NAMMCO

TWENTY SIXTH MEETING OF THE COUNCIL

7 – 8 March 2018, Tromsø, Norway

DOCUMENT NPR-I-2016 National Progress Report – Iceland - 2016

Submitted by: Iceland

This document contains

The National Progress Report for activities in 2016 from Iceland.

Catches are reported in Document "NAMMCO-26-Catches-2016"

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- For Information

ICELAND

PROGRESS REPORT ON MARINE MAMMALS IN 2016

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I INTRODUCTION

The following text reports on studies on marine mammals in Icelandic and adjacent waters in 2016. Most of the studies were conducted by the Marine Research Institute (MRI, since mid-2016 MFRI) In co-operation with various research partners including Húsavík Research Centre (HRC), 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), University of British Columbia in Canada, University of Barcelona in Spain, University of St Andrews in Scotland, Icelandic Seal Center (ISC), BioPol, Hólar University Collage, the University of Stockholm, Natural history museum of Sweden, Natural History Museum of Denmark, Maine University and University of Southern Denmark in Odense, University of Potsdam. Queries for information on research were sent to all offices, individuals and private commercial platforms such as whaling and whale watching companies known to have been involved in marine mammal research or data collection during the period.

II RESEARCH BY SPECIES 2016

Fin whale

In 2016 the Scientific Committee of the IWC completed the *RMP Implementation Review* of North Atlantic fin whales.

No fin whaling was conducted in Iceland in 2016 and thus the proposed sampling program was postponed. A whale research team from the University of British Columbia has conducted various research projects on fin whales at the whaling station in Hvalfjörður in recent years. In recent years the research program focused on analysis of anatomical features related to engulfment feeding and diving in fin whales. This includes a study of many structures in the head and thorax including diaphragm, arteries, nerves and muscles in the ventral groove blubber and tongue, esophagus, pharynx, lung and baleen. The aim is two-fold: 1. to understand how rorqual whales have evolved the capacity to engulf extremely large volumes of water containing prey, filter the prey items from the water, and swallow the prey rapidly with total protection of the airway. 2. to explore mechanisms that protect against adverse effects of rapid descent in the ocean that must cause transient pressure gradients in the thorax, vascular system, and lungs.

Starting in 2014, a research collaboration has been established between the marine mammal research group of the University of Barcelona, led by Alex Aguilar and Asunción Borrell, and the Marine Research Institute. The objective is to validate and deepen in the use of a number of chemical tracers to investigate the ecology and demographic structure of baleen whales, particularly fin and minke whales. Research has focused on the use of stable isotopes of various elements (C, N, O, S), trace elements, as well as

biochemical and molecular markers. A number of communications to conferences has already been presented on the validation of faeces to assess diet in baleen whales and on the use of baleen plates to investigate migration and winter destinations of fin whales.

Common minke whale

Biological sampling from the common minke whale hunt in Iceland continued under the auspices of the MFRI. For all minke whales, the mitochondrial Control Region and a standard set of 16 nuclear microsatellites is genotyped for population/stock assessment in collaboration with the University of Potsdam.
Studies continued at the MFRI on the development of a new ageing method for common minke whales.
The HRC in Húsavík contined their long-term photo-identification and sightings studies of minke whales in Skjálfandi bay.
The aerial (Partenavia) component of the Icelandic NASS15 resulted in very low coverage and was repeated using a Twin Otter aircraft in 2016. Analysis of the results and those from the NASS-15 are in preparation.

Humpback whale

Humpback whales were the primary species of a whale observation effort onboard two capelin survey vessels 11 Sept - 16 Oct 2016 with similar results as in 2015 (Gunnlaugsson *et al.* 2016). The humpbacks were concentrated in the area where capelin is detected and this is of interest in the modelling for quota setting of the capelin stock.

The HRC in Húsavík continued their long-term photo-identification and sightings studies of humpback whales in Skjálfandi bay. The MFRI continued their photo-identification studies including the establishment of a central national humpback whale photo-id database.

Four biopsy samples of humpback whales were obtained in Eyjafjörður, N-Iceland in October 2016 (MFRI).

Blue whale

In 2016 one blue whale was instrumented with a satellite tag in north Icelandic waters. Information on movements were received for the period 24/6-2/8 2016.
The HRC in Húsavík continued their long-term photo-identification and sightings studies of blue whales in Skjálfandi bay.

N-Bottlenose whale

In 2016, the laboratory of Patrick Miller from University of St Andrews in Scotland led a 4-week expedition starting in May working in the waters between Iceland and Jan Mayen. This trial built upon research in the Jan Mayen area in 2013-2015, which had the dual objectives of using animal-attached tags to study the body condition of large cetaceans, and studying northern bottlenose whales (*Hyperoodon ampullatus*) in the waters north of Iceland and in particular using at-sea experiments to investigate their responses to noise from naval sonar. The outcome of the 2016 trial is reported in full in a cruise report (Miller et al. 2016a). Two publications (Miller et al. 2015; Sivle et al. 2015) reported the first results of how *Hyperoodon* responded to underwater noise presented in an at-sea experiment, and another publication reported on estimating body condition for bottlenose whales (Miller et al. 2016b).

Killer whale

In 2016, the MFRI conducted a 4-week field season in Vestmannaeyjar, continuing a long-term project on killer whales started in 2008. The current focus of the project is to investigate dietary specialisation in killer whales and thus the field work focused on collecting information on prey targeted and dietary preferences of individual whales by collection of photo-identifications, observation of feeding events and collection of skin biopsy samples. Publications during 2016 resulting from this project were focused on previous data collected on the acoustic communication of killer whales.

White-beaked dolphins

The HRC in Húsavík contined their long-term photo-identification and sightings studies of white-beaked dolphins in Skjálfandi bay. Recordings of white-beaked dolphins were conducted in Skjálfandi bay using a 16-hydrophone array.

Harbour porpoise

Collaboration of the MFRI with the University of Potsdam on harbour porpoise genetic research is ongoing (Lah et al. 2016). Among the objectives of this study is estimation of population size based on close kin analysis. For all harbour porpoises, the mitochondrial Control Region and a standard set of 15 nuclear microsatellites is genotyped for population/stock assessment and close-kin-based estimation of population size. Furthermore, multiple nuclear Single Nucleotide Polymorphisms (SNPs) are typed in a representative subset of samples.

Recordings of harbour porpoises were conducted in Skjálfandi bay using a 16-hydrophone array.

Harbour seals

A new population estimate was conducted in 2016 (Thorbjörnsson et al. 2017). The aerial survey resulted in a total number of 3,383 individuals yielding an estimated population population size of 7,652 animals. The 2016 census indicated a continuing decline in the harbour seal population. The estimated population size was 77% smaller than when first estimated in 1980, and 32% smaller than in 2011, when the last complete population census was undertaken. The estimate is 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland. Although factors contributing to the observed population decline are poorly understood, by-catch and direct-hunts are likely population limiting factors. Given a recent population decline, it is pressing that factors contributing to mortality are assessed in the future. A new harbour seal census is planned for 2018.

A paper on abundance and haul-out patterns of harbour seals at Vatnsnes peninsula was published during the year (Granquist & Hauksson, 2016).

A study on the effect of seals on salmonids was initiated in 2009. Different methods are used including hard-part analysis, stable isotope analysis and prey-DNA metabarcoding analysis. The project is a cooperation between MFRI, ISC, Stockholm University, Natural history muséum in Stockholm and BioPol. Some results were published in 2016 (Granquist & Hauksson, 2016; Granquist, 2016).

A study of harbour seal genetics was initiated in cooperation between MFRI, ISC and the Natural history museum of Denmark.

The effect of seal watching tourism on the behaviour and distribution of harbour seals has been studied by ISC and MFRI since 2008, together with interdisciplinary research on seal watching management. Some of the results from the project was published during the year (Clack, 2016; Granquist & Nilsson, 2016; Marschall, Burns & Granquist, 2016; Öqvist et al. 2016).

The perception of marine mammal watching tourists towards marine mammal conservation and management in Iceland was investigated by ISC and MFRI in co-operation with Stockholm University (Burns et al., in prep.; Granquist et al., in prep.; Öqvist, 2016).

Grey seals
A project was initiated in 2016 where five grey seal pups were tagged with satellite tags to map habitat use. A study of grey seal genetics was initiated in cooperation between MFRI, ISC, Natural history museum of Denmark and Maine University.

No new population estimate exist for the population, but a census survey is conducted during 2017.

Other pinniped species
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 life animals). In 2016, 62 harp seals were reported in Icelandic waters.

III ONGOING (CURRENT) RESEARCH

Cetaceans
In 2017 fishermen for the first time received a payment for each harbour porpoise DNA tissue sample that they send in to the MFRI, and this e is clearly resulting in an increase in samples and in the recording of by-catch. The main objective of this research is to estimate population size of harbour porpoises based on close-kin relationship model.

As in 2015 and 2016 humpback whales were the primary species of a whale observation effort onboard two capelin survey vessels 4-29 Sept 2017.

During 7. June- 1. July 2017 the MFRI participated in a cetacean sightings cruise conducted onboard the RRS Discovery and organized by the Sea Mammal Research Unit. University of St Andrews, Scotland. The cruise collected data on cetacean and seabird distribution, as well as oceanography in the sub-polar frontal zone between the UK and Canada.

Pinnipeds
An aerial grey seal census is carried out in 2017 to estimate population size. Analysis is currently ongoing. A harbour seal census is planned for 2018. Research on timing of pupping period and pup production has also been initiated.

Research on interactions between seals and fisheries will continue with further investigation on mapping seal habitat/abundance for example with application of satellite tags and by increasing knowledge on by-catch. Analysis of harbour seal diet in river mouths in the north west of Iceland (by ISC and IMFR), with special efforts put on investigating the effect of seals on salmonids has continued during 2017.

A study on the effect of land- and boat based tourism on the spatial and behavioural haul-out patterns of harbour seal and the interdisciplinary research on seal watching management initiated in 2008 by ISC and IMFR will continue the following years.

The MFRI and ISC have initiated a photo-identification pilot study including testing software and creating a foundation for a photo-id database.

In 2017, a study on vocalisations and behaviour of male Icelandic harbour seals during the mating season was initiated by The University of Iceland and MFRI in cooperation with the University of Southern Denmark in Odense.

A project investigating environmental toxicants in seals was initiated by MFRI during 2017.

IV ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN

Cetaceans

Based on assessments conducted by the Scientific Committees of NAMMCO and the IWC, the MFRI recommended in 2017 that annual catches in 2018-2025 do not exceed 161 fin whales on the East Greenland – West Iceland management area and 48 fin whales in the East Iceland-Faroes management area. .On the same basis the MFRI recommended in 2016 maximum annual takes of 224 common minke whales in the Icelandic continental shelf (CIC) area during 2016-2018.

Pinnipeds

MFRI advices that a seal hunting management system should be initiated, and that reporting of all seal hunt should be mandatory. MFRI advices that direct harbour seal hunt should be kept at an absolute minimum level and that actions must be taken to reduce by-catch of seals in commercial fisheries. MFRI will release advice based on the management objectives set for grey seals in Iceland only after the grey seal population census has been finalized in 2017.

V PUBLICATIONS AND DOCUMENTS

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Peer-reviewed publications

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Rasmussen, MH, Atem, A and Miller, LA (2016). Behavioral Responses by Icelandic White-Beaked Dolphins (Lagenorhynchus albirostris) to Playback Sounds. Aquactic Mammals 42, 317-329

Samarra FIP, Deecke V and Miller PJO (2016) Low-frequency sounds produced by Northeast Atlantic killer whales (Orcinus orca). Journal of the Acoustical Society of America, 139: 1149-1157.

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VI APPENDIX 1 - CATCH DATA

See separate sheet.

VII APPENDIX 2 - BY-CATCH DATA

a. Short narrative

By-catch in research surveys and when observed by inspectors on fisheries vessels is reported in Appendix 2. It should be noted that reported numbers of by-catch is underrepresented to an uncertain extent and hence numbers should not be regarded as reliable. However, some increase has occurred in the by-catch reporting from fishermen the past year (see last year's *Iceland progress report* and the report from the NAMMCO Scientific Committee Working Group on By-catch, in Cph). There may be some overlap in the by-catch reported by fishermen and reports from the inspection. Genetic samples of all marine mammals (mainly harbour porpoises) are collected in the surveys and fishermen voluntarily sent in a total of 22 samples of harbour porpoises and 2 foetuses by-caught in lumpsucker nets and cod nets in similar numbers and these are likely included in the fishermen reports. Numbers are given in a separate sheet.

VIII APPENDIX 3 - STRANDINGS[i]

a. Short narrative

All cetacean standings should be reported to the MFRI and when possible autopsies are conducted. genetic samples are stored in the genetic database at the institute.

No records are kept of pinniped strandings at the MFRI.

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