



SCIENTIFIC COMMITTEE

REPORT OF THE WORKING GROUP ON THE POPULATION STATUS OF BELUGA AND NARWHAL IN THE NORTH ATLANTIC

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North Atlantic Marine Mammal Commission

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**REPORT OF THE SCIENTIFIC COMMITTEE WORKING GROUP ON THE
POPULATION STATUS OF BELUGA AND NARWHAL IN THE NORTH ATLANTIC**

The Working Group on the Population Status of Beluga and Narwhal in the North Atlantic met at the Zoological Museum in Oslo from March 1-3, 1999. The participants in the Working Group are listed in Appendix 1.

At its 7th meeting in May 1997, the Council of the North Atlantic Marine Mammal Commission requested its Scientific Committee to "examine the population status of narwhal and beluga (white whales) throughout the North Atlantic." The Working Group convened to address this request.

1. OPENING REMARKS

Chairman Øystein Wiig and NAMMCO General Secretary Grete Hovelsrud-Broda welcomed the participants to the Working Group meeting.

2. ADOPTION OF AGENDA

The agenda was adopted without changes (Appendix 2). The Chairman instructed participants to focus their presentations on the particular agenda item being considered.

A draft tabular format for summarising stock information was adopted by the group.

3. APPOINTMENT OF RAPPORTEUR

Daniel Pike, Scientific Secretary of NAMMCO, was appointed Rapporteur.

4. REVIEW OF AVAILABLE DOCUMENTS AND REPORTS

A revised document list was reviewed by the Chairman. Each document was related to its relevant Agenda items (Appendix 3)

5. DISTRIBUTION, MIGRATIONS AND STOCK IDENTITY OF BELUGA

Locations referred to in this report are shown in Figure 1.

5.1 Russia

SC/7/BN/6 and SC/7/BN/7 summarised the known distribution and migrations of beluga across the Russian Arctic, based on observations from Aerial Reconnaissance of Sea Ice (ARSI), and other data sources.

Two main groups of beluga inhabit the Russian Arctic:

- The Karskaya group inhabits the western and central portions of the Russian Arctic, including the Barents, White, Kara and Laptev Seas. Beluga apparently winter in the Barents Sea, and migrate to areas farther east in the spring and summer. Most beluga leave the central Russian Arctic seas by October and return to the Barents Sea. However, some may winter in the White Sea and in the Kara Sea off Novaya Zemlya and Severnaya Zemlya. Beluga also inhabit the central Arctic Basin during the summer, both in the areas of the continental shelf and the deep sea.

- The Bering Sea group winters in the Bering Sea. A portion of these beluga move into the Chukchi Sea by late June, but few animals occupy the area in the summer. In August-September beluga occupy the northern part of the Chukchi Sea north of Wrangel Island. By October, these beluga begin to move south towards their wintering area in the Bering Sea.

These groups have a disjunct distribution, with few beluga occupying the eastern Laptev and East Siberian Seas, which are areas with very heavy ice conditions. However, in years with light ice conditions, exchange between the groups would be possible.

SC/7/BN/13 and SC/7/BN/20 gave more information on the beluga inhabiting the White Sea. White Sea beluga cannot be distinguished from those of other areas by morphometrics. However, SC/7/BN/13 described 5 summer aggregations of beluga, which are apparently stable for the entire summer. Each of these aggregations may number in the low hundreds. These aggregations are composed mainly of females and calves, with few adult males. Some beluga also overwinter in the White Sea in recurring polynias, but most winter in the Barents Sea.

5.2 Svalbard-Barents Sea

Beluga are found throughout most of the archipelago in the summer. They are, however, most frequently observed in the fiords on the west coast of Spitsbergen. SC/7/BN/24 described the summer movements of some beluga around Svalbard, based on satellite telemetry. Beluga occupied the southern and southeastern parts of the archipelago. The whales stayed close to shore, and tended to congregate near glacier fronts. No long-term trackings were available and the relationship of Svalbard beluga to other stocks is not known. However, their distribution overlaps the winter distribution of the Karskaya group (see 5.1), so exchange is certainly possible.

5.3 East Greenland

No working papers describe the distribution of beluga in East Greenland, however, reference was made to Dietz et al. (1994) that describes beluga as being rare in East Greenland, with only occasional catches per decade.

5.4 West Greenland

The distribution of beluga in West Greenland was described in SC/7/BN/10 and SC/7/BN/12, and in Heide-Jørgensen (1994). Beluga occur from Qaanaaq in the north to Paamiut in the south in the fall, winter and spring. During the summer, there are no beluga in W Greenland except for a few stragglers in Qaanaaq.

Beluga migrate southwards down the W Greenland coast beginning in September (Qaanaaq), passing through Upernavik in October. They reach their known overwintering area between Disko Bay and Nuuk by December, and begin their northward migration from Disko Bay in May. They are thought to summer in Canadian High Arctic. However, of the 20 beluga outfitted with satellite transmitters in the Canadian High Arctic that lasted into October, only 1 has travelled to W Greenland (SC/7/BN/5). The rest remained in the North Water until contact was lost in late October and November. The application of satellite tags has been biased towards those that inhabit certain estuaries, so the portion that migrates to W Greenland may be under-represented.

There are at least two stocks of beluga hunted in W. Greenland, based on tooth morphology (SC/7/BN/12), genetic information (SC/7/BN/12), and concentrations of trace contaminants (SC/7/BN/14). One stock migrates past the Upernavik region in October, while the other is caught later in the fall between Disko and Sisimiut.

5.5 Canada

SC/7/BN/4 presented a description of the stock structure of beluga in Canadian and adjacent waters, based on genetic analyses using both mitochondrial and nuclear DNA. Mitochondrial DNA (mtDNA) is inherited only maternally, while microsatellite nuclear DNA is inherited from both parents. Results from the mtDNA analyses indicated that the Canadian Arctic was recolonized after the last ice age by

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at least two founding groups. The St. Lawrence and Eastern Hudson Bay beluga were founded by one group, while other Canadian stocks were founded by one or more other groups.

A combination of mtDNA and microsatellite DNA analyses can detect differences in samples from many locations in the Canadian Arctic. In general, it appears that there are many more genetic populations than previously thought. This is apparent for the southeast Baffin Island area, once believed to hold one common stock of beluga. These analyses demonstrate that the communities of Pangnirtung, Iqaluit and Kimmirut are probably hunting separate stocks. Similarly, beluga hunted by Sanikiluaq in the Belcher Islands are different from beluga taken on the eastern Hudson Bay coast. Beluga harvested in W Greenland are similar to beluga harvested at some locations in the Canadian High Arctic.

SC/7/BN/14 and SC/7/BN/16 presented analyses of stock structure in Canadian and adjacent waters, based on concentrations of ≥ 49 organochlorine contaminants. At all locations, samples were found to have distinct organochlorine “signatures”, which are related to their diet and hence the range of the beluga stock. These results confirm those of the genetic analyses for southeast Baffin Island and eastern Hudson Bay. They also demonstrate a difference between beluga, landed at Grise Fiord in the Canadian High Arctic, and West Greenland beluga. In addition, they confirm the difference between West Greenland beluga landed at Upernavik, and those taken further south in Greenland.

SC/7/BN/5 reported the results of satellite tagging experiments conducted in Canada. Tagging has been conducted in the Canadian High Arctic, the Beaufort Sea, western Hudson Bay, Eastern Hudson Bay and Cumberland Sound with results as outlined below:

Baffin Bay and Adjacent Waters

A total of 27 beluga have been outfitted with satellite transmitters since 1995, both in the estuaries on Somerset Island and during the fall migration past southern Devon Island. During the summer, beluga are found in Prince Regent Inlet, Lancaster Sound, Barrow Strait and Peel Sound. In the fall, beluga migrate east out of Lancaster Sound and north to the waters of E Devon Island and into Jones Sound. Most remained in this area at least until October-November when the tags stopped functioning. One beluga migrated down the W Greenland coast as far south as the latitude of Disko Island before the tag ceased functioning. These results appear to indicate that the major part of the beluga summering in the Canadian High Arctic winter in the North water, while a small proportion migrate to W Greenland. However, it is recognised that tag application is biased and that some stocks are over-represented and others under-represented.

Pangnirtung

A total of 7 beluga were outfitted with satellite tags in 1998. All remained in Cumberland Sound, extending their movements farther SE as the fall progressed. None had left Cumberland Sound before the tags ceased functioning in mid-November.

Western Hudson Bay

A total of 9 beluga were outfitted with satellite tags near Churchill in western Hudson Bay. They remained relatively close to the tagging area and within the area surveyed in 1987. None had left the area by the time the tags ceased functioning in September.

Eastern Hudson Bay

The movements of Eastern Hudson Bay beluga were outlined in SC/7/BN/5 and SC/7/BN/28. Five beluga were outfitted with satellite tags in estuaries, and one was outfitted with a tag later in the fall and further to the north. Beluga remained relatively close to the tagging area in the summer, but did not go to the Belcher Islands. The one beluga tagged in the fall migrated into Hudson Strait. These limited results are in agreement with other evidence (see 5.5) that indicates that Belcher Island beluga are different from East Hudson Bay coastal beluga.

Aerial surveys conducted in E. Hudson Bay in 1993 and in 1985 show a discontinuity of beluga distribution between E. Hudson Bay and James Bay, but none between E. Hudson Bay and the Belchers.

6. POPULATION SIZE AND TRENDS OF BELUGA

6.1 Russia

Population estimates for the Karskaya group are based on a combination of aerial surveys covering only a part of the range, ship surveys, land based surveys and expert opinion (SC/7/BN/7, SC/7/BN/20). A total of 15-20 thousand animals are thought to occupy the area.

More intensive aerial survey effort has concentrated on the White Sea between 1971-1990 (SC/7/BN/13, SC/7/BN/20). Estimates here range from 200-3000 beluga during the summer, with no discernible trend over the years when surveys were conducted.

6.2 Svalbard-Barents Sea

No population surveys have been conducted.

6.3 East Greenland

No population surveys have been conducted.

6.4 West Greenland

SC/7/BN/10 summarised the results of aerial visual surveys conducted in March on the wintering area off W Greenland between Disko Bay in the north and Nuuk in the south. Surveys have been carried out using essentially the same methodology in 1981, 1982, 1990, 1993 and 1994, and have shown a decline of about 62% over that period. The 1998 survey was extended to the south because of hunter reports of wintering beluga there, and corrected using a video camera system for beluga missed by observers. The estimated number of beluga visible at the surface and seen by observers was 929 (516-1674, 95% CI), similar to the 1994 estimate of 1028 (775-1532 95% CI). When corrected for whales missed by observers, and for diving whales, the estimated abundance is 6722 (3562-12688, 95% CI). These figures confirmed the decline of beluga between 1981 and 1994, but are not precise enough to confirm that the decline of beluga off W Greenland is continuing. They also strengthen the contention that W Greenland beluga must be only a small proportion of the whales summering in northern Canada.

SC/7/BN/8 described the results of helicopter reconnaissance surveys intended to ascertain an "order of magnitude" estimate of the number of beluga migrating past Upernavik in October. Surveys were conducted with the cooperation and help of local hunters, to come to a common understanding of the results, and were timed to coincide with the migratory period for beluga in the area. Hunters have contended that very many beluga migrate through this area in the fall. The results suggest that 1700 to 2000 beluga passed through the area during the period of the survey.

6.5 Canada

SC/7/BN/29 is a tabular presentation of population estimates for Canadian beluga stocks, while SC/7/BN/15, SC/7/BN/27 and SC/7/BN/28 give detailed descriptions of surveys for the Canadian High Arctic, St. Lawrence River and eastern Hudson Bay respectively. It is noted that many of the estimates are not corrected for whales missed by observers, for diving whales, and/or do not cover the entire known range of the stock. In these cases, the estimates have a negative bias.

Information on population trend is available for the St. Lawrence River (SLR) and eastern Hudson Bay (EHB). The SLR stock has shown an annual increase of 2.9% (SE 1.2%) over 5 similar surveys conducted from 1988 to 1997. Surveys detected no change in the EHB stock, but changes in survey methods may have concealed a negative trend.

7. EXPLOITATION AND SUSTAINABILITY OF HARVEST OF BELUGA

Table 1 summarises the population status of all known beluga aggregations in the North Atlantic and adjacent waters. It should be noted that these aggregations may be discrete, or a mixture, of stocks. Given the known stock structure of beluga in some areas, it is prudent to base putative management units on local aggregations and/or harvesting areas until more information on stock structure is available. Here, the term “stock” is used where there is documented evidence that beluga in the catch are distinguishable from beluga caught in other areas, through analyses of genetics, contaminants, morphology and/or movements. Numbers in square brackets below refer to the numbered aggregation in Table 1.

7.1 Russia

Russian catch statistics are presented in SC/7/BN/7, SC/7/BN/19 and SC/7/BN/21. Harvests from the Barents, Kara and White Seas were as high as 3000 annually in the late 1950's and early 1960's. Since that time, harvests have been much lower, and have virtually ceased since 1987. Removals are now limited to accidental captures in fishing gear, occasional live captures for aquaria, and a few kills by local hunters.

All Russian aggregations are considered to be not threatened by exploitation. However, potential threats to some aggregations include:

- Noise and disturbance from potential increased traffic through the Northern Sea Route;
- Increased oil exploitation in the Barents Sea, leading to increased ship traffic, disturbance and possible spills;
- Pollution from industrialised areas transported to beluga concentration areas by major rivers, including the Ob, Dvina and Yenisey Rivers.

It should be emphasised that these are potential threats only and that there is no evidence that they are having an impact at present.

7.2 Svalbard-Barents Sea:

Beluga have been totally protected in Norwegian waters since 1961. The aggregation has probably recovered or is recovering from past exploitation. Oil exploration and exploitation, leading to increased ship traffic, disturbance and possible spills, pose potential threats.

7.3 East Greenland

Catches of beluga in E. Greenland have averaged only a few per decade since 1955 (Dietz et al, 1994), and they are therefore considered not to be threatened.

7.4 West Greenland

Recent catch reporting in Greenland has not been very accurate. Estimates of recent harvests are provided in SC/7/BN/34, and range from 509 in 1994, to 784 in 1993. Of this total, about 80% are taken from the southwest Greenland stock [8], and most of the remainder are taken from the stock migrating past northwest Greenland [9]. Only a few are taken from the North Water winter aggregation [10].

There is evidence that the number of beluga wintering off West Greenland has declined since 1981. This aggregation is likely composed of two or more stocks [8 and 9], but the allocation of catch to each stock is not known. Given the estimated number of beluga (6722), and the total harvest of more than 400 per year, the stocks are likely declining due to overharvesting.

Table 1: Status of beluga aggregations in the North Atlantic and adjacent waters.

OC refers to analyses of organochlorine trace substances in beluga blubber. Qualifiers for population surveys: T=total count, S=sample survey, O=observer corrected, D=dive corrected, A= Anecdotal. 'Level of exploitation' refers to reported landings and does not include under reportings or whales that are killed-but-lost.

Aggregation	Stock ID	Population size	Level of exploitation	Other potential threats	Present status	References
[1] Laptev Sea	<u>Summering ground</u> , probably wintering in Barents Sea [4]	No estimates	No direct takes in this century	Ice breaking	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2a] Kara Sea – Vilkitskiy Strait	<u>Major migration area</u>			Future ice breaking		SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2b] Kara Sea-Severnaya Zemlya	<u>Summering ground</u> (wintering also suggested) most whales probably winter in the Barents Sea [4]	No estimates	No direct takes	Ice breaking	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2c] Kara Sea – Taymyr	<u>Summering ground</u> , probably wintering in Barents Sea [4]	No estimates	No direct takes since 1987	Ice breaking	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2d] Kara Sea – Yenisey Gulf	<u>Summering ground</u> , probably wintering in Barents Sea [4]	No estimates	No commercial catch since 1987 and only occasional catches in the 1990's	Ice breaking, boat traffic, pollution and industrial activities	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2e] Kara Sea – Obskaya Inlet	<u>Summering ground</u> , probably wintering in Barents Sea [4]	No estimates	No commercial catch since 1965 and only occasional takes since	Ice breaking, boat traffic, pollution and industrial activities	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2f] Kara Sea – Vaigach Island + Baidaratskaya Inlet	<u>Summering ground</u> , probably wintering in Barents Sea [4]	No estimates	Occasional catches	Ice breaking, boat traffic and industrial activities related to exploitation of natural gas	Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[2g] Kara Sea-Yogorskiy Shar Strait	<u>Migration area</u> in some years			Future ice breaking	Not threatened	SC/7/BN/7

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Aggregation	Stock ID	Population size	Level of exploitation	Other potential threats	Present status	References
[2h] Kara Sea-Karskiye Vorota Strait	<u>Major migration area</u>			Future ice breaking	Not threatened	SC/7/BN/7
[2i] Kara Sea-Matochkin Shar strait	<u>Migration area in some years</u>			Future ice breaking	Not threatened	SC/7/BN/7
[2j] Kara Sea - north of Novaya Zemlya	<u>Major migration area</u>			Future ice breaking	Not threatened	SC/7/BN/7
[2k] Kara Sea -- Vilkitskiy Strait	<u>Major migration area</u>			Future ice breaking	Not threatened	SC/7/BN/7
[3a] White Sea-Dvinskiy Bay	<u>Summering and wintering ground</u>	A: Few thousands	No direct takes since 1989		Not threatened	SC/7/BN/13
[3b] White Sea -- Solovetsky Island	<u>Summering and wintering ground</u>	A: <1000	No direct takes since 1989		Not threatened	SC/7/BN/13
[3c] White Sea -- Onezhskaya Bay	<u>Summering ground</u>		No direct takes since 1989		Not threatened	SC/7/BN/13, SC/7/BN/20
[3d] White Sea-Mezenskiy Bay	<u>Summering and wintering ground</u>		No direct takes since 1989		Not threatened	SC/7/BN/20
[3e] White Sea -- West coast of Kanin peninsula	<u>Migration area and wintering ground</u>	No estimates	No direct takes		Not threatened	SC/7/BN/21
[4a] Barents Sea-Frantz Josef land	<u>Summer aggregations</u>	No estimates	No exploitation		Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[4b] Barents Sea -- Choshskaya Inlet	<u>Summer aggregations</u>	No estimates			Not threatened	SC/7/BN/6, SC/7/BN/7, SC/7/BN/21
[4c] Barents Sea-Murman coast and Finnmarken	<u>Migration area and perhaps spring and summering grounds</u>	Few animals	No direct takes.	Conflict with fishery	Not threatened	SC/7/BN/20
[4d] Barents Sea-Pomor Strait off Kolgyej	<u>Migration area</u>	A: 2-3000			Not threatened	SC/7/BN/20
[5] Svalbard	<u>Summer occurrence</u>	No estimates	No direct takes since 1961		Not threatened	SC/7/BN/24
[6] East Greenland	<u>Occasional summer occurrences.</u>	Only occasional visitors, no estimates	Few per decade		Not threatened	Dietz et al. 1994
[7] South Greenland	<u>Probably was a</u>	Disappeared after	No present		Disappeared	Heide-Jørgensen 1994

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Aggregation	Stock ID	Population size	Level of exploitation	Other potential threats	Present status	References
Qaqortoq to Maniitsoq	separate <u>wintering population</u> occurring in Oct. through June	intensive hunting in the first third of the 20 th century	exploitation			
[8] Southwest Greenland Maniitsoq-Disko	<u>Wintering ground</u> . A mix of types of whales from [11] and other areas	1998 SOD: 6722 (3562-12688)	Present harvesting >400/yr		Declining due to overexploitation	SC/7/BN/12, unpubl. harvest stat., SC/7/BN/14
[9] Northwest Greenland: Avanersuaq and Upernavik	<u>Autumn migration</u> . Whales that summer in North Canada [11]; probably homogenous	1998 AT: A few thousands counted in October 1998	Present harvesting >100/yr		Declining due to overexploitation	unpubl. harvest stat., SC/7/BN/8, SC/7/BN/5, SC/7/BN/12, SC/7/BN/14
[10] North Water	<u>Wintering ground</u> for whales from Canadian High Arctic [11]	No estimate.	Less than 50/yr in Canada and Greenland		Not threatened	Richard et al. 1998, SC/7/BN/5, SC/7/BN/14
[11] Canadian High Arctic	<u>Summer aggregations</u> . Some move to Greenland [8]+[9] and some stay in the North Water [10]	1996 SOD: 28,499 (13,886-58,491)	<50/yr in Canada (see also [9] and [10])		Large population size but sub-stocks are overexploited in West Greenland	SC/7/BN/5, SC/7/BN/15,
[12] SE Baffin-Pangnirtung	<u>Summer aggregation</u> . Distinguished on OC profiles and genetics from [13] and [14]	1986 T: 484 (partial coverage)	35/yr (quota)		Small population at risk of being overexploited	Richard et al. 1990, SC/7/BN/16 SC/7/BN/5, SC/7/BN/4, SC/7/BN/14
[13] SE Baffin-Iqaluit	<u>Summer occurrences</u> . Distinguished on OC profiles and genetics from [12] and [14]	No estimate.	25/yr		Not known	SC/7/BN/4 SC/7/BN/16
[14] SE Baffin-Kimmirut	<u>Fall and spring migration</u> probably from/to from Hudson Bay. Distinguished on OC profiles and genetics from [12] and [13]	No estimates	<30/yr		Not known	SC/7/BN/4, SC/7/BN/16, SC/7/BN/14

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Aggregation	Stock ID	Population size	Level of exploitation	Other potential threats	Present status	References
[15] Saint Lawrence river	Isolated <u>year-round population</u>	1997 SOD: 1238 (SE 119)	No exploitation	Pollution and harassments	Small restricted population, increasing	SC/7/BN/4 SC/7/BN/27 SC/7/BN/26
[16] Ungava Bay	<u>Former summer aggregation</u> , a few seen today	1982 T: 7 1985 T: 2 1993 T: 20	Occasional takes		Depleted or extirpated and possibly recolonizing.	Smith and Hammill 1985, SC/7/BN/28
[17] North Hudson Bay	<u>Summering ground</u>	1983 S: 1000 (600-1600) (partial coverage)	80-140/yr but most are probably taken from [20]		Not known	Richard et al. 1990,
[18] Eastern Hudson Bay (coastal)	<u>Summer aggregations</u> . Genetically distinct from all other populations incl. [19] Belcher Island	1985 S: 960 (+T: 481) (SE 165) 1993 S: 1014 (+T: 148) (SE 421) (incl. [19] ca. 20% of total)	55/yr for 1994-1997, probably also taken in Hudson Strait [20]		Small population at the risk of being overexploited	Smith and Hammill 1985, SC/7/BN/4, SC/7/BN/28
[19] Belcher Island	<u>Winter and summer occurrence</u> . Distinguished on OC profiles and genetics from [18] and [21]	No estimate.	30/yr		Not known	SC/7/BN/4 SC/7/BN/14, SC/7/BN/28
[20] Hudson Strait	<u>Fall and spring migrations</u>	No estimates	150-200/yr		Not known	Richard 1993
[21] West Hudson Bay	<u>Summering ground</u> (July-September). Different from [18] and [19] on genetics and OC.	1987 S: 25.100 (18.300-52.800) (partial coverage)	130-200/yr. Some also probably taken as migrants in Hudson Strait [20].		Probably not threatened.	Richard et al. 1990 Richard 1993 SC/7/BN/4
[22] Southern Hudson Bay (coastal)	<u>Summering ground</u>	1987 T: 1299 (partial coverage)	Possible exploitation during spring and fall migrations through Hudson Bay and Strait		Not known	Richard et al. 1990
[23] James Bay	<u>Summering ground</u>	1985 S: 1213 (SE 290) (partial coverage) 1993 S: 3300 (SE 787) (partial coverage)	No known exploitation		Not threatened.	Richard et al. 1990, Smith and Hammill 1985, SC/7/BN/28

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Aggregation	Stock ID	Population size	Level of exploitation	Other potential threats	Present status	References
[24] Foxe Basin	<u>Summer and fall occurrences.</u>	No estimates	<110/yr		Not known	SC/7/BN/35
[25] Beaufort Sea	<u>Summering ground.</u> Large migrations to Chukchi Sea and south to Bering Sea	1992 SO: 19.629 (15.134-24.115) (partial coverage)	120/yr also caught in Alaska and Russia	Oil and gas development, commercial fishery	Not threatened.	Harwood et al. 1996

7.5 Canada

SC/7/BN/35 provides reported catch statistics for Canadian-Northwest Territories waters for the past 9 years, while SC/7/BN/36 provides catch-at-age information by community. Catch statistics for Nunavik communities are provided in Brooke (1997). Total annual catch for the period 1989-1998 (excluding the Beaufort Sea) has ranged between 492 and 820, with no apparent trend over the period.

New methods of stock delineation have increased the number of beluga stocks now recognised, and make the designation of status difficult in many cases. It is also difficult to assign a harvest level to some aggregations, since a particular aggregation may be harvested by several communities during migration.

The North Water winter aggregation [10] and Canadian High Arctic summer aggregation [11] are apparently large and not heavily harvested. However, stocks that summer in the Canadian High Arctic and winter off W. Greenland may be exposed to overexploitation in Greenland (see 7.4).

The Southeast Baffin Island area now has 3 recognised stocks, where one was recognised previously. The Pangnirtung stock [12] has been reduced by past overexploitation, and is vulnerable as an apparently small population that is heavily harvested. The recent population trend is unknown, however.

The Iqaluit [13] and Kimmirut [14] areas have only migratory stocks and/or sporadic summer incursions of beluga. The status of these stocks is not known.

The St. Lawrence River stock [15] is small and isolated, and was reduced in the past by overexploitation. The population is now increasing in number. Other potential threats to the stock include pollution and harassment.

The Ungava Bay aggregation [16] was probably extirpated by past overharvesting. Very small numbers of beluga are seen and sometimes harvested. They may be remnant, transient or recolonizing animals.

The North Hudson Bay area [17] includes both summer resident beluga, and migrants from other areas in the spring and fall. Although the harvest seems high relative to the survey estimate, it should be noted that:

- The survey estimate is negatively biased because it did not cover the range of the aggregation, and was not corrected for observer bias or submerged whales;
- Much of the harvest occurs in the fall, when migrants from other areas are passing through.

The status of this aggregation is therefore not known.

The Eastern Hudson Bay – Coastal stock [18] has a high harvest relative to the size of the population. Status is uncertain because no trend in abundance has been confirmed. However, the stock is considered vulnerable as it is small and heavily exploited.

The Belcher Islands area [19] may have both summer and winter resident beluga. The status of this stock is not known.

Western Hudson Bay [21] has a large number of resident summer beluga. Exploitation is not high relative to the size of the aggregation. However, an unknown amount of harvesting may occur in other areas during migration. Given the large size of the aggregation, it is probably not threatened by present harvest levels.

Coastal Southern Hudson Bay [22] and James Bay [23] have summer resident and possibly some winter resident beluga. The aggregations are not known to be harvested, however an unknown amount of harvesting may occur during migration. The status of the James Bay aggregation is considered not

threatened, while status of the Coastal Southern Hudson Bay aggregation is considered unknown because of the lack of a good estimate of the size of the aggregation.

8. DISTRIBUTION, MIGRATIONS AND STOCK IDENTITY OF NARWHAL

8.1 Russia

SC/7/BN/6 summarized the known observations of narwhal across the Russian Arctic, based on observations from Aerial Reconnaissance of Sea Ice (ARSI), and other data sources. Narwhal are rare in the Russian Arctic. Most observations were from the area around Franz-Joseph Land. Some were occasionally seen in the northern parts of the Kara, Laptev, East Siberian and Chukchi Seas. All but a few observations were north of 75°N along the continental slope.

8.2 Svalbard-Barents Sea

SC/7/BN/24 refers to Gjertz (1991), which summarizes the known distribution of narwhal around Svalbard, and concludes that narwhal are presently and were historically rare in the Svalbard region. Narwhal occur in the northern and eastern parts of the archipelago. Three narwhal were outfitted with satellite transmitters in 1998, and moved locally for 4-46 days (SC/7/BN/24).

8.3 East Greenland

Narwhal have been seen in small numbers throughout eastern Greenland waters from 64°N to 77°N (Dietz et al. 1994). The main concentration areas are Scoresby Sund, Kangerlussuaq and Sermilik, where narwhal are regularly seen in summer. They are also seen in the E. Greenland Sea pack ice between May and September, and in Denmark Strait in October and November.

8.4 West Greenland

Narwhal are mainly found in summer in the areas of Inglefield Bay and Melville Bay (Heide-Jørgensen 1994). They are often captured in November in Uumannaq and in Disko Bay throughout the winter. In winter, they are also found throughout Baffin Bay. Palsbøll et al. (1997) describe genetic results obtained from narwhal sampled at Canadian (Baffin Island) and Greenlandic locations. Mitochondrial DNA analyses suggest that there are differences between narwhal from E. Greenland and all other areas sampled. Narwhal sampled at Baffin Island and Avanersuaq (NW Greenland) were also different from narwhal sampled in Melville Bay, Uummannaq and Upernavik but not from narwhal sampled in a Disko Bay ice entrapment. Satellite tracking of narwhal tagged at Melville Bay in Greenland and in the Eclipse Sound Area in Canada indicates that these narwhal did not move into areas with other summer aggregations. The tracking also shows that some male and female narwhal from both areas migrate in the fall to the southern end of Baffin Bay where they occupy the same area. These genetic and tracking results suggest that summer aggregations represent seasonally-segregated stocks, and also that at least one Canadian stock occupies Greenlandic waters where they may be hunted in the winter.

8.5 Canada

8.5.1 Baffin Bay and Adjacent Waters:

In the summer, narwhal occupy four main areas of aggregation: Peel Sound, Prince Regent Inlet, Admiralty Inlet and the Eclipse Sound (SC/7/BN/32; Richard et al. 1994). They migrate east through Lancaster Sound in the fall to the wintering areas that are shared with W. Greenland narwhal and which extend throughout Baffin Bay from shore ice to shore ice.

8.5.2 Hudson Bay:

During the summer, narwhal are most concentrated in the waters north of Somerset Island (SC/7/BN/31). They are also occasionally seen along the Keewatin coast south to Arviat. Narwhal are known to migrate eastward through Hudson Strait and an aggregation has been observed during March surveys in eastern Hudson Strait, with numbers similar to those estimated in the summer range (Richard 1991). On the basis of this distribution information, they are assumed to be a stock separate from the Baffin Bay narwhal.

9. POPULATION SIZE AND TRENDS OF NARWHAL

9.1 Russia

There is no information on the size and trend of the Russian narwhal population.

9.2 Svalbard

There is no information on the size and trend of the Svalbard narwhal population.

9.3 East Greenland

The numbers of narwhal in Scoresby Sund and adjacent fjords in September have been estimated to be 300 (95% CI 165-533) (Larsen et al. 1994). However this survey did not cover the complete range of the narwhal and was not corrected for observer bias or submerged animals. There are no estimates of numbers from other areas.

9.4 West Greenland

SC/7/BN/10 reports survey estimates of narwhal in March 1998 in the waters south of Disko Bay. An estimate of 5210 (95% CI: 1285-2115) was derived from those surveys, using correction factors obtained from video track line recording and time-depth recordings. However, this survey did not cover the entire range of narwhal in the area. Born et al. (1994) estimated the number in Ingelfield Bay in summer as between 800-1500. That estimate was not corrected for diving animals or observer bias. Survey coverage was also incomplete.

9.5 Canada

9.5.1 Baffin Bay and Adjacent Waters

SC/7/BN/32 reported a total estimate of 18,000 (90% CL. 15,000-21,000) for August aggregations in the Canadian High Arctic. Richard et al. (1994) provided details by area. The numbers estimated in each of the four aggregation areas are presented in Table 2. These surveys were photographic and therefore have less observer error than visual surveys, however they did not cover the complete range of narwhal in the area. They were also uncorrected for diving animals.

9.5.2 Hudson Bay

SC/7/BN/31 reports an estimate of 1355 (90% CL 1000-1900) derived from photographic surveys conducted in July 1984. No correction was made for diving animals and the area surveyed did not cover the entire summer range of narwhal.

10. EXPLOITATION AND SUSTAINABILITY OF HARVEST OF NARWHAL

Table 2 summarises the population status of all known narwhal aggregations in the North Atlantic and adjacent waters. It should be noted that these aggregations may be discrete, or a mixture of stocks. Until further information on stock structure is available, it is prudent to base putative management units on local aggregations and/or harvesting areas. Here, the term "stock" is used where there is documented evidence that narwhal in the catch are distinguishable from narwhal caught in other areas, through analyses of genetics, contaminants, morphology and/or movements. Numbers in square brackets below refer to the numbered aggregation in Table 2.

Table 2: Status of narwhal aggregations in the North Atlantic and adjacent waters.

Qualifiers for population surveys: T=total count, S=sample survey, O=observer corrected, D=dive corrected, A= Anecdotal. 'Level of exploitation' refers to reported landings and does not include underreporting or whales that are killed-but-lost.

Aggregation	Stock identification	Population size	Level of exploitation	Other potential threats	Present status	References
[1] Kara Sea	Few observations between Severnaya Zemlya and [2] Perhaps exchanges with narwhal from [3]	No estimates	No exploitation		Not threatened	SC/7/BN/6
[2] Franz Josef Land	Most important area for narwhal in Russia. May be same group as [3].	About 60 seen in 1996. No estimates.	No exploitation		Not threatened	SC/7/BN/6
[3] Svalbard	Few coastal observations. May be same group as [2].	About 100 seen in 1998. No estimates.	No exploitation		Not threatened	SC/7/BN/24 Gjertz 1991
[4] Greenland Sea	Occur in heavy pack ice, perhaps wintering ground for whales from [5] and [3]	No estimates	No exploitation		Not threatened	Dietz et al. 1994 Gjertz 1991
[5a] East Greenland – north of Scoresbysund	<u>Summer aggregations</u> Regular visitor in some fjords during summer	No estimates.	No exploitation		Not threatened	Dietz et al. 1994
[5b] East Greenland – Scorebysund	<u>Summering ground</u> , probably winter in Greenland Sea. Genetically distinct from West Greenland and Canada	1983 S: 300 (165-533) 1984 S: 102 (36-276) (partial coverage)	10-70/yr.		Not threatened	Dietz et al. 1994, Larsen et al. 1994, Unpubl. harvest data, Palsbøll et al. 1997
[5c] East Greenland – Kangerlussuaq	<u>Summering ground</u> , probably winter in Greenland Sea. Genetically distinct from West Greenland	No estimates	44 in 1990		Not threatened	Dietz et al. 1994, Palsbøll et al. 1997

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Aggregation	Stock identification	Population size	Level of exploitation	Other potential threats	Present status	References
[5d] East Greenland – Ammassalik	and Canada <u>Summering ground</u> , probably winter in Greenland Sea Genetically distinct from West Greenland and Canada	No estimates	40 in 1996, may include [5c]		Not threatened	Dietz et al. 1994, Unpubl. harvest data Palsbøll et al. 1997
[6] West Greenland - Disko Bay	<u>Wintering ground</u> Mixing area for 2-several stocks. Whales from Eclipse Sound [10] and Melville Bay [8] move towards Disko Bay in autumn.	1998 SOD: 5210 (1285-21115) (partial coverage)	1993-95: mean 140/yr 1996: 205		A mixture of stocks. A single status cannot be assigned.	Unpubl. harvest data SC/7/BN/10, Palsbøll et al. 1997 SC/7/BN/9
[7] West Greenland - Uummannaq	Major occurrence in November, small sample was genetically distinct from other W. Greenland stocks	No estimates	1993-95: mean 213/yr 1996: 401	Exploitations in other areas.	Not known , but high catches with no population size estimates cause concern	Unpubl. harvest data Heide-Jørgensen 1994, Palsbøll et al. 1997, Dietz et al. 1996
[8] West Greenland - Upernavik-Melville Bay	<u>Summering ground</u> , spring and fall migrations. The summer occurrence genetically distinct from other Greenland Stocks. Satellite telemetry shows no exchange with neighbouring stocks during summer. These whales migrate to a wintering ground close to Disko Bay common with [10]	No estimates Probably a small population	1993-95: mean 62/yr 1996: 69	Exploitation in Disko Bay	Not known	Unpubl. harvest data Palsbøll et al. 1997 SC/7/BN/9
8] West Greenland - Upernavik-Melville Bay (Continued).						

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Aggregation	Stock identification	Population size	Level of exploitation	Other potential threats	Present status	References
[9] West Greenland - Avanersuaq	<u>Summering ground</u> and spring migrations. The summer occurrence genetically distinct from Upernavik and Uummanak.	1986 S: 3539 (95% CI 1869-6722) (partial coverage)	1993-95: mean 144/yr 1996: 44 (probably underreported)	Exploitation in other areas	Not known	Born et al. 1994 Unpubl. harvest data
[10] Eclipse Sound Area.	<u>Summering ground</u> , spring and fall migration route. Satellite telemetry shows no exchange with neighbouring stocks during summer. These whales migrate south along the east coast of Baffin I. to a wintering ground close to Disko Bay shared with [8]	1984 S: 543 (+ 675) (90% CI 166-1784) (partial coverage)	1993-98 Pond Inlet: mean 84/yr	Exploitation in other areas	Catches by Pond Inlet hunters can not be sustained by the local summer aggregation. However, some of the spring catch may originate from other stocks and the narwhal in the summer aggregation may be hunted by other communities at other times of the year. Status uncertain.	Richard et al. 1994 SC/7/BN/32 SC/7/BN/9 SC/7/BN/35
[11] Admiralty Inlet	<u>Summering ground</u> , spring and fall migration route.	1984 S: 5556 (90% CI 3759-8213)	1993-98 Arctic Bay: mean 79/yr	Exploitation in other areas	Not threatened	Richard et al. 1994 SC/7/BN/32 SC/7/BN/35
[12] Prince Regent Inlet	<u>Summering ground</u>	1984 S: 9754 (90% CI 6057-15816)	1993-98 Hall Beach + Igloodik + Pelly Bay+Taloyoak: mean 23/yr	Exploitation in other areas	Not threatened	Richard et al. 1994 SC/7/BN/32 SC/7/BN/35
[13] Peel Sound	<u>Summering ground</u>	1984 S: 1701 (90% CI 1029-2816)	<10/yr	Exploitation in other areas	Not threatened by local exploitation, but exploitation in other areas is not known. Status uncertain.	Richard et al. 1994 SC/7/BN/32 SC/7/BN/35
[14] Jones Sound	<u>Summering ground</u>	No estimate.	<20/yr	Exploitation in other areas	Unknown.	SC/7/BN/32

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Aggregation	Stock identification	Population size	Level of exploitation	Other potential threats	Present status	References
	Spring and fall migration route.			areas.		SC/7/BN/35
[15] Canadian High Arctic	<u>Summering ground.</u> All areas combined: [10]-[14], no discrimination of stocks, however see [10]	1996 SO: 14240 (95% CI 6658-30931) (partial coverage) 1984 S: 18000 (90% CI 15-21000) (partial coverage)	Exploited in all coastal areas [6] - [13] and perhaps [16] 1993-98 all Canadian Baffin Bay communities combined: mean 280/yr		See above for individual aggregations that make up this group.	Richard et al. 1994 SC/7/BN/15 SC/7/BN/32 SC/7/BN/35
[16] Baffin Bay	<u>Wintering ground</u> for narwhal from coastal areas [6] - [14] and perhaps [16], no discrimination of stocks	1979 S: 34.363 (SE 8282) (partial coverage)	Exploited in all coastal areas [6] - [12] and perhaps [16] 1993-95 Canada and Greenland combined: mean 885/yr		See above for individual aggregations that make up this group.	Koski & Davis 1994 SC/7/BN/32
[17] Northern Hudson Bay	<u>Summering ground.</u> Probably wintering in Hudson Strait.	1984 S: 1355 (90% CI: 1000-1900) (partial coverage)	1993-98 mean 22/yr		Not threatened but need to clarify stock discreteness	Richard 1991, SC/7/BN/31 SC/7/BN/35

10.1 Russia

There are no hunts for narwhal in Russian waters. The species is considered rare and is listed as a protected species in the Russian Federation's Red Book.

10.2 Svalbard

There are no hunts for narwhal in Svalbard.

10.3 East Greenland

Up to 150 narwhal a year are caught in E. Greenland (Dietz et al 1994). Narwhal in this area are probably not threatened because of their wide dispersal and the very localized and relatively low level of harvest. However, the sustainability of this hunt is unknown due to an absence of estimates of total population size.

10.4 West Greenland

Catches in West Greenland vary from about 500 to about 700 annually (SC/7/BN/34). The catch would be sustainable if there was only one panmictic population shared between Canada and Greenland. However, the existence of several stocks is suggested by the results of recent satellite tracking and genetic studies. Of particular concern are small summer aggregations which, if they are discrete stocks, could become depleted by large hunts in Greenland or Canada. The sustainability of the overall harvest is therefore uncertain.

10.5 Canada

10.5.1 Baffin Bay and Adjacent Waters

Catches from the Baffin Bay narwhal stock are about 240-320/year (SC/7/BN/35). This combined with the West Greenland catch would be sustainable if there were one shared panmictic population. The same problem of seasonal stock delineation mentioned in 10.4 precludes the evaluation of sustainability of the summer aggregations individually. The Prince Regent Inlet aggregation is large and least susceptible to over-exploitation. The Peel Sound and Eclipse Sound aggregations are smaller and, if they are discrete stocks, could become depleted by large hunts in Greenland and/or Canada. There is evidence through satellite tracking that Tremblay Sound (Eclipse Sound area) narwhal migrate to a wintering area in southern Baffin Bay where they might be subject to Greenlandic hunts (SC/7/BN/9). However, present harvest levels in Canada have been sustained for some decades with no evidence of depletion or range reduction (SC/7/BN/32).

10.5.2 Hudson Bay

The catches in Northern Hudson Bay are small relative to the population estimate (<1%) (SC/7/BN/31). The hunt is therefore considered sustainable, however stock discreteness must be further clarified.

11. RECOMMENDATIONS FOR FUTURE RESEARCH

11.1 Beluga

Aggregation	Research Priority
Russian Arctic and Finnmark Coast [1-4]	<ol style="list-style-type: none"> 1. Stock Identification: It is not known if the aggregations within the Karskaya group are discrete stocks. 2. Stock Enumeration: This should not be attempted until stock identification is completed. 3. Potential Threats: The potential effects of industrial development on these aggregations, including shipping and pollution, should be studied.
Svalbard [5]	<ol style="list-style-type: none"> 1. Stock Identification: The relationship of this aggregation to those in the Barents Sea and

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Aggregation	Research Priority
	Russian Arctic should be addressed.
West Greenland [8-9]	<ol style="list-style-type: none"> 1. Movements and Migrations: There is a need to determine where beluga from these aggregations go in the summer, and to what extent they are harvested during the summer and during migrations. 2. Improved reporting of catch and loss rates. It is necessary to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from stocks, and hence to determine stock status.
Canadian High Arctic and North Water [10,11]	<ol style="list-style-type: none"> 1. Stock Identification: The stock identity of beluga from the numerous concentration areas in the Canadian High Arctic, and their relationship to beluga wintering off West Greenland, should be determined. 2. Movements and Migration: We need to know what proportions of the beluga in the Canadian High Arctic winter in the North Water and off West Greenland, and whether these proportions are constant from year to year.
SE Baffin- Pangnirtung [12]	<ol style="list-style-type: none"> 1. Stock Enumeration: Surveys should be conducted using identical methods to those used previously, to index the population and determine the trend in numbers. 2. Movements and Migration: We need to find out where these whales go in the winter, to see if there is a connection between this stock and those wintering off W Greenland. 3. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from the stock, and hence to determine stock status.
SE Baffin- Iqaluit and Kimmirut [13, 14]	<ol style="list-style-type: none"> 1. Stock Identification, relation to other stocks: We need to know if the stocks hunted in these areas are hunted in other areas, and what aggregations of beluga, if any, support these harvests. 2. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, in order to determine total removals from these stocks, and hence to determine stock status.
St. Lawrence River [15]	<ol style="list-style-type: none"> 1. Relationship of contaminants to observed pathologies. We need to know if pollutants are causing increased morbidity and mortality in this stock, and inhibiting stock recovery.
North Hudson Bay [17], Southern Hudson Bay [22], James Bay [23], Foxe Basin [24]	<ol style="list-style-type: none"> 1. Stock Identification: We need to know if these aggregations are distinct stocks. 2. Movements and Migration: We need to know if the stocks hunted in these areas are hunted in other areas, and what aggregations of beluga, if any, support these harvests. 3. Stock Enumeration: This should be done after stock delineation is complete and stock ranges are defined. 4. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from these stocks, and hence to determine stock status.

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Aggregation	Research Priority
Ungava Bay [16]	<ol style="list-style-type: none"> 1. Stock Recovery: This depleted stock provides an opportunity for studying the dynamics of beluga stock recovery, or the recolonization of areas by other stocks.
Eastern Hudson Bay [18]	<ol style="list-style-type: none"> 1. Stock Enumeration: We need to know whether this stock is increasing or decreasing in number. 2. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from these stocks, and hence to determine stock status.
Belcher Islands [19]	<ol style="list-style-type: none"> 1. Stock Identification, relation to other stocks: We need to know if the stock hunted in this area is hunted in other areas, and what aggregation of beluga, if any, support this harvests. 2. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from these stocks, and hence to determine stock status.
Hudson Strait [20]	<ol style="list-style-type: none"> 1. Stock Identification: We need to know the proportional representation of stocks in the mixed stock hunt. 2. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from these stocks, and hence to determine stock status.
West Hudson Bay [21]	<ol style="list-style-type: none"> 1. Improved reporting of catch and loss rates. We need to know with certainty the number of beluga landed, and the number of beluga killed but lost, to determine total removals from these stocks, and hence to determine stock status.

11.2 Narwhal

Aggregation	Research Priority
NE Atlantic including Svalbard, Russia Severnaya Zemlya, Franz Josef Land and E. Greenland. [1-5]	<ol style="list-style-type: none"> 1. Stock identity through opportunistic sampling. This group does not have high priority for research as narwhal are not abundant in these areas and are not heavily harvested. If samples become available, stock delineation work should be carried out.
West Greenland [6-9]	<ol style="list-style-type: none"> 1. Abundance surveys at Aversuaq [9], Melville Bay [8] and Uummanaq [7]. These are summer aggregations [9 and 8] and a fall migration route [7] that are subject to substantial harvests. 2. Movements from Disko Bay [6] to summering areas. It is known that narwhal from at least two areas [8 and 10] winter in this area. It is necessary to determine if beluga from this area summer in other areas, and where they are subjected to harvesting in their summering areas and during migration. 3. Improved reporting of catch

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Aggregation	Research Priority
	and loss rates. It is necessary to know with certainty the number of narwhal landed, and the number of narwhal killed but lost, to determine total removals from stocks, and hence to determine stock status.
Baffin Bay, Canadian High Arctic. [10-16]	<ol style="list-style-type: none"> 1. Stock identification. It is necessary to determine if the aggregations summering in this area [10-14] are actually distinct stocks. 2. Improved catch and removal reporting. It is necessary to know with certainty the number of narwhal landed, and the number of narwhal killed but lost, to determine total removals from stocks, and hence to determine stock status. 3. Studies of movements/migration. It is necessary to determine the migration routes and wintering areas of these aggregations, to assign harvest to specific stock units.
Northern Hudson Bay. [17]	<ol style="list-style-type: none"> 1. Stock Identification. It is necessary to determine if the aggregation summering in this area [17] is actually a distinct stock. 2. Improved catch and removal reporting. It is necessary to know with certainty the number of narwhal landed, and the number of narwhal killed but lost, to determine total removals from this aggregation, and hence to determine stock status.

12. ADOPTION OF REPORT

The report was adopted in draft form, with noted editorial changes, by all participants.

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Figure 1a: Overview of the Russian, Norwegian, Greenlandic and Canadian Arctic.

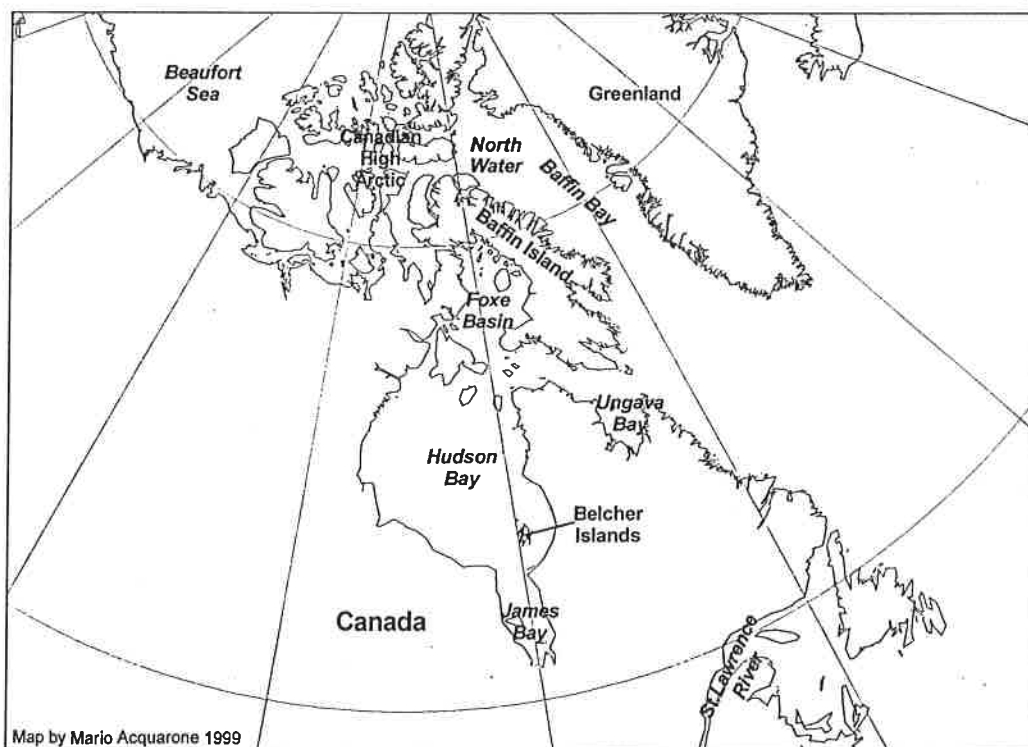
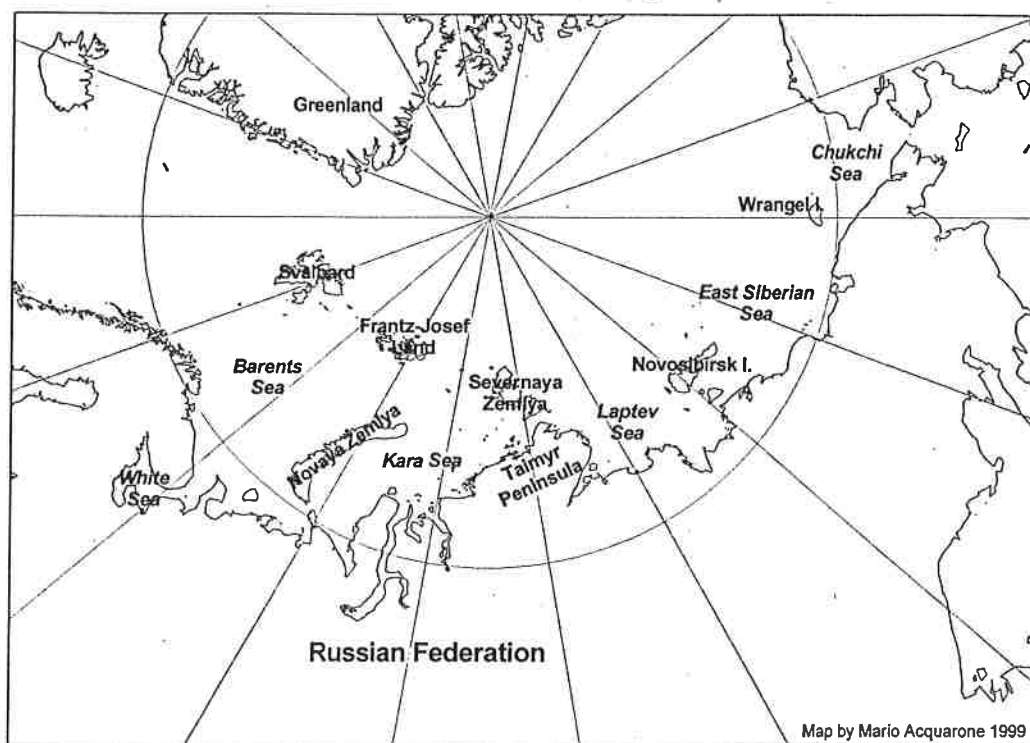


Figure 1b: The Russian Arctic.

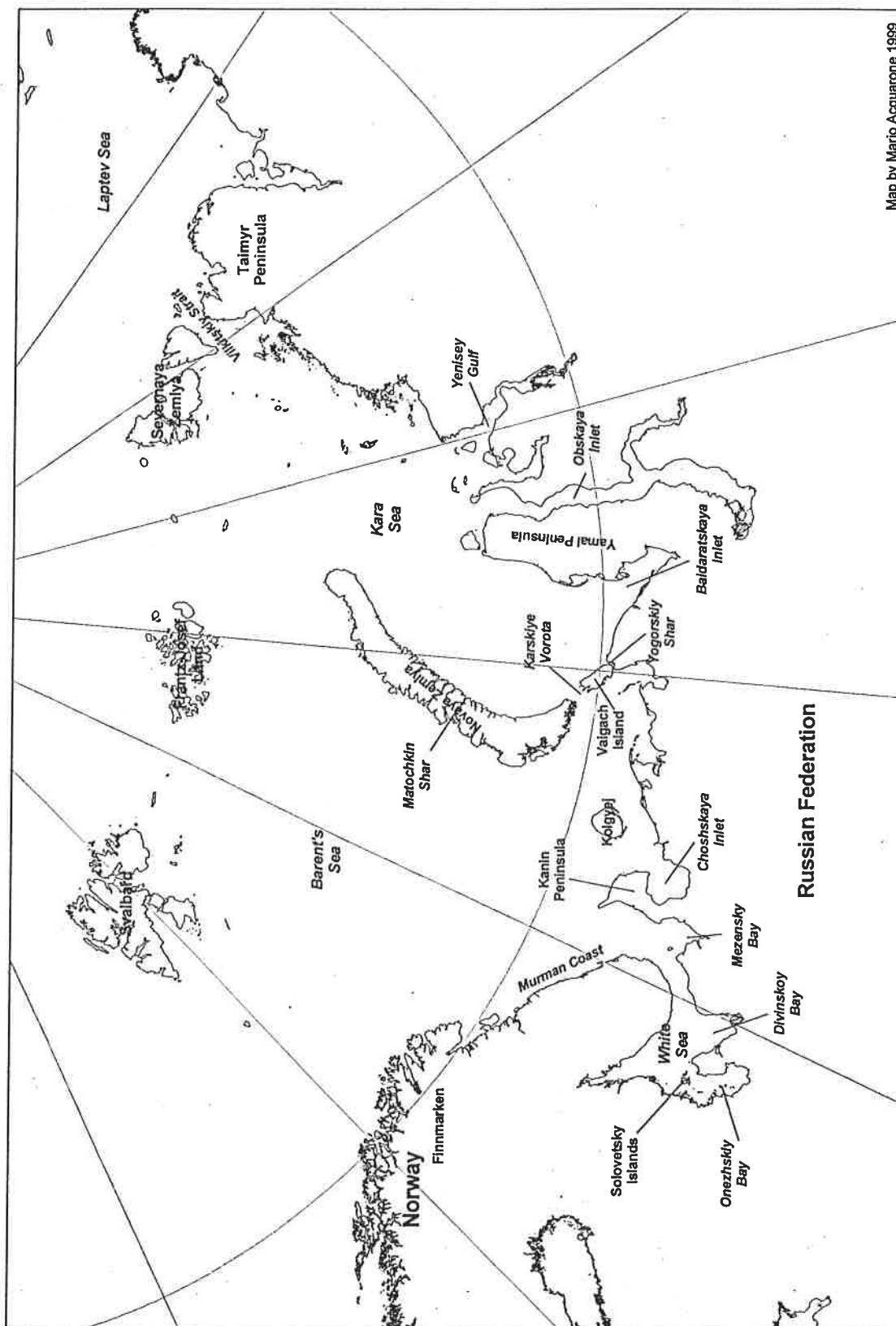


Figure 1c: Greenland.

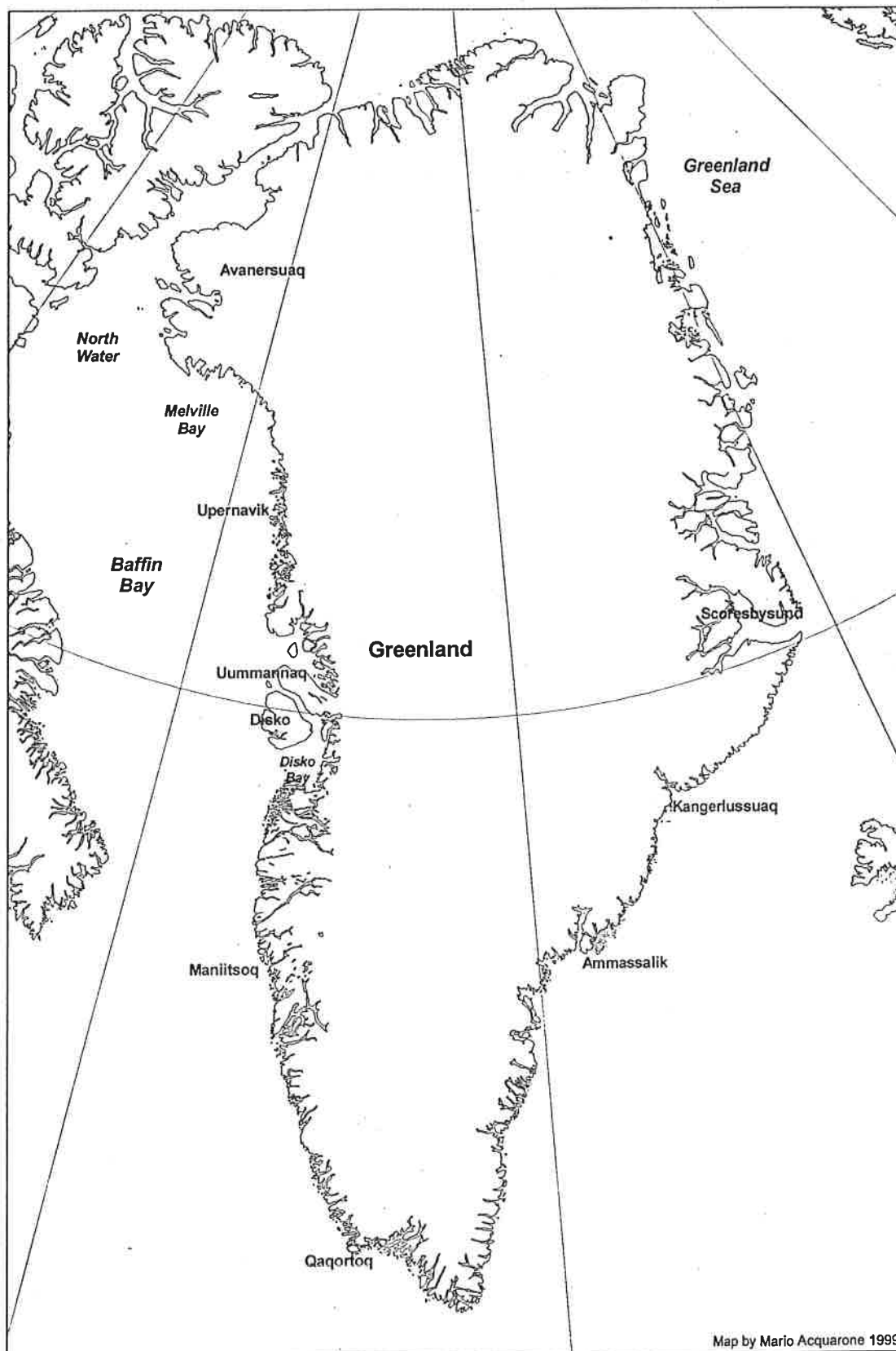
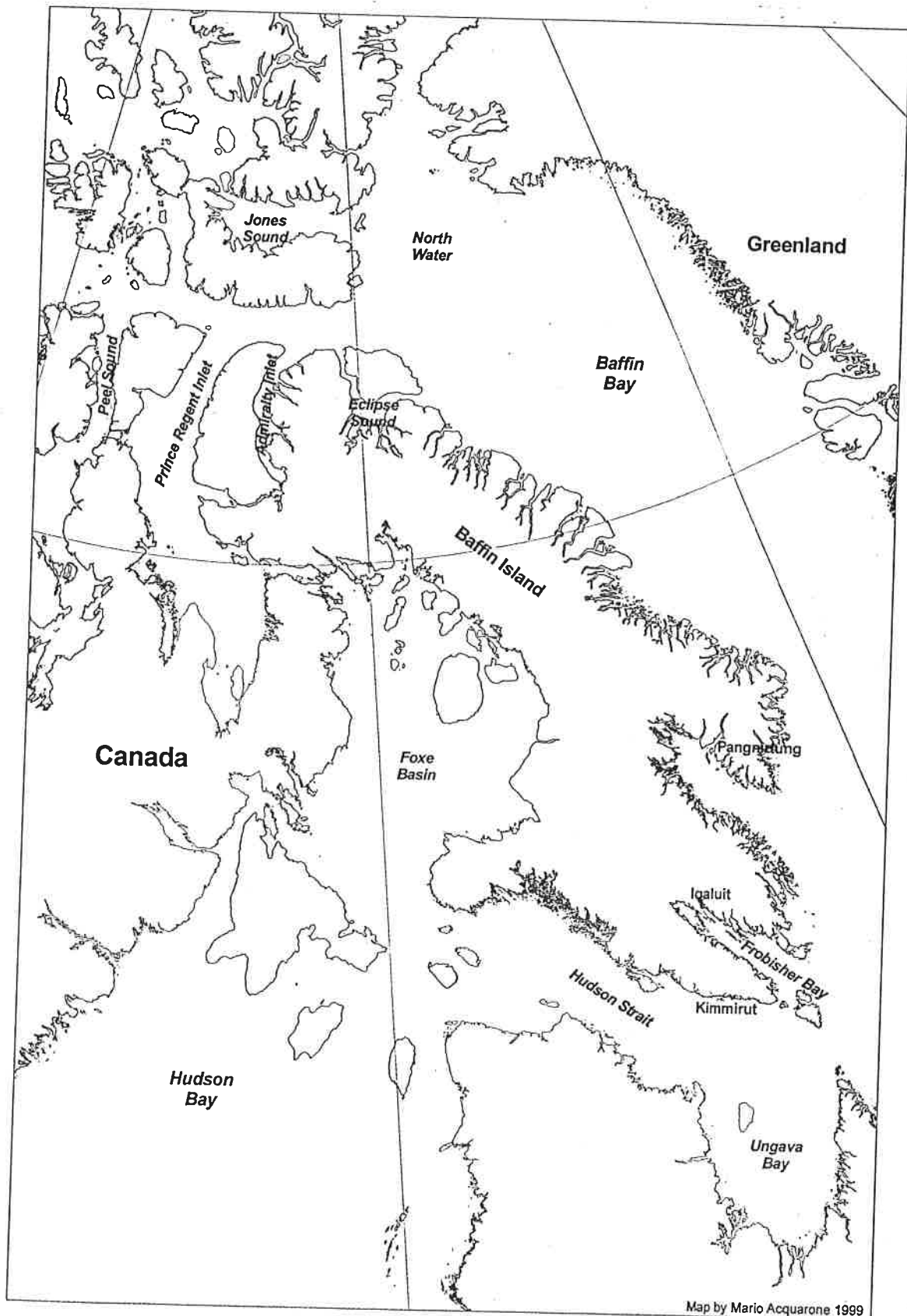


Figure 1d: The Canadian eastern Arctic.



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AGENDA

1. Opening remarks
2. Adoption of Agenda
3. Appointment of Rapporteur
4. Review of available documents and reports
5. Distribution, migrations and stock identity of beluga
 - 5.1 Russia
 - 5.1.1. Laptev Sea
 - 5.1.2. Kara Sea
 - 5.1.3. White Sea
 - 5.1.4. Barents Sea
 - 5.2 Svalbard
 - 5.3 East Greenland
 - 5.4 West Greenland
 - 5.5 Canada
 - 5.5.1 Baffin Bay and adjacent waters
 - 5.5.2 Pangnirtung
 - 5.5.3 Hudson Bay
 - 5.5.4 Saint Lawrence River
 - 5.6 Beaufort Sea and Alaska
6. Population size and trends of beluga – by areas as above
7. Exploitation and sustainability of harvest of beluga – by areas as above
8. Distribution, migrations and stock identity of narwhal
 - 8.1 Russia
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11. Distribution, migrations and stock identity of narwhal – by areas as above
10. Exploitation and sustainability of harvest of narwhal – by areas as above
11. Recommendations for future research
12. Adoption of report

LIST OF DOCUMENTS

- SC/7/BN/1 List of participants
- SC/7/BN/2 Agenda
- SC/7/BN/3 List of documents and working papers
- SC/7/BN/4 B.G.E. de March, Genetic differences among North American and adjacent beluga stocks as determined by mitochondrial DNA and 15 nuclear DNA microsatellites.
- SC/7/BN/5 P.R. Richard, Summer and autumn movements of belugas from Canadian Arctic stocks, in Greenlandic, Canadian and Eastern Russian waters.
- SC/7/BN/6 S.E. Belikov and A.N. Boltunov, Distribution and migrations of cetaceans in the Russian Arctic according to observations of aerial ice reconnaissance.
- SC/7/BN/7 A.N. Boltunov and S.E. Belikov, Beluga (*Delphinapterus leucas*) of the Barents, Kara and Laptev seas.
- SC/7/BN/8 M. Acquarone and M.P. Heide-Jørgensen. Helicopter surveys for belugas in northern Upernavik, West Greenland, 1998.
- SC/7/BN/9 R. Dietz and M.P. Heide-Jørgensen. Satellite radio tracking of narwhals captured in Tremblay Sound in 1997 and 1998.
- SC/7/BN/10 M.P. Heide-Jørgensen and M. Acquarone. Abundance and population trends of belugas (*Delphinapterus leucas*) and narwhals (*Monodon monoceros*) wintering in West Greenland.
- SC/7/BN/12 M.P. Heide-Jørgensen and P.Palsbøll, Evidence of heterogeneity in belugas from West Greenland.
- SC/7/BN/13 V. Bel'kovich. The determinative factors of the population structure of Beluga Whales.
- SC/7/BN/14 S. Innes, D. C. G. Muir, R.E.A. Stewart, R. Dietz and M. P. Heide-Jørgensen. Stock identity of beluga (*Delphinapterus leucas*) based on multivariate analysis of the concentrations of organochlorine contaminants.
- SC/7/BN/15 S. Innes, H. Cleator, and P. Richard. A Population estimate for Baffin Bay beluga and survey estimates for narwhal and bowhead whales in the Canadian High Arctic.
- SC/7/BN/16 G. Stern and S. Innes. Stock identity of beluga in the Southeast Baffin Island based on organochlorine contaminant residues.
- SC/7/BN/17 S. Innes and G. Williams. Use by narwhal of the ice-edge based on photo-identification of individuals.
- SC/7/BN/18 A.D. Chernetzky, V. M. Bel'kovich and E.Isikeeva. Peculiarities of the beluga's

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acoustic vocalization in a reproductive concentration (Solovetsky Island, the White Sea).

- SC/7/BN/19 V.F.Prishchemikhin. Composition of ship catches of beluga in the Kara Sea
- SC/7/BN/20 G.N. Ognetov. A review of investigations on the white whale *Delphinapterus leucas* pall. 1776 of the western Russian Arctic in 1970-1997.
- SC/7/BN/21 G.N. Ognetov. Catch history, statistics and modern exploitation of the beluga (*Delphinapterus leucas*) in the western Russian Arctic.
- SC/7/BN/24 C. Lydersen, K.M. Kovacs and I. Gjertz. Studies of white whales (*Delphinapterus leucas*) and narwhals (*Monodon monoceros*) in Svalbard.
- SC/7/BN/25 Kingsley, M.C.S. Statistical considerations in using an unbiased sub-survey to correct detection bias
- SC/7/BN/26 Kingsley, M.C.S. and I Gauthier. Visibility of St Lawrence belugas to aerial photography, estimated by direct observation.
- SC/7/BN/27 Kingsley, M.C.S. Summary of the status of St Lawrence belugas.
- SC/7/BN/28 Kingsley, M.C.S. Summary of the status of belugas in eastern Hudson Bay, James Bay and Ungava Bay.
- SC/7/BN/29 P. Richard. Summary table of published estimates of Canadian beluga and narwhal stocks.
- SC/7/BN/30 M.P. Heide-Jørgensen, N. Hammeken, R. Dietz, S. Innes, J. Orr, P. Richard. Surfacing times for narwhals and belugas.

Other Documents:

- SC/7/BN/31 Canada Department of Fisheries and Oceans. Hudson Bay narwhal. Stock Status Report E5-44 (1998)
- SC/7/BN/32 Canada Department of Fisheries and Oceans. Baffin Bay narwhal. Stock Status Report E5-43 (1998)
- SC/7/BN/34 Canada/Greenland Joint Commission on Conservation and Management of Narwhal and Beluga. 1997 Report, Scientific Working Group
- SC/7/BN/35 N.W.T Narwhal and Beluga Harvests
- SC/7/BN/36 (Untitled) Age distribution of beluga in Canadian catches.