

## The Greenland muskox population status 1990.

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*Abstract:* The indigenous population of muskoxen (*Ovibos moschatus*) in North and Northeast Greenland is estimated at 9 500–12 500 which is about the half of the previous estimate. This difference is mainly explained by a much better basis for estimating and to a lesser extent by a general population decrease in Northeast Greenland.

The introduced population in the Kangerlussuaq (Søndre Strømfjord) area is still increasing, and is now (1990) estimated at c. 2 600. Quota based harvesting has been allowed since 1988.

New populations have been introduced to the Ivittuut-area in Southwest Greenland in 1987 and to three locations in the Avanersuaq (Thule) area in Northwest Greenland in 1986. The present status of the latter populations are more or less unknown, while the Ivittuut population is thriving and has a very high rate of increase.

**Keywords:** muskox, Greenland, population size, population trends.

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### Introduction

Thing *et al.* (1984) estimated the indigenous Greenland muskox population at 20 000 on rather few and in some cases also outdated references in lack of up-to-date information. Since then, a large part of the range of muskoxen has been surveyed from aircrafts. The sledge patrol Sirius has released all its records on muskoxen, and we have received additional information due to an increased expedition activity. Furthermore detailed studies of muskoxen have been carried out in Jameson Land (Thing *et al.* 1987, Aastrup 1990) and in Peary Land (Klein & Bay 1990, in prep.).

The introduced population in Kangerlussuaq (Søndre Strømfjord) was estimated at 700 in 1983 (Thing *et al.* 1984), and the development of this population has been monitored carefully in the recent years (Olesen 1989, 1990, 1991). In addition, four new populations have been established in West Greenland and in western North Greenland.

### Materials and methods

The present status of muskoxen in Greenland is based on three kinds of information: 1) Aerial surveys, 2) systematic ground based observations made by the military sledge patrol Sirius,

Tab. 1. Assessment of the indigenous muskox population in Greenland, 1990

Area	Population size	Population trend	Reliability of estimate	References
70°-72°N				
Kangertitituaq, western part	1250-1550	?	+	Pedersen (1974), Higgins (in litt.).
Jameson Land	2950-3600	stable	+++	Aastrup (1990).
Liverpool Land and Scoresby Land	150	?	+	Ferns (1977), Halliday & Higgs (1981), Patterson (1984), Sittler (1988), Sirius.
72°-75°N				
Kong Oscar Fjord - Kejser Franz Joseph Fjord	1100-1500	decreasing	++	Ferns (1977), Halliday & Higgs (1981), Stemmerik (1987), Sittler (1988), Bay & Boertmann (1989), Sittler <i>et al.</i> , (undated), Higgins (in litt.), Henriksen (in litt.), Sønderholm (in litt.), Finnbjørnsson (in litt.), Sirius.
Kejser Franz Joseph Fjord - Gael Hamkes Bugt	1200-1700	decreasing	++	Meltofte (1979), Bay & Boertmann (1989), Finnbjørnsson (in litt.), Henriksen (in litt.), Stemmerik (in litt.), Dennis (in litt.), Higgins (in litt.), Sønderholm (in litt.), Sirius.
Gael Hamkes Bugt - Ardencable Fjord	1100-1800	decreasing	++	Meltofte (1979), Halliday & Higgs (1981), Bay & Boertmann (1989), Higgins (1988), Finnbjørnsson (in litt.), Henriksen (in litt.), Stemmerik (in litt.), Dennis (in litt.), Higgins (in litt.), Lea & Roy (in litt.), Sirius.
75°-79°30'N				
Ardencable Fjord - Dove Bugt	55-120	decreasing	+++	Meltofte (1979), Halliday & Higgs (1981), Higgins (1988), Bay & Boertmann (1989), Boertmann <i>et al.</i> 1990, Bay (1992b), Sirius.
Dronning Louise Land	200	?	+++	Bay & Boertmann (1989), Boertmann <i>et al.</i> (1990), Bay (1992b).
Germania Land	175-215	decreasing	+++	Cabot <i>et al.</i> (1988), Bay & Boertmann (1989), Boertmann <i>et al.</i> (1990), Bay (1992b), Sirius.
Hertugen af Orléans Land - Lambert Land	80-110	?	+++	Lundbye (1986), Boertmann <i>et al.</i> (1990), Bay (1992b), Sirius.

79°30' - 83°30' N							
Nioghalvfjerdingsfjorden - Independence Fjord	300-500	stable?	+	Lundbye (1986), Klein & Bay (1990), Higgins (in litt.), Hjort (in litt.), Sirius.			
Independence Fjord - I. P. Koch Fjord	500-700	stable?	++	Johnsen (1953), Diez & Andersen (1984), Aastrup <i>et al.</i> (1986), Bennike <i>et al.</i> (1989), Klein & Bay (1990), Melftofte (in litt.).			
I. P. Koch Fjord - Newman Bugt	285-355	stable?	++	Diez & Andersen (1984), Aastrup <i>et al.</i> (1986), Bennike <i>et al.</i> 1989, Higgins (in litt.), Sirius.			
Total	9345-12500	(9500-12500)					

+ uncertain, ++ rather certain, +++ certain.

and 3) random observations made by various expeditions.

Systematic airborne surveys have been performed in Jameson Land every year in the period 1982-1989 (Aastrup 1990), in North Greenland (north of 80°N) in the region between Sermeruaq (Humboldt Gletcher) and Independence Fjord in 1985 (Aastrup *et al.* 1986), and in Northeast Greenland between Ardencahle Fjord (75°N) and Germania Land (78°N) in 1988 (Bay & Boertmann 1989). Furthermore selected lowland areas were surveyed in the region between Kong Oscar Fjord (72°12' N) and Ardencahle Fjord in 1988 (Bay & Boertmann 1989).

Sirius patrols most of North and Northeast Greenland from Hall Land in the north to Kangertitivaq (Scoresby Sund) in the South by means of dog-sledge. The sledge drivers are instructed to record all observations of muskoxen and other mammals, and material from the period 1961-1989 is now available.

Additional observations are supplied by several expeditions to Northeast Greenland (Ferns 1977, Halliday & Higgs 1981, Patterson 1984, Lundbye 1986, Stemmerik 1987, Cabot *et al.* 1988, Higgins 1988, Siggler 1988, Bennike *et al.* 1989, Klein & Bay 1990, Sittler *et al.* undated) and many unpublished reports are also included (e.g. Melftofte 1979).

Presently, updated and rather detailed quantitative information on muskoxen are available from many parts of the natural range. However, the western part of the Kangertitivaq (Scoresby Sund) area and the region between Kronprins Christian Land and Independence Fjord are without or with only scanty recent information.

The introduced population at the Kangerlussuaq area has been surveyed from the air several times in the period 1986-1990 (Aastrup *et al.* 1988, Olesen 1989, 1990).

The introduced population in the Ivittuut area has been counted in 1988, 1989, and 1990 from helicopter and from the ground (H. Skolemose pers. comm.).

The other three small introduced populations in Avarnersuaq have not been surveyed since their release and information on these populations is very sparse.

## Results and discussion

*The indigenous population* (Tab. 1, Fig. 1).

The distribution of the indigenous muskox po-

pulation is shown in Fig. 1. The southern range limit is Kangertitivaq (Scoresby Sund), Føn Fjord and Vest Fjord. In the region south of here, stragglers or footprints from stragglers have been recorded in Gåse land (Pedersen 1974) and in the northernmost parts of Blossville Kyst (Vibe 1967). Nyeboe Land is the northwesternmost area where muskoxen occur regularly. In Hall Land and Washington Land to the west of Nyeboe Land, no muskoxen were seen during the aerial survey in 1985 or during intensive geological field work in 1984–1985 (Bennike *et al.* 1989). However, stragglers probably from Ellesmere Island, have been reported from Washington Land in the early 1960ies (Aastrup *et al.* 1986) and droppings were reported in 1976 (Dietz & Andersen 1984). The vegetation in Washington Land and Hall Land is so sparse that it probably cannot sustain a stable population of muskoxen (Aastrup *et al.* 1986, Bay 1992a).

In total, the indigenous population is estimated at 9 500–12 500 animals (Tab. 1, Fig. 1) of which c. 83% is located south of Ardencable Fjord (75°N). Major concentrations are found in Jameson Land, Renland/Nathorst Land, the Hold With Hope/Hudson Land area, and the Wollaston Forland/Clavering Ø area (Fig. 1). North of Ardencable Fjord smaller concentrations are found in Dronning Louise Land and in Peary Land.

The estimate of the indigenous population is about half of the previous estimate at c. 20 000 (Thing *et al.* 1984). This difference is best explained by the different materials on which the estimates are based. Thing *et al.* (op. cit.) had few references which covered only minor areas and many of the references were rather old. However, a confirmed general decrease in the population size in Northeast Greenland also explains some of the discrepancies between the two estimates (Forchhammer & Boertmann in prep.). In the following the size and the trends of the sub-populations are discussed:

South of Kong Oscar Fjord (72°N), the population is assessed at 4 350–5 300. The population in Jameson Land, estimated at 2 950–3 600 in 1989, seems to be stable (Aastrup 1990). On the population west of Jameson Land data from 1968–1970 (Pedersen 1974, Higgins in litt.) is the only information available. Therefore no trends can be assessed.

In the region between Kong Oscar Fjord

(72°N) and Ardencable Fjord (75°N) the population is estimated at 2 900–4 600. The Sirius data show that the muskox population peaked in the early 1970ies followed by a slight decrease during the last two decades. Sittler (1988) estimated, based on own observations during the years 1979–1984, the population in the region 72°–74°N at 1 000–1 500. We estimate the population in nearly the same area (excluding the southern part of the Hold With Hope/Gauss Halvø area) at 900–1 400.

In the region Ardencable Fjord (75°N) – Jøkelbugten (78°N) the population is estimated at 450–550. In this region the population decrease is very pronounced. For example, in the extensive lowlands of Hochstetter Forland and on the island of Shannon only two groups (3 and 11; one in each area) were recorded in 1988–1990 in spite of very intensive surveys (Higgins 1988, Bay & Boertmann 1989, Boertmann *et al.* 1990). Thing *et al.* (1984) designated Hochstetter Forland as an area with one of the highest muskox densities, and earlier counts or estimates mention 600 seen from a single site in Hochstetter Forland and 800–1 000 on Shannon (Pedersen 1936). Later, in 1976 Meltofte (1979) estimated the population on Hochstetter Forland at 200 and on Shannon at 300. A similar trend, but not that pronounced, is seen in Germania Land. Dronning Louise Land, a large nunataq area, is the only area in the region where muskoxen today are numerous and it may function as a refugium or protected area (*sensu* Henrichsen 1982). Apparently, a local and dramatic population decline occurred in the region between 75° and 78°N, probably during one winter in the period 1980–1985.

The population in the region between Jøkelbugten (78°N) and Nioghalvfjordsfjorden (79°30' N) is very small and estimated at 80–110 animals. The major part is found in Lambert Land, while the population in Hertugen af Orléans Land and the islands to the east of here is very small (c. 35 animals) (Bay 1992b). The restricted land areas in this region have an extremely sparse vegetation (Bay & Fredskild 1992), and this area probably functions as the gene flow barrier separating the population in North Greenland from the population in central Northeast Greenland (Henrichsen 1982).

In North Greenland, from Nioghalvfjordsfjorden (79°30' N) to Newman Bugt (82°N, 60°W) the population is estimated at 1 000–1 500 ani-

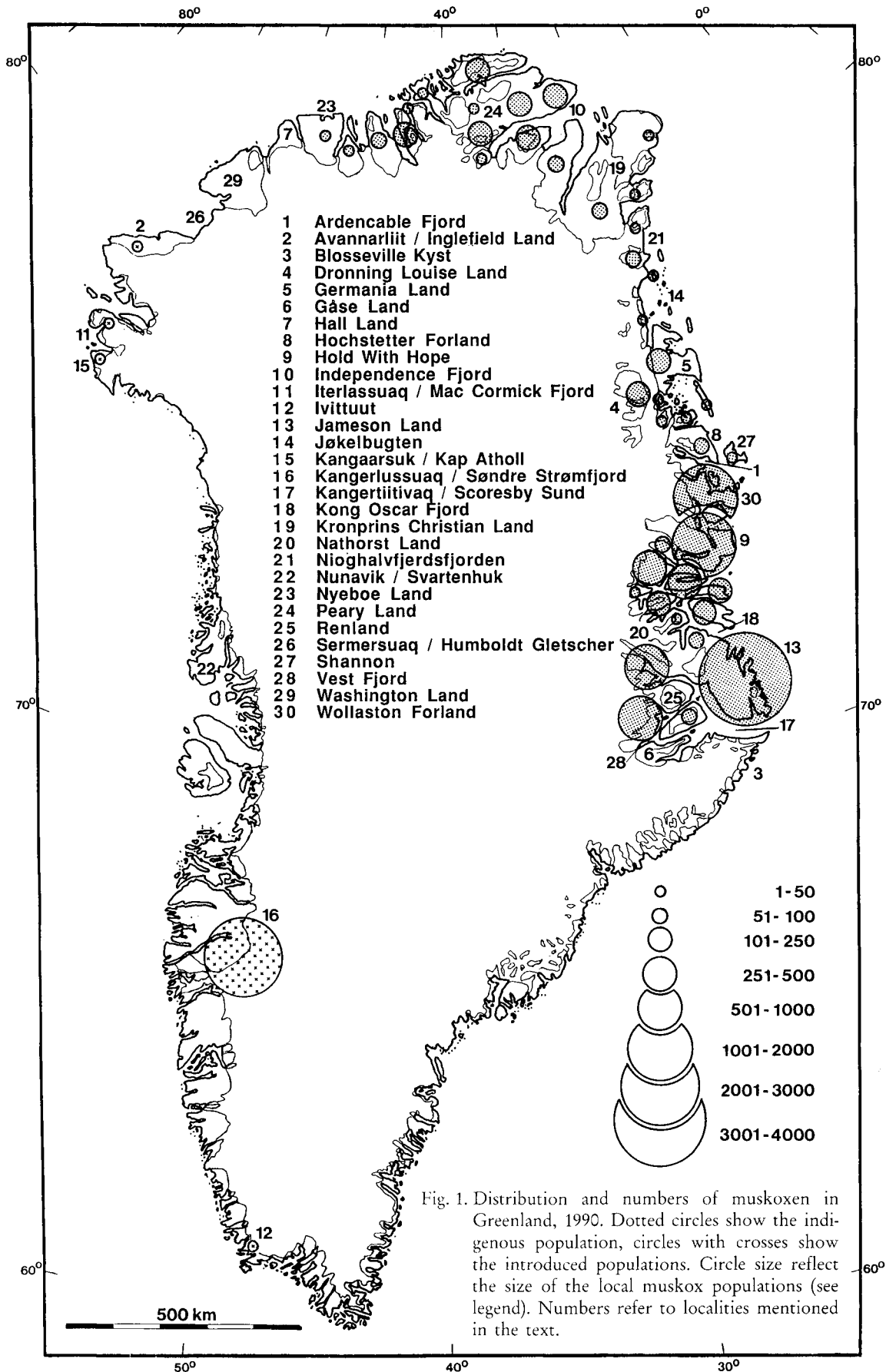


Fig. 1. Distribution and numbers of muskoxen in Greenland, 1990. Dotted circles show the indigenous population, circles with crosses show the introduced populations. Circle size reflect the size of the local muskox populations (see legend). Numbers refer to localities mentioned in the text.

mals, half of them (500–700) in Peary Land. Johnsen (1953) estimated the population in Peary Land at 2 000–3 000 based on observations of 445 animals in the years 1947–1950. However, his estimate is probably exaggerated, since Johnsen mainly visited areas which are now known as some of the best muskox terrains in the region. An airborne survey in 1985 resulted in an estimate at 520–690 animals (Aastrup *et al.* 1986). Geological Survey of Greenland recorded 777 during the years 1976–1980 (Dietz & Andersen 1984). The Sirius material indicates a stable population with only minor fluctuations compared to the populations in Northeast Greenland.

The major part of the distribution range of the indigenous muskoxen is within the North and Northeast Greenland National Park, where the muskoxen are protected from hunting. The large population in Jameson Land is hunted by the local residents. The present quota is 200 animals per year. However, the number of harvested muskoxen is probably larger because some illegal hunting takes place both in Jameson Land and in the southern parts of the National Park. Recently (1991) it has been legalized for residents in case of emergency to kill muskoxen within the National Park.

*The introduced populations* (Table 2, Fig. 1).

The population in the Kangerlussuaq area was introduced in 1962–1965, when a total of 27 animals were transplanted from the Kangertitiivaq (Scoresby Sund) area (Vibe 1967). In 1990, 2 120 animals were counted and the population was estimated at 2 600 (Olesen 1991). The rate of increase has remained at c. 30%. Hunting has

been legal since 1988, and in 1990 the quota was 450 animals, which probably was not reached. Although the carrying capacity of the 6 600 km<sup>2</sup> area south of Kangerlussuaq (66°–67°N) is estimated at 5 000 animals (Olesen in prep.) some highly preferred lowland habitats in 1990 showed signs of overgrazing. In the winter of 1990/91 female muskoxen crossed the rivers or the fjord entering the area north of Kangerlussuaq, where the number of muskoxen at present (spring 1991) is lower than 50 animals.

In 1986, 27 yearlings were released in three sites in the Avanersuaq region: 14 muskoxen in Avannarliit (Inglefield Land), 6 in the Iterlassuaq (Mac Cormick Fjord) area, and 7 at Kangaarsuk (Kap Atholl) (Vibe 1986). In the summer of 1991 two cows and two calves were found shot in Avannarliit (P. Nielsen pers. comm), and in May 1991 5 adult oxen and 2 calves were seen from a helicopter in the Kangaarsuk area (K. Svensson to the Greenland Radio). No information on the Iterlassuaq population is available.

In 1987, 15 yearlings were released near Kangilinnuit (Grønnedal) in the Ivittuut area. This population produced calves already in 1988. In 1989 all 3-year old females calved and in the summer of 1990 all cows were again followed by a calf. The population numbered 42 animals in August 1990 and it has remained within 20 km of the release site and separated in two groups (H. Skolemose pers. comm.).

In total, the introduced muskoxen numbers a little less than 2 700, and at least two of the populations are strongly increasing.

The populations introduced in 1986 and 1987 are protected from hunting, but the Avanersuaq

Tab. 2. Assessment of the introduced muskox populations in Greenland, 1990.

Area	Population size	Population trend	Reliability of estimate	References
Kangerlussuaq (Søndre Strømfjord)	2600	increasing	+++	Olesen (1990) *
Ivittuut	42	increasing	+++	Skolemose (pers. comm.) * *
Avanersuaq (Thule)	27 <sup>1</sup>	unknown	-	Vibe (1986).
Total	2669			

<sup>1</sup> the number which was introduced in 1986.  
+ uncertain, ++ rather certain, +++ certain.

aq populations seem to suffer from illegal shooting. Further introductions with the Kangerlussuaq population as donor population are planned in West Greenland (Dansk Polarcenter & Clausen 1991), and in 1991 31 yearlings were released in Nunavik (Svartenhuk) in Uummanaq and Upernavik municipalities.

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