Netherlands. Progress report on cetacean research, May 2007 to May 2008, with statistical data for the calendar year 2007

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This report summarises information obtained from:

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Sea Mammal Research Company	SEAMARCO	researchteam@zonnet.nl

1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Harbour porpoise	*Phocoena phocoena*	North Sea	2.1 4.3 8 9
Bottlenose dolphin	*Tursiops truncatus*	North Sea	2.1 4.3 8
Common Dolphin	*Delphinus delphis*	North Sea	2.1
White-beaked Dolphin	*Lagenorhynchus albirostris*	North Sea	2.1
White-sided Dolphin	*Lagenorhynchus acutus*	North Sea	4.3 8
Long-finned Pilot Whale	*Globicephala melas*	North Sea	2.1
Killer Whale	*Orcinus orca*	Southern Ocean, Weddell Sea, Lazarev Sea	2.1
Southern Bottlenose Whale	*Hyperoodon planifrons*	Southern Ocean, Weddell Sea, Lazarev Sea	2.1
Arnoux's Beaked Whale	*Berardius arnuxii*	Southern Ocean, Weddell Sea	2.1
Strap-toothed Whale	*Mesoplodon layardii*	Southern Ocean, Weddell Sea	2.1
Gray's Beaked Whale	*Mesoplodon grayi*	Southern Ocean, Weddell Sea	2.1
Tusciziphius (extinct beaked whale)	*Tusciziphius*	n.a. (palaeontology)	9
Antarctic Minke Whale	*Balaenoptera bonaerensis*	Southern Ocean, Lazarev Sea, Weddell Sea	2.1
Humpback Whale	*Megaptera novaeangliae*	North Sea, Southern Ocean, South Shetlands, Lazarev Sea	2.1 3.1
Blue Whale	*Balaenoptera musculus*	Southern Ocean, Lazarev Sea	2.1
Fin Whale	*Balaenoptera physalus*	Southern Ocean, Lazarev Sea, South Shetlands	2.1
Sei Whale	*Balaenoptera borealis*	Southern Ocean, South Shetlands	2.1
Southern Right Whale	*Eubalaena australis*	Southern Ocean	2.1

2. SIGHTINGS DATA

2.1 Field work

2.1.1 Systematic

Target species	Date	Area	No. of sightings (animals)	Contact person/institute and references
Harbour porpoise	Jan 07 to Dec 07	Dutch coastal waters	482 (1167)	K. Camphuysen (NIOZ) (Camphuysen 2008)

Bottlenose dolphin	Jan 07 to Dec 07	Dutch coastal waters	11 (15)	K. Camphuysen (NIOZ) (Camphuysen 2008)
Common Dolphin	Jan 07 to Dec 07	Dutch coastal waters	6 (26)	K. Camphuysen (NIOZ) (Camphuysen 2008)
White-beaked Dolphin	Jan 07 to Dec 07	Dutch coastal waters	10 (60)	K. Camphuysen (NIOZ) (Camphuysen 2008)
Pilot Whale	Jan 07 to Dec 07	Dutch coastal waters	1 (3)	K. Camphuysen (NIOZ) (Camphuysen 2008)
Humpback Whale	Jan 07 to Dec 07	Dutch coastal waters	13 (13)	K. Camphuysen (NIOZ) (Camphuysen 2008)
Antarctic Minke Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	(79)	J.A. van Franeker (IMARES), M. Scheidat (IMARES)
Humpback Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	(112)	J.A. van Franeker (IMARES)
Blue Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	1 (1)	J.A. van Franeker (IMARES)
Sperm Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	(2)	J.A. van Franeker (IMARES)
Southern Bottlenose Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	1 (1)	J.A. van Franeker (IMARES)
Killer Whale	Nov 07 to Feb 08	Southern Ocean, Lazarev Sea	(6)	J.A. van Franeker (IMARES)
Antarctic Minke Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	62 (135)	M. Scheidat (IMARES)
Humpback Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	13 (31)	M. Scheidat (IMARES)
Fin Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	8 (19)	M. Scheidat (IMARES)
Killer Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	4 (32)	M. Scheidat (IMARES)
Arnoux's Beaked Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	1 (4)	M. Scheidat (IMARES)
Strap-toothed Beaked Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	1 (3)	M. Scheidat (IMARES)
Gray's Beaked Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	1 (5)	M. Scheidat (IMARES)
Southern Bottlenose Whale*	Nov 06 to Jan 07	Southern Ocean, Weddell Sea	2(3)	M. Scheidat (IMARES)

*This data refers to systematic helicopter and shipboard surveys conducted from November 2006 to January 2007 on board of the RV Polarstern (ANTXXIII/8). This was a designated survey conducted with the Johann Heinrich von Thünen – Institut in Hamburg and supported by the German government (Scheidat et al. 2008). Preliminary results of this work have been presented at the 2007 IWC meeting (Scheidat et al. 2007 a, b). Current data analyses for this project is continuing and conducted in part through IMARES in the Netherlands and presently the data of this survey is stored at IMARES.

The coastal seawatching program was continued in 2007, all data obtained here as well as through opportunistic (non-effort related) sightings is stored in the Dutch Seabird Group (NZG) database. For 2007 this database contains 523 sightings of 6 identified species of cetaceans (1284 individuals) in Dutch near-shore waters. Additionally, 8 sightings (12 individuals) of unidentified cetaceans were made (Camphuysen 2008).

Systematic ship-based surveys for birds and small cetaceans (following the ESAS - European Seabirds at Sea protocol) were conducted mainly in and around offshore wind parks off the Dutch mainland. The data is collated in the ESAS database. Final report of the study is expected to be completed by June 2009.

Systematic helicopter and ship-based surveys for top predator census were conducted from board of the RV Polarstern during ANTXXIV/2 voyage, Lazarev Sea, 28 Nov2007- 4 Feb 2008 (van Franeker et al. 2008).

2.1.2 Opportunistic, platforms of opportunity

Opportunistic data on cetacean species is also included in the database described under 2.1.1. (Camphuysen 2008).

During both the ANTXXIII/8 and the ANTXXIV/2 additionally to the designated helicopter and shipboard surveys, opportunistic observations of cetaceans from the vessel were made (Franeker et al. 2008, Scheidat et al. 2008). Additional cetacean species sighted "off effort" were Southern Right Whales and Sei Whale. All opportunistic data are stored in databases at IMARES.

2.2 Analyses/development of techniques

No data available.

3. MARKING DATA

3.1 Field work

3.1.1 Natural marking data

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Humpback whale	Fluke, Dorsal Fin	Southern North Sea	1	N	-	K. Camphuysen, NIOZ
Humpback whale*	Fluke	South Shetland Islands	3	N	-	M. Scheidat, IMARES

A humpback whale occurring in Dutch coastal waters in May and November 2007 was photo-identified and matched with a humpback whale sighted in September 2007 in Irish waters (Camphuysen 2007).

During the German survey ANTXXIII/8 three humpback whale flukes were photographed for photo-id purposes. These are stored at IMARES.

Analyses of photo-identified humpback whales in the southeast Pacific were conducted, results are presented at the IWC 2008 (Castro et al. 2008a, b).

3.1.2. Artificial marking data
No data available.

3.1.3 Telemetry data
No data available.

3.2 Analyses/development of techniques
No data available.

4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

4.1 Biopsy samples (summary only)
No data available.

4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches
No data available.

4.3 Samples from stranded animals

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Harbour Porpoise	SE North Sea	Full necropsies (depending on carcass states)	58	y	58	M. Leopold, IMARES
White-sided Dolphin	Unknown (stranded in the Netherlands)	Full necropsy	2	y	2	M. Leopold, IMARES
Bottlenose Dolphin	Unknown (stranded in the Netherlands)	Full necropsy	1	y	1	M. Leopold, IMARES

4.4 Analyses/development of techniques
No data available.

5. POLLUTION STUDIES

Investigations on how persistent organic pollutants bioaccumulate in common dolphins and harbour porpoises from western European seas were published recently (Pierce et al. 2008).

6. STATISTICS FOR LARGE CETACEANS

6.1 Corrections to earlier years' statistics for large whales
No data available.

6.2 Direct catches of large whales (commercial, aboriginal and scientific permits)
No data available.

6.3 Anthropogenic mortality of large whales

6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)
No data available.

6.3.2 Fishery bycatch of large whales
No data available.

7. STATISTICS FOR SMALL CETACEANS

7.1 Corrections to earlier years' statistics for small cetaceans
No data available.

7.2 Direct catches of small cetaceans
No data available.

7.3 Anthropogenic mortality of small cetaceans for the calendar year 2007

7.3.1 Observed or reported ship strikes of small cetaceans (including non fatal events)
No data available.

7.3.2 Fishery bycatch of small cetaceans
No by-catches have been recorded in the ongoing monitoring programme on the incidental bycatch of cetaceans in Dutch pelagic fisheries under EU Council Regulation 812/2004 in 2007.

More than 315 porpoises were found stranded in 2007. Stranded porpoises were collected for necropsies, to reveal bycatch percentages among the stranded animals. A total of 58 animals, ranging from freshly dead when stranded to severely putrefied, received a full (or as full as possible) necropsy. The final numbers of bycaught animals for 2007 are not available yet. However, in 2006, about 55% of the necropsied animals were certain or likely bycatch victims. Bycatch has apparently been a major cause of death during the last two decades.

8. STRANDINGS
Data for 2007 still incomplete due to slow (non) data entries from north of the country. So far 315 harbour porpoises were recorded as stranded. Information collected by Naturalis (www.walvisstrandingen.nl).

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Harbour porpoise	315	58	M. Leopold / IMARES	Mardik.leopold@wur.nl
White-sided Dolphin	1	1	M. Leopold / IMARES	Mardik.leopold@wur.nl
Bottlenose Dolphin	1	1	M. Leopold / IMARES	Mardik.leopold@wur.nl

9. OTHER STUDIES AND ANALYSES
Diet studies are under way, using material from necropsies (see section 4.3). Stomach contents, fatty acids, stable isotopes (porpoises), stomachs only (dolphins).

Within studies in and around offshore wind parks off the Dutch mainland stationary passive acoustic devices (TPODs) were deployed. In total 8 positions were used to monitor porpoise acoustic activity continuously 24h per day since April 2007. The project is ongoing and analyses of the data is expected to be completed by June 2009.

World-wide many cetaceans drown incidentally in fishing nets. To reduce the unwanted bycatch in gillnets, pingers (acoustic alarms) have been developed that are attached to the nets. In the European Union, pingers were made compulsory in some areas in 2005 and in others in 2007. However, pingers may affect non-target marine fauna such as fish. Therefore a study has been carried out in The Netherlands in 2006 (published 2007), to quantify the effects of seven presently commercially-available pingers on the behaviour of five North Sea fish species in a large tank. The species tested were: sea bass (*Dicentrarchus labrax*), pout (*Trisopterus luscus*), thicklip mullet (*Chelon labrosus*), herring (*Clupea harengus*), and cod (*Gadus morhua*). The fish were housed as single-species schools of 9–13 individuals in a tank. The behaviour of fish in quiet periods was compared with their behaviour during periods with active pingers. The results varied both between pingers and between fish species. Of the seven pingers tested, four elicited responses in at least one fish species, and three elicited no responses. Whether similar responses would be elicited in these fish species in the wild, and if so, whether such responses would influence the catch rate of fisheries, cannot be derived from the results of this study. However, the results indicate the need for field studies with pingers and fish. Based on the small number of fish species tested, the present study suggests that the higher the frequency of a pinger, the less likely it is to affect the behaviour of marine fish (Kastelein *et al*. 2007b).

To determine how well harbour porpoises can locate sound sources, and thus can locate acoustic alarms on gillnets, the ability of a porpoise to determine the location of a sound source was investigated by training an animal to indicate the active one of 16 transducers in a 16-m-diam circle around a central listening station. The duration and received level of the narrowband frequency-modulated signals were varied. The animal's localization performance increased when the signal duration increased from 600 to 1000 ms. The lower the received sound pressure level (SPL) of the signal, the harder the animal found it to localize the sound source. When pulse duration was long enough (≈ 1 s) and the received SPLs of the sounds were high (34–50 dB above basic hearing thresholds or 3–15 dB above the theoretical masked detection threshold in the ambient noise condition of the present study), the animal could locate sounds of the three frequencies almost equally well. The porpoise was able to locate sound sources up to 124° to its left or right more easily than sounds from behind it (Kastelein *et al.* 2007a).

The use of ultrasonic sounds in alarms for gillnets may be advantageous, but the deterring effects of ultrasound on porpoises are not well understood. Therefore a harbour porpoise in a large floating pen was subjected to a continuous 50 kHz pure tone with a source level of 122±3 dB (re 1 μPa, rms). When the test signal was switched on during test periods, the animal moved away from the sound source. Its respiration rate was similar to that during baseline periods, when the sound was switched off. The behaviour of the porpoise was related to the sound pressure level distribution in the pen. The sound level at the animal's average swimming location during the test periods was approximately 107±3 dB (re 1 μPa, rms). The avoidance threshold sound pressure level for a continuous 50 kHz pure tone for this porpoise, in the context of this study, is estimated to be 108±3 dB (re 1 μPa, rms). This study demonstrates that porpoises may be deterred from an area by high frequency sounds that are not typically audible to fish and pinnipeds and would be less likely masked by ambient noise (Kastelein *et al.* 2008b).

In a further study the target strength as a function of aspect angle were measured for four species of fish using dolphin-like and porpoise-like echolocation signals. The polar diagram of target strength values measured from an energy flux density perspective showed considerably less fluctuation with azimuth than would a pure tone pulse. Using detection range data obtained from dolphin and porpoise echolocation experiments, the detection ranges for the Atlantic cod by echolocating dolphins and porpoises were calculated for three aspect angles of the cod. Maximum detection ranges occurred when the fish was broadside to the odontocete and minimum detection ranges occurred when the cod was in the tail aspect. Maximum and minimum detection ranges for the bottlenose dolphin in a noise-limited environment was calculated to be 93 and 70 m, respectively. In a quiet environment, maximum and minimum detection ranges for the bottlenose dolphin were calculated to be 173 and 107 m, respectively. The detection ranges for the harbor porpoise in a quiet environment were calculated to be between 15 and 27 m. The primary reason for the large differences in detection ranges between both species was attributed to the 36 dB higher source level of the bottlenose dolphin echolocation signals (Au *et al*.2007).

Paleontological studies based on fossil remains of marine mammals have been conducted over the last decades and are continuing (Post 2005; 2007). A recent study investigated a specimen of the genus *Tusciziphius* which had been found in a Miocene/Pliocene strata of South Carolina (USA, east coast), and which was previously only known from the holotype skull from the Early Pliocene of Tuscany, Italy. The specimen provides information on features not preserved on the holotype skull and reveals that the species was not endemic to the Mediterranean but must also have roamed the North Atlantic realm (Post *et al*. 2008).

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