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PROGRESS REPORT ON MARINE MAMMALS IN 2023

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I INTRODUCTION

The following is a summary of research on marine mammals in Icelandic and adjacent waters in 2023. The studies were conducted by the following research institutes: Marine and Freshwater Research Institute (MFRI), Húsavík Research Centre (HRC), Westman Island Research Centre (WIRC), Húsavík Whale Museum (HWM), Keldur, Institute for Experimental Pathology (KIEP), The National University Hospital of Iceland, The Icelandic 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, The Icelandic Seal Center (ISC), Hólar University Collage, Natural History Museum of Denmark, Maine University, College of the Atlantic – Allied whale in Maine, University of Aarhus, RIF research center, North West Iceland Nature Research Centre, West Iceland Nature Research Centre, Orca Guardians Iceland (OGI), Greenland Institute of Natural Resources and 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 2023

CETACEANS

Fin whale

Studies continued at the MFRI on the biology and ecology of fin whales based on data from commercial catches in 2023 and recent years. Fin whale research conducted at the whaling station in Hvalfjörður is wide ranging and includes e.g. studies on age, reproduction, feeding ecology, energetics, pollutants, genetics, hybridization, anatomy and physiology and involves several research institutions including the University of Iceland, the National University Hospital

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of Iceland, University of British Columbia in Canada, University of Barcelona and Keldur, Institute for Experimental Pathology: In 2023, studies on the functional anatomy of airways in the lungs were conducted. This approach uses anatomy to construct virtual 3D models of lungs in order to make predictions of air flow patterns by using computational fluid dynamics methods. The main question addressed is how large whales are able to exhale and inhale enormous air volumes in only 2-3 seconds. Another anatomical study of fin whales is concerned with the muscle organization of the pharynx that controls flow of air and food separately. Previous work on the structure and mechanical properties of the esophagus was completed (Gil et al. in press). Further, ear plugs collected from fin whales in Hvalfjörður were the basis for a new study that validated the use of ear plugs for age determination using radiocarbon methods (Campana et al. 2024).

Two studies used chemical methods to infer on the feeding ecology of fin whales. Stable isotope analysis on samples from fin whales caught off Iceland showed difference between the trophic position of fin whales in winter and summer, suggesting that fin whales are more generalist in feeding habitats in winter, while they feed almost exclusively on krill in the summer (Rita et al. 2023). In another study, an index of alkenones was used to differentiate between krill and fin whales caught off Iceland and Spain, suggesting that the index in animals can be used to estimate local sea temperatures that the animals inhabit.

The HRC continued work on their fin whale identification in 2023, with a bachelor thesis student updating the catalogue, calculating sightings per unit effort, and checking for matches in the Irish fin whale catalogue.

Common minke whale

Collaboration between the MFRI and the University of Potsdam on common minke whale genetic research continued during 2023. Population genetics analyses across the entire North Atlantic were performed, including samples from Iceland, Greenland, Canada, Norway, and the North Sea, to be finalized in 2024. Microsatellite data were used to infer Parent-Offspring (PO) pairs which informed about regional and ocean-wide movements. Final analyses are to be performed in 2024.

Using the double digest restriction-site associated DNA sequencing (ddRAD) technology over 50,000 new nuclear Single Nucleotide Polymorphisms (SNPs) have been developed for 45 North Atlantic minke whales, including 8 samples from Iceland. Further SNPs are currently developed by Whole Genome Resequencing of a representative set of minke whales. These SNPs will form the basis for the development of an informative minke whale SNP panel for population structure assessment across the entire North Atlantic.

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The HRC continued their long-term photo-identification of minke whales. An internship student investigated the effect of boat presence on minke whale breathing and diving behaviour. Additionally, Faunaguard was used to test the reactions of minke whales towards playback sounds in co-operation with the Dutch engineering company Van Oord.

Blue whale

The HRC continued their long-term photo-identification and sightings studies of blue whales in Skjálfandi bay.

An acoustic study that was initiated in 2022 by HRC and UI in Vestmannaeyjar, where soundtrap long-term recorders are used continued in 2023. An internship student compared blue whale call rate between spring 2022 and 2023 in Skjálfandi Bay and Vestmannaeyjar. The data is also currently being used to investigate the calling behaviour of blue whales during a seismic survey.

Humpback whale

The MFRI's long-term humpback tagging program continued in 2023.

The MFRI continued their photo-identification studies and the development of the national humpback whale photo-id database (ISMN Catalogue): <https://www.hafogvatn.is/en/research/whale-research/whale-photo-id>. This Catalogue is a product of a national collaboration with various contributors, including Universities, whale watching companies, citizen scientists, and dedicated surveys conducted by MFRI. The ISMN catalogue has more than 11250 sightings records in total, including over 1628 unique individuals seen in Icelandic waters (85 of these have also been reported in locations outside of Iceland). Additionally, the ISMN Database also includes 1328 individuals from various international partners (Guadeloupe , Norway , Azores, Irish , Scotland Capo verde , Bermuda/Samana Bay and Greenland).

Two papers were published that reported on the migration patterns of humpbacks using photo-id methods. One reports on the first documented round-trip migration between Iceland and the Turks and Caicos Islands (Bacon et al. 2023) while the other reports on the migration of a humpback whale mother and calf pair to Iceland from the West Indies breeding grounds (Basran et al. 2023).

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Long-term research on humpback whale winter occurrence in Iceland, which started in 2019, continued in 2023. The study is a collaboration between the University of Iceland, MFRI, University of Barcelona and the University of St. Andrews. Analysis on underwater kinematics and breathing behaviour, skin isotope ratio and blubber endocrinology were done in 2023. A study on diving behaviour and breathing rate of humpback whales during the winter was completed as an MSc thesis. A special effort has been made in comparing the ISMN Catalogue to the North Atlantic Humpback Whale Catalogue (NAHWC) in collaboration with the College of the Atlantic – Allied whale, especially regarding the known breeding grounds population.

Based on photoID, a master student investigated the movement of humpback whale to compare it with the observed movement of capelin and herring around Iceland. This master project was co supervised by the HRC and the MFRI.

The HRC continued their long-term photo-identification and sightings studies of humpback whales in Skjálfandi Bay. The long-term project on factors affecting humpback whale vocalization rate in Skjálfandi Bay continued in 2023 with student interns analyzing past acoustic recording data. Additionally, a master's student specifically investigated the occurrence and function of humpback whale whup calls.

A bachelor's student investigated breaching behaviour in relation to time of year and sea conditions. A master's student conducted a biopsy study where kinship of the humpback whales in Skjálfandi Bay will be investigated. Another master's student began working on humpback whale distribution models for the bay, comparing MaxEnt to random forest methods.

The WIRC continued studies during the wintertime with humpback whales including photo-identification mainly from land, many of which are contributed by citizen scientists, and sound recordings. In addition, during the summer, the UI in Vestmannaeyjar conducted photo-identification and tagging studies using suction cup tags (Dtags). Finally, photo-identification data was also collected in Ísafjörður in early September during a field trip as part of a taught course with the University Centre of the Westfjords. The photo-ID data was shared with the Icelandic Humpback Whale catalogue curated by MFRI.

Ongoing research on subarctic humpback whale behavioural ecology called "Icelandic Winter Whales" at the UI continued. Biopsy samples of epidermis and dermis tissue including blubber of life individuals were collected and analysed to investigate the genetics, isotope niche and endocrinology of humpback whales in Iceland. The isotope research is done in collaboration with MFRI and University of Barcelona. The genetic study is done in collaboration with the University

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of Grönigen and MFRI. Result of this genetics work was presented at the 2023 ECS meeting (Gabualdi et al 2023). The endocrinology study is done in collaboration with the University of St Andrews and MFRI.

Behavioural data has also been collected using suction cup digital archival tags and catcam tags, with images and videos from UAVs, from land-based stations and photo-ID data from vessels. Data has been collected in Faxaflói (SW-Iceland), Steingrímsfjörður and Ísafjarðardjúp (Westfjords of Iceland), Eyjafjörður and Skjálfaflói (NE-Iceland). The photo-ID data has been shared with the Icelandic Humpback Whale catalogue curated by MFRI. A master student is using the tag and land-based data to investigate the energy use of humpback whales in the wintertime.

Killer whale

In 2023, the UI and the Icelandic Orca Project conducted a field season in Vestmannaeyjar during June, July and August, continuing the long-term project on killer whales started in 2008. The current focus of the project is to investigate dietary specialization on killer whales, to observe interspecific interactions with pilot whales and to investigate the acoustic behaviour of killer whales. Photo-identification, biopsy sampling and tagging with Dtags was conducted during the summer field season as well as playback experiments of pilot whale sounds to killer whales to investigate their interspecific interactions. Land-based observations also allowed for broader monitoring of variations in the occurrence of killer whales and other cetaceans in the local marine ecosystem. Two Masters students completed their thesis on killer whale acoustic communication. A PhD student from UI concluded research projects on killer whale acoustics that resulted in two publications in the journals *Marine Mammal Science* and *Scientific Reports*. In addition, a UI PhD student concluded a project on movements within and outside herring grounds, based on photo-identification data and including collaboration with many whale-watching companies, naturalists, fisherman and citizen scientists around Iceland. The project resulted in a publication in the journal *Marine Biology*. Finally, tissue samples of killer whale sampled in Iceland were contributed to two North-Atlantic wide publications on fatty acids and its relation to contaminant levels and dietary specialization (Remili et al, 2023a;b;c), led by colleagues at McGill University (Canada).

In 2023, the West Iceland Nature Research Centre and Orca Guardians Iceland continued their collaboration and year-round systematic data collection on killer whales via photo-identification and behavioral observations in Breiðafjörður Bay and along the Snæfellsnes Peninsula. The focus is on recognizing individual killer whales and documenting their associations and travel routes. Efforts of comparing identification images of killer whales from Iceland to photographs received from collaborators in other areas of the North Atlantic are ongoing. Data collection and analysis

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will potentially aid in identifying critical habitat, feeding behavior and prey types, as well as natural mortality and behavioral patterns of Icelandic killer whales. The project started in 2014 in collaboration with Láki Tours whale watching and is conducted both onboard whale watching vessels and via land-based observations.

In 2023, the West Iceland Nature Research Centre and Orca Guardians Iceland published the first matrilineal catalogue of killer whales in Icelandic waters, as well as a short note on the observation of a killer whale female with a pilot whale calf.

Northern bottlenose whale

As part of the Hypmo project, University of Iceland's WIRC in collaboration with MFRI recovered the final deep-sea hydrophone mooring in a series of deployments for studying northern bottlenose whale occurrence and movement around Iceland. The multi-year data set is being analysed by a PhD student. An analysis of echolocation signals recorded in inshore waters was published as a conference paper (Haas et al 2023). Other data collection on the species included the deployment of limpet satellite tags and collection of surface visual and acoustic observations during a dedicated research cruise in the Icelandic Sea (Wensveen et al 2023). A master's thesis was published on the dive behaviour of NBWs based on SPLASH10 satellite tag data (Neubarth, 2023). Photographic analyses for understanding individual movement and site fidelity, group compositions, and age-sex distributions continued in 2023.

WIRC and MFRI are investigating movement and diet of NBWs using a long-term data set of stomach contents (squid beaks) and stable isotopes from stranded individuals.

HRC continued to collect photo-identification and sightings data on northern bottlenose whales that have frequented Skjálfandi bay in recent summers.

In 2023, the WIRC and Orca Guardians Iceland published a short note on the observation of a female killer whale with a pilot whale calf.

Long-finned pilot whale

A comprehensive research project on pilot whales that started in 2019 continued compiling photo-identifications, studying their behaviour in Vestmannaeyjar during interactions with killer whales and investigating the ecology of pilot whales through stable isotopes of carbon and nitrogen. The project aims to gather knowledge on this species in Iceland, such as understanding

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its occurrence in Icelandic coastal waters, their prey and whether that has changed in recent times. The project is conducted by UI in collaboration with MFRI.

Research on the endocrinology and toxicology of stranded pilot whales in Iceland was conducted in collaboration between UI and MFRI resulting in a MSc thesis. Research on the accumulation of POPs in stranded pilot whales in Iceland was published in 2023 (Xuereb et al. 2023).

In 2023, efforts on data collection for long-finned pilot whales, conducted since 2019 by Orca Guardians Iceland and the West Iceland Nature Research Centre, and onboard Láki Tours, continued in Breiðafjörður Bay and along the Snæfellsnes Peninsula. The emphasis is on photo-identification and behavioral observations, with special attention to killer whale – pilot whale interactions, to aid in the understanding of pilot whale behavior and occurrence in the waters of West Iceland, and to potentially identify critical habitat for this species. In 2023, the West Iceland Nature Research Centre and Orca Guardians Iceland published a short note on the observation of a killer whale female with a pilot whale calf.

In 2023, student interns at the HRC began to organize and catalogue long-finned pilot whale photographs from Skjálfandi Bay. Work on the catalogue is ongoing.

White-beaked dolphins

HRC continued their long-term photo-identification and sightings studies of white-beaked dolphins in Skjálfandi bay. Two master students were using the data, one from University of the Westfjords and one enrolled at University of Copenhagen. One master student compared the photo-identification pictures from different regions in Iceland to look at movements within Iceland.

MFRI participated in a large-scale genetic study on the population structure of white-beaked dolphins in the North Atlantic (Gose et al. 2024).

Harbour porpoise

Collaboration between the MFRI and the University of Potsdam on harbour porpoise genetic research is ongoing (Lah et al. 2016), where samples of bycaught and stranded animals are used.

New analyses on nuclear SNPs have been performed on 150 harbour porpoise specimens from the North Atlantic, including 12 specimens from Iceland. These analyses yielded 26,320 informative SNPs which were used for population structure assessment across the entire North

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Atlantic. The results show Icelandic harbour porpoises to be part of a large North Atlantic population, yet there is some indication for isolation-by-distance across the North Atlantic. The results have been published in Conservation Genetics (Autenrieth et al. 2023).

Whole Genome Resequencing was completed for 74 harbour porpoises, including specimens from Iceland, Canada, Norway and the North Sea and Baltic Sea. These efforts yielded around 6 million high quality SNPs. The analyses assign Icelandic harbour porpoises to a large North Atlantic/North Sea population, with closest affinities to Norwegian porpoises. There is no genetic indication of a population decline or inbreeding. The results have been published in Molecular Ecology Resources (Celemín et al. 2023).

Efforts to estimate bycatch of harbour porpoises in fisheries continued at the MFRI.

HRC deployed C-PODS as part of a PhD project in Skjálfandi Bay.

Other (multi) cetacean species

A total of 29 stranding events of cetacean was recorded by the MFRI.

Risso's dolphins were reported stranded for the first time in Iceland, and that resulted in a short publication on the two stranded animals (Chosson et al. 2023).

Northern bottlenose whales and other toothed whales are of interest in two ongoing EU projects (SUMMER and MESO) on the ecology and potential utilization of resources of the mesopelagic zone which the MFRI is a part of.

The HRC is partner in a Biodiversa funded EU-project called e-Whale and has taken water samples for E-DNA analyses.

A master's student from the University Centre of the Westfjords, working in collaboration with the HRC and Ocean Missions NGO, investigated the theoretical direct ingestion of microplastics by baleen whales in Skjálfandi bay.

The MinTag project, which is a collaboration within NAMMCO that aims to develop tags to be able to track large and fast swimming whale species (fin whale and mink whales) continued and testing of tags took place at the whaling station in Hvalfjörður, Iceland, in September 2023.

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Acoustic detection and localisation of sperm whales using a bottom-moored hydrophone in East Iceland was conducted as part of two master's thesis projects (Dutro et al 2023; Kagerer et al 2023).

The effect of formic acid treatment on carbon and nitrogen stable isotope ratios in sperm whale teeth dentine was estimated using sperm whale teeth collected in Iceland (Stukonyté et al 2023). This is of interest as such analysis can provide valuable insight into individual long-distance displacement and diet.

PINNIPEDS

Harbour seals

No new harbour seal census has been conducted in Iceland since 2020, when the population size was estimated to 10,319 (CI 95%= 6.733-13.906) (Granquist, 2022). A partial population estimate is planned by MFRI for 2024. The survey will be based on drone photography instead of manned single engine airplanes, since such surveys pose a large risk under Icelandic conditions (harsh weather, narrow bays, steep mountains and open waters).

Efforts are made by MFRI and ISC to improve knowledge on population demographics and factors contributing to mortality and/or affecting the status of the population. Long term monitoring of timing of pupping period and monitoring of local pup production at important sites in North West Iceland, South Iceland and North East Iceland was initiated in 2009 and continued during 2023.

A new project was initiated in 2018, where haul-out behaviour was monitored by using trail cameras. The results from the project will increase knowledge on factors affecting haul-out behaviour and will assist in improving census design. Analysis and manuscript preparation continued during 2023. A master thesis was published in this project in 2023 (Jakobsdóttir, 2023).

Harbour seal diet and interactions with the fishing industry has been studied at MFRI in cooperation with ISC since 2008. Currently, dietary studies using stable isotopes and fatty acids is ongoing and analysis continued during 2023 (see also Remili et al. 2023). Efforts to estimate bycatch of harbour seals in fisheries and research on mitigation methods continued by MFRI and the Directorate of Fisheries.

A study on the effect of land- and boat-based tourism on harbour seals was initiated by ISC and MFRI in 2008 and continued during 2023. The study is carried out in several areas of Iceland

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including important haul-out sites in North West Iceland and the Westfjords and focuses on how anthropogenic disturbance impact the spatial and behavioural haul-out patterns of harbour seals. Further, interdisciplinary research on how to reduce potential impacts, best practice on management of seal watching and development of an ethical framework continued (Chauvat et al. 2023). An internship student investigated the awareness of seal conservation issues in Iceland among tourists at seal watching sites.

Two citizen science projects were conducted where volunteers take part in seal counting in specific areas. The projects are in co-operation between MFRI, ISC, Youth for arctic nature (YAN) and various landowners. The aim of these projects is to educate about seal conservation issues and to increase the understanding of the importance of seal research.

A study conducted in co-operation between MFRI, ISC and UI on vocalisations and behaviour of Icelandic harbour seals during the pupping, moulting, and mating season was initiated during the year and a master thesis was finished (Lawler, 2023).

A project investigating harbour seal pup growth using drones was initiated as a collaboration between MFRI, ISC and HRC, and a bachelor thesis was finished in the project (Henneman and Poldner, 2023).

Grey seals

To estimate the current status of the Icelandic grey seal population, an aerial census was carried out by MFRI in cooperation with ISC during the pupping period in 2022 and the analysis will be finalised in 2024. A test survey was carried out during 2023, where drones were used to census important grey seal breeding areas. As for the harbour seal population estimates, population surveys using manned single engine airplanes pose a large risk under Icelandic conditions and the aim is therefore to use drones to a larger extent in the future.

A study of the effect of grey seals and seabirds on plant succession on the volcanic island Surtsey in the southern archipelago of Iceland was carried out in cooperation with the Icelandic Institute of Natural History. Monitoring will continue the following years.

A study of grey seal genetics was initiated in 2016, in cooperation between MFRI, ISC, the Natural history museum of Denmark and Main University, and analysis continued during 2023.

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Efforts to estimate bycatch of grey seals in fisheries and research on mitigation methods continued by MFRI and the Directorate of Fisheries.

Other (multi) pinniped species

A project investigating environmental toxicants in pinnipeds in Icelandic waters was initiated in 2017 and continued during 2023. Very little is known about contaminants in Icelandic seal populations. The focus of the project is to investigate the contents of new contaminants of concern in marine mammals, including new brominated flame retardants and PFAS (per- and polyfluoroalkyl substances). A manuscript was published in 2023 looking at alternative and legacy flame retardants in marine mammals (Berger et al. 2023). The project was an international cooperation between The Swedish Museum of Natural History, Stockholm University, Greenland Institute of Natural Resources and MFRI.

III ONGOING (CURRENT) RESEARCH

Pinnipeds

A partial harbour seal census is planned in 2024. The survey will be based on drone photography instead of manned single engine airplanes.

Cetaceans

The HRC will begin an entanglement mitigation project in 2024 where they will attach suction cup tags to humpback whales and conduct “whale pinger” behavioural response experiments.

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 2018 maximum annual takes of 217 common minke whales in the Icelandic continental shelf (CIC) area during 2018-2025. In

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2019, Icelandic authorities issued a regulation on catch limits according to this advice for the period 2019-2025 (annual catch of 161 fin whales and 217 common minke whales). In 2023, 25 fin whales were caught in Icelandic waters, but no minke whales were caught.

Pinnipeds

Preparatory work with initiating an exhaustive management plan for pinnipeds in Iceland will start during 2024. In 2019, a seal hunting ban was enacted. However, seal hunters can be granted exemption from this ban from the Directorate of Fisheries, to hunt seals for own utilization while the hunt is considered sustainable.

The current governmental management objective from 2006 states that the Icelandic harbour seal population should be kept above 12.000 animals. Based on the population assessment carried out in 2020 which resulted in an estimated population size of 10.319 animals, MFRI advised that direct hunt should be limited and that actions must be taken to reduce by-catch of seals in commercial fisheries to enable the population size to reach management objective. MFRI further advises that attempts to minimize anthropogenic disturbance of harbour seal colonies are initiated, in particular during breeding and moulting seasons between May and August. A new partial population estimate is planned for 2024 and the advice will be up-dated based on the results.

The current governmental management objective from 2006 states that the Icelandic grey seal population size should be kept above 4100 animals. A new advice will be released after the new population estimate has been finalized in 2024.

V PUBLICATIONS AND DOCUMENTS

Peer-reviewed publications in 2023

Autenrieth, M., Havenstein, K., De Cahsan, B., Canitz, J., Benke, H., Roos, A., ... & Tiedemann, R. (2023). Genome-wide analysis of the harbour porpoise (*Phocoena phocoena*) indicates isolation-by-distance across the North Atlantic and potential local adaptation in adjacent waters. *Conservation Genetics*, 1-22.

Bacon, C. E., Hart, K. A., Cheeseman, T., Munson, L., Rasmussen, M. H., Chosson, V., & Basran, C. J. (2023). First documented humpback whale (*Megaptera novaeangliae*) photo-identification

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match and round-trip migration between Iceland and the Turks and Caicos Islands. *Journal of Cetacean Research and Management* 24(1): 161-168. <https://doi.org/10.47536/jcrm.v24i1.405>

Basran, C. J., Chosson, V., Williams, A., Simpson, N., Long, S., Dodds, F., Rasmussen, M. H., & Horrocks, J. A. (2023). First documented migration of an Icelandic humpback whale mother and calf pair from the West Indies breeding grounds. *Journal of Cetacean Research and Management* 24(1): 205-208. <https://doi.org/10.47536/jcrm.v24i1.833>

Berger, M. L, Shaw, S. D., Rolsky, C. B., Chen, D. Sun, J., Rosing-Asvid, A., Granquist, S. M. Simon, M. ,Bäcklin, B. M., & Roos, A. M. (2023). Alternative and legacy flame retardants in marine mammals from three northern ocean regions. *Environmental pollution*, 335, 122255.

Campana, S.E., Finnsdóttir S. V., & Sigurðsson, G. M. (2024). Bomb radiocarbon determines absolute age of adult fin whales, and validates use of earplug growth bands for age determination. *Front. Mar. Sci.* 11:1327752. doi: 10.3389/fmars.2024.1327752

Celemín, E., Autenrieth, M., Roos, A., Pawliczka, I., Quintela, M., Lindstrøm, U., Benke, H., Siebert, U., Lockyer, C., Berggren, P., Öztürk, A.A., Öztürk, B., Lesage, V. & Tiedemann, R. (2023). Evolutionary history and seascape genomics of Harbour porpoises (*Phocoena phocoena*) across environmental gradients in the North Atlantic and adjacent waters. *Molecular Ecology Resources*, in press.

Chauvat, C. M., Granquist, S. M., & Aquino, J. (2023). Gender difference in biospheric values and opinions on nature management actions: The case of seal watching in Iceland. *Ocean & Coastal Management*, 235, 106483.

Chosson, V., Randhawa, H., Sigurdsson, G. M., Halldórsson, S. D., Bjornsson, T. T., Svansson, V., Granquist, S., Samarra, F. I. P., Pampoulie, C. (2023). First record of Risso's dolphin *Grampus griseus* (Cuvier, 1812) in Icelandic waters. *Ecology and Evolution*, 13(9), e10477.

Gose, M. A., Humble, E., Brownlow, A. et al. Population genomics of the white-beaked dolphin (*Lagenorhynchus albirostris*): Implications for conservation amid climate-driven range shifts. *Heredity*, 1-10. <https://doi.org/10.1038/s41437-024-00672-7>

Gil, K. N., Vogl, A. W. & Shadwick, R. E. (2023). Morphology and mechanics of the fin whale esophagus: the key to fast processing of large food volumes by rorquals. *Integrative Organismal Biology*, (accepted)

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VI APPENDIX 1 - CATCH DATA

Catch data for pinnipeds are under re-evaluation and should not be considered reliable at this stage.

VII APPENDIX 2 - BY-CATCH DATA

a. Short narrative

Bycatch of marine mammals was monitored in all major fisheries in Icelandic waters in 2023, through logbook submissions, reports from onboard inspectors from the Directorate of Fisheries and in the MFRI annual gillnet survey.

By-catch in research surveys and when observed by inspectors on fisheries vessels is reported in Appendix 2. By-catch by fishermen now comes from electronic logbooks only. 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. There may be some overlap in the by-catch reported by fishermen and reports from the inspection. Numbers are given as requested in a separate sheet.

VIII APPENDIX 3 - STRANDINGS

a. Short narrative

According to the Icelandic stranding protocol, the MFRI is responsible for documentation and biological investigations related to cetacean strandings. Therefore, all strandings should be reported to the MFRI, that subsequently organizes autopsies and/or biological sampling depending on circumstances. Genetic samples are stored in the genetic database at the institute and other biological samples stored at the MFRI or sent to cooperating institutes/scientists.

Live-strandings and associated actions (rescue/euthanasia etc) are managed by the Veterinary Authorities (MAST).

Stranding numbers for 2023 are given as requested in a separate sheet.

No systematic records are kept of pinniped strandings at the MFRI.

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