AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

A. PROPOSAL

Inclusion of Odobenus rosmarus in Appendix II.

B. PROPONENT

The Kingdom of the Netherlands.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Mammalia

12. Order: Pinnipedia

13. Family: Odobenidae

14. Species: Odobenus rosmarus (Linnaeus, 1758)

15. Common Names:

English:	walrus
French:	morse
Spanish:	Morsas
Russian:	morzh
Danish:	hvalros
Dutch:	walrus
German:	Walross
Italian:	trecheco
Inuktitut:	aivuk (Yupik) or aivik (Inuit)
Aleut:	amak or amaghak
Greenlandic:	aaveq

16. Code Numbers: 5301413008001001 (ISIS)

Walruses are instantly recognizable pinnipeds. They are the largest seal species in the Arctic. Both sexes have a pair of long tusks (elongate canine teeth) and a small square head with a broad muzzle that bears a heavy bristle moustache. Colour varies considerably with age and sex, but generally walruses have a cinnamon-brown colour.

Generally, two subspecies are recognized, Odobenus rosmarus rosmarus (Linnaeus, 1758), the Atlantic walrus, and Odobenus rosmarus divergens (Illiger, 1811), the Pacific walrus.

The Pacific walrus is a bigger animal, has longer tusks and its skull is heavier and more massive than the Atlantic walrus.

Tusk length and body weight of walruses tend to increase throughout life, so average sizes or even maxima have in fact little meaning and measurements vary widely with the age composition of the samples measured. However, some data are presented below.

Pacific walrus

Weight - c. 1200 kg. for adult males, c. 825 kg. for adult females
tusk length - ranging from c. 35 cm. to 75 cm. for adult males and 15 to 7 cm. for adult females (Fay, in litt., 1985).

Atlantic Walrus

Average weights of Atlantic walruses are unknown, though there are some data from a few localities, such as Hudson Bay (Mansfield, 1958) and Thule District, western Greenland (Born, unpublished data). The Hudson Bay animals tend to be the smallest in the world, whereas the Thule animals are nearly as large as the Pacific walrus; tusks, however, are generally smaller.

Thule: Maximum recorded tusk length - 53 cm. for males and 45 cm. for females.

Hudson Bay: Maximum recorded tusk length - 40 cm. for males and 25 cm. for females.

A third subspecies Odobenus rosmarus laptevi Chapskii, 1940, the Laptev walrus, has been suggested for the Laptev sea population being intermediate in size between the Atlantic and Pacific walrus, and having the skull chracteristics of the latter. The status of this subspecies, however, is not generally accepted.

Recent views (Mansfield and Fay, unpublished) express the opinion that the taxonomic status of all walrus populations is uncertain, especially the status of the Laptev sea population (Fay, in litt. 1984)

2. Biological Data

21. Distribution: Arctic (primarily north of 60 N), circumpolar. The distribution of land and sea ice, both in prehistoric and recent times, resulted in the formation of six (more or less) geographically isolated* populations.

The Atlantic walrus, inhabiting the northern Atlantic waters is found in four populations:

1) Hudson Bay - Davis Strait Region
2) Eastern Greenland
3) Franz Josef Land and Svalbard
4) Kara Sea - Novaya Zemlya

The Pacific walrus inhabits the northern regions of the Pacific Ocean:

5) The Bering- and Chukchi Seas

The sixth population, the "Laptev walrus" is found in:

6) The Laptev Sea

Historic Distribution:

Atlantic Walrus:

The range of the walrus at the time of first contact with non-aboriginal peoples is impossible to detail accurately. However, it is evident from records of the history of its exploitation, that the extent of its range has declined significantly.

Atlantic walruses used to be more common further South in the Canadian Arctic and were plentiful as far South as Sable Island and the Gulf of St. Lawrence in the 16th century, and were known to have frequented the southern coasts of Nova Scotia. By the mid-19th century, the walrus had vanished from all areas South of Labrador.

Pre-historic remains are found along the entire coast of North America as far South as New Jersey, Virginia and South Carolina, and at different sites in Europe, such as in Norway, Northern Scotland and Iceland (Allen, 1880).

Walruses were present in Scotland in the mid-19th century, were abundant on Bear Island and in the White Sea, near the mouth of the Dwina River and Cherie Island in the beginning of the 17th Century (Allen, 1880).

In the area of the Soviet Union, the walruses occupied, by the late 1950's, only a small part of their former range (Kleinenberg, 1957).

Walruses still occasionally occur off Iceland and Norway and very occasionally get as far as Germany, the Netherlands and Belgium (Van Bree, 1977).

Pacific Walrus

Pacific walruses used to be common, in the first half of the 19th century, as far South as the Shumagin Islands off the Alaskan Peninsula, on the Pribiloff Islands and along the Siberian coast to the southern regions of the Sea of Okhotsk (King, 1983).

Overhunting, encroachment of habitat and climatic changes are thought to be the reasons for the reduction in range.

It is sometimes thought that the preference of the species for the pack-ice (see 23.) is a rather recent adaptation and that walruses have retreated northwards in response to hunting pressure.

Present Distribution (see 22.)

22. Population: Walrus populations are extremely difficult to census, due to their scattered distribution and due to their habits, spending most of their time in the water. Satisfactory counting methods, either direct or indirect, have not yet been adequately developed and estimates of the different populations vary considerably. Data given below come from the most recent surveys.

(1) Hudson Bay - Davis Strait Region

There are no reliable estimates for walruses in this region.

Mansfield (1966, 1968) estimated a population of c. 25,000 walruses in the whole region, assuming that the population was stable and calculating that this size was necessary to hold steady with an annual removal of 1,800 animals.

There is, or was, no evidence available on this question. The annual removal of 1,800 animals occurred in the mid-1950's, since then the annual take in Canada has decreased.

The distribution of walruses in this area is scattered and the picture is complicated by the fact that there are indications, although questionnable, that the walruses in this region occur in more or less semi-local stocks (Davies et al., 1980).

As said before, current population estimates are very fragmented and not reliable.

Within the Canadian population, probably the greatest number of walruses occur in the northern Foxe Basin, although no surveys have been conducted and no estimate is available. The northern Hudson Bay population (Southampton area) is estimated at about 3,000 animals in 1958 and 1961 (Mansfield, 1973).

Aerial surveys, in 1979, in the northern Baffin Bay area (near Southeast Ellesmere Island) indicated the presence of a stock of 700 walruses in 1979, where only few were seen in 1978 (Finley and Renaud, 1980).

Data about the Baffin Bay population are not known.

Other populations, like the South East Hudson Bay population (Belcher, Sleeper and Ottawa Islands) are not large, but no data are available (Davis, et al., 1980).

In West Greenland, walruses have been observed along the coast North of Sukkertoppen at c. 65°N. with the main population occurring in the Thule area, but no population estimates are available.

History

There are no estimates of the population size in the pre-whaling era (except Mowat, 1984, 750,000 without reference). Walruses occurred once on numerous sites in the whole area, where they now have vanished (Loughry, 1959; Mansfield, 1973; Reeves, 1978).

Whaling began in southern Davis Strait in the early 1700's. Most whaling had ceased in the eastern Arctic by 1910-1915, but commercial exploitation of walruses continued periodically until 1952; between 1949 and 1952, Norwegian vessels harvested over 2,000 walruses in Davis Strait (Davis et al., 1980; Mansfield, 1973).

Ross (1975), on the basis of whaling records, states that whalers in northern Hudson Bay took 2,750 walruses between 1900 and 1915 (retrieving 1 of every 4 to 5 walruses killed, which reduced the Hudson Bay population considerably. Over 3,200 walruses were taken by whalers in Davis Strait and Baffin Bay between 1907 and 1910 (Lubbock, 1937), and an

estimated number of 175,000 heads were taken between 1925 and 1931 in Baffin Bay (McClung, 1972, cited in Chapman et al., 1982).

The extent of the reduction by human factors is unknown, but exploitation probably has been most severe in Baffin Bay and Davis Strait and less in Foxe Basin (Davis et al., 1980).

The reduced catches, south of Thule, through the 1960's have been regarded as a possible indication of the decline of the population (Vibe, 1967; Mansfield, 1973; Kapel, 1975).

(2) Eastern Greenland

Walruses have been observed from Angmagssalik at c. 65°N. During a recent kayak trip, from 7 July to 6 September 1984, a total number of 318 walruses were observed in the area, representing the most recent minimum estimate of this population (Dietz et al., 1985). Whether the population in north-eastern Greenland is stable in unknown.

Until recently the total group was estimated to be c. 200, remaining stable (Reeves, 1978a.o.). Whether this must be considered an underestimate or whether the population is increasing is not known to the proponent.

Concluding from observations in the Greenland Sea (Dietz et al., 1985) suggested a possible connection between walruses in North-East Greenland and Svalbard (see 21.*).

History

Very little commercial hunting occurred along the coast of East Greenland. The few records that do exist report small, single catches taken during 1889 and the early 1900's (Lubbock, 1937; Øritsland, 1973).

(3) Franz Josef Land - Svalbard

From 1954 to 1970, the walrus visited the area only incidentally, as a straggler, but observations from 1970, indicate an increasing number of walruses summering in the Svalbard area (incl. Moffen):

Year	Total observed	Estimated minimum number of individuals
1970	101-116	51
1971	(3)	(2)
1972	38	9
1973	(412)	(300)
1974	118-128	41
1975	73	58
1976	14	6
1977	18-19	12-13
1978	48	27
1979	15	10
1980	51	38
1981	26	22
1982	248-274	82-85

(Source: E.W. Born, 1984)

In 1984, a mixed group of at least 550 animals was observed at Kvitøja (eastern Svalbard). (Thor Larsen, Norwegian Polar Institute, Oslo, pers. comm. to Born)

There are indications that the Svalbard area is mainly used as a summering area by males, having its main distribution in the Franz Josef Archipelago, but at least some may also be derived from the walrus population occurring at Novaya Zemlya and the Kara Sea (*see 21.) (Born, 1984; Bychkov, 1975).

The Franz Josef Land population, once large, was diminished to a few hundred in recent years. On 13 August 1979, 100-150 walruses were observed at Northbruk Island (Franz Josef Land), where about 300 animals were seen in September. This was the first sighting of walrus at Franz Josef Land for many years (Nazarenko, 1980, cited in Born, 1984).

History

During the early part of the 17th century, the walruses occurred in vast herds in the Svalbard area, but already by the 1860's, the extinction of the walrus in the area was being predicted (Allen, 1880). The resident population was possibly exterminated during World War I (Løno, 1972).

The number of walruses occurring in the Svalbard area shortly before they were protected in 1952 is unknown. The possibility that there existed a sedentary stock cannot be ruled out (Born, 1984).

Franz Josef Land probably had fewer walruses than Svalbard, but they were better protected by ice, until the advent of steam powered vessels in the late 18th century (Løno, 1972). Harvesting of this stock continued (primarily by Norwegian hunters) until appr. 1950 (Øristland, 1973). Catches had dropped from over 1,000 animals annually in 1925 to 50 in 1950.

(4) Kara Sea, Barents Sea, Novaya Zemlya

The total population for this area may be estimated to be less than 1,000 individuals.

According to Yablokov (1972), the walrus had practically vanished from the Barents and Kara Seas in the early 1970's.

Lukin (1978) stated that the total number of walruses wintering in the South East Barent Sea apparently did not exceed 100-120 heads.

Bel'kovich and Khuzin (1960), estimated 200-300 animals near the Yamal Peninsula in the Kara Sea.

Bychkov (1975) estimates 400 walruses occurring at Novaya Zemlya and according to Belobodorow et al. (1974) the number of walruses in the late 1960's at Novaya Zemlya was about 200-250.

History

The size of the original Atlantic walrus population within the USSR is unknown, but it can be assumed that it once was quite extensive (Beloborodov and Timoshenka, 1974). As early as the 9th century, the White Sea supported a commercial fishery for walruses (Lund, 1954; Bosworth, 1855). From 1600-1900, thousands of animals were killed during individual excursions (Løno, 1972, Beloborodov et al., 1974).

Chapskii (1941) estimated a maximum number of 1,200 individuals occurring in the Kara Sea in the 1930's and 2,000 to 3,000 at Novaya Zemlya in the same period (data from Born, 1984).

(5) Bering and Chukchi Seas

The present population is estimated to be between 230,000 and 250,000 and seems to be stable. This conclusion is based on estimates from two joint Soviet-American censuses, in 1975 and in 1980 (Fay, 1982).

Aerial surveys like these, however, are able to show only very generalized trends in populations and general abundance (Este, 1976; Estes and Gilbert, 1978; Ray, 1981).

The first aerial survey in the summer of 1958 estimated a number of about 40,000-50,000 animals in Soviet waters (Fedoseev, 1962). Judging from recent comparative results from Soviet and American waters, this probably was about half of the total population in 1958 (Fay, in litt., 1985).

Results of aerial surveys of the Pacific Walrus (Source Fay, 1982; Fedoseev, 1984)

Source	Time of Survey	Data Obtained	Total Number
Kenyon, 1960	Feb/March	78,000-113,000	92,000-132,000
Kenyon, 1960	April	70,000-100,000	82,000-118,000
Fedoseev, 1962	Sept. 1960	50,000	83,000
Kenyon, 1961	March	70,000-100,000	82,000-118,000
Gol'tsev, 1968	September	101,000	168,000
Kenyon, 1971	April	85,000-162,000	100,000-190,000
Gol'tsev & Estes, 1975	September	140,000-200,000	140,000-200,000
Fedoseev, 1976	April	112,000	147,000

History

The historic population of the Pacific walrus is unknown. Fay (1957) estimated it as around 200,000 in the mid-19th century. However, catch rates, in correlation with estimated hunting losses, indicate that it may have been considerably higher (Mowat, 1984).

Severe hunting in the 19th and the beginning of the 20th century, when ivory acquisition became the prime objective of these harvests, decimated the populations to a low level. Rigid regulations in the 1930's and 1950's (see 41.), reduced these harvests and the population increased again.

(6) Leptev Sea

The total population at present is estimated to be 4,000 to 5,000 walruses. Judging from recent aerial surveys, it can be concluded that the population could never have exceeded more than 10,000 animals, because of restriction by ice conditions.

The most recent aerial survey in the complete area (after extrapolation) came to: 3,000 head in the western part of the Laptev Sea (near Taimyr). No walruses were censused in the middle part (from Khatanga Gulf to the mouth of the Lena River). In the vicinity of the New Siberian Archipelago: 2 herds, 500-600 animals (Bel'kovskii Island and Kotel'nyi Island), near Vil'kitski and Zhokov Island: c. 600 head.

Habitat conditions divide the population into two groups: an eastern group, confined to the New Siberian Islands and a western group, near Taimyr.

The harvests of walruses in the Laptev Sea (up to 1,500 to 2,000 per year) are recognised to have been devastating, and only a complete prohibition of the walrus hunting could restore the stock completely (Fedoseev, 1984).

23. Habitat: Walruses are found in Arctic waters in close association with, preferably moving, pack-ice. Within these regions, ice conditions, weather, availability of food (primarily dictated by sea depth and nature of the bottom) and topography of the shoreline determine the actual choice of sites.

The walrus is a bottom feeder, concentrating mainly on bivalve molluscs. Although walruses prefer to feed on shallow water banks up to 80 m., there are indications that they may sometimes feed at greater water depths (Finley and Renaud, 1980).

More than two thirds of their lives is spent in the water. Walruses come out of the water to rest (haul-out) and, in certain seasons to moult and to bear their young.

Pacific walruses are capable of maintaining breathing in ice more than 20 cm. thick and also Atlantic walruses are reported by Greenlandic Inuit to be able to break through ice of about 20 cm. thick (Born, in litt, 1985).

The Pacific walrus moves annually from the Bering Sea in winter to the Chukchi Sea in summer (Fay, 1982). Atlantic walruses seem to be less prone to undertake such long seasonal migration, with the possible exception of the population along the coast of western Greenland (Finley and Renaud, 1980).

Ecological Problems

Petroleum will undoubtedly be extracted in the Bering and Chukchi Seas and the Arctic Ocean. The effects this will have on the walrus populations and on their resources is unknown. Exploitation for and exploration of oil and gas have been contemplated in northern Hudson Bay, Baffin Bay and Lancaster Sound (Harvison, 1979).

The Soviet Arctic and the Svalbard area are currently under economical development, which can be associated with possible disturbances to the increase of the walrus populations.

Human population growth and increasing tourism may limit the walrus' recovery, although the effects of human activities on the walruses remain unknown. Herds near human habitation are often and continuously harassed by human activities, particularly low flying aircraft (Salter, 1979).

The benthic food resources are subjected to human use, which may lead to future competition for these resources. There have been studies of the potential mollusc resources in the Arctic, with exploitation for human consumption in mind. This may have an adverse effect on the walrus population. Clam industry in the walrus' feeding grounds in the Bering Strait has been proposed recently, following the depletion of clam resources in the western North Atlantic (Chapman et al., 1982).

3. Trade Data

31. National Utilization: Walrus hunting has always been of considerable importance to the native people of the North. The walrus offered meat, viscera, stomach contents, blubber oil, hides, ivory, intestines, etc. These products were used for human consumption, for dog food, for making ropes, harnesses, whips, boatcovers, etc.

Walrus hides are extremely thick and fibrous and form tough leather. They are used for all kinds of material; because of their tough, abrasive nature, they are uniquely suited for the production of buffing wheels for polishing metals, especially silver. The principal seller of walrus leather, until 1972, was the Soviet Union, whose main source of supply was the Bering Strait. The skin has also some commercial value for the manufacture of billiard cue tips (in Greenland). Nowadays, walrus leather in industry is mainly replaced by synthetic materials.

The ivory from the tusks was used for making harpoon points, sled runners, ice testers, parts of sledge harnesses, etc., but it now is used mainly for native handicrafts, scrimshaw and carved figurines.

The Walrus Hunt

Walrus hunting has a long history. It is known that the Vikings hunted them and by the beginning of the 17th century it had become a regular occupation. There are many references from these times of groups of ships catching 1,000 or more walruses in a single voyage. With the increase of commercial exploitation,

together with the modernization of hunting methods, throughout the 18th and 19th centuries, all segments of the world population, except, perhaps, that in the Laptev Sea, were severely depleted by the beginning of the 20th century.

Walrus Harvests in Present Times: Today, officially , no commercial harvest of the walrus is allowed, only harvests for subsistence. The latter means that in a number of cases only the ivory, bringing cash to the native people, is retrieved, which means a use of only c. 3% of the total potential use of the walrus. Only in western Greenland, particularly in the Thule District, the walrus hunt is still a life condition for the Inuit, and where its full potential is being used.

The Pacific Walrus

Alaska (USA): There is no quota of legal walrus hunting in Alaska in the present time. The Marine Mammal Protection Act, does not allow the Federal Government to place any limit on the catch by resident Eskimos, unless the walrus population is found to be depleted. Since summer 1979 (see 41.) the annual catch by the Alaskan Eskimos has at least doubled.

All hunting occurs, ostensibly, for subsistence use. And the native Eskimos still do rely on the catch for much of their food and raw materials. But with the advent of modern equipment, the subsistence need for the modern native has undergone a dramatic change, instead of meat for dog food, money is required. Nowadays, one small ivory carving may bring US$50-US$100 income to an Eskimo family, which means that ivory acquisition became the major incentive in several villages, in order to acquire the necessary amount of money for native families.

The total number of walrus harvests in Alaska is not known. However, since the late 1970's, annual harvests of walruses in Alaska are being monitored in five villages. Catch statistics are only available for these villages.

Annual takes of walruses in these villages are as follows:

Bering Sea, Retrieved Walrus Harvest, 1980-1984
Source: United States Department of Interior, Fish and Wildlife Service

Village	1980	1981	1982	1983	1984	total
Gambell	556	961	942	642	1499	4600
Savoonga	456	662	167	624	1011	2920
Mome/King Islands	500	759	717	637	157	2770
Little Diomede	709	808	558	166	1043	3284
Wales	68	128	119	67	271	653
Grand Total	2289	3318	2503	2136	3981	14227

Several hundred walruses are taken for scientific purposes each year and, in 1984, the USSR applied for a permit to catch 200 walruses in US waters (Anon, 1984a).

USSR:

Reported catch statistics from USSR:
(Source R.V. Miller, US NMML, NMFS, USDC, in litt. to WTMU, Cambridge)

1975 - 1366
1976 - 1075
1977 - 1461
1978 - 1575 + 545 for scientific purposes
1979 - 1226

In Chukotka (USSR), about two-thirds of the annual quota (at present - 1985 - 5,000 landed per year) is alloted to shore-based hunting by resident Eskimos and coastal Chukchi, who, in the first instance, use the walruses to feed the local people and the sledge dogs. The other third is alloted to the Government's ship-based hunting. The latter is admittedly a commercial operation, since all of the meat, oil and skins are packed for distribution to fur farms on Sakhalin and the southern mainland, as food for minks and foxes. The ivory is distributed to government craftsmen in several far eastern communities, where it is handcrafted for sale.

Hence, nowadays, the boundary between subsistence and commercial hunting is very poorly defined in both Alaska and the USSR.

Loss of Pacific walruses during hunting is estimated to be about 40 to 50%. Additional waste occurs in the utilization of the products of retrieved walruses. If ivory acquisition is the only objective, the actual use of the walrus amounts to 1 to 3% of the full potential utilization (Fay, 1982).

After the needs for food and equipment are fulfilled, ivory acquisition become the main incentive of the walrus harvest. Since no penalties exist for Alaskan natives to shoot walruses only to acquire the ivory, in some cases it has led to excesses. With the rising price of a walrus head (US$ 500-US$ 2,000) and with many headless walrus carcasses strewn along the Alaskan shoreline, it is evident that the Pacific walrus population requires improved management. Recently, so many headless carcasses have washed up on Big Diomede Island in the Bering Strait, that the Government of the Soviet Union has formally protested to the United States Department of State (MMPA, 1982).

There exists, however, an economic and social problem. Modern natives are, of course, dependent on modern equipment, which can only be bought with money, which is scarce for these people and can only be obtained by excessive exploitation of the very resource that they had conserved before, i.e. those on which they rely also for food and other essentials. Most of the walrus hunting Eskimos are ashamed of the way they are mistreating the walruses, but they can find no alternative solution to their cash-flow problems (Fay, in litt. 1985).

The Atlantic Walrus

Greenland: In Greenland, between 20% and 25% of the population is supposed to live from hunting in general, mainly for subsistence (incl. economic subsistence) purposes, with only a minor commercial element (Kapel and Petersen, 1979).

The Thule District, today, is the main district where the walrus is still being traditionally caught. The main reason for these harvests is to provide dog food; the ivory provides an extra source of income. The catch is partially stored away, partly by the walrus hunters themselves and partly by the local authorities to make sure that dog food is available also outside the hunting season.

Reported Catch of Walrus in Greenland, 1975-1983

(Sources: Hunters' Lists of Game, Ministry for Greenland, Denmark)

Year	Total Greenland incl. Thule	Thule (actually reported)	Thule (estimates)	Estimates (other areas as in Gr.1	Estimates % of total Gr.1 catch
1975	94	6	0	0	6
1976	228	124	0	0	0
1977	193	143	0	0	0
1978	221	160	0	160	0
1979	221	150	0	150	10
1980	214	150	0	150	20
1981	272	188	48	140	20
1982	242	170	95	75	20
1983	235	162	62	100	20

The figures presented above are based on rough estimates. This means that the actual catches that have taken place may have been higher in some years but in some years they may also have been less than the 'official' data.

The catches in the Thule area amounted to a large proportion of the total Greenland quota; however, the data from Thule, in particular, are based on guesses. Regrettably, the reporting of catchings in the Thule area is very insufficient (Born, in litt. 1985).

Estimated annual catches in western Greenland in the early 1950's: 550-750 (Loughry, 1959) and 200 in the 1960's (Mansfield, 1973).

Canada: In the days when dogs were in common use, the walrus carcasses were used as dog food, but, with the replacement of dogs by snowmobiles, now the only product that has any commercial value is the ivory (Whitman, Hudson Bay Company, in litt., 1985).

The annual take of walruses in the Canadian Arctic in the early 1950's is estimated to be 1,200-1,600 (Loughry, 1955; Mansfield, 1959).

Annual kill of walrus in the eastern Canadian Arctic in 1955 (Loughry, 1955)

Hunting area	Average annual kill
Ungava Bay	40
East Coast Hudson Bay	60
Hudson Strait	220
West Coast Hudson Bay	50
Southampton Island	200
Foxe Basin	400
Eastern Baffin Island	110
Northern Baffin Island	20
Arctic Islands	100
Total	1200
Estimated annual loss	400
Total	1600

Mansfield (1963) estimated that the average annual walrus take in the 1960's was about 500 in eastern Canada. This, however, is doubtful. Anders (1965), stated that the annual take in Foxe Basin alone was 500-600 in 1965 and 700 in 1962.

Northwest Territories Harvest Statistics:
(Reference: Environment Canada):

1979 520
1980 430
1981 521

USSR: The use of Atlantic walruses by Siberian Eskimos and catch statistics are unknown to the proponent.

Hunting Losses

The use of firearms and motorized vehicles throughout the Arctic has drastically changed the hunting of walruses and has resulted in high percentages of unretrieved carcasses due to immediate sinking of dead or fatally wounded animals (Reeves, 1978; Davis et al., 1980). Percentages for these unretrieved kills range from 15-20% in the Thule District, where the more traditional hunting methods are used (Born, in litt., 1985), 30% in eastern Canada (Mansfield, 1973) to 50% in Alaska (Brooks, 1978; Fay, 1982).

32. Legal International Trade: Few statistics are available to identify the amount of walrus products involved in international trade. This could be rectified by the inclusion of the species in Appendix II of CITES. The need to monitor trade in walrus ivory was identified as a priority necessity for improved management of the species by the U.S. Fish and Wildlife Service (the government agency with jurisdiction over the walrus)(Palmisano et al., 1980).

Trade in walrus products was already known in the 16th century (and probably in the 9th century).

During the 1880's an average sized Atlantic walrus yielded between US$ 60 and US$ 70 worth of merchantible products [Skin: US$ 0.44/kg. x c. 180 kg. of hide; tusks: US$ 2.20/kg (top quality) or US$ 1.6/kg (average)](Gordon, 1887, cited in Reeves, 1978).

In recent years ivory from the tusks is the main and often sole item which enters international trade, although skins are still in some demand, for buffing silver, for high grade luggage and for the tips of billiard cues (Rudge et al., 1980). The Royal Greenland Trade Department, in the beginning of the 1970's, bought up to 5,000 kg. of walrus hides per year (Mansfield, 1973).

In Canada, walrus penis bones are sold to tourists for CA$ 5-10 (Riewe and Amsden, 1980).

The market for walrus hides and other walrus products, at present, is small, but the demand for walrus ivory is increasing (although no statistics are available on this point).

In the mid 1970's walrus ivory (wholesale) yielded between US$ 44/kg. and US$ 77/kg. (Land, 1977, cited in Reeves, 1978).

Much ivory and ivory carvings are sold privately.

Official ivory trading companies are: The Hudson Bay Company in Canada, The Royal Greenland Trade Department (KGH) in Greenland, the USSR Government Trading Company and in the United States, each year, a number of people and shops receive permits to buy and sell authorized, registered, walrus products.

Alaska: In Alaska, the market for ivory handcrafts, such as figurines and scrimshaw, increases slowly, but steadily, as the resident population of Alaska grows and the number of tourists rises. Estimates of the size of the market are very difficult to make (Fay, in litt., 1985).

In the mid-1970's, the potential value of just the Alaskan harvest of walrus ivory was estimated to be US$ 750,000. By 1980 the U.S. Fish and Wildlife Service reported that trade had developed into "multi-million dollar industry" (Palmisano et al., 1980).

At present, raw tusks (of Pacific walruses) are sold for c. US$ 130/kg. Once cut and worked may bring the price to US$ 1,400-1800/kg. One dealer in Alaska sell tusks for US$ 200 each, regardless of size or shape. A mounted skull, with trophy sized tusks costs US$ 2,500 (TRAFFIC USA, 1981).

Profits from the manufacturing of ivory carvings are high. For native peoples in Alaska, one small carving brings the carver at least US$ 50-100. Head-hunting (removing the head and leaving the carcass behind) becomes more and more common practice in Alaska. The value of a walrus head is estimated to be US$ 500-2,000 (Haley, 1980).

Greenland (KGH): In 1984, KGH bought in the district of Thule 375 walrus antlers (with two tusks) and 82 single tusks with point. The quantity of walrus tusks being bought differs much from one year to another, depending on the catch results. In 1984, the catch results in the district was above the average.

The conditions for purchasing walrus teeth from the hunters are agreed between the Association of Greenland Fishermen and Hunters on one hand and the KGH on the other; the latest agreement (July 1985) is as follows:

The walrus tusks are divided into three categories: (1) tusks with point; (2) tusks without point; (3) tusks in maxillae (antler).

When delivered, the tusks and the possible jaws have to be clean and polished. The length must be at least 17 cm. The length of the tusk must exceed at least three times the height of the jaw bone, the latter may not be higher than 15 cm.

To the cost price of the tusks, KGH adds a gross margin of c. 60%. KGH distributes and resells the walrus tusks through its own shops in all towns and villages throughout Greenland. In Greenland the main buyers are resident Danes and tourists.

Because of the relatively high prices, the walrus ivory is only rarely used for domestic handicrafts, apart from broken teeth or tooth stumps. In the Thule District, c. 40 producers of handicraft are registered. Most of these producers have hunting as their main occupation, while only three persons have tooth carving as their main occupation. At present, mainly whale bones and soapstone, together with stumps of narwhal teeth are used for the production of native handicrafts (J. Holten Møller, KGH, in litt., 1985).

There exists local trade to tourists or to Greenlandic residents; the magnitude of this trade, however, is not known (Born, in litt., 1985).

Canada: Although there is still trade with the Hudson Bay Company, much of the ivory is sold privately in Canada.

Some statistics are available concerning Canadian exports and imports of walrus ivory due to the inclusion of the Canadian population of Atlantic walrus in Appendix III of CITES.

CITES comparative tabulation.

Year	Country of import	Country of export	Export/Re-exports reported (Purpose)	Imports reported (Purpose)
1979	DE		94 ivory carvings	
	FR		16 ivory carvings	
	NL		1 ivory carving	
	US		14 carvings (U)	
	US		4 ivory carvings	
	US		5 tusks	
1980	CA	US(CA)	7 ivory carvings (C)	
	CA	XX		7 bones (I)
	CA	XX		2 tusks
	CA	XX		unspecified
	DE	CA	32 sets-ivory carvings	
	FR	CA	2 tusks	
	US	CA	4 trophies	
	US	CA		3 ivory carvings (C)
	US	CA	2 tusks (P)	
	XX	CA	unspecified (U)	

CITES comparative tabulation (continued)

Year	Country of import	Country of export	Export/Re-exports reported (Purpose)	Imports reported (Purpose)
1981	GB	CA	4 tusks	
	US	CA	3 carvings	
	CA	XX		1 carving (I)
	CA	XX		2 tusks (I)
1982	GB	CA	1 carving	
	GB	CA	1 skull	
	GB	CA (XX)		1 carving (P)
	JP	CA	5 carvings	
	US	CA	1 set of ivory carvings	
	CA	JP		5 carvings
	CA	XX		5 carvings (I)
	CA	XX		6 tusks (I)
	CA	XX		17 pieces tusks
1983	AU	CA	2 ivory carvings	
	CA	US	1 bone product (P)	
	CA	US		1 carving
	CA	US	80 ivory carvings	
	CA	US	215 ivory carvings	
	CA	US	1 skull (P)	
	CA	US	2 tusks (P)	
	CA	XX		2 carvings (I)
	CA	XX		2 tusks (I)
	CU	CA	2 tusks	
	CU	CA	2 tusks	
	DE	CA	1 tusk	
	FR	CA	9 ivory carvings	
	GB	CA	1 ivory piece	
	GB	CA	1 tusk	
	GB	US	1 bone product (P)	
	MX	US	7 kg. tusks (C)	
	NZ	CA	3 ivory carvings	
	NZ	CA	2 tusks	
	US	CA	1 tusk	
	US	GB		1 tusk (P)
	US	GB(JP)		1 ivory carving
	US	GB(US)		6 tusks
	US	GB(XX)		7 ivory carvings
	US	GB(XX)		1 ivory carving (Q)
	US	HK		610 ivory carvings
	US	HK(XX)		1 kg. tusks
	US	ID(US)		2 ivory carvings
	US	ID(US)		1 skull
	US	ID(US)		8 teeth
	US	ID(US)		2 tusks
	US	JP		197 leather items
	US	MX(US)		7 kg. tusks
	US	US(JP)		1129 tusks (C)
	US	ZA(XX)		3 teeth

CITES comparative tabulation (continued)

Year	Country of import	Country of export	Export/Re-exports reported (Purpose)	Imports reported (Purpose)
1984	CA	US		3 carvings
	CA	XX		853 carvings
	CA	XX		1 tusk
	CH	CA		1 carving
	CH	CA		1 skin/leather item
	CH	GB(XX)	1 ivory carving	
	GB	CA	1 bone	
	GB	CA	7 carvings	
	GB	CA	5 tusks	
	GB	JP(XX)		1 ivory carving
	GB	NO(XX)		1 carving
	GB	US		1 live
	GB	US		1 tusk
	GB	US(XX)		6 ivory carvings
	GL	CA	8 carvings	
	US	CA	69 carvings	
	US	CA		34 ivory carvings
	US	GB(XX)	4 ivory carvings	
	US	GB(XX)	1 set-ivory carvings	

Walrus ivory carvings and carved tusks are regularly on sale in souvenir and antique shops within the member nations of the European Community. These are not identified by country of origin.

International Trade in Live Specimens: In 1608, the first 2 live walruses were taken to London, of which one survived (Allen, 1880). Since then, small numbers of live walruses are taken for zoos, dolphinaria and aquaria.

(Data compiled from the International Zoo Yearbooks).

33. Illegal Trade: Although trade in raw ivory in Alaska to non-natives is forbidden, presumably, the black market for raw (uncrafted) ivory is virtually limitless, and the size of the network must be enormous (Fay, in litt., 1985). In 1981, American federal agents seized more than 5,000 kg. of illegally traded walrus ivory, value US$ 450,000. wholesale, representing approximately 750 animals. The investigation, with which 90 undercover agents of the US Fish and Wildlife Service were involved, took 11 months and was done in Alaska and 4 other states simultaneously. Traces of the illegal international market reached as far as London, Tokyo, Hong Kong and Taiwan. Two dealers outside Alaska were reported to be involved in an estimated US$ 3.5 million annual business in walrus ivory. Undercover investigations in the USA of the illegal trade in marine mammal parts continued on a much reduced scale during 1982. At least 115 walrus tusks were forfeited and numerous carvings were seized. In 1983, at least 117 tusks were seized. At present, there are indications that dealers are much more cautious about who they deal with (MMPA, 1982 and 1983).

In 1977, despite a section in the Canadian Walrus Protection Regulations prohibiting the export from the Northwest Territories of uncarved walrus tusks, the regulations were not enforced to any degree at that time (Land, 1977).

Bruemmer (1971) and Mansfield (1973) referred to private sales of walrus skulls and tusks to U.S. Air Force personnel in Greenland, in spite of the fact that this is illegal under a U.S. - Danish Agreement. (In addition, it is illegal, under the U.S. Marine Mammal Protection Act, for U.S. citizens to bring walrus products into the United States).

Trophy hunting for walrus is currently outlawed both in Canada and the United States. However, sport hunting guides have seen an increasing demand for walrus sports hunts in Canada. One Canadian trophy hunting outfitter has published the fact that his company will "refer all clients interested in a walrus hunt to one of the best outfitters in Alaska, who we know will offer a quality hunt" (Anon., 1982b).

34. Potential Trade Threats:

341. Live Specimens: Negligible.

342. Parts and Derivatives: There is said to be an increasing demand for carved ivory. Native people of the North are encouraged in their handicrafts with an increasing number of tourists visiting northern countries each year.

It is difficult to determine whether there exists an economic relationship between walrus ivory and elephant ivory. The two ivory sources differ in a number of respects. The walrus ivory is extremely hard and brittle, which means they do not lend themselves to intricate carvings in the same way elephant ivory is so eminently suitable. The rapid escalation in the price of elephant ivory, which occurred in the 1970's, however, may possibly have created a demand for alternative ivory sources.

From 1969 to 1978, the price of African elephant ivory rose from c. US$ 6/kg. to c. US$ 75/kg. The ivory price index in 1978 was in excess of the inflation index, by a factor of 5.9. Since then, the elephant ivory price has dropped to c. US$ 53 in 1982, but the inflation index is still exceeded by a factor 3.5 (Douglas-Hamilton, 1983).

4. Protection Status

41. National:

Atlantic Walrus

Canada: Walrus protection regulations exist since 1928 (Department of Fisheries Act). These regulations limited the killing of walruses to Inuit people for their own food and clothing requirements. In 1931, further and more explicit regulations were issued, forbidding anyone to kill walrus, except for food, and then not in excess of actual needs. Export of walrus ivory, except in the shape of manufactured articles was also prohibited, without special permit. Finally, catches were limited to 7 walruses per year per family. Additional amendments were made to clarify the above objectives in 1934, 1947, 1949 and 1959 (Mansfield, 1973). The Walrus Protection Regulations were updated in 1980.

At present, the territorial governments are responsible for managing wildlife, with the exception of wildlife of international importance, migratory species and rare, threatened or endangered species.

The latest modifications, since 1980, to the Walrus Protection Regulations are as follows:

Only hunting with licence allowed.

Indians and Inuiks may hunt, without licence, max. 4 walruses per year for subsistence purposes.

Annual quota system for each area.

Hunting under licence only allowed for food for himself, family and dogs.

Licences are provided for a given area, for a given quota and for a given hunting method.

Not allowed:

Sell, trade or barter walrus meat, except for Indians and Inuiks within NW Territories; no transport of walrus, or part thereof, allowed south of 55°N, without special permit, etc. (Government of Canada, 1983).

Most of the 1980 changes in the Walrus Protection Regulations tightened subsistence requirements and can be interpreted as a sincere attempt to steer native hunters away from ivory head-hunting and back toward more traditional subsistence use of the walrus.

Canada's inclusion of the walrus in Appendix III also can be seen as an attempt to receive more insight into international trade in walrus products and shows Canada's concern about this trade.

Some of the walrus' critical habitats are now national parks.

Greenland: There have been regulations for the walrus hunt in the Thule area since the beginning of this century. Hunting regulations for the Thule District (Hainang 13/1979) (Source: Born, in litt., 1985):

1) It is permissable to hunt walruses at all seasons.

2) While there is ice cover, it is not permitted to shoot at walruses before they have been harpooned. It is permitted first to shoot at walruses in small leads and holes in the ice, where they can be harpooned.

3) During the open water season, it is not permitted to shoot more walruses than can be transported.

4) It is not permitted to shoot walruses in the head, before they have been harpooned.

5) It is permitted to shoot walruses swimmming along the ice edge, where they can be dangerous.

Hunting Regulations for West Greenland (Source: Born et al., 1982): In West Greenland, walrus hunting regulations came into force in 1956. These limit the hunting in Davis Strait to licensed Greenlanders, and licensed Danish citizens, resident in Greenland (using vessels under 40 tons). From 1 June to 1 January, all hunting of males along the coast and in the West ice from 66°N. to 75°N is forbidden. From 1 April to 1 January, no females nor calves may be taken in the same area. These regulations were amended in 1978: there is no quota for boats smaller than 40 tons, whereas boats above 40 tons are allowed to take 5 walruses per year.

The allowance of 1978, for boats above 40 tons to take walruses, reflects the fact that trawlers operating offshore, near the edge the Davis Strait pack ice, may get the opportunity to take walruses as a 'by-catch' rather than an indication of an increasing number of walruses in the area.

Hunting Regulations for East Greenland: Hunting of walruses North of Scoresby Sund has been prohibited since 1956 (Kundgørelse verdr. Grønland, afsnit 16, grp. 13, 16. un. 10, 1956).

Norway: In 1952, Norway passed the Norwegian Walrus Decree which forbade hunting by Norwegian citizens for any purposes (Lund, 1952).

After the walrus stock near Svalbard was brought to the verge of extinction through reckless hunting, first by English, Dutch and Danish whalers and later by Soviet and Norwegian sealers, the walrus in Svalbard was given complete protection in 1952.

USSR (Atlantic and Laptev): In the Soviet Union, the first steps were taken in 1921 to limit the harvest of walruses (no specifics given, Bychkov, 1975).

Walrus hunting has been forbidden since 1949, when commercial harvests were prohibited in the Barents and Kara Seas (Bychkov, 1975). These prohibitions were extended in 1956 to all regions inhabited by Atlantic and Laptev walruses. Exceptions are made for licensed natives of northern Siberia, hunting only for personal need, and for polar expeditions to supply dog food (Beloborodov et al., 1974).

Pacific Walrus

USSR: Commercial harvests of Pacific walruses by the Soviet Union went as high as 8,000 per year in the 1930's and remained high into the late 1950's. Although the population was severely depleted by the mid 1950's, commercial harvests continued until 1962, when a quota was set at 2,000 animals/year, and allowed only coastal Chukchi and Eskimos to take walrus. The quota was lowered to 1,000 in 1969-1971 and raised again to 2,000 in 1972, and to 5,000 in 1982, when commercial harvests were allowed again (Fay, in litt., 1984).

Alaska: From 1867 (when Alaska was purchased from Russia) to 1958, Alaska has been a 'Territory' administered by the United States Federal Government. During that period, the Pacific walrus

population was severely depleted by Americans, first by Yankee whalers in the 19th century, followed by the so-called Arctic traders in the beginning of the 20th century.

In 1941, the U.S. Congress passed the "Walrus Act" of 1941, which prohibited non-Eskimo Americans from taking walruses anywhere in the world and allowed only the native residents of Alaska to take (only North of Cape Newenham) up to 5 cows and subadults and an unlimited number of males for food and clothing.

In 1956, the Walrus Act was amended, allowing a small amount of trophy-hunting by non-Eskimo sportsmen, which brought income to the Eskimo villages.

In 1958, the first management oriented research was undertaken, in order to obtain information about the annual harvests of walruses.

In 1958/1959, the more or less autonomous State of Alaska was formed within the federated United States, and assumed most of its responsibilities for managing its natural resources. The Alaska Department of Fish and Game (ADF&G) was formed, which regulated the harvests and monitored the size and composition of these harvests. Contact was made with Soviet biologists for the exchange of management information, co-ordination of research and, with co-operation of the Federal Government, conducted aerial censuses of the walrus population. By 1972, the walrus population was clearly on the increase.

In 1972, the Marine Mammal Protection Act (MMPA) was passed, which placed the authority of marine mammals into the hands of the Federal Government. It completely banned the taking (including harassing, capturing and killing) of marine mammals, anywhere in the world by U.S. nationals, except that Alaskan natives were allowed to take as many as they wished for subsistence and for creation of native handicrafts, provided that they do not do so wastefully.

The Marine Mammal Protection Act: Only Alaskan natives (Aleuts, Eskimos and Indians), may hunt the walrus for non-wasteful subsistence purposes or for the creation or sale of authentic native handicrafts (as long as the stock can support these harvests).

It is not allowed to sell or give raw ivory to non-natives (except with special permit). Alaskan natives may possess or receive unfinished ivory or other marine mammal products. The Secretary of Commerce is obliged to report annually to the Congress on the current status of the stocks.

Between 1972 and 1976, the ivory hunting by Alaskan natives increased greatly.

The State of Alaska at once applied to the Federal Government for re-authorization of its jurisdiction over the 10 species of marine mammals of greatest importance to its residents (Waiver of the Moratorium and return of Management, 1976). In 1976, after a public hearing before a Federal judge, the State was granted jurisdiction (within special conditions) over the population of

one of the species, the walrus. Among the conditions was an annual quota system, which equalled the maximum catch in previous years. The State allowed licensed recreation, importation and other activities, to a certain extent.

By 1978/79 the walrus was showing signs of the population reaching its carrying capacity, including reduced productivity, leanness, changes in diet and greatly increased natural mortality. The State applied for the allowance to increase the annual catches, but the Federal Government adhered to its quota.

In 1979, the State of Alaska terminated its management programme, and returned the walruses into the custody of the U.S. Fish and Wildlife Service Again.

Since summer, 1979, the catch of walruses has at least doubled, because the Federal Government cannot place any limits on it. The MMPA cannot regulate the Eskimos' catch, unless it can demonstrate that the population is depleted. The Soviet catch has doubled as well (Fay, in litt., 1985).

Pacific walruses occur in a number of protected areas, such as the Walrus Islands State Game Sanctuary (1960), in North-East Bristol Bay. These were in the 1960's the only summer hauling-out grounds for the walrus in Alaska. The status of the area is now disputed, since native people claim that harvests from this area are necessary to them for subsistence (Chapman and Feldhammer, 1982).

42. International: The Norwegian-USSR Sealing Agreement of 1957 disallows walrus hunting by the citizens of contracting parties.

The Canada-Norway Agreement on Sealing and the Conservation of Seal Stocks in the Northwest Atlantic (1971), extended in 1976 to include the walrus, states the desire of both countries to develop and maintain the most effective conservation methods, and disallows all commercial hunt.

With the extension of national coastal jurisdictions to a 200 mile zone in 1976, the importance of both agreements have been reduced.

The USA-USSR Marine Mammal Project, being part of the USA-USSR Environmental Protection Agreement of 1972, regulates the interchange of information between contracting parties and make the parties responsible for protection of the population and of the resources with which it interacts. Management of the Pacific walrus population at present, however, is done unilaterally.

The walrus is included in Appendix II of the Convention on the Conservation of European Wildlife and Natural Habitats, 1979 (The Berne Convention)(Lyster, 1985).

Canada has included the walrus in Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

43. Additional Protection Needs: The control of the ivory hunt by Alaskan natives poses a serious and sensitive problem to the State (Brooks, 1978 a.o.).

Because of the annual North-South migration of the Pacific walrus population, being mainly East of the International Convention Line in winter and West of it in summer, there exists an interchange of specimens between Soviet waters and American waters (Fay, 1982).

There is no bilateral or perhaps multilateral agreement concerning management of the Pacific walrus population. At present, there exists a lack of management on the Alaskan side and the Soviet Union is managing its population, unilaterally, as best it can. Because of the management lack on the American side, the Soviet Union is at present unwilling to enter any management agreement with the USA, although the Soviet biologists recognize the need for such an agreement (Fay, in litt., 1985).

Investigations concerning the effects of human encroachment of the walrus' habitat and the effects of increased clam-fishing should be undertaken.

The population dynamics of the Pacific walrus should be studied, together with the carrying capacity of its food resource, in order to prevent a potential collapse of the population (Ray 1981).

Control of, and studying the effects of, the increased harvest of both Alaskan and Siberian natives should be undertaken.

Data on the size, status and trends of Atlantic walrus populations are scarce. The vulnerability of some of these populations and the fragmented and unconcerted character of national regulations call for uniform and international regulations concerning management of the walrus and its resources.

Inclusion of the walrus in Appendix II of the Convention conforms with the position in Appendix II of comparable marine mammals, like the narwhal.

Since a large amount of walruses are killed for ivory entering international trade, the placement of this species in Appendix II of CITES would help clarify the extent of legal trade and, to some degree, the numbers and trends in walrus harvests.

Monitoring international trade in walrus products contributes to the attempts to stop the illegal trade in walrus ivory. The perhaps increasing profitability of some walrus products may lead to an increasing trade in these products and adversely affects attempts at unilateral protection. The obvious extent of this illegal trade requires the species to be of concern to the CITES Parties.

5. Information on Similar Species

Walrus ivory can be distinguished from other ivory sources by the granular (globular) dentine filling the pulp cavity. The presence of this globular dentine in carvings is used to identify the source of the ivory. This is, of course, not possible when carvings are so small that they are only manufactured of the parts not including the globular dentine. Such carvings are, however, rare. Pacific and Atlantic walrus ivory is indistinguishable. The complete teeth of adult animals are not recognizable.

6. Comments from Countries of Origin

7. Additional Remarks

8. References

Advisory committee on marine resources research. Mammals in the seas, ad hoc group iv - Ecological and general problems. Draft report, supplement 6. Bering Sea case study. 4pp.

Alaska Department of Fish and Game, 1976. Pacific Walrus, FAO Scientific Consultation of Marine Mammals, Bergen, Norway, 31 Aug.-9 Sept. 1976. ACMMRR/Ad Hoc III/29. 15 pp.

Allen, G.M., 1942. Extinct and vanishing mammals of the western hemisphere. Am. Comm. Int. Wild. Prot. Spec. Publ. 11, 620 pp.

Allen, J.A., 1880. History of North American Pinnipeds. A monograph of the walruses, sea-lions, sea-bears. U.S. Dep. Inter. Misc. Publ. 12, 785 pp.

Allen, J.A., 1913. Shall the walrus become extinct? Am. Mus. J. 13:38-42.

American Society of mammalogists, marine mammal committee, 1966. Background material for annual reports of the committee. 46th meeting. Long Beach, California. Walrus, p. 13.

Anonymous, 1959. Norwegian-Soviet Sealing Agreements 1958. Polar Rec. 9: 345-348.

Anomymous, 1976. East Greenland National Park. Oryx 13: 387-389.

Anonymous, 1981. Walrus ivory. U.S. Raids reveal extensive illegal trade TRAFFIC (USA) Newsletter 3(2): 1&7.

Anonymous, 1982 a. Improvement and Publication of Trade Statistics on Marine Mammals and their Products. Report prepared for the Ad Hoc consultation on a Global Plan for Action for the Conservation, Management and Utilization of Marine Mammals (draft), Nairobi, 11-14 January 1983. IUCN, Gland, Switzerland.

Anonymous, 1982 b. Walrus and Buffalo Sport Hunts? Qaivik ltd. Newsletter, October 1982, Yellowknife, N.W.T., Canada.

Anonymous, 1984. U.S. Federal Register 49(163). August 21, 1984. Notices 33159.

Barzdo, J. and J. Caldwell, 1982. A Review of International Trade in Marine Mammals, TRAFFIC-Bulletin IV (4/5): 40-60.

Belopolski, L.O., 1959. On the migrations and ecology of reproduction of the Pacific Walrus. Fisheries Res. Board Canada Trans. Series 246, 17 pp. From Zoologicheski Zhurnal 18 (5): 762-774 (1939).

Bernard, J.F. 1925. Walrus Protection in Alaska. J. Mammal. 6(2): 100-102.

Boeuf, B.J. le, 1986. Sexual strategies of seals and walruses. New Scientist 1491: 36-39.

Born, E.W, 1984. Status of the Atlantic Walrus in the Svalbard area. Polar Research 2:27-45.

Born, E.W., R. Dietz and M.-P. Heide Jørgensen, 1982. Distribution and Catch of Walruses in West Greenland. International Council for the Exploration of the Sea, Marine Mammals Committee, C.M. 1982/N:10.

Born, E.W., I. Kraul and T. Kristensen, 1981. Mercury, DDT and PCB in the Atlantic Walrus from the Thule District, North Greenland. Arctic 34(3): 255-260.

Bree, P.J.H. van, 1977. On the recent visit by a walrus, along the coast of the Netherlands and Belgium. De levende Natuur 80: 58-62.

Brenton, C., The Walrus, pp. 55-57 in Mammals in the seas. FAO Fisheries Series No. 5 Vol. II.

Brooks, J.W., 1953. The Pacific walrus and its importance to the Eskimo economy. Transact. 18th N. American Wildl. Conf. March 9-11, 1953. 503-511.

Brooks, J.W., 1979. Status of Marine Mammal Stocks in Alaska, pp. 59-69 in: Proc. 29th Alaska Science Conf. Alaska Fisheries. 200 years & 200 miles of change. B.R. Melteff. ed. Aug. 15-17, 1978.

Bruemmer, F., 1973. The North American Walrus. Can. Geogr. J. 86(3): 90-95.

Buckley, 1958. The Pacific Walrus, a review of current knowledge and suggested management needs. U.S. Fish Wildl. Serv. Spec. Sci. Rep. Wildl. 41. 29 pp.

Burns, J.J. 1965. The walrus in Alaska, its ecology and management. Alaska Dept. Fish and Game, Juneau, 48 pp.

Burns, J.J. 1966. Annual Marine Mammal Report, vol VII. Alaska Department of Fish and Game.

Burns, J.J. 1969. Annual Marine Mammal Report, vol X. Alaska Department of Fish and Game.

Bychkov, V.A. 1971. Scientific principles of the conservation of nature. Pinnipeds of the USSR. Moskva 1971, pp. 59-74 (transl. from Russian).

Bychkov, V.A. 1973. The Atlantic Walrus, Novaya Zemlya Population. pp. 56-58, and The Laptev Walrus, pp. 54-55, in Seals. IUCN Publ. New Series, suppl. Paper no. 39, 176 pp.

Bychkov, V.A., 1975. Marine Mammals, pp. 27-38.

Canadian Arctic Resources Committee, 1984. The Northern Agenda: a memorandum. CARC 12(2)

Chapman, D.C. 1979. Marine Mammals and Ecosystem Management. Proc. 29th Alaska Science Conf. B.R. Melteff, ed. Aug. 15-17, 1978.

Chapman, J.A. and G.A. Feldhamer (eds.), 1982. Wild Mammals of North America. Biology, Management and Economics. Baltimore. 769-827.

Chapskii, K.K. 1940. Distribution of Walrus in the Laptev and East Siberian Seas. Probl. Artiki 6, 80 pp. (Transl. Fish Res. Board Canada).

Collins, G., 1940. Habits of the Pacific Walrus. J. Mammal 21: 138-144.

Curry-Lindahl, K., 1975. Conservation of Arctic Fauna and its Habitats. Polar Record 17 (108): 237-247.

Davis, R., K. Finley and W.J. Richardson, 1980. The present status and future management of Arctic Marine Mammals in Canada. LGL ltd. Toronto, 94 pp.

Dietz, R., M.-P. Heide-Jørgensen and E.W. Born, 1985. Havpattedyr i Østgrønland en litteraturundersøgelse (Marine Mammals in East Greenland: A literature survey). Danibu ApS. (Biologiske Konsulenter), Helleru: 277 pp.

Douglas-Hamilton, I., 1983. Elephants Hit by African Arms Race. African Elephant & Rhinogroup Newsletter 2: 11-13.

Dunbar, M.J. and D.M. Moore, 1980. Marine life and its environment in the Canadian Eastern Arctic: A Biogeographic Study. Marine Sciences Centre Manuscript no. 33. McGill University, Montreal.

Eberhardt, L.L., 1977. "Optimal" Management Policies for Marine Mammals. Wildlife Society Bulletin 5(4): 162-169.

Estes, J.A., 1976. The reliability of aerial surveys to estimate population abundance of marine mammals: considerations from a survey of Pacific walruses. FAO, Advisory Committee on Marine Resources Research.

Estes, J.A. and J.R. Gilbert, 1978. Evaluation of an Aerial Survey of Pacific Walruses. J. Fish. Res. Board Can. 35: 1130-1140.

Fay, F.H., 1957. History and Present Status of the Pacific Walrus population. Trans. N. Am. Wildl. Conf. 22: 437-443.

Fay, F.H., 1960. The Pacific Walrus. Alaska sportsman. November 1960. 14-15.

Fay, F.H., 1977. An estimation of the impact of the Pacific Walrus population on its food resources in the Bering Sea. Inst. Marine Science. Report to the Marine Mammal Comm.

Fay, F.H., 1979. Industrial Utilization of Marine Mammals. pp. 75-79. in: Proc. 29th Alaska Science Conf. B.R. Melteff ed. Aug. 15-17, 1978.

Fay, F.H. and G.C. Ray, 1979. Reproductive Behavior of the Pacific Walrus in Relation to Population Structure. pp. 409. e.v. in: Proc. 29th Alaska Science Conf. Aug. 15-17, 1978

Fay, F.H. and B.P. Kelly, 1980. Mass Natural Mortality of Walruses at St. Lawrence Island, Bering Sea, Autumn 1978. Arctic 33(2): 226-245.

Fay, F.H., 1981. The walrus. pp. 1-23 in Ridgway, S.H. and R.J. Harrison (eds.) Handbook of Marine Mammals, Vol I. AP London/New York.

Fay, F.H., 1982. Ecology and Biology of the Pacific Walrus. U.S. Fish Wildl. Serv. Res. Rep. 74. 279 pp.

Fay, F.H., B.P. Kelly and J.L. Sease, 1985. Managing the exploitation of Pacific Walruses: A tragedy of delayed response and poor communication. Biennial Conf. on the biology of marine mammals. Vancouver, November 22-26, 1985 (abstract.)

Fedoseev, G.A., 1962. On the state of the stock and the distribution of the Pacific Walrus (in Russian: Zool. Zhur., 41(7): 1083-1089, 1962). Trans. by Fay, Oct. 1962.

Fedoseev, G.A. 1984. Present status of the population of walruses in the eastern Arctic and Bering Sea. pp. 73-85 in V.E. Rodin et al. (eds.), Marine Mammals of the Far East. TINRO, Vladivostok 149 pp. transl. by Fay, 1985.

Finley, K.J. and W.E. Renaud, 1980. Marine Mammals Inhabiting the Baffin Bay North Water in Winter. Arctic 33(4): 724-738.

Government of Canada, Fisheries and Oceans, 1983. Walrus Protection Regulations, made under the Fisheries Act + Amendment.

Gordon, A.R., 1887. Report on the Hudson's Bay expedition of 1886. Sess. Pap. Parliament Canada 14(15): 1-133 (cited in Reeves, 1978).

Grainger, D. The Walrus, pp. 174-181 in: Animals in Peril. A guide to endangered animals of Canada and the United States. Toronto

Haley, D., 1980. Future of the Walrus. Rise before the Fall? Oceans 13(3) 62-63.

Haley, D., 1980. Tooth-walking Sea Horse. The wonder of the walrus. Oceans 13(3): 38-44.

Harvison, P., 1979. Lancaster Sound. Confusion and Confrontation. Nature Canada. April/June 1979: 36-40.

Jablokov, A. and V. Belkovish, 1961. Among the walruses. Estonian Nature 3, May-June 1961: 149 (summary).

Jensen, A.C. 1965. The vanishing walrus. Frontiers 30(1): 138-141.

Kapel, F.O. and R. Petersen, 1979. Subsistence Hunting-The Greenland Case. Int. Whaling Comm. Meeting, Seattle Wash., 5-9 Febr. 1979. 50 pp.

Kenyon, K.W., 1960. The Pacific Walrus. Oryx. 5(6): 332-340.

Kenyon, K.W., 1978. The Walrus. pp. 179-183 in: Marine Mammals. D. Haley (ed.), Pacific Search Press, USA.

Kiliaan, H.P.L. and I. Stirling, 1978. Observations on overwintering walruses in the Eastern Canadian High Arctic. J. Mammal. 59(1): 197-200.

King, J.E. 1983. The Walrus. pp. 65-72 in: Seals of the World, Br. Mus. (Nat. Hist.) Oxford/London.

Kooyman, Gl., R.L. Gentry and W.B. McAlister, 1976. Physiological Impact of Oil on Pinnipeds. Final Rep. Research Unit 71, Outer Continental Shelf Energy Assessment Programme. U.S. Dept. of the Interior. 26 pp.

Krylov, V.I., 1966. Sexual maturation of Pacific walrus females. Fish Res. Board Canada. Transl. Series 800, 28 pp. (from Zoologicheskii Zhurnal 45(6): 919-927, 1966).

Krylov, V.I., 1968. The timing of sexual maturity in the male Pacific walrus. Problems of the North 11 (1968): 225-233. (Problemy Severa 11: 186-193, 1967).

Krylov, V.I., 1968. Determination of age, growth and analysis of the age structure of the Pacific walrus catch. Fish. Res. Board Canada. Transl. Series 1004, 8 pp. (from: Morkie Mlekopitayushchie. Akad. Nauk. SSSR, Moskya: 201-210, 1965).

Land, E.M., 1977. The narwhal and the walrus: a problem of ivory. Can. Nat. Fed. Spec. Publ. 6: 79-81 (Cited in Reves, 1978).

Larsen, T., 1976. North-East Svalbard Nature Reserve. Naturopa. 25: 21-23.

Løno, O. 1970. The catch of walrus in the Svalbard, Novaya Zemlya and Franz Josef Land. Nor. Polar inst. Arbok. 1972: 199-212.

Loughry, A.G., 1959. Preliminary investigations of the Atlantic Walrus. Can. Wildl. Serv. Wildl. Manage. Bull. Ser. 1 no. 14, 123 pp.

Lowry, L.F., K.J. Frost and J.J. Burns, 1980. Feeding of Bearded Seals in the Bering and Chukchi Seas and Trophic Interaction with Pacific Walruses. Arctic 33(2): 330-342.

Lubbock, B., 1937. The Arctic Whalers. Brown Son and Ferguson Ltd. Glasgow, 483 pp.

Lyster, S., 1985. International Wildlife Law. Cambridge, 470 pp.

Mansfield, A.W. 1959. The Biology of the Atlantic Walrus in the Eastern Canadian Arctic Fisheries Research Board of Canada. Manuscript Report Series 653: 146 pp.

Mansfield, A.W. 1959. The walrus in the Canadian Arctic. Fisheries Research Board of Canada. Arctic Unit Circular No. 2.

Mansfield, A.W. 1966. The walrus in Canada. Can. Geogr. Journal 72(3): 88-95.

Mansfield, A.W. 1966. Le Morse dans l'Arctique canadien. Le Jeune Scientifique 5(1): 12-19.

Mansfield, A.W. 1973. The Atlantic Walrus in Canada and Greenland pp. 69-79 in Seals. Proc. Work. Meeting IUCN/SSC Seal Spec. Group (Aug. 1972). IUCN Publ. New Series, Suppl. Paper 39.

Mansfield, A.W., D.E. Sergeant and T.G. Smith, 1975. Marine Mammal Research in the Canadian Arctic. Fish and Marine Service Canada, Techn. Report 507, 23 pp.

Manville, R.H. and P.G. Favour Jr., 1960. Southern distribution of the Atlantic Walrus. J. Mammal. 41(4): 499-503.

Marine Mammal Protection Act, (1979-1984), Administration of the Marine Mammal Protection Act of 1972. Ann. Rep. U.S. Dept. of the Interior. Fish and Wildlife Service.

Marshall, W.H., 1963. Management and Status of Marine Mammals in Alaska. 28th North American Wildlife and Nat. res. conference, March 4-6, 1963. pp. 319-320.

McClung, R.M., 1978. Hunted Mammals of the Sea. Morrow, New York, 191 pp.

McInnes, J.B., 1977. An Arctic Adventure. International Wildlife, May-June 1977: 36-41.

McKenzie, D., 1985. Snowmobiles and the faith of the Arctic Caribou. New Scientist 12:22.

Mowat, F., 1984. Life and Death of the Sea Tuskers. Equinox Sept./Oct. 1984: 33-55.

Nechiporenko, G.P., 1927. Walrus hunting on the Chuckchea Peninsula. From: Ekonomicheskaya zhizn' Dal'nego Vostoka 5(6-7): 169-177. 1927.

Nikulin, P.G., 1957. Biological characteristics of the shore aggregations of the walrus in the Chukotka Peninsula. Fish. Res. Board Canada Transl. Ser. 115, 4 pp (orig., 1947)

Norderhaug, M., 1970. Conservation and Wildlife Problems in Svalbard. Proc. Productivity and Conservation in Northern Circumpolar lands. IUCN Publ. 16(21); 192-198.

Olney, P.J.S. (ed.), 1984. International Zoo Yearbook 23 (1983) Zool. Soc. London. (and others).

Øritsland, T., 1973. Walrus in the Svalbard area. pp. 59-68 in Seals. IUCN Publ. New Series Suppl. Paper 39, 176 pp.

Øritsland, T., 1974. Publication of Catch Statistics and Routine Biological Data for North Atlantic Seals. International Council for the Exploration of the Sea. C.M. 1974/N:10 Marine Mammals Committee, pp. 1-2.

Palmisano, A.W., 1980. Alaska, Research for the 80's. A decision Report of the U.S. Fish and Wildlife Service, June 1980.

Petersen, S. and E.W. Born, 1981. Age Determination of the Atlantic Walrus, by means of mandibular growth layers. Z. Säugetierkunde.

Popov., L.A. 1971. State of coastal walrus rookeries in the Laptev Sea. Fish. Res. Board Canada. Transl. Ser. 1944. 24 pp. (Original from: Okhrana Prirody i Ozeleniye 3: 95-104, 1960).

Ray, G.C., 1979. Conservation of Marine Mammals, pp. 81-83 in Proc. 29th Alaska Science Conf. Aug. 15-17, 1978.

Ray, G.C. 1981. The Pacific Walrus pp. 303-315 in Management of locally abundant populations.

Reeves, R.R., 1978. The Atlantic Walrus, a literature survey and status report. U.S. Fish and Wildl. Serv. Res. Rep. 10:41 pp.

Reeves, R.R., 1979. The Atlantic Walrus in retreat. Nat. Parks. Cons. Mag. 53(6): 10-14.

Reeves, R.R., and E. Mitchell, 1981. The Whale behind the Tusk. Natural History 90(8): 50-57. Am. Mus. Nat. History.

Ridgeway, S.H. and R.J. Harrison (eds.), 1981. Handbook of Marine Mammals I, Acad. Press.

Riewe, R.R. and C.W. Amsden, 1980. Harvesting and Utilization of Pinnipeds in Canada's Eastern High Arctic . Mercury Series. Archeological Survey of Canada, National Museum of Man, Ottawa pp. 324-341.

Ronald, K., J. Selley and P. Healey, 1982. Seals. pp. 769-827 in J.A. Chapman and G.A. Feldhamer (eds.), Wild Mammals of North America. Biology, Management and Economics Baltimore/London. 1147 pp.

Ross, W.G., 1975. Whaling and Eskimos: Hudson Bay 1860-1915. Natl. Mus. Canada. Publ. Ethnol. 10. 164 pp.

Rudge, A.J.P., M. Klinowska and S.S. Anderson, 1981. Preliminary Status Report on the Marine Mammals of Major Relevance to Europe, Report EUR 7317 EN, Environment and Consumer Protection Service, Comm. of the European Communities.

Scammon, C.M., 1874. The Marine Mammals of the Northwest Coast of North America, together with an account of the American Whale Fishery. Dover Publ. Inc. Toronto Ontario. pp. 176-181. The Walrus.

Scheffer, V.B., 1958. Seals, Sea Lions and Walruses, a review of the Pinnipedia. Stanford, 197 pp.

Scott, R.F., K.W. Kenyon and J.L. Buckley, 1959. Status and Management of Polar Bear and Pacific Walrus. 24th N. Amer. Wild. Conf.: 366-374.

Shustov, A.P., 1968. Rational use of the populations of pinnipedia in the Bering Sea. Problems of the North 11: 219-223.

Slater, R.E;. 1979. Site Utilization, activity budgets, and distribution responses of the Atlantic walruses during terrestrial haul-out. Canadian J. of Zoology 57(6): 1169-1180.

Smith, T.G. and D. Taylor, 1977. Notes on marine mammals, fox and polar bear harvests in the NWT 1940-1972. Environ. Can. Fish Mar. Serv. Techn. Rep. 694, 37 pp.

Southwell, Th., 1899. Notes on the Seal and Whale Fishery, 1898. The Zoologist (London) Ser. 3(11): 182-189.

USSR Ministry of Agriculture, 1978. Red Data List. Main Administration for Nature Conservation, Nature Reserves, Forestry and Game Management, Central Research Laboratory on Nature Conservation, Moscow.

Vibe, C., 1950. The marine mammals and the marine fauna in the Thule District. Meddelser om Grønland 150(6), 116 pp.

Vibe, C. 1956. The walrus, west of Greenland. Proc. Techn. Meeting IUCN 5 (1954): 79-84.

Voronov, V.G. and G.A. Voronov, 1980. Restored Range and Findings of Walrus in the Sea of Okhotsk.

Wood, T.J. 1974. Wildlife in the Vicinity of Baffin Island National Park: An assessment of the impact of Inuit hunting and other factors on wildlife populations in southeastern Baffin Island. Can. Wildl. Serv. Fredericton, NB., 35 pp. (unpubl rep.)