



## *Status of Marine Mammals in the North Atlantic*

# THE ATLANTIC WALRUS



*This series of reports is intended to provide information on North Atlantic marine mammals suitable for the general reader. Reports are produced on species that have been considered by the NAMMCO Scientific Committee, and therefore reflect the views and findings of the Scientific Committee of NAMMCO.*

### **North Atlantic Marine Mammal Commission**

Polar Environmental Centre N-9296 Tromsø, Norway

Tel.: +47 77 75 01 80, Fax: +47 77 75 01 81 Email: [nammco-sec@nammco.no](mailto:nammco-sec@nammco.no), Web site:

[www.nammco.no](http://www.nammco.no)

## **ATLANTIC WALRUS** (*Odobenus rosmarus rosmarus* L.)

The walrus is one of the largest members of the Pinnipeds (the group which contains all types of seals and walrus), and is the largest member of this group to live in the Arctic. Two distinct subspecies are recognised: Atlantic and Pacific walrus. The Atlantic walrus is the slightly smaller of the two, with males reaching weights around of 1200 to 1500 kg and lengths of close to 3 m. Females are smaller than males, weighing up to around 600 - 700 kg and reaching lengths of 2.5 m (Born *et al.* 1995). A male Pacific walrus can weigh up to 1700 kg and be nearly 4 m long.

Walrus are a cinnamon-brown colour overall. After a long period in cold water, they may appear almost white, as blood vessels to the skin constrict to conserve body heat. In warmer weather animals can appear pink as blood vessels dilate and circulation increases to shed excess heat. A walrus' skin is very tough, and may be between 2 to 4 cm thick. It is thickest on the neck and shoulders of adult males, where it protects the animal against tusk jabs or bites from other males during fights for dominance. Under the skin lies a layer of insulating blubber, which can be up to 10 cm thick in places (Wiig *et al.* 2000).

Both male and female walrus have long ivory tusks, which are modified upper canine teeth. Male walrus tusks tend to be longer and thicker than those of females. Another distinguishing feature of walrus is the presence of many stout vibrissae or whiskers on the snout. A walrus can have from 400 to 700 of these arranged in from 13 to 15 rows. The vibrissae are attached to muscles and are supplied with blood and nerves, and are used mainly to feel for food in bottom sediments.

Walrus are long-lived animals with a low reproductive rate. A walrus can live to be 40 years old. Females reach sexual maturity at from 4-10 years old, males at 6-10 years, although males likely cannot compete successfully for females until they are older, about 15 years of age. Mating takes place in the water, usually from January to April, and pregnancy lasts 15-16 months. Females can only therefore give birth a maximum of once every two years, though it is more commonly 3 years between calves. This means that the walrus pregnancy rate is much lower than that of other pinnipeds.

Walrus calves are born on land or on the pack ice between late April and early June. The calf is nursed solely on milk for the first 6 months or so, before beginning to eat solid foods. Nursing mostly takes place in the water, but also sometimes on land or ice. The nursing period typically lasts for 2 years, with weaning occurring gradually over a period of time.

### **Distribution and stock definition**

The walrus (*Odobenus rosmarus*) has a disjunct circumpolar distribution, with two subspecies recognised. Pacific walrus (*O. r. divergens*) inhabit the Bering, Chukchi, and Laptev seas, while Atlantic walrus (*O. r. rosmarus* L.) inhabit coastal areas of north-eastern Canada, Greenland and Svalbard. It has been proposed that the walrus in the Laptev Sea are a third subspecies, but this is questionable (Born *et al.* 1995).

A “stock” of animals is usually defined as a management unit, that is, a group of animals that can be managed independently of other groups. Stock definition in Atlantic walrus is not presently clear, and is the subject of on-going research (Born *et al.* 1995, NAMMCO 1995, Outridge *et al.* 2003). There are eight presumed sub-populations of Atlantic walrus based largely on geographical distribution and movement data (NAMMCO 1995, Born *et al.* 2001).

Five of these sub-populations are to the west of Greenland and three are to the east (see Fig. 1). Current research suggests that each of these eight sub-populations contain smaller local stocks (Outridge *et al.* 2003).

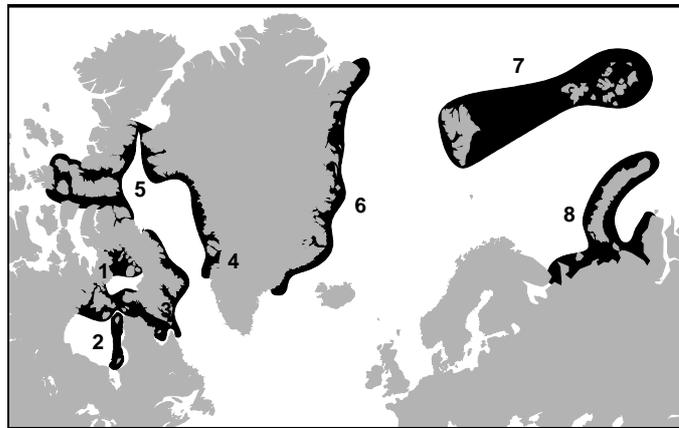


Fig. 1. Proposed (putative) walrus stocks in the North Atlantic. 1 – Foxe Basin; 2 – Southern and Eastern Hudson Bay; 3 – Northern Hudson Bay – Hudson Strait – Southeastern Baffin Island – Northern Labrador; 4 – Western Greenland; 5 – North Water (Baffin Bay – Eastern Canadian Arctic); 6 – Eastern Greenland; 7 – Svalbard – Franz Joseph Land; 8 – Kara Sea – Southern Barents Sea – Novaya Zemlya. Adapted from Born *et al.* (1995).

### Ecology

Walrus are primarily bottom feeders, foraging in sediments on the ocean floor for bivalve molluscs (clams) and other invertebrates (Outridge *et al.* 2003). The soft parts of clams, the feet and siphons, have been found to make up 95% of both numbers and weight of walrus food intake. Other invertebrates are eaten to varying extents, and fish may be rarely taken (Born *et al.* 1995). Walrus predation on seals is well documented, and seems to be largely carried out by older males. The animal in the cover photograph of this document is shown consuming a ringed seal.

Because of their benthic mode of feeding, walrus are generally confined to the continental shelf where water depths are not greater than 80 to 100 m. Walrus are powerful swimmers, and can break through fast ice up to 20 cm thick. Once the ice becomes thicker than this, they retreat to areas of drift ice. In winter, walrus are found in areas where there are numerous leads or polynyas (areas which stay ice-free all year round), and where the ice is thick enough to support their weight (Born *et al.* 1995). In summer, groups of walrus haul out onto land at traditional sites, called *uglit* in Inuktitut, which are often located close to their feeding grounds.

Apart from man, the main predators of walrus are killer whales (*Orcinus orca*) and polar bear (*Ursus maritimus*). Mainly calves and younger walrus are susceptible to such predation.

### Abundance and trends

The total population of Atlantic walrus prior to the European discovery of North America must have been at least in the hundreds of thousands. This is, of course, a very rough guess, and is based on recorded observations by early explorers and traders, plus known records from commercial walrus hunting. Commercial hunting of walrus began in the late 1800s,

roughly around the time of the end of the whaling era, and proceeded on an “enormous scale” (Born *et al.* 1995). In western Greenland, for example, many hundreds of animals were taken annually over several decades. Walrus were hunted for their skins, blubber and ivory tusks. The result was that by the mid 20<sup>th</sup> century the population of Atlantic walrus had been reduced in nearly all areas and its range had shrunk substantially (Born *et al.* 1995). At Svalbard, for example, walrus were nearly completely extirpated (Wiig *et al.* 2000). Large herds which once hauled out on island and mainland beaches in cold temperate and sub-temperate latitudes, for example as far south as Sable Island off Nova Scotia, Canada, have been exterminated, and walrus today are confined solely to the Arctic (Born *et al.* 1995).

Walrus population estimates are very hard to obtain for a number of reasons. Walrus occur in patches over a vast and remote area, which means that they need to be counted using aerial survey methods. These are both time consuming and expensive. Walrus are also very difficult to count from the air. When they are hauled out on land or ice floes, animals tend to lie piled on top of one another, making it hard to see all individuals. As well, at any one time, a certain unknown proportion of the population is in the water and cannot be seen.

Current estimates of stock sizes are therefor considered to be of relatively poor quality (see Table 1). The largest stocks are those in the Foxe Basin and northern Hudson Strait. Those two stocks together contain some 11,500 walrus. The smallest stocks, Western Greenland, south-east Hudson Bay and the Kara Sea area, are each estimated to contain roughly 500 animals.

<b>STOCK</b>	<b>SIZE</b>	<b>CATCH</b>	<b>STATUS</b>
1. Foxe Basin	5,500 <sup>P</sup>	200 <sup>F</sup>	stable? <sup>F</sup>
2. S and E Hudson Bay	500 <sup>P</sup>	35+ <sup>P</sup>	unknown <sup>P</sup>
3. N Hudson Bay – Hudson Strait – SE Baffin Isl. – N Labrador	6,000 <sup>P</sup>	230 <sup>P</sup>	unknown <sup>P</sup>
4. Western Greenland	500 <sup>F</sup>	46	declining <sup>F</sup>
5. North Water (Baffin Bay – E Canadian Arctic)	3,000 <sup>P</sup>	280 <sup>P</sup>	declining? <sup>P</sup>
6. Eastern Greenland	500-1,000 <sup>P</sup>	20 <sup>F</sup>	stable/incr. <sup>?F</sup>
7. Svalbard – Franz Joseph Land	<2,000 <sup>F</sup>	0 <sup>F</sup>	increasing <sup>F</sup>
8. Kara Sea – Barents Sea – Novaya Zemlya	<500 <sup>P</sup>	? <sup>F</sup>	increasing? <sup>P</sup>

Table 1. Size, catch and status of putative walrus stocks. Catch does not include struck-and-lost animals. Data quality ratings in superscript: G – good; F – Fair; P – Poor. Adapted from Born *et al.* (1995) and NAMMCO (1995).

Since the population estimates for each stock are not well quantified, trends of increase or decrease in the stocks are also very difficult to determine. The only stock which can be said with some certainty to be increasing is that on Svalbard and Franz Josef Land (Born *et al.* 1995, NAMMCO 1995). This stock has been protected since the 1950’s so that there have been no removals by hunting.

The Kara Sea area walrus stock may also be increasing, although information for this area is very limited. The Eastern Greenland stock may be either stable or increasing, but again information is limited. The other walrus stocks are in an unknown state or are thought to be in decline (Born *et al.* 1995, NAMMCO 1995).

### **Current management and utilisation**

Commercial walrus hunting reached its peak in the early part of the 1900's, and continued through the 1930's and 40's. Commercial hunting was stopped in Canada in 1931, but continued in Greenland. Catches in Greenland declined after about 1940, most likely due to a decline in the population (Born *et al.* 1995). Subsistence hunting by Inuit in both Canada and Greenland has continued since then. Walrus meat was an important source of food for dog teams, which most Inuit relied upon prior to the introduction of motorised snow machines in the late 1960s and 1970s. Atlantic walrus meat remains an important item in traditional Inuit diets in Canada and Greenland. The ivory is still a valuable item, and is used in carvings and jewellery. The hides are used to make traditional footwear and other items such as rope. Substantial hunts occur in the western north Atlantic, across Nunavut in Canada and in western Greenland. On the eastern coast of Greenland, walrus are hunted on a more limited scale. Further east, on Svalbard, Franz Josef Land and in the western Russian Arctic walrus are fully protected from hunting (Born *et al.* 2001).

In Canada, walrus are managed by the federal Department of Fisheries and Oceans. The first regulations on walrus hunting were introduced in 1928 and have been amended several times since then (Born *et al.* 1995). Under the Nunavut Land Claims agreement of 1993 the Nunavut Wildlife Management Board (NWMB) was established. The NWMB is a decision-making body within the Nunavut Settlement Area, with advisory authority in the adjacent waters. Ultimate responsibility for wildlife management, however, lies with the governments of Nunavut and Canada. These governments carry out NWMB decisions, once they are made.

In 1999 the NWMB created a walrus working group, which is developing a walrus management plan for Nunavut. This working group's members have been studying traditional and scientific knowledge about walrus, looking at problems with the current management system, and suggesting ways to better manage walrus. This new management plan is still under development. In the meantime, the current management system has quotas for some communities in Nunavut, while people in other communities are allowed 4 walrus per family per year.

Walrus hunting in Greenland is controlled by various regulations, according to location (Born *et al.* 1995). Regulations govern the type of hunting method used, location and timing of the hunt. Walrus are an important item in the diet of Greenland Inuit, in some areas providing an estimated 25% of the meat and other edible products obtained through hunting. Recent harvests in Greenland are listed in Table 2. It is important to note that the landed catches listed do not include animals that are killed but lost. Loss rates vary with location, season, hunting method and hunter skill, and may range as high as 50% of the landed catch in some situations.

Walrus have been protected in Norwegian territory (Svalbard) since 1952, and walrus hunting by Norwegian citizens in other areas is prohibited (Born *et al.* 1995). Much walrus habitat on Svalbard has been included in nature reserves and national parks.

In Russian territory, regulations curtailing walrus harvest were introduced in 1921. In 1956 hunting of Atlantic walrus was prohibited for all Soviet citizens, excluding a limited subsistence harvest by native people (Born *et al.* 1995).

<b>YEAR</b>	<b>WEST</b>	<b>EAST</b>	<b>TOTAL</b>
1994			484
1995			403
1996			305
1997			317
1998			610
1999			325
2000	322	7	329
2001	211	8	219

Table 2. Recent landed catches of walrus in West and East Greenland.

Walrus are listed in Appendix III of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). Appendix III concerns species which are not necessarily endangered, but which are managed by the listing nation. For walrus, the listing nation was Canada. A permit is required for any international trade in walrus parts.

### **Threats**

While over-hunting was the primary cause for decline in walrus numbers over the 20<sup>th</sup> century, other human activities may also have an impact on walrus populations.

Walruses are very sensitive to human caused environmental disturbances, such as the noise of boats and low-flying airplanes. This causes them to flee, and sometimes leads to the death of animals, especially calves, by trampling. Repeated disturbance may cause walrus to abandon an *uglit* (Born *et al.* 1995).

Walruses are quite conservative in their choice of habitat and food, so any reduction in these may have detrimental effects on their numbers. Walrus numbers could be threatened by a loss of sea ice caused by global warming and accompanying environmental changes, the retreating sea ice reducing the availability of suitable habitat and food supply.

Other potential threats to walrus populations include pollution and disturbance from oil and gas exploration and extraction activities. Walruses are particularly at risk from oil spills as their staple diet of benthic invertebrates are known to accumulate hydrocarbons (Born *et al.* 1995). Other pollutants of concern are heavy metals, such as cadmium, lead and mercury. High levels of these metals have been found in Atlantic walrus tissues, though it is not clear what effect these might have on walrus health (Born *et al.* 1995). Relatively high levels of organochlorines such as DDT and PCB have also been found in those walruses that eat seals (for example in Svalbard, Wiig *et al.* 2000).

### **Status and outlook**

The main problem with determining the current status of walrus populations is the lack of accurate population numbers, for reasons stated previously. New satellite and aerial imaging technologies are being evaluated, and researchers are investigating how best to conduct walrus population surveys. Another problem lies in the determination of accurate harvest statistics. In all regions where walrus are hunted, there occur losses of animals which are shot but not retrieved. Loss rates of up to 50% have been reported, but it is generally assumed to be roughly 30% (Born *et al.* 1995). This means that numbers of walrus reported killed by

hunting are underestimates of the total hunting mortality by perhaps 30%. Other information lacking for most stocks is the age and sex distribution of the animals harvested.

Without good information about population levels and total removals, it is impossible to say whether walrus harvesting is being done at sustainable levels. For some stocks, there is concern that more animals are taken than may be sustainable (Table 1) but the quality of these assessments ranges from fair to poor.

In 1995, the Scientific Committee of NAMMCO expressed concern that stocks in West Greenland may be overexploited (NAMMCO 1995). In response, the Management Committee of NAMMCO recommended that Greenland take appropriate steps to arrest the decline of walrus along its west coast. Greenland has since introduced some measures to reduce the walrus take, including the restriction of walrus hunting to people with valid professional hunting licences only; a year-round ban on walrus hunting south of 66° N; limitations on the means of transport used in connection with walrus hunting to dog sleds and small vessels, and the sale of walrus products has been restricted to direct sales at open markets or for personal use only (NAMMCO 1999). Greenland has also stated its intention to introduce a quota system for walrus in the near future (NAMMCO 2003).

There is no question that Atlantic walrus numbers today are greatly reduced from what they were in pre-European contact times. The question these days is how best to manage present-day numbers to ensure healthy stocks of walrus for use now and long into the future.

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