TWENTY SIXTH MEETING OF THE COUNCIL

7 – 8 March 2018, Tromsø, Norway

DOCUMENT NPR-F-2016 National Progress Report – Faroe Islands - 2016

Submitted by: Faroe Islands

This document contains

The National Progress Report for activities in 2016 from the Faroe Islands.

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

Action requested:

- For Information

FAROE ISLANDS
PROGRESS REPORT ON MARINE MAMMALS 2016

By Bjarni Mikkelsen, Katrin Hoydal and Maria Dam

I. INTRODUCTION

This report summarises research on cetaceans and pinnipeds conducted in the Faroe Islands in 2016, by the Museum of Natural History and the Environment Agency.

II. RESEARCH BY SPECIES 2016

II.a Species/Stocks studied

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

II.b Field work

In 2016, a total of 158 biological samples, for age, reproduction and diet analysis, were collected from **pilot whales** by the Natural History Museum – Hvannasund on 6 July (43 samples), Hvannasund on 26 July (39), Hvannasund on 26 August (9) and Hvannasund on 28 August (67). This is a continuation of a small-scale sampling programme, with the plan to complement with a more comprehensive monitoring programme.

In 2016, the Environment Agency took samples of **pilot whales** in connection with grinds in Hvannasund 6 and 26 July and in Leynar 7 November. In all, 78 individual samples of muscle and blubber were taken, and liver and kidney tissue samples from 65 of these individuals.

II.c Laboratory work

The biological material collected from **pilot whales** in 2016 has been prepared ready for finalizing examinations of age, diet and reproduction.

The Environment Agency are regularly collecting **pilot whale** samples for a tissue bank (Table 1). In addition to monitoring, research to elucidate potential negative impact of pollutants on pilot whales are undertaken when funding allows.

Table 1. Pollutants in the pilot whale monitoring program of the Environment Agency.

Matrix (tissue)	blubber & muscle	kidney	liver	blubber / liver*,**	blubber*
Frequency of sampling	yearly, pref. from 3 schools, focus incr. on juv. males for timetrend				
number of samples analysed per year	25	15	15	5	5
Tissue analysed for:	Blubber:Legacy persistent organic pollutants$	Cadmium, dry mass	Mercury, selenium, cadmium,	Perfluoroalkyl substances, polybrominated	hexabromo cyclo-dodecane

	Muscle:metals£		dry mass	diethyl ethers	

*Timetrends
** PFAS is analysed in liver
$ PCB, HCH, HCB, DDT, DDE, and from ca. ½ of the samples even o,p-isomer DDT and metabolites, CHL, Mirex, Toxaphene.
£ Mercury, selenium, dry mass and stable N and C isotopes

II.d Other studies

In the Faroe Islands, **grey seals** are hunted at salmon sea farms, as a protective act, when interfering with the installations. In 2010, a logbook system of seal culls was implemented, and fish farmers were motivated to deliver statistics on an annual basis. However, the reporting system need to be validated in order to provide a reliable overview of grey seal removals.

II.e Research results

A study, integrating **pilot whale** samples from Faroe Islands, described the levels of diversity of the Major Histocompatibility Complex DQB and DRA loci in long-finned pilot whales from four regions of the North Atlantic, and compared with South Pacific (Monteiro et al., 2016). Three alleles were resolved at each locus, with trans species allele sharing and higher levels of non- synonymous to synonymous substitution, especially in the DQB locus. Overall nucleotide diversities of 0.49 ± 0.38% and 4.60 ± 2.39% were identified for the DRA and DQB loci, respectively, which are relatively low for MHC loci in the North Atlantic, but comparable to levels previously described in New Zealand (South Pacific). There were significant differences in allele frequencies within the North Atlantic and between the North Atlantic and New Zealand. Patterns of diversity and divergence are consistent with the long-term effects of balancing selection operating on the MHC loci, potentially mediated through the effects of host-parasite coevolution. Differences in allele frequency may reflect variation in pathogen communities, coupled with the effects of differential drift and gene flow.

The effects of persistent organic pollutants (POPs) on thyroid hormones and vitamin A, E and D were studied in pilot whales from the Faroe Islands (Hoydal et al., 2016). Some significant positive relationships were found between POPs and thyroid hormone concentrations in the youngest juveniles ($p<0.05$). In plasma of juvenile whales α–tocopherol was also positively correlated with all the POPs ($p<0.05$). Only few significant correlations were found between single POPs and retinol and vitamin D in plasma within the age groups. There were significant negative relationships between hepatic PBDE concentrations and retinol (BDE-47) and γ–tocopherol (BDE-49, -47, -100, -99, -153) in liver. The relationships between OHCs and THs or vitamins suggested that in pilot whales POPs seem to have minor effects on TH and vitamin concentrations.

Co-operation has been established with scientist at the Department of Anatomy and Cell Biology/ Canadian Light Source, Saskatoon, SK Canada, regarding the mercury/selenium in eyes and inner ear of the pilot whale and these results were presented at the SETAC conference in Orlando (Korbas et al., 2016). This research continues.

III. ONGOING (CURRENT) RESEARCH

The Museum of Natural History will continue to track **pilot whales** by satellite telemetry (last tagging was in 2015), in order to monitor migration patterns and distribution areas of pilot whales recruiting to the Faroese harvest.

Katrin Hoydal, since 2000 staff at the Environment Agency, continues work on her PhD thesis: "Levels and endocrine disruptive effects of legacy POPs and their metabolites in long-finned pilot whales of the Faroe Islands". Katrin is enrolled at the Norwegian University of Science and Technology (NTNU). In 2016, the study on effects of pollutants on hormone and vitamin concentrations in **pilot whales** is in progress.

By 2016, the Environment Agency have submitted two large research/development proposal on behalf of research consortia consisting of participating scientists from Denmark, Sweden, Norway and the Faroe Islands. The focus of these proposals have been the pilot whale at molecular level - with basis in genome and transcriptomes. The intent is to develop skills in the Faroe Islands for performing these analyses and interpretations - as this would be applicable in population assessment and pilot whale function at the molecular and cell level. Unfortunately, the proposals have so far not been successful, but search for funding continues.

Perfluoro alkyl substances, PFAS, and brominated dioxins and HBCD are environmental pollutants for which pilot whale tissue have been analysed in recent years. In 2016, parts of this research has been in cooperation with Harvard University, Ørebro University and Aarhus University.

IV. CATCH DATA

Appendix 1. Data available at the NAMMCO secretariat.

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 four years, still for some selected fleets. The rare incidences with by-catches of large whales have traditionally been reported directly to the Museum. Reported by-catch data for 2016 is given in Appendix 2.

VI. ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN

None

VII. PUBLICATIONS AND DOCUMENTS

Hoydal, K.S., Ciesielski, T.M., Borrell, A., Wasik, A., Letcher, R.J., Dam, M., Jenssen, B.M., 2016. Relationships between concentrations of selected organohalogen contaminants and thyroid hormones and vitamins A, E and D in Faroese pilot whales. Environmental Research 148, 386–400.

Mikkelsen, B. and Dam, M. 2016. Faroe Islands – Progress report on Marine Mammals 2015. Paper presented to the NAMMCO Scientific Committee, Nuuk, Greenland. 5pp.

Malgorzata (Gosia) Korbas, Katrin Hoydal and Maria Dam. Shining light on environmental contaminants in sensory organs of pilot whales. Presented at the SETAC in Orlando, 2016.

Sílvia S. Monteiro, José V. Vingada, Alfredo López, Graham J. Pierce, Marisa Ferreira, Andrew Brownlow, Bjarni Mikkelsen, Misty Niemeyer, Robert J. Deaville, Catarina Eira & Stuart Piertney. 2016. Major Histocompatibility Complex (MHC) class II sequence polymorphism in long-finned pilot whale (*Globicephala melas*) from the North Atlantic. *Marine Biology Research* Vol. 12, Iss. 6.

APPENDIX 1 – CATCH DATA

Pilot whale drives in the Faroe Islands in 2016			
Date	Locality	Number of whales	Samples taken
06 July	Hvannasund	43	43
26 July	Hvannasund	135	39
26 August	Hvannasund	9	9
28 August	Hvannasund	67	67
07 November	Leynar	41	0
2016	**5 pods**	**295 whales**	**158**

APPENDIX 2 – BY-CATCH DATA

By-catch of marine mammals in the Faroe Islands in 2016					
Date	Locality	Species	Gear	Number	Samples
26 January	Faroese EEZ	*Orcinus orca*	Trawl	5	na
07 August	Faroese EEZ	Whale	Trawl	1	na
10 August	Faroese EEZ	Whale	Trawl	1	na
15 August	Faroese EEZ	Whale	Trawl	1	na
16 October	Faroese EEZ	Whale	Trawl	1	na
2016				**9**	

APPENDIX 3 - STRANDINGS

Marine mammal strandings in the Faroe Islands in 2016				
Date	Locality	Species	Number	Samples
2016			0	