regulations this year are enforced to the limit, and that local patriotism does not allow any one group of sealers to be in error in the way in which they handle the killing of the animals or the product itself. I am sure you are more aware of this, and hopefully after a somewhat active two months we will settle back down again to evaluate what really did happen in 1979.

I appreciate the letters of authority which you have sent and have taken the liberty of attaching a list, as enclosed, of persons who will be working with our Committee, or are known to be working under projects agreed to by your own office.

Looking forward to meeting with you in the near future and discussing the programme, and perhaps the future of the Committee on Seals and Sealing.

Yours sincerely,

Professor K. Ronald
Chairman
Committee on Seals and Sealing

Minister
Fisheries and Environment Canada

Ministre
Pêches et Environnement Canada

Ottawa, Ontario.
K1A 0E6

FEB 2 1979

Professor Keith Ronald,
Chairman, Committee on Seals and Sealing,
Dean, College of Biological Sciences,
University of Guelph,
Guelph, Ontario.

To whom it may concern:

This letter will authorize the present activities of its bearer Professor Keith Ronald at the 1979 sealing operations.

I would request that the Department of Fisheries and Oceans employees provide every assistance possible to the bearer in performing his/her requested functions at the sealing operations in 1979.

Roméo LeBlanc.

To my knowledge, the following persons will be active in the 1979 sealing programme:

T.I. Hughes
T.H. Scott
K. Henriksen
H.D. Fisher
H. Rowsell
R. Stewart
G. Nancekivell
S. Innis
T. Miller
D.M. Lavigne

Professor K. Ronald
Chairman, Committee on Seals & Sealing

1165-C236
1165-C59

University of Guelph
COLLEGE OF BIOLOGICAL SCIENCE
OFFICE OF THE DEAN
79 08 30

The Honourable Mr. James McGrath
Minister of Fisheries and Oceans
Fisheries and Environment Canada
House of Commons
Ottawa, Ontario K1A 0A6

Dear Mr. McGrath:

We are writing in order to seek your opinion on a mutual problem.

The Committee on Whales and Whaling, and the Committee on Seals and Sealing, both form a service in directly advising you on all matters pertaining to whales and seals. In many cases, the problems are similar, but also specific enough that there is a definite need for two advisory groups. COSS has been active for eight years and has built up a great deal of associated expertise to perform its task. COWW will undoubtedly have started along the same route.

Marine mammals produce similar problems of emotionalism, humane killing, and utilization, whether the species are large or small. To this end, we believe it would be reasonable to have a continuing interchange of the Chairmen of the two committees. This would ensure that there was no marked waste of effort through overlap, and a compounding of results through mutual information utilization. There may well be times when a Chairman cannot be available, in which case he would designate a replacement with adequate expertise to meet with the other Committee.

We would appreciate your comments on this rather simple matter and if you agree to the procedure, we would appreciate the appointment of the relevant chairmen ex-officio to the other committee.

Yours sincerely,

Professor I. McTaggart-Cowan
Chairman
Committee on Whales & Whaling

Professor K. Ronald
Chairman
Committee on Seals & Sealing

University of Guelph
COLLEGE OF BIOLOGICAL SCIENCE
OFFICE OF THE DEAN

79 08 20

The Honourable J.A. McGrath
Minister of Fisheries and Oceans
Ottawa, Ontario
K1A OH3

Dear Mr. McGrath:

I have been informed by our secretary, Mr. T.I. Hughes, that you wish the Committee on Seals and Sealing to continue.

All Committee members have agreed to do so under the original terms of reference, i.e., advise you on all aspects of seals and sealing relevant to Canada.

To this end, we will be meeting in Ottawa on 79 09 05 at the Skyline Hotel. We will, at that time, prepare a verbal statement of our past activities, present status, and future recommendations for your appraisal. In order that we might discuss this with you and have you personally meet your Committee, I would ask that we meet with you on the morning of (or for lunch on) 79 09 06. We usually are able to complete our advisement in about one hour, and hopefully you will be able to fit us into what must already be a very busy schedule.

Looking forward to meeting with you, I remain,

Yours sincerely,

Professor K. Ronald
Chairman, Committee on Seals and Sealing
and Dean, College of Biological Science

cc: C.O.S.S.

Minister of Fisheries and Oceans

Ministre des Pêches et des Océans

DEC - 7 1979

Professor K. Ronald,
Chairman,
Committee on Seals and Sealing,
University of Guelph,
Guelph, Ontario.
N1G 2W1

Professor I. McTaggart-Cowan,
Chairman,
Committee on Whales and Whaling,
3919 Woodhaven Terrace,
Victoria, British Columbia.
V8N 1S7

Gentlemen:

Thank you for your letter received on September 20, 1979 in which you outlined some of the similarities in problems addressed by the Committee on Seals and Sealing and the Committee on Whales and Whaling. While your two Committees have very specific mandates which do not overlap, I can certainly appreciate the parallel nature of some of your concerns. Since receiving your letter, I have had the opportunity to further discuss your suggestion with Dr. McTaggart-Cowan, who is of course already aware of my position on the matter.

As outlined in my conversation with Dr. McTaggart-Cowan, I feel it desirable to maintain the total separation of the two Committees in order to allow them to provide me with fully independent advice in the two subject areas. The advice which each of the Committees provide is made publicly available to all interested parties and you may well find it useful to review copies of advice generated by the other Committee.

I look forward to your continuing advice and support in the management of marine mammals in Canada.

Yours sincerely,

Original signed by
Original signé par

James A. McGrath

cc: Minister's Office (2)
M.C. Mercer (originator) (4)
B.S. Muir

Ottawa, Canada
K1A 0E6

University of Guelph
COLLEGE OF BIOLOGICAL SCIENCE
OFFICE OF THE DEAN

79 05 11

The Honourable Romeo LeBlanc
Minister
Fisheries and Environment Canada
Ottawa, Ontario
K1A 0E6

Dear Mr. LeBlanc:

On behalf of the Committee on Seals and Sealing I wish to thank you for your letter of 79 05 11 regarding a meeting to review the 1979 seal hunt.

We will await your notification of an appropriate time and day during the month of June, and look forward to a meeting of benefit to all concerned.

Best wishes.

Yours sincerely,

Professor K. Ronald, Dean
and Chairman, Committee on Seals and Sealing

cc: COSS

Professor K. Ronald
Chairman
Committee on Seals and Sealing
University of Guelph
College of Biological Science
Guelph, Ontario
N1G 2W1

Dear Professor Ronald:

Thank you for your letter of July 4 concerning the work of the Committee on Seals and Sealing. While your itemized comments deal with matters handled by the previous Minister, I will be pleased to comment on some of the points which you have raised in your letter. I refer to these on an item by item basis using the numbering which you have applied in your letter.

1. I have nothing to add to the previous comments concerning preparation of documents and scheduling of meetings. If we are, in fact, to have annual meetings to deal with assessments of seals and incorporate into consideration at these meetings the results of the previous field season, it is not practical to have documents completed many months in advance of meetings. With two meetings of the CAFSAC Subcommittee on Marine Mammals and a subsequent meeting of the NAFO Scientific Council, there should be a very adequate opportunity for detailed scientific review of documents prepared and the provision of the best available scientific advice. The situation in fact is analagous to that occurring for all other stocks considered domestically or by international fisheries commissions. I am not aware of any technical faults which you have found with the ICNAF/NAFO scientific advice over the past few years that would lead me to believe that we have suffered from faulty assessments.

4. I understand that COSS is prepared to investigate the net fishery and will look forward to having a research protocol tabled as part of COSS participation in the CAFSAC Sub-committee on Marine Mammals over the next couple of months.

. . . /2

Ottawa, Canada
K1A 0H3

5. You are, of course, well aware of the annual budget cycle of government. If we contract work to be done by a university within a given fiscal year and a decision is subsequently taken to carry forward funding into the next fiscal year the expenses for this must be borne out of our budget for the second year while Departmental funds which originally budgeted for the project lapse. If the research clearly requires that a project or specific tasks be continued over two or more years, this should be specified and agreed at the outset so that appropriate budgeting may take place.

20. I am unsure what you mean by receiving documentation by "less than direct routes". We have encouraged departmental personnel to forward material directly to you from our various offices. However, if you prefer we can consolidate this process into a single channel so that any problems which you may perceive may be overcome.

21. I concur that the Chairman of COSS and COWW should exchange minutes of meetings.

22. The COSS budget was not, in fact, reduced since in previous years the budgeting included funds for research programs. You will recall that we adopted a different method of budgeting for the Committee in the 1978/79 fiscal year wherein all research which you proposed would be considered and appropriate contracts issued, specifying costs, timeframes, etc. The budget of $75,000 thus does not include research and you should note that our current research contracts with the University of Guelph run to a total of $71,860. Furthermore, we are informed by Mr. Hughes that you had cash on hand of $24,571.34 available as of March 31, 1980 which, because of our new budgeting process, may be carried over to this year. When added to our 75K budget contribution for 1980/81, this brings your comparable budget to $171,431.34 which is, in fact, significantly higher than the Committee's actual expenditures of $117,513.90 during 1977/78, the year previous to our changing the budget system. You thus have a substantially larger budget available than you have ever had before.

. . . /3

It was unfortunate that I was unavailable to meet with you during your meeting of July 15-16 in Halifax. However it is certainly my wish to meet with the Committee at some point in the very near future, particularly to consider any new recommendations which you may have in preparation for the forthcoming seal hunt.

Yours sincerely,

Roméo LeBlanc

COPIES TO:

Correspondence Unit - 4
C.D. McAllister - 1
M.C. Mercer - 1

16 JUIL 1980

1165-C59

Follow-up ()

University of Guelph

COLLEGE OF BIOLOGICAL SCIENCE
OFFICE OF THE DEAN

80 07 04

Mr. Roméo LeBlanc,
Minister of Fisheries and Oceans,
Ottawa,
Ontario K1A 0H3.

Dear Mr. LeBlanc,

I am writing to thank you for your letter of 80 06 20 regarding the CVMA's report on the use of the club, hakapik, and gun. It is a pleasure to see our previous reports substantiated by such a group, and presumably the report will be of some value when discussing the overall hunt strategy.

There was one point of concern, in that they have given a number without supporting documentation regarding mother-pup bonding and after-retention of carcass recognition, these figures would have meaning if the total number observed had been recorded. We await such absolute data from the behaviour study sponsored through your ministry. As you know this will need a further year to reach completion and we strongly advised you to continue to support such a basic study.

At this time I would also like to refer to your "intermediate's" letter dated 80 01 14 in which he responded to COSS's letter of advisement of 79 09 14. The points may no longer be relevant with your return, but they were of concern to the committee.

Item 1 - This seemed totally irrelevant to our point, two wrongs presumably don't make a right. We would again reiterate that if we are to give you sound advice we should have highly technical documents available to us at least 1-2 months before we are called upon to respond. Matters decided without such a normal prologue are liable to be hurriedly assessed, perhaps incorrectly, and hence hazardous to seals and sealing.

...../2

Item 4 - We look forward to receiving the data outlined, COSS is seriously considering ways to investigate the net fishery.

Item 5 - The long term committment to a project is perhaps not as evident externally as your ministry might presume, in fact with today's university budgets there is no room for credit carry-over hence work must cease. This places such projects as the behaviour study annually in jeopardy as there is no continuity of funding guaranteed.

Item 20 - We would appreciate that "the transfer of documentation" be brought to the attention of all your personnel. We sometimes receive documentation by less than direct routes.

Item 21 - We are sorry that your predecessor felt that there was no need for exchange of chairmen or their designates between COWW and COSS. We presume however that you would agree to an exchange of minutes between the committees?

Item 22 - The budget requested was felt to be reasonable as it only equalled past budgets, a unilateral decrease had been imposed in the previous year hence the 33% change. This figure is therefore not an increase only a return to a former figure.

I would also suggest that everyone on COSS is (1) holding a non-government full time position of some responsibility, (2) acting on COSS on a literally unpaid basis. These two items make the COSS members very different to personnel of Fisheries and Oceans who are paid to do what they are doing at sealing time, hence they have a primary responsibility to be in the field. I believe therefore that COSS members (who for every hour of work for Fisheries and Oceans, must make up that time at another time and place) should expect the budget to be adequate or better for transportation, and accommodation at all times. This matter is one that I am sure can be worked out, but the distinction between your full time personnel, and our members' near sacrificial scheduling for COSS must be considered.

...../3

Mr. R. LeBlanc 80 07 04

COSS will be meeting in Halifax on July 15 and 16 and I can assure you that we would be pleased to have you join us if your schedule permits, as I often find personal conversation is far clearer than written comments.

Best personal wishes and belated congratulations on your reappointment as minister.

Yours sincerely,

Professor K. Ronald,
Dean.

cc: COSS

CANADA

TELEX MESSAGE FORM
FORMULE DE MESSAGE TELEX

FILE NO. / DOSSIER N°

SEND TO / EXPEDIER A

DR. KEITH RONALD
CHAIRMAN, COMMITTEE ON SEALS & SEALING
DEAN, COLLEGE OF BIOLOGICAL SCIENCE
UNIVERSITY OF GUELPH
GUELPH, ONTARIO

TELEX # 069-56500

(Full Name and Complete Address) – (Nom et adresse au complet)

PLEASE TYPE MESSAGE IN CAPITAL LETTERS AND DOUBLE SPACED

PRIÈRE DE DACTYLOGRAPHIER LE MESSAGE EN MAJUSCULES ET À DOUBLE INTERLIGNE

FOR VARIOUS CONSIDERATIONS I HAVE DECIDED NOT TO PROCEED WITH A CULL OF GREY SEALS ON SABLE ISLAND THIS YEAR. CAFSAC WILL BE REQUESTED TO PROVIDE DETAILED SCIENTIFIC REVIEW OF GREY SEAL PROBLEM. SUGGEST WE ARRANGE MEETING LATE MAY OR JUNE TO DISCUSS THIS AND OTHER ISSUES. DETAILED RESPONSE TO ISSUES RAISED IN YOUR LETTERS FORTHCOMING.

File Copies

Minister's Office (2)
D.D. Tansley
A.W. May
D. Goodman (3) ✔

(Sender's Signature) / (Signature de l'expéditeur): Original signed by / Original signé par

(Name of Sender – typed) / (Dactylographier le nom de l'expéditeur): ROMEO LEBLANC
MINISTER

(Identifying Unit) / (Bureau de l'expéditeur): FISHERIES AND OCEANS

SERVICE	BRANCH/Direction	COLLATOR NUMBER/N° d'interci.
DFO	MINISTER'S OFFICE	02-1221-022

TYPIST'S NAME/Dactylo	CONTACT TELEPHONE No.	DATE	SIGNATURE OF PERSON AUTHORIZING MESSAGE
A. Luelo	5-5159 (Pour renseignements composer)	FEB 10 1981	Signature de la personne autorisant l'envoi

TELEX MESSAGE FORM
FORMULE DE MESSAGE TELEX

FILE NO. COSS
DOSSIER N°

SEND TO / ENVOYER À

DR. KEITH RONALD
CHAIRMAN, COSS
DEAN, COLLEGE OF BIOLOGICAL SCIENCE
UNIVERSITY OF GUELPH
GUELPH, ONTARIO

(Full Name and Complete Address) – (Nom et adresse au complet)

PLEASE TYPE MESSAGE IN CAPITAL LETTERS AND DOUBLE SPACED

PRIÈRE DE DACTYLOGRAPHIER LE MESSAGE EN MAJUSCULES ET À DOUBLE INTERLIGNE

THANK YOU FOR YOUR TELEX DATED 81 03 10.

AS YOU ARE BY NOW AWARE, THE HUNT AT P.E.I., THE FIRST THERE IN 12 YEARS, WAS CLOSED AFTER ONLY ONE DAY BECAUSE OF PROBLEMS EXPERIENCED THERE, PARTICULARLY IN RELATION TO ICE CONDITIONS, WHICH DID NOT ENABLE ENFORCEMENT STAFF TO PROPERLY SUPERVISE THE HUNT.

IN VIEW OF GENERALLY GOOD PRACTICES ELSEWHERE, TRAINING COURSES, AND AGREEMENT, FOLLOWING RECOMMENDATION BY THE ATLANTIC SEALS ADVISORY COMMITTEE AT THEIR OCT. 30 MEETING (AT WHICH YOU WERE PRESENT), THAT THE ISSUE OF LANDSMEN LICENSING SHOULD BE REVIEWED IN DETAIL BY THE DEPARTMENT PRIOR TO NEXT YEAR'S HUNT, I AM SURPRISED AT YOUR ADVICE THAT THE HUNT NOT BE OPENED TO LANDSMEN IN OTHER AREAS.

LANDSMEN HUNT AT FRONT WILL BE SUPERVISED BY ENFORCEMENT STAFF AS USUAL GIVING DUE REGARD TO PREVAILING CONDITIONS.

WILL LOOK FORWARD TO LEARNING FINAL RESULTS OF YOUR FIELD STUDIES FOLLOWING THE HUNT.

File Copies

Minister's Office (2)
D.D. Tansley
A.W. May (2)
D. Goodman (3)

(Sender's Signature) / (Signature de l'expéditeur) — Original signed by / Original signé par

(Name of Sender – typed) / (Dactylographier le nom de l'expéditeur) — ROMEO LEBLANC

(Identifying Unit) / (Bureau de l'expéditeur) — MINISTER OF FISHERIES & OCEANS

SERVICE	BRANCH/Direction	COLLATOR NUMBER/N° d'interc.
DFO	MINISTER'S OFFICE	03 1221 022

TYPIST'S NAME /Dactylo	CONTACT TELEPHONE No	DATE	SIGNATURE OF PERSON AUTHORIZING MESSAGE
A. Lucio	5-5159	MAR 24 1981	
	Pour renseignements composer		Signature de la personne autorisant l'envoi

MAR 10 1981

JU (31)

SECTION DE LA CORRESPONDANCE DU MINISTRE
DEC 314-815
MAR 10 1981
RECEIVED
MINISTER'S CORRESPONDENCE UNIT

GOVERNMENT OF CANADA / GOUVERNEMENT DU CANADA
MAR 10 - 10 35 AM '81
FISHERIES AND OCEANS / PÊCHES ET OCÉANS

+

MARSI OTT

COLL BIOL GLPH
81 03 10

THE HONOURABLE ROMEO LEBLANC
MINISTER, FISHERIES AND OCEANS

URGENT - FOR HIS PERSONAL ATTENTION IMMEDIATELY.

1. VERY DISMAYED THAT P.E.I. SHORE HUNT OPENED CONSIDERING TOTAL INADEQUACIES OF SEALER TRAINING, AND ENFORCEMENT PROCEDURES (SEE MY TELEX 81 02 27 - POINT B).

2. MUST NOW ADVISE HUNT NOT BE REOPENED TO ANY LANDSMEN P.E.I. OR OTHER AREAS, NO LONGER BELIEVE THEY ARE CONTROLLABLE.

3. SHOULD CONSIDER TOTAL ABOLITION PRESENT PROCEDURES AND PATCHING OF OTHER INTER-PROVINCIAL CRACKS IN REGULATIONS. GOVERNMENT CULL AND ABOLITION OF OPEN HUNT NOW APPEARS SENSIBLE.

4. GUN PROGRAMME IMPOSSIBLE TO CARRY OUT, ALTHOUGH SOME TESTS MADE.

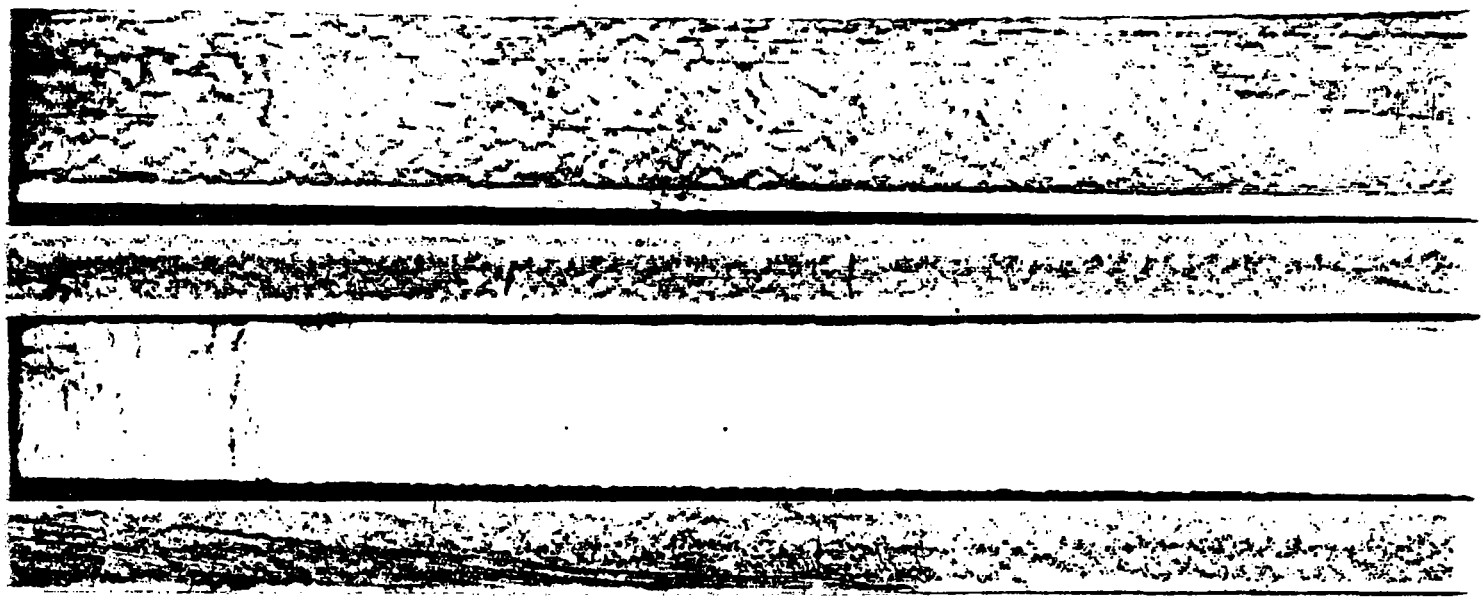
5. FERTILITY STUDIES NOW PARTIALLY COMPLETED IN GULF, MAY NOT HAVE TO MOVE TO FRONT.

6. STILL ADVISE SEVERE RESTRAINT ON FRONT LANDSMEN CONSIDERING PROBABLE ICE CONDITIONS AND OPPORTUNITY FOR INEXPERIENCED OPPORTUNISTS TO REACH SEALS.

RONALD, GUELPH.
TX 069-56500

+

MARSI OTT



3668-2

UNIVERSITY OF GUELPH
COLLEGE OF BIOLOGICAL SCIENCE
Office of the Dean

GUELPH ONTARIO CANADA N1G 2W1
Telephone (519) 824-4120

AUG 27 1981
AOUT

81 08 20

314-815
F.U.

Mr. Romeo LeBlanc,
Minister,
Fisheries and Oceans,
Ottawa, Canada.

Dear Mr. LeBlanc:

I have the privilege of forwarding the latest recommendation of your advisory committee on seals and sealing.

We were pleased that Mr. Morrisey Johnston and Dr. Peter Larkin were asked to join C.O.S.S., and even more pleased that they have both accepted. This gives C.O.S.S. a greater dimension at both "ends" of the sealing spectrum.

At the Moncton and the previous Guelph meeting, there was a feeling of general disenchantment with the activities that took place in the 1981 hunt (see telexes of March etc.). This was not just in regard to the activities in the Gulf, but included those in all eastern Canadian waters. We have often, in the past, expressed our distress at the handling of the whole sealing process, this has arisen in part from an apparent insensibility on the part of governmental and non-governmental persons. Further, it has placed C.O.S.S. members in a very peculiar position in respect to their other responsibilities in Canada, and indeed the world.

The latest disastrous public experience in P.E.I. was an unfortunate example of intra- and interdepartmental (regional) isolation, power politics on the part of those who placed their own territorial boundaries above the welfare of seals, or individual sealers. There was also, in our opinion, little recognition of the intent of the regulations (as noted below). Further to this, we had either an apparent over-shooting of quotas, or an inadequate reporting of the hunt statistics.

In fact, these unfortunate incidents were further enforced by the inadequacies of those responsible to stop sealers from what at times was apparently illegal and dangerous hunting.

There is a still much to be changed if the hunt is to continue. We would draw your attention to our past recommendations and further ask that you, **personally** consider those listed below.

I have itemized the recommendations arising from the 81 06 11 meeting at Moncton -

1. SEALING - the committee feels that the traditional methods of hunting in the Gulf region (excluding the north shore of the Gulf and the northwest coast of Newfoundland-Labrador), should be changed and be replaced by a more efficient and more humane system. This modification would be directed towards the use of fewer personnel, and those with the greatest experience in sealing. This would result in a greater financial return to the individuals concerned; a more efficient "cull" and offer a higher degree of enforcement. It would also eliminate the danger of inhumane hunting.

2. "CULL" - To bring the new "cull" into operation, we would suggest that a sub-quota be set for the Gulf, to be utilized by a number of "small vessels", but that the number of sealers be limited to 100. No other sealing permits would be issued anywhere else in the Gulf. This would eliminate the controversial uncontrollable free-for-all system by substituting a "limited cull fishery". This would follow developments elsewhere in Canadian fisheries, and would therefore not appear as precedential.

3. LONG-LINERS-FRONT-HUNT - No long liners be permitted to participate in seal hunting above latitude 52° North. This will remove a major hazard to the sealers because of the waters being "non-navigational" to boats of their type. There would also be a more efficient use of enforcement officers, air-sea rescue units and ice-breakers.

The number of long-liners should be "frozen" at the present level.

4. LONG-LINERS - GULF - If long liners are to be licensed at all, they be restricted to a clearly defined area adjacent to the Magdalen Islands and be considered part of the restricted cull in the Gulf (2 above).

5. The committee recognizes and commends your Ministry for the initiatives they have shown in preparing draft revisions of the existing regulations. It is our belief that the drafts we have seen will when enforced, play a major part in correcting anomalies that have occurred in the past. We are working with Mr. Montreuil to this end.

6. ENFORCEMENT - To encourage and ensure uniform overall application of the regulations (at this time, variation probably exceeds days of the year), it is the opinion of the committee that the government should appoint a senior official to be the overall co-ordinator of <u>all</u> sealing. That is regional administration should be discontinued.
a) To produce petty conflicts, or b) detract from the efficient and functional administration of reasonalbe and humane sealing strategies.
Both Gulf and Front are geographically juxtapositioned and not recognized as separate by seals, therefore their management should be on an overall basis rather than by the 3 (now 2?) present offices.

The enforcement of regulations should be enhanced and an internal departmental system, necessary to guarantee a high level of enforcement, should be developed. This would include the provision of an off-shore working base for fishery officers. The Baffin has been a good example of

such a base. We now recommend that the number and calibre of the fishery enforcement officers should be reviewed to ensure in the main the fisheries officers working on the ice are young and fit enough to withstand the rigours of the requirements of their positions. The same officers should be highly conversant with all sealing regulations. The officers should be rotated when and where possible.

7. KILLING METHODS - C.O.S.S. will continue its enquiries into the development of a firearm as the primary killing method. C.O.S.S. will, however, continue to consider any credible method which is brought to its attention.

8. SCIENTIFIC PERMITS - The committee expressed a strong disenchantment with this years "misuse" of scientific permits. We hope that you would take immediate steps to ensure in future that scientific permits be issued, only for scientific purposes.

9. T.A.C. - In the absence of any new scientific data the committee has no comments on the total allowable catch. The committee is concerned however with reports which indicate that the T.A.C. for 1981 was exceeded quite substantially, and the dates of the closing of the season were not complied with. The commmittee has reason to believe that, in spite of being advised of their obligations, some sealers chose to continue sealing, often after warning notices had been received.

In spite of the above the committee wishes to commend some fisheries officers for their efforts made under very trying conditions, particularly the senior officers, both in the Gulf and in the Front.

10. OBSERVERS - It was reiterated that other than members of C.O.S.S. and C.F.H.S. representatives, observers should be screened by the Canadian Federation of Humane Scientists and the World Society for the Protection of Animals. If applications from the other organisations, are received the committee would if requested be pleased to help review their applications.

11. NET FISHERY - In view of the research now underway on the netting of seals, the C.O.S.S. recommends that permits for the catching of seals by such methods be frozen at the present level.

12. WEST COAST SEALS - We would again reiterate our disbelief that a bounty system can be of any use in attaining control of the required seal numbers. For the present, steps should be taken to carry out a survey of the sea lion population, particularly in the Gulf Islands, (Gulf of Georgia), as frequently as necessary to provide sound scientific data. Additionally, a survey be made of the northern sea lion populations during the breeding season.

13. GREY SEALS - The bounty system is still not supported by C.O.S.S. It is inefficient and cruel and should be discontinued. We again suggest that your scientists be encouraged to work on the Sable Island colony, especially noting the cause and effects of the decrease in number of grey seals reported in recent statistics.

14. HOODED SEALS - There is an obvious dearth of information on this exploited species. Its numbers are not well known, its sustainable yield has never been satisfactorily established. Its full biology, especially life cycle, behaviour, and population dynamics are curiously unknown. Some programmes should be initiated to ensure the viability of this species.

15. EDUCATION - C.O.S.S. has previously and again recommends that: a) as a prerequisite of obtaining a seal license a sealer should have to achieve a certain level of proficiency which would terminate in a practical test to demonstrate his understanding and knowledge of sealing practices and b) that fishery officers be given further training in every aspect of sealing, and their enforcement duties, and c) that "gunners" on large vessels be tested to guarantee a high standard of marksmanship.

16. RESEARCH - C.O.S.S. would recommend that research be initiated and or continued on population size, behaviour, biology, and method of capture of harp and hooded seals. Behavioural studies ongoing should be continued, and a programme on hooded seals be initiated.

17. OPENING DATE - HARP HUNT - It was recommended that the opening dates for the harp seal hunt should be March 10th.

Finally, C.O.S.S. has felt certain inadequacies in its activities, as it has not been able to meet with you and discuss personally topics of concern that require your personal input. We have appreciated the help of your staff but the passage of words through intermediaries may cause a loss of value. If C.O.S.S. is to remain in contact could we meet in the fall. Perhaps you would suggest several dates recognizing that all committee members have many committments, and are usually a quarter of a world apart.

For now, please be assured of our continuing activity and interest in seals and sealing.

Yours sincerely,

Professor K. Ronald.
Chairman, Committee on Seals and Sealing.

c.c. - C.O.S.S.

RECOMMENDATION - SEALING

The Committee feels that the traditional methods of hunting in the Gulf Region (excluding the north shore of the Gulf and the northwest coast of Newfoundland-Labrador), should be changed and be replaced by a more efficient and humane system. This modification would be directed towards the use of fewer personnel, and those with the greatest experience in sealing. This would result in a greater financial return to the individuals concerned; a more efficient "cull" and offer a higher degree of enforcement. It would also eliminate the danger of inhumane hunting.

Response

Increasing the efficiency and humaneness of the commercial seal hunt, and limiting access to the resource to a smaller number of well qualified sealers has been one of the important guiding objectives in the revision of the Seal Protection Regulations presently underway. We continue to rely on the opinions of experts that the regulation club and hakapik, properly used, are humane and efficient instruments, and presume that your reference to the humane aspect of sealing under this heading does not imply criticism of the technique per se, but rather to the expertise with which it is applied. We are confident that extension of the training program (which is already well developed at the Magdalen Islands) to all areas, together with the new regulations, stringently applied, will ensure a level of professionalism on the ice which is above reproach.

RECOMMENDATION - CULL

To bring the new "cull" into operation, we would suggest that a sub-quota be set for the Gulf, to be utilized by a number of "small vessels", but that the number of sealers be limited to 100. No other sealing permits would be issued anywhere else in the Gulf. This would eliminate the controversial uncontrollable free-for-all system by substituting a "limited cull fishery". This would follow developments elsewhere in Canadian fisheries, and would therefore not appear as precedential.

Response

This suggestion may be applicable in years of light ice conditions, such as was the case in 1981. During normal ice-years however, it frequently happens that small vessels are ice-bound in the harbours, and cannot gain access to the seals.

Limiting the number of individuals participating in the hunt is clearly one of our intentions. A substantially increased fee structure for licensing such as foreseen in the new regulations, is bound to accomplish a reduction in this respect, as will stringent new conditions for the issue of sealers licences. We are moreover considering establishing sealing as a limited-entry fishery.

RECOMMENDATION - LONGLINERS FRONT HUNT.

No longliners be permitted to participate in seal hunting above latitude 52° North. This will remove a major hazard to the sealers because of the waters being "non-navigational" to boats of their type. There would also be a more efficient use of enforcement officers, air-sea rescue units and ice-breakers.

The number of longliners should be "frozen" at the present level.

Response

We agree to this recommendation and J.W. Carroll who has been designated as Senior Manager of Atlantic Sealing Operations has already undertaken discussions to this effect within the Newfoundland Region.

RECOMMENDATION - LONGLINERS - GULF.

If longliners are to be licensed at all, they be restricted to a clearly defined area adjacent to the Magdalen Islands and be considered part of the restricted cull in the Gulf (2 above).

Response.

We agree to the principle behind this recommendation, subject to the concerns expressed under item 2 above.

RECOMMENDATION 5

The committee recognizes and commends your Ministry for the initiatives they have shown in preparing draft revisions of the existing Regulations. It is our belief that the drafts we have seen will, when enforced, play a major part in correcting anomalies that have occurred in the past. We are working with Mr. Montreuil to this end.

Response

The new Regulations should be completed shortly. They will, hopefully, be easier to interpret and will provide the means to cope with unusual circumstances such as prevailed in 1981.

RECOMMENDATION - ENFORCEMENT.

To encourage and ensure overall application of the regulations (at this time, variation probably exceeds days of the year), it is the opinion of the Committee that the Government should appoint a senior official to be the overall coordinator of all sealing. That is, regional administration should be discontinued. a) to produce petty conflicts, or b) detract from the efficient and functional administration of reasonable and humane sealing strategies.
Both Gulf and Front are geographically juxtapositioned and not recognized as separate by seals, therefore their management should be on an overall basis rather than by 3 (not 2?) present offices.

The enforcement of regulations should be enhanced and an internal departmental system, necessary to guarantee a high level of enforcement, should be developed. This would include the provision of an offshore working base for fishery officers. The Baffin has been a good example of such a base. We now recommend that the number and calibre of the fishery enforcement officers should be reviewed to ensure in the main the fisheries officers working on the ice are young and fit enough to withstand the rigours of the requirements of their positions. The same officers should be highly conversant with all sealing regulations. The officers should be rotated when and where possible.

Response.

As previously mentioned, Mr. J.W. Carroll has been designated as Senior Manager of Atlantic Sealing Operations, in Ottawa. The final details of his role remain to be defined. It must be pointed out that our policy is to operate under the principle of decentralization rather than the reverse and it would be difficult to make exceptions to this philosophy.

Your comments relating to enforcement will be seriously considered. We are aware of deficiencies resulting from the recently increased participation of the longliner fleet and appreciate your suggestions as being a possible means which would facilitate covering this component of sealing activities.

RECOMMENDATION - KILLING METHODS

C.O.S.S. will continue its enquiries into the development of a firearm as the primary killing method. C.O.S.S. will, however, continue to consider any credible method which is brought to its attention.

Response.

We continue to support the efforts of C.O.S.S. to develop a "sealing gun".

RECOMMENDATION - SCIENTIFIC PERMITS

The Committee expressed a strong disenchantment with this year's misuse of scientific permits. We hope that you would take immediate steps to ensure in future that scientific permits be issued, only for scientific purposes.

Response

We agree to your comments; the new regulations will provide a means of coping with the circumstances which made this necessary in 1981.

RECOMMENDATION - T.A.C.

In the absence of any new scientific data the Committee has no comments on the total allowable catch. The Committee is concerned however with reports which indicate that the T.A.C. for 1981 was exceeded quite substantially, and the dates of the closing of the season were not complied with. The Committee has reason to believe that, in spite of being advised of their obligations, some sealers chose to continue sealing, often after warning notices had been received.

In spite of the above, the Committee wishes to commend some fisheries officers for their efforts made under very trying conditions, particularly the senior officers, both in the Gulf and in the Front.

Response

The T.A.C. will be established on the basis of recommendations of the Scientific Committee of NAFO. Preliminary information emanating from the recent meeting of the Marine Mammals Subcommittee of CAFSAC seems to indicate increased confidence in the robustness of the harp seal population.

The over-run experienced in 1981 resulting from a combination of unusual ice conditions, and the exceptionally active participation of the longliner fleet has made us aware of deficiencies in our licensing policy and enforcement mechanism. As mentioned above, steps will be taken to correct these deficiencies.

RECOMMENDATION - OBSERVERS.

It was reiterated that other than members of C.O.S.S. and C.F.H.S. representatives, observers should be screened by the Canadian Federation of Humane Scientists (sic) and the World Society for the Protection of Animals. If applications from the other organizations are received, the Committee would if requested be pleased to help review their applications.

Response

We appreciate the valuable role played by C.O.S.S., C.F.H.S. and W.S.P.A. in providing assistance in screening applicants from other organizations who wish to view the seal hunt, and count on

RECOMMENDATION - OBSERVERS (Continued)

Response (Continued)

your continued contribution in this regard.

RECOMMENDATION - NET FISHERY.

In view of the research now underway on the netting of seals, the C.O.S.S. recommends that permits for catching of seals by such methods be frozen at the present level.

Response

We take note of your comments and will recommend to the Government of Québec that the issue of seal net permits be frozen at the 1980-81 levels.

RECOMMENDATION - WEST COAST SEALS.

We would again reiterate our disbelief that a bounty system can be of any use in attaining control of the required seal numbers. For the present, steps should be taken to carry out a survey of the sea lion population, particularly in the Gulf Islands (Gulf of Georgia), as frequently as necessary to provide sound scientific data. Additionally, a survey be made of the northern sea lion population during the breeding season.

Response

We are perplexed by this recommendation. There is no bounty system for seals on the Pacific coast, and there has been no suggestion to institute one.

We note your recommendations relating to the survey of the sea lion population.

RECOMMENDATION - GREY SEALS

The bounty system is still not supported by C.O.S.S. It is inefficient and cruel and should be discontinued. We again suggest that your scientists be encouraged to work on the Sable Island colony, especially noting the cause and effects of the decrease in number of grey seals reported in recent statistics.

Response

We are seriously considering alternatives to the bounty system for grey seals. At the moment, bounty returns, combined with tag returns constitute the principal method at our disposal

RECOMMENDATION - GREY SEALS (Continued)

Response (Continued)

for determining population abundance, dispersal patterns, age structures and other information essential for the management of the species.

We are investigating the feasibility of instituting a cull by licensed hunters which would provide us with this essential material.

RECOMMENDATION - HOODED SEALS

There is an obvious dearth of information on this exploited species. Its numbers are not well known, its sustainable yield has never been satisfactorily established. Its full biology, especially life cycle, behaviour, and population dynamics are curiously unknown. Some programmes should be initiated to ensure the viability of this species.

Response

The tagging program for hooded seals in the Gulf will be increased this year, and CAFSAC has recommended that the Gulf remain closed to the hooded seal hunt. Contacts have been made with Danish scientists with respect to age composition data they have on seals caught off the coasts of Greenland.

Plans are underway for an international conference on this species, to be held within the next 18 months.

This is expected to be the keystone in establishing a realistic program aimed at answering the crucial questions relating to the population dynamics of this species.

RECOMMENDATION EDUCATION

C.O.S.S. has previously and again recommends that: a) as a preprequisite of obtaining a seal licence a sealer should have to achieve a certain level of proficiency which would terminate in a practical test to demonstrate his understanding and knowledge of sealing practices and b) that fishery officers be given further training in every aspect of sealing, and their enforcement duties, and c) that "gunners" on large vessels be tested to guarantee a high standard of marksmanship.

Response

This Department has put in a substantial amount of time and effort in the development of a training program for sealers, and has prepared training aids which have been shown to be effective. Efforts will continue in this direction, and a formal training program will be defined, for application in all Regions.

Fishery officers will be involved in this program and every effort will be made to familiarize them with all aspects of sealing.

We take note of your recommendations that the marksmanship of gunners on large vessels be tested and will instruct our field personnel to this effect.

RECOMMENDATION - RESEARCH

C.O.S.S. would recommend that research be initiated and or continued on population size, behaviour, biology, and method of capture of harp and hooded seals. Behavioural studies ongoing should be continued, and a program on hooded seals be initiated.

Response

As in the past, research on seals will proceed, where possible, along the directions recommended by CAFSAC, NAFO and COSS.

RECOMMENDATION - HARP SEAL HUNT

It was recommended that the opening dates for the harp seal hunt should be March 10th.

Response

March 10 has been the traditional date set for the opening of the seal hunt. It is necessarily subject to modification by variation order, taking into account factors such as whelping dates, and the stage of development of the pups.

Minister of Fisheries and Oceans | Ministre des Pêches et des Océans

Your file Votre reference

Our file Notre reference

C 05

Professor K. Ronald,
Chairman,
Committee on Seals and Sealing,
University of Guelph,
Guelph, Ontario.
N1G 2W1

Dear Professor Ronald:

I am writing in response to your January 22 telex regarding the 1982 seal hunt. Your recommendation that careful attention be given to the organization of the Fisheries and Oceans seal program for the management of the hunt and to the enforcement of all regulations has been brought to the attention of Mr. Carroll who is responsible for coordinating these activities.

My staff have received cost projections from Mr. Hughes regarding research and development for the gun to kill seals and for field trials for this gun. I reiterate my earlier verbal commitment to support this research and development. My staff are expediting the necessary contract paper work.

I note you intend to utilize one helicopter funded by COSS to observe the gun trials. I have no objection to this.

Yours sincerely,

Roméo LeBlanc.

COPIES TO:

Minister's Office (2)
A.W. May (1)
B.S. Muir (1)
W.D. Doubleday (1)

Ottawa, Canada
K1A 0H3

cc J.W. Carmel
P. Martineau

RAR/S

DFO/MPO OTT
82 01 22
HONOURABLE ROMEO LEELANC
FISHERIES AND OCEANS

JAN. 22 1055AM GUELPH ONT

1. RE 1982 SEAL HUNT

C.O.S.S. WOULD ENCOURAGE YOUR ATTENTION TO FOLLOWING:
1981 HUNT PRODUCED FOLLOWING PROBLEMS:
1) P.E.I.
2) TAC GREATLY EXCEEDED
3) PROBABLE HIGH (BUT AS YET UNSUBSTANTIATED SCIENTIFICALLY)
''NATURAL'' MORTALITY.

ADDED TO THE ABOVE IS THE INCREASE IN 1982 TAC. ALL INSTILL RENEWED ACTION BY ANTI-HUNT GROUPS. THE ORGANIZATION OF F AND O HUNT AND THE ENFORCEMENT OF ALL REGULATIONS BY NEW PERSONNEL ARE ESSENTIAL CONSIDERATIONS IF AN INCREASED RESISTANCE TO THE KILLING OF SEALS IS TO BE AVOIDED.

2. GUN TRIALS ARE NOW WELL DEVELOPED BUT WILL REQUIRE SUPPLEMENTARY BUDGET AS PROTOTYPE COSTS ARE HIGH. HUGHES WILL BE ADVISING DRS. MAY AND DOUBLEDAY OF REQUIREMENTS.

3. WILL HAVE 2 HELICOPTERS IN GULF MARCH 1 FOR APPROXIMATELY 1 WEEK. I DEDICATED TO GUN TRIALS, OTHER FOR MEMBERS OF COMMITTEE AND HOODED SEAL OBSERVATIONS

WILL BE ADVISING FURTHER AS HUNT DATE APPROACHES.

PROFESSOR RONALD, CHAIRMAN, COSS

TELEX 069 56645

CHGE UOFG INAT GLPH 3-C-0821
CENTRE FOR INTL. PROGRAMS
+
DFO/MPO OTT
T

Minister of Fisheries and Oceans | Ministre des Pêches et des Océans

Your file Votre référence

Our file Notre référence

NOV - 1 1982

Professor K. Ronald
Dean, College of Biological Science
University of Guelph
Guelph, Ontario
N1G 2W1

Dear Professor Ronald:

As you are no doubt aware, I have just taken over the Fisheries and Oceans portfolio. I am currently familiarizing myself with business of the Department including my various advisory committees. I am pleased to note your advice that management of the 1982 hunt represented "a very satisfactorily regulated year" after the difficulties of 1981.

I note the August 25, 1982 letter to Mr. LeBlanc from the Advisory Committee on Seals and Sealing and would like to thank you for the timely advice.

As you recommend, and as agreed by the Canada/Norway Sealing Commission, I do not intend to alter the TAC for harp seals for 1983 unless substantial revision of the scientific advice results from the independent review of harp and hooded seal conservation by ICES in October. However, I am prepared to instruct my officials to look at the feasibility of assigning a separate quota for the Northern Labrador area in place of the present allowance. Arctic catches are included in official sealing statistics when they become available. Improving the timeliness of these figures could involve substantial costs. I agree that quota regulation of sealing at Greenland is a desirable objective and will instruct my officials to continue encouraging management authorities in the EEC and at Greenland to adopt more rigorous management measures.

Your recommendation with respect to research on the mixing of harp seal populations, on the aerial survey for hooded seals, and on more extensive study of hooded seals biology have been brought to the attention of the relevant research managers.

.../2

Ottawa, Canada
K1A 0E6

I note your concern that the hooded seal is over-exploited and your recommendation that the TAC for hooded seals be reduced from 15,000 to 10,000. I presume you mean this to apply in 1983 and not 1982 as stated in your letter. As you are no doubt aware, the Scientific Council of NAFO has advised a continuation of the present level of harvest. I look forward to receiving advice from ICES on this question.

With respect to the development of the gun for killing seal pups, I have directed my Department to set aside $15,000 to fund additional gun trials if necessary. This money will be held until January 30 to fund a possible contract.

With respect to the Sealing Regulations, my staff are presently reviewing experience of the 1982 hunt and will consider outstanding recommendations from COSS and field staff in a revision of the Seal Protection Regulations for 1983. Work is under way examining means of phasing out or finding alternative ways to replace the net fishery for seals in the Quebec north shore, Newfoundland and Labrador area. Your assistance in explaining, to the hunters involved, the scientific basis for eliminating this harvesting practice would be most welcome to my staff in view of your contracted research on this subject.

Your recommendations with respect to grey seals have been drawn to the attention of my Atlantic Directors General who are considering action to control the grey seal population. Your recommendation with respect to west coast pinnipeds has been brought to the attention of my Director General in Vancouver.

In closing, it is important that we meet to get acquainted as early as possible, and I welcome your suggestion that we meet before the 1983 seal hunt gets under way to discuss sealing issues. I look forward to my first meeting with the Committee. Please consult my office at the beginning of November to determine a mutually convenient date.

Yours sincerely,

Pierre De Bané

cc: Minister's Office (3)
A.W. May (1)
L.J. Cowley (1)
B.S. Muir (1)
W.G. Doubleday (2)
P. Montreuil (1)
Central Registry

C055

Professor K. Ronald
Dean
College of Biological Science
Chairman
Committee on Seals and Sealing
University of Guelph
Guelph, Ontario
N1G 2W1

Dear Professor Ronald:

This will acknowledge receipt of an original copy of my letter to you dated October 27, 1982, which you have signed and returned. The substance of the letter will form the basis of financial arrangements between the Committee and my Department, which I anticipate will serve us both without unreasonable constraints.

With regard to arrangements for a meeting, I have asked my staff to propose December 17 at 2:00 p.m. I look forward to meeting with other members of the Committee at that time.

Yours sincerely,

Pierre De Bané

File Copies
Minister's Office (2)
A.W. May (2)
L.J. Cowley (2)
Originator (3)
Correspondence Unit
Central Registry

Ottawa, Canada
K1A 0H3

Minister of Fisheries and Oceans
Ministre des Pêches et des Océans

Your file Votre référence

Our file Notre référence
1414/7125-C3

OCT 27 1982

Professor K. Ronald
Chairman
Committee on Seals and Sealing
Dean, College of Biological Science
University of Guelph
Guelph, Ontario
N1G 2W1

Dear Professor Ronald:

I value greatly the advice which the Committee on Seals and Sealing has provided to my predecessor, the Honourable Roméo LeBlanc, since its inception and your role in particular as Chairman. Since COSS's only source of funding for its important work of advising on all aspects of research and management of seals, taking into account conservation, environmental, humanitarian and socio-economic considerations is an annual contribution of funds by my Department, I wish to ensure that this contribution is administered smoothly.

As a responsible body, independent of my Department, COSS should manage its funds with as few constraints as necessary subject to budgetary limits and accountability through audit. In response to your request for improvement in the financial arrangement for the contribution, I propose a revised agreement as follows:

During the fiscal year, beginning April 1, 1982 and ending March 31, 1983, my Department will set aside $100,000 for the COSS contribution, in a controlled allotment administered by the Director General, Fisheries Research Directorate. This amount will increase to $106,000 for the period April 1, 1983 - March 31, 1984 and $111,000 for the period April 1, 1984 - March 31, 1985 following the Government's spending restraint policy.

. . . /2

Ottawa, Canada
K1A 0H3

During each fiscal year, COSS may spend up to this amount on Committee expenditures for:

(i) Honoraria to members of $150 per day on Committee business;

(ii) Travel expenses attendant on Committee meetings;

(iii) Travel expenses related to attendance by representatives at various Departmental and other meetings concerned with seals and sealing;

(iv) Travel to the sealing operations to conduct observations particularly in relation to humane killing;

(v) Maintenance of a detailed bibliography on seals and sealing and correspondence with the public;

(vi) Administrative costs;

(vii) Audit;

(viii) Special projects in support of the objectives of COSS and approved in the minutes of a COSS meeting.

On receipt of a budget from COSS showing quarterly expenditure expectations for the following new fiscal year 45 days in advance of April 1, the Director General for Fisheries Research will issue a cheque by April 1 to cover the forecast expenses for the first quarter of the new year, i.e. April, May and June. On receipt of quarterly expenditure forecasts for subsequent quarters, 45 days before the beginning of each quarter, the Director General will issue a cheque to cover forecast expenditures for the coming quarter. Installment dates will be April 1, July 1, October 1, January 1, and March 31 (year end adjustment). The total value of cheques issued in any fiscal year shall not exceed the maximum allowed contribution for the year less whatever funds COSS has carried over from the previous year as indicated by audit. I realize that these forecasts of expenditures will be subject to some degree of uncertainty and recognize that it is therefore necessary and fair for COSS to maintain a current account balance of about $15,000 to cover unforeseen charges.

. . . /3

I propose that your annual audit of COSS expenditures form the basis for adjustment of the subsequent year's contribution. Your choice of auditing firm is to be approved by my Department. My officials are to contact the auditors to inform them of the terms of the contribution arrangement and to let them know that the following year's contribution will be adjusted, based on their report. You should maintain COSS accounts separately from those of the Ontario Humane Society.

The auditors shall prepare an annual statement of receipts, including bank interest, if any, and expenditures on a cash basis. They shall prepare a schedule of payables at year end listing goods and services received in the old year but not yet paid, whether bills have been received or not and determine the year end cash position of the Committee. In accordance with Section 30 of the Financial Administration Act, expenditures relating to the old year made on or before April 30 will be allocated to the old year; those occurring after April 30 to the new year.

The Committee will provide my Department with a copy of the audit report on completion.

If you concur with this proposal, please sign both originals and return one to me. In closing I emphasize again the valuable advisory role which COSS has played and continues to play in the formulation of policies and programs in relation to the seal hunt.

Yours sincerely,

Original signed by
Original signé par

Pierre De Bané

I concur _____

Professor K. Ronald

CC: Minister's Office (3)
A.W. May (1)
L.J. Cowley (1)
B.S. Muir (1)
W.G. Doubleday (2) ✓
Central Registry (1)

Y.U. 314-825 RAR/5

UNIVERSITY OF GUELPH
COLLEGE OF BIOLOGICAL SCIENCE
Office of the Dean

GUELPH, ONTARIO, CANADA · N1G 2W1
Telephone (519) 824-4120

Rerum
Cognoscere
Causas

5

83 01 04

The Honourable Mr. Pierre de Bané,
Minister of Fisheries and Oceans,
Ottawa,
Ontario K1A 0H3.

Dear Mr. de Bané,

I would like to thank you for your letter of 82 12 23 regarding liaison coordination between C.O.S.S. and your ministry.

We note that Dr. Muir will be responsible for treasury board's contributions and Dr. Doubleday for other matters, we are happy with both arrangements as we know the persons concerned and have had very professional dialogues with both. We also note we will still be in continuing contact with yourself for matters of major concern.

Best wishes in the new year.

Yours sincerely,

Professor K. Ronald,
Dean.

cc: C.O.S.S.

COSS

OCT 27 1982

Professor K. Ronald
Chairman
Committee on Seals and Sealing
Dean, College of Biological Science
University of Guelph
Guelph, Ontario
N1G 2W1

Dear Professor Ronald:

I value greatly the advice which the Committee on Seals and Sealing has provided to my predecessor, the Honourable Roméo LeBlanc, since its inception and your role in particular as Chairman. Since COSS's only source of funding for its important work of advising on all aspects of research and management of seals, taking into account conservation, environmental, humanitarian and socio-economic considerations is an annual contribution of funds by my Department, I wish to ensure that this contribution is administered smoothly.

As a responsible body, independent of my Department, COSS should manage its funds with as few constraints as necessary subject to budgetary limits and accountability through audit. In response to your request for improvement in the financial arrangement for the contribution, I propose a revised agreement as follows:

During the fiscal year, beginning April 1, 1982 and ending March 31, 1983, my Department will set aside $100,000 for the COSS contribution, in a controlled allotment administered by the Director General, Fisheries Research Directorate. This amount will increase to $106,000 for the period April 1, 1983 - March 31, 1984 and $111,000 for the period April 1, 1984 - March 31, 1985 following the Government's spending restraint policy.

. . . /2

Ottawa, Canada
K1A 0H3

During each fiscal year, COSS may spend up to this amount on Committee expenditures for:

(i) Honoraria to members of $150 per day on Committee business;

(ii) Travel expenses attendant on Committee meetings;

(iii) Travel expenses related to attendance by representatives at various Departmental and other meetings concerned with seals and sealing;

(iv) Travel to the sealing operations to conduct observations particularly in relation to humane killing;

(v) Maintenance of a detailed bibliography on seals and sealing and correspondence with the public;

(vi) Administrative costs;

(vii) Audit;

(viii) Special projects in support of the objectives of COSS and approved in the minutes of a COSS meeting.

On receipt of a budget from COSS showing quarterly expenditure expectations for the following new fiscal year 45 days in advance of April 1, the Director General for Fisheries Research will issue a cheque by April 1 to cover the forecast expenses for the first quarter of the new year, i.e. April, May and June. On receipt of quarterly expenditure forecasts for subsequent quarters, 45 days before the beginning of each quarter, the Director General will issue a cheque to cover forecast expenditures for the coming quarter. Installment dates will be April 1, July 1, October 1, January 1, and March 31 (year end adjustment). The total value of cheques issued in any fiscal year shall not exceed the maximum allowed contribution for the year less whatever funds COSS has carried over from the previous year as indicated by audit. I realize that these forecasts of expenditures will be subject to some degree of uncertainty and recognize that it is therefore necessary and fair for COSS to maintain a current account balance of about $15,000 to cover unforeseen charges.

. . . /3

I propose that your annual audit of COSS expenditures form the basis for adjustment of the subsequent year's contribution. Your choice of auditing firm is to be approved by my Department. My officials are to contact the auditors to inform them of the terms of the contribution arrangement and to let them know that the following year's contribution will be adjusted, based on their report. You should maintain COSS accounts separately from those of the Ontario Humane Society.

The auditors shall prepare an annual statement of receipts, including bank interest, if any, and expenditures on a cash basis. They shall prepare a schedule of payables at year end listing goods and services received in the old year but not yet paid, whether bills have been received or not and determine the year end cash position of the Committee. In accordance with Section 30 of the Financial Administration Act, expenditures relating to the old year made on or before April 30 will be allocated to the old year; those occurring after April 30 to the new year.

The Committee will provide my Department with a copy of the audit report on completion.

If you concur with this proposal, please sign both originals and return one to me. In closing I emphasize again the valuable advisory role which COSS has played and continues to play in the formulation of policies and programs in relation to the seal hunt.

Yours sincerely,

Pierre De Bané

I concur _____

Professor K. Ronald

Ottawa Canada
K1A 0E6

OCT 26 1983

Dear Dr. Ronald:

This letter is in response to the recommendations of the Committee on Seals and Sealing as conveyed in your letter of July 18, 1983.

At the outset, I note your appreciation of contributions of my officials during your meeting in Vancouver. Your thanks have been conveyed to those involved.

In response to your recommendations concerning regulations governing access to the seal hunt and coordination of enforcement activities with other departments, I wish to inform you that Mr. Peter Flewwelling is assuming the responsibilities of Atlantic Seal Hunt Co-ordinator this year. Mr. Flewwelling has already initiated a review of the regulations as you have recommended. It is our understanding that the R.C.M.P. are also interested in the early planning for contingency operations. Mr. Flewwelling will be liaising with them and other departments on this topic.

I concur with your recommendation concerning the stationing of an ice breaker in the vicinity of the Magdalen Islands during the seal hunt. Although I understand that their first priority at that time of year is keeping the shipping lanes open, we will continue to request this service from the Ministry of Transport.

Dr. K. Ronald,
Chairman,
Committee on Seals and Sealing,
University of Guelph,
Guelph, Ontario.
N1G 2W1

.../2

Canada

Your recommendation concerning centralized authority for the seal hunt and coordination of sealing operations in the Gulf, are, I believe, well founded. Mr. Flewwelling's terms of reference and the agreement that the Quebec Region would have the responsibility to co-ordinate sealing operations in the Gulf as defined in the regulations should meet your concerns.

With regard to the Committee's recommendation that the regulations be changed to ensure that instruments of manual killing be abolished and that the use of an approved gun and ammunition be made mandatory, it is my view that we are not quite ready for such a drastic change in the operation of the seal hunt. I am informed by my officials that testing with the "sealing pistol" has, to date, only involved a small number of both seals and sealers. Further, I am aware that the development of the "sealing pistol" has proceeded only as far as the production of a single shot pistol and that a multi-shot pistol capable of firing a minimum of two shots without reloading would be required to ensure the capability of producing a humane kill in all instances. For these reasons, I consider the Committee's recommendation for regulatory change somewhat premature. I am, however, prepared to consider a larger scale testing of the pistol in the coming year as well as authorizing development work to produce a multi-shot pistol.

With regard to your recommendation concerning support for a contract with the Institute of Animal Resource Ecology at the University of British Columbia to develop a model describing the population of North Pacific fur seals, I am pleased to inform you that a contract has been issued and that work on this project commenced in August.

You have stated the opinion of the Committee that there is, at present, no justification for consideration of culling or bounty programs for California sea lions, Stellar sea lions or harbour seals on the West coast and that scientific research programs be continued. I wish to assure you that, at the present time, there are no plans for the implementation of either culling or bounty programs for these animals and that research involving these species will continue.

With regard to your recommendations concerning the Interim Convention on Conservation of the North Pacific Fur Seals, I share your view that Canada should remain as a

signatory. I am, however, perplexed at your recommendation concerning the possible reduction of harvest levels since, it is my understanding that the Standing Scientific Committee of the North Pacific Fur Seal Commission has, for the past several years, expressed the unequivocal view that the observed declines are unrelated to the present harvesting régime. I note your intention to be present at the 1984 meeting of the Commission and welcome your interest in this matter.

With regard to grey seals, I am aware that you have been invited to participate in the recently established task force that will address the issue of parasite infestation of commercially important fish stocks. I would like to leave further consideration of the Committee's recommendations regarding grey seals until the work of this task force has been completed.

With regard to the Committee's recommendation concerning the netting of seals, it is my understanding that due to present market conditions this activity has been substantially reduced over the past year to the point that it is now essentially a food fishery. While I am reluctant to close this fishery which provides an important source of food to residents of relatively isolated communities, I have instructed my officials to initiate discussions with the fishermen involved to examine the available options. I would be pleased to communicate further with the Committee on this matter after these discussions have taken place.

On the subject of harp and hooded seal research, you will be aware that our plans for the coming year include considerably increased effort on hooded seals. I am sure that this program will go a long way to providing a better basis for hooded seal stock assessments. However, because priority must, at this time, be given to studies relating to population estimation, funding for other projects such as large scale tagging of harp seals by the sealers and an aerial survey of harp seals may not be possible. In this regard, I am aware the Dr. Muir, Director-General, Fisheries Research Directorate, has informed you by letter that funding is not available to support your proposed work on energy requirements of hooded seals. I would also request some clarification of your comment that the Committee is no longer certain that the conditions you have identified as being necessary to justify continuation of the seal hunt are still being met.

Your recommendation on the evaluation of the tourist industry around the unhunted herds has raised considerable internal discussion with respect to the legal ramifications and resources to ensure compliance with regulations and minimize undue disruption on the whelping grounds. This will undoubtedly be discussed further and I would welcome the Committee's further views on this matter.

With regard to your comments concerning communication between myself and the Committee, I would like to retain the system whereby the Committee communicates directly with me, as opposed to channeling communications through my Deputy Minister or Parliamentary Secretary. I am aware that Dr. Doubleday, now Chairman of CAFSAC, has for the past two years been responsible for liaison with the Committee on operational and financial matters. Notwithstanding his new position, he has agreed to continue this work. I am satisfied that this will maintain the continuity of our relations that you desire.

Finally, I note the Committee's wish to meet with me and discuss the above issues. I would like to suggest that we arrange such a meeting for late November or early December, which will provide sufficient time for the elaboration of plans for the 1984 seal hunt.

Yours sincerely,

Original signed by
Original signé par

Pierre De Bané, P.C., M.P.
Matapédia-Matane

UNIVERSITY OF GUELPH
COLLEGE OF BIOLOGICAL SCIENCE
Department of Zoology

GUELPH, ONTARIO, CANADA N1G 2W1
Telephone (519) 824-4120

Rerum Cognoscere Causas

83 09 02

The Honourable Pierre de Bané
Minister of Fisheries and Oceans
Fisheries and Environment Canada
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Mr. de Bané,

I am writing to you at the request of Professor Keith Ronald, to correct a typographical error contained in his letter to you of July 18th.

The phrase following item (b) in the last paragraph on page 4 contains the word " inhumanely ". This should be replaced by the word " humanely ", thereby ensuring that the sentence as a whole reads:

> " We have recommended in the past that killing is only justified providing (a) there are sufficient seals to maintain or increase the herd size, (b) the animals are killed humanely and (c) there is a proper use of the resource. "

We hope that you will understand that this was a typographical error, but Professor Ronald is of course most anxious that it be corrected.

Yours sincerely,

Jane Dougan

Jane Dougan
Research Assistant
to Professor Ronald.

UNIVERSITY OF GUELPH
COLLEGE OF BIOLOGICAL SCIENCE
Office of the Dean

GUELPH, ONTARIO, CANADA · N1G 2W1
Telephone (519) 824-4120

Rerum
Cognoscere
Causas

83 07 18

The Honourable Pierre de Bané,
Minister of Fisheries & Oceans,
Fisheries and Environment Canada,
House of Commons,
Ottawa, Ontario,
K1A 0A6.

Dear Mr. de Bané,

I am writing to provide you with the Committee on Seals and Sealing's most recent advice on seals and sealing.

The west coast meeting was very successful in that it provided us with a considerable data base as to the seals and sea lion situation in British Columbia and some adjoining states. We were very pleased that Dr. Goodman and Dr. Bigg were available to meet with us in Vancouver. Both went well out of their way to provide the Committee with information and in the case of Dr. Goodman, he acted as a continuing information resource. Perhaps you would pass on our thanks to these gentlemen - they were invaluable.

In regard to our recommendations, we would advise you that we discussed the 1983 hunt in its full complexity.

Sealing

We would recommend that the present regulations be reviewed concerning the procedures to be followed when dealing with activities which interfere with the legitimate sealing activities, particularly the activities of protest groups, vessels, or groups of that nature. The second phase of the same recommendation is that your ministry ensure that the Department of Fisheries and Oceans are organized in such a way that they can effectively enforce the regulations and there be advanced planning with other departments, such as the D.O.T., Justice and any other department involved, so that these departments are aware of the full range of possibilities that may develop, and can deal with the situation without delay and confusion.

...../2

We recommend that an ice breaker be stationed in the Gulf with the centre of operations at Magdalen Islands during the seal hunt in order to ensure that vessels are not endangered and to provide a central point for enforcement activities as well as a base for ongoing governmental and non-governmental research.

We would re-emphasize the need for an effective central authority in sealing matters, extending beyond present limits, i.e., regional territoriality should not intrude into the effective use of that authority.

Subject to the above we recommend that geographical areas be recognized in which seal hunting is conducted and that a single authority be appointed in each of the two geographical areas (these geographical areas overriding regional areas) to ensure that there is no confusion in the operation and enforcement of regulations. For example, the seal hunting carried on in the Gulf of St. Lawrence, is centered in the Magdalen Islands and it follows, therefore, that the control of the whole Gulf should be vested in the officer stationed in the Magdalen Islands.

Killing Methods

We recommend that the regulation be changed to ensure that, in future, the use of clubs and other instruments of manual killing be abolished and that in the future, killing of the young of the harp seals and grey seals (if any) be by approved gun and ammunition and that the use of these weapons be made mandatory.

Supplementary to this is an internal recommendation that Rowsell and Hughes be requested to produce a paper on killing methods, encompassing the use of all instruments past, present and possibly future. This will give full and detailed support of the above recommendation.

West Coast Seals

We recommend that support should be given to increased research on the west coast into (1) population modelling of harbour seals and fur seals, and (2) population biology including the development of models on all species as becomes possible. In reference to fur seals, the committee recommends that support be given to a project to be carried out by the Institute of Animal Resource Ecology at the University of British Columbia to develop a fur seal model. It appears that the Guelph and UBC models are good background formats for this work and that Institute is prepared to produce such a model.

...../3

Attempts have been made by the committee to try to evaluate if there was a problem created by California sea lions, Steller sea lions, and harbour seals on the west coast and it would appear from the lack of representation at the meeting that the problem is certainly not pressing and it is the opinion of the committee therefore that there is no justification for any consideration to be given to culling or bounty systems. This should not prevent the carrying out of scientific programmes such as:

a) continued investigation into the zoonoses that might be associated with these animals,

b) and that the studies on feeding habits of fur seals by Canadian scientists on the west coast be accelerated and strongly encouraged and brought to fruition as early as possible so as to assist in the management of these stocks.

Fur seal convention - we recommend that Canada should remain a member of the Convention but that, because of the current status of the stocks which are apparently declining, the TAC should be reviewed and, if necessary, reduced ideally to the OSY in order to produce a stable herd. The TAC should be lowered to such a level that the population would not be at risk of further decline, even if this implies a zero quota.

We would advise you that the committee will be sending a scientific observer to the Fur Seal Convention meetings in 1984 and we would ask that we be advised, at an early date, as to the details of the meetings so that we may plan to participate.

Grey Seals

We recommend that the culling of grey seals be stopped since the committee sees no reason or justification for continuing the cull. This is an addition to our reiteration that the bounty system is inhumane, and useless as a control technique. We further recommend that your Ministry should encourage work to be performed to quantify the relationships between grey seals and the codworm. If that work indicates there is a very real relationship between the grey seal population and the degree of infestation in inshore fish socks, at that time we would recommend that chemical fertility control techniques be considered as an alternative instead of the more traditional killing methods. The committee believes that control techniques that utilize killing are no longer acceptable and in anticipation of this development, it is recommended that research into fertility control methods be reinstated as a three year programme and at an adequate level.

Netting

It was reiterated that the netting of seals should be abolished or phased out and that the first phase should be the abolition of netting

...../4

in Newfoundland and Quebec. Closure in Labrador should be deferred until more information is obtained on the socio-economic returns of netting to the inhabitants of Labrador, We would point out that by closing the Newfoundland and Quebec net fishery you would eliminate two-thirds of the net fishery for one-sixth of the cost. Net fishing for mammals cannot be supported, as it is obviously inhumane.

Hooded Seals

The committee recommends that increased research be carried out, including capture and recapture studies, behavioural studies, population dynamics, and the nutritional requirements of the seals. To this end we would remind you that the fisheries subvention has already referred the latter to you for suitable support and awaits your decision.

C.O.S.S. will be participating in the hooded seal workshop, as well as the ICES meetings, to be held this fall.

Harp Seals

We note from a technical management point of view, that a large fluctuation from year to year in the size of the population would offer useful management data. To carry out such a programme would be political suicide. There is therefore a need to provide one firm datum point on population size of the harp seal herd. This absolute measure of the size of population could then be related to all modelling data. Such a basic figure could be provided by aerial surveys using u.v. technology. We recommend therefore that you take advantage of the present situation in the trade to carry out the aerial survey because there would be no conflict with industrial activities.

Harp and Hooded Seals

We would recommend that a scientific programme of research be carried out in 1984 utilizing some personnel of the sealing industry to provide the necessary resources to allow large scale tagging programmes to be carried out which would be co-ordinated with the aerial survey as recommended above. In this way, sealers would receive some income as well as providing a scientific base which will support future discussions of the stocks and add materially to the validity of the model.

We have recommended in the past that killing is only justified providing (a) there are sufficient seals to maintain or increase the herd size, (b) the animals are killed inhumanely, and (c) there is a proper use of the resource. If any of these three premises are not met, then killing should not be permitted. The committee is no longer certain all three of the above can be supported.

Mr. P. de Bané 83 07 18

Further we recommend that consideration be given to evaluating the tourist industry around the new unhunted herds. This must be done in consultation with experts, the committee stands ready to advise.

General

We would ask that the official line of communication between the committee and yourself be re-established ideally through your Deputy Minister, or Parliamentary Secretary, we have found a lack of continuity over the past few years that is not helpful in critical evaluations or negotiations with your Ministry. It would be a pity if such a small item as lack of a communication channel at a senior level depreciated our interaction.

The committee actively expressed a wish to have an opportunity to meet with you at your earliest convenience so that we might fully discuss these recommendations.

Yours sincerely,

Professor K.Ronald, Chairman,
C.O.S.S.

cc: C.O.S.S.

OCT 26 1983

C L O S E D

Dear Dr. Ronald:

This letter is in response to the recommendations of the Committee on Seals and Sealing as conveyed in your letter of July 18, 1983.

At the outset, I note your appreciation of contributions of my officials during your meeting in Vancouver. Your thanks have been conveyed to those involved.

In response to your recommendations concerning regulations governing access to the seal hunt and coordination of enforcement activities with other departments, I wish to inform you that Mr. Peter Flewwelling is assuming the responsibilities of Atlantic Seal Hunt Co-ordinator this year. Mr. Flewwelling has already initiated a review of the regulations as you have recommended. It is our understanding that the R.C.M.P. are also interested in the early planning for contingency operations. Mr. Flewwelling will be liaising with them and other departments on this topic.

I concur with your recommendation concerning the stationing of an ice breaker in the vicinity of the Magdalen Islands during the seal hunt. Although I understand that their first priority at that time of year is keeping the shipping lanes open, we will continue to request this service from the Ministry of Transport.

Dr. K. Ronald,
Chairman,
Committee on Seals and Sealing,
University of Guelph,
Guelph, Ontario.
N1G 2W1

.../2

Canada

Your recommendation concerning centralized authority for the seal hunt and coordination of sealing operations in the Gulf, are, I believe, well founded. Mr. Flewwelling's terms of reference and the agreement that the Quebec Region would have the responsibility to co-ordinate sealing operations in the Gulf as defined in the regulations should meet your concerns.

With regard to the Committee's recommendation that the regulations be changed to ensure that instruments of manual killing be abolished and that the use of an approved gun and ammunition be made mandatory, it is my view that we are not quite ready for such a drastic change in the operation of the seal hunt. I am informed by my officials that testing with the "sealing pistol" has, to date, only involved a small number of both seals and sealers. Further, I am aware that the development of the "sealing pistol" has proceeded only as far as the production of a single shot pistol and that a multi-shot pistol capable of firing a minimum of two shots without reloading would be required to ensure the capability of producing a humane kill in all instances. For these reasons, I consider the Committee's recommendation for regulatory change somewhat premature. I am, however, prepared to consider a larger scale testing of the pistol in the coming year as well as authorizing development work to produce a multi-shot pistol.

With regard to your recommendation concerning support for a contract with the Institute of Animal Resource Ecology at the University of British Columbia to develop a model describing the population of North Pacific fur seals, I am pleased to inform you that a contract has been issued and that work on this project commenced in August.

You have stated the opinion of the Committee that there is, at present, no justification for consideration of culling or bounty programs for California sea lions, Stellar sea lions or harbour seals on the West coast and that scientific research programs be continued. I wish to assure you that, at the present time, there are no plans for the implementation of either culling or bounty programs for these animals and that research involving these species will continue.

With regard to your recommendations concerning the Interim Convention on Conservation of the North Pacific Fur Seals, I share your view that Canada should remain as a

signatory. I am, however, perplexed at your recommendation concerning the possible reduction of harvest levels since, it is my understanding that the Standing Scientific Committee of the North Pacific Fur Seal Commission has, for the past several years, expressed the unequivocal view that the observed declines are unrelated to the present harvesting régime. I note your intention to be present at the 1984 meeting of the Commission and welcome your interest in this matter.

With regard to grey seals, I am aware that you have been invited to participate in the recently established task force that will address the issue of parasite infestation of commercially important fish stocks. I would like to leave further consideration of the Committee's recommendations regarding grey seals until the work of this task force has been completed.

With regard to the Committee's recommendation concerning the netting of seals, it is my understanding that due to present market conditions this activity has been substantially reduced over the past year to the point that it is now essentially a food fishery. While I am reluctant to close this fishery which provides an important source of food to residents of relatively isolated communities, I have instructed my officials to initiate discussions with the fishermen involved to examine the available options. I would be pleased to communicate further with the Committee on this matter after these discussions have taken place.

On the subject of harp and hooded seal research, you will be aware that our plans for the coming year include considerably increased effort on hooded seals. I am sure that this program will go a long way to providing a better basis for hooded seal stock assessments. However, because priority must, at this time, be given to studies relating to population estimation, funding for other projects such as large scale tagging of harp seals by the sealers and an aerial survey of harp seals may not be possible. In this regard, I am aware the Dr. Muir, Director-General, Fisheries Research Directorate, has informed you by letter that funding is not available to support your proposed work on energy requirements of hooded seals. I would also request some clarification of your comment that the Committee is no longer certain that the conditions you have identified as being necessary to justify continuation of the seal hunt are still being met.

Your recommendation on the evaluation of the tourist industry around the unhunted herds has raised considerable internal discussion with respect to the legal ramifications and resources to ensure compliance with regulations and minimize undue disruption on the whelping grounds. This will undoubtedly be discussed further and I would welcome the Committee's further views on this matter.

With regard to your comments concerning communication between myself and the Committee, I would like to retain the system whereby the Committee communicates directly with me, as opposed to channeling communications through my Deputy Minister or Parliamentary Secretary. I am aware that Dr. Doubleday, now Chairman of CAFSAC, has for the past two years been responsible for liaison with the Committee on operational and financial matters. Notwithstanding his new position, he has agreed to continue this work. I am satisfied that this will maintain the continuity of our relations that you desire.

Finally, I note the Committee's wish to meet with me and discuss the above issues. I would like to suggest that we arrange such a meeting for late November or early December, which will provide sufficient time for the elaboration of plans for the 1984 seal hunt.

Yours sincerely,

Original signed by
Original signé par

Pierre De Bané, P.C., M.P.
Matapédia-Matane

FILE COPIES
Minister's Office (2)
A.W. May
L.S. Parsons (2)
D. Goodman (3)
Central Registry
Correspondence Unit

UNIVERSITY OF GUELPH
[illegible]

GUELPH ONTARIO CANADA N1G 2W1
Telephone (519) 824-4120

Senate
Corporate
Canada

83 07 18

204

-14
314:35

The Honourable Pierre de Bané,
Minister of Fisheries & Oceans,
Fisheries and Environment Canada,
House of Commons,
Ottawa, Ontario,
K1A 0A6.

Dear Mr. de Bané,

I am writing to provide you with the Committee on Seals and Sealing's most recent advise on seals and sealing.

The west coast meeting was very successful in that it provided us with a considerable data base as to the seals and sea lion situation in British Columbia and some adjoining states. We were very pleased that Dr. Goodman and Dr. Bigg were available to meet with us in Vancouver. Both went well out of their way to provide the committee with information and in the case of Dr. Goodman, he acted as a continuing information resource. Perhaps you would pass on our thanks to these gentlemen - they were invaluable.

In regard to our recommendations, we would advise you that we discussed the 1983 hunt in its full complexity.

Sealing

We would recommend that the present regulations be reviewed concerning the procedures to be followed when dealing with activities which interfere with the legitimate sealing activities, particularly the activities of protest groups, vessels, or groups of that nature. The second phase of the same recommendation is that your ministry ensure that the Department of Fisheries and Oceans are organized in such a way that they can effectively enforce the regulations and there be advanced planning with other departments, such as the D.O.T., Justice and any other department involved, so that these departments are aware of the full range of possibilities that may develop, and can deal with the situation without delay and confusion.

...../2

We recommend that an ice breaker be stationed in the Gulf with the centre of operations at Magdalen Islands during the seal hunt in order to ensure that vessels are not endangered and to provide a central point for enforcement activities as well as a base for ongoing governmental and non-governmental research.

We would re-emphasize the need for an effective central authority in sealing matters, extending beyond present limits, i.e., regional territoriality should not intrude into the effective use of that authority.

Subject to the above we recommend that geographical areas be recognized in which seal hunting is conducted and that a single authority be appointed in each of the two geographical areas (these geographical areas overriding regional areas) to ensure that there is no confusion in the operation and enforcement of regulations.. For example, the seal hunting carried on in the Gulf of St. Lawrence, is centered in the Magdalen Islands and it follows, therefore, that the control of the whole Gulf should be vested in the officer stationed in the Magdalen Islands.

Killing Methods

We recommend that the regulation be changed to ensure that, in future, the use of clubs and other instruments of manual killing be abolished and that in the future, killing of the young of the harp seals and grey seals (if any) be by approved gun and ammunition and that the use of these weapons be made mandatory.

Supplementary to this is an internal recommendation that Rowsell and Hughes be requested to produce a paper on killing methods, encompassing the use of all instruments past, present and possibly future. This will give full and detailed support of the above recommendation.

West Coast Seals

We recommend that support should be given to increased research on the west coast into (1) population modelling of harbour seals and fur seals, and (2) population biology including the development of models on all species as becomes possible. In reference to fur seals, the committee recommends that support be given to a project to be carried out by the Institute of Animal Resource Ecology at the University of British Columbia to develop a fur seal model. It appears that the Guelph and UBC models are good background formats for this work and that Institute is prepared to produce such a model.

...../3

Attempts have been made by the committee to try to evaluate if there was a problem created by California sea lions, Steller sea lions, and harbour seals on the west coast and it would appear from the lack of representation at the meeting that the problem is certainly not pressing and it is the opinion of the committee therefore that there is no justification for any consideration to be given to culling or bounty systems. This should not prevent the carrying out of scientific programmes such as:

a) continued investigation into the zoonoses that might be associated with these animals,

b) and that the studies on feeding habits of fur seals by Canadian scientists on the west coast be accelerated and strongly encouraged and brought to fruition as early as possible so as to assist in the management of these stocks.

Fur seal convention - we recommend that Canada should remain a member of the Convention but that, because of the current status of the stocks which are apparently declining, the TAC should be reviewed and, if necessary, reduced ideally to the OSY in order to produce a stable herd. The TAC should be lowered to such a level that the population would not be at risk of further decline, even if this implies a zero quota.

We would advise you that the committee will be sending a scientific observer to the Fur Seal Convention meetings in 1984 and we would ask that we be advised, at an early date, as to the details of the meetings so that we may plan to participate.

Grey Seals

We recommend that the culling of grey seals be stopped since the committee sees no reason or justification for continuing the cull. This is an addition to our reiteration that the bounty system is inhumane, and useless as a control technique. We further recommend that your Ministry should encourage work to be performed to quantify the relationships between grey seals and the codworm. If that work indicates there is a very real relationship between the grey seal population and the degree of infestation in inshore fish socks, at that time we would recommend that chemical fertility control techniques be considered as an alternative instead of the more traditional killing methods. The committee believes that control techniques that utilize killing are no longer acceptable and in anticipation of this development, it is recommended that research into fertility control methods be reinstated as a three year programme and at an adequate level.

Netting

It was reiterated that the netting of seals should be abolished or phased out and that the first phase should be the abolition of netting

...../4

in Newfoundland and Quebec. Closure in Labrador should be deferred until more information is obtained on the socio-economic returns of netting to the inhabitants of Labrador. We would point out that by closing the Newfoundland and Quebec net fishery you would eliminate two-thirds of the net fishery for one-sixth of the cost. Net fishing for mammals cannot be supported, as it is obviously inhumane.

Hooded Seals

The committee recommends that increased research be carried out, including capture and recapture studies, behavioural studies, population dynamics, and the nutritional requirements of the seals. To this end we would remind you that the fisheries subvention has already referred the latter to you for suitable support and awaits your decision.

C.O.S.S. will be participating in the hooded seal workshop, as well as the ICES meetings, to be held this fall.

Harp Seals

We note from a technical management point of view, that a large fluctuation from year to year in the size of the population would offer useful management data. To carry out such a programme would be political suicide. There is therefore a need to provide one firm datum point on population size of the harp seal herd. This absolute measure of the size of population could then be related to all modelling data. Such a basic figure could be provided by aerial surveys using u.v. technology. We recommend therefore that you take advantage of the present situation in the trade to carry out the aerial survey because there would be no conflict with industrial activities.

Harp and Hooded Seals

We would recommend that a scientific programme of research be carried out in 1984 utilizing some personnel of the sealing industry to provide the necessary resources to allow large scale tagging programmes to be carried out which would be co-ordinated with the aerial survey as recommended above. In this way, sealers would receive some income as well as providing a scientific base which will support future discussions of the stocks and add materially to the validity of the model.

We have recommended in the past that killing is only justified providing (a) there are sufficient seals to maintain or increase the herd size, (b) the animals are killed inhumanely, and (c) there is a proper use of the resource. If any of these three premises are not met, then killing should not be permitted. The committee is no longer certain all three of the above can be supported.

...../5

Mr. P. de Bané 83 07 18

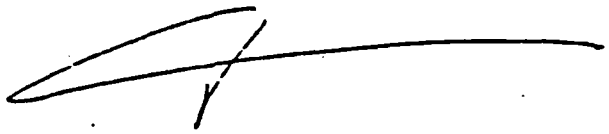
Further we recommend that consideration be given to evaluating the tourist industry around the new unhunted herds. This must be done in consultation with experts, the committee stands ready to advise.

General

We would ask that the official line of communication between the committee and yourself be re-established ideally through your Deputy Minister, or Parliamentary Secretary, we have found a lack of continuity over the past few years that is not helpful in critical evaluations or negotiations with your Ministry. It would be a pity if such a small item as lack of a communication channel at a senior level depreciated our interaction.

The committee actively expressed a wish to have an opportunity to meet with you at your earliest convenience so that we might fully discuss these recommendations.

Yours sincerely,



Professor K.Ronald, Chairman,
C.O.S.S.

cc: C.O.S.S.

and Oceans Ministre des Pêches et des Océans

Canada
OE6

FEB - 9 1984
FEV

Dear Professor Ronald:

This letter is in response to the recommendations of the Committee on Seals and Sealing contained in your letter of November 30, 1983.

I am pleased that COSS is satisfied with the existing liaison channels with the Department and with our organization for management of the 1984 seal hunt. Your concern regarding the absence of a dedicated ice-breaker in the vicinity of the Magdalen Islands during the seal hunt is once again noted. My officials continue to confer with the Ministry of Transport regarding the availability of an icebreaker, recognizing that their first priority at that time of year is to keep open the shipping lanes.

I am pleased that COSS concurs with my view expressed in my October 26 letter that large scale trials of the sealing pistol developed by Mr. Hughes should be carried out before any steps are taken to modify existing regulations regarding instruments of manual killing of seals. My officials hope to carry out such a large scale trial in early 1984 during the annual seal cull on Camp and Basque Islands. I understand that the Canadian

Dr. K. Ronald
Chairman
Committee on Seals and Sealing
Dean, College of Biological Sciences
University of Guelph
Guelph, Ontario
N1G 2W1

.../2

Canada

6&5
working together ensemble
Canada

Veterinary Medical Association's Committee on Sealing as well as Mr. Hughes and Dr. Rowsell will be observing this testing. As I indicated in my letter dated October 26, 1983 I am prepared to authorize development work to produce a multi-shot pistol and appreciate your offer of assistance in the preparation of specifications. I have in addition requested that my officials consult with sealers to obtain their views concerning the practical aspects of using such a weapon.

Your comments concerning the pinniped research program for 1984 are appreciated. I am sure that our expanded research efforts related to assessment of population abundance of both hooded and grey seals this year will assure you that we are directing as much funding as possible towards these research programs even though we recognize there is more that could be done given unlimited budgets.

With regard to your comments on north Pacific fur seals I would welcome further consultation that you have suggested following the 1984 meeting of the Commission. I hope that you will be able to attend both the meeting of the Commission and its Standing Scientific Committee. Given the need for fiscal restraint by Government in the light of the projected budgetary deficit, I hope that COSS can find the necessary funds within its 1984 contribution.

Mr. Marc Briand, the seal hunt coordinator for the Gulf region has made preliminary arrangements for representatives of COSS to observe the harvesting of seals in pound nets on the Quebec North Shore and in Labrador in May 1984 in response to your request. Please contact Mr. Briand to confirm arrangements.

Thank you for elaborating your concerns regarding the continuing full utilization of harp and hooded seals. While the 1983 market was weak in comparison with the peak years of 1981-82, the situation is not as bleak as you describe it. Firstly, the consumption of seal meat in coastal communities seems to be continuing to increase and is now estimated to exceed 50% of its maximum potential. Commercial canning of seal meat is planned to continue, with the introduction of new products in 1984. Secondly,

.../3

the market for seal oil has been strengthening with good prospects for 1984. Finally, while the market for white-coats and bluebacks remains weak, much of the 1983 harvest of pelts has been processed and relatively small volumes remain in storage. Markets for pelts have improved recently and I understand that at least 60,000 harp seal pelts will be purchased in 1984. Recognizing the normal time lags for markets to adjust to major dislocations like the EEC import ban, I see the continued interest of private buyers as an indication of good prospects for a stronger market in future.

The possibility of developing and promoting tourism related to the seal herd is under consideration by my officials.

Thank you for your thorough consideration of the issues surrounding a possible increased grey seal cull. I have decided not to proceed with a significantly increased cull this winter but will reconsider the situation next year. Your comment regarding the lack of progress in the development of techniques to remove nematodes from fish seems to apply throughout the world and not in any special way to Canada. A significant amount of money is being allocated for research on ways to detect and remove parasites in commercially important fishes. My Department also plans to carry out additional scientific research, especially tagging of pups in the Southern Gulf of St. Lawrence in the winter of 1984.

Unfortunately, I had no choice but to cancel our planned meeting in November due to urgent matters on the West Coast. I consider that personal contact with COSS for discussion of sealing issues is of continuing value and propose we meet in Ottawa before the 1984 seal hunt. Please contact my office to arrange a date and time.

Yours sincerely,

Original signed by
Original signé par

Pierre De Bané, P.C., M.P.
Matapédia-Matane

Our comments on the quota reduction for the west coast fur seals, now under Interim Convention on the Conservation of the North Pacific Fur Seals, was purely a cautious conservation strategy. We find it hard to understand how a declining population could not be helped by reducing terminal exploitation. The fact that the observed declines are believed to be unrelated to the present harvesting strategy seems to beg the question. If numbers in a population are declining and one reduction is through man's intentional Harvesting, the termination of the latter would appear to be the easiest and most understandable technique to attempt to reduce the decline. We would however be open to further consulation and information based on the 1984 meeting of the Commission. We understand this meeting will be held in Moscow and we had hoped to have a member present. It may however be impossible without the addition of a supplementary budget item of approximately $ 4,000-5,000.

We have spent considerable time reconsidering the netting question. It now appears that there are two specific techniques used by sealers on the Quebec north shore, in Newfoundland, and along the Labrador coast. The first is the use of a net set deliberately to take seals; the seal 'gill' net, this technique we believe is inhumane. The second is the accidental take of seals in a trap net set for fish. We are led to believe that in the latter case the free-swimming but encircled seal is shot. We are not however totally clear as to the procedure followed, and we therefore at the present time await an opportunity to observe this trapping technique. We would therefore appreciate your personnel arranging for members of our Committee to observe such activities in 1984.

At the same time, I might clarify our statement referred in your letter as 'Committee no longer certain the conditions you have identified as being necessary to justify a continuation of the seal hunt are still being met'. COSS has always had 3 principal criteria for its assessment of the seal hunt: 1) numbers - i.e. the hunt should produce a sustainable yield. We now believe that the herd is stabilized or perhaps increasing in size, 2) that the animals are killed humanely - we believe that the organized hunt is equal in killing quality to most slaughter houses, 3) the resource is being properly utilized - there are some problems in meeting the last criterion. If Canada, because of emotional public reaction, cannot sell its pelts, and if Canada has not developed a cottage or larger industry (as COSS recommended in 1972) to handle pelts and by-products, it leaves us in the position of killing seals with no possibility of utilization of the dead animal. It would be the equivalent of killing a young calf and leaving it to rot on the floor of the barn, in a slaughter house, or in the farmer's field. We have been advised that approximately one million dollars worth of sculps were purchased in 1983. This is a far cry from the returns of previous years. We were also advised that many of the pelts are now in storage

and have not been processed to the final product. If the market does not improve and if Canada does not (or cannot) develop its own profitable use of the dead animal, then we are not in favour of killing for the sake of killing; this, I do not believe, differs from your views. In considering the aboriginal people of Canada, one might have the above view tempered by our consideration of their needs, as long as we are assured of their proper utilization of the resource as well as the humaneness of their kill.'

As to the tourist industry, and its part in replacing the loss that would be suffered by the 'historical sealers' of the northwest Atlantic coast. We believe that a properly organized and advertised visit to the seal herds is quite saleable.

It would be very tempting to ask you to join me personally in March of 1984 so as to allow me to have the privilege of showing you that which I have enjoyed for many years. The unhunted seal herd is an incredible sight, perhaps not matched anywhere else in the world as to pure beauty and biological vitality. It would seem almost unethical not to have people enjoy such an experience. There is a new wave of conservatism in the world, within this wave Canada could offer exposure to the natural history and natural beauty of both our coasts and our animals which are unparalleled in this hemisphere. The non-consumptive use of resources has shown itself to be as marketable, and to produce equal economic return as the consumptive use. It is essential however in such a plan that the 'historical sealers' be utilized as the guides and as the interpreters of these phenomena. The exposition of marine mammals, especially seals, anywhere in the world is perhaps only possible in waters such as those of the Gulf of St. Lawrence. This could become a natural substitute for the now uneconomic killing of this attractive mammal. It would also seem imperative that we move fairly quickly, so that Canada may enjoy the benefits of our resources before another country exploits them.

The other point in your letter that I have deliberately left to the end is the matter of the grey seal/parasite/cull. The Committee welcomed the receipt of the document produced by Mr. Comeau's Committee. Rarely do we have such a detailed and well-written report made available to us. The Committee has always been convinced that seals, codworm, and fish infestations are interwoven. It appears that we now have specific documentation as to the size of such parasitic burdens, in certain of our coastal areas. These infestations may cause a loss of 25% of the gross return available from areas off Nova Scotia, and this when our east coast fisheries need significant help if they are to survive.

The very strong circumstantial evidence outlined in the Comeau document indicates that reducing grey seal numbers might in five or more years reduce the codworm infestation in groundfish. Such groundfish is sold in large quantities to various countries (50% to America). Some of these countries demand a very high quality standard which we cannot expect to meet with the present product.

The question then facing us becomes one of options: we must balance the $ 26 million reduction in gross return against the results of opening up yet another seal hunt. There are however a few alternatives that must be looked at carefully before proceeding. They are: 1) whether species selection, selected capture sites, and size selectivity for less-infested fish have been thoroughly reviewed as an alternative to killing the grey seal; 2) we are suggesting that the industrial inactivity over the development of techniques for detecting the removal of codworm has not advanced our position in 25 years. The result is the usual marine mammal-man confrontation brought about by a lack of activity in certain areas, which makes us wish to kill the suspected offender. We are recommending therefore that you initiate enquiries through a major research agency such as the National Research Council of Canada as to whether they can advise you as to the feasibility of devising a mechanical and/or electronic method for the detection and removal of the worm. This request will be a repeat of one made in 1957 that was never brought to fruition.

If you find that neither of the above provide reasonable solutions, we ask you to consider the following: 1) we are not certain that such a massive campaign as envisaged could be carried out humanely. If it was not, we would be unleashing yet another 'dog of emotion' that would threaten Canadian fisheries through the reaction of the responsible humane societies; 2) there is every evidence that a Sable Island cull would not allow the proper utilization of the seal. This, as we have already discussed, would offend our list of principal criteria for the continuation of kill of any animals; 3) we find the document is extremely detailed in all things but the cost of the cull. We could expect a further expenditure of $ 50,000-100,000 for salaries and incidentals for those persons participating in the cull. This would include the salaries of the actual killers, the organizers, logistic support, personnel, public relations, observers, etc., etc.; 4) we do not wish to comment further on the bounty system other than to say that in good management practice, it is recognized as inefficient, ineffective, and often inhumane; 5) the Committee has commented before on the possibility that a massive disturbance in any one seal colony might displace that colony into a more direct competition with an inshore fishery, e.g. Sable Island seals emigrating to inshore Nova Scotia;

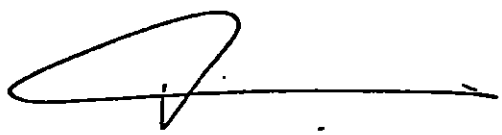
6) finally, at the crux of the matter, the killing of seals on Sable Island: a) one might be thought as desecrating a Canadian national shrine, b) one would also be opening up another seal hunt at a time when the protest movement is sitting on the sideline with baited breath, and this at a time when Canada appears to be desperately fighting a rear-guard action on our historical hunts. Such straws have broken many a camel's back. c) Perhaps even more important, your Ministry will have to declare <u>why</u> the kill is being carried out; that is to reduce worms in Canadian fish. For the first time, it will have to admit that the quality of its product is low. This would allow the protesters to develop a very useful theme in boycotting Canadian products both in Europe and in the U.S.A. We are assured that this general protest is now well-organized and exceeds even the limited uneasiness of External Affairs.

There are times when the Committee on COSS finds itself in a difficult position in generating advice. In the above case we have evidence of a possible solution to parasite burdens, but the solution itself may be more dangerous than the problem. At this time we cannot advise you to proceed with the Sable Island cull. We see no overall short-term benefit for Canadian fisheries, and we suspect it may generate such furour not only the U.S.A. and Europe but in Canada, that it would result in political consequences of marked severity.

Finally, as a result of our last communication, I have received the attached letter. I believe that COSS is doing all it can to ensure privacy in respect to its advisory letters to yourself, but it is obvious that this privacy is still being usurped by some individuals.

Your committee is pleased to have the opportunity of advising you at this time and we look forward to our early meeting with great interest.

Yours sincerely,



Professor K. Ronald,
Chairman, COSS.

Attachment
cc: COSS