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Submitted by	Faroe Islands
Action requested	Take note
Background	Each NAMMCO party shall submit an annual National Progress Report by March 1 st the following year.

FAROE ISLANDS

PROGRESS REPORT ON MARINE MAMMALS 2018

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I. INTRODUCTION

This report summarises research on cetaceans and pinnipeds conducted in the Faroe Islands in 2018, by the Museum of Natural History and the Environment Agency.

II. RESEARCH BY SPECIES 2018

II.a Species/Stocks studied

- Grey seal (*Halichoerus grypus*) – abundance, hunting statistics
- Pilot whale (*Globicephala melas*) – landed animals, tagged animals
- Northern bottlenose whale (*Hyperoodon ampullatus*) – stranded animals

II.b Field work

In 2018, biological samples, for age, reproduction and diet studies, were collected from a total of 115 **pilot whales**, by the Natural History Museum – from the drives in Borðoyarvík on 1 July (26 samples), Tórshavn on 24 July (51) and Tórshavn on 30 July (38). Also, tissue samples from the same animals were stored for genetic and contaminant studies. In addition, flipper pairs were collected from 120 animals, for a study on calcification and diversity of bone structures.

In 2018, the Environment Agency took samples of **pilot whales** in connection with grinds in Gøta 22 May, Tórshavn 24 July and 30 July. In all, 78 individual samples of muscle and blubber, and liver and kidney tissue samples were taken. In addition, muscle, blubber, liver and kidney were taken from 4 fetuses from the grind in Gøtu, and gall samples were taken from 6 individuals in the July 30th grind.

On September 5, the Museum tagged four **pilot whales** with satellite transmitters. A small pod counting fifteen whales, spotted north of the island Vágoy, was driven to the bay of Bøur. The pod was lead gently towards the shore, where most animals pertly stranded. Satellite transmitters were attached to the dorsal fin of four whales, during the one-hour tagging operation, thereafter,

the pod swam to sea again. This is the sixth tagging event in a dedicated tracking programme, with the objective to determine the management unit of pilot whales recruiting to the hunt in the Faroe Islands.

A programme for estimating the abundance of **grey seals** started in 2018. During summer, the shoreline of the archipelago was surveyed from boat and all seals hauling-out and in the water were counted. Each island was visited from one to three times, except the southernmost island Suðuroy with no visit. In high-density areas, footages captured from a drone were used for the seal counts, and this improved accuracy considerable. The programme will continue in 2019, this time expanded with studies using camera traps and satellite tracking, in order to get the most accurate population estimate.

From the stranding of four **bottlenose whales** in Hvalba, biological data was delivered to the Museum of Natural History.

II.c Laboratory work

The biological material collected from **pilot whales** in 2017 has been prepared ready for finalizing the analysis of age, reproduction and diet.

The Environment Agency are regularly collecting **pilot whale** samples for a tissue bank, where the aim is to take samples from three schools a year, with generally 25 individuals from each. In addition to a monitoring program as outlined in Table 1, research activities are done as projects and when funding allows. Such projects could be to investigate the presence of chemicals of emerging environmental concern and elucidate potential negative impact of pollutants on pilot whales are undertaken. In 2017, samples of pilot whales were included in a Nordic Council of Ministers supported study of new per- and polyfluorinated alkyl substances, as arranged and coordinated by the Nordic Screening group, see also www.nordicscreening.org. The results will be reported in 2019 in a TemaNord report 2019:515: PFASs in the Nordic environment (in prep.).

In addition to securing samples suitable for contaminants analyses, the sampling of **pilot whales** in recent years have included sampling for RNA and DNA analyses. These studies are mainly done as student projects either at the Environment Agency, or at the University of the Faroe Islands in connection with laboratory courses in molecular biology. The gall samples are being analysed at the University of Stavanger, Norway, in research encompassing metabolism pathways studies and proteomics.

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 Muscle: metals [£]	Cadmium, dry mass	Mercury, selenium, cadmium, dry mass	Perfluoroalkyl substances, polybrominated diethyl ethers	hexabromo cyclo-dodecane

*Time trends

** 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, it is legal for salmon farmers to cull **grey seals** interacting with the installations, as a protective act. From 2018, salmon farmers have been legislated to deliver monthly removal numbers to the authorities. However, salmon farmers have reported these numbers indirectly to the Museum of Natural History for some years now, giving reliable removal numbers back to 2014.

II.e Research results

The **pilot whale** pod tagged with satellite transmitters on September 5 left the islands in a westward direction. After reaching the slope of the Faroe Plateau, the group took a southward direction, towards the Rockall Plateau. At this point, one tagged animal left the others. Reaching the Plateau, the main group took a southeastward direction towards the continental shelf, and continued southward in the trench between here and the Rockall Plateau. They continued south to approximately 50°N when turning north again. The single animal moved east, to the eastern slope of the Faroe-Shetland channel. Hereafter it moved north, towards the Norwegian Sea, when contact was lost, at 63°N. The last tag terminated after 50 days.

The results from the contaminants analyses of **pilot whales** were reported by the Environment Agency in the report Andreassen et al., 2019 “AMAP Faroe Islands 2013-2016: Heavy Metals and POPs Core programme”, Environment Agency, pp.103. The report includes data from time trend analyses of PBDEs and PFAS in pilot whale, along with the data for heavy metals and legacy POPs. The monitoring of pollutants in pilot whales are focused on juvenile males, so as to minimize variability that stems from sex/age related biological processes. The monitoring results indicate a steadily decreasing concentration of POPs in general (ie PCB and legacy pesticides) including the brominated flame retardants PBDE. For perfluorinated alkyl

substances, like PFOS, however, there are no clearly discernible trend, other than that the concentrations appear to have levelled out, or still be on a weakly increasing curve.

Analyses of mercury accumulation in sensory organs (eye and inner ear) of **pilot whales** and mercury selenium interactions using the synchrotron based techniques X-ray absorption spectroscopy and X-ray fluorescence mapping was presented at the synchrotron conference XAFS 2018 in Krakow, Poland in July 2018. The presentation was held by Gosia Korbas, a scientist from the Department of Anatomy and Cell Biology/ Canadian Light Source, Saskatoon, SK Canada. The analyses in pilot whale are results of a co-operation between the Environment Agency and the scientist.

III. ONGOING (CURRENT) RESEARCH

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

The Museum of Natural History will continue the summer census surveys for estimating the abundance of the **grey seal** population in the islands.

IV. ADVICE GIVEN AND MANAGEMENT MEASURES TAKEN

In a new amendment to the legislation regulating fish farming activities in the islands, it has become mandatory for farmers to deliver statistics to the authorities once a year, on monthly removals of grey seals for each farming locality separately. This is based on a recommendation from NAMMCO, to collect statistics of the removals of grey seals around fish farms.

The Fisheries Inspection has followed the recommendations from NAMMCO, that Faroes should collect data on bycatch of marine mammals in the pelagic fisheries targeting mackerel, herring and blue whiting, and has performed opportunistic inspections of the fleet over all seasons. For all fisheries, fishermen are mandated to deliver this information, both in the electronic and paper logbooks.

V. PUBLICATIONS AND DOCUMENTS

Andreasen, B., Hoydal, K., Mortensen, R., Erenbjerg S.V., and Dam, M. 2019. AMAP Faroe Islands 2013 – 2016: Heavy Metals and POPs Core Programme, Umhvørvisstovan, Argir, Faroe Islands, x + 103 pp

Korbas, M., Hoydal, K., Dam, M., Barst, B.D. and Basu, N. 2018. From fruit flies to whales: probing mercury toxicity across the animal kingdom with X-ray fluorescence

mapping and XAS. Oral presentation at XAFS 2018, 17 International Conference on X-Ray Absorption Fine Structure, 22.-27.07.2018, Krakow, Poland

- Mikkelsen, B., Hoydal, K and Dam, M. 2018. Faroe Islands – Progress report on Marine Mammals 2017. Paper presented to the NAMMCO Scientific Committee, November 13-16, M/S Polarlys, Norway. 6pp.
- Pike, D. G., Gunnlaugsson, T., Desportes, G., Mikkelsen, B., Vikingsson, G. A. and Bloch, D. 2018. Estimates of the relative abundance of long-finned pilot whales (*Globicephala melas*) in the Northeast Atlantic from 1987 to 2015 indicate no long-term trends. NAMMCO Scientific Working Group on Abundance Estimates. May 22-24, Copenhagen, Denmark. 39 pp.
- Pike, D. G., Gunnlaugsson, T., Mikkelsen, B., Halldórsson, S. D., Vikingsson, G. A. Acquarone, M. and Desportes, G. 2018. Estimates of the abundance of cetaceans from the T-NASS Icelandic and Faroese ship surveys conducted in 2007. NAMMCO Scientific Working Group on Abundance Estimates. May 22-24, Copenhagen, Denmark. 32 pp.
- Pike, D. G., Gunnlaugsson, T., Mikkelsen, B. and Vikingsson, G. A. 2018. Estimates of the abundance of cetaceans from the NASS Icelandic and Faroese ship surveys conducted in 2015. NAMMCO Scientific Working Group on Abundance Estimates. May 22-24, Copenhagen, Denmark. 31 pp.

VI. APPENDIX 1 – CATCH DATA

In the whaling legislation, it is statutory declared that all harvest activities are to be reported, by the district Sheriff, to the Ministry of Fisheries within three days after each hunt.

Drives in the Faroe Islands in 2018			
Species	Pods	Number of whales	Samples taken
<i>Globicephala melas</i>	10	624	115
<i>Lagenorhynchus acutus</i>	4	256	na
2018	14	880	115

VII. APPENDIX 2 – 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.

By-catch of marine mammals in the Faroe Islands in 2018					
Date	Locality	Species	Gear	Number	Samples
05 May	Faroese EEZ	Whale	Trawl	1	na
08 November	Faroese EEZ	Whale	Trawl	1	na
2018				2	

VIII. APPENDIX 3 – STRANDINGS

Strandings of live and dead animals are reported directly to the Natural History Museum, usually by the municipality or the district Sheriff.

Marine mammal strandings in the Faroe Islands in 2018				
Date	Locality	Species	Number	Samples
22-08-2018	Miðvágur	<i>Hyperoodon ampullatus</i>	1	na
29-08-2018	Hvalba	<i>Hyperoodon ampullatus</i>	4	na