We are writing to express concerns regarding the conclusions on the potential impacts of underwater noise emissions associated with the West Flemish Pass Exploration Drilling Project on marine mammals presented in the Draft Environmental Assessment (EA) Report. Our major concerns are as follows and discussed in more detail below. We conclude with some recommendations on how to address the identified shortcomings.

1. Mitigation measures are too focused around vertical seismic profiling (VSP) operations and auditory injuries.
2. The Impact Assessment Agency (Agency) minimizes the actual duration of proposed operations and potential spatio-temporal overlap with other concurrent projects.
3. The Agency fails to consider the impacts of anticipated drilling-noise induced displacements of individual animals and their population-level consequences.
4. The Agency minimizes the importance of the project area for marine mammals
5. The assessment of cumulative effects is incomplete and ignores available tools to improve its evaluation
6. The Agency fails to appreciate the importance of underwater noise in its assessment of habitat quality
7. The assessment of impacts does not align with the government of Canada's upcoming *Ocean Noise Strategy for Canada*
8. The Agency fails to propose concrete actions to minimize and understand the cumulative effects of the proposed activities

1. Mitigation measures are too focused around VSP operations and auditory injuries.

All concrete mitigation efforts seem to be focused on the VSP operations, which are likely to have limited effects considering their small footprint, low airgun shot repetition rate and short duration (~ 12 hrs) in comparison to the temporal scale of the project. Of much greater concern are the consequences of the disturbance caused by lengthy exploratory drilling activities. The Agency acknowledges the potential for acoustic disturbance and physical displacement over large distances (up to 32 km from the drilling site). It is concerning that when listing the radii to auditory injury (permanent threshold shift, PTS) thresholds from drilling activities, the report only presents data for high-frequency cetaceans when previous modeling studies have consistently shown that baleen whales are likely affected at similar, if not greater, ranges. Indeed, there is a greater frequency overlap between the acoustic emissions of a drilling vessel and the band of best auditory sensitivity for baleen whales than other species, and baleen whales are likely to be more common, at least seasonally, than high-frequency species in the project area. Temporary loss of auditory sensitivity (temporary threshold shift, TTS) can start occurring at greater ranges (3-5 km) for most species, assuming 24-hr exposures, but are not discussed in the report.

2. The Agency minimizes the actual duration of proposed operations and potential spatio-temporal overlap with other concurrent projects.

The Agency states that it considered the potential for several drilling projects to occur simultaneously and the consequences for marine mammals. The C-NLOPB advised that the worldwide availability of drill rigs capable of operating in the Newfoundland and Labrador offshore is limited, therefore reducing the potential for multiple drilling operations to occur simultaneously and in close proximity to each other.

Based on this best-case scenario and the consideration that "project activities producing potential behavior-altering sound in the marine environment would be generally short-term, transient and temporary", the Agency finds that there would be no significant cumulative effects of the project on the these species. The latter point, we believe, is flawed. Drilling operations are forecasted to last 70-180 days for each of up to eight wells planned. These are not short-term operations.

3. The Agency fails to consider the impacts of anticipated drilling-noise induced displacements of individual animals and their population-level consequences.

Cetacean species occurring in the project area are likely to use the area for extended periods for foraging, breeding, and other life activities. There are now abundant data derived from passive acoustic monitoring and visual surveys describing the year-round occurrence of several sensitive species such as fin, sperm, and northern bottlenose whales. Other SARA listed species (e.g sei and blue whales) occur mainly during the preferred period of activity for drilling operations (summer and fall). Restricting access to undetermined but presumably large areas of available habitat by marine mammal species cannot be discarded as a negligible effect. Evaluating the impacts of such exclusion is a difficult task but translating what may be limited effects on individuals to potentially detrimental effects at the population/species level is the object of ongoing research (see PCod and PCaD models) and has not been given sufficient attention in this EA.

4. The Agency minimizes the importance of the project area for marine mammals

There is a dangerous misconception that the ocean is large and therefore marine mammals have many areas to choose from. However, decades of research have shown that marine mammals often depend on specific regions where specific oceanographic conditions provide the conditions for sufficient prey abundance and optimal foraging. Restricting access to such areas offshore Newfoundland could lead to population level consequences that directly conflict with the Fisheries Act and the Species at Risk Act. It should also be noted that the lack of critical habitat designation in the project area, as stated in the EA, is the result of its location outside of Canada's EEZ and DFO's jurisdiction, and does not indicate that this area is not critical to some species. In fact, it is part of Ecologically and Biologically Significant Areas, which points towards its importance for several marine communities, including marine mammals.

5. The assessment of cumulative effects is incomplete and ignores available tools to improve its evaluation.

The assessment of cumulative effects is therefore incomplete in its current state. Modeling tools are available to assess the acoustic exposures of marine mammals from different sources. An excellent candidate for such an analysis would be animat models for central place foragers that allow for an investigation of the interaction between avoidance of noise and the attraction to foraging opportunities. Applying these methods in the context of this EA, in conjunction with the two other draft EA under review at the same time, would be a first step towards more robust assessments of cumulative effects of this project in the context of other oil and gas activities with large and potentially overlapping acoustic footprints. We note that seismic airgun surveys have occurred in the Newfoundland offshore most summers for the past decade and it seems reasonable that surveys will overlap with the drilling operations – this has not been considered. The EA has also not sufficiently considered the currently permitted drilling programs in the same area, including CNOOC, ExxonMobil and Equinor.

6. The Agency fails to appreciate the importance of underwater noise in its assessment of habitat quality.

The notion of habitat quality is mentioned in the report. However, the report fails to appreciate the importance and meaning of acoustic habitat for species, such as marine mammals, that rely almost entirely on sound to navigate, forage, find mates, socialize, and communicate. The large acoustic footprints associated with drilling vessels have been shown to reduce communication space significantly. Analysis and consideration of the change in communication space does not appear to have been considered. Vessel noise has been shown to induce stress in north Atlantic right whales, with unknown long-term consequences on the fitness of affected individuals, and many species have been found to react to sound at various levels. If an analysis of these effects was contained in the EA it does not appear to have been considered in the Agency's review.

7. The assessment of impacts does not align with the government of Canada's upcoming *Ocean Noise Strategy for Canada*

It appears that the Agency's opinion does not align with the government of Canada's growing consensus on underwater noise management. As stated in the *Ocean Noise Strategy for Canada* document currently undergoing public review, the guiding principles of Canada's noise management should be sustainable development and a precautionary approach based on risk. "The precautionary approach means that lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to reduce the effects of anthropogenic underwater noise". It is clear that in the case of this EA, the lack of data on the long-term effects of behavioral disturbance by underwater noise has led to the conclusion that the proposed activity will have negligible impacts, far from a precautionary approach, and that the associated risks for individual animals and populations have not been weighted properly.

8. The Agency fails to propose concrete actions to minimize and understand the cumulative effects of the proposed activities.

Imposing restrictions on simultaneous drilling operations that would occur within each other's radius of behavioral disturbance would be a concrete step towards mitigating cumulative effects of sound. Requiring better baseline studies of the environment to understand how species are using the area and what effects noise and other pollutants could have would improve our ability to make informed assessments of the effects of the proposed activities. The mitigation procedures surrounding VSP will not protect marine mammals from the extended exposures from drilling vessels and are given too much weight as part of an effective way of reducing cumulative effects of sound.

<u>Recommendations for Improvement</u>

The proposed project area is a productive habitat that is home to not only cetaceans but also many commercially harvested species of fish and crustaceans. Changes to this habitat affect the animals and the communities that have traditionally harvested them. The effects of season-long drilling operations and eventually permanent installations in such an environment have never been systematically studied. This lack of knowledge makes it difficult for EA to properly describe the potential effects of the activities. Combined with the lack of thorough cumulative effects analysis, the knowledge deficit biases the Agency towards finding that there will be limited effects. Assuming the Agency does not change their finding of

limited effects, the ramifications of making that choice must be studied. The proposed project, in conjunction with other concurrent projects under review, provides a unique opportunity to do so. We recommend that the Agency mandate a long-term (multi-decadal) study of the changes to the Flemish Pass due to the surge in oil and gas activity, which must be understood in the context of climate change. The Environmental Studies Research Fund is the logical organization to manage such an endeavour. While the costs of such a research program may be high, they pale in comparison to the scale of expenditure being made by the oil and gas proponents. They also pale in comparison to the scale of ecosystem services that will be lost if the oil and gas activities are more damaging than the current assessment assumes.

| Name | Affiliation, Title, or Expertise |
|---|---|
| Elizabeth Zwamborn, MSc | President, Balaena Institute for Cetacean Conservation Studies |
| Hal Whitehead, PhD | Professor, Dalhousie University |
| Laura Feyrer, PhD | Vice-president, Balaena Institute for Cetacean Conservation Studies |
| Christian Ramp, PhD | Biologist |
| Richard Sears | President, Mingan Island Cetacean Study, Speciality Baleen Whale |
| Katherin Gavrilchuk, PhD | Aquatic Science Biologist |
| Liam Mueller-Brennan, BSc | Passive Acoustic Research Group, Northeast Fisheries Science Center |
| Catherine Berchok, PhD | Bioacoustician, Arctic and Sub Arctic Marine Mammals |
| Annamaria DeAngelis, MRes | Passive Acoustic Research Group, Northeast Fisheries Science Center |
| Marie Guilpin, PhD | Université du Québec à Rimouski - Institut des Sciences de la Mer de Rimouski. |
| Taylor Hersh | Treasurer, Balaena Institute for Cetacean Conservation Studies |
| David Gaspard | Senior Aquatic Sciences Technician |
| Allison Stokoe, BA | Passive Acoustic Research Group, Northeast Fisheries Science Center |