

## FAROE ISLANDS PROGRESS REPORT ON MARINE MAMMALS 2013

By Bjarni Mikkelsen, Dorete Bloch, Maria Dam, Jústines Olsen and Geneviève Desportes.

### I. INTRODUCTION

This report summarises research on cetaceans and pinnipeds conducted in the Faroe Islands in 2013. Research has been conducted by the Museum of Natural History, the Environment Agency and the Veterinary Service.

### II. RESEARCH BY SPECIES 2013

#### II.a Species/Stocks studied

- Walrus (*Odobenus rosmarus*) – tagged animal
- Grey seal (*Halichoerus grypus*) – hunting statistics
- Pilot whale (*Globicephala melas*) – landed animals
- Sperm whale (*Physeter macrocephalus*) – stranded animals

#### II.b Field work

In 2013, a total of 270 “full samples” were collected from **pilot whales** by the Natural History Museum, from 10 drives - Viðvík on 21 July (34 samples), Fuglafjørður on 30 Juli (25), Sandavágur on 8 August (20), Leynar on 11 August (21), Húsavík on 13 August (20), Hvalvík on 27 August (51), Sandavágur on 6 September (20), Hvalvík on 22 September (20), Sandavágur on 10 October (21) and Hvannasund on 1 November (18). This is a continuation of a small-scale sampling programme. The future plan is to complement this with a comprehensive monitoring programme, one priority being age determination of all individuals. “Full sample” refers to recording/sampling total length, weight (if possible), sex, teeth, ovaries/testes and stomach as well as muscle, blubber, kidney and liver tissues. Foetuses are sampled when present.

The Environment Agency took samples of 25 **pilot whales** from the Fuglafjørður 30 July 2013 drive. The sampling included samples of muscle and blubber from 25 individuals, kidney from 21 and liver from 19. From a subsample of 12 animals, a liver sample was placed in liquid nitrogen for additional analyses. Also teeth from the lower jaw were extracted (by sawing off the outer section) from a number of individuals from this grind for age determination. At the drive kill in Sandavágur 8 August 2013, samples of muscle and blubber were taken of from 24 whales; liver and kidney and samples were taken from 23 and 21 individuals respectively.

At the grind in Sandavágur 10 October 2013, the sampling was focused on two organs solely; the eye and the ear. Samples (tissue samples as above in addition to what was supposed to be the thyroid gland) were taken from one adult female (286 cm long) only, and the head was taken to the Environment Agency in Tórshavn for dissection of the ear. The eye was samples on the request of a Canadian scientist who wanted to study the retina, and the ear was sampled in

response to a study proposal from a Norwegian scientist. The efforts were largely wasted due to the custom at the US/Canada border that held the dry-shipper (nitrogen tank for transporting goods that must be kept deep frozen) for such a prolonged time (months) that the samples rotted and were thrown away.

Trials with a spinal lance as new hunting equipment in the **pilot whale** drive hunt have been performed for many years. The spinal lance is now adopted as legal equipment in the new executive order on pilot whaling from 5 July 2013 (see [www.whaling.fo](http://www.whaling.fo)). The spinal lance is reducing the killing time to 1-2 seconds, while also improving accuracy and safety. Other equipment has also been tested. A blowhole hook has also been developed and from May 2015, only persons having attended a certified course of instructions in the whaling regulations and killing methods will be permitted to kill whales. NAMMCO has published an instruction manual on pilot whaling, both in Faroese and English (<http://www.nammco.no/webcronize/images/Nammco/999.pdf>).

On 27 February 2013 a **walrus** was observed in Svínøy. On 3 March the same animal was observed in Orkney and again on 9 March in Norway. On 21 March the walrus turned up again on a sandy shore near Sørvágur on Vágoy. Here, the animal was tagged with a satellite transmitter, by the Museum, in co-operation with the Greenland Institute of Natural Resources. For the next 78 days the walrus was tracked in the waters of the Faroe Islands, where it stayed in fjord areas but also made longer trips to the Faroe Plateau and Norwegian Sea. After the satellite transmitter had stopped in June the walrus was observed in Iceland. On 4 September the walrus was back in the Faroe Islands where a new transmitter was deployed. Thereafter the animal moved to east Iceland, where it was fairly stationary in the fjords, but again made some trips to more offshore waters in east and north Iceland as well as to the Norwegian Sea. In early January the animal moved to Jan Mayen and after a period without signals the walrus turned up in Nordland in Norway. Here the tag stopped after having transmitted for 157 days. The stock affiliation of the walrus will be investigated by genetics from a skin biopsy collected during the tagging. Both transmitters were subsequently discovered by locals on the beaches where the last signal was received, and delivered back to the Museum.

On 21 November 2013 four **sperm whales** entered the sound between Streymoy and Eysturoy, the two largest islands in the archipelago. The area where the whales were located was shallow and difficult for skilful ship handling, so rescue was not attempted. The second day one animal was brought with the currents under a bridge, where it hit a pile and was injured, before entering deeper waters, and finally leaving the next day. A second whale stranded and died the second day while one whale died the following day. The fourth animal made it out again to deeper waters in the sound. But it never left the area, and was found dead on 14 April 2014 (Appendix 3). Two animals were pulled to offshore waters by the Fishery Inspection, while one skeleton was preserved by the Museum.

On 23 Desember 2013 three **sperm whales** entered Hvalvík on Streymoy. Although the whales appeared close to land, almost stranded, two MOB boats from the Fishery Inspection managed to drive the three animals back to sea, and hereby avoiding a potential new stranding incident.

## II.c Laboratory work

The biological material collected from **pilot whales** in 2013 has been prepared ready for finalizing age, diet and reproduction examinations.

When possible, the Environment Agency performs tissue sampling for contaminants analyses from two **pilot whale** drives a year, ideally from 25 individuals in each school. The samples are stored in the Environmental Specimen Bank at approx. -20°C from which they may be retrieved for analyses upon request, also from external scientists. From the total number of specimens sampled, selections of subsamples of individuals for chemical analyses are done with selection criteria on sex and age/size depending on the analyses aims in question. The samples taken and stored are primarily blubber and muscle and from a smaller selection of animals, mainly the older/larger ones, also kidney and liver. Muscle samples are analysed for mercury, and blubber samples for persistent organic pollutants such as PCB and “legacy” pesticides like DDT, and increasingly also emerging pollutants like PFOS (the latter though analysed in muscle and/or liver). Kidney and liver samples are analysed for mercury, cadmium and selenium. The focus of the monitoring of muscle and blubber is to elucidate possible changes in concentrations over time in the exposure of the human population utilizing pilot whale blubber and meat for food. The focus of the monitoring of heavy metals in kidney and liver tissues is to follow the possible risk to the pilot whale imposed by elevated tissue metal concentrations. Since 2008, the monitoring data established in the AMAP run by the Environment Agency, with support from the Ministry of Environment and Environmental Protection Agency DK, has been available online at [www.us.fo](http://www.us.fo), under the heading ENVOFAR. ENVOFAR is a cooperation of Faroese institutions that work actively to describe and study the environment in the AMAP and CAFF working groups under the Arctic Council (see also [www.envofar.fo](http://www.envofar.fo)).

Samples of 20 **pilot whales** from the Faroe Islands were included as a reference material for species identification of stranded animals, distinguishing between the two morphologically very similar *G. melas* and *G. macrohynchus* by the use of mitochondrial and nuclear loci (microsatellites) genetic markers.

Skin samples from 25 **pilot whales** landed in the Faroe Islands were included in a study looking at sequence polymorphism and geographical variation at mitochondrial and MHC loci in long-finned pilot whale from the North Atlantic based on samples from five areas, Cape Cod (NE USA), Faroe Islands, United Kingdom, Norway and Northwest Iberia (Monteiro *et al. Submitted*).

## II.d Other studies

In the Faroe Islands **grey seals** are merely killed at salmon farms, when interfering with the installations. In 2010 a logbook system of seal culls was implemented and farmers were motivated to deliver statistics on an annual basis. Unfortunately, the reporting system is still not optimal in providing a full overview of grey seal removals.

## II.e Research results

A study using genetic markers to identify species of **pilot whales**, distinguishing between the long-finned *G. melas* and the short-finned *G. macrorhynchus*, revealed positive identifications. The DNA study identified mixed ancestry for one individual, the maternal species being *G. melas*. This is the first hybridization documented between the two species, and the first post-F1 hybrid genetically identified between cetaceans, revealing interspecific genetic introgression in marine mammals.

Sequence polymorphism and geographical variation at two adaptive loci in the Major Histocompatibility Complex (pathogen-driven selection) was investigated in long-finned **pilot whales** from three regions in East Atlantic and one region in West Atlantic. A spatial diversity in genetic substructure was identified, where Iberian pilot whales were found to represent a significantly genetically differentiated group. But a significant structure in genetic diversity across North Atlantic could not be demonstrated, which is contrary to studies using neutral markers.

A study on neurons and glial cells in **pilot whale** brain was successfully completed as an Master study in biology at the University of the Faroe Islands. The study has been described in a scientific paper submitted to *Frontiers in Neuroanatomy*.

### **III. ONGOING (CURRENT) RESEARCH**

The Museum of Natural History will continue tracking **pilot whales** by satellite telemetry, in order to assess migration patterns and the distribution area of pilot whales recruiting to the Faroese harvest.

A PhD study at the Environment Agency on negative effects of pollutants on hormone and vitamin concentrations in **pilot whales** is in progress.

### **IV. CATCH DATA**

Given in Appendix 1.

### **V. BY-CATCH DATA**

The electronic logbook system for all fishing vessels larger than 15 GRT, reporting also marine mammal by-catch, has been in function for two years (some fleets). Reported by-catches are given in Appendix 2. The rare incidences with by-catches of large whales are usually reported directly to the Museum.

### **VI. ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN**

None

### **VII. PUBLICATIONS AND DOCUMENTS**

Heidi S Mortensen, Bente Pakkenberg, Maria Dam, Rune Dietz, Christian Sonne, Bjarni Mikkelsen and Nina Eriksen. 2014. Quantitative relationships in Delphinid neocortex. *Front. Neuroanat.*, 26 November 2014 | doi: 10.3389/fnana.2014.00132.

Lydersen, C., Øien, N., Mikkelsen, B., Bober, S., Fisher, D. and Kovacs, K. M. 2013. A white humpback whale (*Megaptera novaeangliae*) in the Atlantic Ocean, Svalbard, Norway, August 2012. *Polar Research* 2013, 32, 19739, <http://dx.doi.org/10.3402/polar.v32i0.19739>

- Mikkelsen, B., Bloch, D., Dam, M., Olsen, J. and Desportes, G. 2013. Faroe Islands – Progress report on Marine Mammals 2012. Paper presented to the NAMMCO Scientific Committee, Reykjavík, Iceland, November 2013. 5pp.
- Miralles L., Lens S. and Rodríguez-Folgar, A., Carrillo, M., Martín, V., Mikkelsen, B. and Garcia-Vazquez, E. 2013. Interspecific Introgression in Cetaceans: DNA Markers Reveal Post-F1 Status of a Pilot Whale. *PLoS ONE* 8(8): e69511. doi:10.1371/journal.pone.0069511
- Monteiro, S.S., Vingada, J., López, A., Pierce, G.J., Ferreira, M., Brownlow, A., Øien, N., Mikkelsen, B., Niemeyer, M., Deaville, R and Piertney, S. Sequence polymorphism and geographical variation at mitochondrial and MHC loci in long-finned pilot whale (*Globicephala melaena*) from the North Atlantic. Submitted to *Marine Biology*. In S.S. Monteiro. 2014. Population ecology of long-finned pilot whale (*Globicephala melas*) off the western coast of the Iberian Peninsula. PhD thesis. University of Minho (Portugal) and Aberdeen (Scotland). 200pp.

## APPENDIX 1 – CATCH DATA

Pilot whale drives in the Faroe Islands, 2013.			
Date	Locality	Number of whales	Samples taken
21 July	Viðvík	125	34
30 July	Fuglafjørður	267	25+25
8 August	Sandavágur	107	20+24
11 August	Leynar	21	21
13 August	Húsavík	135	20
27 August	Hvalvík	51	51
6 September	Sandavágur	50	20
22 September	Hvalvík	120	20
10 October	Sandavágur	108	21+2
1 November	Hvannasund	86	18
14 November	Vestmanna	34	0
<b>2013</b>	<b>11 grinds</b>	<b>1.104 whales</b>	<b>321</b>

Catches of species other than <i>G. melas</i> in the Faroe Islands, 2013.				
Date	Locality	Species	Number	Samples
13 August	Hvalba	Lagenorhynchus acutus	430	0
2013			430	

## APPENDIX 2 – BY-CATCH DATA

By-catch in the Faroe Islands, 2013.				
Date	Locality	Species	Number	Samples
?	Faroese EEZ	<i>G. melas</i>	5	0
?	Faroese EEZ	?	1	0
2013			6	

## APPENDIX 3 - STRANDINGS

Strandings in the Faroe Islands, 2013.				
Date	Locality	Species	Number	Samples
21 Nov	Faroe Islands	<i>Physeter macrocephalus</i>	3	1
2013			3	1