

FAROE ISLANDS PROGRESS REPORT ON MARINE MAMMALS 2014

By Bjarni Mikkelsen and Maria Dam

I. INTRODUCTION

This report summarises research on cetaceans and pinnipeds conducted in the Faroe Islands in 2014. Research has been conducted by the Museum of Natural History and the Environment Agency.

II. RESEARCH BY SPECIES 2014

II.a Species/Stocks studied

- Grey seal (*Halichoerus grypus*) – hunting statistics
- Pilot whale (*Globicephala melas*) – landed animals
- Bottlenose whale (*Hyperoodon ampullatus*) – stranded animals

II.b Field work

In 2014, a total of 47 “full samples” were collected from **pilot whales** by the Natural History Museum, from 2 drives – Fuglafjørður on 18 May (13 samples) and Sandur on 30 September (34). This is a continuation of a “small-scale” sampling programme, with the future plan to complement it with a more comprehensive monitoring programme, one priority being age determination of all individuals. A “full sample” refers to recording/sampling total length, weight (when possible), sex, teeth, reproductive organs and stomach as well as muscle, blubber, kidney and liver tissues. Foetuses are sampled when present.

The Environment Agency did not collect samples of **pilot whales** in 2014.

On 28 September 2014, five **bottlenose whales** stranded in Hvalba, Suðuroy. Samples from stomachs, reproductive organs and lower jaws were delivered to the Museum of Natural History for examinations.

II.c Laboratory work

The biological material collected from **pilot whales** in 2014 has been prepared ready for finalizing examinations of age, diet and reproduction.

In 2014, the activities of the Environment Agency in relation to **pilot whales** were limited to that of preparing samples from previous years for analyses, as no new samples were taken in 2014. The samples selected for analyses in 2014 are shown in Table 1 and Table 2.

Table 1 Samples of pilot whales selected for analyses for the AMAP programme.

Date of kill	ID whales	Number of whales	Tissue	Analyses	Results
300713	nos 7, 9	2	Liver and blubber	PFAS (liver) and PBDE (blubber)	not available
80813	nos, , 3, 19, 27	3	Liver and blubber	PFAS (liver) and PBDE (blubber)	not available
80813	nos. 6, 8, 12, 18, 20, 21, 25.	7	Liver	Selenium	not available
80813	nos. 1, 3, 5, 6, 7, 10, 11, 16, 19, 21, 24, 26, 27	13	Muscle and blubber	Selenium and stable isotopes (N and C) in muscle, POPs in blubber.	not available
300713	nos. 3, 7, 8, 9, 11, 13, 18, 19, 20, 22, 28, 30.	12	Muscle and blubber	Selenium and stable isotopes (N and C) in muscle, POPs in blubber.	not available
300713	nos. 8, 15, 18, 20, 21, 23, 28, 29.	8	Liver	Selenium	not available

Table 2 Samples of pilot whales selected for analyses for PFAS.

Number	ID	Scientific name	Location	Sampling date
1	30-06-1994-0018	Globicephala melas	Hvannasund	30-06-1994
2	30-06-1994-0046	Globicephala melas	Hvannasund	30-06-1994
3	280696-0266	Globicephala melas	Vestmanna	28-jun-96
4	280696-0267	Globicephala melas	Vestmanna	28-jun-96
5	280696-0282	Globicephala melas	Vestmanna	28-jun-96
6	251198-0045	Globicephala melas	Hvalvík	25-nov-98
7	251198-0048	Globicephala melas	Hvalvík	25-nov-98
8	140399-0046	Globicephala melas	Tórshavn	14-mar-99
9	140399-0018	Globicephala melas	Tórshavn	14-mar-99
10	080999-0019	Globicephala melas	Vestmanna	08-sep-99
11	310800-118	Globicephala melas	Hvannasund	31-aug-00
12	310800-120	Globicephala melas	Hvannasund	31-aug-00
13	090900-016	Globicephala melas	Tórshavn	09-sep-00

In addition, the Environmental Agency delivered **pilot whale** samples for genetic studies, to be undertaken as part of an MSc project at the University of the Azores, by Marilia Olio (in all 37 samples of pilot whales liver or muscle). The study is delayed and the results are not available at present.

II.d Other studies

In the Faroe Islands **grey seals** are merely killed at salmon sea 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, integrating **pilot whale** samples, explored the utility of Hg stable isotope ratios in human hair as a new method for discerning MeHg exposure sources. The study characterized

Hg isotope fractionation between humans and their diets using hair samples from Faroese whalers exposed to MeHg predominantly from pilot whales. It was observed an increase of 1.75‰ in $\delta^{202}\text{Hg}$ values between pilot whale muscle tissue and Faroese whalers' hair but no mass-independent fractionation (Li et al., 2014).

Results of PFAS analysis were partially presented in Sunderland et al. (see Figure 1) at the Goldschmidt 2015 Conference in Prague, 17 August 2015. The results show that, in contrast to the declining trend observed a few years ago, even PFOS in pilot whale muscle appears to be increasing again (Figure 2).

Temporal trends in perfluorinated alkylated substances (PFASs) in North Atlantic seawater and pilot whales

*Elsie M. Sunderland*¹, Xianming Zhang¹, Clifton Dassuncao¹, Cindy Hu¹, Bjarni Mikkelsen², Maria Dam³, Rossana Bossi⁴

¹Harvard University, ²Faroese Museum, ³Environment Agency, Faroe Islands, ⁴Aarhus University

Figure 1. Authors and affiliations for the Sunderland et al., 2015 presentation.

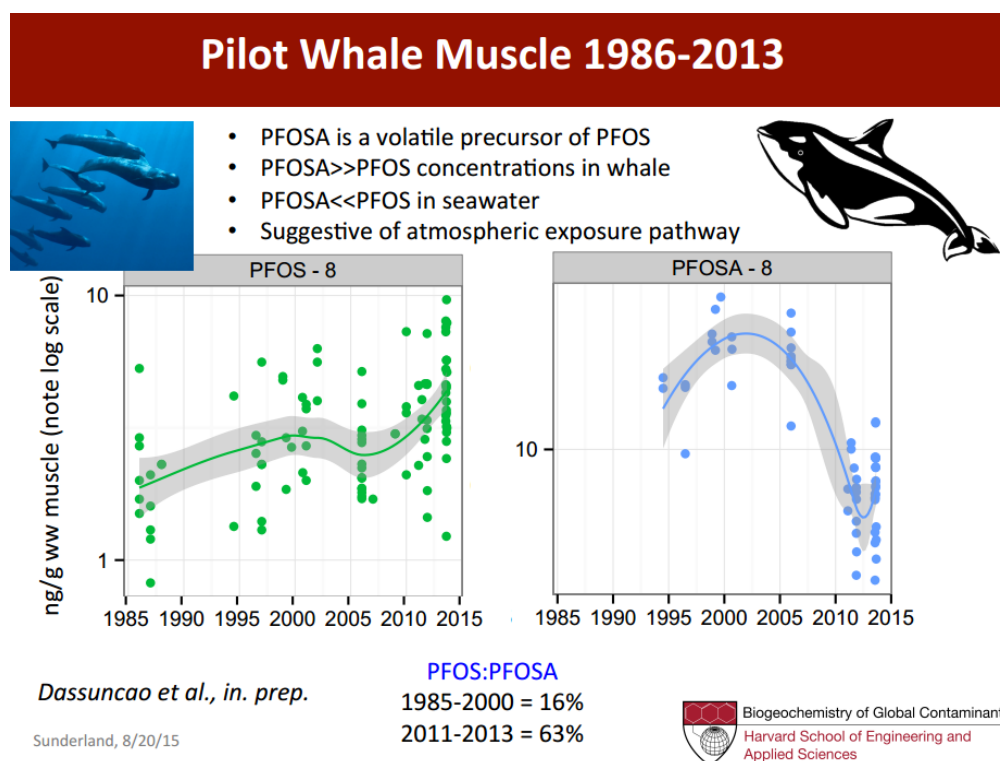


Figure 2. Slide from the Sundeland et al., 2015 presentation.

A study on neurons and glial cells in **pilot whale** brain found that the long-finned pilot whale neocortex has approximately 37.29×10^9 neurons, which is almost twice as many as humans, and 127×10^9 glial cells. Thus, the absolute number of neurons in the human neocortex is not correlated with the superior cognitive abilities of humans (at least compared to cetaceans) as has previously been hypothesized. However, as neuron density in long-finned pilot whales is

lower than that in humans, their higher cell number appears to be due to their larger brain (Mortensen et al., 2014).

A report summarising the findings of the monitoring of environmental pollutants in **pilot whales** as in other selected species from the Faroe Islands for the Arctic Monitoring and Assessment programme (AMAP) has been published in Nielsen et al., 2014.

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, with mandatory reporting of marine mammal by-catches, has been in function for three years now, still for some selected fleets. Reported by-catches are given in Appendix 2. The rare incidences with by-catches of large whales are by tradition reported directly to the Museum.

VI. ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN

None

VII. PUBLICATIONS AND DOCUMENTS

Mikkelsen, B., Bloch, D., Dam, M., Olsen, J. and Desportes, G. 2014. Faroe Islands – Progress report on Marine Mammals 2013. Paper presented to the NAMMCO Scientific Committee, Bergen, Norway, November. 5pp.

Miling, L., Sherman, L. S., Blum, J. D., Grandjean, P., Mikkelsen, B., Weihe, P., Sunderland, E. M. and Shine, J. P. 2014. Assessing Sources of Human Methylmercury Exposure Using Stable Mercury Isotopes. *Environ. Sci. Technol.*, 48 (15), pp 8800-8806.

Mortensen, H. S., Pakkenberg, B., Dam, M., Dietz, R., Sonne, C., Mikkelsen, B. and Eriksen, N. 2014. Quantitative relationships in delphinid neocortex. *Front Neuroanat.*, 8: 132. 10pp.

Nielsen, Sanna í Túni, Rakul Mortensen, Katrin Hoydal, Sissal Vágsheyg Erenbjerg and Maria Dam, 2014. AMAP Faroe Islands Heavy Metals and POPs Core Programme 2009-

2012 Environment Agency, Faroe Islands ISBN: 978-99918-819-9-7, pp. 64 excl. appendices. Available at <http://us.fo/Default.aspx?ID=13912>.

APPENDIX 1 – CATCH DATA

Pilot whale drives in the Faroe Islands, 2014.			
Date	Locality	Number of whales	Samples taken
18 May	Fuglafjørður	13	13
30 September	Sandur	35	34
2014	2 grinds	48 whales	47

APPENDIX 2 – BY-CATCH DATA

By-catch of marine mammals in the Faroe Islands, 2014.					
Date	Locality	Species	Gear	Number	Samples
7 August	Faroese EEZ	G. melas	Trawl	15	0
22 October	Faroese EEZ	O. orca	Trawl	1	0
?	Faroese EEZ	Cetaceans	Trawl	2	0
2014				18	

APPENDIX 3 - STRANDINGS

Marine mammal stranding in the Faroe Islands, 2014.				
Date	Locality	Species	Number	Samples
28 September	Hvalba, Suðuroy	Hyperoodon ampullatus	5	5
2014			5	5