

Success and failure of reindeer herding in Greenland

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Abstract: Animal husbandry is a recent innovation in Greenland, specifically reindeer husbandry is less than 50 years old. Reindeer husbandry was first established in mid-west Greenland and later in southern Greenland. The Greenland hunter tradition and culture is, however, still dominant in many communities. During the 1980's and 1990's, the incompatibility of these two traditions resulted in the failure of reindeer husbandry in mid-west Greenland. There were neither herding nor seasonal herd movements. Animals remained year round on the winter range, which was destroyed as lichens were trampled every summer. Without seasonal herd movements both sustainable range use and control of the herd were lost. Today, there are just two semi-domestic reindeer herds left, and both are in southern Greenland. One herd is commercially successful, and the other is under development. In mid-west Greenland, semi-domestic reindeer husbandry officially ended in 1998, and a hunt was initiated to remove the remaining population. Possibly, by the year 2000 any animals left in this region will be considered wild caribou.

Key words: *Rangifer tarandus*, husbandry, herding, Greenland.

Introduction

Prior to the introduction of the semi-domestic reindeer from Norway, the indigenous west Greenland caribou (*Rangifer tarandus groenlandicus*) inhabited the west coast of Greenland from Thule in the north-west, 77°N, down to the southern tip of the country, 60°N. They are considered the same subspecies as the Canadian Barren-ground caribou, also called Tundra caribou. At present some Greenlandic caribou populations may have disappeared in certain regions. In 1998 the greatest abundance of west Greenland caribou can be found between 62°-68°N. It is commonly assumed that there are several sub-populations of caribou in west Greenland as a result of natural geographic barriers, i.e. glaciers, mountains and fjords.

The question arises, why bring Norwegian semi-domestic reindeer (*Rangifer tarandus tarandus*) to Greenland when caribou already inhabited the region? During the 1920's, '30's and '40's the indigenous caribou were accounted scarce in west Greenland (Fynbo, 1954a; Vibe, 1967). Hunting records for the period report fewer than 100 to 1000 caribou shot in any given year. The Greenlandic people, however, still depended heavily upon natural resources for food and clothing. By the 1950's the idea of bringing domestic reindeer to Greenland was an old one. Already in 1905 Knud Rasmussen evaluated much of west Greenland with respect to the establishment of reindeer husbandry, and the Godthåbsfjord region was recommended. Therefore, following some years of debate and discussion amongst the Danish and Greenlandic authorities (Fynbo, 1954a), in 1952, domestic reindeer were brought from Norway and released in mid-west Greenland (Fig. 1).

300 semi-domestic reindeer were bought from the Karasjok reindeer district, Finmark, Norway (Fynbo, 1954b; Lassen & Aastrup, 1981; Rasmussen, 1992) and shipped to Godthåbsfjord. The voyage lasted from September

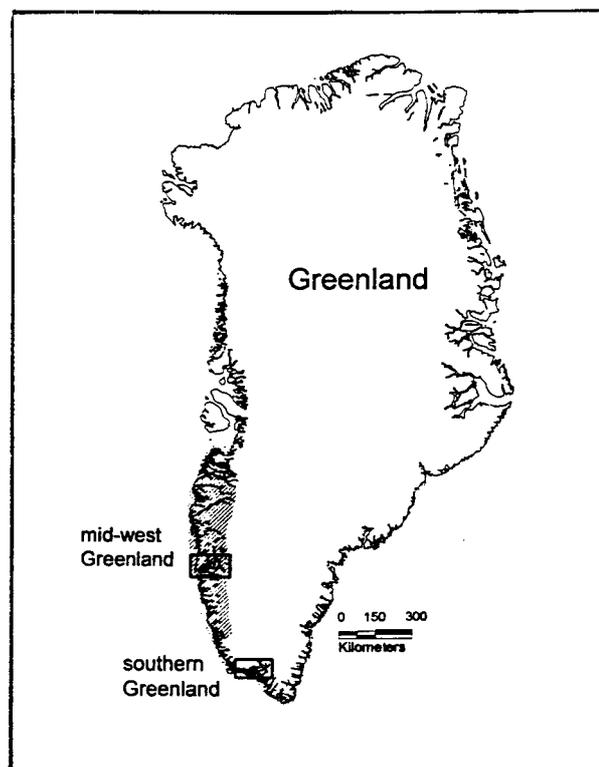


Fig. 1. Map of Greenland showing the area of greatest wild caribou abundance in 1998 by diagonal lines (//////), and with the two districts for semi-domestic reindeer herding outlined, mid-west Greenland and southern Greenland.

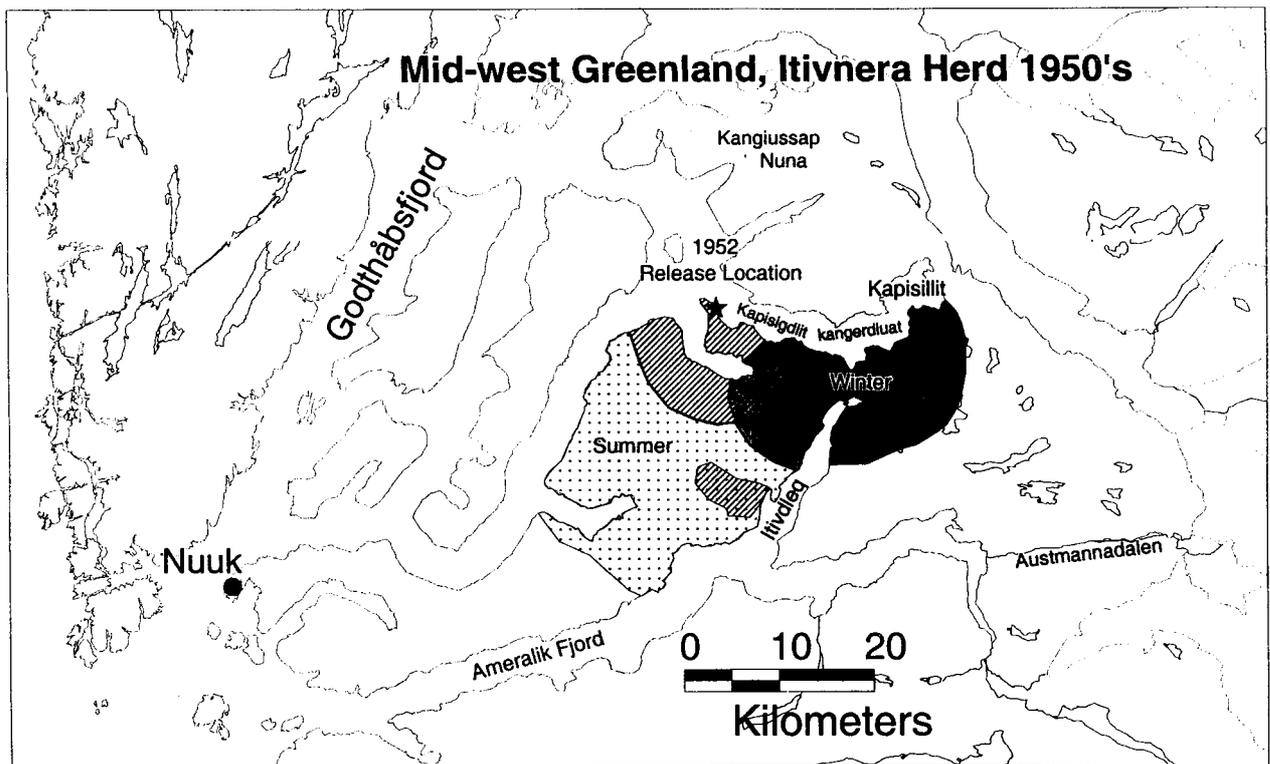


Fig. 2. Mid-west Greenland, Godthåbsfjord region, showing the Itivnera herd's release location of 1952, and initial range use during the 1950's, with calving areas indicated by diagonal lines (////), (Jens Rosing & Johan Hætta, pers. comm.).

12-25th, 1952 (Fynbo, 1954c). Owing to 37 deaths during transport, only 263 reindeer were released, 239 females and 24 males (Lassen & Aastrup, 1981). The release was on the north-east side of Sulugssugut, Kapisigdlit kangerdluat fjord (Fig. 2) (Fynbo, 1954c; Jens Rosing, pers. comm.).

The introduction of semi-domestic reindeer to Greenland was a combined Danish and Greenlander decision. Greenland Inuit made significant contributions to the discussions and even had the right to veto any reindeer release proposals. Jens Rosing was the key Greenlander involved in all aspects of the initial establishment of reindeer herding at Itivnera in Godthåbsfjord, specifically between 1952-59 (Jens Rosing, pers. comm.). To establish the herding, Sami specialists from Norway were hired and came with the reindeer to Greenland. It was hoped that the Greenland Inuit of Kapisillit, at Itivnera in Godthåbsfjord, would embrace this initiative and profit by it (Fynbo, 1954c). The hired Sami would train them in reindeer husbandry after the Norwegian Sami model. The benefit to Greenlanders in Godthåbsfjord, however, did not materialise in the manner hoped for.

Reindeer herding was developed in two regions, mid-west Greenland and southern Greenland (Fig. 1). There were two herds in each region. Today reindeer herding exists only in southern Greenland. This paper reviews the success and subsequent failure of reindeer herding in mid-west Greenland, and includes a brief description of the preliminary success in southern Greenland.

Reindeer husbandry in the Godthåbsfjord region (1952-1998)

Originally there was only the Itivnera reindeer herd in Godthåbsfjord. In 1961 a second herd, the Kangerlupiluk, was established on the Kangerlupiluk peninsula (Figs. 3, 4) with 500 reindeer purchased from the Itivnera herd. By 1978 both herds belonged to the residents of Kapisillit under the management of the local Greenlandic Co-operative, *Kapisilinni Tuttuutiteqatigiit*. The herd remained the Co-operative's until 1998, when it was sold to the Nuuk Municipality, ending reindeer husbandry in the Godthåbsfjord region.

Until 1978 the persons actually responsible for the herding were almost without exception Norwegian Sami hired specifically for that purpose. There was limited ownership or responsibility for reindeer herding by Greenlanders. Some Sami were employees of the Danish State while others, following 1961, owned their reindeer. Initially herding practice followed traditional Sami methods. The herd was kept as a single group, with

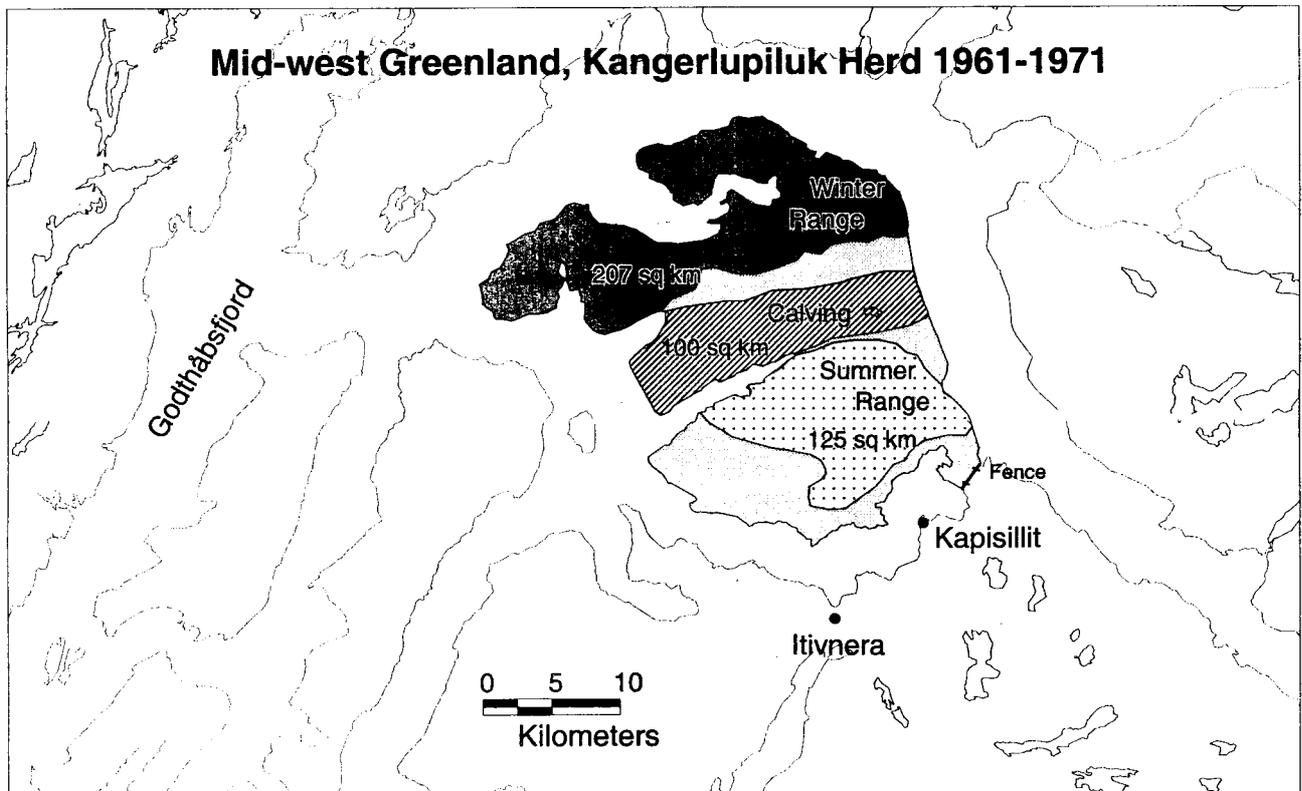
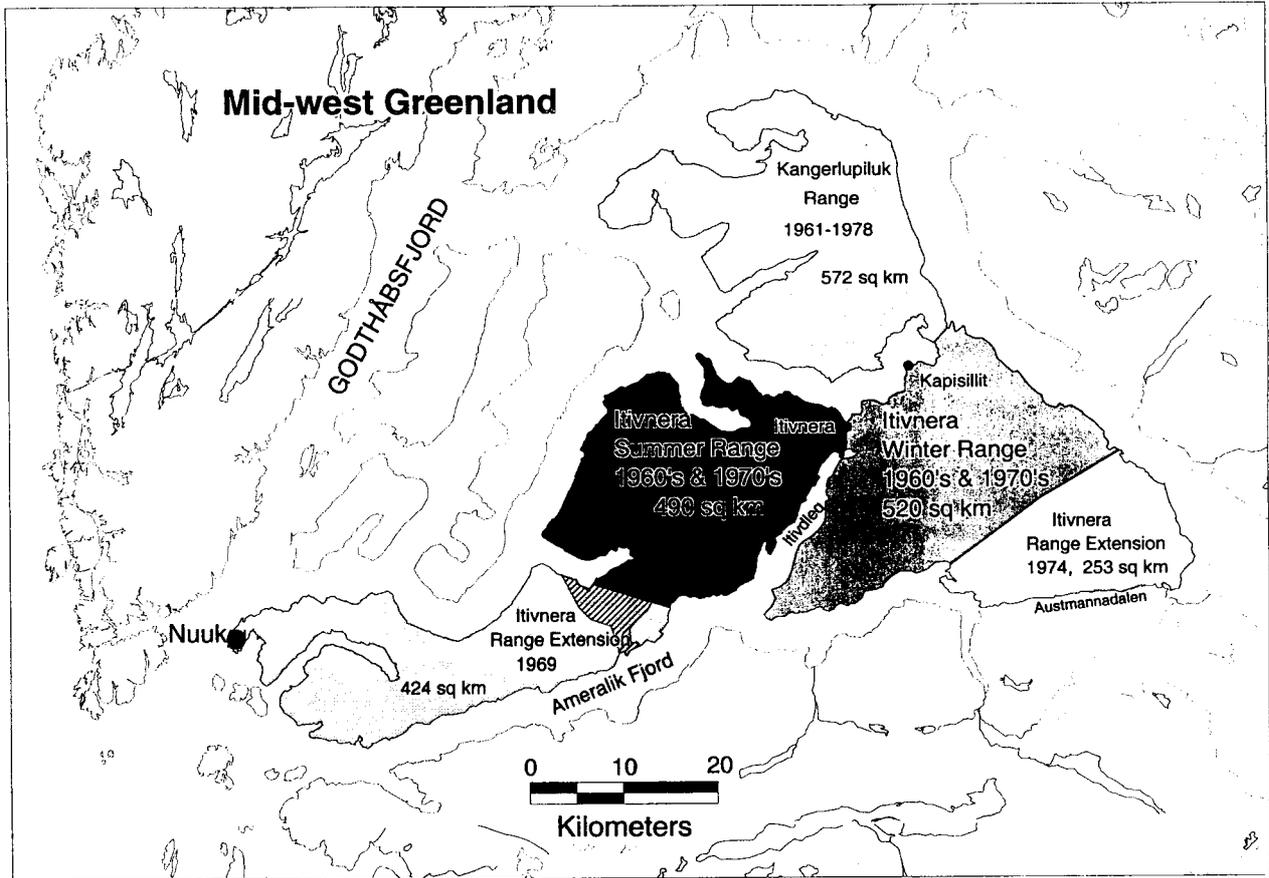


Fig. 3. Mid-west Greenland, Godthåbsfjord region, showing the Itivnera herd's range use during the 1960's and 1970's, and the range extensions of 1969 and 1974. The calving area is indicated by diagonal lines (////). Size and location of the Kangerlupiluk range is also shown. (Johan Hætta & Anders Triumpf, pers. comm., Grønlandsk Lovsamling, 1968; 1969; 1974).

Fig. 4. Mid-west Greenland, Godthåbsfjord region, showing the Kangerlupiluk herd's range use from 1961 to 1971. Calving areas are indicated by diagonal lines (////). The location of the fence separating the Kangerlupiluk from the Itivnera herd is also shown. (Johan Hætta, pers. comm.).

close herder contact year round and seasonal migrations between summer and winter pastures (Figs. 2, 3). Calves were marked in July. Dogs were commonly used to aid herding. The principle slaughter was in November and consisted primarily of 4-6 year old males, which had been castrated six months previously (Aastrup, 1978). In 1969 and thereafter, the principle slaughter was shifted to August/September (Holck, unpubl.).

About 20 Sami were employed during this period, and many were from Kautokeino and Karasjok, Finmark, Norway. There were several Greenlander assistants, but training Greenlanders in reindeer husbandry, after the Norwegian Sami model, was of limited success. Ole Kristiansen, Greenlander and present co-owner of the Isortoq herd in southern Greenland, received training in reindeer husbandry at Itivnera. He also completed a two year course for reindeer husbandry in Norway (Aastrup, 1978). Four other Greenlanders also received training at Itivnera (Aastrup, 1978), including Pavia Berthelsen, who had responsibility for the Kangerlupiluk herd for four years (1971-1975). Already by 1977, of the five who had received training, only Ole Kristiansen remained involved in reindeer husbandry (Aastrup, 1978).

The Itivnera Herd

During 1952 to 1956 the Itivnera herd was under public ownership with Danish State management. From 1956 to 1974 there was still public ownership under the Danish State, but the Royal Greenland Trade Department, known as *Den Kongelige Grønlandske Handel* (KGH), administered the operation. KGH also had financial responsibility for the reindeer herd. In 1964, a field abattoir was established. In October 1974, KGH sold private ownership of the Itivnera herd, and leased the field abattoir facilities to the Sami reindeer herder Anders Triumph. The Itivnera herd remained Anders Triumph's until 1978, when it became the property of the Kapisillit Co-operative. Unfortunately, no one in the Co-operative had received training in reindeer husbandry (Aastrup, 1978).

Mixing of the Itivnera reindeer and wild caribou occurred. Following 1972 there was less contact with the herd, but seasonal migrations between summer and winter pastures for females continued. By 1977-78 most male reindeer were not herded and did not migrate seasonally, but remained on the winter pastures year round (Aastrup, 1978). At that time, the slaughter became based on calves rather than castrated males (Aastrup, 1978). In 1977, semi-domestic reindeer were observed outside of the herding district, south of Austmannadalen (Aastrup, 1978). After 1978, contact with the herd declined further and evolved into no contact, no calf marking, and no seasonal migrations. Without supervision the reindeer stayed on the winter pasture year round, and were free to leave the herding district. Wild caribou could also enter.

There is uncertainty in most Itivnera herd size and slaughter data. KGH records give rough estimates of herd size, since up until 1968 these records were collected with a two to three year delay (Lone Grønbaek, pers. comm.). Records for 1969-74 are poor or non-existent. The records can include both mid-year and end-of-year numbers, and often left unstated whether the herd size estimate represented only the Itivnera herd, or a total of all tame reindeer in Greenland. The latter would include both the Itivnera and Kangerlupiluk herds, and possibly after 1973 also the Isortoq herd (in southern Greenland). KGH slaughter records are confusing, and often are only estimates. In addition, slaughter records for a given year can vary. In one record the reindeer slaughtered during the spring are omitted, and in another included.

According to Lassen & Aastrup (1981) calf production and the number of slaughtered reindeer were stable until the mid 1960's. At that time, young reproductive females were prioritised while most others including male calves were slaughtered (Holck, unpubl.). Prior to 1967-68 calf production exceeded the number of slaughtered reindeer (Lassen & Aastrup, 1981).

During the late 1960's herd size increased (Fig. 5). Low slaughter rates, due to poor prices was the cause, while immigration of wild Greenland caribou was not a factor (Johan Hætta & Anders Triumph, pers. comm.). Later reports suggested the herd increase was due to unfavourable weather conditions preventing successful slaughter (Aastrup, 1978; Lassen & Aastrup, 1981). KGH's Itivnera herd slaughter records, however, show that numbers slaughtered increased during the years 1966, 1967 and 1968, being 1156, 2250 and 2750 respectively. Never were more reindeer slaughtered in the Itivnera herd than during this period. Still, in 1969 only 325 animals were reported slaughtered from the Itivnera herd. How well this figure reflects actual numbers slaughtered is unknown. Export revenues from the sale of reindeer products, however, increased dramatically between 1967 and 1972, with peak revenues occurring in 1972 (Fig. 6). Although possibly in part the result of better prices on the foreign markets and a phase shift in revenue income (delay from year of slaughter to year of sale),

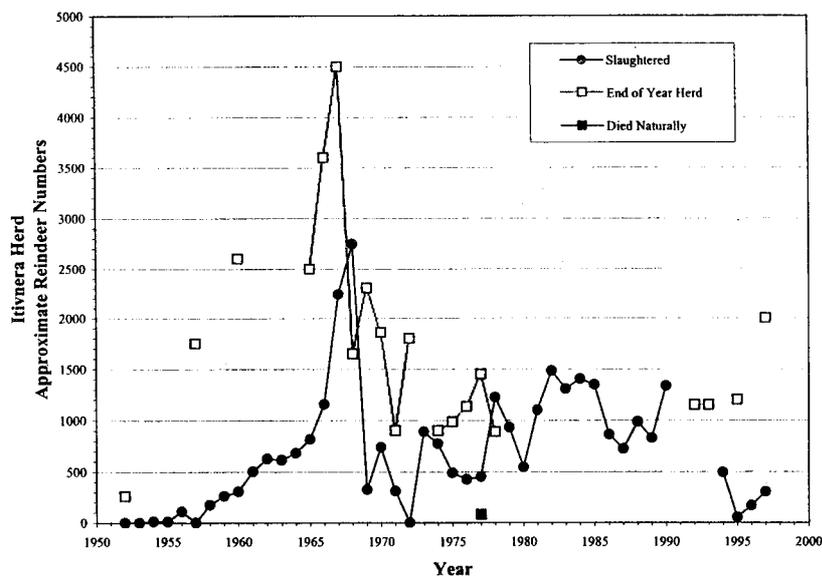


Fig. 5. Itivnera herd's approximate, numbers for slaughter, end-of-year herd size, and natural mortality. The free-ranging male reindeer on the winter range (about 300 animals used for breeding) have been added to all end-of-year herd sizes between 1974 and 1978 (KGH records, Hentzer, 1997).

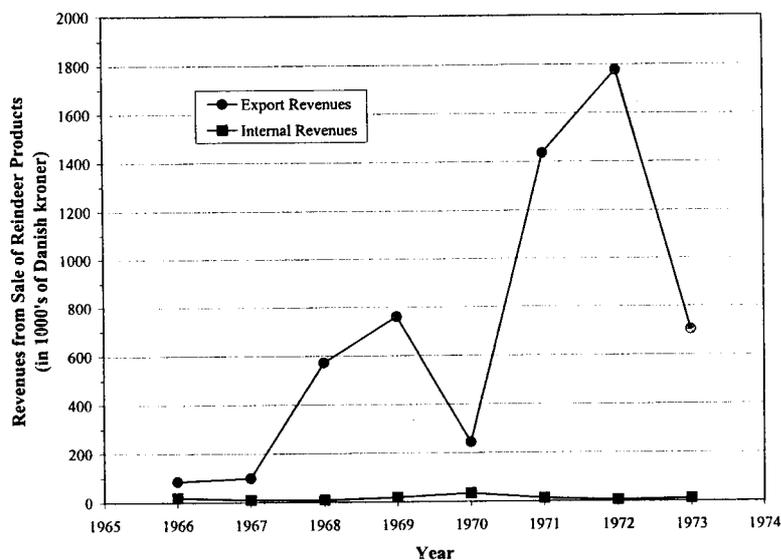


Fig. 6. Greenland revenues from the sale of reindeer products (in 1000's of Danish kroner) for the years 1966-1973. Both export and internal revenues are shown (KGH records).

substantial annual slaughters were probably involved in causing the peak revenues in the early 1970's. Therefore, the post-1968 Itivnera slaughter figures may not be accurate.

According to Lassen & Aastrup (1981) in mid-summer 1968 the Itivnera herd size peaked at 7000 animals. It is not clear that there truly were 7000 animals in the Itivnera herd at mid-summer in 1968.

KGH records for all tame reindeer in Greenland during mid-summer 1968 reported a total of about 7-8000 animals. This number included the Kangerlupiluk herd, which from KGH records numbered approximately 2000 animals in mid-summer 1968. A Kangerlupiluk summer herd of 2000 is supported by the then Kangerlupiluk herd owner, Johan Hætta (pers. comm.).

KGH records suggest that Itivnera herd size at its mid-year summer maximum during 1968 was between 5-6000 reindeer. Reports exaggerated the number to over 7000, but the actual number was closer to 5000 reindeer (Johan Hætta, pers. comm.). KGH slaughter records for 1968 estimated that approximately 2800 reindeer were removed from the Itivnera herd. Further that these were removed at the end of the year in November and December. Therefore while the Itivnera herd's grazing pressure on the 1968 summer pasture was around 5000

animals, the grazing pressure on the winter pasture may never have exceeded about 2000 animals. Lassen & Aastrup (1981) stated that the large summer herds of the late 1960's caused overgrazing of, and lichen disappearance from, the summer range. On the winter range, however, lichen abundance remained excellent even in 1978 (Lassen & Aastrup, 1981).

The Itivnera region had been investigated as to lichen stands and what number of reindeer the winter range could support. In 1905 Itivnera was evaluated as capable of sustaining a winter herd of about 2000 animals (Rasmussen, 1910). This estimate did not include the Kangerlupiluk peninsula. In 1957 a 2000 animal maximum was again recommended, due to administrative problems and the limited number of Sami herders available (Hagen, 1957). The figure did not reflect the capability of the Itivnera range, which could tolerate

more than 2000 reindeer (Hagen, 1957). In 1957 the range use involved distinct summer and winter grazing within the region later designated as only summer range.

According to Lassen & Aastrup (1981), their suggested 1968 peak herd size of 7000 was followed with a crash in numbers over the next 2-3 years. Holck (unpubl.) suggested there were only 1000 animals by 1970. Lassen (1981) and Lassen & Aastrup (1981) gave 800 animals by 1971, but did not know whether this was a pre- or post-slaughter figure. Further, Lassen & Aastrup (1981) proposed that starvation, emigration, and lowered net production all contributed to the decline in numbers. Although herd size decreased, information from Sami herders involved, KGH records of revenues from reindeer product sales, and KGH records of 1970-71 total reindeer numbers, would indicate reasons other than those suggested above. It appears that a greatly exaggerated pre-slaughter herd size in 1968 was compared with a conservative post-slaughter herd size for 1971. Lassen (1981) suggested the possibility that the supposed lack of animals by 1971 may have been the result, not of a crash, but of overestimating the late 1960's herd size.

There is no data supporting massive deaths after 1968 due to starvation, emigration or lowered net production. Although, the Itivnera herd was in poor condition at the slaughter, and some died while being herded to the slaughter (Aastrup, 1978; Lassen & Aastrup, 1981), Anders Triumph (pers. comm.) stated there were never mass starvation deaths in the Itivnera herd. Also, Johan Hætta (pers. comm.) stated the Itivnera reindeer were in poor condition at slaughter by the late 1960's, but that deaths were not a noticeable result. Instead, after 1966-67, the Sami herders slaughtered large numbers of reindeer to reduce herd size and allow the range to recover (Johan Hætta, pers. comm.). Increased slaughter could have generated the 1971 and 1972 peak revenues from reindeer products, being 1.4 and 1.8 million Danish kroner respectively (Fig. 6). Increased slaughter may account for the reduction in Itivnera herd size from 1968 into the early 1970's. 1977 was the only year a number of reindeer deaths occurred in the Itivnera herd, when Anders Triumph reported that about 80 animals died (Lassen, 1981).

Emigration was never a problem while the Sami herders were responsible for the herds (Johan Hætta & Anders Triumph, pers. comm.). Emigration first occurred from the Kangerlupiluk herd after 1971, when it fell under Greenland herder management (Lenvik, 1993).

The actual year of maximum Itivnera herd number on the winter range appears to have been 1967, being about 4500 reindeer (Fig. 5), which was more the double the recommended winter herd size. Thereafter there was a serious slaughter effort to reduce numbers. A similar situation appears in the Kangerlupiluk herd. KGH records of reindeer numbers for the period are unreliable, however, for mid summer in 1970, they indicate a combined total for both herds of about 4000 reindeer. By December 1970 this was about 3000 reindeer, after a slaughter of 740 and 423 from the Itivnera and Kangerlupiluk herds respectively. In mid summer 1971 the KGH combined total of 2500 included both herds. The 1971 end-of-year combined total was 2000. 1100 of these belonged to the Kangerlupiluk herd and hence 900 to the Itivnera herd. In addition to these 900 reindeer, in 1971-72 there was a small herd of male reindeer, about 50-60, remaining on the Itivnera winter pastures year round (Johan Hætta, pers. comm.) making the end-of-year Itivnera herd size about 1000 animals.

In 1974 the pre-slaughter Itivnera herd numbered approximately 1400 reindeer. Anders Triumph bought 600 of these animals, all were females over 3 years of age, and the rest \approx 800, were slaughtered (Aastrup, 1978). Not included in these 1974 numbers was a completely unsupervised herd of about 300 males, which remained year round on the winter pastures (Lassen, 1981). This male herd, although counted upon for breeding, was always omitted from reported herd size throughout the 1970's.

Anders Triumph's ownership of the Itivnera herd ended in 1978, and after slaughter 589 live reindeer were sold to the Kapisillit Co-operative (Lassen, 1981). The number of breeder male reindeer on the winter range may still have been at the 1974 figure of about 300, but as usual these were not included in the recorded herd size of 589.

Kangerlupiluk Herd

The second herd in the Godthåbsfjord region began in 1961 when Sami reindeer herder Johan Hætta established a private herd on the Kangerlupiluk peninsula, north of Itivnera (Figs. 3, 4). The initial herd included 300 females, 100 males and 100 calves, all purchased from the Itivnera herd (Johan Hætta, pers. comm.). A fence was built and maintained across the thin "neck" of the peninsula to keep the Itivnera and Kangerlupiluk herds separated.

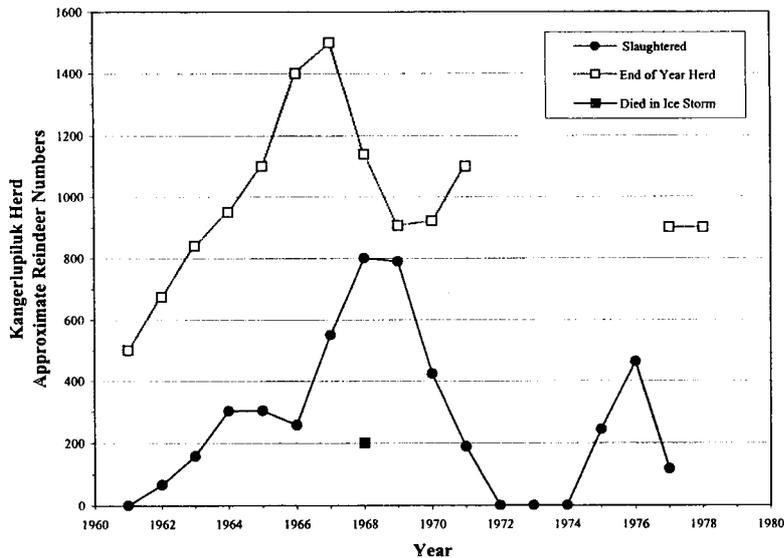


Fig. 7. Kangerlupiluk herd's approximate numbers for slaughter, end-of-year herd size, and natural mortality. Slaughter records are accurate, but the end-of-year herd sizes and the number of deaths during the ice storm are approximations (KGH records; Johan Hætta, pers. comm.).

The Kangerlupiluk peninsula has an area of 572 km². There was good herd control and seasonal movement between ranges from 1961 to 1971. During this period, the north was used for winter pasture (207 km²), and the south for summer pasture (125 km²), with the calving region in between.

Although about 1000 reindeer was thought to be the optimal winter herd size for Kangerlupiluk (Lenvik, 1993), winter herd size grew from 500, in 1961, to a maximum of about 1500 in 1967 (Fig. 7). Through increased slaughter, however, the recommended "1000" was regained.

There was negligible natural mortality. Although in the late 1960's (perhaps 1967-68) an ice storm caused about 200 deaths in the Kangerlupiluk herd, there were few deaths or no icing events in other years and no emigration from 1961 to 1971 (Johan Hætta, pers. comm.).

Johan Hætta sold the Kangerlupiluk herd in 1971, to Greenlander Pavia Berthelsen, when the post-slaughter herd numbered 1100 (Lenvik, 1993). Although Pavia Berthelsen had received education in reindeer husbandry (Aastrup, 1978), there followed four years of negligible herding and minimal slaughter, with no seasonal migrations between winter and summer pastures (Lenvik, 1993). It was during this time that the dividing fence between the two herds fell into disrepair, resulting in about 1200 animals moving south into the Itivnera district (Anders Triumph, pers. comm.). In 1975, a "wild" Kangerlupiluk herd, consisting of 60% males (Aastrup, 1978), was put under public ownership vested in the Danish State (Ministry of Greenland). In 1976, the Kangerlupiluk herd became the private property of the residents of Kapisillit under the management of the local Greenlandic Co-operative, *Kapisilinni Tuttuutiteqatigiit*.

Range quality in Godthåbsfjord

Itivnera and Kangerlupiluk ranges were initially characterised as excellent for both summer and winter pastures. In the late 1960's summer pasture quality decreased, while winter range lichen pastures remained excellent even until 1978. In addition, since there were virtually no predators calf survival was optimal and natural mortality nominal (Johan Hætta, pers. comm.).

Considering the winter ranges, the recommended winter herd sizes were 2000 and 1000 reindeer for the Itivnera and Kangerlupiluk herds respectively (Lenvik, 1993). These figures, however, required that the herds were moved off the winter range each spring to prevent trampling of the lichen pastures during the dry summers (Lenvik, 1993).

From the beginning, those involved with the Godthåbsfjord reindeer herding initiative were interested in monitoring range quality. *Lappefoged* Peder Hagen (1957) examined the region in 1952 and again 5 years later in 1957 to assess possible effects of reindeer grazing on range. *Lappefoged* Peder Hagen (1957) reported that the range was virtually unchanged from 1952, and could support about 2000 reindeer, given the human resources available then, while the range could support more. His findings are supported by the calving reports of 1956, when many yearling females calved (Aastrup, 1978). To attain breeding weights their first autumn it is likely that female calves have been on excellent pasture.

From 1952 until 1959 only a portion of the total designated Itivnera range was actually in use. Initially both summer and winter grazing occurred in the region west of Itivdleg fjord. Although Peder Hagen (1957) found no sign of depleted winter lichen range west of Itivdleg fjord in 1957. By 1959-60 the Itivnera herd's winter range began to shift east of the Itivdleg fjord (Johan Hætta, pers. comm.). By 1965, KGH records reported lichens were becoming scarce in the range west of Itivdleg fjord. Thus this area decreased in importance as a winter

range. During the 1960's and 1970's winter range use was expanded to employ the entire designated Itivnera region, as shown in Fig. 3. Seasonal movements between summer and winter ranges occurred across the narrow land bridge at the Itivnera station.

The Itivnera winter range has a dry cold continental climate with little snow. There were no icing events on the Itivnera winter range during the late sixties or up until 1978 (Anders Triumph, pers. comm.). According to Sami reindeer herder Johan Hætta (pers. comm.) the winter lichen ranges for both the Itivnera and Kangerlupiluk herds were still excellent in 1971. The Itivnera herd's winter pasture during the period 1973 and 1978 remained excellent, and lichen growth on the winter range was good in 1977 and 1978 (Aastrup, 1978; Lassen & Aastrup, 1981; Lenvik, 1993). Sami reindeer herder, Anders Triumph (pers. comm.) confirmed the continued presence of abundant lichen growth on the Itivnera winter pasture in 1978.

Summer range quality for the Itivnera herd, however, deteriorated during the late 1960's (Aastrup, 1978; Lassen & Aastrup, 1981). Poor quality summer range in 1977-78 was assumed to be a limiting factor for the Itivnera herd, as slaughtered adults had little body fat (Aastrup, 1978; Lassen & Aastrup, 1981). Slaughtered calves, however, had relatively high body weights compared to wild Greenland caribou and Norwegian domestic reindeer (Aastrup, 1978; Lassen & Aastrup, 1981) which might contradict the assumption of poor range quality.

Originally there was about 1000 km² available for the Itivnera herd, 490 km² for summer range and 520 km² for winter. In 1969 and again in 1974 the allowed range was extended. By 1978 the total area available for the Itivnera district was 1687 km², 914 km² for summer range, and 773 km² for winter range. With the Kangerlupiluk district added, the total area available became about 2260 km². In 1977 the number of reindeer using the Itivnera summer range was about 1600. During the winter of 1977-78 the number of reindeer using the Itivnera winter range was about 1440 (Aastrup, 1978). The 1977 winter herd size was below the recommended maximum for the region, 2000 reindeer, and winter range was in good condition when Anders Triumph sold the herd in 1978.

Collapse of reindeer husbandry in the Godthåbsfjord region (1978-1998)

After the slaughter in 1978, an Itivnera herd of just under 600 reindeer was placed in the hands of the Kapisillit community with the Greenlandic *Kapisilinni Tuttuutileqatigiit* Co-operative responsible. The Co-operative had already received the Kangerlupiluk herd in 1976. In 1957 *Lappefoged* Peder Hagen (1957) described the Itivnera herd a success, while stressing that Sami herding methods of year round herd contact and control were necessary to ensure continuing success. Stefan Magnusson (pers. comm) concurs that seasonal herd movements are necessary to maintain human herder control over a reindeer herd. Since 1978, Sami herding methods and seasonal herd movements have been markedly absent.

Kapisilinni Tuttuutileqatigiit's herding method was simple. The reindeer roamed unsupervised the entire year, with an annual round up for slaughter in September. Despite lack of herd control and contact, slaughter records for 1981-90 (Hentzer, 1997) show annual harvests of between 700 and 1500 reindeer. These successful harvests were the result of using helicopters, which were effective at gathering large numbers of reindeer to the slaughter (Johan Hætta, pers. comm.). Round up was not effective after 1990, and typically all reindeer caught in the round up were slaughtered, usually only 300 to 400 animals. The 1997 slaughter was no different. In September 1997 *Kapisilinni Tuttuutileqatigiit* rounded up 401 reindeer, but only 301 were slaughtered due to the escape of 100 animals through a hole in the corral. With no seasonal movements or herder contact, herd control was lost.

From 1978 to 1995 the Itivnera herd's normal behaviour of remaining in large aggregations disintegrated into average group sizes under 5 animals. In February 1989 an aerial survey by Thing (unpubl.) observed 991 reindeer, divided amongst 60 herds, with an average herd size of 16 animals. The observers during the aerial survey noted three things. There were no signs of human husbandry of the herds anywhere in the region. The animal's distribution, herd structure and foraging behaviour was as for wild herds. Finally, that the percentage of calves was two thirds what would be expected from a domestic reindeer herd. In April 1993 a Greenland Department of Health and Environment aerial survey of abundance by Nielsen (unpubl.) estimated 1100 to 1200 reindeer/caribou in the Itivnera herding district. Herd size averaged only 5, while the maximum herd size observed was 27 animals. The observers could not determine whether these were semi-domestic reindeer or west Greenland caribou. In April 1995 a Greenland Institute of Natural Resources aerial survey of abundance by Nielsen (unpubl.) estimated a maximum of 1200 animals. Herd sizes were 2, 3 and 4 animals, which is similar to group sizes for the indigenous west Greenland caribou (Peter Nielsen, pers. comm.). Without seasonal movement, herder control was lost and herd behaviour became indistinguishable from wild native caribou.

Dag Lenvik (1993) characterised the Itivnera region as one suffering from biological breakdown, since the absence of seasonal herd movements had severely deteriorated the winter lichen range. The continued presence, for the past 15 years, of large numbers of reindeer on the winter range during the dry summers, caused trampling, breakage and wind erosion of the dry unprotected lichen pastures (Lenvik, 1993; Johan Hætta, pers. comm.). Aastrup & Lund (1995) found that lichens were all but missing on the 1995 range. They agreed with Lenvik's assessment of range conditions, and concluded that lichens were unavailable as a winter food source for the reindeer of Itivnera.

Kapisilinni Tuttuutileqatigiit's management (or lack thereof) of the Itivnera herd since 1978 resulted in a complete loss of control over the herd. In 1988 a large proportion of the reindeer on the Itivnera range was assumed a mix with, or to be, west Greenland caribou (Holck, unpubl.). By 1993 emigration from Itivnera had been substantial. Many reindeer had crossed Austmannadalen and entered the Buksefjord wild caribou region south of Ameralik fjord (Fig. 3), (Lenvik, 1993). In 1998, it was common to observe animals possessing semi-domestic reindeer characteristics in the Buksefjord region. Reindeer herding in the Godthåbsfjord region was at a standstill in early 1998. Even by 1995 there was no longer a "herd", but many spread small groups of 2 to 4 animals. Local opinion felt that these reindeer were no longer "tame", but were now feral. Suggestions for allowing a legal hunt abounded by the mid 1990's.

In 1998, reindeer husbandry in mid-west Greenland was at a stand still. There had been initial success under Sami management. The later Greenlandic herding, however, was not a viable industry. Both Rasmussen (1992; 1994) and Hentzer (1997) have stated that semi-domestic reindeer herding on the Norwegian Sami model was not culturally compatible with the Greenland Inuit hunter tradition and culture. Rasmussen (1994) wrote that the reindeer herding industry had failed at Itivnera on organisational, economic and ecological levels.

To date the Nuuk municipality provided financing for the Kapisillit Co-operative, *Kapisilinni Tuttuutileqatigiit*. Although in debt to the Nuuk municipality, in 1998 the Kapisillit Co-operative was considering additional financing to further reindeer husbandry in the region. The Nuuk municipality was divided as to a future course of action. The numbers, sex and age of the herd were all unknowns. In addition all animals were unmarked and difficult to distinguish from wild Greenland caribou.

A report on the economic feasibility of continued reindeer herding in Itivnera was requested. During February 1998, consultants Stefan H. Magnusson and Kenneth Høegh, with assistants Ole Kristiansen and Sivert Josefsen investigated the Itivnera reindeer husbandry industry.

Their subsequent report was negative. The following is a brief summary of the report by Magnusson & Høegh (1998). Continued reindeer husbandry was not possible because the semi-domestic reindeer herd of the past no longer existed. Herd structure had disintegrated into widely spread and small groups with no distinctions for winter and summer range use. The winter range was of extreme poor quality and an 8 to 10 year period of protection for the old winter pastures east of Itivnera was suggested. Approximately 470 animals were observed, mostly females with calves, and the estimated total number of animals in the region was about 800.

In light of this report, Kapisillit held a town meeting in May of 1998 and decided to ask the Nuuk municipality to buy the herd. Unlike the Magnusson and Høegh report, Kapisillit estimated the number of reindeer in their herd to be 2000. The Greenland home-rule government granted the Nuuk municipality permission to buy the remnants of the Itivnera herd, but not to farm it. On June 1, 1998, the Itivnera herd became the Nuuk municipality's responsibility. Lacking jurisdiction to farm the herd, the Nuuk municipality decided to liquidate it through hunting by both commercial and sport hunters.

The 1998 hunting harvest quota for semi-domestic reindeer was 500. The hunt was concurrent with the hunting season for west Greenland caribou, August 15 to September 10. During February and March 1999, there will be a winter hunt with a quota of 1000 reindeer. Possibly by the year 2000, any remaining reindeer or caribou in the region will be considered wild and fall under government wildlife management. Designation of Godthåbsfjord peninsula as a reindeer husbandry district would cease.

Brief history of reindeer husbandry in southern Greenland

Reindeer herding in southern Greenland has prospered. Southern Greenland has a tradition of animal husbandry through its extensive sheep farming, and this may have provided a better cultural understanding and acceptance for the demands and responsibilities of animal husbandry. It appears likely that the careful husbandry of the two reindeer herds in southern Greenland will have little trouble complying with the forthcoming new regulations, and may continue to provide economic gains and a future for those involved.

Isortoq Herd

Greenlander Ole Kristiansen established the Isortoq herd in 1973, with 48 reindeer purchased from the Itivnera herd, and an additional 50 reindeer bought in 1974 (Aastrup, 1978; Lassen, 1981). By 1977 the herd numbered about 300 animals (Aastrup, 1978). A station for the Isortoq herd was first founded in 1990. The Isortoq herd, is now under private co-ownership by Ole Kristiansen and the Icelander, Stefan H. Magnusson. Both co-owners received education in reindeer husbandry.

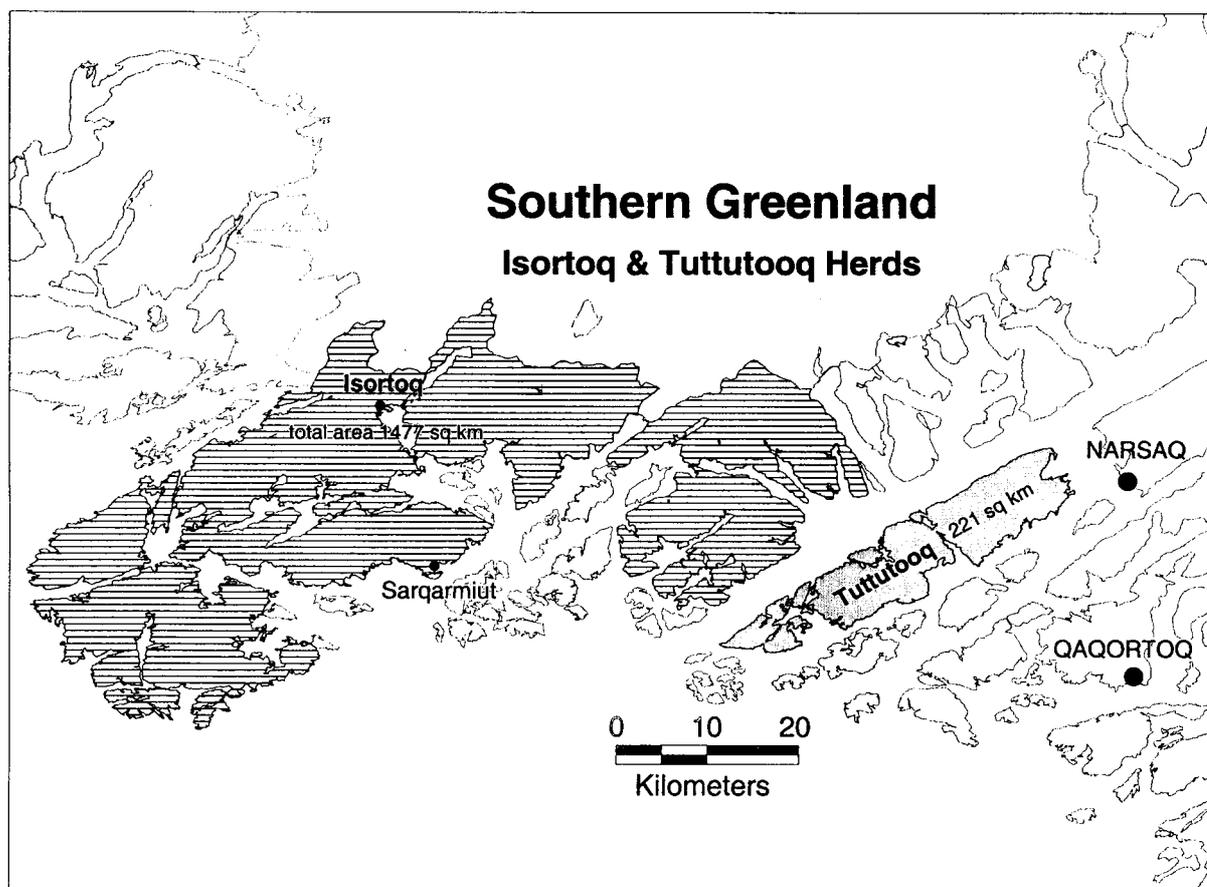


Fig. 8. Southern Greenland, showing the Isortoq and Tuttutooq herd ranges.

The Isortoq herd supports the owners' two families and three apprentices, for a total of 11 people. During the summer season three more are hired for work at the reindeer station, for a total of eight people employed. At the reindeer slaughter at least 4 more people are required for a two month period. The slaughter is well organised and under veterinary supervision.

The Isortoq reindeer herding district is 1477 km² (Fig. 8). Calf production has averaged 42% (Stefan Magnusson, pers. comm.). On average 1200 reindeer are slaughtered each year for a net gain of 1.3 to 1.5 million Danish kroner (Stefan Magnusson, pers. comm.). The years 1997 and 1998 have been exceptions, with about 3100 and 2200 reindeer slaughtered respectively. Most of the reindeer are marked.

In 1996 several portions of the Isortoq range were found severely overgrazed and a reduction of herd size as well as forced reindeer migration from the overgrazed areas (to apply for the next 15 to 20 years) were recommended (Lund *et al.*, 1996).

In 1989 there were approximately 800 reindeer in the Isortoq herd (Holck, 1989). In 1995 there were perhaps 3000 reindeer in the herd. To align reindeer numbers in accordance with available range and obtain the desired herd size and composition, the Isortoq herd has since been reduced in size by both late summer and winter slaughtering. The reindeer herd owners (Stefan Magnusson and Ole Kristiansen) and the municipality were in agreement on this decision. In 1997 there were 3100 reindeer slaughtered and it is expected that 2200 reindeer will be slaughtered in 1998.

The 1997-98 winter herd size was about 1900, of which 1100 were females, with 400 males and 400 calves (Kenneth Høegh, Greenlandic Agricultural Advisory Service 1998, pers. comm.). In 1998, the end-of-year herd size was about 1800 reindeer (Stefan Magnusson, pers. comm.). In future the winter herd size will be kept around 1400 animals, as a larger winter herd may overgraze the available range. Reindeer density for the entire district will be about 1 reindeer per km².

Monitoring of range condition is to continue. The owners aim for a balance between the number of reindeer and their available range. Sustainable reindeer herding is their goal. They seek an optimum number of reindeer on the range, versus maximum number of reindeer. The object is to attain maximum meat production in kilograms per km² without detriment to that range (Stefan Magnusson, pers. comm.).

Also progressive is the development of good marketing. The abattoir, Neqi A/S, recently received veterinary approval for the export of semi-domestic reindeer meat to European Union (EU) countries. Neqi A/S is now investigating export possibilities and there is interest in EU for importing reindeer meat from Greenland. The Isortoq reindeer herders would be the suppliers, and they are optimistic for the future of their reindeer herding enterprise.

Tuttutooq Herd

The Tuttutooq herd is under private ownership by the Greenlander, Søren Janussen (Narsaq). The herd is small and under development, having been established in 1992. The herd is kept on Tuttutooq Island west of the town Narsaq, an area of 221 km² (Fig. 8). The winter 1997-98 herd numbered about 130 animals, of which 70 to 80 were females and the rest young animals and males (Kenneth Høegh, Greenlandic Agricultural Advisory Service 1998, pers. comm.). Most animals are marked.

Herd ownership may pass from Søren Janussen to his son, Hans Janussen, who is receiving an education in reindeer husbandry. There is no official slaughter information from the Tuttutooq herd, and no range studies of the Tuttutooq Island.

Laws and regulations on reindeer husbandry in Greenland

In 1996, the Greenland government obtained the legal right to regulate reindeer husbandry in Greenland. Thus new agricultural laws for regulating reindeer husbandry are now evolving. For example, the marking of all domestic animals, including semi-domestic reindeer, was first made law in 1997. Prior to 1996 the only laws available were those regulating sheep farming. New regulations may include, among other things, mandatory education in reindeer husbandry for prospective reindeer owners. In addition, the Greenland government first obtained the right to inspect and supervise as to whether their new laws and regulations were actually being adhered to, in 1997.

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