

Iceland. Progress report on cetacean research, May 2009 to April 2010, with statistical data for the *calendar year 2009*

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Húsavík Research Centre	HRC	mhr@hi.is
Húsavík Whale Museum	HWM	hermann@whalemuseum.is
Innovation Centre, Iceland	ICI	gudjonatli@nmi.is

And from private commercial platforms such as whaling and whale watching companies.

1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific	Area/stock(s)	Items referred to
Fin whale	<i>Balaenoptera physalus</i>	Icelandic and adjacent waters	4.2; 4.4; 5; 6.2; 9; 11
Blue whale	<i>Balaenoptera musculus</i>	Icelandic and adjacent waters	3.1.1; 3.1.3; 3.2; 4.1; 11
Humpback whale	<i>Megaptera novaeangliae</i>	Icelandic and adjacent waters	3.1.1; 3.1.3; 3.2; 4.1; 4.3; 8; 9; 11
Common minke whale	<i>Balaenoptera acutorostrata</i>	Icelandic and adjacent waters	2.2; 3.1; 3.2; 4.1; 4.2; 4.4; 5; 9; 11
Sperm whale	<i>Physeter macrocephalus</i>	Icelandic and adjacent waters	4.3; 8; 11
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	Icelandic and adjacent waters	11

2. SIGHTINGS DATA

2.1 Field work

2.1.1 Systematic

In June-July 2009 the MRI conducted an aerial cetacean sightings survey in Icelandic continental shelf waters (Pike *et al.* 2009). This was the fifth full scale aerial survey of this area. The survey was conducted successfully although various problems were encountered during preparation and conduct of the survey (Pike *et al.* 2009, 2010).

The HRC, UI and HWM will continue their collaboration in a graduate student project on investigation on the annual distribution, abundance and habitat use of whales in Skjálfandi Bay, using the following methods: 1) Long-term acoustic recordings using sea-bed mounted hydrophones; 2) Shore-based observations using theodolite; 3) Boat-based visual and acoustic line transect surveys.

2.1.2 Opportunistic, platforms of opportunity

Monitoring of sightings during whale watching operations was conducted in two bays, Faxaflói and Skjálfandi. Sighting and effort data is stored at each whale watching company and data from Skjálfandi is also stored and analysed at the HWM.

2.2 Analyses/development of techniques

Analysis of data collected in recent sightings surveys, including TNASS, continued at the MRI and results were presented to the Scientific Committees of NAMMCO and the IWC in 2009 (Lawson *et al.* 2009, Paxton *et al.* 2009a, 2009b, Pike *et al.* 2009a, 2009b, Gunnlaugsson *et al.* 2009).

Preliminary results from the cetacean aerial survey conducted in coastal Icelandic waters in 2009 were presented to the NAMMCO WG on assessments in March 2010 (Pike et al 2010). Total coverage was somewhat less than in 2007. Encounter rates were considerably higher than in 2007, but this was primarily due to different search pattern of the observers compared to those from previous surveys. Although a final corrected estimate is not available yet, the results do confirm the decreased abundance of minke whales in Icelandic near-shore waters discovered in the 2007 survey. This decrease is most likely due to a shift in distribution of minke whales and their prey species rather than the result of a mass mortality (NAMMCO 2010).

Data collection and evaluation on the distribution of cetacean species in Skjálfandi Bay in relation to environmental variables was continued at HWM.

3. MARKING DATA

3.1 Field work

3.1.1 Natural marking data

Catalogues of individuals based on natural marking data are held at the MRI for blue and humpback whales. Photographs are obtained in special cruises as well as from opportunistic platforms. No cruises were conducted in 2009 specifically to collect photo-id data.

Photo-id pictures of minke whales and humpback whales from whale watching platforms in Faxaflói Bay have been collected since 2007 as a part of a student project at the UI.

The HWM and WMH have collected photo id pictures obtained in whale watching operations in Skjálfandi Bay since 2001. In 2009, data was collected from mid May to mid September.

3.1.2. Artificial marking data

None

3.1.3 Telemetry data

The MRI's satellite tracking programme continued, resulting in tracking of four humpback whales and one blue whale in 2009 (Víkingsson 2010).

3.2 Analyses/development of techniques

Analysis of all available photo-id material on humpback whales in Icelandic waters (archived at the MRI) is at a final stage. In 2009 new material on humpback and blue whales was added to the catalogue.

Studies conducted from commercial whale watching vessels as a part of a student project at the UI included a photo-id study on common minke whales in Faxaflói Bay in 2008. The photos of minke whales taken during 2008 and 2009 were also analysed to assess the occurrence of cutaneous disorders in minke whales.

The HWM and the College of the Atlantic in Main, US collaboration on comparing the humpback whale photo ID catalogues of both institutions is in progress. The museum will continue data collection during the summer months. The HWM collaborates with the Nature Centre Húsavík by sharing data on sea bird species, associated with whales.

4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

4.1 Biopsy samples (summary only)

Skin biopsies were collected by the MRI from six humpback whales and single samples from common minke and blue whales in 2009 in satellite tracking cruises.

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Blue whale	Iceland	2009/summer/1	Y	1		MRI
Minke whale	Iceland	2009/summer/1	Y	1		MRI
Humpback whale	Iceland	2009/summer/6	Y	6		MRI

4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches

Extensive biological sampling was conducted by MRI staff from the 125 fin whales landed at the whaling station in Hvalfjörður in 2009. Sampling and measurements of minke whales was conducted by whalers onboard the vessels.

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Fin whale	EGI	sk, b, m, g, e	125	Y	125**	MRI
Common minke whale	CIC	sk, b, m, g, e	78	Y	9**	MRI

* sk= skin, b=blubber, m=muscle, g=gonads, e = eye lenses

** Genetic analyses see 4.4

4.3 Samples from stranded animals

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Sperm whale	N. Atl.	sk, b, m	3	Y	0	MRI
Humpback whale	N. Atl.	Sk, b, m	1	Y	0	MRI

* sk= skin, b=blubber, m=muscle.

4.4 Analyses/development of techniques

Common minke whale research programme

During 2003-2007 a wide ranging research programme concerning common minke whales was conducted in Icelandic waters (for details see MRI 2003). Progress has been reported to the Scientific Committees of NAMMCO and the IWC SC (Vikingsson *et al.* 2004, 2005, 2006, 2007, 2008, 2009, NAMMCO 2005, 2006, 2007, 2008, 2009). The collection of 200 common minke whales was completed in 2007. Analyses of samples are complete for the most sub-projects and data validation and statistical analysis is ongoing. The status of different sub-projects of the programme to date is discussed under the representative sections below. For details on sample sizes etc. see previous progress reports.

Feeding and energetics

Diet composition

Analysis of forestomach contents, including prey species identification and estimation of age and length of fish prey from otoliths was completed in 2008. The data have been entered into a database and statistical analyses, including construction of a multi-species model are underway.

Laboratory work on stable isotopes and fatty acids in common minke whale and 8 common prey species is completed and analysis of the results is underway.

Preliminary results from the study of the feeding ecology of minke whales were presented to the NAMMCO WG on assessments in March 2010 (Vikingsson and Elvarsson 2010).

Energetics

Laboratory analysis on the energy density of various tissues (muscle, blubber, visceral fat liver and kidneys) is completed and statistical analysis is ongoing. Two samples of 8 common prey species each were prepared for measurements of energy density. Further processing is underway.

Biological parameters

Gonads from all animals have been analysed for sexual maturity for both sexes and reproductive history for females. Analyses of amino acid racemisation (AAR) in lenses for age determination are underway.

Environmental contaminants

Laboratory work on organic and inorganic contaminants in various tissues collected as a part of the minke whale research programme is completed. This includes analysis of dibenzo-p-dioxins, dibenzofurans, dioxinlike PCBs and marker PCBs as well as various trace elements. Interpretation and diagnostic work with reference to biological parameters (age, size, sex, etc), pathology, trophic status, body condition and geographical variation is underway.

Analyses on samples from commercial catch*Genetics*

Laboratory analyses of all fin whales (n=125) and part of common minke whales (n=9) from the commercial hunt in 2009 is completed. Ten to seventeen microsatellite genetic markers were screened and mtDNA sequenced for all samples.

Life history parameters

Age reading of 125 fin whales from the commercial hunt in 2009 began in the fall 2009 using ear plugs (MRI) and aspartic acid racemisation (ARR) method for eye lenses (student project at the University of Copenhagen). The results of the different methods will be compared for estimating their reliability.

Analyses of ovaries and testes from the commercial hunt in 2009 is underway.

5. POLLUTION STUDIES

Laboratory analysis of pollutants from the minke whale research programme is completed. This includes measurements of 30 organic compounds (PCB, DDT, PBDEs etc.) in liver, blubber (2 locations) and muscle from 25 animals and in 50 samples of minke whale prey species. Trace elements (11 kinds) have been measured in liver, kidneys, muscle, skin and reproductive organs of 25 minke whales as well as in 50 samples of prey.

Interpretation and diagnostic work on trace elements with reference to biological parameters (age, size, sex, etc), pathology, trophic status, body condition and geographical variation is underway.

In addition, a wide range of organic compounds were measured in blubber, muscle and liver as a part of a Nordic collaborative project in 2009. The Icelandic samples include fin and minke whales as well as harbour porpoises.

6. Statistics for large cetaceans

6.1 Corrections to earlier years' statistics for large whales

None

6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2009

Species	Type of catch	Area/stock	Males	Females	Not reported	Total landed	Struck and lost
Fin whale	Commercial	EGI	66	59	0	125	0
Common minke whales	Commercial	CIC	64	13	1	78	3

6.3 Anthropogenic mortality of large whales for the calendar year 2009*6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)*

No reports on ship strikes of large whales were reported.

6.3.2 Fishery bycatch of large whales

No reports on bycatch of large whales reported.

7. STATISTICS FOR SMALL CETACEANS

Reported to NAMMCO.

8. STRANDINGS

Information on stranded cetaceans in Iceland is compiled by the MRI in cooperation with the INH and other relevant institutions. According to an arrangement formally adopted in 2005 the Marine Research Institute is the central authority concerning science and research while other aspects of strandings s.a. euthanasia/rescue, disposal of carcasses and preservation of museum specimens fall under the responsibilities of the Chief Veterinary Office, the Environment Agency of Iceland and INH respectively.

In 2009, 5 incidents of large cetacean strandings were recorded by the MRI. This is considerably less than last year when the number of reported strandings was record high

Species*	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Humpback whales	2	1	MRI	gils@hafro.is
Sperm whales	3	3	MRI	gils@hafro.is

* large cetaceans

9. OTHER STUDIES AND ANALYSES

A collaborative study between MRI scientists and colleagues from Norway and Scotland on stock structure and movements on killer whales in the Northeastern Atlantic (Foote *et al* 2007) was continued in 2009.

The two-year process of RMP Implementation Assessment of North Atlantic fin whales initiated in 2007 was completed at IWC's annual meeting in June 2009. (IWC 2009).

Information on strandings of cetaceans observed on Icelandic waters has been collected over many years by INH and MRI. This includes dead cetaceans, ice-locked live animals and live animals driven ashore, historical and recent. Skeletal remains from the natural environment and archaeological material from middens is also included but not animals from commercial whaling operations. The database now (March 2010) contains 1609 records of estimated 43000 animals.

A student project at the UI has been conducted since 2008, with the title "Minke whale and white-beaked dolphins feeding behaviour of in Faxaflói bay, south-west Iceland". Data on breathing rate of minke and humpback whales were also collected from 2008.

A project to study the effects of the whale watching boats on the distribution of whales was continued at the HRC. This project is a part of the "Wild North project" including study on the potential disturbance of tourism on seal haul out behaviour (<http://www.thewildnorth.org/>).

Ecological Acoustic Recorders (EAR) were deployed in two locations in Skjálfandi Bay in September 2008, deployments will continue throughout September 2010 as cooperation between the University of Hawaii, UI and HRC.

Two bottom-mounted hydrophones, called Ecological Acoustic Recorders (EARs), were deployed in two locations in Skjálfandi bay in September 2008. Deployments will continue throughout September 2010.

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Comment [D01]: Ath ref merkta með rauðu

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