Heavy Fuel Oil:
A Priority Threat to Arctic Cetaceans

The Arctic is undergoing a period of profound ecological transformation due to climate change. Sea ice melt is creating an opening for new commercial opportunities in the region, including increased ship traffic. These activities pose a major threat to Arctic cetaceans such as the beluga whale. A primary risk to beluga populations from shipping is the possibility of a spill of heavy fuel oil (HFO). The International Whaling Commission (IWC) has an important role to play in providing expert advice on the negative impacts of shipping on Arctic cetaceans, including spill risk associated with HFO.

BACKGROUND

Climate change is producing a dramatic global shift, which has already begun to have a disproportionate impact on the polar regions. The Arctic region is projected to experience a total shift of temperature between 2.8 and 7.8 degrees Celsius by the end of the 21st Century.[1] Already in 2016, sea ice receded to 4.14 million square kilometers, tied for the second lowest extent ever recorded.[2]

This shift in sea ice extent has led to an increase of both commercial and tourist ships in the region of unprecedented size and scale. Use of the Northern Sea Route (NSR) along Russia's northern coast has increased both for destination traffic, and as an international shipping route. In May 2016 the Arctic Gate oil and natural Terminal opened in the Gulf of Ob in the Russian Federation.[3] The Arctic Gate field is the northernmost oil terminal in the world, and will provide year-round supplies of oil from the Yamal Gulf to Murmansk and other destinations.[4]

THE DIRTIEST FUEL

In the landmark 2009 *Arctic Marine Shipping Assessment*, the Arctic Council's Protection for the Arctic Marine Environment (PAME) working group identified an oil spill as the greatest threat posed to the Arctic environment by the maritime shipping industry, and suggested the risk could be greatly reduced by switching from HFO to a lighter distillate fuel.[5] HFO is literally "the bottom of the barrel" with regard to oil; it is a viscous liquid, only slightly more fluid than roofing tar or road pavement.[6] Although only 28 percent of vessels used HFO in the Arctic in 2012, HFO accounted for 75 percent of the total bunker mass (fuel used by the ships) of all vessels operating in the region.[7] HFO is an extremely potent marine pollutant. HFO spills are exceptionally toxic, and account for roughly 60 percent of ship-sourced oil spills worldwide.[8]

Especially in Arctic conditions, HFO is nearly impossible to clean up. Due to its high viscosity, not only does HFO emulsify in the water column, dispersants are comparatively ineffective. In situ burning is also difficult, and in conditions with 10 percent or more ice coverage, conventional booms and skimmers are also rendered ineffective. All of these technical complications are compounded by the natural difficulties posed by the Arctic; heavy storms, high winds, and periods of 24 hour darkness are all characteristic for the region.

A THREAT TO THE BELUGA WHALE

An HFO spill in the Arctic marine environment would have a major impact on Arctic cetaceans, such as the beluga whale (*Delphinapterus leucas*). In the winter, belugas feed in offshore waters around the edges of pack ice, where they can hide from predators like the killer whale. In spring, many populations migrate, often over thousands of miles, to warmer coastal estuaries, bays, and rivers where they gather in large numbers, although a few populations remain resident in defined areas.[9] As each population exhibits a high degree of philopatry to their specific summer habitats, belugas are extremely vulnerable to the kind of persistent and lasting impact that HFO spills can have. These impacts are caused by swimming in oiled waters as well as through bioaccumulation from consumption of contaminated prey.[10] Such impacts have already been documented in one recent HFO spill in Onega Bay.

On September 1, 2003, the bulk storage tanker Nefterudovoz-57 collided with another vessel amidst heavy storms in Onega Bay, within the Russian White Sea.[1112] The impact tore several holes in the ship's hull, spilling 54 tons of mazut-100 HFO into the prime calving habitat of the local beluga population.[1314] Only nine tons, or 16 percent, of the oil was recovered.[15] More than a decade after the spill, hydrocarbon pollution in nearshore water was still 22 times the Russian Maximum Permissible Contamination level (MPC), and contamination levels in many species such as the flounder were still 10 times higher than the MPC.[16] Scientists observed multiple adult beluga carcasses near the spill site with no obvious injuries, and the population has effectively abandoned its former calving grounds.[17] Were a larger scale HFO spill to occur it could cause irreparable, lasting harm to any beluga populations and Arctic marine ecosystem they depend on.

MOMENTUM IS BUILDING TO ADDRESS HFO USE IN THE ARCTIC

HFO use and carriage is banned in the Antarctic due to the severe nature of spill risk, but its use and carriage in the Arctic is merely discouraged under the new *International Code for Ships Operating in Polar Waters* (Polar Code). However, international momentum is building to ban the use of HFO as fuel in the Arctic in order to minimize the risk it poses to Arctic people and ecosystems.

At the 69th meeting of the IMO's Marine Environment Protection Committee (MEPC) a coalition of international NGOs submitted a paper addressing the risk of HFO use in the Arctic, which received support from Sweden, Norway, Canada, and France. In March 2016, Canada's Prime Minister Justin Trudeau and United States President Barack Obama issued a joint statement in which they agreed to determine "how best to address the risks posed by heavy fuel oil use and black carbon emissions from Arctic shipping."[18] These two countries followed up by submitting a paper to the 70th meeting of MEPC expressing interest in collaborating on "how best to identify and address risks of use and carriage for use of HFO by ships in the Arctic."[19] The Danish Shipowners Association has also recently called for a ban on the use of HFO in Arctic shipping.[20]

The Arctic Council has also studied the impact of HFO in recent years. Following the workstream established by the 2009 AMSA, PAME has continued to explore the impacts and scale of HFO use in the Arctic. In a series of reports commissioned by PAME and produced by Det Norske Veritas, the Council has examined the scope of HFO use in the Arctic, the number of vessels utilizing HFO for use or carriage, the Bering Sea particularly, and historic HFO spills.[21]

RECOMMENDATIONS FOR IWC

At IWC 62, the Commission recognized the need for greater preventative measures in the Arctic and established an intersessional Working Group to plan a workshop on Anthropogenic Impacts in the Arctic Ocean relevant to cetaceans.[22] The Workshop concluded in 2014 with a recommendation for increased collaboration with both the International Maritime Organization (IMO) and the Arctic Council.

At the 66th Meeting of the Scientific Committee, the Scientific Committee endorsed "contribut[ing] to the development of Arctic disaster response plans to include cetaceans, building on the oil spill response plan, and mutual assistance, working with Arctic Council Working Groups," as its highest priority topics related to Arctic issues.[23]

The Committee also endorsed, "minimis(ing) risks to cetaceans related to anthropogenic commercial activities in the Arctic, integrat(ing) the work of various sub-committees and working groups within the Committee (e.g. BRG and HIM), as well as of working groups within other bodies, such as the Arctic Council Working Group," as a priority topic.

EIA urges the IWC to take into account the special risk posed by HFO as a part of its work on these priority topics and to explore ways of assessing and mitigating its impacts to Arctic cetaceans.

EIA notes with appreciation the work that the IWC has undertaken thus far to enhance cooperation with the Arctic Council and IMO and recommends that assessment and mitigation of HFO spill risks be included in these cooperation activities.

References:

[1] Meltofte, H. (2013). "The Arctic Biodiversity Assessment: Status and Trends in Arctic Biodiversity; the Full Report". *Convention on Arctic Flora and Fauna*. Pg. 28
[2] Vinas, M.J (2016). Arctic Sea Ice Minimum Ties Second Lowest on Record. NASA.
[3] Sovcomflot. (2016). Tanker Shturman Albanov carries her first cargo from Novy Port field to Murmansk. *Hellenic News Shipping*.
[4] Ibid.
[5] PAME. (2009). Arctic Marine Shipping Assessment. Protection for the Arctic Marine Environment. The Arctic Council.
[6] Wisegeek. (2015). What is Bunker Fuel?
[7] Det Norske Veritas (2013). HFO in the Arctic-Phase 2, for Norwegian Environmental Agency, DNV Doc. No./Report No.: 2013-1542-16G8ZQC-5/1, 6, 33 (2013), *available at* http://www.pame.is/index.php/projects/arctic-marine-shipping/heavy-fuel-in-the-arcticphase-i.
[8] Det Norske Veritas. 2011. HFO in the Arctic-Phase one. For the Norwegian Environmental Agency. DNV Doc.No./Report No.: 2011-0053/12RJ7IW04.
[9] COSEWIC 2004.. COSEWIC assessment and update status report on the beluga whale *Delphinapterus leucas* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 70 pp.
[10] R. Spies et al., An Independent Review of USGS Circular 1370: "An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska," prepared for the Pew Environment Group and Ocean Conservancy, 51 (2011) [hereinafter Independent Review].
[11] Greenpeace, 2012. Oil and gas development in the Arctic: At What Cost?
[12] The spill occurred slightly south of the Arctic Circle (at 60 degrees latitude) in similar environmental conditions.
[13] Andrianov, V.V., Lukin, L.R., Lebedev, A, A., Neverova N.V. (2012). Southern local stock of belugas (Delphinapterus leucas) as an indicator of environmental changes caused by oil pollution in the southern Onega Bay of the White Sea. Marine Mammals of the Holarctic: 8. Vol. 1
[14] Andrianov, V.V., Lebedev, A.A., Neverozva, N.V., Lukin, L.P., Vorobyeva, T.Ya., Sobko, E.I., Kobelev, E.A., Lisitsina, T.Yu, Samokhina, L.A., Klimov, S.I. (2016) Long-Term Environmental Impact of an Oil Spill in the Southern Part of Onega Bay, the White Sea. *Russian Journal of Marine Biology*
[15] Andrianov et al. 2016
[16] Ibid.
[17] Ibid.
[18] The White House. (2016). U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership.
[19] Canada, the United States of America. (2016). Comments on Document MEPC 70/17/4 Heavy fuel oil use by vessels in the Arctic. MEPC 70/17/11
[20] Hellenic Shipping News (2016). Arctic Nations and NGOs Call on UN Shipping Agency to Drop World's Dirtiest Fuel.
[21] PAME (2016). Heavy Fuel in the Arctic. *The Arctic Council.*
[22] Reeves, Donovan, Moore, Rosa, Garcia, Reed, Tillman, Rowles, DeMaster, Brockington (2014). Report of the IWC Workshop on Impacts of Increased Marine Activities on Cetaceans in the Arctic. *International Whaling Commission.*
[23] IWC (2016). Report of the Scientific Committee. IWC/66/Rep01.