

ICELAND

PROGRESS REPORT ON MARINE MAMMALS IN 2013

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I. INTRODUCTION

The following reports on studies on marine mammals in Icelandic and adjacent waters in 2013. While most of the studies were conducted by the Marine Research Institute (MRI) and its various research partners, queries for information on research were sent to all offices or individuals known to have been involved in marine mammal research or data collection during the period. These include University of Iceland Research Center in Húsavík (UIRCH), Húsavík Whale Museum (HWM); Faxaflói Cetacean Research project (FCR), Innovation Centre, Iceland (ICI); Keldur, Institute for Experimental Pathology (KIEP); The Institute of Natural History (INH); University of Iceland (UI) as well as data collection from private commercial platforms such as whaling and whale watching companies. The Icelandic Seal Center (ISC) has conducted seal research in Iceland since the year of 2008. The Icelandic Institute of Freshwater Fisheries (IFF) has one joint employee with ISC, who is also head of Seal Research department at ISC. ISC is currently cooperating with several institutions regarding seal research, such as Vör Marine Research Center at Breiðafjörður, BioPol ehf a Marine Biotechnology Science Hotel in Skagaströnd, Hólar University Collage, The University of Stockholm, Natural history museum of Sweden and Swedish University of Agricultural Science.

As in previous years research efforts on marine mammals at the MRI in 2013 were largely devoted to a comprehensive biological programme from the commercial catch of fin whales initiated in autumn 2006 and catches taken since (2009, 2010 and 2013 seasons). Further analysis of the previous NASS sightings surveys (Gunnlaugsson et al. 2013; Pike et al. 2013) and planning for the survey in 2015. Sightings data on all species and effort is routinely collected on board the Hvalfjörður station whaling vessels, and stored in a database at the MRI.

The MRI preserves all genetic samples available. Since 2012 skin samples for genetic analysis have been routinely collected from most marine mammals by-caught in the MRI fisheries surveys.

The INH is responsible for collection and preservation of museum specimens of marine mammals in Iceland. The INH archives mammal skeletons and bone remains discovered from the natural environment and archaeological material from middens. The archive includes about 200 specimens, mostly from walruses. Information on occurrences of Walruses found in Iceland has been collected over many years, historical and recent. Cleaning and preservation of a blue whale skeleton from a stranding event in 2010 is completed.

Information on strandings of whales found in Icelandic waters has been collected by the MRI over many years. This includes dead whales, ice-locked live animals and live animals driven ashore, historical and recent. Biological investigations of strandings is conducted on an opportunistic basis. The ISC monitors visits of vagrant seals to the coast of Iceland by collecting information about such visits from the news or human resources (photos of live animals) or by receiving corpses of stranded dead pinnipeds.

In recent years increasing number of scientists have conducted research on marine mammals from platforms of opportunity such as those offered by the rapidly expanding commercial whale watching operations. The geographical scale of these studies is generally small, but the frequency of observation is high during the summer and some companies operate throughout the year. Studies on cetaceans conducted under the auspices of the University of Iceland have mainly focused on acoustics, photo-id, behaviour and distribution in near-shore areas.

II. RESEARCH 2013

a. Species/stocks studied

Pinnipeds

Grey seal (*Halichoerus grypus*)

Harbour seal (*Phoca vitulina*)

Harp seal (*Pagophilus groenlandica*)

Hooded seal (*Cystophora cristata*)

Bearded seal (*Erignathus barbatus*)

Walrus (*Odobenus rosmarus*)

Cetaceans

Blue whale (*Balaenoptera musculus*)

Fin whale (*Balaenoptera physalus*)

Common minke whale (*Balaenoptera acutorostrata*)

Humpback whale (*Megaptera novaeangliae*)

Sperm whales (*Physeter macrocephalus*)

Northern bottlenose whale (*Hyperoodon ampullatus*)

Long-finned pilot whale (*Globicephala melas*)

Killer whale (*Orcinus orca*)

White-beaked dolphins (*Lagenorhynchus albirostris*)

Harbour porpoise (*Phocoena phocoena*)

Pinnipeds

Harbour seals

Analyses of abundance and trends

The comprehensive seal count in Húnaflói bay is conducted annually at the end of July by the ISC (since 2007) the seventh year in a row. The count was carried out by several volunteers on 28th of July 2013 during 3 hours around low tide. All seals on the coastline of Vatnsnes and Heggstaðanes peninsulas in Húnaflói bay were counted (~100 km). The count resulted in 755 seals (mainly harbour seals), compared to 618 in the same area and time of year in 2012. In previous years, the numbers were considerably higher, with over 1000

animals counted (Granquist and Hauksson 2013). The number of seals in the area of Vatnsnes and Heggstaðanes will be monitored by repeating the count annually.

Interaction with salmon fishery

A study on the effect of seals on salmonids was initiated in 2009. The project is a cooperation between ISC and IFF. The main goal is to determine feeding habits of seals in river mouths in the north western part of Iceland, especially in regards of the effect of seals on salmonids. In 2009-2010 16 harbour seals were tagged with radio transmitters in order to monitor their presence in a river mouth during the summer. Seals were also regularly counted in the area during different times of the years (2009-2011). The diet of harbour seals that haul out in the river mouths Bjargaós and Sigríðastaðaós in Húnaþing vestra, NW-Iceland is also being investigated by IFF and the ISC. A special effort is put on studying the effect of seals on salmonids. Faecal samples from seals hauling out in the river mouth area (collected between 2009 and 2011) were analysed with hardpart- and prey-DNA analysis during 2013. Prey-DNA analysis is a cooperation between ISC, IFF, Stockholm University and Natural history museum in Stockholm. In addition, hair-samples from seals in the area were prepared for further stable-isotope analysis. To be able to compare the diet of seals hauling out in the river mouth area to seals from other areas, hair- and muscle samples from seals caught in nets in other parts of the country were obtained from BioPol during 2013 and will be analysed for stable isotopes for comparison purposes. The stable isotope analysis is cooperation between ISC, IFF, BioPol and Stockholm University.

Other

The effect of seal watching on the behaviour and distribution of harbour seals has been studied by ISC and IFF since 2008. The main study site is Illugastaðir at Vatnsnes, NW Iceland. The results show that harbour seals increase their vigilance in presence of tourists and more intense tourist behaviour has a greater effect on the seals. During periods when many tourists visit the area, harbour seals changed their distribution and moved further away from the seal watching sites (Granquist 2013). A book chapter was published in 2013 on interdisciplinary sustainable management of seal watching (Granquist and Nilsson 2013, see also Granquist and Sigurjónsdóttir 2014).

Age determination

Some of the seals collected by Biopol for food studies were aged in 2013, from GLGs' in canine teeth.

Grey seals

Analyses of abundance and trends

Grey seal pups were tagged with roto-tags in their back flippers during the pupping season in 2012 and 2013 by ISC on Strandir, NW_Iceland and Breiðafjörður, W-Iceland. In addition, pups were counted and aged according to the Canadian system, on appearance and growth. Tagged seals that are later re-captured, are recorded by the ISC.

Other pinniped species

Analyses of abundance and trends

ISC monitors visits of vagrant seals to the coast of Iceland by collecting information about such visits from the news or human resources (photos of live animals) or by receiving corpses of stranded dead pinnipeds. In 2013 the ISC did not receive any reports of vagrant seals in Iceland.

Cetaceans

Fin whales

The MRI conducted routine sampling (age, reproduction, genetics, diet, energetics) and measurements of every landed fin whale in the whaling station in Hvalfjörður (Gunnlaugsson *et al* 2013). In addition scientists from several other Icelandic and foreign research institutes performed sampling of the landed fin whales. Age reading of fin whales from the commercial hunt using laminated layers in ear plugs (MRI) and the aspartic acid racemisation method for eye lenses (MS project at the University of Copenhagen) was continued in 2013. The results of the different methods will be compared for estimating their reliability.

MRI scientists participated actively in the RMP *Implementation Review* process under the auspices of the Scientific Committee of the IWC.

Analyses of stock structure of North Atlantic fin whales continued (Benonisdóttir 2012; Elvarsson 2012; Víkingsson *et al* 2012; Gunnlaugsson *et al* 2012).

A collaborative project involving analysis of fin whale baleen plate measurements of nitrogen and carbon stable isotopes and trace elements, as a continuous-time recorder of seasonal migration, was initiated in collaboration with the University of Barcelona, Spain. Preliminary results will be presented in two separate communications (posters) to the next ECS.

Minke whales

Sampling and measurements of common minke whales conducted onboard the vessels were provided to the MRI by whalers.

Attempts to tag common minke whales in the spring and autumn of 2013 were unsuccessful. One common minke whale was instrumented with a satellite tag 26th April 2013. No signals were received.

Studies on harmful effects of whale watching vessels on the behaviour and energetics of common minke whales in Faxaflói and Skjálfandi bays were continued (Martin, 2012, Christiansen *et al.* 2013a, 2013b, 2013c, 2013d).

MRI scientists participated in genetic collaborative work on stock structure issues relevant to management of minke whales (Benonisdóttir *et al* 2013, Tiedemann *et al* 2014a and b).

Studies continued at the MRI on the development of a new ageing method for common minke whales.

Blue whales

The blue whale project continued in 2013 with collection of photo-id material, behavioural data and acoustic tagging (AUSOMS mini) in Skjálfandi Bay by the MRI and IURCH. The Skjálfandi blue whale catalogue (photo-identification) sums 105+ individuals by the end of 2013. One blue whale was instrumented with a satellite tag on 12th July 2013. Position data were received until 12th August.

Humpback whales

Two humpback whales were tagged with satellite transmitter tags in October. Data were received from one of these during for one month (15/10-16/11 2013).

Collection of Photo-id material continued in Skjálfandi Bay in 2013 by the MRI, FCR and IURCH.

North of Iceland skin biopsies were collected by the MRI from 13 humpback whales in satellite tracking cruises in 2013. These samples are used in studies on population structure and to determine the gender of the tracked animals. One biopsy was obtained from a northern bottlenose whale.

Peduncle scarrings and a first assessment on entanglement rate was estimated in humpback whales of Faxaflói and Skjálfandi Bays (Bertulli *et al.* 2011) is continuing.

Killer whales

Data collection continued for MRI's research project on killer whale ecology and behaviour in Breiðafjörður Bay Work (late winter) and around the Vestmannaeyjar Islands (summer). This project will be finalized in 2015.

Harbour porpoise

Collaboration with the University of Potsdam is ongoing to make use the existing 1300 harbour porpoise samples from Iceland (1991 onwards) and future samples in a wide genetic study (Lah *et al.* 2014). In 2013 additional 98 older harbour porpoise samples were prepared, 50 samples collected by lump sucker fishermen and 53 obtained in the annual spring gillnet survey.

Sightings data

Preparations for the NASS survey scheduled in 2015 were continued at the MRI in cooperation with other participating nations.

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.

The data collection in Faxaflói available includes weather parameters, effort, sighting, group size, photo-ID images, and behaviour. Data analysis by the FRC aims to assess feeding behaviour, association with avian species, site fidelity, distribution (Bertulli 2013), occurrence of cutaneous disorders and epizoa (Bertulli 2010; Bertulli *et al.* 2012). Additionally, survival rates and abundance was assessed in both common minke whales and white-beaked dolphins, social structure (Bertulli *et al.* 2013 poster), vertebral malformations and colour patterns (Bertulli *et al.* 2013 conference) were investigated in white-beaked dolphins (unpublished data).

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

III. ONGOING (CURRENT) RESEARCH

Pinnipeds

The ISC conducted an aerial harbour seal counting survey in August-September 2014, and data analysis is carried out at the moment. The biggest haul-out sites were counted, using airplane. In addition, an experiment was carried out, where a DRONE was used to count in some areas. This is the first time that harbour seal counting using a DRONE has been carried out in Iceland and an evaluation of the method is currently ongoing. Due to lack of financial support, the data provided by this year's survey will not produce a significant population estimate for the Icelandic harbour seal population and ISC will apply for funding for a population estimate survey in 2015.

A project where the diet of harbour seals that haul-out in river mouths in the north west of Iceland, with special efforts put on investigating the effect of seals on salmonids, initiated in 2009 by ISC and IFF will be continuing in 2014 and 2015. Feeding analyses built on stable isotopes, hard-part analysis and prey-DNA will be published and telemetry data from radio-tagged seals in the river mouth area of Bjargós/Sigriðastaðarós at Vatnesnes peninsula will be analysed.

A study on the effect of tourism on the spatial and behavioural haul-out patterns of harbour seal initiated in 2008 by ISC will also continue the following years (Granquist and Sigurjónsdóttir 2014). Codes of conducts for visitors and tour operators in the area regarding how to behave during seal watching was published in 2014 on behalf of The Wild North (www.twn.org). The effect of boat-based seal watching is being investigated. A BS thesis reviewing codes of conducts for seal watching worldwide was finished in 2014 and one master student is currently investigating the behaviour of tourists during seal watching.

An investigation on the timing of birth among harbour seals in the north western part of Iceland is conducted at the moment at the ISC. In addition, data of abundance and haul-out patterns of harbour seals at Vatnesnes peninsula is being analysed at the ISC and will soon be published.

Cetaceans

In 2012 the MRI submitted a comprehensive research program (Vikingsson *et al.* 2013) on fin whale stock structure as a part of the RMP implementation review process within the IWC. As the implementation review could not be completed in 2013 or 2014, discussion of the program was postponed.

Analysis of fin whale baleen plate measurements of nitrogen and carbon stable isotopes and trace elements, as a continuous-time recorder of seasonal migration, will be presented in two separate communications (posters) to the next ECS.

In 2014 behavioural and acoustic tags were placed on on humpback whales in collaboration with Dr. Tomonari Akamatsu from Japan and Maria Iversen from Denmark. Sound recordings of humpback whales were made using a single hydrophone by Master student Arnar Björnsson.

On-going photo-identification project of blue whales with Maria Iversen in charge.

IV. ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN

Pinnipeds

No new population size estimate exists for the Icelandic harbour seal population, since the last estimate was made in 2011. Advice given for harbour seal in 2011 was in accordance with advice given in recent years. Based on the most recent surveys of harbour seals from August 2003 and 2006 respectively the SCI and MRI concluded that due to uncertainties in the number of net entangled animals it is not possible to predict whether the observed decline in abundance in the past will continue. Further, no figures for hunted seals exist for 2013.

The MRI and ISC therefore reiterated the importance of better recording for both hunting and by-catch and that the stock was monitored with aerial surveys at two or three year intervals in the next years. Management objectives for the stock of harbour seals in Iceland were set by Icelandic authorities in 2010.

Advice given for grey seal in 2012 was in accordance with advice given in recent years. No new population estimate exists for the Icelandic grey seal population. The grey seal population probably has decreased considerably from the population size in 2008/9 and even more from the year 1990 when the population size was estimated about 12000 animals. The survey method was improved in year 2005 by counting pups in every major breeding site more often than once and take into considerations the stage of the pups. However it is clear that the exploitation of the population has been non-sustainable the last decades of the 19th century. The catch has probably nevertheless declined considerably in the recent years. The population size in year 2012 was the lowest since year 2004, although the changes since the turn of the new century probably were

not significant statistically. It was not clear what factors could explain this reduction in the population, however by-catch probably plays a part in this and it is considered important to improve the recording process of the by-catch, as well as grey seal hunting.

Management objectives for the stock of grey seal in Iceland were set by Icelandic authorities in 2005.

The management objective set for the grey seal stock in 2005 calls for action if the stock is further reduced below the estimated level in 2004 of 4100 animals. The stock was probably close to the management objective in year 2012, so the MRI and the ISC stressed the importance of more regular monitoring. An aerial survey of grey seal pups is planned for the autumn of 2015, if funds will be available.

Cetaceans

Based on assessments conducted by the Scientific Committees of NAMMCO and the IWC, the MRI recommended that annual catches in 2013-2014 do not exceed 154 fin whales on the traditional whaling grounds west of Iceland (West Iceland Small Area). On the same basis the MRI recommended maximum annual takes of 229 common minke whales in the Icelandic continental shelf (CIC) area, and 121 animals in the CM area (Jan Mayen) in 2013 and 2014.

V. PUBLICATIONS AND DOCUMENTS (2013)

Peer reviewed

- Bertulli, C.G., Rasmussen, M.H. and Tetley, M.J. 2013. Photo-identification rate and wide-scale movement of common minke whales (*Balaenoptera acutorostrata*) in the coastal waters of Faxaflói and Skjálfandi Bays, Iceland. *J. Cetacean. Res. Manage* 13, 39-45
- Christiansen, F., Víkingsson, G., Rasmussen, M. and Lusseau, D. 2013a. Minke whales maximise energy storage on their feeding grounds. *J.Exp.Biol.* 216, 427-436
- Christiansen, F., Víkingsson, G., Rasmussen, M. and Lusseau, D. 2013b. Female body condition affects foetal growth in a capital breeding mysticete. *Functional Ecology*. doi: 10.1111/1365-2435.12200
- Christiansen F., Rasmussen M., Lusseau D. 2013c. Whale watching disrupts feeding activities of minke whales on a feeding ground. *Mar Ecol Prog Ser* 478:239-251
- Christiansen F., Rasmussen M., Lusseau D. 2013d. Inferring activity budgets in wild animals to estimate the consequences of disturbances. *Behavioral Ecology* 24, 1415-1425.
- Granquist.S. and Nilsson, P.Å. 2013. The Wild North: Network Cooperation for Sustainable Tourism in a fragile Marine Environment in the Arctic Region. In Müller, D., Lundmark, L. and Lemelin, R. (Eds.), *New Issues in Polar Tourism* pp. 123-132. Heidelberg: Springer.
- Olafsdottir, D. and Shinn, A.P. 2013. Epibiotic macrofauna on common minke whales, *Balaenoptera acutorostrata* Lacépède, 1804, in Icelandic waters. *Parasites & Vectors*, 6:105: 10 pp.
- Rasmussen, M.H., Akamatsu, T, Teilmann, T., Víkingsson, G. and Miller, L.A. 2013. Biosonar, diving and movements of two tagged white-beaked dolphin in Icelandic waters. *Deep-Sea Research II*, 88-89:97-105.
- Williams, R., Víkingsson, G. A., Gislason, A., Lockyer, C., New, L., Thomas, L., and Hammond, P. S. 2013. Evidence for density-dependent changes in body condition and pregnancy rate of North Atlantic fin whales over four decades of varying environmental conditions. *ICES J. Mar. Sci.* 70, 1273–1280.

Other publications and reports.

- Auðunsson, G.A., Nielsen, N.H., Víkingsson, G.A., Halldórsson, S.D., Gunnlaugsson, T., Elvarsson, B.T., Hidehiro Kato, H. and Hansen, S.H. 2013. Estimation of age of minke whales (*Balaenoptera acutorostrata*) in Icelandic waters by aspartic acid racemization (AAR) and earplugs of minke whales from the Antarctic (*B. bonaerensis*) used as a reference. Paper SC/F13/SP15 presented to the IWC Expert Panel, Reykjavik. 17pp
- Auðunsson, G.A. Víkingsson, G.A. 2013. Concentrations of POP's in minke whales from Icelandic waters. Paper SC/F13/SP22 presented to the IWC SP Expert Panel, Reykjavik. 22pp
- Auðunsson, G.A. & Víkingsson, G.A. 2013. Concentrations of mercury and other trace elements in minke whales from Icelandic waters. Paper SC/F13/SP23 presented to the IWC SP Expert Panel, Reykjavik. 20pp
- Benónísdóttir, S., Skaug, H.J., Glover, K., Víkingsson, G.A., and Pampoulie, P. 2013. Genetic study on close relatedness of minke whales in the Central and Northeast Atlantic. Paper SC/F13/SP20 presented to the IWC SP Expert Panel, Reykjavik. 4pp.
- Elvarsson, B.T., 2013. An implementation of the statistical framework Gadget for common minke whales in Icelandic waters. Status update on multispecies modelling effort. Paper SC/F13/SP7 presented to the IWC SP Expert Panel. Reykjavík. 12pp
- Elvarsson, B.T., Víkingsson, G.A. and Stefánsson, G. 2013. An implementation of the statistical framework Gadget for common minke whales in Icelandic waters. Paper SC/65a/EM1 presented at the IWC SC annual meeting, South Korea. 18pp.
- Elvarsson, B.T., 2013. Evaluating stock structure hypotheses using genetically determined close relatives: a simulation study on North Atlantic fin whales. Paper SC/65a/RMP7 presented at the IWC SC annual meeting, South Korea. 13pp.
- Granquist, S. 2013. Harbour seals (*Phoca vitulina*) and tourists in Iceland - Who's watching who? Licentiate thesis, Zoological department, Stockholm University. 13. November 2013. 71pp.
- Granquist, S. and Hauksson, E. 2013. Selatalningin mikla. Niðurstöður 2007-2012 [The Great Seal Count. 2007-2012]. Report to the Icelandic Institute of Freshwater Fisheries VMST/13001. http://veidimal.is/files/Skra_0059670.pdf
- Gunnlaugsson, T., Víkingsson, G.A., Halldórsson, S.D., Tøre Haug and Christian Lydersen 2013. Spatial and temporal variation in body mass and the blubber, meat and visceral fat content of North Atlantic minke whales. Paper SC/F13/SP11 (revised) presented to the IWC Expert Panel, Reykjavik. 8pp
- Gunnlaugsson, T., Daniel Pike and Víkingsson, G.A. 2013. Changes in minke whale distribution and abundance by season and over time in aerial surveys off Iceland 1986-2009. Paper SC/F13/SP6 presented at the IWC SC annual meeting, Jeju-Do, South Korea. 14pp.
- Gunnlaugsson, T., Víkingsson, G.A., Halldórsson, S.D. 2013. Recent changes in biological parameters of North Atlantic fin whales. Paper SC/65a/RMP04 presented at the IWC SC annual meeting, Jeju-Do, South Korea. 5pp
- Gunnlaugsson, T. and Víkingsson, G.A. 2013. Report on blood testosterone and progesterone concentrations of the North Atlantic minke whale (*Balaenoptera acutorostrata*) during the feeding season in Icelandic waters from research catches 2003-2006. Paper SC/F13/SP13 presented to the IWC SP Expert Panel, Reykjavik. 7pp
- Harbo-Hansen C. 2013. Patterns within blue whale *Balaenoptera musculus* downsweep vocalizations in Icelandic coastal waters and anthropogenic influence on their occurrence. Bachelor thesis available from the University of Copenhagen, Denmark, 60pp.

- Hauksson, E., Víkingsson, G.A., Halldórsson, S.D., Ólafsdóttir, D., Nynne Hjort Nielsen and Sigurjónsson, J. 2013. Growth and reproduction of common minke whales (*Balaenoptera acutorostrata*) in Icelandic waters. Paper SC/F13/SP12 presented to the IWC SP Expert Panel, Reykjavik. 40pp
- Hauksson, E., Gísli Víkingsson and Sigurjónsson, J. 2013. Geographic, temporal and size segregation of sexes of the common minke whale (*Balaenoptera acutorostrata*) in Icelandic waters based on catch data from 1974 to 2009. Paper SC/F13/SP14 presented to the IWC SP Expert Panel, Reykjavik. 13pp
- Hauksson, E., Víkingsson, G.A., Ólafsdóttir, D., Anton Galan and Sigurjónsson, J. 2013. Anisakid nematodes from stomach of minke whales (*Balaenoptera acutorostrata*) off Iceland, collected in the period 2003-2007. Paper SC/F13/SP28 presented to the IWC SP Expert Panel, Reykjavik. 9pp
- Hauksson, E., Christensen, I., Víkingsson, G.A. and Halldórsson, S.D. 2013. Morphometric comparison of common minke whales *Balaenoptera acutorostrata* from different areas of the North Atlantic, including animals from Icelandic waters. Paper SC/F13/SP19 presented to the IWC SP Expert Panel, Reykjavik. 21pp
- Halldórsson, S.D. and Guðnason, K. 2013. A short note on radioactivity in minke whale meat (*Balaenoptera acutorostrata*) from Icelandic waters. Paper SC/F13/SP30 presented to the IWC SP Expert Panel, Reykjavik. 3pp
- Koponen, M. 2013. The harbour porpoises (*Phocoena phocoena*) of Skjálfandi bay - diet and general condition. *Bachelor thesis* Turku University of Applied Sciences, Finland. 46 pp.
- Lukas, A. 2012. Diving and surface feeding events of Minke whale (*Balaenoptera acutorostrata*) observed in the south-western part of Iceland. MS thesis Lund University. 15pp
- Ólafsdóttir, D. and Andrew P. Shinn 2013. Epibiotic macrofauna on common minke whales, *Balaenoptera acutorostrata* Lacépède, 1804, in Icelandic waters. *Parasites & Vectors*, 6:105. Paper SC/F13/SP27 presented to the IWC SP Expert Panel, Reykjavik. 26pp
- Ólafsdóttir, D., Víkingsson, G.A., Elvarsson, B.T. and Auðunsson, G.A. 2013. Analyses on stable carbon and nitrogen isotope ratios in soft tissues of common minke whale (*Balaenoptera acutorostrata*) in Icelandic waters and its prey. Paper SC/F13/SP3 presented to the IWC SP Expert Panel, Reykjavik. 13pp.
- Pampoulie, C., Benónisdóttir, S., Skaug, H.J., Elvarsson, B. and Gísli A. Víkingsson. 2013. Genetic relatedness of North Atlantic fin whale *Balaenoptera physalus* in Icelandic waters. Paper SC/65a/RMP1 presented at the IWC SC annual meeting 7pp.
- Pampoulie, C. and Daníelsdóttir, A.K. 2013. Review on the genetic stock structure of North Atlantic fin whales (*Balaenoptera physalus*): past, present and future. Paper SC/65a/RMP3 presented at the IWC SC annual meeting, Jeju-Do, South Korea. SC 8pp.
- Pampoulie, C. and Víkingsson, G.A. 2013. Status of the Icelandic whale DNA register. Vinnupappír SC/65a/DNAWP3 presented at the IWC SC annual meeting, Jeju-Do, South Korea. 1pp
- Pampoulie, C., Anna K. Daníelsdóttir and Víkingsson, G.A. 2013. Genetic structure of the North Atlantic minke whale (*Balaenoptera acutorostrata*) at feeding grounds: a microsatellite loci and mtDNA analysis. Paper SC/F13/SP17 presented to the IWC SP Expert Panel, Reykjavik. 17pp.
- Pampoulie, C. and Daníelsdóttir, A.K. 2013. Genetic analysis of minke whale during the Icelandic scientific permit: a description of the Icelandic DNA registry protocols. Paper SC/65a/SD1 presented to the IWC SP Expert Panel, Reykjavik. 4pp.
- Pampoulie, C., Ólafsdóttir, D., Pétursdóttir, H., Elvarsson, B.T., Auðunsson G. A., Hauksson, E., and Víkingsson, G.A., 2013. Stock structure of North Atlantic common minke whale (*Balaenoptera acutorostrata*): a multidisciplinary review of the Icelandic Research Program results. Paper SC/65a/SD2 presented at the IWC SC annual meeting, Jeju-Do, South Korea. 15pp.

- Pampoulie, C., Gunnlaugsson, T., Elvarsson, B.T., Pétursdóttir, H., Chosson, C., Halldórsson, S.D., Auðunsson, G.A., Matthías Kjeld, Hauksson, E., Karlsson, K.Æ. Guðnason, K., Svansson, V., Benónisdóttir, S., Ólafsdóttir, D. and Víkingsson, G.A. 2013. Research program on common minke whales (*Balaenoptera acutorostrata*) in Icelandic waters. An overview of implementation and results. Paper SC/F13/SP1 presented to the IWC SP Expert Panel, Reykjavík. 42pp.
- Pétursdóttir, H., Guðjón A. Aupunsson, Elvarsson, B.T. and Víkingsson, G.A. 2013. Fatty acids in the blubber and blood of common minke whales (*Balaenoptera acutorostrata*) and relation to their diet in Icelandic waters. Paper SC/F13/SP4 presented to the IWC SP Expert Panel, Reykjavík. 19pp.
- Pike, D.G., Desportes, D., Gunnlaugsson, T., Mikkelsen, B. and Bloch, D. 2013. Estimates of the relative abundance and trend of pilot whales (*Globicephala melas*) in the North Atlantic from 1987 to 2007. Paper SC/20/18 presented at the NAMMCO SC annual meeting, Reykjavík. 54pp.
- Svansson, V., Jörundsson, E., Árnadóttir, S., Hjartardóttir, S., Ólafsdóttir, D. and Víkingsson, G.A. 2013. Gross pathology, histo- and homological logical findings and microbial examination of minke whales in Icelandic waters. Paper SC/F13/SP29 presented to the IWC SP Expert Panel, Reykjavík. 14pp.
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VI APPENDIX 1 - CATCH DATA

Table 1. Commercial cetacean catch in coastal Icelandic waters in the 2013 summer season. The largest fin whales, female and male on record caught at the station were caught in 2013. The female (75ft) was identified as a blue whale hybrid, the male (70ft) is inconclusive. One female (69ft) had polycystic ovaries.

Species	Area	Male	Female	Unspecified	Total	Foetuses
Fin whale	West Iceland	58	71	5	134	19
Minke whale	Coastal Iceland	13	22		35	16

Table 2. Direct catches of pinnipeds in Icelandic waters in 2013. Where pups are known they are given separately and not included. Pups are generally caught in sealing nets and older seals shot.

Species	Area	Unspecified	Pups	Total
Harbour seal	Coastal Iceland	151	100	251
Grey seal	Coastal Iceland	116	88	204
Unspecified seal	Coastal Iceland	177		177

As in recent years, Icelandic authorities issued permits to Norwegian sealers to take harp seals within the Icelandic EEZ in 2013. These catches are not included here, but appear in the Norwegian sealing statistics.

VII APPENDIX 2 - BY-CATCH DATA

In 2013, information on marine mammal by-catch (Tables 3 and 4, below) was obtained from all research surveys, inspectors in the Fishery Directorate's observer programme and handwritten logbooks kept by most of the commercial lump sucker fishery. Finally, information on by-catch events are received on occasional basis from anecdotal sources, skin trading reports and lists of samples collected by various research groups. Electronic log-book records kept by the rest of the fleet have not been received by the MRI. Total by-catch estimates for 2013 are given in a report to the 21st Scientific Committee meeting (SC/21/11). Monitoring bycatch of pinnipeds is now the responsibility of the ISC where preparations have been made to improve the reporting. Inspectors have now been instructed to report all observed bycatch separately and check the reporting of the catchers.

In 2013, lump sucker net fishing was rather less than in previous years and 57 boats reported some bycatch and inspectors were onboard in 57 trips. The reporting level was higher than in 2012 Gillnet effort was 1/3 the 1992 to 2005 level and the lowest on record. Inspectors were on only 3 trips.

Table 3. Reported pinniped by-catch in 2013. 3 harbour and 6 grey seals reported by inspectors are also given under log books. Where pups are known they are given separately.

Species	Area	Count	Pups	Gear	Source
Harbour seal	Coastal Iceland	42		Gillnet	MRI survey
Harp seal	Coastal Iceland	6		Gillnet	MRI survey
Ringed seal	Coastal Iceland	1		Trawl	MRI survey
Harbour seal	Coastal Iceland	8		Lumpsucker net	Inspector
Grey seal	Coastal Iceland	47		Lumpsucker net	Inspector
Ringed seal	Coastal Iceland	1		Lumpsucker net	Inspector
Harbour seal	Coastal Iceland	27	2	Lumpsucker net	Log books
Grey seal	Coastal Iceland	10	3	Lumpsucker net	Log books
Ringed seal	Coastal Iceland	1		Lumpsucker net	Log books
Bearded seal	Coastal Iceland	1		Lumpsucker net	Log books
Unspecified seal	Coastal Iceland	77		Lumpsucker net	Log books

Table 4. Reported by-catch of cetaceans by the Icelandic fishing fleet in 2013.

Harbour porpoise	Coastal Iceland	69		Gillnet	MRI survey
White-beaked dolphin	Coastal Iceland	2		Gillnet	MRI survey
White-beaked dolphin	Coastal Iceland	2		Gillnet	Inspectors
Harbour porpoise	Coastal Iceland	2*		Lumpsucker net	Inspectors
Harbour porpoise	Coastal Iceland	1*		Lumpsucker net	MRI scientist
Harbour porpoise	Coastal Iceland	87		Lumpsucker net	Log books
Unspecified dolphin	Coastal Iceland	1		Lumpsucker net	Log books

* also reported in log books

VIII APPENDIX 3 - STRANDINGS

Information on stranded cetaceans in Iceland is compiled by the MRI in cooperation with the INH and other relevant institutions (Table 5, below). 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 e.g. 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.

Depending on the condition of the stranded animals and accessibility, samples are taken for studies on diet (stomach), life history (teeth, ear plugs, gonads), genetics (skin, muscle), energetics (muscle, blubber) and for morbillivirus antigen screening (blood). Various tissue samples for pollution studies have been routinely collected during dissections of stranded or by-caught cetaceans in recent years. These are stored frozen at the MRI. Samples for genetic studies are obtained from most animals.

Table 5. Cetacean strandings in 2013.

Species	Stranding events	Stranded animals
Minke Whale	2	2
Fin whale	1	1
Sperm whale	3	3
Killer whale	3	7
Harbour porpoise	2	2
Pilot whale	7	60
White-beaked dolphin	4	4
Total	22	79

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