GREENLAND, NARWHAL (*MONODON MONOCEROS*)

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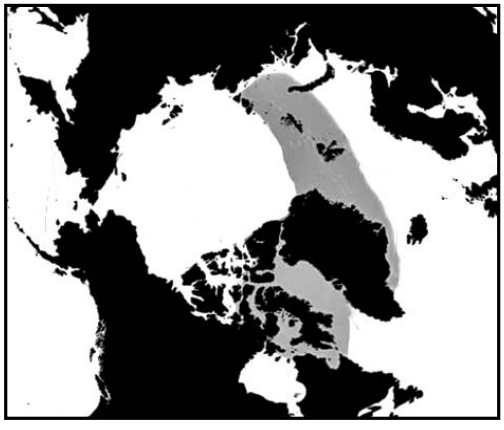
I. Background information on the taxa

1. BIOLOGICAL DATA

1.1. Scientific and common names
Narwhal (*Monodon monoceros*)

1.2. Distribution
Narwhals are distributed in the North Atlantic Arctic, with the majority of the abundance being in Arctic Canada and Greenland. The summer distribution is largely continuous, but divided into relatively isolated aggregations with site fidelity to separate fjord systems during summer. During winter the species can be found in the drift ice between Greenland and Canada, off the west coast of Greenland, off East Greenland, in the Greenland and in the northern Barents Sea.



1.3. Biological characteristics

1.3.1. *Provide a summary of general biological and life history characteristics of the species*

Narwhals may exceed 100 years of age, with the majority of females being sexually mature at about seven years of age. The average calving interval for mature females is three years.

1.3.2. *Habitat types*

The species is found in drift ice during winter often at deep water where it feeds on halibut. During summer it is often found in deep fjord systems.

1.3.3. *Role of the species in its ecosystem*

A top predator that feeds on halibut and squid in deep waters. Narwhals are preyed upon by killer whales (*Orcinus orca*) and men.

1.4. Population

1.4.1. *Global Population size*

An aerial line-transect survey that did not cover the total range of narwhals in Arctic Canada estimated 45,000 (95% CI: 23,000-88,000) narwhals in 1996. Aerial line-transect surveys off West and East Greenland carried out in 2006 (west, spring), 2007 (northwest, summer) and 2008 (east, summer) are currently being analysed. Numbers in Svalbard and the Barents Sea are unknown, but the densities are lower than in Arctic Canada and Greenland. Abundance estimates are listed by NAMMCO 2005[1](See ANNEX 1 *JCNB/NAMMCO SWG workshop report on narwhal and beluga*).

1.4.2. *Current global population trends*

___increasing ___decreasing ___stable _X_unknown

1 NAMMCO 2005. Report of the Thirteenth meeting of the NAMMCO Scientific Committee Annex 1. Report of the joint meeting of the NAMMCO Scientific Committee Working Group on the Population Status of Narwhal and Beluga in the North Atlantic and the Canada/Greenland Joint Commission on Conservation and Management of Narwhal and Beluga Scientific Working Group. NAMMCO Annual Report 2005, pp. 219-251. www.nammco.no/nammco/mainpage/publications/annualreports/

1.5. Conservation status

1.5.1. *Global conservation status* (according to IUCN Red List)

___Critically endangered
___Endangered
___Vulnerable
___ Near Threatened
___Least concern
_X_Data deficient

1.5.2. *National conservation status for the case study country*

Greenland Red List, "Critically endangered" in West Greenland and data deficient in East Greenland.

1.5.3. *Main threats within the case study country*

___No Threats
___Habitat Loss/Degradation (human induced)
___Invasive alien species (directly affecting the species)
_X_Harvesting [hunting/gathering]
___Accidental mortality (e.g. Bycatch)
___Persecution (e.g. Pest control)
___Pollution (affecting habitat and/or species)
_X Other: natural die-back and climatic events
___Unknown

2. SPECIES MANAGEMENT WITHIN THE COUNTRY FOR WHICH CASE STUDY IS BEING PRESENTED

2.1. Management measures

2.1.1. *Management history*

Before 2005 there was an unregulated hunt on narwhals in West and East Greenland with approximately 700 narwhals taken per year. Continuing from 2005 a quota system has been in place with a current annual quota of 385 narwhals in West Greenland.

No quota system is in place for narwhals in East Greenland, with an average reported take of 95 narwhals per year over the ten year period between 1997 and 2006. Catches have increased in East Greenland during the past 20 yrs.

2.1.2. *Purpose of the management plan in place*

To regulate the hunt and make the catches in West Greenland sustainable.

2.1.3. *General elements of the management plan*

There is no long-term management strategy. Quotas for West Greenland are set in a year-to-year basis, taking into consideration both the biological advice and the hunter's opinion. Resulting quotas are higher than the biological advice and lower than the average yearly catches before the introduction of quotas.

2.2. Monitoring system

2.2.1. *Methods used to monitor harvest*

The harvest is monitored through hunters reports.

2.2.2. *Confidence in the use of monitoring*

While some under-reporting is likely to take place, over-reporting may also have occurred, especially prior to 2005. No measure of the overall credibility of the reporting system has been made.

2.3. Legal framework and law enforcement

In West Greenland, the quota and harvest are monitored by the municipal authorities and by the Fisheries, Hunting and Agriculture Agency, through a licence and reporting system. Management advice is given by The Canada/Greenland Joint Commission on Conservation and Management of Narwhal and Beluga (JCNB). The scientific advice for JCNB on harvest sustainability is provided by a Joint Working Group (JWG) of the Scientific Working Group of JCNB and a Working Group from the Scientific Committee of the North Atlantic Marine Mammal Commission (NAMMCO). Quotas are based on management recommendations from JCNB and on advice from the Hunting Council, which includes representatives from the Organization of Fishermen and Hunters (KNAPK), the Organization of Leisure Hunters (TPAK) and the Greenland Association of Municipalities (KANUKOKA). Quotas are proposed by the Department of Fisheries, Hunting and Agriculture and adopted by the Cabinet. The municipal authorities distribute the quota among the different settlements and individual hunters. It is the responsibility of the municipal authority to stop the harvest once the quota has been reached. Any excess catches and illegal captures are subtracted from the municipal quota the following year. Calves and females accompanied by calves are protected. All usable meat and skin should be utilised. Failure to comply with the executive order can result in confiscation of catch and equipment and fine. Narwhals found in ice-entrapments are not included in the quota and can, following approval by the Department of Fisheries, Hunting and Agriculture, be hunted without regulations.

3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED

3.1. **Type of use** (origin) **and destinations** (purposes)

Meat and skin are consumed locally or distributed within Greenland. Tusks are generally sold and resold by a number of intermediaries. Tusks reach the final consumer both as whole tusks and pieces used for artwork. Export of narwhal products was banned in 2006. Narwhal products are legally traded within Greenland. Only subsistence hunting takes place, trophy hunt is not allowed.

3.2. Harvest:

3.2.1. *Harvesting regime*

Extractive (hunt). Hunting methods vary according to local rules and traditions; narwhals are taken with hand harpoons from kayak, with high-powered rifles from open boats or with nets placed at strategic places. Narwhals are hunted during summer in the east and northwest and during winter in the west.

3.2.2. *Harvest management/ control*

In West Greenland hunters have to apply for a licence from the local authorities before setting out to hunt narwhals. After the hunt, hunters report their catch by filling a form for each narwhal taken (ANNEX 2 Hunter Reporting Form). This form contains biological information, as well as information about the licence and the hunter. Hunters have to deliver catch reports to the municipal authorities in order to sell the products of their hunt and to obtain a new licence. Besides the specific report for each narwhal caught, once a year all hunters have to report monthly catches of most species, including narwhals. This yearly reports are mandatory in order to renew the hunting permits.

Judging by the numbers of catch reports received, the system works better in west than in east Greenland.

3.3. Legal and illegal trade levels

The meat, skin and tusks are sold legally within Greenland. The skin is considered a delicacy with high cultural value and high demand within Greenland.

Prior to the export ban in 2006, tusks, and artwork from tusks, where exported legally, mainly as personal items bought in Greenland. Export is now prohibited, but export permits can be issued to Greenland residents that are taking up residence in another country, and own narwhal products as part of their household items. A few

individuals have taken advantage of this exception and transported several narwhal tusks to their new homes in Denmark.

To our knowledge, there are no statistics about narwhal products smuggled out of Greenland. But given the lack of systematic control in harbours and airports, it is not impossible that a number of narwhal items leave the island unnoticed.

II. Non-detrimental Finding procedure (NDFs)

1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFS?

__yes _X_no

The procedure used for the NDF of narwhal and other species in Greenland is not based on the IUCN checklist. It follows instead a protocol that was developed by the Greenland Scientific Authority in 2005. The protocol is in Danish, and its major points are outlined below.

2. CRITERIA, PARAMETERS AND/OR INDICATORS USED

Nearly all the NDF-relevant species in Greenland have multiple stocks, and multi-stock considerations are thus essential in the NDF protocol developed by the Greenland Scientific Authority. Generally speaking, we would make a positive NDF for multi-stock species only if 1) the hunt on all stocks are considered sustainable, or 2) the harvest on at least some of the stocks are sustainable and there is a system in place that can trace products to stock origin. In the latter case it would be possible to issue a positive NDF for the stocks with a sustainable hunt, and a negative NDF for stocks with an unsustainable hunt. However, as no tracing system is yet in place in Greenland, we would generally only make a positive NDF if the hunt on all stocks is sustainable.

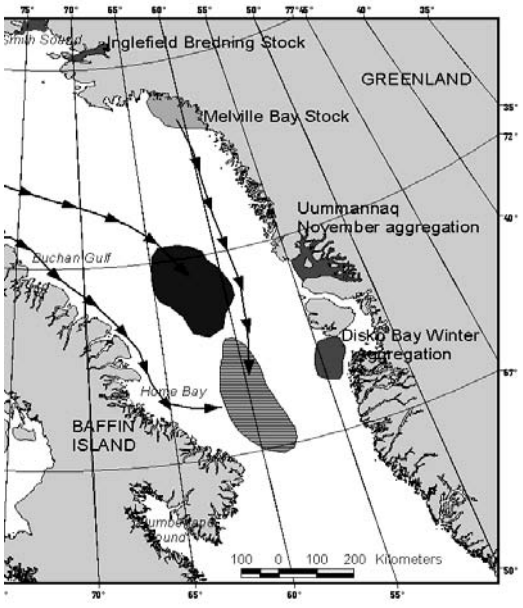
The final set of rules in our procedure for NDFs is for the clarification of when the hunt on a given stock is to be considered sustainable. If the Scientific Working group of the international body that deals with the species in question has produced a clear statement/recommendation of the sustainability of a hunt on a stock, it should be straight forward to conclude whether the hunt is sustainable or not. However, such statements/recommendations might be missing for several reasons. A stock might not yet have been assessed by a working group, or it might have been considered but found that there was not enough data to make recommendations. Our internal rules on sustainability are based on precautionary principles so that positive

NDFs should be made only when there is positive evidence that the hunt is sustainable. We would generally make a positive NDF only if 1) the catch is below or equal to a level recommended by a scientific evaluation of the relevant international body, or 2) there are no explicit evaluation of sustainability but the issue of a sustainable hunt has been considered by the scientific working group and no concerns were raised. If instead there are no explicit evaluation of sustainability but the issue of a sustainable hunt has been considered by a scientific working group and concerns were raised, or the issue of sustainability has not yet been considered by a scientific working group, we would conclude that we cannot conclude that the hunt is sustainable and, thus, no positive NDF would be made. Likewise, we would conclude that the hunt is unsustainable if the hunt exceeds a recommended level for sustainability.

3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED

Many of the species (i.e. narwhal, beluga, polar bear and walrus) that require NDFs in Greenland are hunted and subject to scientific recommendations on sustainable harvest levels through international bodies, such as the North Atlantic Marine Mammal Commission (NAMMCO), the Canada /Greenland Joint Commission on the Conservation and Management of Narwhal and Beluga (JCNB), and the IUCN Polar Bear Technical Committee. The NDFs guidelines for Greenland are based on the recommendations from the Scientific Working groups of these bodies (see e.g. NAMMCO 2005[2] for narwhal).

The international scientific bodies typically make their recommendations based on an



In West Greenland, narwhals are hunted during summer in Smith Sound, Inglefield Bredning and Melville Bay , and during winter in Uummannaq and South of Disko Island. Narwhals from Melville Bay winter in the pack-ice with narwhals that summer in Arctic Canada

2 The relevant international body for narwhal is a joint JCNB/NAMMCO working group

assessment that includes a population dynamic modelling over the available data on stock structure, abundance estimates and catch statistics. Assessment models for narwhals have included Bayesian statistical integrations with age-structured and discrete density-regulated models over the entire time period of the known catch history, making it possible to estimate the catch level that would allow a population to increase with a certain probability.

4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT

By basing the NDFs on the scientific recommendations of international bodies, the Scientific Authority achieves several things. First of all the scientific evaluations of sustainable use become internationally peer-reviewed and thus likely to represent a more firm background for the NDFs than any sustainability evaluation performed by the Scientific Authority itself. Thirdly the evaluation becomes more robust to internal political pressure, should such pressure arise. Duplication of work is also avoided, which is another essential factor in a small country with only few heads to do the work. And finally, by letting the NDFs depend on the scientific recommendations of the international bodies, and not on recommendations at the Council or Commission level, the NDFs become based on scientific arguments only.

A potential problem with this process is that scientific data may need to be available for all harvested stocks, even for those that are widely dispersed and only hunted locally as is the case for most species in East Greenland. This usually calls for very expensive studies to provide data for the scientific process and in some cases it might even be practically impossible to attain scientific data of sufficient precision for a proper assessment.

5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND ON THE ELABORATION OF NDF

Challenges on the elaboration of a narwhal NDF in Greenland

We have been unable to provide a positive NDF for narwhals in Greenland because the catches in the west are larger than what was recommended by the Scientific Working Group of the JCNB.

The current recommended takes are much lower than the catches before the introduction of quotas, and hunters are very reluctant to accept such a large reduction; they encounter narwhals often and consider them abundant. In the end, the government sets quotas that are a compromise between the scientific advice and the hunter's knowledge.

Several hunters and a few politicians have expressed mistrust towards the biological advice and narwhal quotas are a hot issue in the Greenlandic news.

A key problem for providing credible management advice is the lack of detailed knowledge about the narwhal populations. Due to our limited knowledge, and in accordance with the precautionary principle, the current biological advice is conservative. JCNB would be able to provide more accurate recommendations if the range and abundance of the separate stocks were better understood. A more accurate advice would probably reduce the distance between the biological advice and the actual catches.

In West Greenland, narwhals are caught in three different locations of the far north during summer and two locations further south during winter (see figure above). In East Greenland narwhals are caught in several fjord systems during summer. The main scientific challenges are to obtain abundance estimates for all locations and to understand if the different locations correspond to separate stocks or are linked through seasonal migrations or intra-seasonal movements of individual narwhals. Studies from Arctic Canada and West Greenland have shown that stock delineation among narwhals is complex.

At the Greenland Institute of Natural Resources, we are working towards improving the knowledge about range, migration and abundance of the major narwhal stocks in Greenland. For this purpose, we are carrying out a series of studies using satellite telemetry, aerial surveys and analysis of biological samples obtained from the harvest.

The satellite telemetry should help to understand the stock delineation by giving information about range and migrations. In addition, satellite tags provide us with information about the proportion of time when the narwhals are on the upper layers of the water column and are available for observation during aerial surveys.

The aerial surveys give information about the distribution and abundance of narwhals in the different areas. We expect that all the important areas have been surveyed at least once in recent years by September 2009.

The analysis of biological samples should help to understand the population dynamics and genetic relationships. However, it is difficult to use DNA analysis to understand stock delineation because narwhals have an extremely low genetic diversity.

As a consequence of this ongoing research program, we expect that JCNB will be able to provide an improved management advice already in 2009.

Problems and difficulties on the elaboration of NDFs in Greenland

The internal protocol for the Greenland Scientific Authority provides guidelines to make NDFs relatively easily and consistently with basis on the recommendations of the relevant international scientific bodies. The international scientific bodies generally evaluate the sustainability of the hunt on a population/stock level, and do not tend to consider socio-economic aspects that could be relevant for an NDF, such as the impact of trade on a population.

Although NDFs, in principle, should evaluate if export is of detriment to the species, the Greenlandic guidelines do not consider direct analyses of the impact of export on a population. This is partly because the statistics on export of products from species listed by CITES contain several confounding factors and cannot be used directly to provide insight into the number of animals involved in the trade.

In theory, a direct evaluation of the impact of export should be necessary and sufficient for a positive NDF if the hunt on a species is unsustainable but the hunt is independent of international trade. Such cases are of interest in Greenland, where it has been argued that since the current hunt on narwhals in West Greenland is limited by quotas and driven strongly by local demand, exports would not have any impact on the hunt and, thus, it should be allowed to export narwhal tusks even though current takes are probably unsustainable.

In Greenland, the main objective of harvesting species such as narwhals, polar bears and walrus is subsistence. However, international trade can add additional value to the hunt and therefore export may have some impact on the hunt. A positive NDF requires that it can be documented that the export has no impact on the hunt and thus has no detrimental effect on the stock. This level of documentation was a priory considered to be impossible for species like narwhals, polar bears, and walrus where the exported products have an important economical value for the hunters. When such documentation is considered impossible, any analyses on the direct impact of the export seems redundant, because any positive NDF necessarily must depend upon whether the hunt is considered to be sustainable or not. The NDFs in Greenland are thus based almost exclusively on precautionary principles of sustainability. We would, however, appreciate any expert discussion on a possible inclusion of analysis of the effect of international trade, especially in relation to the possibility of providing positive NDFs for cases with a potentially unsustainable harvest.