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**Subject: Middle Scotian Shelf and Slope Strategic Environmental Assessment –
Draft Report – March 2019**

Dear Ms. McDonald:

On March 19, 2019 the Canada-Nova Scotia Offshore Petroleum Board (C-NSOPB) posted the Middle Scotian Shelf and Slope Strategic Environmental Assessment (SEA) – Draft Report – for public comment. Fisheries and Oceans Canada (DFO) understands that the document is intended to assist the C-NSOPB in its determination with respect to the potential issuance of future exploration rights within the central Scotian Shelf area, including general restrictive or mitigation measures that should be considered in an exploration program application and a project-specific environmental assessment (EA) process.

DFO has reviewed the document and offers the following comments for consideration:

General

- The draft SEA provides an overview of the environmental characteristics of the Middle Scotian Shelf and Slope as well as the potential effects of oil and gas exploration activities in the Study Area. While project-specific EAs may draw upon the information contained in the SEA, they should also incorporate new scientific information as it becomes available in the assessment of environmental effects from project-specific activities.

Section 3.1.1 Oceanography

- New information has been published on recent oceanographic conditions from within the Study Area (e.g., Hebert et al. 2018, Johnson et al. 2018) and should be incorporated into the SEA.

Section 3.1.2 Climatology

- New information pertaining to climatology for the Study Area is available and should be incorporated into the SEA. The following updates are suggested:
 - Wind data (MSC50) is currently available for the Study area up to December 31, 2015. Wind and wave statistics given in Tables 3.1 – 3.7 should be updated to reflect new available information;
 - Wind roses displayed in Figure 3.3 should be updated with up-to-date information;
 - Relevant sections in Table 3.8 should be updated to reflect these changes; and
 - Updated seismic activity mapping is available from Natural Resources Canada and should be included in Table 3.8 and Figure 3.5.

Section 3.2.1 Plankton

- New literature on phytoplankton, zooplankton, and ichthyoplankton on the Middle Scotian Shelf and Slope has been published and should be incorporated into the SEA. Examples include:
 - Johnson, C., Devred, E., Casault, B., Head, E., and Spry, J. 2018. Optical, Chemical, and Biological Oceanographic Conditions on the Scotian Shelf and in the Eastern Gulf of Maine in 2016. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/017. v + 58 p.;
 - Ross, T., Craig, S.E., Comeau, A., Davis, R., Dever, M., Beck, M. 2017. Blooms and subsurface phytoplankton layers on the Scotian Shelf: Insights from profiling gliders. *Journal of Marine Systems* 172: 118-127;
 - Li, W.K.W. 2014. The state of phytoplankton and bacterioplankton on the Scotian Shelf and Slope: Atlantic Zone Monitoring Program 1997-2013. *Can. Tech. Rep. Hydrogr. Ocean. Sci.* 303: xx + 140 p.;
 - Electronic Atlas of Ichthyoplankton on the Scotian Shelf of North America (OBIS Canada 2018); and
 - the most recent Atlantic Zone Monitoring Program (AZMP) reports (<https://waves-vagues.dfo-mpo.gc.ca/Library/4072623x.pdf>).

Section 3.2.4 Corals and Sponges

- The references used in Section 3.2.4 provide a well established overview of corals and sponges within the Study Area. New information pertaining to corals and sponges is available and should be incorporated into the SEA. Examples include:
 - Kenchington, E., L. Beazley, C. Lirette, F.J. Murillo, J. Guijarro, V. Wareham, K. Gilkinson, M. Koen Alonso, H. Benoît, H. Bourdages, B. Sainte-Marie, M. Treble, and T. Siferd. 2016. Delineation of Coral and Sponge Significant Benthic Areas in Eastern Canada Using Kernel Density Analyses and Species Distribution Models. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/093. vi + 178 p. (<https://waves-vagues.dfo-mpo.gc.ca/Library/40577806.pdf>)
 - Beazley, L., Kenchington, E., Murillo, F.J., Lirette, C., Guijarro, J., McMillan, A., and Knudby, A. 2016. Species Distribution Modelling of Corals and Sponges in the Maritimes Region for Use in the Identification

of Significant Benthic Areas. Can. Tech. Rep. Fish. Aquat. Sci. 3172: vi + 189p. (http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs97-6-3172-eng.pdf)

- Beazley L, Wang Z, Kenchington E, Yashayaev I, Rapp HT, Xavier JR, et al. (2018) Predicted distribution of the glass sponge *Vazella pourtalesi* on the Scotian Shelf and its persistence in the face of climatic variability. PLoS ONE 13(10): e0205505. (<https://doi.org/10.1371/journal.pone.0205505>)

Section 3.2.5.4 Fish Species of Special Status

- Correction on page 3.36: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the status of wildlife species but doesn't list species. Species are only listed under Schedule 1 of the *Species at Risk Act* (SARA).
- Comments regarding Table 3.16:
 - DFO's most up-to-date information on White Shark is that since 1874, there have been 57 confirmed records of White Sharks in Canadian waters, and over 30 tagged White Sharks detected in Canadian waters.
 - Winter Skate Eastern Scotian-Shelf-Newfoundland population is assessed as Endangered by COSEWIC, not Special Concern.
 - COSEWIC's assessment of Shortfin Mako is Special Concern. DFO has referred the assessment back to COSEWIC and the species is scheduled to be re-assessed at the next COSEWIC meeting beginning April 28, 2019. The COSEWIC status may change after that meeting.
 - The COSEWIC status of Roughhead Grenadier is Not at Risk as of November 2018.
 - Suggest adding Lumpfish to the table. It has been assessed by COSEWIC as Threatened.

3.2.6 Marine Mammals and Sea Turtles

- Page 3.46:
 - While Lawson and Gosselin (2009) provide data from one of the largest and most comprehensive surveys off eastern Canada to date, it is important to recognize that these surveys were conducted during a limited time period between 21 July to 23 August, 2007; and the Scotian Shelf part of the survey was only a portion of these days. Therefore this dataset only represents a snapshot in time and the results of this survey may not necessarily be representative of other times of the year, or other years.
 - DFO requests that all references to data from the marine mammal sightings database include the following citation format: "Whalesitings Database, Ocean and Ecosystem Sciences Division, Dartmouth, NS, [yyyymmdd]" As well, the period (years) included in the data presented should also be described.
 - The database has been updated to 2018. If the data in the SEA was requested prior to 2018, a new data extraction should be requested and incorporated into the SEA.

- Note that the DFO Maritimes Region Whalesitings Database does not include all data available on cetacean occurrence on the Scotian Shelf and Slope. A more complete picture can be obtained from including sightings data from the North Atlantic Right Whale Consortium Database (which includes multispecies data). Also note that over the past two years DFO's cetacean aerial surveillance efforts have substantially increased in eastern Canada and more cetacean sightings data are available for the Scotian Shelf region that are not necessarily included in our Maritimes Region database. For access to DFO aerial surveillance science survey data, including sightings on the Scotian Shelf, contact Jean-Francois Gosselin (jean.francois-gosselin@dfo-mpo.gc.ca).
- Page 3.46 "...although some have been sighted year-round on the Scotian Shelf...". All six baleen whale species that occur offshore Nova Scotia have been sighted in Scotian Shelf waters throughout the year, including in winter months. There is also acoustic evidence to support their year-round presence in our waters; for example see: Delarue, J., K.A. Kowarski, E.E. Maxner, J.T. MacDonnell, and S.B. Martin. 2018. Acoustic Monitoring Along Canada's East Coast: August 2015 to July 2017. Document Number 01279, Environmental Studies Research Funds Report Number 215, Version 1.0. Technical report by JASCO Applied Sciences for Environmental Studies Research Fund, Dartmouth, NS, Canada. 120 pp + appendices. Available here: https://static1.squarespace.com/static/52aa2773e4b0f29916f46675/t/5c784432e5e5f0533d5756f0/1551385685533/ESRF215_Delarue%2C+J_et+al_optimized.pdf
- Comments regarding Table 3.17:
 - SARA status of Humpback Whale and Harbour Porpoise – Note that species on schedules 2 and 3 are not protected or listed under the SARA. The List of Wildlife Species at Risk only includes species listed on Schedule 1.
 - North Atlantic Right Whale – The description of species range should be updated to indicate that the range extends into the Gulf of St. Lawrence.
 - Blue Whale – The SEA should include information from: Moors-Murphy, H.B., Lawson, J.W., Rubin, B., Marotte, E., Renaud, G., and Fuentes-Yaco, C. 2019. Occurrence of Blue Whales (*Balaenoptera musculus*) off Nova Scotia, Newfoundland, and Labrador. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/007. iv + 55 p. Available at : http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2018/2018_007-eng.html
 - Sei Whale is being assessed by COSEWIC in April 2019 and there could be a change to its status designation.
 - Sowerby's Beaked Whale – Information could also include sensitivity to underwater sound and their reliance on sound to carry out life processes (similar to Northern Bottlenose Whale).
 - Humpback Whale – "*Few have been sighted within the area during the winter.*" Note that most acoustic detections on the shelf edge occurred during winter months, indicating that at least some individuals occur in Canadian waters all year round. See: Kowarski, K., Evers, C., Moors, H., Murphy, B. Martin, and Denes, S. L.. 2018. Singing through winter nights: Seasonal and

diel occurrence of humpback whale (*Megaptera novaeangliae*) calls in and around the Gully MPA, offshore eastern Canada. *Marine Mammal Science* 34: 169– 189.

- Minke Whales have been sighted in the study area in the spring, summer and fall, and there have been occasional minke whale sightings in adjacent Scotian Shelf areas in the winter as well (based on information available in our Whalesitings Database).
 - Atlantic Bottlenose Dolphins have been sighted on the Scotian Shelf and Slope areas in the spring, summer and fall, and there have also been a few sightings reported in winter months as well (based on information available in our Whalesitings Database).
 - Atlantic White-sided Dolphins have been sighted on the Scotian Shelf and Slope areas in the spring, summer and fall, and there have been a few sightings reported in winter months (based on information available in our Whalesitings Database). There are many sightings in our waters that have occurred at depths > 100 metres (m).
 - Harbor porpoise – “They are an occasional visitor to the shallow banks of the Scotian Shelf, although they are rarely sighted.” Harbor porpoise have been sighted on the Scotian Shelf and Slope, and are not confined to shallow waters, they have been seen in our waters throughout the year (based on information available in our Whalesitings Database).
 - Common Dolphins have been sighted throughout the years, including in spring and winter months (based on information available in our Whalesitings Database).
 - Sperm whales can occur in on-shelf waters < 200 m deep and have even been sighted up in the Bay of Fundy; they are not restricted to deep waters.
 - COSEWIC will be posting a new assessment documents for Atlantic Fin Whales, Sei Whales and Sowerby’s Beaked Whales in the coming months and these documents will include the most up-to-date information on distribution and habitat use in Canadian waters. These documents will be valuable references for these species for future project-specific EAs.
- Figure 3.11, page 3.52; Figure 3.14, page 3.55 - Data source(s) for each figure should be listed with the figure.
 - Figure 3.12, page 3.53 – The data source for this figure is not the DFO Marine Mammal Sightings database as indicated below the figure.
 - Figure 3.13, page 3.54 – This figure is outdated and no longer accurately portrays the Canadian range of North Atlantic Right Whales; in recent years many more sightings of this species have occurred in the Gulf of St. Lawrence.
 - DFO recommends that the SEA includes maps of identified critical habitat for North Atlantic Right Whale and Northern Bottlenose Whale.
 - Figure 3.15, page 3.56 – There exists more recent information on Northern Bottlenose Whale occurrence/sightings for the Scotia Shelf area as the Whitehead Lab of Dalhousie University conducted boat-based surveys along the 1000 m contour from the United States border to the Flemish Cap in the 2015-2017 period.

- There is very limited data on seals within the DFO Whalesitings Database and this dataset is not a very complete or accurate source of information on seal occurrence in Scotian Shelf waters. This caveat should be included in reference to Figure 3.16.

Section 3.2.6.3 Sea Turtles

- To maintain consistency with other tables in Sections 3.2.5 and 3.2.6, DFO suggests removing the “Potential Occurrence in Study Area” column from Table 3.19.

Section 3.2.8 Special Areas

- The SEA should be clear that the Western-Emerald Banks Conservation Area is listed as a Marine Refuge (*Fisheries Act*) which is an Other Effective Area-Based Conservation Measure that contributes to Canada’s Marine Conservation Targets.
- Table 3.23 Ecologically and Biologically Significant Areas
 - Emerald Basin and the Scotian Gulf: Emerald Basin is an area where North Atlantic Right Whales have been observed and regularly acoustically North Atlantic Right Whales on the Scotian Shelf other than in Roseway Basin suggesting that this area might be an important right whale habitat (e.g., see: Davis, G.E., M.F. Baumgartner, J.M. Bonnell, J. Bell, C. Berchok, J. Bort Thornton, S. Brault, G. Buchanan, R.A. Charif, D. Cholewiak, C.W. Clark, P. Corkeron, J. Delarue, K. Dudzinski, L. Hatch, J. Hildebrand, L. Hodge, H. Klinck, S. Kraus, B. Martin, D.K. Mellinger, H. Moors-Murphy, S. Nieukirk, D. Nowacek, S. Parks, A. Read, A.N. Rice, D. Risch, A. Širović, M. Soldevilla, K. Stafford, J. Stanistreet, E. Summers, S. Todd, A. Warde and S.M. Van Parijs. 2017. Long-term passive acoustic recordings track the changing distribution of North Atlantic Right Whales (*Eubalaena glacialis*) from 2004 to 2014. *Scientific Reports* 7:13460. doi: 10.1038/s41598-017-13359-3. Available here: <https://www.nature.com/articles/s41598-017-13359-3>).
 - Scotian Slope: This area is considered Northern Bottlenose Whale habitat, and also includes identified Critical Habitat for Northern Bottlenose Whales in the Gully, Shortland and Haldimand canyons. The Scotian Slope has also been identified as important Blue Whale Habitat (see: Lesage, V., Gosselin, J.-F., Lawson, J.W., McQuinn, I., Moors-Murphy, H., Plourde, S., Sears, R., Simard, Y. 2018. Habitats important to Blue Whales (*Balaenoptera musculus*) in the western North Atlantic. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/080. iv + 50 p. Available here: <https://waves-vagues.dfo-mpo.gc.ca/Library/40681373.pdf>).

Section 5.1.1.1 Seismic and Seabed Surveys

- Table 5.1, in reference to Northern Bottlenose Whales, states “*further study is needed on responses of deep-diving cetacean species in response to anthropogenic sound*”. Further study since the last SEA update has occurred on the topic of the effects of anthropogenic sound on both deep-diving cetacean species (Northern Bottlenose Whale) and cetacean species in general. DFO suggests that the SEA consider information in Wensveen et al. (2019) as well as the United Nations General

Assembly's list of important literature on ocean noise

(https://www.un.org/depts/los/general_assembly/noise/noise_files/GONL1.pdf)

Section 5.2.1.1 Seismic and Seabed Surveys

- Table 5.6 states “Recent acoustic modelling for drilling programs offshore Nova Scotia suggested that underwater sound levels exceeding behavioural thresholds could extend over 150 km from the drill site in winter (DFO pers. comm., Feb 2019).” The correct citation for this statement is: “BP Canada Energy Group. 2016. Scotian Basin Exploration Drilling Project Environmental Impact Statement. Prepared by Stantec Consulting Ltd.”

Section 6.0 Potential Effects of the Environment on Exploration Activities – Hurricanes, Wind and Extreme Weather

- The section describing hurricanes and extratropical storms should be updated with more recent data on the seasonality and potential effects of these storms (e.g., <https://www.nhc.noaa.gov/climo/>).

Thank you for the opportunity to provide comments on the draft SEA document. If you have any questions with the content of this letter, please contact me at our Dartmouth office at 902-233-9731 or by email at christopher.burbidge@dfo-mpo.gc.ca.

Yours sincerely,



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