WHITE PAPER ON MANAGEMENT AND UTILIZATION OF LARGE WHALES IN GREENLAND

THE GOVERNMENT OF GREENLAND
MINISTRY OF FISHERIES, HUNTING & AGRICULTURE
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1. Introduction to whaling in Greenland:
Kalaallit Nunaat/Greenland is a Self-Governing part of the Kingdom of Denmark with full legislative and executive responsibility in many fields including the management of natural living resources. Foreign policy (including international organisations) is the responsibility of the Danish Government in consultation with Greenland.

Greenlanders have maintained a traditional lifestyle connected to the sea dependent on marine resources, including subsistence hunting. Greenland (2018) has a population of app. 55,900 people living in 17 towns and 81 settlements (2018, West Greenland: 52,635 and East Greenland: 3,242). Inuit comprise about 90 % of the population.

Within the IWC context, Greenland's hunt of large whales falls in the category of Aboriginal Subsistence Whaling (ASW) together with the Chukotka hunt of gray and bowhead whales, the Bequia hunt of humpback whales and the Alaskan hunt of bowhead and gray whales.

For aboriginal subsistence whaling the IWC has the following objectives:

- ensure risks of extinction not seriously increased (highest priority);
- enable harvests in perpetuity appropriate to cultural and nutritional requirements;
- maintain stocks at highest net recruitment level and if below that ensure they move towards it.

The Greenland hunt for large whales respects those objectives.

2. Historical overview of whaling activities and catches up to present time:
The ancestors of the modern Greenlanders that migrated from Arctic Canada at the turn of the first millennium were skilled hunters of bowhead and humpback whales. These Thule Inuit brought with them specialized tools used in whaling, which included the *umiaq* skin boat, distinctive whaling harpoons made of whalebone, floats, hunting lines and the *atallaaq*. The *atallaaq* was a dry suit made of waterproof seal skin that allowed the hunters to crawl upon the back of the whale in order to deliver the final strike and to aid in flensing.

The hunting of large whales is still today a vital component of everyday life and culture in Greenland. It is an important part of the Greenland food security system and provides a significant amount of nutritious food and income to families living in the cities as well as in remote coastal communities. The baleen whales are important species; they are hunted in every part of Greenland as an activity from small boats or by the use of fishing vessels with harpoon cannons.

Therefore, whaling and Greenland are inseparable. There are still parts of Greenland where whaling is one of the very important component of people's livelihood, combined with other

forms of hunting. Whaling acts also as a supplement to fishing activities and is an economic buffer for families when no other income sources are available. It is documented that whale meat and other whale products such as organs, blubber and *mattak* are a vital source of proteins and omega-3 fatty acids. So what may not be so obvious for everyone else is that consuming whale meat has huge advantages for the environment, for the health of *Kalaallit* - Inuit in Greenland and as food security.

3. Status of large whales around Greenland:

Of the large whales can be mentioned five species of the family balenopteridae, or rorquals, which can be regularly found in Greenland waters: common minke whale (*Balaenoptera acutorostrata*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae)*, sei whale (*Balaenoptera borealis*) and blue whale (*Balaenoptera musculus*). All five species migrate to southern breeding grounds during the winter and return to feed in the ice-free waters of Greenland during summer. Two species from the family balaenidae, or right whales, can also be seen in Greenland waters: the North Atlantic right whale (*Eubalaena glacialis*), which is sometimes seen during summer in East Greenland and West Iceland and the bowhead whale (*Balaena mysticetus*). The bowhead whale can be found in Disko Bay and adjacent waters from around February until the break-up of the ice in April or May. Observations from Sisimiut up to Qaanaaq have in later years been reported by the hunters. Bowhead whales are sometimes seen in Northeast Greenland. The last species of large whale found in Greenland waters is the sperm whale (*Physeter macrocephalus)*, from the physeteridae family. Sperm whales are relatively abundant in deep waters of both West and East Greenland.

The summer abundance of large whales in West Greenland waters is estimated by a series of aerial surveys that has been carried out starting in 1983, with the last three surveys being in 2005, 2007 and 2015. The later surveys were conducted later in the summer and early fall (August/September), and having less weather problems they have provided solid estimates for several species of whales, including common minke whales, fin whales, and humpback whales. The last survey in 2015 included also the waters off East Greenland..

The last three surveys are fully corrected, estimating 5,095 common minke whale sin 2015 in West Greenland and 2,760 in East Greenland. The average catch in West Greenland has been 144 minke whales per year with quotas remaining stable at 164 since 2014. The utilization in the last two quota blocks has remained stable with 2008-2012 of 85 % and in the quota block 2013-2017 of 84 %. The average catch in East Greenland has been 9 minke whales per year since from 1987. The utilization in the quota block 2008-2012 was 39 % and in the quota block 2013-2017 it increased to 67 %.

Fin whales in West Greenland in 2015 are estimated at 2,215 and 6,440 in East Greenland. The average catch has been 11 fin whales per year. The utilization in the last two quota blocks has remained stable with 2008-2012 of 47 % and in the quota block 2013-2017 of 53 %.

For humpback the survey in 2015 estimated 993 in West Greenland and 4,220 in East Greenland. The average catch has been 7 humpback whales per year since 2010. The utilization in the quota block 2008-2012 was 100 % and in the quota block 2013-2017 56 %.

Bowhead whale in Disko Bay was in 2012 estimated at 1,274. The average catch has been 1 bowhead whale per year with quotas remaining stable at 2 since 2007 based on the advice from the Scientific Committee. The utilization in the quota block 2008-2012 was 50 % and in the quota block 2013-2017 6 %.

4. Regulation and Monitoring:

In Greenland, there is no private ownership of land, sea or living resources. Hunting grounds and game animals are open to harvest and use by Greenlandic citizens, subject to hunting licenses. However, only persons with a full-time occupational hunting license are allowed to hunt large whales, and there are a number of important conditions and limitations, including those related to catch limits, methods of hunting, training and reporting. In addition to the Government of Greenland's executive orders there may also be additional local rules set by the municipality.

Hunting is regulated and administered by the Ministry of Fisheries, Hunting and Agriculture, and supervised by the Fisheries Licence Control Authority. Locally, a team of wildlife officers control hunting and coastal fishing activities, making sure that conservation measures of protected areas and species are observed, and passing on information to the local community. The wildlife officers work in close cooperation with the municipalities, the police, Arctic Command, and the Government of Greenland.

The Government of Greenland has issued one act in 1999, with several later amendments that affects hunting of all animals, including whales. Other acts that indirectly affect whaling include an act on animal welfare from 2003 and an act on nature protection from the same year.

In addition, there are 3 executive orders that directly affect the taking of large whales: one on maintenance and approval of harpoon cannons, one on the reporting of the hunt and one on the hunt itself. Furthermore, whaling is indirectly affected by an executive order that regulates the issuing of hunting certificates.

The Home Rule Act on Hunting and its revisions have the goal to ensure a responsible and sustainable harvest of wild mammals and birds. There is a well-developed process for stakeholder participation in harvest management that includes the Organisation of Fishermen and Hunters (KNAPK), the municipalities, the Greenland Institute of Natural Resources and the Ministry of Nature and Environment. It also mentions that only persons

with a hunting certificate can hunt, specifies the types of weapons that can be used for hunting and describes the mechanisms to choose leadership in the case of collective hunts.

5. Animal welfare; hunting methods, time to death and loss rates:
The IWC Convention and the Schedule do not contain rules relating to ASW in regard to animal welfare issues. IWC rules only outlaw the cold harpoon in the commercial hunt for whales. The Government of Greenland has, nevertheless, on its own introduced the mandatory use of the exploding Whale Greanade-99 as well as comprehensive regulation and information requirements in order to address the question of animal welfare.

A central element is that humans should make every effort to avoid causing unnecessary distress to animals. This principle is brought into the legislation in Greenland by the Home Rule Act on Animal Welfare.

In the case of whaling, the main goal from an animal welfare point of view is to cause death as quickly as possible. An ideal situation is when the whale is killed instantaneously. However, when hunting a large mammal in the wild, this goal may be difficult to attain in some situations. Another important goal of whaling is to ensure that as many of the wounded animals are killed and landed.

In order to monitor the welfare aspects in the hunting of large whales, Greenlandic whalers report the time passed between the first hit and the moment when the whale is considered to be dead or unconscious. In addition, hunters are required to report all incidences of large whales that were struck but lost.

Time to death and loss rates depend on the species being hunted and on the method used to hunt the animal. There are three types of hunting of large whales in Greenland: hunting of fin whales, bowhead whales and humpback whales with harpoon cannon, hunting of minke whales with harpoon cannon and the collective rifle hunt for minke whales.

A whale is considered dead when it stops swimming, it does not move and its flippers are still. In practice, it can be difficult to estimate the exact moment of death or unconsciousness because fin and minke whales tend to sink as soon as they are dead. Often, the whale is considered dead or unconscious when it has sunk and the harpoon lines attached to the whale show no signs of movement. As reported by The North Atlantic Marine Mammal Commission (NAMMCO) the presented Greenlandic data on TTD is biased high for those hunts where the TTD are estimated by the hunters and are not corrected by post-mortem examinations.

In this quota block reports show faster times to death compared to the previous quota block with median times to death annually ranging between 1 - 10 minutes for the fin whale hunt,

1 - 2 minutes for the minke whale hunt with harpoon cannon, 20 - 25 minutes for the collective hunt and 5 – 20 minutes for the humpback whale hunt with harpoon cannon (figure 8 and table 3).

In the present quota block, loss rates have ranged between 0–17 % for the fin whale hunt, 0–1 % for the minke whale hunt with harpoon cannon, 2–8 % for the collective hunt and 0–14 % for the humpback whale hunt (figure 9 and table 3).

From 2013 to 2017, instantaneous death rates, defined as the proportion of whales dying or losing consciousness within one minute after being wounded, were 39 % for the fin whale hunt, 55 % for the minke whale hunt with harpoon cannon, 3 % for the collective hunt and 16 % for the humpback whale hunt (table 3).

At the second NAMMCO "Expert Group on assessment of whale killing data for large whales" in 2015 improvements were reported for the majority of TTD data and struck and lost rates, which is a continued trend in this quota block.

6. Aboriginal Subsistence Whaling (ASW) in the IWC

The legal binding Aboriginal Subsistence Whaling obligations within the IWC are defined by the Convention, the Schedule, and contain some obligations on the Governments and areas managing ASW. They are to be found in relevant paragraphs of article V of the Convention and paragraphs 13 and 14 of the Schedule.

In the Schedule, there is a single reference to "subsistence needs" – but it is not defined (Schedule §13a – "..establish catch limits" "to satisfy aboriginal subsistence needs .."). The Convention does not mention aboriginal subsistence needs. Thus there is no objective agreed basis in the Treaty instruments for setting aboriginal subsistence needs, especially in an opportunistic, multi-species hunt in the difficult conditions faced in Greenland.

Observations of relevance when considering "need":

- The great variability in the catch of all animals during any one given year (due to climatic variations or variations in the size of the individual groups of animals).
- The substitution possible and often necessary between the various prey animals.
- The opportunistic nature of the hunt.
- The nutritional superiority of traditional Greenlandic diet.
- Food security.

The Government of Greenland is the political responsible organization in defining the needs of the people in Greenland, in general and in relation to whales subject to IWC management rules. The government in close cooperation with the municipalities is the only organization having sufficient knowledge to determine such "needs" and ensure food security. The

political decisions in Greenland are based on scientific knowledge and will have to take account of the changing size of the population living in West and East Greenland.

7. Greenland's need of whale meat:
The reasons why whaling is important for Greenlanders include:

- Whales and whaling are fundamental part of the culture and the history
- Large whales are a substantial source of food for the majority of the population
- The selling, sharing and distribution of whale meat provide a necessary source of food security and income for many people
- There are well documented health reasons to promote the consumption of whale products
- In a country surrounded by highly productive seas, where the climate seriously restricts farming and agriculture, whaling provides large amounts of food at very low costs for the environment.

For these reasons, the Government of Greenland is committed to continue harvesting a sufficient number of large whales in a sustainable way in the foreseeable future.

Greenland's hunt of large whales falls in the category of Aboriginal Subsistence Whaling (ASW) in an IWC context. Where commercial whaling proper aims at maximizing profits ASW aims at satisfying the local need (food security) of whale meat and to secure the continuation of cultural practices.

The discussion of Greenlandic need for whale products and its multispecies component dates back to discussions within the IWC from the late 1970s and considerable documentation has been presented over the years and discussed at the IWC Meetings.

The Greenlandic hunt is a multispecies hunt and for this reason, the 'need' statement has traditionally been expressed in terms of tons of meat / edible products of large whales, rather than in individual animals by species.

The catch of individual species varied over the years due to a number of factors (ice and climatic conditions, weather, availability). If the result of the hunt, on one individual species, lead to an unsatisfactory result, then the hunt on other species might help to attain the objective of overall food security or an approximation to that objective.

It should be noted that external factors mentioned at times do have a significant influence on quota utilisation. Over the last two quota-blocks (2008-2018) the utilisation of quotas has varied with more than 25 % (74 % quota utilization in 2017; 98 % quota utilization in 2013) in relation to minke whales and 40 % (31 % quota utilization in 2012; 74 % quota utilization in

2008) in relation to fin whales. Under such circumstances it is necessary to have sufficient quotas of the various species to neutralize the misfortunes of nature. Normally, when the hunt for one species fails, the hunts for the other species don't fail. Substitution thus takes place in order to archive the necessary result of the hunt.

The original West Greenland's need of meat from large whales was evaluated and endorsed by the IWC in 1990 and 1991, with basis on the catches previous to 1986.

According to the estimates accepted by the IWC, the average yearly catches in West Greenland before 1986 were 14 humpback whales, 9 fin whales and 232 minke whales. Using different sources of information, the IWC Aboriginal Subsistence Whaling Sub-committee agreed that the best available estimates for conversion of number of whales to weight of whale meat in this area were 8 metric tons for humpback whales, 10 tons for fin whales and 2 tons for minke whales.

Thus using the conversion factor available, the yearly catches of West Greenland, before 1986, yielded 112 tons of humpback whale meat, 90 tons of fin whale meat and 464 tons of minke whale meat. This means that previous to 1986, approximately 670 tons of meat of large whales was consumed yearly in West Greenland.

The aggregated "need for whale meat" as such has never changed. The ways to attain the objective of 670 tons meat could and can however be fulfilled by a number of various combinations of the catch quotas for the individual species.

The established need for whale meat has been based on historical catches. The different species can, to a certain extent, substitute each other and consequently Greenland have had to establish a common definition of needs, i.e. tons. The need for whale meat is administratively, during the IWC process, changed into the normal catch limits for the different species and that only after the Scientific Committee has had the opportunity to review the possibility of the various species to sustain a certain hunting pressure. So the catch limits is expressed as number of whales and not as tons.

The need of meat from large whales for West Greenland has increased since the 20 year period of 1965-1985, because Greenland's ability to locally produce alternative sources of meat has remained stable, and there has been an increase in the population size of 18 %.

For the present time our need update is an average of the West Greenlandic population size during the last quota block from 2013-2018 used, as this is the same time frame used for the calculation of the actual use of the four whale species per given strike limit.

The 18 % increase in the population size in West Greenland corresponds to an increase of 124 tons of edible products from large whales with a need of 670 tons, giving a total need of 794 tons in present time West Greenland.

Both in the 20 year period of 1965-1985 and in present time the need of respectively 670 tons and 794 tons corresponds to consumption from large whales of 15 kg annually per capita. However, as documented, the actual average annual consumption per capita in West Greenland based on actual catches (428 tons of edible products landed) in the present quota block 2013-2018 is 8.2 kg. If the whole quota was utilized this is raised to 12.5 kg or 11.8 kg when calculating the struck and lost ratio into.

The East Greenlandic hunt of large whales is only focusing on one species, which is the minke whale from the Central Atlantic stock. Up to 1985, takes from the Central Atlantic minke whale stock had not been considered under aboriginal subsistence whaling. In 1985 the quota had been 242 whales. A needs statement was developed in 1986 and an aboriginal subsistence catch limit established. The continuing need for 12 animals per year from this stock has been recognised by the Commission without discussion since 1986.

There are several reasons for the proposed quota change in East Greenland. Based on recent scientific advice, the hunting opportunities in East Greenland has been reduced over the last couple of years for species other than minke whales, such as seabirds and other marine mammals not covered by the management of the IWC. This effect can be part of the reason for the almost doubling in quota use observed from the last quota block 2008-2012 of 39 % to the present quota block utilization of 67 %.

On that basis, the possibility to increase the hunt of minke whales is considered the preferred option to satisfy the needs of the local population for fresh whale meat and to provide food security. With an average population in East Greenland in 2013-2018 of 3,389, the per capita consumption in kg of 20 minke whales is 11.2 kg, corresponding to the range of 11.8-12.5 kg per capita in West Greenland, but lower than the approved and updated need of 15 kg. With the present annual quota of 12 minke whales in East Greenland, the per capita consumption is 6.7 kg.

In addition to this, it is important to note that apart from the need for fresh whale meat, the population of East Greenland needs some sort of income in order to purchase fuel, ammunition, other types of food etc. It has become increasingly difficult to attain this essential income from fisheries and seal hunt, which has increased the need for self-supply including barter and trade of whale products. The IWC has on several occasions recognized that a generalized currency is involved in this barter and trade, as long as the predominant portion of the products from such whales are ordinarily directly consumed or utilized in their harvested from within the local community.

Harvesting large whales from local waters has a relatively low cost for the local and global climate and the environment. In contrast, the amount of gas emissions, production of waste and use of land needed to farm western meat, and to transport this meat to Greenland is enormous and contrary to any national or international policy on CO2 emissions. The buffer in the food supply and the consequence of food shortage is an increased import of western meat from overseas, because agricultural activities in Greenland are minimal and not covering the nutritional need at all.

8. Biological advice on catches of large whales in Greenland

It is important that the IWC quotas can satisfy the documented need of meat from large whales of 794 tons for West Greenland and East Greenland of 38 tons. The IWC was in 2018 able to approve quotas, all based on the Scientific Committee's completions of Strike Limit Algorithms (SLA) for all four stocks in the Greenlandic hunt. The SLA provides an even more robust basis for providing long-term management advice to the Commission on the subsistence hunt of whales off West Greenland.

The Scientific Committee advises in 2018 that catch limits of 164 minke whales, 19 fin whales, 2 bowhead whales and 10 humpback whales in West Greenland and 20 minke whales in East Greenland will not harm the stocks.

According to the IWC-rules, the whaling season for minke whales from the West Greenland and Central stock (East Greenland) is currently limited to 9 months per year. This limitation originates from the regulation of commercial whaling, and was intended to give the relevant stocks a resting period. The limitation does not take into account the opportunistic nature of aboriginal subsistence whaling. In order to accommodate the need for Greenlandic hunters to have sufficient flexibility in their hunting opportunities throughout the year, the hunting season should be normalized to 12 months.

Furthermore, the IWC-rules does not allow for catch of fin whales below 50 feet (15.2 meters). The limitation also originates from the requirements for commercial whaling and was intended to strengthen the management of whale stock when it was introduced in 1946. When carrying out aboriginal subsistence whaling, it is not physically possible to make these measurements. The hunters therefore risk overstepping requirements that they are not able to take into account when hunting for fin whales. Therefore, this requirement should be abandoned. Abandoning the 50 feet limitation is not intended to make it possible to hunt calves or any whale accompanied by a calf, which is not allowed according to paragraph 13. (a) (4) in the IWC schedule nor in Greenlandic national legislation.

Both limitations are historically based in parts of the Schedule dictating the commercial hunt and they do not apply to other ASW-hunts regulated by the IWC - neither in Greenlandic nor

the other ASW-countries. The IWC's Scientific Committee reviewed the two proposals in May 2018 and concluded that none of them would have conservation implications.

9. Concluding remarks:

Greenlandic whaling is the continuation of a very old tradition performed according to needs in a contemporary society. Hunting in general and hunting of large whales in particular are integral parts of the culture and the economy of the country. A Greenland without whale hunting is therefore unimaginable. For this reason, Greenland has the intention to hunt large whales both in the near-term and in the long-term future.

When considering catch limits proposals for 2019 – 2025 the following positive developments should be taken into consideration:

- The IWC scientific committee (SC) has recently for the first time approved reliable estimates of abundance for all the relevant stocks and long-term strike limit algorithm (*SLA)* for all West Greenlandic hunts has been completed.
- The control and monitoring systems are functioning well and the block quotas for the period 2013 – 2018 have not been exceeded, both in West and East Greenland.
- Documented improvements in time to death and struck and lost rates, hereby increasing the quota utilization.
- Both in the 20 year period of 1965-1985 and in present time the need of respectively 670 tons and 794 tons corresponds to consumption from large whales of 15 kg annually per person living in West Greenland and the need of 38 tons in East Greenland corresponds to 11 kg per person.
- Taking both the quota usage and the struck and lost rates into account the annual average landing of large whales in West Greenland in the previous quota block 2013-2018 was 428 tons of edible products, corresponding to the average consumption of just close to 8 kg per person living in West Greenland.
- With the most recent catch limits and scientific advice from 2018, Greenland is in practice close to the documented need of 670 tons of meat from large whales that was approved by the IWC in 1991 and 137-175 tons short of the present need of 794 tons documented in this paper

With such a robust advice from the Scientific Committee, the IWC should be able to approve catch limits for both West and East Greenland that are biologically sound. Such catch limits would be sustainable and the hunt would be well regulated. Furthermore, Greenland will continue working actively on improving the welfare aspects of whale hunting.

The Government of Greenland hopes that the IWC will be able to take management decisions based on the best available scientific knowledge and with respect for the cultural, nutritional and economical needs of Greenlanders and in this respect also fulfil the obligations of the IWC Convention. Allowing Greenland to obtain sufficient whale meat to

fulfil the documented need will be a way to protect the global climate and the environment by rationally utilising the natural resources at hand.

From Appendix II:
The Inuit food system and food security in the Baffin Bay Davis Strait region:

The World Food Summit of 1996 defined food security as existing "*when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (FAO, 1996). Food insecurity therefore exists when these conditions are not met. In acknowledgement of the dual food system characteristic of the BBDS region, food security additionally entails the continued and predictable availability of and access to traditional foods (Paci, 2004; Council of Canadian Academies, 2014). This definition of food security stresses the importance of the traditional food system from a social perspective and recognizes that the traditional diet of country food is not only a vital source of nourishment but also an integral part of emotional, spiritual, and cultural wellbeing (Wenzel, 2009; Cunsolo Willox et al., 2012; Wenzel, 2013). For Inuit, the right to food extends beyond basic physical and economic accessibility, as country food is integral in providing social cohesion and identity (Dahl, 2000; Damman et al., 2008; Sejersen, 2009; Harder and Wenzel, 2012). Inuit livelihoods have historically been, and continue to be, defined by a close relationship to the environment and the resources it provides..

2. Introduction to whaling in Greenland

In June 2009 *Kalaallit Nunaat*/Greenland obtained status as a Self-Governing part of the Kingdom of Denmark with full legislative and executive responsibility in a substantial number of fields. The responsibility of the management of natural living resources was obtained per January 1st, 1985. Foreign Policy remains the responsibility of the Danish Government, including international organisation of which the Kingdom of Denmark is a member, in consultation with Greenland.

The population of Greenland still depends on marine resources, including subsistence hunting. It has a population of app. 55,900 people living in 17 towns and 81 settlements (2018, West Greenland: 52,635 and East Greenland: 3,242, table 6). The size of Greenland is 2,166,086 square kilometres, covering an area from Norway to Sahara, and with a coastline of 44,087 kilometres (plate I). Inuit is about 90 % of the total population. Greenlanders have maintained a lifestyle connected to the sea, land and the harsh nature and environment.

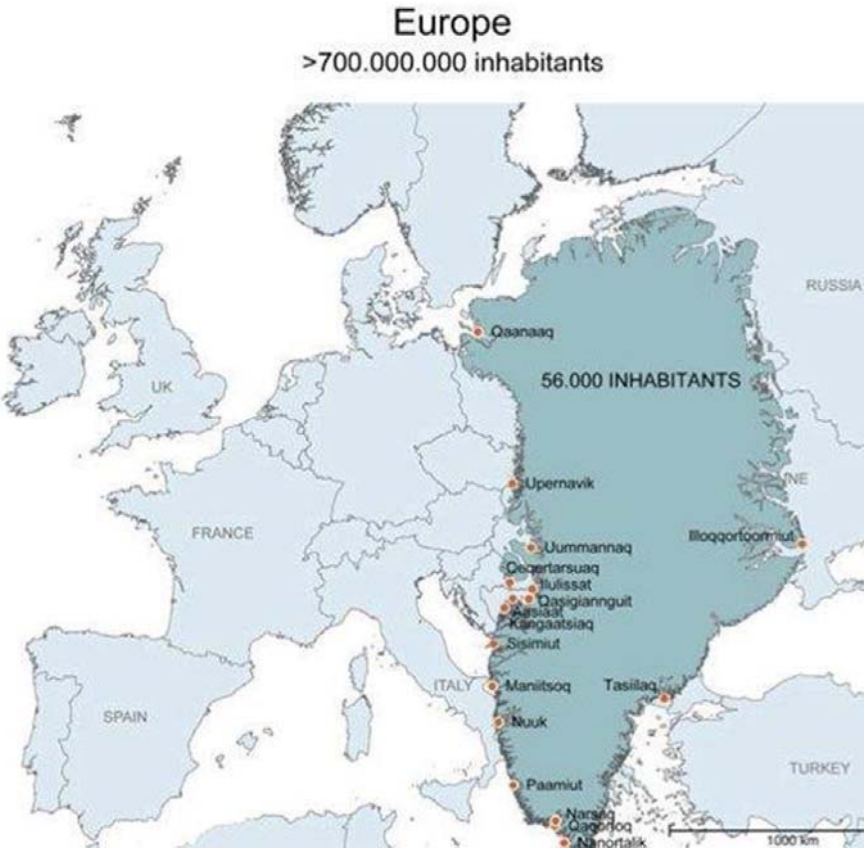


Plate I. Map of Greenland compared to Europe.

The hunting of large whales is a vital component of everyday life and culture in Greenland. It is an important part of the Greenland food security system and provides a significant

amount of nutritious food and income to families living in the cities as well as in remote coastal communities. The baleen whales are important species; they are hunted in every part of Greenland during the year as an activity from small boats or by the use of fishing vessels with harpoon cannons. The skin / *mattak* and lower jaw meat; and the ventral groves / *qiporaq* are used as a delicacy, the meat for celebration and for everyday food. The baleens are used as a beautiful part of modern jewellery and design and in ancient time also used as part of hunting and housekeeping tools.

Therefore, whaling and Greenland are inseparable. There are still parts of Greenland where whaling is one of the more important components of people's livelihood, combined with other forms of hunting (see importance of whaling in the individual communities, table 8). Whaling acts as a supplement to fishing activities and is an economic buffer for families when no other income sources are available (Ministry of Social Affairs, Family, Equality and Justice 2018).

It is documented that whale meat and other whale products such as organs, blubber and *mattak* are a vital source of proteins and omega-3 fatty acids. So what may not be so obvious for everyone is that consuming whale meat has huge advantages for the environment, for the health of *Kalaallit* / Greenlanders in Greenland and as food security (Appendix II).

Archaeological investigations and discoveries have shown that the old Greenlandic cultures in part have been based on the harvest of humpback and bowhead whale in addition to other marine mammal species. The introduction of fisheries in certain areas normally covered by ice during winter has not reduced the importance of whaling in any way, particularly not in the remote coastal communities.

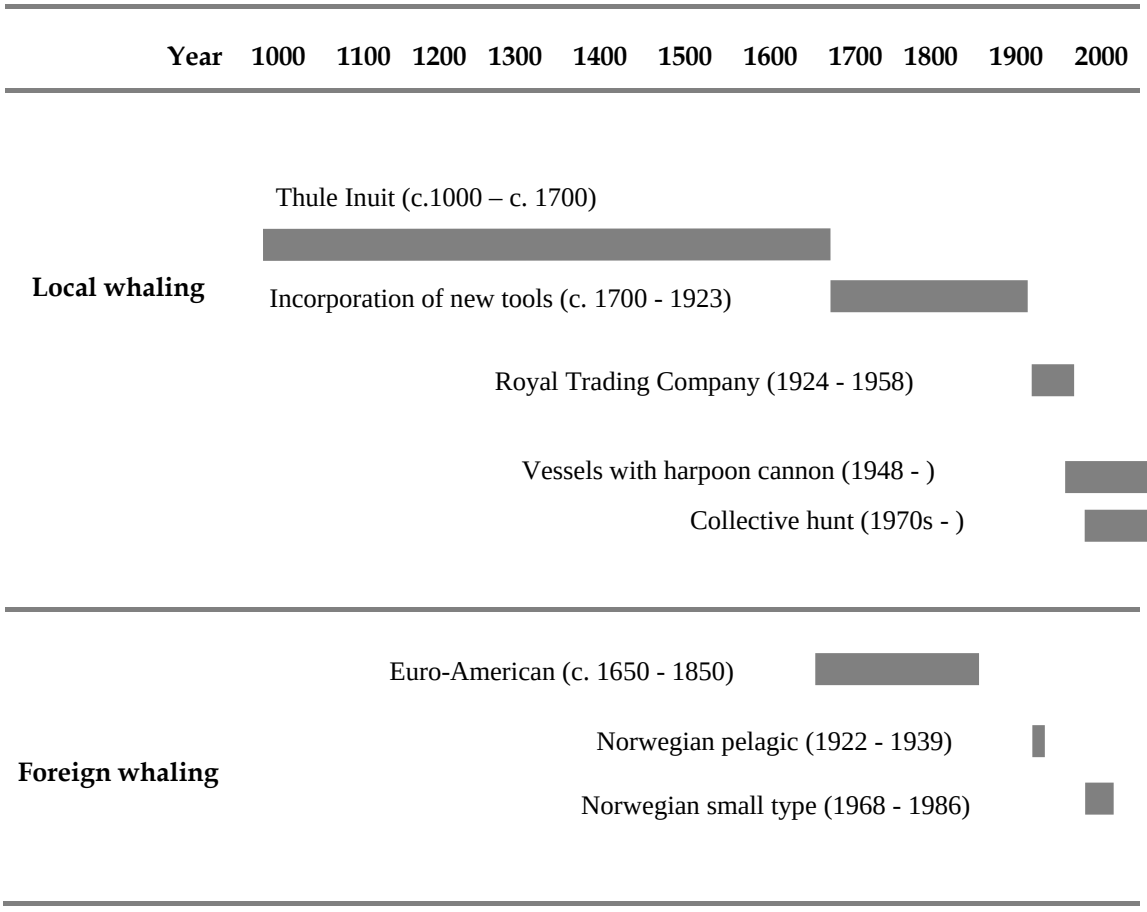
Through a traditional way of life for many generations, the Inuit have developed an in-depth knowledge of the ecosystems in which they live where accurate observations and interpretations about wildlife behaviour, weather patterns and other environmental factors are essential for survival. Inuit have traditionally spent hours observing and discussing the animals, the sea, the ice and the land and the knowledge base became fine-tuned through direct experience of a subsistence lifestyle. The respect for wild animals educated Inuit on how to use and preserve the wildlife resources for future generations.

Among the problems the Inuit presently face are the lack of understanding of the Arctic way of life, resulting in e.g. international trade bans, the perception that the use of money and development of the hunting activities and equipment conflicts with the status of the Inuit hunt or the rights of hunters and Indigenous peoples and the on-going climate changes in the Arctic regions. Weather and ice conditions are changing and attempts are made at both local and national level to adapt to what seems to be severe and lasting changes in the Arctic environment.

3. Historical overview of whaling activities and catches up to present time

The following section gives a short overview of the history of hunting of large whales in Greenland from the time when the Thule Inuit, the ancestors of the present Greenlanders emigrated from Arctic Canada until today. Timelines for the different categories of whaling described in the text are schematised in table 1.

Table 1. Schematic representation of different periods in the history of whaling in Greenland. Local whaling: whaling by Greenlanders or Danish for the benefit of Greenlanders. Foreign whaling: whaling off Greenland by Europeans or North Americans for the purpose of trading with oil and other whale products.



Hunting of large whales by early Greenlanders

The ancestors of the modern Greenlanders that migrated from Arctic Canada at the turn of the first millennium were skilled hunters of bowhead and humpback whales. These Thule Inuit brought with them specialized tools used in whaling, which included the *umiaq* skin boat, distinctive whaling harpoons made of whalebone, floats, hunting lines and the *atallaaq*. The *atallaaq* was a dry suit made of waterproof seal skin that allowed the hunters to crawl upon the back of the whale in order to deliver the final strike and to aid in flensing. The

atallaaq was still used in some areas during the 19th century (Birket-Smith 1924, Caulfield 1997).

Other Eskimo cultures immigrated to Greenland and became extinct before the arrival of the Thule Inuit. The whaling of these cultures is not discussed here. Likewise, we do not discuss the whale hunting of the Scandinavian *Nordboere*, who came via Iceland and settled in Greenland from the year 985-6 to the 15th century (Kellog 1997, Gulløv 2004).

Contact of the Thule Inuit with European and North American whalers in the 18th century resulted in changes of equipment, such as shifting to metal harpoons, more efficient flensing tools and wooden boats (Caulfield 1997).

The hunting of humpback whales continued with few modifications until 1923, when modern whaling was introduced by the Danish authorities (Kapel and Petersen 1982).

Bowhead whales became scarce due to overexploitation by foreign whalers during the 17th, 18th and beginning of the 19th century. As a result of this, hunting of bowhead whales by Greenlanders on a regular basis stopped in the 19th century. Only a couple of bowhead whales were taken during the 20th century (Kapel and Petersen 1982).

Minke whales were taken in Disko Bay during the 19th century, and perhaps also in earlier times (Caulfield 1997).

Pelagic whalers (1922 – 1958)

Norwegian pelagic whalers caught considerable numbers of large whales during 8 cruises off West Greenland carried out between 1922 and 1939. The catches included 705 fin whales, or an average of 88 fin whales per cruise. During the first three years of the operation, the Norwegian whalers took 327 humpback whales. Thereafter the catches of humpback whales were much smaller (Kapel and Petersen 1982, Simon *et al.* 2007b, Witting 2007b).

From 1924 to 1939, and again from 1946 to 1958, the Royal Greenland Trade Company, from Denmark, used a large steel catcher *Sonja* to provide whale meat for the Greenlanders and bring oil back to Denmark and other European countries. On average, this operation caught 21 fin whales per year, and a smaller number of humpback, blue, sei, sperm and bottlenose whales. The operation ended because it was financially unprofitable (Kapel and Petersen 1982, Freeman *et. al.* 1998, Simon *et al.* 2007b).

Coastal whaling in the 20th century

In 1948, in Disko Bay, West Greenland, a fisherman and hunter mounted a harpoon cannon on the bow of his 36 ft. vessel, "*Auveq*" revitalizing the community based hunting of large whales. The owner was the first Greenlander to own an harpoon cannon. Other vessels from

West Greenland followed this example in the late 1950s and began taking minke, fin and humpback whales. A few blue whales were taken during the first years of this whaling (Caulfield 1997, Freeman *et. al.* 1998).

Bowhead whale

The taking of bowhead whales was stopped in 1938 by a decision of the Government of Denmark in order to protect the stock due to low stock numbers. In 2007, Greenland was by the IWC given a quota of 2 bowhead whales per year with the possibility of carrying over up to 2 whales from one year to the next. Greenland started the bowhead whale hunt in spring of 2009 and the first two landings were given to the Greenlandic people in connection with the introduction of Self-Government (figure 1; Kapel and Petersen 1982, Lemche 1990, Caulfield 1997, IWC 2007a).

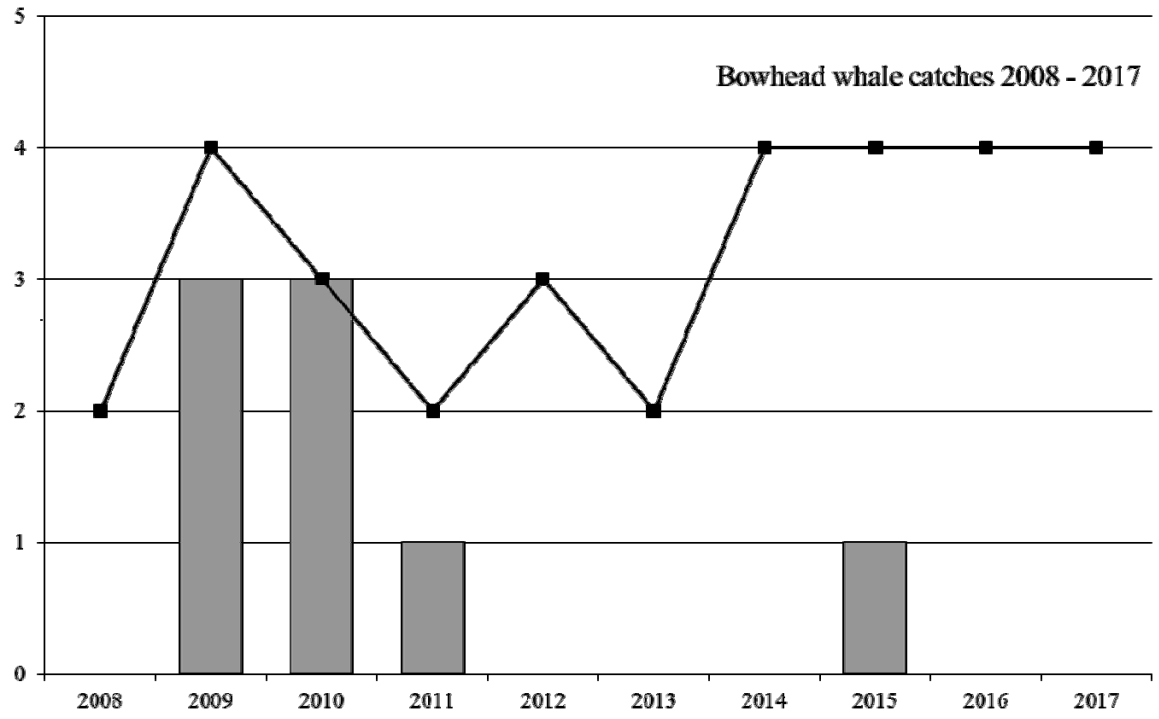


Figure 1. Catches of bowhead whales by Greenlandic whalers off West Greenland in Disko Bay area from 2008 to 2017. The black line shows the quotas including carry-over provision. Only a few bowhead whales were caught prior to 1938. Source: IWC SEC. / Ministry of Fisheries, Hunting and Agriculture.

The average catch has been 1 bowhead whale per year with quotas remaining stable at 2 since 2007 based on the advice from the Scientific Committee. The utilization in the quota block 2008-2012 was 50 % and in the quota block 2013-2017 6 %.

Humpback whale

In 1955, the IWC limited the taking of humpback whales in West Greenland to 10 animals per year. Quotas were reduced to 9 humpback whales per year in 1984 and to 8 in 1985. The IWC prohibited the catching of humpback whales off Greenland in 1986, due to uncertainties about the size of the stock. In 2010, Greenland was given a quota of 9 humpback whales per year, with the possibility of carrying over up to 2 whales from one year to the next. In the following quota block it was raised to 10 humpback whales per year based on the advice from the Scientific Committee (figure 2; Kapel and Petersen 1982, Lemche 1990, Caulfield 1997).

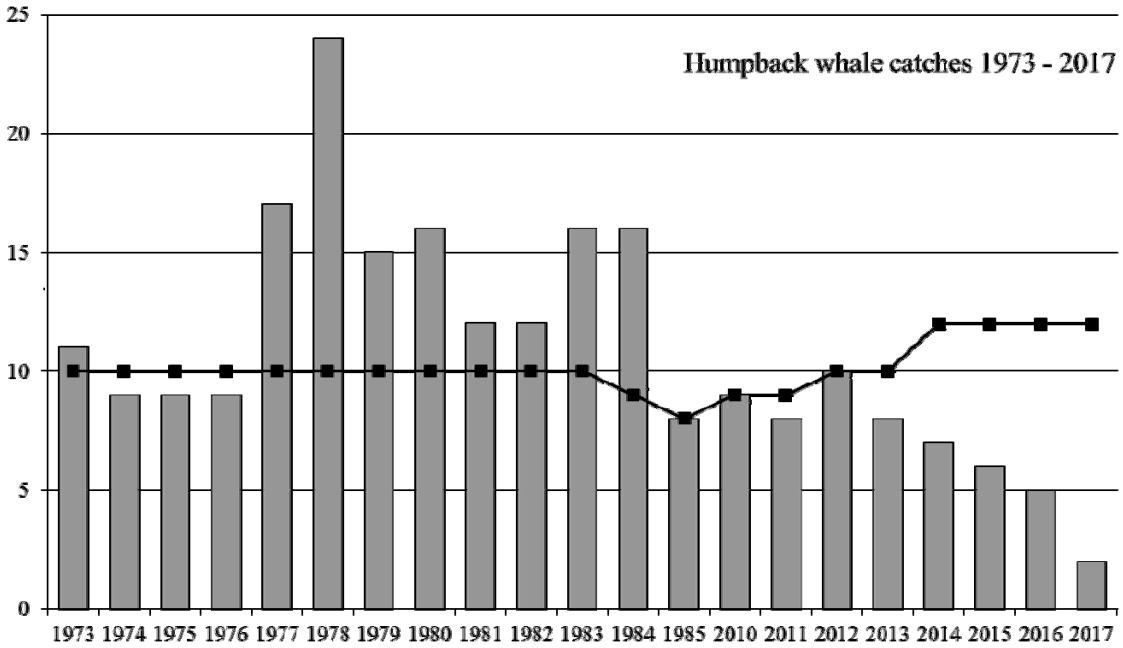


Figure 2. Catches of humpback whales by Greenlandic whalers off West Greenland from 1973 to 2017. The black line shows the quotas including carry-over provision from 2010. Previous to 1973 Greenlandic whalers caught less than 5 humpback whales per year. Source: Witting 2007b / Ministry of Fisheries, Hunting and Agriculture. Note: comparison with catches of fin whales (figure 3) and minke whales (figure 4) show that the regulation system and the subsequent adherence to quotas improved substantially during the 1990s.

The average catch has been 7 humpback whales per year since 2010. The utilization in the quota block 2008-2012 was 100 % and in the quota block 2013-2017 56 %.

Fin whale

During the 1960s and 1970s, Greenlanders caught 0-13 fin whales per year. Catches have been regulated by IWC aboriginal subsistence quotas since 1977, where a quota was given as substitute for the humpback whale quota, even though it was not a traditionally target

species. The quotas have ranged from 6 to 23 whales per year, and since 1995 have remained stable at 19.

Surveys carried out in 2004 in order to update abundance estimates of large whales were unsuccessful and, due to the uncertain status of the stock the Greenland Home Rule voluntarily reduced the quotas for 2006 and 2007 to 10 fin whales per year. The following year the survey went well and for the quota block 2008-2012 Greenland was given 19 fin whales per year (figure 3; Kapel and Petersen 1982, Caulfield 1997, Simon *et al.* 2007b).

In connection to a political decision during the IWC Annual Meeting in 2010, the Government of Greenland agreed to a reduction of the fin whale quota from 19 to 16 (IWC 2010). The Government of Greenland on a voluntarily basis further reduced the catch limit for the West Greenland stock of fin whales from 16 to 10 for each of the years 2010 to 2012 in connection with the obtained quota of 9 humpback whales. For the present quota block the quota was again set at 19 animals based on the advice from the Scientific Committee.

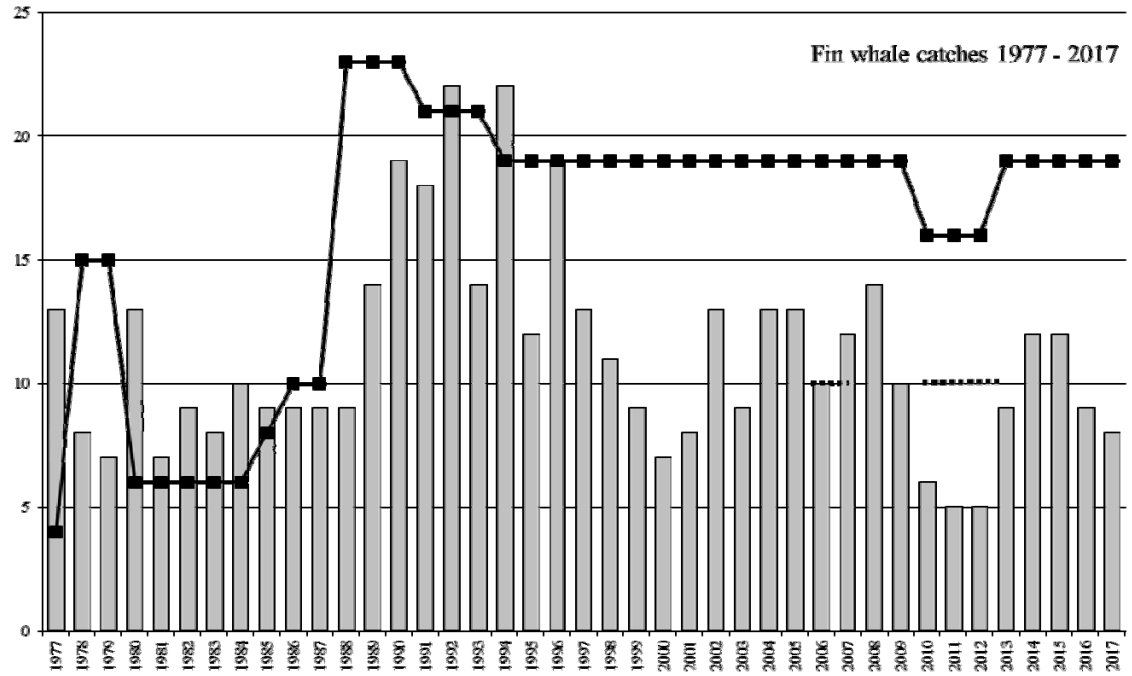


Figure 3. Catches of fin whales by Greenlandic whalers off West Greenland from 1976 to 2017. The black line shows the quotas, broken-up lines show the actual quota. The Government of Greenland voluntarily reduced the quota for 2006-2007 and 2010-2012 from 19/16 to 10 fin whales. Previous to 1976 Greenlandic whalers caught less than 5 fin whales per year. Source: Ministry of Fisheries, Hunting and Agriculture / Greenland Institute of Natural Resources.

The average catch has been 11 fin whales per year. The utilization in the last two quota blocks has remained stable with 2008-2012 of 47 % and in the quota block 2013-2017 of 53 %.

Common minke whale, West Greenland

The catches of minke whales remained low during the 1950s, but several boats acquired harpoon cannons during the 1960s and the catches off West Greenland increased to more than 200 whales per year. In 1968, small type whaling boats from Norway expanded their operation to include waters of East and West Greenland. During the early and mid-1970s, Norwegian catches off West Greenland averaged 175 minke whales per year. At that time, Greenlanders caught an average of 225 minke whales per year. After 1977, following recommendations by the IWC, the Norwegian catches were reduced to 75 minke whales per year (Kapel and Petersen 1982). The Norwegian boats stopped catching minke whales in Greenland in 1986 due to the moratorium.

A proliferation of outboard engines in the 1970s allowed hunters to take minke whales with rifles and hand held harpoons by cooperatively working from several skiffs (Kapel 1978). This type of whaling is called the "collective hunt", and is the only type of whaling carried out in East Greenland today.

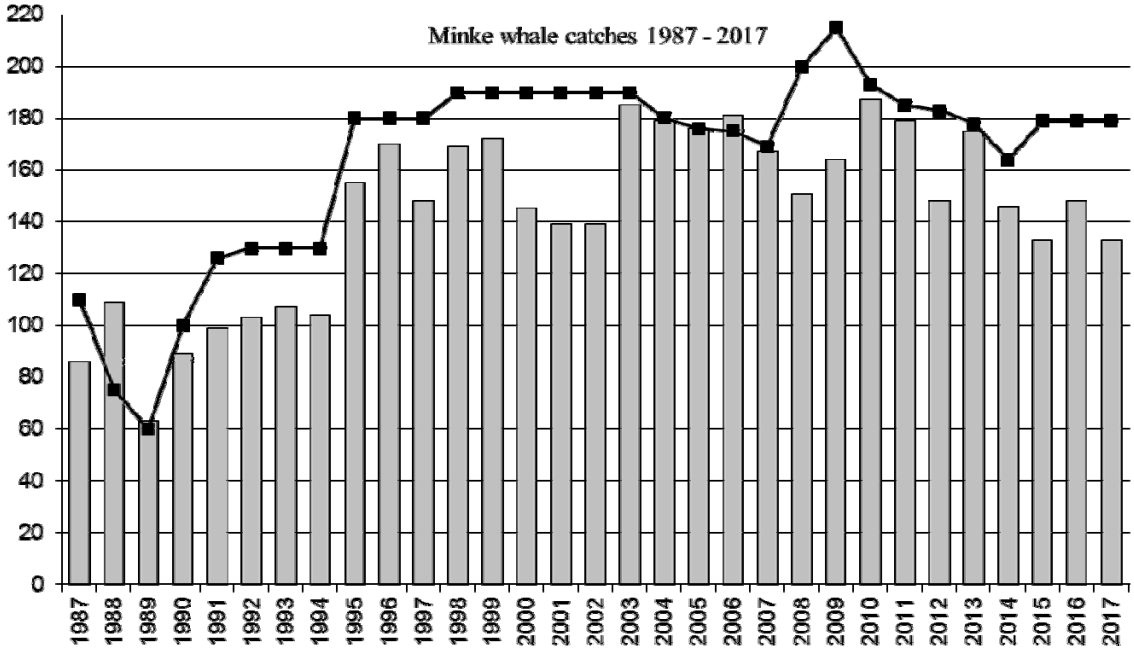


Figure 4. Catches of minke whales by Greenlandic whalers off West Greenland from 1987 to 2017. The black line shows the quotas including carry-over provision. The overrun from 2006 has been withdrawn from the 2007 quota. Previous to 1987, minke whales were caught both by Norwegian small type whalers and by Greenlanders. Source: Ministry of Fisheries, Hunting and Agriculture / Greenland Institute of Natural Resources.

Since 1975, catches of minke whales by Greenlanders are regulated by IWC aboriginal subsistence quotas. Until 1985, the quotas were higher than the average catches. Since 1986, the quotas for West Greenland have ranged from 60 to 200 minke whales per year, and

remained stable at around 175 whales per year since 1998 (with the exception of 2008-2009 having a quota of 200), with the possibility of carrying over up to 15 whales from one year to the next based on the advice from the Scientific Committee (figure 4).

The average catch has been 144 minke whales per year with quotas remaining stable at 164 since 2014. The utilization in the last two quota blocks has remained stable with 2008-2012 of 85 % and in the quota block 2013-2017 of 84 %.

Common minke whale, East Greenland

The quota for East Greenland has since 1986 been set at 12 minke whales per year, with the possibility of carrying over up to 3 whales from one year to the next based on the advice from the Scientific Committee (Rep. Int. Whal. Commn 37) (figure 5).

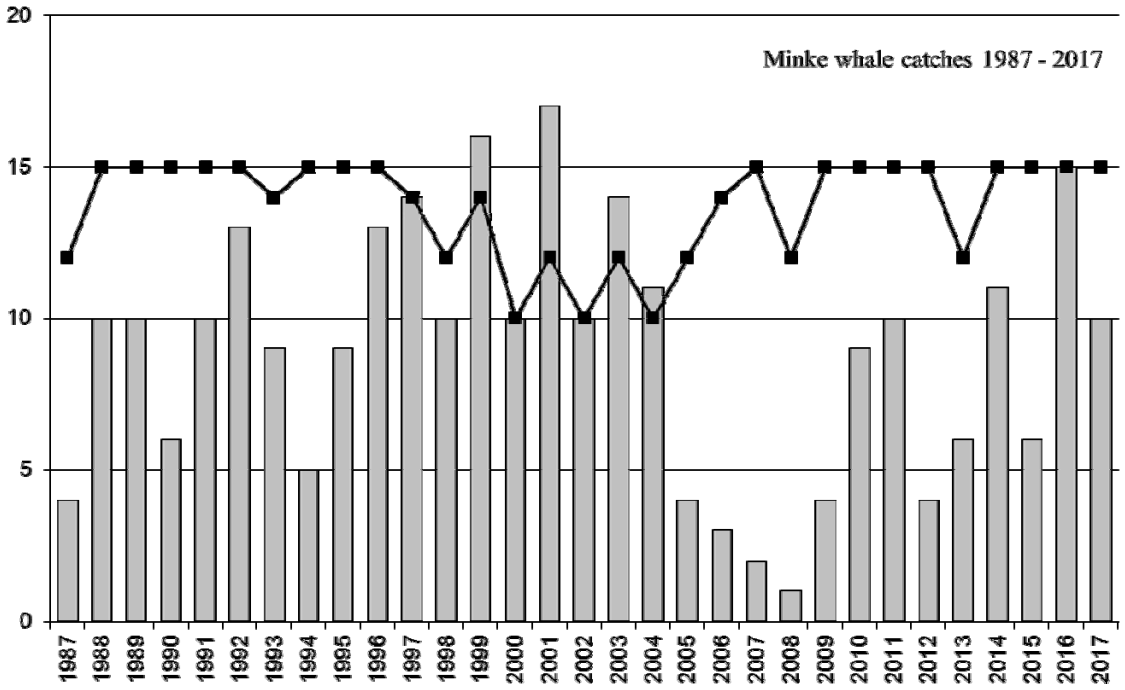


Figure 5. Catches of minke whales by Greenlandic whalers off East Greenland from 1987 to 2017. The black line shows the quotas including carry-over provision. Source: Ministry of Fisheries, Hunting and Agriculture / Greenland Institute of Natural Resources.

The average catch has been 9 minke whales per year since from 1987. The utilization in the quota block 2008-2012 was 39 % and in the quota block 2013-2017 it increased to 67 %.

Modernisation of the whaling fleet

In 1987, inspired by increasing concerns in the IWC regarding whale killing methods, the Government of Greenland sought for the assistance of Norwegian experts to perform experimental trials with exploding penthrite whale-grenade harpoons. Further trials were

carried out in 1988 and 1989. At that time, there were about 70 50mm harpoon cannons spread throughout West Greenland. Due to the poverty of the country, many of these harpoon cannons had been poorly maintained.

In 1990, the Home Rule Government launched a program to renovate these harpoon cannons and introduce the use of the exploding whale-grenade as a standard practice. The program finished in 1998. During this time, about 70 harpoon cannons were renovated and safely mounted on the bow of vessels.

These boats were combined fishing and hunting boats, used in all open water seasons to harvest a variety of fish, crustaceans, mammals and birds. Because of the flexibility of the hunting and fishing activities, and the opportunistic nature of the hunt, not all the boats equipped with harpoon cannon take part in the hunting of large whales each year. In 1999, at the end of the harpoon-cannon renovating program, 50 boats equipped with harpoon cannon participated in the hunt of large whales. After that, the number of boats that catch large whales has remained stable until 2017, oscillating between 29 and 45, with a median of 40 boats (figure 6).

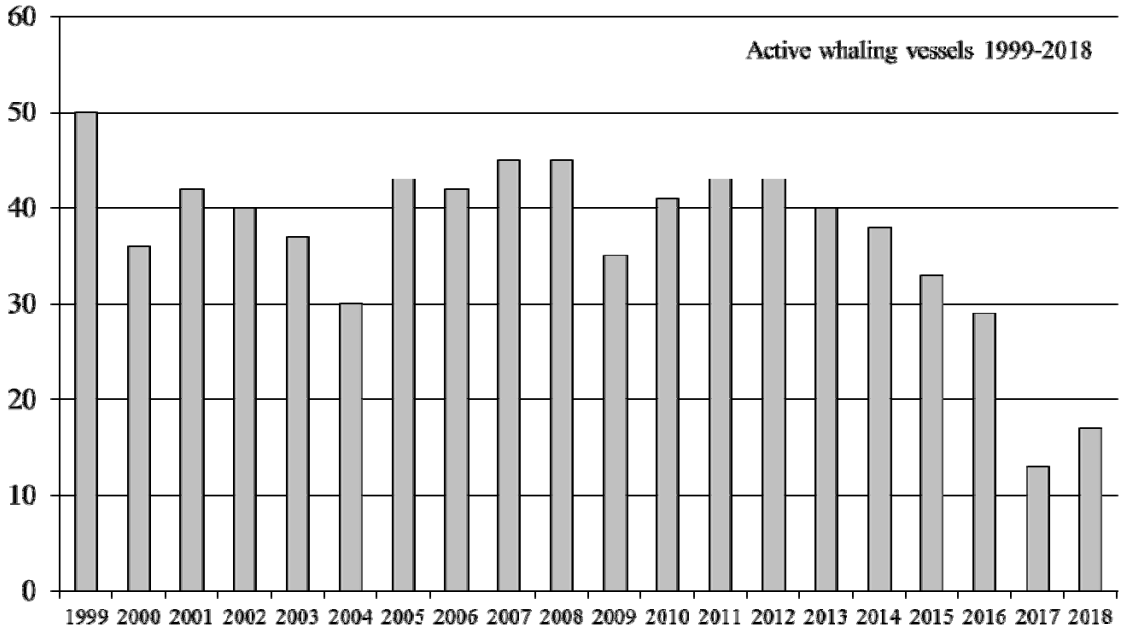


Figure 6. The number of boats actively hunting large whales from 1999 to 2018. The harpoon-cannon renovating program ended in 1998. Source: Ministry of Fisheries, Hunting and Agriculture.

4. Status of large Whales around Greenland

There are five species of the family balenopteridae, or rorquals, which can be regularly found in Greenland waters: common minke whale (*Balaenoptera acutorostrata*), fin whale

(*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae)*, sei whale (*Balaenoptera borealis*) and blue whale (*Balaenoptera musculus*). All five species migrate to southern breeding grounds during the winter and return to feed in the ice-free waters of Greenland during summer. The first whales are usually seen in March or April, and the last ones in December or January, but some individuals especially of fin and humpback whales may remain in Greenland waters throughout the winter. Except for the blue whale, all the species of this family are regularly seen off West Greenland. All five species are seen regularly off East Greenland.

Two species from the family balaenidae, or right whales, can be seen in Greenland waters: the North Atlantic right whale (*Eubalaena glacialis*) and the bowhead whale (*Balaena mysticetus*). The North Atlantic right whale is highly endangered. The only known population feeds during the summer in waters of northern US and southern Canada. Whales of this population are sometimes seen during summer in East Greenland and West Iceland. The bowhead whale can be found in Disko Bay and adjacent waters from around February until the break-up of the ice in April or May. Observations from Sisimiut up to Qaanaaq have in later years been reported by the hunters. Bowhead whales are also present in small numbers in Northeast Greenland.

The last species of large whale found in Greenland waters is the sperm whale (*Physeter macrocephalus)*, from the physeteridae family. Sperm whales are relatively abundant in deep waters of both West and East Greenland.

Surveys

The summer abundance of large whales in West Greenland waters is estimated by a series of aerial surveys that has been carried out starting in 1983, with the last three surveys being in 2005, 2007 and 2015 (Hiby 1985, Hiby *et al.* 1989, Larsen *et al.* 1989, Larsen 1995, Larsen and Hammond 2004, Heide-Jørgensen *et al.* 2008, 2010a,b, 2012, Hansen *et al. 2018*). The earlier surveys (prior to 2005) were conducted in the early summer, typically July, and they were often unsuccessful due to bad weather combinations with either calm weather and fog, or too strong winds and no fog. The later surveys were conducted later in the summer and early fall (August/September), and having less weather problems they have provided solid estimates for several species of whales, including common minke whales, fin whales, and humpback whales. The last survey in 2015 included also the waters off East Greenland.

A series of aerial winter surveys targeting beluga, narwhal, and bowhead whales have been conducted in West Greenland starting in 1981, with the last two surveys being carried out in 2006 and 2012 (Heide-Jørgensen *et al.* 2007; Rekal *et al.* 2015). These surveys provide a time series of sighting rates for bowhead whales in the Disko Bay area, and fully corrected estimates for 2006 and 2012. Mark-recapture estimates from biopsy sampling in the Disko Bay area have also provided comparable estimates by a different method (Rekal *et al.,* 2015).

Common minke whale

The last three surveys are fully corrected, estimating 10,790 (cv:0.59) common minke whales in 2005 in West Greenland, 9,070 (cv:0.39) in 2007, and 5,095 (cv:0.46) in 2015 (Heide-Jørgensen *et al*., 2008a, 2010a, Hansen *et al. 2018*). The 2015 estimate for East Greenland is 2,760 (cv: 0.47) (Hansen *et al. 2018*).

When the West Greenland estimates are included in a time-series of relative estimates that starts in 1984, we see a varying index with no apparent trend (Heide-Jørgensen and Hansen 2016). Similar fluctuations in the local abundance of common minke whales are known from other areas of the North Atlantic, with the coastal areas around Iceland being the best documented example (IWC, 2018b). This indicates a flexible geographical distribution, where the different summer feeding areas contain a varying fraction of the common minke whales in the North Atlantic. This is in agreement with genetic analyses that find a very week stock structure differentiation across the North Atlantic (IWC, 2018a). Common minke whales in adjacent areas are found to be very similar genetically, indicating the absence of strong stock boundaries. The site fidelity of "western" minke whales (i.e., East Canada and West Greenland) to the western area is estimated to lie somewhere between 55 and 80 percent, with the majority of the remaining whales being from the central North Atlantic (IWC, 2018a).

While the hypothesis of a week and variable stock delineation for common minke whales in the North Atlantic is well supported by data, there is a relatively large degree of uncertainty on the details of the mixing of animals in the different areas. The agreed strike limit algorithm (SLA) for common minke whales in West Greenland, and a constant annual take of 20 whales in East Greenland, were thus tested for a variety of trials that cover the potential range of plausible stock structure hypotheses. The advice for an annual take of 164 common minke whales in West Greenland, and an annual take of 20 in East Greenland, is therefore considered safe from a conservation point of view (IWC 2018d).

Fin whale

The last three surveys provide fully corrected estimates for the abundance of fin whales West Greenland: 9,800 (cv:0.62) in 2005, 15,960 (cv:0.72) in 2007, and 2,215 (cv:0.41) in 2015 (Heide-Jørgensen *et al*. 2008, 2010b, Hansen *et al. 2018*). The 2015 estimate for East Greenland is 6,440 (cv:0.26) (Hansen *et al. 2018*).

While the precision of the estimates from 2005 and 2007 is small, the estimates indicate a fluctuating abundance, and a somewhat similar stock structure scenario as for common minke whales. The genetic evidence for fin whales, however, is much weaker than for minke whales owing to fewer data from a smaller geographical range. In result, there are no direct estimates of the degree of stock delineation in North Atlantic fin whales.

The agreed SLA for fin whales in West Greenland was therefore tested for the two extremes of the potential range of stock structures. At one limit, there may be a single stock where the fluctuating abundance in West Greenland is caused a by a fluctuating partial presence of a single stock. At the other extreme, there may be a small stationary stock, with a variable influx from a larger North Atlantic stock. Being tested for both cases, the advice for an annual take of 19 fin whales in West Greenland is safe from a conservation point of view (IWC 2018d).

Humpback whale

The aerial survey in 2007 provided a fully corrected estimate of 2,700 (CV: 0.34) humpback whales off West Greenland (Heide-Jørgensen and Laidre 2013). The survey in 2015 estimated 993 (cv:0.44) humpback whales in West Greenland, and 4,220 (cv:0.44) in East Greenland (Hansen *et al., 2018*). Apart from these, there are four uncorrected line-transect estimates from aerial surveys from 1984 to 2005 (Heide-Jørgensen *et al*. 2008b), and four mark-recapture estimates of abundance from 1988 to 1992 (Larsen and Hammond, 2004).

Taken together the abundance estimates have shown an increasing trend in humpback whales off West Greenland (Witting, 2011), but also a somewhat fluctuating pattern as indicated by the decline from 2007 to 2015. These fluctuations are at least partly cause by temporal movements of whales between West and East Greenland, and West Greenland and East Canada as show by recent satellite tracking (Heide-Jørgensen pers., Boye, pers.).

The agreed SLA for humpback whales in West Greenland is tested under the conservative assumption that the number of whales that are counted in West Greenland comprise a single stock. The advice for an annual take of 10 humpback whales in West Greenland is therefore considered safe from a conservation point of view (IWC 2018d).

Bowhead whale

Since 1981, the Greenland Institute of Natural Resources has carried out a series of surveys to estimate the numbers of narwhals and belugas in West Greenland during spring. Bowhead whales are a secondary target of these surveys. A survey carried out in March and April 2006 provided a fully corrected estimate of 1,230 (CV: 0.47) bowhead whales in the Disko Bay (Heide-Jørgensen *et al.* 2007). A mark-recapture estimate based on biopsies taken in Disko Bay provide a similar 2012 estimate of 1,274 (CV: 0.12) whales (IWC 2014b, Rekal *et al.* 2015).

Satellite tracking and genetic analyses indicate that bowhead whales from the Eastern Canadian Arctic and Western Greenland form a single population, where whales move extensively and share common ranges in summer as well as in winter (Dueck *et al.* 2006, Postma *et al.* 2006, Heide-Jørgensen and Laidre 2006, 2007). The winter and spring aggregation of bowhead whales in West Greenland is only a fraction of the total population, for which there is an agreed estimate of 6,340 (cv: 0.38) bowhead whales in 2002 (Givens et al., 2009), and 6,446 (cv:0.26) in 2013 (Doniol-Valcroze *et al.*, 2015).

The agreed SLA for bowhead whales in West Greenland is tested under the conservative assumption that the number of whales that are counted in West Greenland comprises a single stock. The advice for an annual take of 2 bowhead whales in West Greenland is therefore considered safe from a conservation point of view (IWC 2018d).

5. Regulations and Monitoring

The Ministry of Fisheries, Hunting and Agriculture have authority in protection and management of Greenland's living resources locally and internationally, including commercially exploited fish species, terrestrial mammals, marine mammals, birds, recreational use of wildlife and trophy hunting/sport fishing. The Ministry of Nature and Environment have authority in nature conservation and environment.

In Greenland, there is no private ownership of land, sea or living resources. Hunting grounds and game animals are open to harvest and use by Greenlandic citizens, subject to hunting licenses. However, only persons with a full-time occupational hunting license are allowed to hunt large whales, and there are a number of important conditions and limitations, including those related to catch limits, methods of hunting, training and reporting. In addition to the Government of Greenland's executive orders there may also be additional local rules set by the municipality.

Hunting is regulated and administered by the Ministry of Fisheries, Hunting and Agriculture, and supervised by the Fisheries Licence Control Authority. Locally, a team of wildlife officers/wardens control hunting and coastal fishing activities, making sure that conservation measures of protected areas and species are observed, and passing on information to the local community. The wildlife officers work in close cooperation with the municipalities, the police, Arctic Command, and the Government of Greenland. In 2018, 6 wildlife officers and up to 10 assisting wildlife officers were employed nationally. Wildlife officers are operating on the west coast as well as on the east coast.

Legislation related to the hunting of large whales

The Government of Greenland has issued one act in 1999, with several amendments that affects hunting of all animals, including whales. Other acts that indirectly affect whaling include an act on animal welfare from 2003 and an act on nature protection from the same year (table 2).

In addition, there are 3 executive orders that directly affect the taking of large whales: one on maintenance and approval of harpoon cannons, one on the reporting of the hunt and one on the hunt itself. Furthermore, whaling is indirectly affected by an executive order that regulates the issuing of hunting certificates (table 2).

Table 2. Legislation used to regulate hunting of large whales in Greenland.

Type of legislation	Name of legislation
Greenland Home Rule Act	No. 12 of 29 October 1999 on Hunting No. 11 of 12 November 2001 on Revisions to Greenland Home Rule Act no. 12 of 29 October 1999 on Hunting No. 9 of 15 April 2003 on Revisions to Greenland Home Rule Act no. 12 of 29 October 1999 on Hunting No. 1 of 16 May 2008 on Revisions to Greenland Home Rule Act no. 12 of 29 October 1999 on Hunting No. 29 of 18 December 2003 on Nature Protection No. 25 of 18 December 2003 on Animal Welfare
Executive Order	No. 26 of 24 October 1997 on Extraordinary Check and Approval of Harpoon Cannons No. 28 of 30 October 1998 on the Tasks and Authority of Wildlife Officers No. 12 of 16 July 2010 on Reporting of Hunting and Strike of Large Whales, with a revised version expected finalized in May-June 2012. No. 13 of 30 December 2014 on Hunting Licenses for Full Time Hunters No.12 of 22 December 2014 on Protection and Hunting of Large Whales

The Home Rule Act on Hunting and its revisions have the goal to ensure a responsible and sustainable harvest of wild mammals and birds. There is a well-developed process for stakeholder participation in harvest management that includes the Organisation of Fishermen and Hunters (KNAPK), the municipalities, the Greenland Institute of Natural Resources and the Ministry of Nature and Environment. It also mentions that only persons with a hunting certificate can hunt, specifies the types of weapons that can be used for hunting and describes the mechanisms to choose leadership in the case of collective hunts. The Home Rule Act on Hunting gives authority to the Cabinet for regulating the hunting and protecting the wildlife under a specific framework.

The Home Rule Act on Nature Protection is aimed at ensuring the protection of animals and plants by protecting Greenland's nature in an ecologically sustainable basis, in accordance with the cautionary principle and with respect for the living conditions of the people.

The Home Rule Act on Animal Welfare aims at ensuring that all animals are handled in a responsible way and, as much as possible, are spared from unnecessary pain, suffering, fear, injuries and disadvantages.

The Executive Order No. 26 of 24 October 1997 on extraordinary check and approval of harpoon cannons establishes the requisites for installing and maintaining harpoon cannons in combined fishing and whaling boats. The goals of this executive order are to ensure that harpoon cannons mounted in whaling boats are safely installed, and adequate for using the exploding whale-grenade, which is the most efficient available weapon for killing whales.

The Executive Order No. 28 of 30 October 1998 on the Tasks and Authority of Wildlife officers equips the officers with the authority to monitor the hunts. It also gives them the task of coordinating the mercy killing of wounded, entangled or sick animals.

The Executive Order No. 13 of 30 December 2014 on Hunting Licenses for Full Time Hunters defines who can be accredited as a fulltime hunter. Permits for fulltime hunters are based on a number of criteria. The applicant must be a permanent resident of Greenland, having lived here for a minimum of two years over the last decade, and must establish that hunting is a primary source of income (at least half of the applicant's income must be based on hunting and small-scale fishing). The licences are issued by the Ministry of Fisheries, Hunting and Agriculture, but the Organisation of Fishermen and Hunters (KNAPK) is involved before permits are issued. This is relevant because only fulltime hunters can apply for licences to hunt large whales.

The Executive Order No. 12 of 16 July 2010 on Reporting of Hunting and Strike of Large Whales sets the guidelines for reporting both catches and struck and lost animals. The reporting system is described below in the section about monitoring and data collection.

The executive order on hunting of large whales

The core legislation dealing with hunting of large whales in Greenland at the moment is the Executive order No. 12 of 22 December 2014 on Protection and Hunting of Large Whales[1] (appendix I). This Executive order declares that all baleen whales and sperm whales are protected, with the exemption of minke whales, fin whales, bowhead whales and humpback whales, which can be taken following the rules specified in the executive order.

This executive order allows only for the hunt of adult whales that are not accompanied by immature animals. It also sets hunting seasons and defines rules for the merciful killing of whales that are injured, entangled in fishing gear or captured in ice entrapments.

The executive order places restrictions on the size and the type of boats that can be used for the taking of large whales. It also regulates the type of harpoon cannons allowed, specifies who should mount, examine and approve these cannons and demands that harpoon cannons should be examined and approved every other year.

1 This executive order is a revision of earlier versions of this executive order, which dates back to 1979.

The executive order specifies that only persons with licence can hunt large whales. Only full-time hunters that have taken a special course on handling and use of whale-grenades, and whose boat and equipment have been approved can apply for licences. The executive order outlines a control system that limits sales of whale-grenade to hunters that have taken the whale-grenade course, and have a licence valid for the running year.

Licenses for collective hunt of minke whales can be given in places where the local boats equipped with harpoon cannon cannot satisfy the demand of fresh meat. Only full-time hunters that own skiffs and do not have access to boats with harpoon cannon can apply for Licenses for the collective hunt. There are further regulations concerning the equipment necessary on-board the skiffs and the minimum amount of skiffs that can participate in a collective hunt.

Failure to comply with the executive order can result in a fine and in confiscation of the hunt and of the hunting equipment.

Quota system

Whaling in Greenlandic waters is the competence of the Government of Greenland and is managed by the Ministry for Fisheries, Hunting and Agriculture. The management and hunting of living resources are based on scientific advice.

The quota year follows the calendar year with different hunting periods: minke whale 1 March to 30 November, bowhead whale 1 April to 31 December, fin whale and humpback whale 1 January to 31 December.

Catch limits set by the IWC apply to all four large whale species taken in West Greenland and one large whale species in East Greenland. Thereafter, according to the executive order on hunting of large whales, the Ministry of Fisheries, Hunting and Agriculture decides the maximum number of large whales that can be taken from each municipality. This decision is taken every year after consulting with the municipalities and with the hunter's organisation. The municipal authorities provide numbered licences that allow the owner to hunt whales with a specified boat during the running year.

Since 1994, the fin whale quotas and in 2018 the humpback whale quotas have been set "free" internally in West Greenland, meaning that quotas are not allocated to any specific municipalities. Hunters who have obtained a licence to take one of these whales can hunt freely until the Ministry of Fisheries, Hunting and Agriculture stop the hunt, when the catches approach the quota. This system has worked satisfactorily.

At the beginning of the season, about 25 % of the quota for minke whales for West Greenland is distributed among the municipalities to be used in the collective hunt. The municipality

has the responsibility to allocate this quota among the settlements where there are not enough boats with harpoon cannon.

As a rule, the quotas for minke whales taken with harpoon cannon are also set free in March, at the beginning of the season and redistributed during August or September, depending on the progress of the hunt. In some years however, a proportion of the Greenland quota is distributed through fixed quotas among the municipalities at the beginning of the season, and the remaining Greenland quota is distributed later during the season.

The Ministry of Fisheries, Hunting and Agriculture stops the hunt of minke whales when the catches approach the quota. This is usually between September and December. The Ministry of Fisheries, Hunting and Agriculture can reduce the quota for the running year, or for the following year, if the quotas have been exceeded. Other factors that may lead to redistribution of quotas, or the moving or cancelling of licences include quota overruns, incorrect reporting and the infraction in the taking of whales of protected species[2]. The Ministry also coordinates and is in cooperation with the municipalities on a redistribution of the quotas, if the allocated municipal quotas are not reached during the early fall season.

As a rule, the current system works satisfactorily. The catch progress of the quota block 2013-2018 has been followed thoroughly by the Ministry of Fisheries, Hunting and Agriculture and no overrun has taken place for any of the four species. There have been changes of the quotas during this 6-year period decided by the IWC (IWC 65: humpback whale and minke whale).

Because whalers are a combination of hunters of large whales, hunters of other species and fishermen, the hunters have to evaluate a complex number of factors before setting out to catch large whales. These factors include weather conditions, seasonal variations in the availability of whales and time available for other activities such as fishing for snow crab, salmon and a number of fish species that are regulated by quotas, fishing seasons and market forces. Finally the hunting season for caribou and muskoxen can play an important role. This explains why some years the quotas for large whale are not fully utilised (figures 1-5).

Monitoring and data collection

The hunt is monitored by the local authorities and by wildlife officers. Furthermore, it is possible to control the fate of all whale-grenades, which are marked with unique serial numbers and distributed under a tightly regulated system. The Ministry of Fisheries, Hunting and Agriculture gathers information and follows the development of the hunt

2 Executive order number 12 of 22. December 2014 on Protection and Hunting of Large Whales

through a self-reporting system, where a slight increase in most data reporting categories can be seen from the quota block 2008-2012 to the quota block 2013-2018 (figure 7).

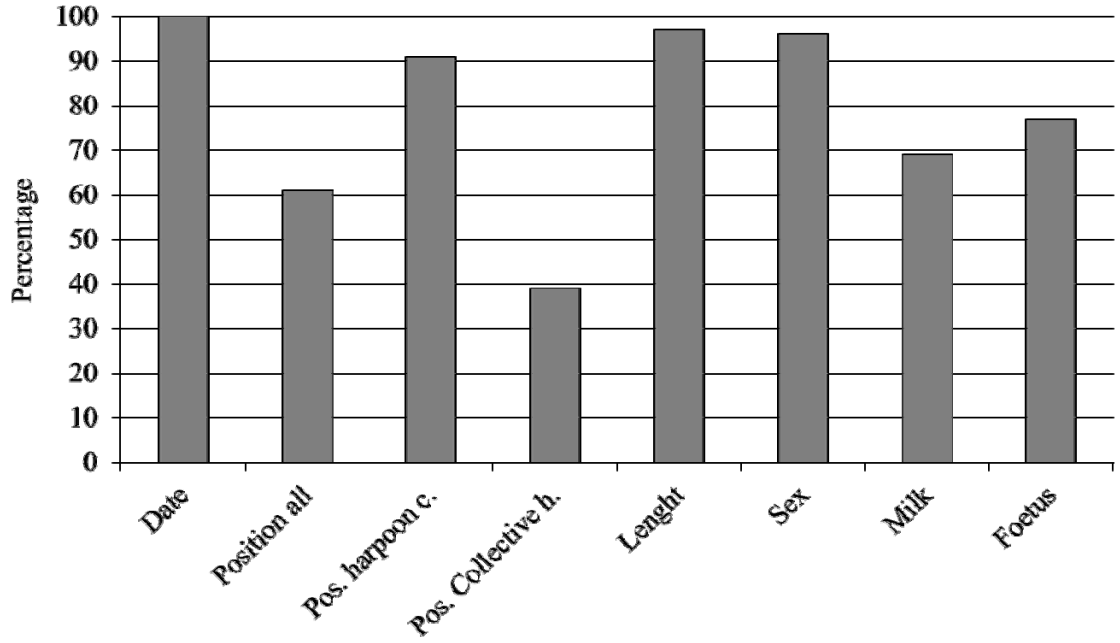


Figure 7. Proportion of the large whales caught in 2013 to 2017 for which information about the following items was clearly reported: Date when whales were caught; position where whales were caught for all catches pooled; position where whales were caught by boats with harpoon cannon; position where whales were caught in the collective hunt; length of the whales; sex of the whales; females for which data on lactation state was given; females for which information on presence/absence of foetus was given. N = 861 large whales. Note: This figure shows only a selection of biological parameters, catch reports contain more information than what is outlined here. Source: Ministry of Fisheries, Hunting and Agriculture.

As mentioned above, licences are required for the killing of large whales. The product of a catch cannot be sold before the municipal authorities have registered the hunt and stamped the licence. In order to obtain a stamp, whalers must show the receipt for the purchase of the whale-grenade, as well as the used whale-grenade with serial number. Any sale of edible products is forbidden until the licence is stamped. If the catch happens at the weekend, it must be reported on Monday. When the municipality sees that the local quota is almost reached, it informs the Ministry of Fisheries, Hunting and Agriculture, and the time to stop the overall hunt is announced through a media release.

In the small communities of Greenland, it would be difficult to kill, flense and distribute a large whale without the local people and authorities noticing and asking for the relevant licence. In addition, wildlife officers, where available, monitor the hunt by making random

checks in the field and in the open air markets, where the hunters sell their products – catch of the day.

After a whale has been caught, the hunter has the obligation to deliver a catch report to the municipal authorities. This catch report was designed to collect the information described in section IV of the Schedule of the International Convention for the Regulation of Whaling, 1946 (IWC 2006). It includes operational information about the hunter, his license, boat, etc., as well as data about biologically relevant items such as the place where the animal was caught, the approximate size of the animal, sex, reproductive state of females, stomach contents, weight of meat products etc. The report also includes information about the hunting method, including descriptions of the weapon used to kill the animal, serial number of the whale-grenade and estimated time to death.

Although it is obligatory to present a catch report, this is a self-reporting system, since there is no external control over the accuracy of the data provided by the hunters. Not all hunters are able to provide information on all items included in the catch report (figure 7). For instance, only hunters who own a GPS (Global Positioning System) provide with latitude and longitude. Hunters without access to a GPS write the local name of the place where the whale was hunted. This explains the low reporting of geographical data from the collective hunt (figure 7).

Hunters deliver their catch reports to the municipal authorities, together with tissue samples stored in a saturated saline solution. This information is forwarded to the Ministry of Fisheries, Hunting and Agriculture, where it is stored as a hard copy and entered into an electronic database. The tissue samples, together with copies of their associated catch reports are sent to the Greenland Institute of Natural Resources. The Greenland Institute of Natural Resources and the Ministry of Fisheries, Hunting and Agriculture share information and cooperate in the validation of the electronic database. The Greenland Institute of Natural Resources uses the data for biological studies (e.g. Simon *et al* 2007a, 2007b; Witting 2007a, Witting and Schweder 2007). The Ministry of Fisheries, Hunting and Agriculture uses the catch reports to monitor the hunt and to provide information requested by the IWC (e.g. appendix IV) and /or The North Atlantic Marine Mammal Commission (NAMMCO).

The Ministry of Fisheries, Hunting and Agriculture also present annual hunting statistics, based on the statutory reports of catches by all hunters, in the information folder *Piniarneq*. The *Piniarneq* is sent to all licence holders and also made available online by the Government of Greenland.

International observers that report to the NAMMCO Inspection and Observation Committee have monitored the hunt of large whales in Greenland a number of times, most recently in 2014.

6. Animal welfare: hunting methods, time to death and loss rates

The IWC Convention and the Schedule do not contain rules relating to ASW in regard to animal welfare issues. IWC rules only outlaw the cold harpoon in the commercial hunt for whales. The Government of Greenland has, nevertheless, on voluntarily basis introduced comprehensive regulation and information requirements in order to address the question of animal welfare. An explanation (below) of the Greenlandic animal welfare system will aid in understanding the extent of this system.

Every effort should be made to avoid causing unnecessary distress to living animals. This principle is brought into the legislation in Greenland by the Home Rule Act on Animal Welfare (table 2).

In the case of whaling, the main goal from an animal welfare point of view is to cause death as quickly as possible. An ideal situation is when the whale is killed instantaneously. However, when hunting a large mammal in the wild, this goal may be difficult to attain in some situations. Another important goal of whaling is to ensure that as many of the wounded animals are killed and landed. The proportions of animals that are struck but lost (S/L) are also known as "loss rates" and can be used in describing the efficiency of the hunt.

In order to monitor the welfare aspects in the hunting of large whales, Greenlandic whalers report the time passed between the first hit and the moment when the whale is considered to be dead or unconscious. This will often result in higher times because the hunter's main focus will be on the hunt it-self (see also the paragraph on time to death, page 58). This period of time is technically known as Time to Death, or TTD. In addition, hunters are required to report all incidences of large whales that were struck but lost.

Time to death and loss rates depend on the species being hunted and on the method used to hunt the animal. There are three types of hunting of large whales in Greenland: hunting of fin whales, bowhead whales and humpback whales with harpoon cannon, hunting of minke whales with harpoon cannon and the collective rifle hunt for minke whales.

Vessels with harpoon cannon

Vessels with harpoon cannons (e.g. plates II and III) take minke, fin, humpback and bowhead whales. Not all local communities have a vessel with harpoon cannon (since 2004, 3 out of 15 communities in West Greenland have never had this option: This is the 3 most northern communities: Qaanaaq, Upernavik and Uummannaq). In recent years, of the approximately 50 fishing vessels equipped with harpoon cannon, some 35-45 are generally approved for hunting and active in whaling during the season. Gunners must be trained and formal approval of the harpoon cannon is mandatory and required every second year.

Courses are provided in the use of the harpoon cannon and whale-grenade and are compulsory to obtain a licence for the hunting of large whales.

The size of the vessels varies (9-20 m) with 75 % < 15m. A 30 foot (9m) vessel is required for minke whale hunting and 36 foot (11m) vessel for fin whale, humpback whale and bowhead whale hunting. Crew size also varies from around 4 to up to 7. The vessels operate opportunistically and seasonally i.e. they are not full-time whaling vessels but are also fishing vessels and crew members may also have other seasonal employment. The monthly distribution of catches of minke whales by the harpoon hunt has a peak from June-October while for fin whale it is August to September. Bowhead whale is caught in April-May, and humpback from April-December.

Hunting generally occurs in good sea conditions only (<Beaufort 3) as the main method of hunting is stealth. Trips generally last less than 24 hours and once a vessel has caught a whale it tows it to the nearest suitable flensing site. Hunting usually occurs within 60n.miles of the home port of the vessel and depending on conditions up to 10n.miles offshore.

Fin whales with harpoon cannon[3]

Fin whales are caught in West Greenland, south of Uummannaq. They are caught either by two boats of a minimum length of 30 ft. working together, or by one boat of a minimum length of 36 ft. Each boat should be equipped with one certified harpoon cannon, which is checked every second year.

The primary weapon is a harpoon with the Norwegian penthrite "Whale Grenade 99". This whale-grenade was originally produced for hunting minke whales, and it has been modified for the hunt of fin whales by extending the length of the triggering cord and an increase in the amount of explosives.

The triggering cord is a string with one end attached to the detonator and the other end attached to a small hook. This hook anchors itself to the skin of the whale and, as the harpoon penetrates the body of the whale, the triggering cord unfolds until it tenses and initiates the detonation of the whale-grenade. This way, the whale-grenade explodes deep inside the body cavity of the whale at a depth applicable to the anatomy of the specific whale species.

The harpoon with the whale-grenade is fired with a 50mm Kongsberg cannon. The harpoon is attached to a forerunner, which is in turn attached to a winch in the boat. The secondary weapon is the same as the primary weapon and is required ready before the hunt starts in

3 Executive order number 12 of 22. December 2014 on Protection and Hunting of Large Whales

each participating boat. Gunners shoot in the heart and lungs region by aiming at an area close to the pectoral fins.

Bowhead whale with harpoon cannon[4]
Bowhead whales are caught in West Greenland in the Disko Bay area. They are caught by three boats of a minimum length of 36 ft. working together. Each boat should be equipped with one certified harpoon cannon, which is checked every second year.

The primary weapon is a harpoon with the Norwegian penthrite "Whale Grenade 99" being modified for the hunt of bowhead whales by extending the length of the triggering cord and with a larger amount of explosives.

The harpoon with the whale-grenade is fired with a 50mm Kongsberg cannon. The secondary weapon is the same as the primary weapon and is required ready before the hunt starts in each participating boat. Gunners shoot in the heart and lungs region by aiming at an area close to the pectoral fins.

Humpback whale with harpoon cannon[5]
Humpback whales are caught in West Greenland south of Uummannaq. They are caught by one boat of a minimum length of 36 ft. The boat should be equipped with one certified harpoon cannon, which is checked every second year.

The primary weapon is a harpoon with the Norwegian penthrite "Whale Grenade 99" being modified for the hunt of humpback whales by extending the length of the triggering cord and with a larger amount of explosives.

The harpoon with the whale-grenade is fired with a 50mm Kongsberg cannon. The secondary weapon is the same as the primary weapon and is required ready before the hunt starts in each participating boat. Gunners shoot in the heart and lungs region by aiming at an area close to the pectoral fins.

Minke whales with harpoon cannon[6]
The majority of the minke whales are taken by this method (figure 10). Minke whales are caught with harpoon cannon in West Greenland, south of Uummannaq. The boat length is 30-70 ft. The harpoon cannon used to hunt minke whales should be certified and checked every second year.

4 Executive order number 12 of 22. December 2014 on Protection and Hunting of Large Whales
5 Executive order number 12 of 22. December 2014 on Protection and Hunting of Large Whales
6 Executive order number 12 of 22. December 2014 on Protection and Hunting of Large Whales

The primary weapon is a 50mm Kongsberg harpoon with the Norwegian penthrite "Whale Grenade 99". The gunners aim at an area close to the pectoral flippers, in order to damage the heart and surrounding areas.

The secondary weapon is either a harpoon with the "Whale grenade 99", or rifles of a minimum calibre of 7.62 mm (30.06) and full mantled bullets. Some hunters use solid round-nosed bullets together with rifles with higher calibre (.375), due to their better penetration. Rifle shots are aimed at the neck, in the back of the animal's head.

Plate II. Examples of harpoon cannon vessels in Greenland. (Photo: Greg Donovan).

Plate III. Examples of harpoon cannon and whale-grenades in Greenland. (Photo: Greg Donovan).

Collective minke whale hunt

The collective minke whale hunt takes place in settlements where there are no boats with harpoon cannons or where there is not a food sufficient supply of products from large whales from vessels with mounted harpoon cannon. The collective minke whale hunt is the only hunt of large whales in areas with little infrastructure, such as East Greenland and West Greenland north of Disko Bay.

A minimum of 5 skiffs have to participate in the hunt, normally up to 8-10 small (usually around 6m and never more than 9m) vessels equipped with outboard motors (plate IV). Each boat generally contains around 2-4 people. Boats of larger size without harpoon cannon can also take part, but not as the leading boat. These are usually small fishing boats. Each boat has to be equipped with at least one hand harpoon with line and buoys. This harpoon is attached to the whale at the first opportunity, to prevent the animal from sinking. During the course of the hunt, hunters attempt to herd the whale towards shallow and inshore waters.

The weapons of the collective minke whale hunt are rifles of a calibre of 7.62 mm. (30.06) or larger and full mantled bullets. As a rule, the whales are first wounded and then secured with the hand harpoons. When possible, the hand harpoon is used before wounding the animal. One hunter is designated the leader and it is his task to secure the animal with the hand harpoon. Once a whale has been secured, it is killed by shoots aimed at the neck.

Round-nosed solid bullets together with rifles with higher calibre, such as .375, are often used to kill the whale. As for the harpoon hunt, the animal is towed to the nearest suitable flensing site and whaling can only occur in good weather conditions (<Beaufort 3). The economic costs of such hunting are less than those of a harpoon vessel (although the number of participants requiring a share is greater and the amount available for distribution and sale is less). Again, this is a seasonal activity for the hunters. The peak season is from July-September

Plate IV. The rifle hunt: a common minke whale caught and brought to a flensing site in 2008 (Photo: Leif Fontaine).

Distribution of whale products

At the first high tide after a hunt, whale carcasses are usually dragged into shallow waters, where they are flensed during low tide. Thereafter, the meat and other edible products are distributed among those who participated in the hunt and in case of a surplus; this can be sold at the local market. In three of the more isolated communities in West Greenland, only rifle hunting occurs and thus only common minke whales can be taken; in such cases all products are consumed within the village. In the other communities where multiple species can be taken, products are distributed via direct sharing, bartering or sales at local open markets *Kalaalimineerniarfiit* and in some cases, transportation and sales to other towns and settlements that do not have direct access to whale products or for which there is a shortage.

This may be via a co-operative supermarket chain or two distribution companies that are partially owned by the Government of Greenland; Greenland is a very large island and any sharing is within Greenland. No export of whale products is allowed. Sometimes, the meat is also sold directly to institutions, such as hospitals or nursery homes, when the Veterinary authority has given the necessary permission. In East Greenland the minke whale hunt is only possible with skiffs and small vessels with the same distribution methods as described above.

Time to death, instantaneous death and loss rates

A whale is considered dead when it stops swimming, it does not move and its flippers are still. In practice, it can be difficult to estimate the exact moment of death or unconsciousness because fin and minke whales tend to sink as soon as they are dead. Often, the whale is considered dead or unconscious when it has sunk and the harpoon lines attached to the whale show no signs of movement. The presented Greenlandic data on TTD is biased high for those hunts where the TTD are estimated by the hunters and are not corrected by post-mortem examinations (NAMMCO 2015).

In the case of hunts with harpoon cannon, reasons for longer than average times to death include malfunction of equipment (whale-grenades failing to explode, ropes breaking, etc.) and inaccurate shots. Deterioration of weather conditions may lead to unsuccessful or difficult catches.

For collective hunts, unusual long times to death are caused by factors such as whales swimming offshore and weather deteriorating.

For all hunts, long times to death increase the risk of wounded animals escaping before being secured. Both fin and minke whales tend to sink when dead, and therefore a relatively common cause for losing the animals is when dead whales sink before they have been secured properly.

Table 3. Time to death, instantaneous death and loss rates for each type of hunt, from data reported by hunters in 2013-2017 (N = 816-862 reports). The maximum times to death for the hunts with harpoon cannon correspond to situations when the forerunners broke, the wounded animals escaped and it took a long time to recapture them. Source: Ministry of Fisheries, Hunting and Agriculture.

	Harpoon cannon fin whale	Harpoon cannon minke whale	Collective minke whale hunt	Harpoon cannon humpback
Number of reports TTD - S&L	44 - 8	325 - 5	422 - 16	25 – 0
Average TTD	17 minutes	4 minutes	27 minutes	18 minutes
Median TTD	8 minutes	1 minutes	21 minutes	13 minutes
Maximum TTD	71 minutes	24 minutes	264 minutes	54 minutes
Percentage of whales killed within 1 minute	39 %	55 %	3 %	16 %
Percentage of whales killed within 5 minutes	48 %	78 %	10 %	48 %
Loss rate (% of struck animals that are lost)	10 %	0 %	4 %	5 %

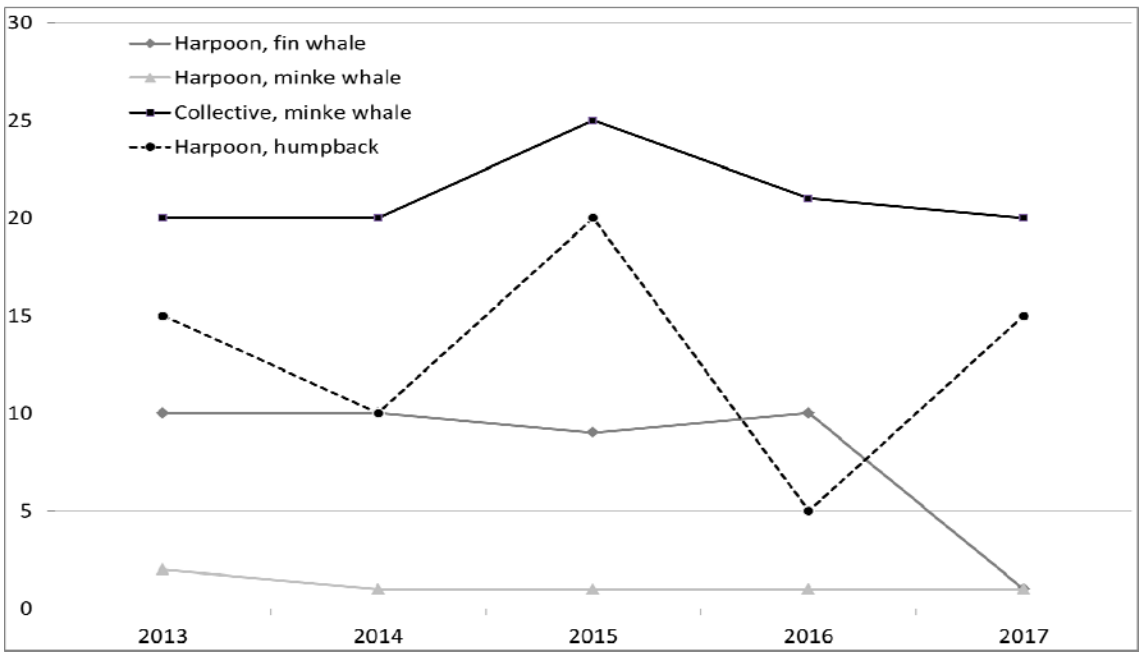


Figure 8. Median time to death in minutes for fin whales (diamonds), minke whales taken with harpoon cannon (triangles), minke whales taken in the collective hunt (squares) and humpback whales (circles) from 2013 to 2017. N = 816 catch reports with recorded TTD. Source: Ministry of Fisheries, Hunting and Agriculture.

In this quota block reports show faster times to death compared to the previous quota block with median times to death annually ranging between 1 - 10 minutes for the fin whale hunt, 1 - 2 minutes for the minke whale hunt with harpoon cannon, 20 - 25 minutes for the collective hunt and 5 – 20 minutes for the humpback whale hunt with harpoon cannon (figure 8 and table 3).

In the present quota block, loss rates have ranged between 0–17 % for the fin whale hunt, 0–1 % for the minke whale hunt with harpoon cannon, 2–8 % for the collective hunt and 0–14 % for the humpback whale hunt (figure 9 and table 3).

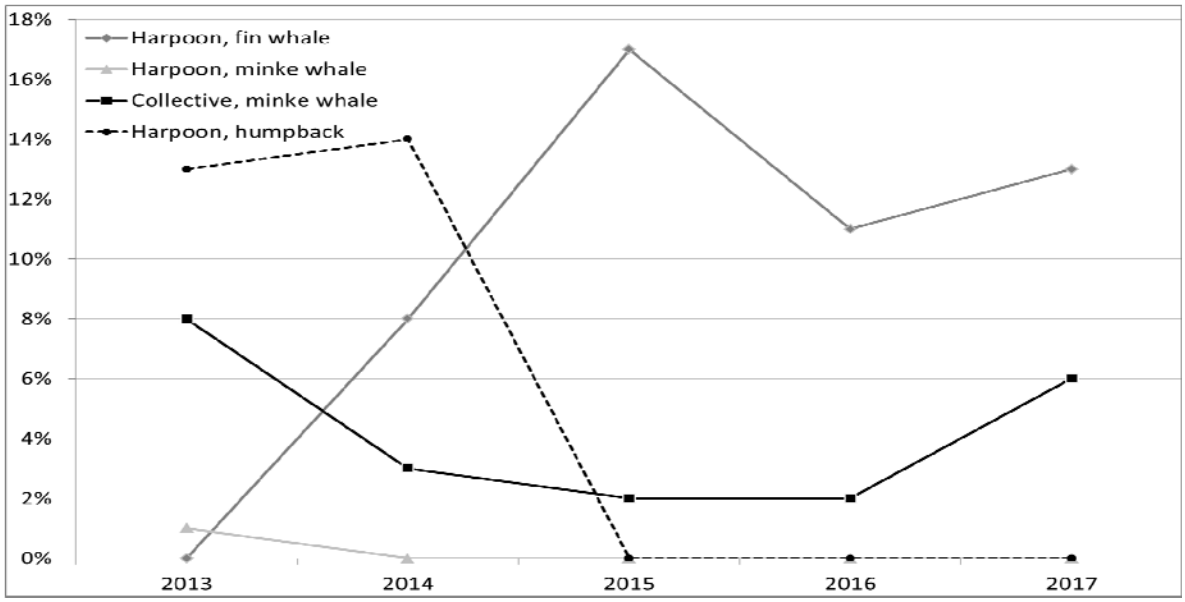


Figure 9. Loss rates in percentage for fin whales (diamonds), minke whales taken with harpoon cannon (triangles), minke whales taken in the collective hunt (squares) and humpback whales (circles) from 2013 to 2017. N = 862 catch reports. Source: Ministry of Fisheries, Hunting and Agriculture.

From 2013 to 2017, instantaneous death rates, defined as the proportion of whales dying or losing consciousness within one minute after being wounded, were 39 % for the fin whale hunt, 55 % for the minke whale hunt with harpoon cannon, 3 % for the collective hunt and 16 % for the humpback whale hunt (table 3).

Because instantaneous death is difficult to achieve when hunting wild animals, it may be relevant to consider also the proportion of animals that die within five minutes after being struck for the first time. From 2013 to 2017, this proportion was 38-67 % for the fin whale hunt, 68-91 % for the minke whale hunt with harpoon cannon, 7-17 % for the collective hunt and 33-60 % for the humpback whale hunt (table 3).

The majority of large whales hunted in Greenland are whales taken with harpoon cannon. As we can see from table 3 and figures 8 and 9, this type of hunt is characterised by a

relatively low TTD and a low loss rate especially for minke whales. Improving hunter's skill through training with harpoon cannon may be a way to keep the instantaneous death rates of whales taken with harpoon cannon at the current levels or lower. Training with rifle as secondary weapon for minke whales, and continued experiments with different types of newly available ammunition may help to further reduce the killing time of minke whales that do not die instantly.

Fin whales are particularly difficult to hunt because of their large size and fast swimming speed. On November 2006, the North Atlantic Marine Mammal Commission (NAMMCO) organised a workshop to Address Problems of "Struck and Lost" in hunts of marine mammals (table 5). In February 2010, NAMMCO arranged a new meeting the "Expert Group on assessment of whale killing data for large whales". One of the conclusions of the workshop was that the hunting of the three largest whales could be improved by modifying the Norwegian penthrite "Whale Grenade 99" for fin whale to include added explosive power, which was done later in 2010. At the second NAMMCO "Expert Group on assessment of whale killing data for large whales" in 2015 improvements were reported for the majority of TTD data and struck and lost rates, which is a continued trend in this quota block.

Of the methods used to catch large whales in Greenland, the collective hunt has the longest TTD and the next highest rate of struck and lost animals. TTD could be improved by changing the type of ammunition or increasing the calibre of the rifles. However, more effective weapons may lead to animals dying and sinking before they can be secured with hand-harpoons attached to lines and floats; a reduced TTD may lead to an increased struck and lost rate.

The collective hunt is vital for the food security and survival of several hunters and their families, and is especially important in the more remote settlements of Greenland, where there are no boats that can hunt large whales with harpoon cannon. Therefore, any measures to improve the killing methods used in the collective hunt should take the hunters into consideration and should be economically viable.

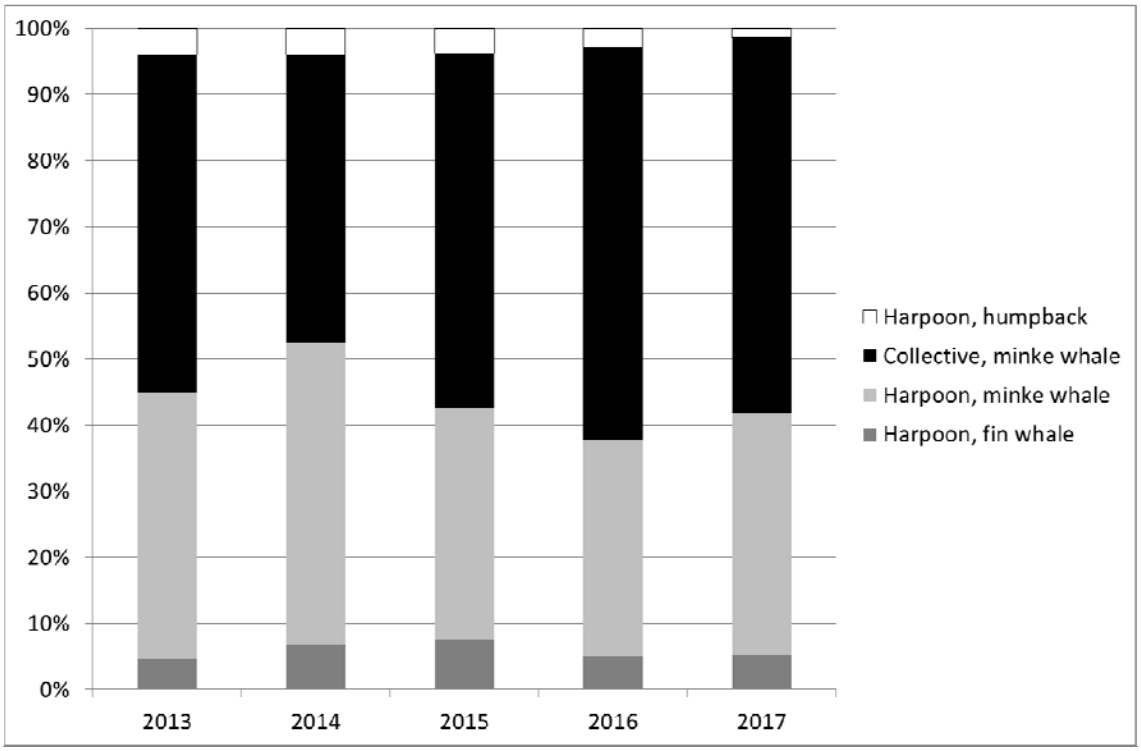


Figure 10. Percentage of whales taken by the different types of hunt from 2013 to 2017. Top: humpback whales with harpoon cannon. Middle, top: minke whales in the collective hunt. Middle, bottom: minke whales with harpoon cannon. Bottom: Fin whales with harpoon cannon. (N = 862 whales). Source: Ministry of Fisheries, Hunting and Agriculture.

Measures to reduce animal suffering

In 1997, the IWC adopted the resolution 1997-1 on improving the humaneness of aboriginal subsistence whaling (IWC 1997). In response, the Greenland Home Rule Government took a number of initiatives, including improved legislation (table 2) and organization of conferences and workshops (table 5).

In addition, the Government of Greenland works towards improving the animal welfare aspects of hunting large whales by promoting the use of detonating whale-grenades. As mentioned earlier, this work was boosted by a harpoon-cannon renovating program that finished in 1998 and has been supplemented annually with courses in the handling, use and storage of whale-grenades and maintenance of the equipment.

Maintaining and running a vessel used in whaling has inherent expenses over and above those of running an ordinary vessel. This is primarily due to the regulations that require the use of explosive whale-grenade harpoons in order to maximize the humaneness of the hunt. The use of penthrite whale-grenades became mandatory for all the boats equipped with harpoon cannons in 1991. Currently, it is obligatory to use the Norwegian penthrite "Whale Grenade 99", which is the globally best available weapon for killing large whales. This

whale-grenade is relatively expensive and the Government promotes its use by subsidising part of its cost.

A harpoon cannon itself (essentially a one-off purchase) costs around US$60,000 while the shot of an individual whale-grenade costs as much as US$1,200. Other expenses of course, include fuel, maintenance and crew salary if outside the family. The mixed distribution system enables the hunters to meet these costs.

In order to secure the safety of the hunters, and ensure that the whale-grenade is optimally used, a special course is obligatory in order to buy, handle and use whale-grenades. Whale-grenades can only be purchased after showing the certificate of this course, together with the licence for whaling. Licences for taking whales with harpoon cannon are given only to boat owners who have taken the course, or have at least one member of their crew who has taken the course.

The current whale-grenade courses are organised by the Organisation of Fishermen and Hunters (KNAPK) in cooperation with the Ministry of Fisheries, Hunting and Agriculture and take place one or more times per year, depending on demand (table 4). The program of the course includes the mechanics of the "Whale grenade 99", security aspects, mounting of harpoon, storage and handling of the whale-grenade, as well as operation of the harpoon cannon and new regulations if needed.

Table 4. Courses on the handling and use of the Norwegian penthrite "Whale Grenade 99", as well as number of hunters, wildlife officers and distributors of the whale-grenade that participated 2008-2017. Skippers or crew members representing all boats equipped with harpoon cannon were taught in the courses from the year 2000. Courses on the use of a previous model of the penthrite whale-grenade were already held since 1991.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No. of courses	8	2	1	1	2	3	0	1	0	0
No. of people trained	69	12	8	10	15	23	0	3	0	0

Table 5. Conferences and workshops relevant for improving the humaneness of whaling, which have been organised or co-organised by the Government of Greenland after the IWC adopted the resolution 1997-1 on improving the humaneness of aboriginal subsistence whaling (IWC 1997).

Date	Place	Event
9 - 11 October 1998.	Nuuk, Greenland.	**Seminar on renewable resources** Topics: future ways for sustainable harvest, the situation of the living natural resources, hunting ethics, sharing the resources, etc. Participants: hunters, resource managers, scientists and politicians
9 - 11 February 1999	Nuuk, Greenland	**NAMMCO Workshop on Methods Used for Hunting Marine Mammals** Topics: review of existing marine mammal hunting methods and examination of possibilities for technical innovation. Participants: hunters, resource managers and scientists.
12-15 November 2001	Sandefjord, Norway	**NAMMCO Workshop on Marine mammals: Weapons, Ammunition and Ballistics** Topics: review of existing marine mammal hunting methods and examination of possibilities for technical innovation. Participants: hunters, resource managers and scientists.
4 - 7 January 2003	Reykjavík, Iceland	**NAMMCO Conference on User Knowledge and Scientific Knowledge in Management Decision-Making** Topics: ways of incorporating user's knowledge and scientific knowledge into management decisions. Participants: hunters, fishermen, scientists, and resource managers.
14 - 16 November 2006	Copenhagen, Denmark	**NAMMCO Workshop to Address Problems of "Struck and Lost" in Seal, Walrus and Whale Hunting** Topics: hunting methods with respect to the problem of "struck and lost" (S&L), reasons why some hunts have a high or low S&L rate, recommendations on how to reduce S&L. Participants: hunters, resource managers, scientists and NGOs
8 February 2008	Nuuk, Greenland	**Hunter's seminar** Topics: status of natural resources, legislation, user's knowledge, hunting methods Target audience: hunters, resource managers, scientists and politicians
17 – 18 February 2010	Copenhagen, Denmark	**NAMMCO Expert Group on assessment of whale killing data for large whales** Topics: review of existing marine mammal hunting methods, data collection, data analyses and examination of possibilities for technical improvement and innovation. Participants: hunters, resource managers, scientists

		NAMMCO Expert Group second assessment meeting on time to death in large whales hunts
4 – 6 November 2015	Copenhagen, Denmark	The meeting reviewed and evaluated whale killing data from Greenland, Iceland, Norway, Japan, Canada and the USA. It also considered information on recent and ongoing research on improvements and technical innovations in hunting methods and gears used in the hunts. Protocols for collection of TTD data for hunts with deck mounted harpoon guns and statistical analyses of TTD in whaling operations were presented. The meeting resulted in both general and hunt specific recommendations.. Participants: hunters, resource managers, scientists
		Mechanical Workshop, visit / course
9 – 13 February 2015	Tønsberg, Noeway	Topics: Visit and course at Mechanical Workshop, Tønsberg. Extended course in "Whale Grenade 99" for KONFIFA teacher, APNN and Nuuk Shipyard. Participants: resource managers, technical staff

The first courses on the use and handling of the whale-grenade were arranged in 1991, in cooperation with Dr. Egil Ole Øen, from the Norwegian School of Veterinary Science and the Norwegian "Kongsberg" company. At that time, the courses were taken by skippers and crew members from all the boats equipped with harpoon cannons (table 4). The courses were also targeted to technicians in shipyards and Trading Companies dealing with the whale hunting equipment. The courses were arranged by the Government owned Ship Consultant Service and the Ministry of Fisheries, Hunting and Agriculture.

The harpoon cannons are checked every second year by persons who have taken a course on mounting and renovation of harpoon cannons. Today these courses are also organised by the Organisation of Fishermen and Hunters (KNAPK) in cooperation with the Ministry of Fisheries, Hunting and Agriculture. Their frequency depends on the demand. The most recent course was held in the fall of 2011, where personal from shipyards in West Greenland attended. In 2015 a mechanic from Nuuk Shipyard participated in a visit to a mechanical Workshop to get a more thorough introduction to the harpoon cannon. An animated video on the technical set-up of the "Whale Grenade 99" for future courses (table 4) was also an important out-put of the visit.

The course on mounting and renovation of harpoon cannons can be taken by persons who have completed a technical education on welding and working with metal, and are employed in a shipyard approved for the mounting and checking of harpoon cannons. In order to be approved, the shipyard needs to have specific machines and tools, as well as reserve parts needed for mounting and renovation of harpoon cannons.

All the courses are financed by the Government of Greenland.

7. Aboriginal Subsistence Whaling (ASW) in the IWC

Within the IWC context

Greenland's hunt of large whales falls in the category of Aboriginal Subsistence Whaling (ASW) together with the Chukotka hunt of gray and bowhead whales, the Bequia hunt of humpback whales and the Alaskan hunt of bowhead and gray whales.

The legal binding ASW obligations within the IWC are defined by the Convention, the Schedule, and contain some obligations on the Governments and areas managing ASW. They are to be found in relevant paragraphs of article V of the Convention and paragraphs 13 and 14 of the Schedule. For further information please see appendix VI, 2014.

Following non-binding resolutions are relevant in the Greenland context, in particular:

- Resolution 1978 – 3 Capture of Humpback Whales in Greenland Waters, requesting the Danish Government to attempt to substitute fin whales for humpback whales in meeting the Schedule set that year for West Greenland waters.
- IWC Resolution 1978-4 Reporting Data Relative to Humane Killing, requesting 2 specific types of information on each whale taken
- IWC Resolution 1980-3 (as later adjusted) Resolution on the Documentation of Aboriginal Need, requesting information on utilization of the meat and other products
- IWC Resolution 1982-3 Resolution Concerning Aboriginal Subsistence Whaling, which agreed to implement the Aboriginal Subsistence Whaling Management Regime.
- IWC Resolution 1985-3 Resolution on Humane Killing in Aboriginal Subsistence Whaling, requesting that ASW areas adopt more efficient methods in order to reduce cruelty and inhumanity (which in Greenland lead to the introduction of the exploding whale-grenade in 1991)
- IWC Resolution 1992-1 Resolution on Humane Killing, encouraging collection and presentation of struck and lost rates and time to death records
- IWC Resolution 1993-1 Resolution on Humane Killing
- IWC Resolution 1997-1 Resolution on improving the humaneness of Aboriginal Subsistence Whaling
- IWC Resolution 1999-1 Resolution arising from the Workshop on Whale Killing Methods, requesting regularly 7 specific types of information in order to minimize time to death.
- IWC Resolution 2014-1 Resolution on Aboriginal Subsistence Whaling ASW, improving the process for ASW quotas and help in depoliticising it.

The relevant IWC decisions include:

IWC definition for aboriginal subsistence whaling (1979, 1981, referenced in):
"Aboriginal subsistence whaling means whaling for the purpose of local consumption carried out by or on behalf of aboriginal, indigenous, or native peoples who share strong community, familial, social, and cultural ties related to a continuing traditional dependence on whaling and the use of whales."

"Local aboriginal consumption means the traditional uses of whale products by local aboriginal, indigenous, or native communities in meeting their nutritional, subsistence, and cultural requirements. The term includes trade in items which are by-products of subsistence catches."

"Subsistence catches are catches of whales by aboriginal subsistence whaling operations."

Objectives for managing aboriginal subsistence whaling (1982, referenced in):
"To ensure that the risks of extinction to individual stocks are not seriously increased by subsistence whaling."
"To enable aboriginal people to harvest whales in perpetuity at levels appropriate to their cultural and nutritional requirements, subject to other objectives."

"To maintain the status of whale stocks at or above the level giving the highest net recruitment and to ensure that stocks below that level are moved towards it, so far as the environment permits."

Definition of subsistence use (1979, 2005, referenced in):
"1. The personal consumption of whale products for food, fuel, shelter, clothing, tools, or transportation by participants in the whale harvest.

2. The barter, trade, or sharing of whale products in their harvested form with relatives in the harvest, with others in the local community, or with persons in locations other than the local community with whom residents share familial, social, cultural, or economic ties. A generalized currency is involved in this barter and trade, but the predominant portion of the products from each whale are ordinarily directly consumed or utilized in their harvested form within the local community."

In the Schedule, there is a single reference to "subsistence needs" – but it is not defined (Schedule §13a – "..establish catch limits" "to satisfy aboriginal subsistence needs .."). The Convention does not mention aboriginal subsistence needs. Thus there is no objective agreed

basis in the Treaty instruments for setting aboriginal subsistence needs, especially in an opportunistic[7], multi-species hunt in the difficult conditions faced in Greenland.

In the 1980 IWC resolution on the documentation of Aboriginal "Needs Statements" (resolution 1980-3) it was indicated that the Contracting Governments should document annually, for the information of the Commission, the utilization of the meat and other products, taken for the aboriginal/subsistence purposes. Later (as the quota block period expanded in time in 1997-2002) it was decided that it was sufficient to provide this information only once in a quota block period. However, IWC has continuously requested information as seen in the amount of resolutions.

In a Greenlandic Context
Observations of relevance when considering "need":

- The great variability in the catch of all animals during any one given year (due to climatic variations or variations in the size of the individual groups of animals).
- The substitution possible and often necessary between the various prey animals.
- The opportunistic nature of the hunt.
- The nutritional superiority of traditional Greenlandic diet.
- Food security.

The Government of Greenland is the political responsible organization in defining the needs of the people in Greenland, in general and in relation to whales subject to IWC management rules. The government in close cooperation with the municipalities is the only organization having sufficient knowledge to determine such "needs" and ensure food security. The political decisions in Greenland are based on scientific knowledge and will have to take account of the changing size of the population living in West and East Greenland.

In 1979 (resolution 1979-4 on Bering Sea Bowhead whales) the IWC unanimously acknowledged its intention that the needs of the "aboriginals of the USA" should be determined by the Government of the USA. That Resolution contains a second pre-ambular paragraph which recognises the importance of accommodating the subsistence and cultural needs of aboriginal people in general not simply those in the USA. Thus as long ago as 1979, the IWC considered that it was a national prerogative and the competence of the relevant government to define the needs of its relevant population.

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[7]. To be a whaler is to be a combination of hunter of large whales, of other mammal / bird species and to be a fisherman. The hunters have to evaluate a complex number of abiotic and biotic factors before setting out to catch large whales. These factors include weather conditions, tide and seasonal variations in the availability of whales, time and crew. Also to be taken into consideration is that the vessel and crew has to be available for other activities such as fishing for snow crab, salmon and a number of other fish species that are regulated by quotas, fishing seasons and market forces. Finally the hunting season for caribou and muskoxen can play an important role.

The Government of Greenland must secure the food supply of the Greenland society including distribution to settlements or towns not able to cover their own needs of whale products. This means that distribution channels within the local area and between municipalities had to be established and later on to be kept open.

During the period 1923-58 the whale catcher *Sonja* was tasked with securing food supply in whale products because the hunt for other animals had failed and because, at that time, there was only one Greenlandic owned vessel with harpoon cannon (1948-). This failure to secure sufficient supplies was the situation in the years 1916-23 after which *Sonja* was commissioned by the Danish State to avoid starvation. When *Sonja* was decommissioned in 1958 the idea of equipping more fishing vessels with harpoon cannons emerged – again in order to secure the meat supply of the population.

The distribution and sharing of whale meat within a community, having taken a whale, is in Greenland based on an assumption of reciprocity. It was and is expected that the successful hunters shares the result of their hunt and that they will receive meat, blubber and *mattak* gift later. This was, in the old time, a suitable kind of "mutual insurance" system in a society without monetary means. When it comes to sharing with other communities the barter economy prevailed, but also here we have found the idea of "insurance" between the Communities. Finally, the sharing with more distant communities (which only became possible when organised transport was introduced) would have to include money – or as stated in the 1982 definition "a generalized currency." This acquisition of money helps to pay for those commodities that cannot be bought in the barter trade. Money secures full utilization of the whale and money is necessary to buy and operate the means of production (boat, motor, harpoon cannon, payment of crew and insurance) and to transport the whale products from the flensing sites and between settlements and even municipalities.

According to the rules of the Government of Greenland, the large whales cannot be taken without the use of the explosive whale-grenade (Norwegian penthrite "Whale Grenade 99", in this document called the exploding whale-grenade). The Government of Greenland banned the use of the "cold harpoon" in 1991 following a request by the IWC (Resolution 1985-3). It will have to be noted that the indigenous societies are not required by IWC rules to use the explosive whale-grenade. It is in accordance with IWC rules for an indigenous society to take a whale with the "cold harpoon" or with other means, but that would mean a longer time to death (TTD) for the whale. In Greenland the explosive whale-grenade was introduced for animal welfare reasons. This was the answer to criticism for using the cold harpoon. However, the current 2018 price for such an exploding whale-grenade is very high – approx. 1200 US dollars and some whales require multiple grenades, due to a requirement to keep an extra explosive whale-grenade ready.

Indigenous subsistence whaling cannot function in Greenland without money involved as described. The involvement of money was already agreed to in the 1982 definition and money helps to keep the channels of distribution open to areas where no whaling takes place or where whaling has failed in order to fulfil the obligation of the Government to secure the food supply of the population. The money earned from whaling is also used to maintain the harpoon cannon and other equipment.

The function and importance of money in Greenland in relation to whale meat is definitely different to the importance of money in the commercial whaling previously known. In an IWC context, the commercial whaling was a business enterprise with the purpose to generate an economic surplus to the owners of the whaling fleets. The aboriginal whaling in Greenlandic waters has the purpose of contributing to secure the food supply of the Greenlandic population and this purpose is helped along by a limited involvement of money.

An alternative, which is not considered feasible today, would be to introduce a whale catcher (like the before mentioned historic vessel *Sonja*) to secure the food supply of the population. However, the costs of such a vessel would have to be covered either by sale to consumers or by the taxpayers. There would thus be no difference in substance between the present system and a new one. The current policy of the Government of Greenland is to minimize or eliminate all kinds of subsidies.

The products from indigenous hunting intend to meet both immediate nutritional requirements and to provide food for the winter period as well as satisfying important cultural and socioeconomic needs (Appendix II, paper 1-9).

It has been argued by some that the Greenland hunt is "commercial" or "semi-commercial". Direct or indirect accusations that the Kingdom of Denmark engage in commercial whaling contrary to the IWC moratorium or attempts to question whaling in Greenland by claiming commercial intentions or practices is un-acceptable.

It is correct that a very limited sale of whale meat takes place in local restaurants in Greenland accessible to the Greenlandic population as well as people visiting Greenland. Following accusation at IWC-64 of this sale being disproportionate to the amount of products caught, the Greenland authorities reviewed the situation and concluded that in the years prior (2010-2012) an estimated average of 13 restaurant meals per day through out Greenland contained whale products. That equated to approximately 1,600 kg of whale meat per year.

Given that the vast majority of visitors to restaurants are members of the Greenlandic population, the consumption by foreign tourists are considered to be insignificant. The small

number of restaurant meals consumed probably reflects the fact that most local people prefer to prepare and cook the whale products in their own home in the traditional way. The few hotels and restaurants which have whale products on their menu prepare the dish in a non-traditional way.

Future considerations

In 2011 the IWC established an ASW Working Group (ASW WG) to discuss and put forward recommendations on how to improve the process for ASW in the future through a more consistent and long-term approach.

The question on "Needs Statements" was part of the agenda of the ASW WG due to the fact that considerable divergences on the content of Needs Statements and the different requirements in the individual ASW societies exist. From our initial point of view, the only legitimate requirements of ASW countries are that the hunt is undertaken by people living in an ASW country, that the hunt is based on a tradition, and intended for local consumption, hereby being part of the country's food security.

Greenland has continued to engage constructively in the discussions on the question of Needs Statements and other associated questions raised in the ASW WG. There is no acceptance of any ASW member being subjected to special demands beyond IWC requirements prejudging the outcome of those deliberations and the ASW WG's work. Greenland is of the view that all ASW areas should be treated equally in accordance with the Convention, Schedule and resolutions thereunder. For further information, please also see appendix VI, 2014 and the reports from the work of the ASW WG (IWC 2012, IWC 2014a, 2016, 2018c).

A Consistent and Long-term Approach for Aboriginal Subsistence Whaling

In 2015, the ASW Working Group held a workshop in Maniitsoq, Greenland (IWC 2016). One of the central objectives of the workshop was to ensure better synergy between the IWC and other international commitments, including those on the rights of indigenous peoples. That included that the members of the IWC should be better informed about the international indigenous peoples' human rights developments at the United Nations, the International Labour Organization (ILO), the Arctic Council and other intergovernmental regimes. In a report to the UN Permanent Forum on Indigenous issues (UNPFII), the key recommendations coming out of the Maniitsoq workshop has been highlighted as constructive examples of how intergovernmental fora should be addressing consistency with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and other international human rights instruments.

In 2016, the IWC recognized the value of improving process and increasing understanding of issues surrounding ASW and submitted the report from Maniitsoq for further consideration and recommendation at its 2018 session.

On that basis, the ASW working group met in Barrow, Alaska in April 2018, where it reached consensus on a number of recommendations to be presented to the IWC in September 2018 (IWC2018c). One concrete achievement was the conclusion of arrangements for a new, web-based template for "Description of the Hunt" that will enable the very different ASW communities to share information about their hunts in an easily accessible and consistent way. This White paper supplies background information for the new online description as well as includes a thorough report of whaling in Greenland and two previous presented non-papers from the Kingdom of Denmark (Appendix V and VI).

8. Greenland's need of whale meat

The reasons for whaling being important for Greenlanders include:

- Whales and whaling are fundamental part of the culture and the history
- Large whales are a substantial source of food for a great part of the population
- The selling, sharing and distribution of whale meat provide a necessary source of food security and income for many people
- There are well documented health reasons to promote the consumption of whale products
- In a country surrounded by highly productive seas, where the climate seriously restricts farming and agriculture, whaling provides large amounts of food at very low costs for the local and global climate and the environment.

For these reasons, the Government of Greenland is committed to continue harvesting large whales in a sustainable way to meet the needs of its people in the foreseeable future.

Greenland's hunt of large whales falls in the category of Aboriginal Subsistence Whaling (ASW) in an IWC context. Commercial whaling aims at maximizing profits, while ASW aims at satisfying the local need (food security) of whale meat and to secure the continuation of cultural practices. Therefore, one of the differences between commercial whaling and ASW is that commercial quotas would be limited only by the sustainability of catches, while aboriginal quotas are limited by the sustainability of the catches and by the needs of local subsistence. As a result, the IWC requires an evaluation of the local need of whale meat before allocating ASW quotas.

The discussion of Greenlandic need for whale products and its multispecies component dates back to discussions within the IWC from the late 1970s and considerable documentation has been presented over the years and discussed at the IWC Meetings,

initially in the discussions of the Commission's Aboriginal Subsistence Whaling sub-committee (appendix III).

The Greenlandic hunt is a multispecies hunt and for this reason, the 'need' statement (documentation of the cultural and nutritional requirements of the population) has traditionally been expressed in terms of tons of meat / edible products of large whales, rather than in individual animals by species. The catch of individual species varied over the years due to a number of factors (ice and climatic conditions, weather, availability). If the result of the hunt, on one individual species, lead to an unsatisfactory result, then the hunt on other species might help to attain the objective of overall food security or an approximation to that objective.

It should be noted that external factors mentioned at times do have a significant influence on quota utilisation. Over the last two quota-blocks (2008-2018) the utilisation of quotas has varied with more than 25 % (74 % quota utilization in 2017; 98 % quota utilization in 2013) in relation to minke whales and 40 % (31 % quota utilization in 2012; 74 % quota utilization in 2008) in relation to fin whales. Under such circumstances it is necessary to have sufficient quotas of the various species to neutralize the misfortunes of nature. Normally, when the hunt for one species fails, the hunts for the other species don't fail. Substitution thus takes place in order to archive the necessary result of the hunt.

East Greenland need from large whales, prior to 1985 and 1986-2018

The East Greenlandic hunt of large whales is only focusing on one species, which is the minke whale from the Central Atlantic stock. Up to 1985, takes from the Central Atlantic minke whale stock had not been considered under aboriginal subsistence whaling. In 1985 the quota had been 242. For the 1986 season it was 0.

The Kingdom of Denmark was asked at the 1985 meeting to make a submission concerning the Central stock. Thus a needs statement was developed for the Annual Meeting in 1986 (IWC38) and an aboriginal subsistence catch limit established. The continuing need for 12 animals per year from this stock has been recognised by the Commission without discussion since 1986, for further information see below:

ASW Sub-committee 1986 (IWC/38/14)

- Denmark submitted document TC/38/AS 3 that described two villages in East Greenland (Angmagssalik and Scoresbysund) giving their histories, the population at the time, occupation, hunting statistics, occurrence and pattern. It concluded that it was necessary to seek provision for the continuation of the minke whale hunt as this formed a natural part of the aboriginal subsistence hunting of these areas.
- The Sub-committee concluded that the hunt could be regarded as aboriginal/subsistence in nature. It recognised that a need had been demonstrated but noted that since a multi-

species hunt [here meaning: including non IWC-regulated species] was involved, the dependence was not totally on minke whales. The Sub-committee wished to record this conclusion noting that it was based on its discussions during which it had noted in particular that all whales were used for local consumption and did not enter into commercial trade. It was also noted that there was a tradition of whaling in a hunting economy based on species including sea mammals, and the villages were subsistence communities.

Technical Committee 1986 (IWC/38/5)

- Denmark requested that a catch limit of 12 minke whales from [this] Central Atlantic stock should be permitted, available to be taken by aborigines pursuant to paragraph 13(b)(3) of the Schedule. It was encouraging Greenland authorities to initiate improved monitoring of the catches and data collection and was establishing procedure by which the struck and lost rates could be studied and improved. The TC supported the proposal.

Commission (Rep. Int. Whal. Commn 1987, 37: 17-19)

- The Commission adopted by consensus the proposal.

East Greenland need from large whales 2019-2025

The size of the requested quota of 20 is considered sustainable and not to harm the stock as stated by the last IWC Scientific Committee meeting in 2018 (IWC 2018d).

The minke whale hunt in East Greenland is operated from small skiffs with the use of high powered rifles. It is comparable to the same type of hunt (the collective hunt, page 59-60) taking place in West Greenland. In East Greenland, there is no vessels mounted with harpoon cannon, and in fact, there are no vessels that can be authorized to be mounted with harpoon cannon.

The minke whale catch is shared within the settlements and limited sale of the products occurs. No processing plant for whale products exists in East Greenland. The usage of the catch is for local consumption. The limited numbers of skiffs and vessels in the two management areas (Ittoqqortoormiit and Tasiilaq and its surrounding settlements) and the ice conditions are the reasons for the limited use of the quota in some years.

There are several reasons for the proposed quota change. Based on recent scientific advice, the hunting opportunities in East Greenland has been reduced over the last couple of years for species other than minke whales, such as seabirds and other marine mammals not covered by the management of the IWC. This effect can be part of the reason for the almost doubling in quota use observed from the last quota block 2008-2012 of 39 % to the present quota block utilization of 67 %.

Furthermore, the Greenlandic Government does not allow for hunt in East Greenland of other large whales covered by IWC-management. This is because of the lack of vessels with proper harpoon cannons and other technical facilities to carry out flensing of such whales.
On that basis, the possibility to increase the hunt of minke whales is considered the preferred option to satisfy the needs of the local population for fresh whale meat and to provide food security. With an average population in East Greenland in 2013-2018 of 3,389, the per capita consumption in kg of 20 minke whales is 11.2 kg, corresponding to the range of 11.8-12.5 kg per capita in West Greenland (table 7B, 7C and 8), but lower than the approved and updated need of 15 kg. With the present annual quota of 12 minke whales in East Greenland, the per capita consumption is 6.7 kg.

In addition to this, it is important to note that apart from the need for fresh whale meat, the population of East Greenland needs some sort of income in order to purchase fuel, ammunition, other types of food etc. It has become increasingly difficult to attain this essential income from fisheries and seal hunt, which has increased the need for self-supply including barter and trade of whale products. The IWC has on several occasions recognized that a generalized currency is involved in this barter and trade, as long as the predominant portion of the products from such whales are ordinarily directly consumed or utilized in their harvested from within the local community (e.g. IWC, 2004, p. 15).

West Greenland need from large whales, prior to 1985 and 2019-2025
The effect of the Government's policy of food security (covering all living resources) has turned out to be a success. A study by Memorial University, St. Johns, Canada (Appendix II, paper 5) concludes on the question of food insecurity in a Greenland Society (Qeqertarsuaq) that the "prevalence of food insecurity (8%) is low. However, interviews reveal a more nuanced picture, with women, adults aged 55+, and non-hunters reporting constrained access to Greenlandic foods. Barriers restricting traditional food access include changing sea ice conditions, reduced availability of some species, high costs of hunting and purchasing food, tightening food sharing networks, and hunting and fishing regulations."

It should furthermore be noted that the Scientific Committee's advice on catch limits not harming the stock is based first on whether hunting levels meet the Commission's conservation objectives and secondly whether they meet the needs of people. In an ideal world, both objectives are met, but where this is not possible, the Government of Greenland has given priority to long-term sustainability. To determine how need can be met in terms of long-term sustainable catches, then a conversion factor is required by species that turns 'strikes' (which may or may not result in a landed animal but which the Scientific Committee assumes always results in death) into tons of edible products.

West Greenland's need of meat from large whales was evaluated and endorsed by the IWC in 1990 and 1991, with basis on the catches previous to 1986 (IWC 1989, IWC 1991a, b, IWC

2007b). The rationale behind this evaluation was that catches of large whales off West Greenland were severely reduced by quotas in 1985, when the humpback whale quota was eliminated and the quota for minke whales was reduced from 300 to 130 whales. Thus, catches previous to 1986 were based on the population size in the same time period and were limited by the demand of whale meat and by the logistic limitations for catching whales, rather than by restrictive quotas (IWC 1989, IWC 1991a, b, IWC 2007b).

According to the estimates accepted by the IWC, the average yearly catches in West Greenland in a 20 year period before 1986 (1965-1985) were 14 humpback whales, 9 fin whales and 232 minke whales. The average population size in the same time period is available in table 6 and figure 11. Using different sources of information, the IWC Aboriginal Subsistence Whaling Sub-committee agreed that the best available estimates for conversion of number of whales to weight of whale meat in this area were 8 metric tonnes for humpback whales, 10 tons for fin whales and 2 tons for minke whales (table 7A; IWC/41/22 submitted to the 1989 meeting of the Commission presented the Greenlandic information on conversion factors and need, subsequently expanded in TC/43/AS3 ADD, IWC 1989, IWC 1991a,b).

Using this conversion factor, the yearly catches of West Greenland, before 1986, yielded 112 tons of humpback whale meat, 90 tons of fin whale meat and 464 tons of minke whale meat. This means that previous to 1986, approximately 670 tons of meat of large whales was consumed yearly in West Greenland by the approx. 44,400 inhabitants (table 6 and 7A). The aggregated "need for whale meat" as such has never changed. However the ways to attain the objective of 670 tons meat could and can be fulfilled by a number of various combinations of the catch.

With the acceptance for the West Greenland hunt to include bowhead whales in 2007 (effectively from 2008) and humpback whales in 2010, the establishing of catch limits expressed in numbers of whales, which will satisfy the underlying need for food security can be even more diversified. Only very high quotas fort the individual species could justify a permanent change alone to numbers of whales, as the availability of whales change every year, whereas the need remains fixed in a food security context.

The established need for whale meat has been based on historical catches in West Greenland. The different species can normally substitute each other and consequently Greenland has had to establish a common definition of needs, i.e. tons. The need for whale meat is administratively, during the IWC process, changed back into the normal catch limits for the different species and that only after the Scientific Committee has had the opportunity to review the possibility of the various species to sustain a certain hunting pressure. So, the catch limits is expressed as number of whales and not as tons.

The need of meat from large whales for West Greenland has increased since the 20 year period of 1965-1985, because Greenland's ability to locally produce alternative sources of meat has remained stable, and there has been an increase in the population size of 18 %. The increase of population size in West Greenland is more substantial when considering the number of people born in Greenland, which is approx. 26 % (table 6 and figure 11). The people born in Greenland are the ones that are primary consumers of marine mammal products, including meat from large whales. However, as there is no domestic regulation on who can eat whale products in Greenland, further calculations are made on the total population size in West Greenland. As baseline is used the same 20 year catch period of 1965-1985 as the original West Greenlandic need was based on (TC/43/AS3 ADD, IWC 1989, IWC 1991a,b).

Table 6. Population size in West Greenland in 1965-1985 and in the last quota block 2013-2018 and corresponding need in tons. Source: Statistics Greenland.

	Population Born in Greenland	**Population Born outside Greenland**	**West Greenland Population Total**	**Need in tons**	**Per capita consumption in kg.**
Average for the period 1965-1985	37,301	7,141	44,442	670	15
Average for the period 2013-2018	46,976	5,675	52,651	794	15
Increase of population	9,675	-1,466	8,209		
% increase of population	26	-21	18		
Need of 670 ton multiplied with the % increase of the population	844		**794**		

For the present time our need update is an average of the West Greenlandic population size during the last quota block from 2013-2018 used, as this is the same time frame used for the calculation of the actual use of the four whale species per given strike limit. Hence in a future perspective in updating Need Statements and conversion factors, this is a solid data based approach and also used in the need statement of 2014 (IWC/65/17), where the population census gave a need of 799 tons in West Greenland.

The 18 % increase in the population size in West Greenland corresponds to an increase of 124 tons of edible products from large whales with a need of 670 tons, giving a **total need of 794 tons in present time West Greenland.**

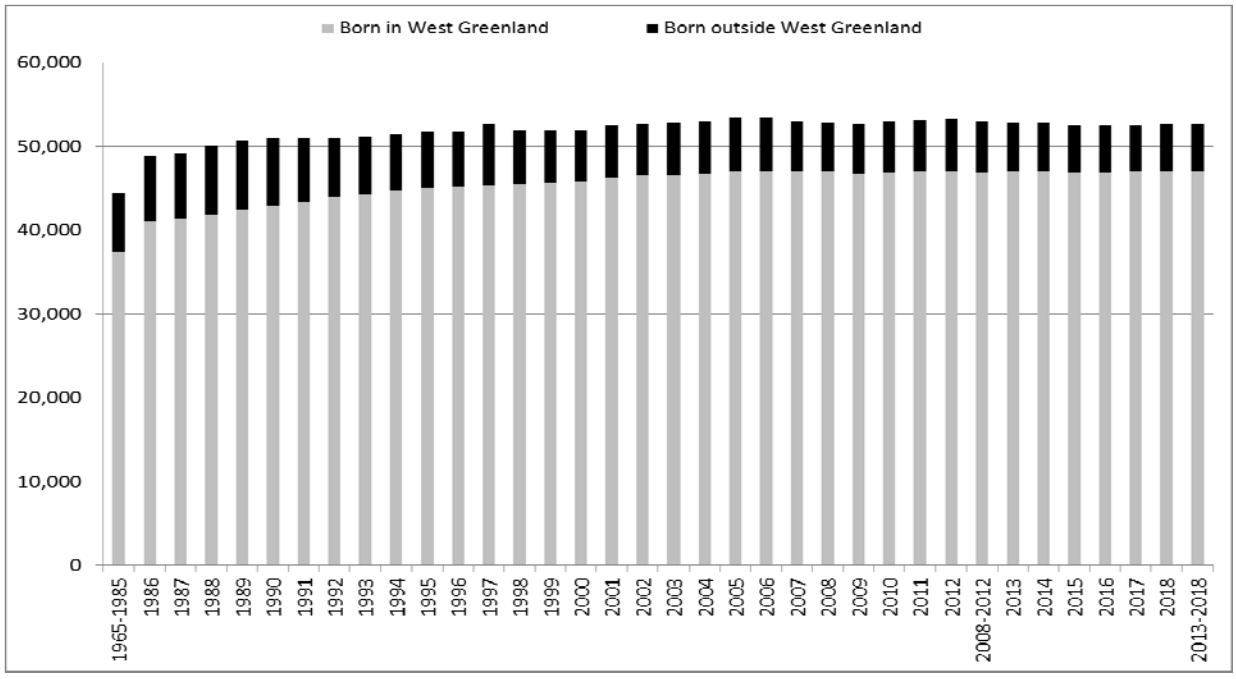

Figure 11. The number of people residing in West Greenland from January 1965-85 to January 2018. Bottom: people born in Greenland. Top: people born outside Greenland. Source: Greenland Statistic.

Applying the same principle to the potential catches given by the recommended quotas from the Scientific Committee in 2018 (IWC/67/Rep01) of 164 minke whales, 19 fin whales, 10 humpback whales and 2 bowhead whales for the period 2019 – 2025 and by using the adopted conversion factors from the report from "the small working group on conversion factors" (from whales to edible products) for the Greenlandic large whale hunt of 2010 (Donovan et al. 2010), a potential total of 657 tons of large whale edible products is obtained (table 7B), but in reality based on actual landed number of whales as seen in the last quota block of 2013-2018, it amounts only to 619 tons (table 7C).

The quotas from the Scientific Committee for 2019-2025 give a potential and actual yield in tons of edible products of approx. 137-175 tons less than the documented need for West Greenland of 794 tons (table 7A-7C).

The improvements in the struck and lost rate in the present quota block compared to the previous quota blocks is clearly shown in appendix IV, table 9A-9D, and resulting in better quota utilization in table 7C.

Table 7A. The documented yearly need of meat from large whales for West Greenland. Based on the catches previous to 1986 (1965-1985). Traditional conversion factors. I.e. per capita consumption kg. 15. Population (1965-1985): 44.400.

Species	Tons of meat per whale	Average yearly catches before 1986	Tons of meat form large whales consumed yearly in West Greenland previous to 1986
Humpback whale	8	14	112
Fin whale	10	9	90
Minke whale	2	232	464
Bowhead whale	0	0	0
		Total	**666**

Table 7B. The potential amount of edible products from large whales for West Greenland based on the advised quotas for 2019-2025 from the Scientific Committee in 2018 and adopted conversions factors from 2010. The quotas from the Scientific Committee 2019-2025 give a potential yield in tons of edible products of app. 137 tons less than the updated need for West Greenland of 794 tons. I.e. per capita consumption kg. 12.5. Population (2018): 52.600.

Species	Tons of edible product per whale	Scientific Committee advised quotas 2018	Tons of edible products form large whales available per year from 2019-2025 quotas
Humpback whale	11.6	10	116
Fin whale	10.9	19	207
Minke whale	1.9	164	312
Bowhead whale	11.0	2	22
		Total	**657**

Table 7C. The actual amount of edible products from large whales for West Greenland based on the values corresponding to the advised quotas for 2019-2025 from the Scientific Committee in 2018. Using adopted conversions factors from 2010 and based on average number of landed whales in the last quota block 2013-2018, the actual use for minke whale is 97 %, for fin whale is 90 %, for humpback is 93 % and for bowhead is 100 % per given strike limit (Appendix IV-table 9).
The quotas from the Scientific Committee for 2019-2025 give an actual yield in tons of edible products of approx. 175 tons less than the updated need for West Greenland of 794 tons. I.e. per capita consumption kg. 11.8. Population (2018): 52.600.

Species	Tons of edible product per whale	Annual quota 2015-2018. Actual utilisation including the recent struck and lost rates		Tons of edible products form large whales available per year from 2019-2025 quotas
Humpback whale	10.77	10	93%	108
Fin whale	9.81	19	90%	186
Minke whale	1.85	164	97%	303
Bowhead whale	11.0	2	100%	22
		Total		**619**

The regional distribution and the average yearly catches in kg pr. citizen pr. municipality (Colum 6 to the right) are shown in table 8. There is large diversity in the availability of edible products pr. citizens in the cities and settlements spread along the cost (Colum 4). From 0.5 kg. pr. year in Qaanaaq (due to the distribution of the relevant species and ice coverage for the most of the year) to 30.7 kg in Paamiut having open water during the year and the possibility for sale in the surrounding settlements and towns. The capital, Nuuk, has low availability of edible products with only 2.6 kg pr. citizen despite the fact, that Nuuk has many whaling vessels and "open water" in the fiords most of the year. The main part of all products (> 95% in 2013) are sold at the local market, public institutions and finally through distribution to family / crew etc. (the informal economy). Just a small amount (<5% in 2013) is purchased by the retail and restaurants via the two processing plants respectively Maniitsoq and Ilulissat.

Both in the 20 year period of 1965-1985 and in present time the need of respectively 670 tons and 794 tons corresponds to consumption from large whales of 15 kg annually per capita (table 6). However, as seen in table 8, the actual average annual consumption per capita in West Greenland based on actual catches (428 tons of edible products landed) in the present quota block 2013-2018 is 8.2 kg. If the whole quota was utilized this is raised to 12.5 kg (table 7B) or 11.8 kg (table 7C) when calculating the struck and lost ratio into.

Table 8. Average population size per cities in West Greenland in the last quota block 2013-2018 with corresponding average catches in tons in 2013-2018 and actual per capita consumption. 178 people are without registered location and not included here. Source: Statistics Greenland.

City with corresponding settlements	Municipality	Population number	Kg edible products / population number	Kg edible products / population number
Nanortalik		1,837	5.6	
Qaqortoq		3,340	6.3	
Narsaq	Kujalleq	1,765	6.3	6.1
Paamiut		1,584	30.7	
Nuuk	Sermersooq	17,305	2.6	5.0
Maniitsoq		3,179	19.1	
Sisimiut	Qeqqata	6,244	10.2	13.2
Kangaatsiaq		1,194	13.5	
Aasiaat		3,280	9.3	
Qasigiannguit		1,222	6.0	
Qeqertarsuaq	Qeqertalik	880	18.4	10.6
Ilulissat		4,879	12.3	
Uummannaq		2,213	5.9	
Upernavik		2,785	9.4	
Qaanaaq	Avannaata	770	0.5	9.3
Total		52,476	8.2	

There is a high demand of meat from large whales in modern Greenland. When fresh meat from a large whale is brought to the open market Kalaalimineerniarfik, the news spreads through the "kamikpost", a communication network that includes phone calls and text messages from mobile phones and, in the larger cities chain emails across working places. Social media is also being increasingly used. As a result, people often line up to buy the meat and hunters have no problem selling the share of the catch that is meant to be sold (plate V).

Plate V. People lining up to buy fresh minke whale meat at the open market in Nuuk, May 2007. Photo: Benny Koksholm

Environmental and health reasons for consuming whale meat in Greenland

It is clear that hunting and consuming large whales have a cultural importance in Greenland. It is also clear that whale meat and other whale products, such as *mattak* are a vital source of

proteins and a very welcome source of income, either as cash from sales, or as savings for those who acquired whale meat through non-commercial transactions or by sharing. What is not so obvious for everyone is that consuming products from large whales in Greenland has huge advantages for the protection of the environment and for the health of Greenlanders.

Harvesting large whales from local waters has a relatively low cost for the local and global climate and the environment. In contrast, the amount of gas emissions, production of waste and use of land needed to farm western meat, and to transport this meat to Greenland is enormous and contrary to any national or international policy on CO2 emissions. As mentioned above, the current IWC quotas are short of fulfilling the need of meat from large whales in West Greenland. The buffer in the food supply and the consequence of this food shortage is an increased import of western meat from overseas, because agricultural activities in Greenland are minimal and not covering the nutritional need at all (local meat production 7-9 %, imported meat 92 % 2012-2016, Agency of Agriculture pers comm.).

In recent years, the Government of Greenland has followed the same trend as Scandinavian countries and the EU with having a higher focus on bio-economy and more efficient use of local resources. In several forums increased research and cooperation in education has been identified as a key action in achieving an improved bio-economy.

Improved utilization and outlets for local and domestic markets has been seen as a possible bio-economic focus area in the future. A very central part of Greenlandic culture is fishing as well as hunting of terrestrial and marine mammals and birds. Similarly, the traditional manufacture and preservation of these foods is unique to Greenland.

Increased research efforts focusing on traditional Greenlandic food, traditional production and preservation will therefore be one way forward without compromising food safety. A higher rate of self-caught Greenlandic food will be associated with positive socioeconomic effects, as the natural economy (including fisheries and hunting) plays an important role in the household economy at the lowest incomes (Ministry of Social Affairs, Family, Equality and Justice 2018).

In a country like Greenland, surrounded by highly productive seas and with a climate unsuitable for traditional agriculture and farming (as known in Europe and North America), it would be environmentally irresponsible not to satisfy the demand of meat by hunting large whales, as long as such hunts are sustainable.

For Greenlanders, consuming baleen whale meat has further advantages in terms of health. Several studies have confirmed the nutritional value of marine mammal products compared to imported and westernised food such as chicken, beef and pork. Whale *mattak* contains rich sources of vitamin A and C, thiamine, riboflavin and niacin. These are known to provide

excellent protection against scurvy. Whale meat and blubber are considered beneficial due to their high concentration of selenium. In addition, marine mammal lipids are low in saturated fats and high in the omega-3 polyunsaturated fatty acids that give protection from the cardiovascular diseases common in North America and Europe (e.g. appendix II).

There is evidence that Inuit traditional diet protects against several serious diseases, including some types of cancer, thrombosis and atherosclerosis. There is also evidence that Greenlanders depend on traditional food to obtain vitamin D. The Board of Nutrition in Greenland recommends Greenlanders not to stop eating traditional food because the effects of stopping are not known. It is believed that a reduction of traditional diet would lead to an increase in the number of western diseases (appendix II).

9. Biological advice on catches of large whales in Greenland

The current block-quota period for the Greenlandic ASW hunt will expire by the end of 2018 and will therefore have to be renewed. As described in the table below, Greenland expects to continue with the existing quotas in the following period, with one exception. The exception is minke whales from the Central stock (East Greenland) where Greenland intends to put forward a proposal for an increase from 12 to 20 animals.

Species	**Stock**	**2014-18**	**2019-2025**
Minke whales	Central stock (East Greenland)	12	20
Minke whales	West Greenland	164	164
Fin whales	West Greenland	19	19
Bowhead whales	West Greenland	2	2
Humpback whales	West Greenland	10	10

It is important that the IWC quotas can satisfy the documented need of meat from large whales of 794 tons for West Greenland and East Greenland of 38 tons. During the last 20 years, the knowledge about the status of the stocks of large whales was insufficient to grant optimal allocation of quotas. Fortunately, recent surveys for large whales were successful, and the IWC was in 2018 in a better position to approve new quotas, all based on the Scientific Committee's completions of Strike Limit Algorithms (SLA) for all four stocks in the Greenlandic hunt (IWC 2018d). The SLA provides an even more robust basis for providing long-term management advice to the Commission on the subsistence hunt of whales off West Greenland.

The Scientific Committee advises in 2018 that catch limits of 164 minke whales, 19 fin whales, 2 bowhead whales and 10 humpback whales in West Greenland and 20 minke whales in East

Greenland will not harm the stocks. When presenting a catch limit proposal the work and advice of the Scientific Committee will be respected, giving a potential total of 657 tons of large whale meat, and hereby with full utilization almost satisfies the traditional target of 670 tons endorsed by the Commission in 1991 for West Greenland.

According to the IWC-rules, the whaling season for minke whales from the West Greenland and Central stock (East Greenland) is currently limited to 9 months per year. This limitation originates from the regulation of commercial whaling, and was intended to give the relevant stocks a resting period. The limitation does not take into account the opportunistic nature of aboriginal subsistence whaling. In order to accommodate the need for Greenlandic hunters to have sufficient flexibility in their hunting opportunities throughout the year, the hunting season should be normalized to 12 months.

Furthermore, the IWC-rules does not allow for catch of fin whales below 50 feet (15.2 meters). The limitation also originates from the requirements for commercial whaling and was intended to strengthen the management of whale stock when it was introduced in 1946. When carrying out aboriginal subsistence whaling, it is not physically possible to make these measurements. The hunters therefore risk overstepping requirements that they are not able to take into account when hunting for fin whales. Therefore, this requirement should be abandoned. Abandoning the 50 feet limitation is not intended to make it possible to hunt calves or any whale accompanied by a calf, which is not allowed according to paragraph 13. (a) (4) in the IWC schedule nor in Greenlandic national legislation.

Both limitations are historically based in parts of the Schedule dictating the commercial hunt and they do not apply to other ASW-hunts regulated by the IWC - neither in Greenlandic nor the other ASW-countries. Finally, it is important to highlight that the IWC's Scientific Committee reviewed the two proposals in May 2018 and concluded that none of them would have conservation implications (IWC 2018d).

10. Concluding remarks

Greenlandic whaling is the continuation of a very old tradition performed according to needs in a contemporary society. Hunting in general and hunting of large whales in particular are integral parts of the culture and the economy of the country. A Greenland without whale hunting is therefore unimaginable. For this reason, Greenland has the intention to hunt large whales both in the near-term and in the long-term future.

When considering catch limits proposals for 2019 – 2025 the following positive developments should be taken into consideration:

- The IWC scientific committee (SC) has recently for the first time approved reliable estimates of abundance for all the relevant stocks and long-term strike limit algorithm (*SLA)* for all West Greenlandic hunts has been completed.
- The struck and lost rates are kept at a low level as previously commented by the Scientific Committee and improved in this quota block together with the time to death.
- The control and monitoring systems within Greenland are functioning well and the block quotas for the period 2013 – 2018 have not been exceeded, both in West and East Greenland.
- Both in the 20 year period of 1965-1985 and in present time the need of respectively 670 tons and 794 tons corresponds to consumption from large whales of 15 kg annually per person living in West Greenland and the need of 38 tons in East Greenland corresponds to 11 kg per person.
- Taking both the quota usage and the struck and lost rates into account the annual average landing of large whales in West Greenland in the previous quota block 2013-2018 was 428 tons of edible products, corresponding to the average consumption of just close to 8 kg per person living in West Greenland.
- With the most recent catch limits and scientific advice from 2018, Greenland is in practice close to the documented need of 670 tons of meat from large whales that was approved by the IWC in 1991 and 137-175 tons short of the present need of 794 tons documented in this paper.

With such a robust advice from the Scientific Committee, the IWC should be able to approve catch limits for both West and East Greenland that are biologically sound. Such catch limits would be sustainable and the hunt would be well regulated. Furthermore, Greenland will continue working actively on improving the welfare aspects of whale hunting.

The Government of Greenland hopes that the IWC will be able to take management decisions based on the best available scientific knowledge and with respect for the cultural, nutritional and economical needs of Greenlanders and in this respect also fulfil the obligations of the IWC Convention. Allowing Greenland to obtain sufficient whale meat to fulfil the documented need will be a way to protect the global climate and the environment by rationally utilising the natural resources at hand.

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Appendix I

Summary of the points relevant to limitations of catch, monitoring of quota and human killing methods, from the "The *Government of Greenland's executive order nr. 12 of 22 of December 2014 on the hunt of large whales*"

Species:

- All baleen whales and sperm whales are protected, with the exemption of minke whales, fin whales, bowhead whales and humpback whales, which can be taken following the rules specified in the executive order.

- Only fin whales above 15.2 m can be taken from January 1 to December 31. Mother/calf pairs are protected year round.

- Only adult humpback whales can be taken from January 1 to December 31. Mother/calf pairs are protected year round.

- Minke whales can be taken from March 1 to November 30. Mother/calf pairs are protected year round.

- Only adult bowhead whales can be taken from April 1 to December 31. Mother/calf pairs are protected year round.

- It is possible to apply for a dispensation for the euthanasia of whales that are injured, entangled in fishing gear or captured in ice entrapments.

- Large whales caught legally, but discovered being sick and unsuitable for human consumption are considered as euthanized and are not counted as part of the quotas.

- The Ministry of Fisheries, Hunting and Agriculture decides how to use products derived from whales euthanized. It has been the custom that the meat of whales entangled in fishing gear is distributed freely among local institutions, such as hospitals or schools, and among the people from the community.

Requirements:

- Only Greenlandic boats registered in the Danish Maritime Authority can be used for whaling. Furthermore, there are restrictions related to the size of the boat and the equipment on board. The restrictions include the type of harpoon cannon.

- Harpoon cannons should be mounted and approved by authorized personnel. All harpoon

cannons have to be examined and approved every other year by authorized personnel.

- Only persons that have taken a special course on the handling and use of whale-grenades can buy or handle whale-grenades. A certificate of the whale-grenade course, as well as a license, valid for the current year, has to be shown in order to buy a whale-grenade. Registers of all the purchases of whale-grenades are kept at the Ministry of Fisheries, Hunting and Agriculture.

- The boat and the equipment that will be used for whaling have to be approved before a hunter can obtain a license. Only full-time hunters that have taken the course on handling and use of whale-grenades can apply for licenses for large whales (an exemption from this rule are the license for the collective hunt for minke whales described below). Only persons with license can hunt large whales.

- Licenses for the collective hunt of minke whales can be given in places without harpoon cannon boats or where the local boats equipped with harpoon cannon cannot satisfy the demand of fresh meat. Only full-time hunters that own skiffs and do not have access to boats with harpoon cannon can apply for licenses for the collective hunt. There are further regulations concerning the equipment necessary on board the skiffs and the minimum amount of skiffs that can participate in a collective hunt.

Quotas and licences:

- After consulting with the municipalities and with the hunter's organization, the Ministry of Fisheries, Hunting and Agriculture decides every year the maximum number of fin whales, bowhead whales, humpback whales and minke whales that can be taken from each municipality. The allocated IWC quotas are the basis of the annual quota.

- The municipal authorities provide numbered licenses that allow the owner to hunt whales with a specified boat during the current year. Since 1994, the fin whale quotas have been set free, meaning that quotas are not allocated to specific municipalities. Hunters who have obtained a licence for taking fin whales can hunt freely and the Ministry of Fisheries, Hunting and Agriculture stop the hunt when the catches approach the quota.

- Licenses for minke, bowhead and humpback whales are restricted to one whale per license. Licenses for hunting of these three whale species are given in numbered forms by the Ministry of Fisheries, Hunting and Agriculture and distributed to the municipal authorities. The municipal authorities issue the licenses for all the large whales to the hunters.

- Once the amount of licenses allowed by the allocated quotas has been issued, the municipal authorities send information about the hunters, licenses and boats to the Ministry of Fisheries, Hunting and Agriculture. This information is entered into an electronic database.

- A license for the hunt of a large whale in West and East Greenland is used when the animal is struck, not depending on the success of the landing.

- When the quota for any of the four species have been reached for the calendar year any exceeded numbers shall be reduced the same year or following year on any allowed species.

Redistribution and reduction of quotas:

- The Ministry of Fisheries, Hunting and Agriculture can reduce the quota for the current year, or for the following year, if the quotas have been exceeded. Quotas can also be reduced if whales, including whales of protected species, have been shot or captured without license.

- The municipal authorities and the Ministry of Fisheries, Hunting and Agriculture have the authority to transfer or cancel licenses. Incorrect reporting of taken or wounded whales may lead to loss of licenses.

- The quotas are redistributed in early fall. Unused licenses cannot be used after the redistribution of quotas.

Sale of catch, biological samples and catch data

- The product of a catch cannot be sold before the municipal authorities have registered the hunt and stamped the license. In order to obtain a stamp, whalers must show the receipt for the purchase of the whale-grenade, as well as the used whale-grenade with serial number (hunters from the collective hunt do not buy whale-grenades and are exempted from showing receipts or used whale-grenades).

- It is forbidden to export meat of large whales for commercial purposes.

- Anyone who kills a large whale has the obligation to deliver a fresh tissue sample to the municipal authorities. The sample should be stored in containers with chemical solution provided by the Greenland Institute of Natural Resources, and sent to this institute as soon as possible. The sample should be accompanied by information about species, date, location, etc.

- Failure to compile with the regulations of this executive order can lead to fines.

Appendix II

The importance of whale meat and blubber to the diet of Greenlanders

Paper 1.

Title: The Inuit diet. Fatty acids and antioxidants, their role in ischemic heart disease, and exposure to organochlorines and heavy metals.An international study.

Authors: Mulvad G, Pedersen HS, Hansen JC, Dewailly E, Jul E, Pedersen M, Deguchi Y, Newman WP, Malcom GT, Tracy RE, Middaugh JP, Bjerregaard P.

Affiliation: Center of Primary Health Care, Nuuk, Greenland.

Journal: Arctic Med Res. 1996; 55 Suppl 1:20-4.

Abstract: Traditional food is culturally, economically and nutritionally important for the Greenlandic Inuit people. In the 1970s the preventive effect of marine fat on cardiovascular disease, thrombosis and atherosclerosis was described. The low incidence of ischemic heart disease among Greenlanders has been related to the high intake of marine food. Since 1990 routine autopsies have taken place in two towns in Greenland, Nuuk and Ilulissat. The autopsies represent 26% of the total number of deaths in these two towns. Samples have been collected from 104 autopsies. International cooperative studies have analysed specimens in relation to ischemic heart disease as a benefit related to diet, as well as the level of heavy metals and organochlorine in organs as a risk related to diet. High amounts of mono-unsaturated and Omega-3 poly-unsaturated fatty acid were found in adipose tissue. Liver analyses of selenium have confirmed the expected high intake among Greenlanders. Reduced atherosclerotic lesions were found in the coronary arteries. Blood pressure levels calculated from renovascholopathia of hypertension indicate prevailing levels similar to those in industrialized countries. Some factors in Greenland may be protecting the coronary arteries, thereby of setting the expected effect of hypertension. The level of methyl mercury in organs is generally high. PCB concentrations found in organs of Greenlanders are higher than among other populations. **Health and risk effects of the traditional foods need further investigation.**

Paper 2.

Title: Vitamin D insufficiency in Greenlanders on a westernized fare: ethnic differences in calcitropic hormones between Greenlanders and Danes.

Authors: Rejnmark L, Jorgensen ME, Pedersen MB, Hansen JC, Heickendorff L, Lauridsen AL, Mulvad G, Siggaard C, Skjoldborg H, Sorensen TB, Pedersen EB, Mosekilde L.

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Journal: J Trace Elem Med Biol. 2004

Abstract: We studied the influence of age, gender, latitude, season, diet and ethnicity on plasma 25-hydroxyvitamin D 25 OHD, PTH, 1,25-dihydroxyvitamin D, vitamin D-binding protein, bone-specific alkaline phosphatase, and osteocalcin levels in 46 Greenlanders living in Nuuk (64 degrees N) on a traditional fare (group A), 45 Greenlanders living in Nuuk on a westernized fare (group B), 54

Greenlanders (group C), and 43 Danes (Group D) living in Denmark (55 degrees N) on a westernized fare. Blood specimens were drawn both summer and winter. Vitamin D insufficiency (plasma 25 OHD <40 nmol/l) was common in all four study groups during summer (23-74%) and winter (42-81%). Compared to groups A and D, vitamin D insufficiency was significantly more frequent in groups B and C. In all groups, summer levels of 25 OHD were above winter levels. Multiple regression analysis revealed a significant effect of ethnicity. Compared to Danes, Greenlanders had higher 1,25-dihydroxyvitamin D levels, but lower 25 OHD and PTH levels despite relatively low plasma calcium concentrations. In addition to ethnicity, 25(OH)D levels were influenced by age, season (summer > winter), and diet (a traditional Inuit diet>westernized diet). Ethnic differences exist between Greenlanders and Danes. Our results suggest that Greenlanders may have an inherent lower "set-point" for calcium-regulated PTH release or an enhanced renal 1,25(OH)(2)D production. **In addition to ethnicity, age, season, and diet were important determinants of vitamin D status. Changes from a traditional to a westernized fare are associated with a reduced vitamin D status in Greenlanders. Vitamin D supplementation should be considered."**

Paper 3.

Title: Inuit are protected against prostate cancer.

Authors: Dewailly E, Mulvad G, Sloth Pedersen H, Hansen JC, Behrendt N, Hart Hansen JP.

Affiliations: Public Health Research Unit, CHUQ-Laval University, Sainte-Foy, Quebec, G1V 5B3 Canada. eric.dewailly@crchul.ulaval.ca

Journal: J Trace Elem Med Biol. 2004

Abstract: Incidence and mortality rates for prostate cancer are reported to be low among Inuit, but this finding must be additionally supported given the difficulty of obtaining a precise medical diagnosis in the Arctic. We conducted an autopsy study in 1990-1994 among 61 deceased males representative of all deaths occurring in Greenland and found only one invasive prostate cancer. Histological data were available for 27 autopsies and revealed no latent carcinoma. **Our results suggest that in situ carcinoma is rare among Inuit and that their traditional diet, which is rich in omega-3 polyunsaturated fatty acids and selenium, may be an important protective factor**."

Paper 4.

Title: Elements in autopsy liver tissue samples from Greenlandic Inuit and Danes. V. Selenium measured by X-ray fluorescence spectrometry.

Authors: Milman N, Laursen J, Byg KE, Pedersen HS, Mulvad G, Hansen JC.

Affiliation: Department of Medicine B, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark. milman@rh.dk

Journal: J Trace Elem Med Biol. 2004;17 (4):301-6.

Abstract: The content of selenium in normal liver tissue samples from Greenlandic Inuit was measured and the results compared with those obtained in normal liver tissue samples from Danes. Normal liver tissue samples were obtained at autopsy from 50 Greenlandic Inuit (27 men, 23 women) with a median age of 61 years (range 23-83) and from 74 Danes (44 men, 30 women) with a median age of 60 years (range 15-87). Total liver selenium content was measured by X-ray fluorescence

spectrometry. The content of selenium (median) was in Inuit 26.6 micromol/kg dry liver (5-95 percentile: 15.2-49.4) and in Danes 17.7 micromol/kg dry liver (5-95 percentile: < 3.8-36.5) ($p < 0.0001$). Liver selenium content displayed no significant gender difference, either in Inuit or Danes. In Inuit men, there was a negative correlation between liver selenium content and age ($rs = -0.39$, $p < 0.05$), whereas Danish men displayed a positive correlation between liver selenium content and age ($rs = 0.37$, $p = 0.02$). There was no correlation in Inuit or Danish women. In Inuit, the median hepatic selenium index (liver selenium content divided by age) was 0.48 and in Danes 0.33 ($p = 0.001$). There was an inverse correlation between hepatic selenium index and age both in Inuit ($rs = -0.77$, $p < 0.0001$) and in Danes ($rs = -0.47$, $p < 0.0001$). **In conclusion, Inuit had a higher liver content of selenium and a higher hepatic selenium index compared with Danes. The more favourable selenium status is due to a higher nutritional selenium intake with fish and meat from sea mammals.**

Paper 5.

Title: Prevalence of food insecurity in a Greenlandic community and the importance of social, economic and environmental stressors.

Authors: Goldhar C, Ford JD, Berrang-Ford L.

Affiliation: Department of Geography, Memorial University, St. John's, Canada.

Journal: Int J Circumpolar Health 2010; 69(3):285-303.

Abstract: **Objectives.** Characterize and examine the prevalence of food insecurity in Qeqertarsuaq, Greenland, and identify stressors affecting the food system.

Study design. A mixed-methods study using quantitative food security surveys and semi-structured interviews.

Methods. Food security surveys (n=61) were conducted with a random sample of 6% of Qeqertarsuaq's population. Semi-structured interviews (n=75) allowed participants to describe in their own words their experience of food insecurity and permitted in-depth examination of determinants. Key informant interviews were used to provide context to local perspectives.

Results. Prevalence of food insecurity (8%) is low. However, interviews reveal a more nuanced picture, with women, adults aged 55+, and non-hunters reporting constrained access to Greenlandic foods. Barriers restricting traditional food access include changing sea ice conditions, reduced availability of some species, high costs of hunting and purchasing food, tightening food sharing networks, and hunting and fishing regulations.

Conclusions. While the Qeqertarsuaq food system is relatively secure, the research highlights susceptibility to social, economic and environmental stressors which may become more prevalent in the future.

Paper 6.

Title: Can we safely eat our traditional food? Yes, most of it!

Authors: The Nutrition Council of Greenland

Affiliation: Ministry of Health, The Government of Greenland.
Journal: Public information service from the Nutrition Council: A discussion on contamination of Greenlandic food. Knowledge is needed when choosing healthy food, 2011 and repeated in 2013.

Consuming marine mammals with regard to contaminants
If you have passed child-bearing age or no longer wish to have more children, you can eat marine mammals with no consequences for your health, despite the contamination of the marine food chain. Since contaminants from the marine food chain accumulate over a lifetime, and a number of them are not excreted, consuming marine mammals will generate levels during pregnancy that can affect the health of the foetus, as has been ascertained in cases in Greenland.
Therefore, until you have had the children you plan to have, the Greenland Nutrition Council would suggest exercising restraint in consuming marine mammals. If you want to be completely sure of not exposing the foetus to such contaminants, consumption of marine mammals should be avoided until you have had the children you wish. After this there is no risk to health, given the doses measured and the knowledge available in this area. At the same time, **the Nutrition Council recommends that work be done in all the necessary fora to avoid contaminating the food chain, i.e. banning the substances causing the health risk.** A ban on PCB has measurably succeeded in reducing its occurrence in the Arctic marine food chain.

Paper 7.
Title: Food Security across the Arctic.
Authors: Inuit Circumpolar Council - Canada.
Affiliation: Inuit Circumpolar Council – Canada.
Journal: Background paper of the Steering Committee of the Circumpolar Inuit Health Strategy, May 2012.
The Inuit right to food security, page 9-10: Food security is inextricably linked to a person's ability to exercise his or her right to food. That right is included in the 1948 Universal Declaration of Human Rights: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family (sic) including food" (Article 25). It is also enshrined in the 1966 International Covenant on Economic, Social and Cultural Rights.
The UN's Office of the High Commissioner for Human Rights (OHCHR) has recognized the importance of food security for indigenous peoples – not just from a calorific perspective but also from the broader socio-cultural perspective. In its paper on *The Right to Adequate Food*, the significance of food and its accessibility is acknowledged as being "inextricably grounded in …socio-cultural traditions and [the] special relationship to ancestral territories and resources. Food and its procurement and consumption are often an important part of their culture, as well as of social, economic and political organization[8]. For Inuit, this linkage between food and culture is inextricable.
Also important in the context of the right to food is the States obligation to protect the right to food. For Inuit across the Arctic, this is particularly relevant in terms of the level of chemically contaminated

8 The Right to Adequate Food, UNHCHR, Fact Sheet No. 34.

traditional foods. In this, **OHCHR points out that States have to protect the right to food against violations by third parties. "For example, States should prevent third parties from destroying sources of food by, for instance, polluting land, water and air with hazardous industrial or agricultural products or destroying the ancestral lands of indigenous peoples".** As noted earlier, this area of contaminants is one in which ICC has taken a leading role internationally to bring about changes to international regulations and governance surrounding the production of contaminants which threaten the Arctic and its wildlife.

Paper 8.

Title: The best of two worlds: how the Greenland Board of Nutrition has handled conflicting evidence about diet and health

Authors: Peter Bjerregaard and Gert Mulvad.

Affiliation: National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark.

Journal: Int J Circumpolar Health. 2012; 71.

Abstract: The traditional diet in Greenland consists to a large extent of meat and organs of seal and other marine mammals, which is polluted by POPs and mercury. These substances are present in the blood of Greenlanders in concentrations well above international guidelines, and as these contaminants are suspected of having negative impacts on health, some action should be taken. On the other hand, traditional food is also an important source of health promoting micronutrients that are not provided by imported food in sufficient quantities, for example vitamin D, long chain n-3 fatty acids, and selenium, not to mention the traditional diet's function as a social glue that is perceived as important for Inuit identity in Greenland. The proportion of the total diet that comes from marine mammals is on a constant decrease, and especially children and young adults consume rather little seal and whale. The traditional food items are consequently being replaced by imported food, and among the imported food items several rather unhealthy items are popular, that is carbonated soft drinks with sugar, sweets, chips and farmed (red) meat with a high content of saturated fat. Together with a decrease in physical activity, this dietary transition has resulted in a severe epidemic of overweight and diabetes. **In giving advice to the public, the Greenland Board of Nutrition was therefore faced with the challenge to retain the benefits of the traditional diet while minimizing the contaminant exposure, and at the same time to counteract the effects of poor quality imported food. The Board tried to balance the known and suspected positive and negative aspects of the total diet in relation not only to physical health but to general wellbeing, and decided on 10 simple recommendations. As the consumption of traditional food becomes less prominent and as the consumption of food rich in empty calories increases, the guidelines are continuously revised and updated.**

Paper 9.

Title: Health and well-being, chapter 4.

Authors: Anne Merrild, Linnea Ingebrigtson, Sharon Edmunds-Potvin, 2018.

Journal: In: Adaptation Actions for a Changing Arctic: Perspectives from the Baffin Bay/Davis

Strait Region. pp. [101-106]. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.

In Nunavut, food insecurity has been identified to be at crisis levels. In Greenland, some children also experience food insecurity. Food security is affected by climate change through its impacts on food availability, accessibility, quality, and use.

š. *Climate change is affecting the availability of food as a result of shifts in biodiversity as well as changes in the ranges and abundances of animal and plant species important to communities (e.g., berries).*

š. *Thinner ice, later ice freeze-up, earlier ice break-up, more variable snowfall, unpredictable weather, warmer temperatures, and more frequent and intense storms have direct impacts on access to traditional and healthy foods.*

š. *Food quality is being affected by (1) a general decrease in wildlife health and (2) the substitution of storebought food for traditional foods, resulting in higher consumption of nutrient-poor and high-fat foods.*

š. *Climate change affects the development of traditional knowledge and land skills by reducing the ability of young Inuit to engage in land-based (i.e., subsistence) activities. The disruption of traditional mechanisms of knowledge learning and exchange, including meat storage and preparation, has direct implications for how communities interact with the impacts of climate change on the food system, now and in the future.*

š. *Because the production, preparation, and consumption of food are central cultural BBDS activities that provide social cohesion and identity, the availability of traditional food is a core issue regarding food security.*

The World Food Summit of 1996 defined food security as existing "*when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (FAO, 1996). Food insecurity therefore exists when these conditions are not met. **In acknowledgement of the dual food system characteristic of the BBDS region, food security additionally entails the continued and predictable availability of and access to traditional foods** (Paci, 2004; Council of Canadian Academies, 2014). This definition of food security stresses the importance of the traditional food system from a social perspective and recognizes that the traditional diet of country food is not only a vital source of nourishment but also an integral part of emotional, spiritual, and cultural wellbeing (Wenzel, 2009; Cunsolo Willox et al., 2012; Wenzel, 2013).

For Inuit, the right to food extends beyond basic physical and economic accessibility, as country food is integral in providing social cohesion and identity (Dahl, 2000; Damman et al., 2008; Sejersen, 2009; Harder and Wenzel, 2012). **Inuit livelihoods have historically been, and continue to be, defined by a close relationship to the environment and the resources it provides**.

Appendix III

Documentation on Greenland Whaling Submitted by The Government of Greenland to the IWC, 1979 – 2018[9]

1979

1) Ab. Subs. Panel of Experts. Seattle. Kapel, F.O and Petersen, R. Subsistence Hunting – the Greenland Case.

1981

2) TC/33/WG/S 3 Subsistence Whaling in Greenland.[10]

1983

3) TC/AB 1. Subsistence and Cultural Needs relating to Aboriginal Subsistence Whaling among the Inuit in Greenland.
4) TC/AB 2. Nutritional Needs relating to Aboriginal Subsistence Whaling among the Inuit in Greenland.

1984

5) TC/36/AS 2. The Greenland Aboriginal Whale Hunt: Report to the standing Sub-Committee on Aboriginal /Subsistence Whaling of the International Whaling Commission, June 1984. 2

1986

6) TC/38/AS 3. Documentation on the catch taken by aboriginal people from the Central Stock of Minke Whales.
7) TC/38/HK 2 B. The Greenland Aboriginal Whale Hunt.

1987

8) TC/39/AS 1. The Legal and Administrative Aspects of Whaling Operations in Greenland.
9) TC/39/AS 2. Hunting Methods including the "Cold/Warm Harpoon Question".
10) TC/39/AS 3. Larsen, F.B. - Scoresbysund - A Hunting Community in East Greenland. 2
11) TC/39/AS 4. Petersen, R. - Communal Aspects of Preparation for Whaling, of the Hunt Itself and of the Ensuing Products. 2

1988

12) IWC/TC/40/AS doc.1. Submission by the Delegation of Denmark. 2

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9 Scientific Committee Papers not included

10 An edition of these papers is found in "The Anthropology of Community-Based Whaling in Greenland", Studies in Whaling No. 4, Occasional Publication No. 42, Canadian Circumpolar Institute, University of Alaska, ISBN 1-896445-05-5. This book was given to all IWC-delegations at the Annual Meeting in 1997.

13) TC/40/AS 3. Danish Statement.
14) TC/40/HK 3. Denmark´s Answers to the Remaining Questions stated in Document IWC/39/19 "Report of the Humane Killing Working Group", Annex 4.
15) TC/40/HK 4. Implementation of the Detonating Grenade Harpoon i Greenland´s Whaling on a Experimental Basis.

1989

16) IWC/41/22. Greenland Subsistence Hunting.[1]
17) TC/41/HK 2. Introduction of the Detonating Grenade Harpoon in Greenland Whaling on a Experimental Basis.
18) TC/41/Inf. 4. National Inspection in Greenland.

1990

19) TC/42/SEST 4. Larsen, S.E. and Hansen, K.G. - Inuit and Whales at Sarfaq (Greenland): Case Study.[1]
20) TC/42/SEST 5. Josefsen, E. - Cutter Hunting of Minke Whale in Qaqortoq (Greenland): Case Study.[1]
21) TC/42/HK 1. Greenland Home Rule Government. - Introduction of the Detonating Grenade Harpoon in Greenland on an Experimental Basis.
22) TC/42/HK 2. Greenland Home Rule Government. - Greenland Licences for Hunting Minke Whales with Rifles.
23) TC/42/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland.

1991

24) TC/43/AS 1. Greenland Home Rule Government. - Designation of Types of Rifles in Greenland.
25) TC/43/AS 3 Add. Conversion Factors for Minke Whale Meat (Denmark)
26) TC/43/AS 4. Caulfield, R.A. - Qeqertarsuarmi arfanniarneq: Greenlandic Inuit Whaling in Qeqertarsuaq Kommune, West Greenland.[11]
27) TC/43/HK 2. Greenland Home Rule Government. - Introduction of the Detonating Grenade Harpoon in Greenland, 1991.
28) TC/43/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland, 1990.

1992

29) IWC/44/HK 1. Greenland Home Rule Government. - Introduction of the detonating grenade harpoon in Greenland, 1992.
30) IWC/44/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland, 1991.
31) IWC/44/12. International Register of Whaling Vessels, June 1992 (contribution concerning Greenlandic vessels).

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11 An edition of these papers is found in “The Anthropology of Community-Based Whaling in Greenland”, Studies in Whaling No. 4, Occasional Publication No. 42, Canadian Circumpolar Institute, University of Alaska, ISBN 1-896445-05-5. This book was given to all IWC-delegations at the Annual Meeting in 1997.

1993

32) IWC/45/HK 3. Greenland Home Rule Government. - Greenland Action Plan on Whale Hunting Methods, 1992.

33) IWC/45/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland, 1992.

1994

34) IWC/46/AS 1. Caulfield, R.A. - Whaling and Sustainability in Greenland.[12]

35) IWC/46/AS 2. Greenland Home Rule Government. - Quota monitoring in Greenland, 1993.

36) IWC/46/AS 3. Greenland Home Rule Government. - Greenland Action Plan on Whale Hunting Methods, 1993.

1995

37) IWC 47/24. Greenland Home Rule Government. - Greenland Action Plan on Whale Hunting Methods, 1995.

38) IWC/47/Inf. 2. Greenland Home Rule Government. - Quota monitoring in Greenland, 1994.

1996

39) IWC/48/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland, 1995.

1997

40) IWC/49/AS 3. Caulfield, R.A. - New Technologies, New Traditions: Recent Developments in Greenlandic Whaling.

41) IWC/49/Inf. 1. Greenland Home Rule Government. - Quota monitoring in Greenland, 1996.

1998

42) IWC/50/Inf.1. Greenland Home Rule Government - Quota monitoring in Greenland, 1997.

1999

43) IWC/51/inf.3. Greenland Home Rule Government. - Quota monitoring in Greenland, 1998.

44) IWC/51/WK6.Greenland. Status for Greenland Action Plan on Whale Killing Methods, 1999

45) IWC/51/WK7.Greenland. Report on improvings in ASW in Greenland.

46) IWC/51/WK8.Greenland.Efficiency in the Greenlandic Hunt of Minke and Fin whales, 1990-1998.

47) IWC/51/22. A note regarding information requested in IWC-resolution 1998-11.

2000

48) IWC/52/AS1. A note regarding information requested in IWC-resolution 1998-11.

49) IWC/52/AS2. Traditional Food – Environmental and Health Concerns.

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12 An edition of these papers is found in "The Anthropology of Community-Based Whaling in Greenland", Studies in Whaling No. 4, Occasional Publication No. 42, Canadian Circumpolar Institute, University of Alaska, ISBN 1-896445-05-5. This book was given to all IWC-delegations at the Annual Meeting in 1997.

50) IWC/52WKM&AWI 2. A note regarding information encouraged in IWC-resolution 51/44
51) IWC/52WKM&AWI 3. Status for Greenland Action Plan on Whale Hunting Methods, 2000
52) IWC/52WKM&AWI 4. Report on improvings in ASW in Greenland
53) IWC/52/INF3.Quota monitoring on Minke whale and Fin whale hunting in Greenland, 1999.

2001

54) IWC/53/WKM&AWI 1. A note regarding information encouraged in IWC-resolution 51/44 + Appendix 1: 2000 Quota allocation to individual municipalities
55) IWC/53/WKM&AWI 2. Status for Greenland Action Plan on Whale Hunting Methods, 2001 + Efficiency in the Greenlandic hunt of Minke and Fin Whales 1990 – 2000
56) IWC/53/WKM&AWI 3. Report on improvements in ASW in Greenland
57) IWC/53/WKM&AWI 4. Quota monitoring on minke whale and fin whale hunting in Greenland, 2000.
58) IWC/53/INF1. Quota monitoring on minke whale and fin whale hunting in Greenland, 2000.

2002

59) IWC/54/AS4.Caulfield, R.A. - Whaling and Sustainability in Greenland.
60) IWC/54/WKM&AWI 1. Efficiency in the Greenlandic hunt of Minke and Fin Whales 1990 – 2001
61) IWC/54/WKM&AWI 2. A note regarding information encouraged in IWC-resolution 1999-1 + Appendix 1: 2001 Quota allocation to individual municipalities
62) IWC/54/WKM&AWI 3. Report on improvements in ASW in Greenland
63) IWC/54/WKM&AWI 4. Quota monitoring on minke whale and fin whale hunting in Greenland, 2001 (submitted to the Working Group on Whale Killing Methods and Associated Welfare Issues and the Infractions Sub-Committees)
64) IWC/54/WKM&AWI 5.Status for Greenland Action Plan on Whale Hunting Methods, 2001
65) IWC/54/19 Proposed Schedule Amendment (Greenland catch limit)
66) IWC/54/28. Explanation by Denmark on the transfer of traditional food, including minke whale meat, blubber and mattak to Kalaallit living in Denmark
67) IWC/54/29 Statement by Denmark Mr. Honourable Hans Enoksen, Minister of Fisheries, Hunting and Settlements, Greenland Home Rule

2003

68) IWC/55/AS2 Documentation to IWC on Greenland Whaling, 1979 – 2002
69) IWC/55/WK 8. Efficiency in the Greenlandic hunt of Minke and Fin Whales 1991 – 2002
70) IWC/55/WK 9. A note regarding information encouraged in IWC-resolution 1999-1 + Appendix 1: 2002 Quota allocation to individual municipalities
71) IWC/55/WK 10. Report on improvements in ASW in Greenland
72) IWC/55/WKM 11.Status for Greenland Action Plan on Whale Hunting Methods, 2002
73) IWC/55/WKM 12 Rev. Times to death in the Greenlandic minke and fin whale hunt in 2002
74) IWC/55/INF 5 Rev. Quota monitoring on minke whale and fin whale hunting in Greenland, 2002
75) IWC/55/INF 6. Entanglements in fishing gear 2002

2004

76) IWC/56/AS2 Documentation to IWC on Greenland Whaling, 1979 – 2003

77) IWC/56/5. Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)

78) IWC/56/6. Report on improvements in ASW in Greenland

79) IWC/56/7. A note regarding information encouraged in IWC-resolution 1999-1 + Appendix 1: 2003 Quota allocation to individual municipalities

80) IWC/56/8. Status for Greenland Action Plan on Whale Hunting Methods, 2003

81) IWC/56/34rev Draft Statement on Greenland Research Program

82) IWC/56/INF5.Quota monitoring on minke whale and fin whale hunting in Greenland, 2003

2005

83) IWC/57/AS4. Documentation to IWC on Greenland Whaling, 1979 – 2004

84) IWC/57/INF5.Quota monitoring on minke whale and Fin whale hunting in Greenland, 2004

85) IWC/57/WKM&AWI/6. A note regarding information encouraged in IWC-resolution 1999-1 + Appendix 1: 2003 Quota allocation to individual municipalities

86) IWC/57/WKM&AWI/7. Report on improvements in ASW in Greenland

87) IWC/57/WKM&AWI/8. Status for Greenland Action Plan on Whale Hunting Methods, 2004

2006

88) IWC/58/AS3 Documentation to IWC on Greenland Whaling, 1979 – 2005

89) IWC/58/WKM & AWI3. A note regarding information encouraged in IWC-resolution 1999, for the Greenland catch of 2005.

90) IWC/58/WKM & AWI4. Report on improvements in ASW in Greenland.

91) IWC/58/ WKM & AWI5. Status for Greenland Action Plan on Whale Hunting Methods.

92) IWC/58/WKM & AWI6. Summary of activities related to the Action Plan on Whale Killing Methods.

93) IWC/58/WKM & AWI7. Whale killing methods and associated welfare issues in Greenland.

94) IWC/58/INF/3. Draft Summary of Infraction Reports received by the Commission in 2006 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches

95) IWC/58/INF/INF5 Quota monitoring on Minke whale and Fin whale hunting in Greenland, 2005

96) IWC/58/INF. Checklist of Information Required or Requested under Section VI of the Schedule

97) IWC/58. Denmark. Progress report on cetacean research, March 2005 to March 2006, with statistical data for the calendar year 2005

2007

98) IWC/59/WKM&AWI/3 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)

99) IWC/59/INF/4 Summary of Infraction Reports received by the Commission in 2007 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
100) IWC/59/INF Checklist of Information Required or Requested under Section VI of the Schedule
101) IWC/59 Denmark. Progress report on cetacean research, March 2006 to March 2007, with statistical data for the calendar year 2006
102) IWC/59/ASW8rev. White Paper on Hunting of Large Whales in Greenland
103) IWC/59/23 Proposed Schedule Amendment (Greenland catch limits)
104) IWC/59 Greenland Power Point Presentation IWC 59, 2007

2008
105) IWC/60/20 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
106) IWC/60/INF/4 Summary of Infraction Reports received by the Commission in 2008 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
107) IWC/60/INF Checklist of Information Required or Requested under Section VI of the Schedule
108) IWC/60 Denmark. Progress report on cetacean research, March 2007 to March 2008, with statistical data for the calendar year 2007
109) IWC/60/23 rev. Proposed Schedule amendment (Greenland catch limits)
110) IWC/60 Greenland Power Point Presentation IWC 60, 2008

2009
111) IWC/61/6 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
112) IWC/61/INF/4 Summary of Infraction Reports received by the Commission in 2009 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
113) IWC/61/INF Checklist of Information Required or Requested under Section VI of the Schedule
114) IWC/61 Denmark. Progress report on cetacean research, March 2008 to March 2009, with statistical data for the calendar year 2008
115) IWC/61/11 rev. Proposed Schedule amendment (Greenland catch limits)
116) IWC/61 Greenland Power Point Presentation IWC 61, 2009

2010
117) IWC/62/9 Donovan, G et al. 2010. Report of the Small Working Group on Conservation Factors (from Whales to Edible Products) for the Greenlandic Large Whale Hunt.
118) IWC/62/x Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)

119) IWC/62/INF/4 Summary of Infraction Reports received by the Commission in 2010 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
120) IWC/62/INF Checklist of Information Required or Requested under Section VI of the Schedule
121) IWC/62 Denmark. Progress report on cetacean research, March 2009 to March 2010, with statistical data for the calendar year 2009
122) IWC/62/25 rev. Proposed Schedule amendment (Greenland catch limits)
123) IWC/62 Greenland Power Point Presentation IWC 62, 2010

2011

124) IWC/63/9 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
125) IWC/63/INF/4 Summary of Infraction Reports received by the Commission in 2011 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
126) IWC/63/INF Checklist of Information Required or Requested under Section VI of the Schedule
127) IWC/63 Denmark. Progress report on cetacean research, March 2010 to March 2011, with statistical data for the calendar year 2010
128) IWC/63/12rev Proposal to Establish an Ad Hoc Aboriginal Subsistence Working Group (Denmark, Russian Federation and USA)
129) J. CETACEAN RES. MANAGE. 13 (SUPPL.), 2012, appendix 4, page 153. The Ministry of Fisheries, Hunting and Agriculture, Government of Greenland 2011. Greenlandic response to" 9.1 Conversion factors for edible products for Greenland fisheries from the IWC SC meeting 2010."

2012

130) IWC/64/ WKM&AWI7 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
131) IWC/64/INF/x Summary of Infraction Reports received by the Commission in 2012 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
132) IWC/64/INF Checklist of Information Required or Requested under Section VI of the Schedule
133) IWC/64 Denmark. Progress report on cetacean research, March 2011 to March 2012, with statistical data for the calendar year 2011
134) IWC/64/12. Proposed Schedule amendment (Greenland catch limits)
135) IWC/64 Greenland Power Point Presentation IWC 64, 2012
136) IWC/64/ASW7 White Paper on Management and Utilization of Large Whales in Greenland
137) IWC/64/ASW8 Note on the Greenland needs statement
138) IWC/64/ASW10 Progress on Conversion Factors for the Greenland Hunt

2013

139) IWC/65a/ WKM&AWI06 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
140) IWC/65a/INF/4 Summary of Infraction Reports received by the Commission in 2013 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
141) IWC/65a/INF Checklist of Information Required or Requested under Section VI of the Schedule
142) IWC/65a/18 Denmark. Progress report on cetacean research, March 2012 to March 2013, with statistical data for the calendar year 2012
143) SC/65a/AWMP07 Malene Simon, Greenland Institute of Natural Resources and The Ministry of Fisheries, Hunting and Agriculture, Government of Greenland 2013. Progress on Conversion Factors for the Greenlandic Hunt.

2014

144) IWC/65b/ WKM&AWI07 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
145) IWC/65b/INF/4 Summary of Infraction Reports received by the Commission in 2014 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
146) IWC/65b/INF Checklist of Information Required or Requested under Section VI of the Schedule
147) IWC/65b/18 Denmark. Progress report on cetacean research, March 2013 to March 2014, with statistical data for the calendar year 2013
148) IWC/65b/16 Proposed Schedule amendment (Greenland catch limits)
149) IWC/65b Greenland Power Point Presentation IWC 65b, 2014
150) IWC/65b/17 Utilization of Large Whales in Greenland. A Need Statement

2015

151) IWC/66a/ WKM&WI05 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
152) IWC/66a/INF/4 Summary of Infraction Reports received by the Commission in 2015 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
153) IWC/66a/INF Checklist of Information Required or Requested under Section VI of the Schedule
154) IWC/66a/online Denmark. Progress report on cetacean research, March 2014 to March 2015, with statistical data for the calendar year 2014

2016

155) IWC/66b/ WKM&WI05 Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
156) IWC/66b/INF/4 Summary of Infraction Reports received by the Commission in 2016 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
157) IWC/66b/INF Checklist of Information Required or Requested under Section VI of the Schedule

158) IWC/66b/online Denmark. Progress report on cetacean research, March 2015 to March 2016, with statistical data for the calendar year 2015

2017

159) IWC/67a/ WKM&WI0x Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
160) IWC/67a/INF/x Summary of Infraction Reports received by the Commission in 2017 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
161) IWC/67a/INF Checklist of Information Required or Requested under Section VI of the Schedule
162) IWC/67a/online Denmark. Progress report on cetacean research, March 2016 to March 2017, with statistical data for the calendar year 2016

2018

163) IWC/67b/ WKM&WI0x Summary of Activities Related to the Action Plan on Whale Killing Methods (based on Resolution 1999-1)
164) IWC/67b/INF/x Summary of Infraction Reports received by the Commission in 2018 / Report on infractions of the International Convention for the Regulation of Whaling, 1946 and summary information on catches
165) IWC/67b/INF Checklist of Information Required or Requested under Section VI of the Schedule
166) IWC/67b/online Denmark. Progress report on cetacean research, March 2017 to March 2018, with statistical data for the calendar year 2017
167) IWC/67b/x Proposed Schedule amendment (Greenland catch limits)
168) IWC/67b Greenland Power Point Presentation IWC 67b, 2018
169) IWC/67b/X White Paper on Management and Utilization of Large Whales in Greenland
170) IWC/67b/x Description of the hunt in Greenland, IWC web: URL

Appendix IV

West Greenlandic catches 2013-2017 submitted to the IWC database

Table 9A. In the present six year strike limit period (2013-2018), the average proportion of landed animals relative to all struck animals (landed plus lost animals) is 97 % for Greenlandic minke whales, 90 % for Greenlandic fin whales, 100 % for bowhead whales and 93 % for humpback whales. 2018: Not available, na.

	2013			2014			2015			2016			2017			2018			Actual use 2013-2017
Species	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Proportion
Minke whale	166	9	175	144	2	146	130	3	133	146	2	148	129	4	133	na	na	na	0.97
Fin whale	9	0	9	11	1	12	10	2	12	8	1	9	7	1	8	na	na	na	0.90
Bowhead whale	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	na	na	na	1.00
Humpback whale	7	1	8	6	1	7	6	0	6	5	0	5	2	0	2	na	na	na	0.93

Table 9B. Quota including carry-over provisions in the last three quota blocks in West Greenland

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Species	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota	Quota
Minke whale	190	180	176	175	169	200	215	193	185	183	178	164	179	179	179	179
Fin whale	19	19	19	10	10	19	19	10	10	10	19	19	19	19	19	19
Bowhead whale						2	4	3	2	3	2	4	4	4	4	4
Humpback whale						0	0	9	9	10	10	12	12	12	12	12

West Greenlandic catches 2008-2012 submitted to the IWC database

Table 9C. In the five year strike limit period of 2008-2012, the average proportion of landed animals relative to all struck animals (landed plus lost animals) is 96 % for Greenlandic minke whales, 83 % for Greenlandic fin whales, 100 % for bowhead whales and 89 % for humpback whales																
	2008			**2009**			**2010**			**2011**			**2012**			**Actual use 2008-2012**
Species	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Proportion
Minke whale	146	5	151	153	11	164	180	7	187	173	6	179	144	4	148	0.96
Fin whale	11	3	14	8	2	10	5	1	6	5	0	5	4	1	5	0.83
Bowhead whale	0		0	3	0	3	3	0	3	1	0	1	0		0	1.00
Humpback whale	0		0	0		0	9	0	9	8	0	8	7	3	10	0.89

West Greenlandic catches 2003-2007 submitted to the IWC database

Table 9D. In the five year strike limit period of 2003-2007, the average proportion of landed animals relative to all struck animals (landed plus lost animals) is 97% for Greenlandic minke whales and 84% for Greenlandic fin whales.																
	2003			**2004**			**2005**			**2006**			**2007**			**Actual use 2003-2007**
Species	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Landed animals	Struck and lost animals	Struck animals	Proportion
Minke whale	178	7	185	175	4	179	173	3	176	175	6	181	161	6	167	0.97
Fin whale	6	3	9	11	2	13	12	1	13	9	1	10	10	2	12	0.84

Appendix V

The 63. Annual meeting of the International Whaling Commission:

Range state consultation - Addressing Greenland's aboriginal subsistence quota on humpback whale, 2011

Introduction

Over the last couple of annual meetings, a decision has been hard to reach on the Greenlandic request of 10 humpback whales off West Greenland. However after many hours of negotiations a consensus was in the end reached at IWC 62 in 2010.

Concerns or criticism were raised based on some of the following arguments: (1) the shared nature of the resource and the possible opportunity costs to tourist-based whale watching in parts of the Caribbean where humpback whales from the western North Atlantic migrate to breed and (2) the need for notifications and consultations with nations that benefit (e.g. through tourist-based whale watching) from shared ownership of western North Atlantic humpback whales.

A wish was raised that Greenland had consultation with the Range states. Therefore Greenland at the following meeting IWC 63 in 2011 invited all range states countries or territories in North America and in the Caribbean Basin to participate in a consultation. This is a resume of the presentation given at that consultation.

Range state

Range state is a term used in zoogeography to refer to the countries in which a species or biotope is usually found. The migratory route followed by the West Greenland feeding aggregation is unknown and thus it is difficult to formally identify its range states.

Criteria used for the consultation was by the advice from the IWC Secretariat in combination with Randy Reeves from the IUCN Cetacean Specialist Group, in total 13 Countries / Territories incl. Greenland-Denmark was invited.

With the presentation we did not only wished to talk about whaling, but also to give a more thorough introduction to the country Greenland with all the possibilities and challenges we are facing now and in the time to come. The presentation covered the following topics: I) Greenland's geography, infrastructure, economy, II) use of natural resources, III) fishing and whaling, with a focus on the humpback whale, IV) a short status on the use of the quota of 2010, V) the last topics up for discussion was other human induces mortality and whale watching.

I) Greenland's geography, infrastructure, economy
Not enclosed here.

II. The use of natural resources
Whale hunting is part of our modern life today; however Greenland is also a traditional hunting society, where food is gathered by those who are able to take it. Opportunities for employment in Greenland and especially in settlements are limited and for many of our people, hunting and sharing of food resources offers the only opportunity for food of our own sources.

Our hunting is opportunistic, given the resources available, as different species migrate around our settlements. These resources are shared throughout Greenland. As it is known, we do not export our whale products. 14 out of the 18 whale hunting villages are able to take a combination of minke, fin, humpback whales and in the Disko Bay area also bowhead whales.

The Greenland whale hunt, relevant to the IWC, consists of two forms. It is the rifle hunt of minke whale conducted from small boats by license and it is the harpoon hunt conducted from fishing vessels, mounted with harpoon cannon.

The Hunting methods have continually been evaluated and improved since the end of 1980's. Only full-time hunters that have taken a special course on handling and use of whale-grenades, and whose boat and equipment have been approved can apply for licences.

The White Paper on Hunting of Large Whales in Greenland presented (ASW/8) in 2007, described our efforts to keep up with technology and to train the hunters in order to ensure that large whales are killed as humanely as possible, while at the same time taking into consideration the safety of the crews. Most of this work is done in close collaboration with NAMMCO, weapon experts and veterinaries.

In this case where two new species have become available to Greenland, an exchange of knowledge and know-how on hunting techniques etc. was started to ensure that the appropriate killing and flensing methods are used. The whale-grenade was modified last year for ensuring a quicker killing.

Scientific advice on Greenlandic quotas
In 2009 the Scientific Committee was for the first time able to give interim advice on all 4 whale species relevant to Greenland. The interim advice is valid for two quota blocks. The recommendation from the Scientific Committee was 10 humpback whales off West Greenland. In asking for the quota of humpback whales, we seek to return to the multi-

species harvest and balance of resources available to our people prior to 1987, when concerns over the health of the humpback whale population led to the need to abandon that hunt.

By returning the humpback whales to our mix of resources, we will be able to reduce the overall number of whales our hunters take, because of the greater yield provided by the humpback whales.

In 1991 IWC commission accepted and endorsed that the annual need of meat from large whales in West Greenland was 670 tonnes. The need was estimated on the basis of the average annual catches of 232 minke whales, 9 fin whales and 14 humpbacks through the years from 1965 to 1985. This estimate was calculated by the "Technical Committee and Aboriginal Subsistence Whaling Sub-committee".

III) Humpback whales in Greenland

Movement patterns of thousands of humpbacks photographed across the North Atlantic show high levels of site fidelity. There is good evidence that there is little or no movements between the four major feeding aggregations in the North Atlantic although there is mixing on the breeding grounds. The primary breeding grounds now appear to be near the Dominican Republic. To date there is no evidence that these whales migrate as far as or below the equator.

The Scientific Committee has previously agreed to provide management advice on the West Greenland feeding aggregation of humpback whales by treating this as an independent stock. The full biological population stock from which Greenland is harvesting is not endangered; in fact the West Greenland feeding aggregation has an estimated increase rate of 9 % per year. The total breeding population was estimated to be more than 11,000 animals from the YONAH project. The stock winters in the Caribbean Seas and stay in Greenland waters during summer.

Last year the Commission agreed that an annual strike limit of 9 whales for the years 2010-2012 with an annual review by the Scientific Committee will not harm the stock.

IV) Status on the use of the quota of 2010

The 9 Greenlandic catches in 2010 took place from Disko Bay down to South Greenland over a time span of 4 months August-November. It is likely that the range of humpback whales in West Greenland will expand as the population continues to increase. In recent years humpback whales were found more widely distributed in West Greenland and records of observations further north are now frequent.

To implement the decisions taken at the 62 Annual Meeting a new official order had to be issued by the Government of Greenland covering, at the same time, all the changes to the minke whale quota, the fin whale quota and the new humpback quota.

The Government of Greenland decided to introduce the new official order on 13 August 2010, i.e. 2 months before 13 October 2010. This decision had been taken to honor the political agreement from the 62 Annual Meeting. This can be considered an infraction in relation to the wording of article V, para 3 in the IWC Convention. During the deliberations of the Government of Greenland the decision was to disregard Arcticle V, para 3 as the objection procedure in the convention is without meaning when one country only has been granted quotas. The 90-day period and the dates of the Annual Meeting were originally linked in with the Antarctic season and for catch limits shared by a number of governments and it does not work temporally for the Northern Hemisphere if limits are set for the same year as the Annual Meeting which agrees them.

V) Other human induces mortality
In terms of anthropogenic mortality affecting the large western North Atlantic breeding population, any mortality (e.g. ship strikes, bycatches, direct catches) is relevant wherever it occurs throughout the range.

Humpback whales are subject to entanglements, often fatal, in fishing gear. They are also vulnerable to injury by ship strikes, which can also be fatal.

The documentation of such incidents is best for US waters. For the Atlantic coasts of the US during 1999-2003, there were 19 reports of death or serious injury caused by entanglements and 7 cases of death or serious injury due to ship strikes (Anonymous. 2005. Humpback Whale (*Megaptera novaeangliae*) Gulf of Maine Stock. Marine Mammal Stock Assessment Reports.. Office of Protected Resources. NOAA Fisheries). For US Pacific waters (mainly Alaska) during 1999-2001 there were 13 reports of deaths and serious injuries due to entanglement and 3 reports of deaths due to ship strikes (Anonymous. 2005. Humpback Whale (*Megaptera novaeangliae*) Eastern North Pacific Stock. Marine Mammal Stock Assessment Reports. Office of Protected Resources. NOAA Fisheries).

So in US waters alone a higher number of humpback whales die than the annual quota given to GRL. Much work is done to reduce the numbers, however these will be underestimates, and possibly large underestimates of actual deaths. There is a need for estimates based on the understanding of the risk in relation to ship densities and whales involved.

Whale watching
Greenland respects the whale watching industry and hears the concern raised from some parties. However Greenland sees the possibility of the two industries moving forward hand

in hand. For the first time guidelines has been made concerning whale watching in Greenland. The guidelines have been made as a collaboration between the Greenland Institute of Natural Resources and The Greenland Tourism and Business Council.

Unregulated whale watching has proved to disturb humpback whale behaviour in Nuuk Fjord. Preliminary results of a study on the effect of guidelines on humpback whale behavior indicate that if a simple set of guidelines are followed, the impact of whale watching is likely to be reduced. Based on these preliminary results, the Greenland Institute of Natural Resources recommends the following set of guidelines for whale watching in Greenland:

- Slow down to "no wake" when within 500 m of the whale
- Do not approach the whale directly from behind or in front
- Do not actively move closer to the whale than 50 m

Furthermore there was Greenland participation in the Whalewatching Workshop, Puerto Madryn in November 2010.

There are at present 15- 20 Operators in Greenland with none dedicated to WW alone. WW covers app. 5-10 % of charter tours.

On October 5th 2010, the Government of Greenland received a letter from CARIBwhale Inc. (Association of Caribbean Whale Watch Operators), which was signed by 80 whale watch operators from 14 different countries, all represented here except Iceland, Australia and Trinidad & Tobago. They expressed their concern regarding the resumption of our humpback whale hunt. Their concern is that the whaling will harm the tourism in Greenland. The Government of Greenland does not share this concern.

The Government of Greenland is confident that both whaling and whale watching can co-exist, as it already has done for several years in Greenland, Iceland and Norway. Both in Norway and Iceland reports are showing that whaling is not harming the tourism or other industries, on the contrary, the countries have seen increase in the tourism industry.

Furthermore, the Government of Greenland's legislation number 11 of 16th July 2010 on hunting and protection of large whales gives the Municipalities of Greenland the opportunity of creating their own guidelines on whaling and whale watching. A recent statement from Greenland Tourism Council says that the Council will support whaling as long as the whaling is conducted in a sustainable way

Conclusion

The aim of the presentation was to inform a bit more about Greenland than is possible during a quota discussion and also to set into perspective our quotas influence on the economic interest of the Range states.

The humpback hunt is a part of the food gathering in Greenland – on parallel with the hunt for seals and fishing. We think it is a biological sound to distribute the hunting pressure on several species, including the humpback.

When we compare the numbers involved in the hunt and the total stock of humpbacks we can see no harm for the stock at all and we do not believe that the hunt influence the behaviour of the animals at all, i.e. is a problem in relation to whale watching nationally nor internationally.

We hope this presentation gave the background information needed for further consideration and will be happy for any feedback. No concern or criticism was raised during or after the presentation. Neither have any of the range states countries or territories contacted Greenland in the time after June 2011 for further questions or consultation concerning the humpback whale hunt.

Appendix VI:

Management of Aboriginal Subsistence Whaling / Reflections on Issues Raised During the Dialog, 2014

Over the past year Denmark and Greenland have conducted consultations with the aim of improving the Aboriginal Subsistence Whaling (ASW) management of the IWC and reaching a decision at the IWC65 on aboriginal subsistence whaling in Greenland. The Kingdom of Denmark appreciates the kind assistance of the Chair of the IWC and the Secretariat in facilitating the process advised by the Bureau.

The initial comments received have been very welcome and helpful to the process. Denmark and Greenland believe the comments can guide the IWC towards more solidly based ASW management in the future.

The proposals forwarded to the IWC, has been influenced to a large degree by the initial comments, questions and suggestions received.

Denmark and Greenland wish in addition to the proposals to add a few comments on some central issues raised. It has become evident to us during the process that a high degree of uncertainty still prevails among IWC members as to the obligations of contracting governments managing ASW, in particular in relation to Greenland. Such uncertainty underlines the grave need for an internationally more coherent view of ASW management and continued work by the ASW working group (ASW WG) over the coming years.

The network of obligations in an IWC context consists of legal and other, less binding, obligations. There are very few legally binding obligations relating to ASW on the Governments and areas managing ASW in the Convention and the Schedule. They are to be found in relevant paragraphs of article V of the Convention and paragraphs 13 and 14 of the Schedule.

In addition, the following non-binding resolutions are particular relevant in the Greenland context:

- Resolution 1978 – 3 Capture of Humpback Whales in Greenland Waters, requesting the Danish Government to attempt to substitute fin whales for humpback whales in meeting the Schedule set that year for West Greenland waters.
- IWC Resolution 1978-4 Reporting Data Relative to Humane Killing, requesting 2 specific types of information on each whale taken

- IWC Resolution 1980-3 (as later adjusted) Resolution on the Documentation of Aboriginal Need, requesting information on utilization of the meat and other products
- IWC Resolution 1982-3 Resolution Concerning Aboriginal Subsistence Whaling, which agreed to implement the Aboriginal Subsistence Whaling Management Regime.
- IWC Resolution 1985-3 Resolution on Humane Killing in Aboriginal Subsistence Whaling, requesting that ASW areas adopt more efficient methods in order to reduce cruelty and inhumanity (which in Greenland lead to the introduction of the exploding grenade)
- IWC Resolution 1992-1 Resolution on Humane Killing, encouraging collection and presentation of struck and lost rates and time to death records
- IWC Resolution 1993-1 Resolution on Humane Killing
- IWC Resolution 1997-1 Resolution on improving the humaneness of Aboriginal Subsistence Whaling
- IWC Resolution 1999-1 Resolution arising from the Workshop on Whale Killing Methods, requesting regularly 7 specific types of information in order to minimize time to death.

We have studied the legal obligations and agreed policy Resolutions of the IWC and have respected their implications in the following pages.

During the consultations it has also become clear to us that some important concepts relating to ASW are not interpreted equally by everyone in relation to Greenland. These are the areas to which we wish to respond:

- The concept of aboriginal
- The question of Commercialization
- The question of Subsistence Needs

These are all issues that are currently being considered by the ASW WG and we are confident that once the results of the Group's deliberations are available it will be possible to build consensus around them. In the meantime, Denmark and Greenland offer the following views on these concepts.

Re The concept of aboriginal:
It has been suggested that only "aboriginals" can have a share of the catch – not other nationals of the Kingdom of Denmark, visitors or others. This concept – aboriginals - was first mentioned in relation to whaling more than 80 years ago (in 1931) and it has never been explained nor defined within the IWC, as it was taken for granted that the concept covered people living in the areas, where whaling took place to the benefit of these people.

Under Danish or Greenlandic law there has never been a legal or administrative distinction in Greenland or Denmark between individuals based on ethnicity or culture, or attempts to distinguish "indigenous" from "non-indigenous".

These facts have left their footprint in the wording of the Schedule. For Greenland (Schedule §13,b,3) and St Vincent (Schedule §13,b,4) it is written that the whale products are for "local consumption", whereas in Schedule § 13,b,1 and 2 for other geographical areas there is a more specific requirement that the products "…are to be used exclusively for local consumption by the aborigines."

It is fortunate that the modern Schedule does not try to restrict the consumption of whale products in Greenland to "aborigines", since this would require the introduction of a legal framework and implementing rules on ethnic identification and registration. We cannot provide a definition of aboriginal in Greenland, not only because of the legality of the matter, but also because the IWC has not managed to settle the issue of a definition of "aboriginal". Greenland only has the concept of Kalaallit (Greenlandic translation of "Greenlander", meaning any person who lives in Greenland for so long, that they feel and are acknowledged as Greenlanders). Establishing a definition of "Inuit" has been tried internationally many times and has always failed.

In Greenland there is no register of who is "Inuit", "Non-Inuit" or "Kalaallit" in Greenland. Instead, there is a registration of people living in Greenland and registration of who is born in Greenland and who is not. Following centuries of external contacts many Greenlanders have mixed Greenlandic, Danish or other origin. At present an estimated 18.000 Greenlanders study or live temporarily or permanently in Denmark. Every Greenlander is a national of the Kingdom of Denmark. Defining "Aboriginal" – is not legally, politically or practically possible.

This is why the Schedule § 13,b,3 speaks only about "local consumption" without defining which individuals can consume the whale products locally. Since aboriginal cannot be defined, an effort to restrict the consumption of whale products to parts of the population of Greenland is not possible, reasonable or legally acceptable nor required by the IWC.

Nevertheless, Denmark and Greenland has always sought to provide information to the IWC to explain and justify its subsistence whaling for local consumption as an integral part of Greenland's ability to exist as a small community under harsh Arctic conditions with few and limited natural resources whose harvest comes at high cost.

Re The question of Subsistence Needs

This is perhaps the most contentious issue in the IWC's current consideration of ASW. There is a long history to the IWC's deliberations on the matter and it may be helpful to recall some of that. Denmark and Greenland also consider that the ASW WG's work to be of great importance in this context and Denmark and Greenland are contributing actively to it. In doing so Denmark and Greenland hold the view that all ASW areas should be treated equally in accordance with the Convention, Schedule and Resolutions thereunder.

The original 1946 Schedule adopted along with the Convention contained a very brief paragraph 2 referring to aborigines since all other whale stocks could be hunted to varying degrees. The paragraph did not include catch limits on aboriginal hunting but read:

- It is forbidden to take or kill gray whales or right whales [this included bowheads], except when the meat and products of such whales are to be used exclusively for local consumption by the aborigines.

Subsequently the Schedule was reordered several times but the concept of the 'aboriginal' exemption for local consumption remained.

The adoption of the moratorium on commercial whaling in 1982 coincided with adoption of Resolution 1982 – 3 responding to a Report of a Technical Committee Working Group on Management Principles and Guidelines for Subsistence Catches of Whales by indigenous (Aboriginal Peoples). These two developments modified the Schedule, including, at Denmark's suggestion, the insertion of the Management Principles (current Schedule §13a – "..establish catch limits" .. "to satisfy aboriginal subsistence needs ..").

However, this single reference to "subsistence needs" has never been defined in the Schedule. Thus there is no objective agreed basis in the Treaty instruments for defining subsistence needs, especially in an opportunistic, multi-species hunt in the difficult conditions faced in Greenland.

Nevertheless, two Resolutions from just before the adoption of the Management Principles are relevant to the concept of subsistence needs as is the final part of Resolution 1982 - 3 itself.

In 1979 there was considerable controversy over the Bering Sea hunt of Bowhead whales. In adopting Resolution 1979-4 on the matter, the IWC unanimously included a second preambular paragraph which recognised the importance of accommodating the subsistence and cultural needs of aboriginal people in general not simply those in the USA. In the operative part of the Resolution, which is specifically directed at the USA, the Resolution states the intention of the IWC that the needs of the 'aboriginals of the USA' should be

determined by the Government of the USA while putting forward a number of reporting requirements that should be covered in a Needs Statement to be documented annually to the Technical Committee. Thus as long ago as 1979, the IWC considered that it was a national prerogative and the competence of the government to define the needs of its relevant population.

In the 1980 IWC resolution on the documentation of Aboriginal "Needs Statements" (resolution 1980-3) it was indicated that the Contracting Governments should document annually, for the information of the Commission, the utilization of the meat and other products, taken for the aboriginal/subsistence purposes. Later (as the quota block period expanded in time in 1997-2002) it was decided that it was sufficient to provide this information only once in a quota block period. Thus the detailed guidance given in 1979 on factors to be covered in the Needs Statement was not repeated in the general Resolution 1980 – 3 addressed to all Contracting Parties with aboriginal/subsistence whaling.

It should be noted that although the detailed resolution 1979-4, which put forward a number of reporting requirements (importance of whaling in traditional diet, adverse effects of shifts to non-native foods, other food sources, historical takes, risks to community identity if restrictions, ecological considerations) was not addressed to Greenland, these issues have none the less been covered in our Need papers.

Greenland has, time and again, demonstrated what is needed in West Greenland (i.e. 670 tons of whale products on the West Coast based on the number of whales caught in a defined time interval before the implementation of quotas and inhabitants in Greenland at that time, and latest in 2014 799 tons). Greenland has been working with the Scientific Committee (SC) on the conversion factors it uses for translating tons into whales. The latest reporting from Greenland on its progress was positively accepted by the SC, who recommended no further reports to the SC.

Through Resolution 1982 – 3 adopting the aboriginal subsistence management regime the IWC also established a standing sub-committee of the technical Committee to consider documentation on nutritional, subsistence, and cultural needs relating to aboriginal subsistence whaling and the uses of whales taken for such purposes, and to provide advice to the Technical Committee for its consideration and determination of appropriate management measures. This Resolution did not make the IWC responsible for reaching a unanimously agreed view of aboriginal subsistence needs in particular cases. This has led to a number of different individual interpretations of the concept with no legal basis within the IWC.

Previous Schedule language limiting Russia's aboriginal whaling to situations where "traditional aboriginal subsistence and cultural needs have been recognised" was waived by

consensus as a discriminatory practice in 2004. "Cultural needs" are therefore not anymore taken into consideration.

Some countries request for information from Greenland goes far beyond what other ASW contracting governments have previously provided, including demands for information on "regional and national population trends and demographic, regional differences in consumption pattern – other sources of subsistence meats" just to mention a few.

The question on "Needs Statements" is part of the agenda of the ASW WG due to the fact that considerable uncertainty on the content of Needs Statements and the different requirements in the individual ASW societies exist. From Denmark's and Greenland's initial point of view, the only legitimate requirements of ASW countries are that the hunt is undertaken by people living in an ASW country, that the hunt is based on a tradition and is intended for local consumption.
Greenland and Denmark will continue to engage constructively in the discussions on the question of Needs Statements and other associated questions raised in the ASW WG.

Re The question of Commercialization
It has been argued by some that the Greenland hunt is "commercial" or "semi-commercial". Denmark and Greenland cannot accept any direct or indirect accusations that the Kingdom of Denmark is engaged in commercial whaling contrary to the IWC moratorium or attempts to question whaling in Greenland by claiming commercial intentions or practices.

It is noted and appreciated of the fact that no official documentation has been submitted by contracting government to substantiate such allegations of commercial whaling which are usually made by civil society organisations based outside Greenland.

Following are responses to concerns that have been expressed:

Greenland's hunt is – as unanimously agreed by the IWC Commission characterised not as commercial whaling but is covered by § 13 in the Schedule and acknowledged as aboriginal subsistence whaling.

Neither the Convention nor the Schedule prevent the involvement of money in the taking and distribution of ASW products, nor do they impose restrictions on where and how the products can be distributed or consumed locally. In our view, this is a national responsibility.

Commercial operations are usually defined as being driven by market forces to maximize catches in economic terms. The Greenlandic hunt is limited, within the framework of a local quota system adopted and managed by the Government of Greenland, so that the hunters

only take what is available and required to satisfy local needs, for food consumption, in line with the prevailing opportunistic gathering of food in Greenland. In the IWC Special Issue 4, 1982, reporting on a meeting in the Cultural Anthropology Panel (February 1979) it is mentioned that a definition was developed on "subsistence use" at the meeting, relating to "the barter, trade or sharing of whale products". Money had a place in this definition, but was not of primary importance. The Report was later accepted by the IWC in 1982.

In the 35 years since the meeting of the Panel, the world has changed considerably, not least in the areas where whaling takes place by indigenous societies. In 2004 the IWC reaffirmed not only the Panel's 1979 conclusion but also by consensus that some transactions beyond the aboriginal whaling community under the current Schedule language are acceptable. Furthermore, the introduction of new catch methods (decreasing time to death, but requiring money for the equipment) has fundamentally changed the importance of the involvement of money and its socio-economic importance, especially in remote areas.

In the Greenlandic hunt, the money involved is intended to allow the recovery of costs (whale-grenades, boats, salaries, equipment, storage, distributions etc.) as well as to ensure optimal use of any animal and as an integral part of the modern functioning of the local society. Whale-grenades in particular are costly (the equivalent of 1200 US dollars for one and some whales require multiple whale-grenades). The Greenland hunters are not obliged by IWC-rules to use the exploding whale-grenade as the "cold" harpoon would be legitimate in accordance with IWC-rules (the cold harpoon is only outlawed in relation to commercial whaling covered by § 10 in the Schedule).

The IWC Commission has in 1979 (Technical Committee) and again in 1985 (Resolution 1985-3) urged that areas where aboriginal whaling took place should promptly adopt more efficient methods of killing whales in order to reduce cruelty and inhumanity. In Resolution 1999-1, with a view to minimise time to death, the Commission requested 7 specific types of information which Greenland has consistently provided since then.

In the delicate balance between animal welfare, costly whale-grenades and reporting requirements, the Government of Greenland has taken the decision to enforce the use of the exploding whale-grenade, where this is feasible. And that means that money has a high importance in the effort to reduce time to death and effective killing. Greenland remains committed to improving those aspects of the hunt.

A very limited sale of whale products takes place in local restaurants in Greenland accessible to the Greenlandic population as well as people visiting Greenland. Following accusations at IWC-64 of this sale being disproportionate to the amount of products available from the hunt, the Greenland authorities have reviewed the situation and concluded that an estimated average of 13 restaurant meals per day throughout Greenland, contain whale products. This

equates to approximately 1.600 kg. whale products pr. year. Given that the vast majority of visitors to restaurants are members of the Greenlandic population, the consumption by foreign tourists is considered to be insignificant. The small number of restaurant meals consumed probably reflects the fact that most local people prefer to prepare and cook the whale products in their own home in the traditional way. The few hotels and restaurants which have whale products on their menu prepare the dish in non-traditional ways.

Transfer of small quantities of minke whale products within our Kingdom for private consumption by the Greenland community in Denmark is allowed on a purely non-profit basis, through members-only associations in compliance with international commitments. No permits for such transfer have been issued since the summer of 2012. Greenland and Denmark are discouraged by the repeated attempts to spread disinformation through the media and some civil society representatives about these transfers. Denmark and Greenland encourage contracting governments, IWC commissioners as well as citizens and NGOs to contact Denmark and Greenland directly for further information.