

From: Douglas Channel Watch

Comments to the Proposed changes to the LNG Canada Export Terminal Project decision statement conditions i.e. 3.9

As an overview: Sound is essential to many types of marine animals and is one of the main tools they use to survive in the ocean. Light can only penetrate a few hundred feet underwater, but sound can travel much farther. As a result, cetaceans (whales, dolphins, and porpoises) have evolved over millions of years to send and receive a variety of complex sounds. They rely on sound to communicate with each other, navigate, find mates and food, defend their territories and resources, and avoid predators. Fish and invertebrates also use sound for basic life functions.

Because water is denser than air, sound travels faster and farther in the ocean. Its speed and distance depends on the density of the water (determined by its temperature, salinity, and depth) and the frequency of the sound, measured in hertz (Hz). Some sounds, particularly low-frequency ones, can cover vast distances, even across ocean basins.

Depending on the sound source, duration, and location, human-caused sound has the potential to affect animals by:

- Causing temporary or permanent hearing loss.
- Causing a stress response.
- Forcing animals to move from their preferred habitat.
- Disrupting feeding, breeding/spawning, nursing, and communication behaviours.

The impacts may be immediate and severe, or they may accumulate over time.

Mammals have different abilities to hear and the following shows the range.

Low-frequency (LF) cetaceans (baleen whales) 7 Hz to 35 kHz

Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales) 150 Hz to 160 kHz High-frequency (

HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis) 275 Hz to 160 kHz

Phocid pinnipeds (PW) (underwater) (true seals) 50 Hz to 86 kHz

Otariid pinnipeds (OW) (underwater) (sea lions and fur seals) 60 Hz to 39 kHz *

Source -2018 REVISION TO: TECHNICAL GUIDANCE FOR ASSESSING THE EFFECTS OF ANTHROPOGENIC SOUND ON MARINE MAMMAL HEARING (VERSION 2.0)

As indicated by the above, the determination of the effect of sound on mammals is complex and the scale of determining intensity being logarithmic. However the current levels for disturbance have been set with science supporting the limits used in the condition 3.9 as set out by the Federal government. It should be noted that the current limits are generalized for LNG Canada's legally binding condition 3.9 but the population of mammals it is mitigating for has a diverse hearing range. It is acknowledged in the proposal that injury threshold for pinnipeds is 190 decibels.

The Agency and the proponent acknowledge that 'the proposed 180 decibels exclusion zone would result in pinnipeds being exposed to underwater noise levels that could result in behavioural change but stated "However ... the population *seems to be thriving in the environment in an environment where activity is already present...*".

The problem for the request is that the evidence is provided by the proponent and not an independent party. As well with a science based decision of Condition 3.9, a revision based on "seems to be thriving" it not appropriate or science based. More data and evidence needs to be considered beyond this.

Overall the proponent is suggesting in their argument that there will be impact but not considerable and that the population seems to have adapted. So in other words from the proponents perspective there would likely to be disturbance but these will not create a permanent threshold shift. This however needs to be actually determined.

LNG Canada is striving to move the project forward, at the least cost and initiated the project with pile driving. Pile driving has the greatest likelihood of producing sound levels great than 160db with more extensive exclusions zones. The determination by the proponent that it will now predominantly use vibratory piling methods with less impact is proactive and should be standard practise and placed within the conditions to ensure it is ongoing.

In summary Douglas Channel Watch would like to recommend:

Regarding 3.9.3

Douglas Channel Watch requests increasing the exclusion buffer zones from 150m zone for pinnipeds to 200-250m at 180 db to ensure that impacts are reduced to this animal. There is no current science to request the 150m.

Further science investigation needs to occur regarding the exposure of pinnipeds to increased levels of sound.

Regarding 3.6.1

DCW asks that the proponent use as a standard of practise only vibratory piling methods along with other sound mitigating measures and that these method should be placed in the conditions with requests for exemptions.

Further study needs to be done to determine if there are unintended consequences of vibratory piling methods on marine mammals.

Also

As the proponent is asking for a change in current practice of mitigating the impact of sound on marine mammals DCW would like to see a monitoring program of the potential effects of these changes and determine if there are any unintended consequences. Monitoring needs to include changes in behaviour including feeding, socializing, and communication. This should be taken on by an independent party that can add to the science data.

Changes within the above behaviours once noted should then require a review of the impact of the change in the condition and further mitigation done.

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