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Directorate for the Environment and Nature

Memo: Environmental impact of the Mary River project

A huge mining project is being developed in Northern Canada on the northern part of Baffin Island. It is an iron ore project, which has so far has received authorisation to export 18 million tonnes of iron ore, in the so-called *Mary River Project* that is being carried out by mining company *Baffinland.* The iron ore has to be transported down through Baffin Bay for processing in Europe, and there are severe environmental impacts both in Canada and along West Greenland that will affect wildlife in Greenland, and probably also for hunting and fishing (Fig. 1).

Transportation of ore most of the year

Originally, the ore was intended to be shipped via a 150 km railway on the west side of Baffin Island for sea transport through the Hudson Bay and Hudson Strait. However, shortly after permission was granted for this, the company changed its plans and instead wanted to transport the ore from the east side of Baffin Island through Baffin Bay. At first, it was only summer transport during the open water period, but recently the *Baffinland* company has applied for permission to extend the transport to 10 months of the year from June to March, with weekly and sometimes daily departures. This means that for a large part of the year, transport will take place in the dense pack ice in Baffin Bay, and there is little doubt that the looser ice cover along the eastern part of Baffin Bay is where transport will take place during winter. This area, which is primarily along the coast of Greenland, is, from a biological point of view, the most valuable area, because a large number of marine mammals spend winter here and use the area as a larder to fed.

In addition to the risk of oil spills, collisions with whales and accidents along the shipping lane, there are two major environmental problems with ship traffic to and from the mine that will affect Greenland. One is that Milne Inlet in Eclipse Sound, which is the iron ore shipping port, has about 10% of the world's population of the incredibly noise-sensitive narwhal. The second is that ice-breaking and ship traffic in the loose pack ice along West Greenland will affect many seals and whales that stay here during winter.

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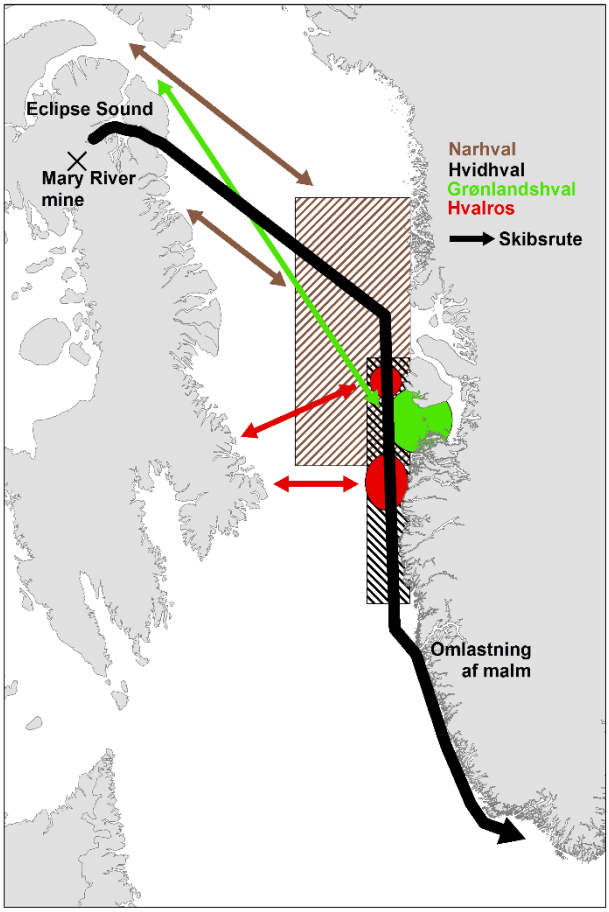

Translation of Fig.1:
Narhval = Narwhal
Hvidhval = Beluga whale
Grønlandshval = Bowhead whale
Hvalros = Walrus
Skibsrute = Shipping lane
Omlastning af malm = Reloading of ore

Fig. 1. Schematic map of the Baffin Bay with the shipping lane for the ore ships indicated by a black line. The main wintering sites for marine mammals are shown for four selected species with their migration routes indicated by arrows. The white whales migrate outside the area affected by the ore ships, but they live off West Greenland during winter.

The narwhal population's connection to West Greenland

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It is estimated that there are around 100,000 narwhal worldwide, so that approx. 15% or 15,000 narwhal spend the summer in the area (Eclipse Sound with adjacent fjords) where the iron ore is to be shipped. That is twice as many narwhal as there are in all of Greenland, which means that the Eclipse Sound has a very significant population, which supplies the hunters in Pond Inlet with a quota of 130 whales per year, but which are also caught along the east coast of Baffin Island during the autumn and in Disko Bay during the winter.

Whales have fixed migration routes that, amongst other things, ensure that they avoid getting frozen in the ice and that they can reach their crucial feeding grounds in a timely manner. If they are disturbed on their migration routes, they may search for food in areas where the ice cover can be dangerous to them.

Most of their food intake takes place during winter in the dense but moving ice pack at depths of between 1000 and 2000 metres. These are areas that are known to be very quiet, and precisely the silence is something that the narwhals rely on when hunting fish at great depths.

Narwhals' sensitivity to noise

Every hunter knows how sensitive narwhal are to noise and ship engines. For the same reason, hunters tend to spot narwhal from the land before the catch begins, and they often use the silent kayaks to catch the narwhal. Daily traffic with cargo ships is not something we have seen before at the narwhals' summer stopover sites, and there is every reason to regard summer sailing in the Eclipse Sound as an experiment that can have unpredictable consequences and can hardly be 'repaired'. Narwhal have traditionally only been found in isolated areas of the Arctic without any ship traffic and where so far there has been very little human activity.

The Greenland Institute of Natural Resources has conducted extensive studies of the narwhals' short-term reaction to noise pollution from ship traffic and the airguns used for seismic surveys. The results clearly indicate that whales are affected by noise. On average, the whales reduced their buzz[1] and click[2] activity by 50% compared to the normal level when the seismic ship was at a distance of 13 km. Notice that it was the ship's airgun that made a sound with significantly lower intensity than that what is used for geological surveys. When an even smaller airgun was used, the distance to the ship was 5 km at the time the buzz activity was reduced by 50%. Ship traffic without seismic also affects the whales, but at a shorter distance and the effect was less evident. Buzz activity is part of feeding and the impact of persistent noise pollution, such as the planned shipment of iron ore from Baffin Island, is likely to stop feeding in the area permanently. There is nothing to suggest that narwhal can get used to regular noise pollution, as it is known from the whales in the Saint Lawrence River.

[1] Buzz, a sound that indicates food intake. It is made by many clicks in quick succession.
[2] Click is the toothed whale's echolocation sound (the whale's sonar), which is used primarily for feeding and navigation.

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Canadian whales are important to Greenland

For thousands of years, narwhal have resided in areas where there has been almost no human activity. At the same time, compared to other whales, the narwhal have no or low behavioural plasticity, i.e. it is difficult for them to adapt their behaviour to changing environmental conditions. Therefore, in the longer term, there is a risk that the whales will disappear from Milne Inlet where they spend the summer. How this will affect the possibilities of catching narwhal in Disko Bay is not known, but one option is that the quota for Disko Bay must be reduced.

Satellite tracking has shown that 15-20% of the Eclipse Sound narwhal population is in Disko Bay during the winter months. Here they represent approximately half of the whales that are caught in Disko Bay. This means that if the summer population of Eclipse Sound is reduced, or their migration to Disko Bay is disturbed by icebreakers, it will affect the number of narwhal in Disko Bay and so also affect the possibilities of catching narwhal here. The recommended quota for catching narwhal in Disko Bay has recently been increased as a result of the Bay being stocked with whales from Eclipse Sound.

Beluga whales are not found in the area where the iron ore is to be shipped in northern Canada in the summer. They spend the summer further into northern Canada and migrate north on the shipping lane to the banks in West Greenland where there are approximately 10,000 beluga whales that spend the winter there. They stay from November to April in the area in West Greenland where the ore ships will pass several times a week. Beluga whales are, like narwhals, sensitive to heavy engine noise, and of course, they will be affected by the ore ships' ice-breaking in their winter feeding grounds. It can, for example, cause the whales to move to less favourable feeding grounds or to interrupt suckling.

Ore ships ice channels can disturb migration routes

After 100 years of absence, the Bowhead whale has finally returned to West Greenland for the last 20 years, and now there are 1500 whales in Disko Bay and Store Hellefiskebanke. They use several migration routes between Canada and Greenland and just outside the fjord where the ore ships sail from Canada (Eclipse Sound), where the Bowhead whales wait in the spring for the ice to break up in the Canadian fjords. The consequence of the ore ships, in a shorter period of time, opening the ice in channels that can be used by all whale species is unknown. However, the ore ships' channel in the ice quickly freezes over again, and they do not always lie where the ice naturally opens, and which are the natural routes of the whales. We have no experience of what happens if whales get lost in the ore ships' channels in the ice, and the question is whether the whales can avoid getting frozen in these channels.

The future of the walruses and seals is uncertain

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About 1000-1500 walruses spend the winter months on the banks along West Greenland, where they use the shallow water to feed on mussels. Mating and births also take place in this area, and ship traffic across where the walruses reside can, in addition to disrupting feeding, also cause the female walruses to become separated from their newborn pups, with the direct consequence that the pups die. We know that during the 20th century, walruses have abandoned all their resting sites in West Greenland due to hunting and disturbance. We do not know how they will respond to disruptions in the pack ice that they now use instead of resting sites to lay on in the spring.

Bearded seals are also numerous on the banks of West Greenland, and Ringed seals are found throughout Baffin Bay. Ice-breaking in the area can destroy the Ringed seals' habitat and can separate pups from the females of both species.

Conclusion

The environmental impact of ship traffic in Milne Inlet and the transportation of iron ore through Baffin Bay may be a loss of parts of the whale and walrus populations, and this may reduce hunting opportunities in both Greenland and Canada. Overall, the transportation of the iron ore in the *Mary River* project must be considered one of the greatest threats to marine mammals in the Arctic - not least because history has shown that the possibilities to restore the situation are very limited.

Yours sincerely,

Mads Peter Heide Jørgensen & Fernando Ugarte