

**DENMARK. PROGRESS REPORT ON CETACEAN RESEARCH, APRIL 2003 TO
APRIL 2004, WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2003**

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This report summarises information obtained from: Age Dynamics (AD), Kongens Lyngby (agedynamics@mail.dk); Danish Forest and Nature Agency (FNA), København (MFM@sns.dk); Danish Institute for Fisheries Research (DIFFRES), Charlottenlund (fl@dfu.min.dk); Fisheries and Maritime Museum (FMM), Esbjerg (st@fimudk.dk); Fjord&Bælt (F&B), Kerteminde (genevieve@fjord-baelt.dk); Greenland Home Rule Government (GHG), Nuuk (amalie@gh.gl; kim@gh.gl); Greenland Institute of Natural Resources (GN), Nuuk (larsw@natur.gl; mcsk@natur.gl); Institute of Biology, University of Southern Denmark (USD), Odense (lee@biology.sdu.dk); Institute of Biology, Aarhus University (AAU), Aarhus (bertel.moehl@biology.au.dk, Magnus.Wahlberg@biology.au.dk); National Environmental Research Institute (NERI), Roskilde (jte@dmu.dk, rdi@dmu.dk, lwa@dmu.dk, jat@dmu.dk) and non-affiliated persons.

1. Species and stocks studies

The following studies were conducted in the period:

Common name	Scientific name	Area/stock(s)	Items referred to
Minke Whale	<i>Balaenoptera acutorostrata</i>	Denmark, West & East Greenland, North Atlantic	2.2; 3.1.3; 4.1; 4.2; 5; 6.1; 8
Fin Whale	<i>Balaenoptera physalus</i>	Denmark, West Greenland	3.1.3; 4.2; 6.1
Humpback Whale	<i>Megaptera novaeangliae</i>	West Greenland, Alaska	3.1.3; 4.1; 6.2; 9
Bowhead Whale	<i>Balaena mysticetus</i>	West Greenland	3.1.3; 4.1
Sperm Whale	<i>Physeter macrocephalus</i>	Norway, Denmark, Mediterranean	9
Narwhal	<i>Monodon monoceros</i>	Canada and Greenland	3.1.3; 4.1
White whale	<i>Delphinapterus leucas</i>	Greenland, various Arctic	9
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	Faroe Islands	9
Killer whale	<i>Orcinus orca</i>	Norway, Iceland	9
Longfinned Pilot Whale	<i>Globicephala melas</i>	Denmark, North Sea	9
White-beaked Dolphin	<i>Lagenorhynchus albirostris</i>	Denmark; Iceland, Germany	8; 9
White-sided dolphin	<i>Lagenorhynchus acutus</i>	Faroe Islands	9
Bottlenose dolphin	<i>Tursiops truncatus</i>	Israel, Zanzibar	9
Rough-toothed dolphin	<i>Sieno bredanensis</i>	Israel	9
Striped dolphin	<i>Stenella acoeruleoalba</i>	Israel	9
Common Dolphin	<i>Delphinus delphis</i>	Denmark, Spain	8; 9
Hector's dolphin	<i>Cephalorhynchus hectori</i>	New Zealand	9
Harbour Porpoise	<i>Phocoena phocoena</i>	Denmark, Greenland, Germany, Netherlands, UK	2.1.1; 3.1.3; 4.1; 4.2; 4.3; 8; 9

2. Sightings data in 2003

2.1 Field work

2.1.1 SYSTEMATIC

NERI conducts regular ship surveys for harbour porpoises at Horns Reef as part of the monitoring program for Horns Reef Offshore Wind Farm. Status reports are available and the final report will be ready in 2006.

2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY

No information

2.2 Analyses/development of techniques

A comparative study between aerial cue-counting and digital photography surveys for minke whales was conducted in Faxafloi Bay on Iceland in September 2003. The study concluded that the two techniques are comparable, and the study allowed for the calculation of a factor to correct a photo survey for submerged whales (see documents sc/mo4/awmp1-3).

3. Marking data in 2003

3.1 Field work

3.1.1 NATURAL MARKING DATA

No information.

3.1.2 ARTIFICIAL MARKING DATA

No information.

3.1.3 TELEMETRY DATA

During 1997-2003 60 harbour porpoises were tagged with satellite tags in a cooperation between NERI, DIF-FRES and F&B. Results from the study are available at:

http://www.dmu.dk/1_viden/2_Publikationer/3_fagrappporter/rapporter/FR484_samlet.PDF

In 2003 a young minke whale was live caught in a pound net at Skagen, the northernmost point of Denmark, and equipped with a satellite tag. Contact remained with the whale for 3 months. After being released at Skagen, it swam north of the British Isles and then headed south, passing the Azores, Cap Verde Islands and the Canary Islands. The last locations were received from the Mediterranean.

Four bowhead whales were instrumented with satellite transmitters in northwestern Disko Bay, West Greenland, May 2003. The movements within Disko Bay showed that the tagged whales preferred the northwestern part of the bay. Two of the tags were successful in tracking the whales during their migration. The two whales moved from Disko Bay to northern Canada in late May where after they stayed along the east coast of Baffin Island until late October where both whales moved south into Hudson Strait.

One fin whale, 2 minke whales and four humpback whales were instrumented with satellite transmitters in West Greenland in August-September 2003. The fin whale and one minke whale received the instruments too low on the side and no positions were obtained from these whales. One minke whale was caught by local whalers a couple of weeks after the instrumentation with the tag (a Telonics ST15) still functioning. Two of the humpback whales provided positions for 2,5 mths detailing movements along West Greenland and across Baffin Bay to the east coast of Baffin Island.

Eleven humpback whales were successfully instrumented in Brazil in October 2003. All tags provided positions from the whales and three tags documented the southward migration. One tag is still transmitting after 7 months.

Thirteen narwhals were tagged in Admiralty Inlet, Canada. Migration data were obtained for up to 6 months. The animals did not frequent other and previous investigated summer areas in Canada and Greenland. The timing autumn migration routes and winter home ranges were estimated.

3.2 Analyses/development of techniques

Nothing to report

4. Tissue/biological samples collected in 2003

4.1 Biopsy samples

Biopsies were taken from 1 minke whale and 8 harbour porpoises in parallel with tagging operation in Danish waters.

Thirteen biopsies were obtained from narwhals in parallel with tagging operation in Admiralty Inlet, Canada. 11 biopsies were taken from bowhead whales in Disko Bay in May, and 4 biopsies were taken from humpback whales in West Greenland in the fall.

4.2 Samples from direct catches or by-catches 2003

Species	Area/stock	Calendar year/season Total	Archived (N/Y)	Tissue type(s), stomach samples	Contact person/institute
Minke whale	Greenland	12	Y	skin	GN
Fin whale	Greenland	1	Y	skin	GN
Harbour porpoise	Denmark	Several	Y	Not specified	FNA/FMM

4.3 Samples from stranded animals 2003

Species	Area/stock	Calendar year/season total	Archived (N/Y)	Tissue type(s), stomach samples	Contact person/institute
Harbour Porpoise	Danish waters	several	Y	Not specified	FNA/FMM

5. Population and pollution studies

Data from the arctic environment were presented in Riget *et al.* (2003 a,b). In addition results on genetics, fatty acids and contaminants from the North Atlantic minke whales were published (Andersen *et al.* 2003, Born *et al.* 2003, Hobbs *et al.* 2003, Møller *et al.* 2003).

6. Statistics for large cetaceans

6.1 Direct catches for the calendar year 2003

Commercial, aboriginal and scientific permits						
Species	Type of catch	Area/stock	Males	Females	Total Landed	Struck and lost
Fin whale	Aboriginal	West Greenland	2	4	6	3
Minke whale	Aboriginal	West Greenland	58	117	178	7
Minke whale	Aboriginal	East Greenland	1	11	13	1

Source: GHG

6.2 Other non-natural mortality for the calendar year 2003

Species	Area/stock	Males	Females	Total	Cause	Methodology
Humpback whale	West Greenland	?	?	1	Bycatch	Observation

Source: GHG

6.3 Earlier year's statistics

No corrections.

7. Statistics for small cetaceans

7.1 For the calendar year 2003

Concerning statistics on small cetaceans the Greenland Home Rule Government, the Directorate for Fishery, Hunt, Trade and Agriculture, and the Home Rule Government of the Faroe Islands as a matter of principles request IWC to obtain scientific and technical information on small cetaceans from the North Atlantic Marine Mammal Commission (NAMMCO), University of Tromsø, N-9037 Tromsø, Norway (Nammco-sec@nammco.no).

8. Strandings

The Danish stranding network is based on a contingency plan developed and managed by FNA (HLS@sns.dk) in cooperation with the Zoological Museum in Copenhagen, the Esbjerg Fisheries and Maritime Museum (st@fimus.dk) and the participation of F&B (genevieve@fjord-baelt.dk).

In 2003 the following strandings were recorded: 124 harbour porpoises (some are probably discarded by-caught animals), 7 white-beaked dolphins, 3 common dolphins, 2 minke whales.

9. Other studies and analyses

By-catch mitigation

F&B, DIFRES and Kolmårdens Djurpark (SE) completed the cooperative project NAPER, “New Alternatives to Porpoise Entanglement Reduction”, funded by the Nordic Council of Ministers and the Kolmården Fund Raising Foundation. In 2002 and 2003, the NAPER project tested on wild porpoises the prototype of an interactive type “pinger”, where the deterrent sound is triggered by the porpoises’ own sonar (Rosager Poulsen, 2004). The interactive pinger is an interesting alternative to the beacon mode pinger since the deterrent sounds are only transmitted when they are necessary, i.e. when a porpoise is swimming toward a net. As a consequence, the sound emitted to the environment is reduced and the unpredictability of the deterrent signal will delay habituation. The experiments showed that an interactive pinger was effective at displacing the porpoises, but did not exclude them from a wider area. Changes in swimming behaviour compared to baseline were indeed significant for the dive where the displacement sound was emitted, but not for any of the subsequent dives. Since the purpose of a pinger is to keep the animals at a safe distance from nets but not to scare them off, the interactive pinger seemed to work as intended. Also, the sound monitoring showed that the interactive pinger emitted less than 3% of the amount of deterrent sounds a beacon mode pinger would emit. Further testing will be carried out with an array of interactive pingers in August 2004. (contact: genevieve@fjord-baelt.dk, fl@dfu.min.dk)

DIFRES conducted research on methods for reducing by-catch of harbour porpoises in bottom-set gillnets. (Contact: fl@dfu.dk).

Population structure

NERI, Dept. of Wildlife Ecology and Biodiversity conducted data -analysis of the genetic population structure and relatedness of harbour porpoises in Danish and adjacent waters. (contact: lwa@dmu.dk).

NERI, Dept. of Wildlife Ecology and Biodiversity conducted, in cooperation with the Faroese Museum of Natural History, a genetic analysis on white sided dolphins off the Faroe Islands (Jacobsen, Å. 2004) in order to 1) Locate any possible subdivision of the *L. acutus* population in the North Atlantic, 2) Characterise the social structure within and between the herds, 3) Estimate the gene flow between the different sample areas, 4) Infer if possible the design of the management scheme for *L. acutus* based on the information obtained from the above mentioned objectives. Population structure analyses of the white-sided dolphin from the Faroe Islands and Scotland based on mtDNA and DNA-microsatellites indicated a panmictic population, while the analysis of the social structure detected the presence of a family structure within the Faroese samples. Furthermore, the results also indicated that the population had expanded recently. (contact: lwa@dmu.dk.)

Biological parameters - Age determination

AD undertook the age determination of various stranded / by-caught / local take small cetacean species for inclusion in national databases, including harbour porpoise, *Phocoena phocoena* (Germany, Netherlands, Poland, Sweden, UK), white-sided dolphin, *Lagenorhynchus acutus* (Faroe Islands), white-beaked dolphin, *L. albirostris* (Germany), northern bottlenose whale, *Hyperoodon ampullatus* (Faroe Islands), common dolphin, *Delphinus delphis* (Spain), rough toothed dolphin, *Steno bredanensis* (Israel), striped dolphin, *Stenella coeruleolba* (Israel), bottlenose dolphin, *Tursiops truncatus* (Israel, Zanzibar), long-finned pilot whale, *Globicephala melas* (Netherlands), Hector’s dolphin, *Cephalorhynchus hectori* (New Zealand) and investigation of large whale species including sperm whale, *Physeter macrocephalus* (eastern Mediterranean), and humpback whale, *Megaptera novaeangliae* (Alaska). AD also continued the validation of age determination methods, especially with humpback whale ear plugs from a known-history animal (in cooperation with Christine Gabriel, Glacier Bay National Park, Alaska) and white whale, *Delphinapterus leucas*. AD also organised workshops on age determination techniques in Hel Marine Station, Poland (April 2003), Bangor University, UK (May 2003, April 2004) and Kongens Lyngby, Denmark (November 2003, March 2004) instructing in methods of tooth preparation and age interpretation. (contact: agedynamics@mail.dk)

Feeding

F&B investigates, in co-operation with the Faroese Museum of Natural History, the feeding behaviour of bottlenose whales off the Faroe Islands (Contact: genevieve@fjord-baelt.dk).

The analysis of the cephalopod beaks contained in the stomachs of ten sperm whales stranded in Denmark during 1991, 1997 and 2000 was completed. (Contact: MJSimon@bi.ku.dk).

Acoustics

AAU runs a study on the acoustics of sperm whales (*Physeter macrocephalus*) in the waters off Andenes, Norway, aims to investigate the biosonar system of these whales. The project now focuses on measurements with a 10 hydrophone, vertical, linear, 1km array, using fiber optics. (Contacts: bertel.moehl@biology.au.dk and Magnus.Wahlberg@biology.au.dk).

USD run an ongoing study on the biosonar and acoustic communication system of white-beaked dolphins (*Lagenorhynchus albirostris*) in Icelandic waters, aiming to describe the acoustic characteristics and directionality of these signals. Playback studies of communication sounds were used to study the hearing abilities of free ranging white-beaked dolphins. (Contacts: mhr@biology.sdu.dk and lee@biology.sdu.dk).

USD completed a project (Simon, M.J. 2004) concerning the use of sounds during prey capture by killer whales (*Orcinus orca*) in Norway and Iceland. (Contacts: MJSimon@bi.ku.dk and lee@biology.sdu.dk).

Human disturbance

NERI investigates effects on harbour porpoises from wind farm construction and operation at Nysted Offshore Wind farm and Horns Reef Offshore Wind Farm. Investigations are based preliminary on acoustic recordings (T-PODs) and ship surveys. A report on the effect from the construction phase is available. The final report on the projects will be available in 2006. (Contact: jat@dmu.dk)

The University of Ruhr-Bochum (Germany), in cooperation with F&B, completed in February 2004 a project investigating the hearing sensitivity of harbour porpoises in cooperation using Auditory Brainstem Recordings, for looking at the effect of man-made noise on harbour porpoise hearing, especially offshore windmill construction works, and to provide guidelines for safe intensity level for sound emissions during underwater operations. Analysis is ongoing. (Contact: lucke@ftz-west.uni-kiel.de)

10. Literature cited

11. Publications in 2003

11.1 Published or 'In Press' papers only

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