REVIEW AND ASSESSMENT OF REGIONAL ASSESSMENT OF OFFSHORE OIL AND GAS EXPLORATORY DRILLING EAST OF NEWFOUNDLAND AND LABRADOR

Draft Report January 2020

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Rationale

The primary focus of an environmental assessment must be on the environment and biodiversity. The primary goal of an environmental assessment must be ensuring adequate environmental and wildlife protection in the face of developmental intervention.
The Impact Assessment Agency (hereafter IAA) should give this goal precedence over non-renewable resource exploitation. The IAA should apply such precedence to the proposed program for Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador.

Here we review the January 2020 draft report of the Impact Assessment Agency with a focus on mechanisms and policies that help to ensure adequate environmental and wildlife protection in the face of developmental intervention. We offer proactive and constructive suggestions for a way forward. An environmental assessment must be focused on the environment and biodiversity. This logical contention is at odds with the key stated objective of the IAA:

"*Will help to improve the efficiency of the federal-environmental assessment process as it applies to offshore oil and gas. Ensure a more predictable and timely regulatory process for future offshore exploration drilling projects and their investors, while also ensuring the environment is protected.*"

This objective is developmentally biased and is focused on fast-tracking offshore assessment while paying minor attention to the environment in the final clause of the IAA's objective. The objective is driven by developmental efficiency, with environmental concerns as subsumed add-ons. This orientation has been brought about by corporate lobbying efforts, i.e. the "time is money" argument. Current procedures to assess multiple wells in a packaged proposal are already fast-tracking the assessment process. The oil isn't going anywhere, and time is needed for adequate assessments of environmental effects that should not be compromised by economic pressures.

It is notable that this objective was forged by the ministers of IAA, Natural Resources Canada, the Newfoundland and Labrador Department of Natural Resources and for Intergovernmental and Indigenous Affairs for Newfoundland and Labrador.

The process results in a biased and conflicted way with which to execute a comprehensive environmental assessment.

Chapter 1 - INTRODUCTION

1.1 Purpose and Rationale

- The review committee bias is explicit: "*many of the potential effects of routine exploratory drilling activities in this area are relatively well understood and may be managed through rather generic mitigation measures that are often based in regulation or other guidelines and are thus relatively standard industry practices.*"
- This overstatement is manifest in the report's orientation. It stands in stark contrast to what has occurred to date. To highlight a single example, when Chevron drilled Canada's deepest well in the Orphan Basin during 2012, no independent observers were present, and corporate confidentiality privileges did not require them to report pollution events during exploration activity to ECCC. How can such circumstances be aligned with credible environmental assessments and monitoring of offshore exploratory drilling?
- The rationale contends further that "*improved efficiency and the reduction of unnecessary regulatory burden and process fatigue amongst EA participants is one objective …*"
- This pandering to corporate oil lobbying efforts could well limit the comprehensiveness and adequacy of environmental assessments.

1.4 Use of the Regional Assessment

- The report contends …"*that the federal Minister may make a regulation that would exempt future offshore exploratory drilling projects from federal impact assessment*

requirements if they are proposed in the area where the Regional Assessment was carried out and they meet the conditions for exemption established by the Minister in such a regulation. … would set out the conditions which a future exploratory drilling project offshore Eastern Newfoundland would need to meet in order to be exempt from federal impact assessment requirements."

- Without putting too fine a point on it, this strategy would be akin to having no environmental assessments at all for new exploratory project proposals.

Chapter 2 - APPROACH, METHODS AND ACTIVITIES

2.3 Overview of Key Findings and Outcomes

- "*The Committee understands that a primary rationale for initiating this Regional Assessment stemmed from perceived inefficiencies in the EA process for offshore exploratory drilling projects to date, which has resulted in voluminous Environmental Impact Statement (EIS) documents with a high degree of duplication, and for which there is a degree of EA participant fatigue and a desire for a more effective and efficient approach.*"
    - It is essential that efficiency of process does not trade-off with the effectiveness and comprehensiveness of process. Corporate "fatigue" is irrelevant. Environmentalists tire as well.

2.5 GIS Decision-Support Tool

- While a publically accessible GIS tool is promising and we commend those who've developed it, the relationship between data accessibility and corporate confidentiality must be clarified.

2.5.1 Objectives

- The objectives do not include explicit consideration of improving assessments of potential environmental effects of exploratory drilling interventions.

2.5.2 Functionality

- 1) The system has been designed to allow the user to identify instances where, for example, exploratory drilling proposals are situated in close proximity to valued components (VCs) and therefore may require greater scrutiny, mitigation and/or avoidance.

    - Some locations are biological hotspots, e.g. shelf-edge, Orphan Basin etc., where seabirds will be attracted to the lighting and flares of rigs wherever they are located.
- 2) The tool provides an ability to monitor change in the offshore environment and the implications this might hold for the scheduled land tenure process, and the mitigation measures that should be required for specific exploratory drilling proposals.
    - How could the GIS-tool account for mobile marine mammals and seabirds that could exhibit distributional shifts related to changing ocean and sea ice conditions? In the best instances, there would be a considerable temporal lag in obtaining animal movement data.
- 3) The tool allows users to see and analyze trends in the offshore environment, such as seabird population dynamics or changes in the fishery.
    - It could be informative to overlay seabird distributions with proposed drilling sites, offshore rigs, platforms, and former and current spill trajectories. It is more accurate to change “dynamics” to “distributions” in the item above.
- 6) Lastly, the system is also of value in the case of an unplanned event(s) in terms of supporting our collective ability to manage and respond.
    - It would be informative to keep past as well as current spill data on the site.

2.5.4 Data Holdings

- *“… user uploading of additional map layers to the application is also not available.”*
    - This restriction posed a major deficiency for users, e.g. researchers who will want to compare updated and real-time data on seabird distributions and rigs locations, spills etc. Such interactive capability even without input to the restricted site is an essential component of current understanding and potential responses.

Table 2.5

- Physical Environment
    - Include sea ice data for the past 10 years
- Marine Birds Sightings (select species)
    - Include Ivory Gull sighting data
- Marine Research
    - Include Environment Canada Seabirds at sea data (CSAS)
- Special Areas, 2) Provincially Designated Areas, b) Provincial Parks and Protected Areas
    - Highlight Seabird Ecological Reserves

Chapter 3 - ENVIRONMENTAL SETTING

Overall, the considerations taken are in the right direction and some very relevant, important information is given which deserves commendation. However, each section is far too focused on addressing the needs and problems associated with a few hand-picked, biased species or groups. This leads the reader to think that only a certain few species can or will be affected by the proposed exploratory drilling procedures, and ignores the “big picture” of impacts to the ecosystem as a whole. The Grand Banks are irrefutably important as a productive ecosystem and act as a feeding ground for some highly-migratory species. The occasional presence of such transitory species (some endangered) is wrongly treated throughout this section as though the effects that exploratory drilling and increased activity in this area will not affect them. As per the recognition of vulnerability status, this section almost exclusively mentions and discusses animals listed as threatened by COSEWIC or SARA (Canadian designations), and ignores IUCN or other (International) designations, which are the only designations for many of these migratory species. This produces a significant bias in the information presented and trivializes their existence within this Study Area.

This section, as with the rest of the document, irresponsibly treats information or literature on a particular species that is data-deficient to be irrelevant and of no conservation concern. Section 3 also omits a great deal of information regarding species presence and oceanographic patterns, some of which is available on the GIS tool developed by this same committee, and some of which may not be available to them at all. In the case of the latter, the authors should be transparent about the lack of information available, and transparent about which interest-groups were involved in collecting the data to avoid any hidden biases. Anything stated as matter-of-fact, particularly in this section with respect to species abundance and known effects on animals of conservation concern, must be cited with an appropriate reference. This is vital to ensuring that presented information is accurate, not under- or overstated, and provides the critical reader with additional information when necessary.

3.1 Overview

- Include a statement on how conservation concerns must be at the forefront of future oil and gas activities, as outlined in Kark et al. 2015.

3.2.1.1 Plankton, Macroalgae and Marine Plants

- Phytoplankton are responsible for producing much of the world’s oxygen which further highlights their ecological importance and the ecological importance of Newfoundland’s ocean ecosystem

3.2.1.2 Benthic Invertebrates

- Section 3.2.1.2 on Benthic Invertebrates is notably short and lacking in detail for every invertebrate species mentioned apart from corals and sponges.

3.2.1.4 Finfish

- *"Across the region and its various habitat types (see earlier Figure 3.1), a variety of fish species and assemblages occur, with "shallow water" groups found primarily on the shelves and upper slopes of the Grand Banks (such as capelin, sand lance, yellowtail flounder, deepwater redfish), giving way to "deeper water" assemblages on the middle and deeper slopes of the Grand Banks and the Flemish Pass (including lanternfish, grenadier species) and finally to "deep slope-abyssal assemblages" (such as blue hake, roughhead and armed grenadier and skates)."*
    - There is mention of sand lance and capelin in the upper slopes section, but these two species are of little conservation concern, whereas many species found on the upper slopes of the Grand Banks such as Atlantic cod, various wolffish and other redfish species and other finfish that are listed as vulnerable or threatened/endangered are not mentioned here. Deepwater redfish are the most abundant species (33% total abundance in the study area according to the GIS tool) and are listed as Threatened by COSEWIC, so that should be the first and forefront example here.
    - The roughhead grenadier is epibenthic, occurring on all depth zones mentioned here throughout their lifecycle, year-round and were previously listed a Special Concern species due to lack of information on the adult survival rate (COSEWIC 2007). They have since been removed due to a reduction in bycatch numbers in the halibut fishery, but problems such as the late maturation of the species and poor management persists, therefore failure to highlight these concerns and to simply lump this species as a "deep slope-abyssal" mention is inadequate.

- *"Overall fish abundance was also highest along the Northern Slope of the Grand Banks. However, while higher along the eastern slope of the Flemish Pass, fish abundance was found to be relatively low within the Flemish Pass itself."*
    - Cite this study or include the data/tables in this document

- *"In contrast, the shallow areas of the Grand Banks were found to be relatively poor for all fish community measures, while the eastern slope of the Grand Banks was poor for richness and abundance"*
    - Cite this study or include the data/tables in this document

- *“Key migration strategies used by finfish found in the Study Area include:*

  • Migrations from offshore wintering habitats to shallow coastal areas in summer (cod and capelin);

  • Summer feeding migrations from southerly latitudes into the Study Area by large warm water pelagic species such as tunas, swordfish and a variety of sharks;”

    - Include Atlantic mackerel
    - This small section is severely under-cited and should provide more examples of species that can be found in the study area, with more in-depth descriptions of the species-of-concern following. (See additions to 3.2.1.5 below)
    - No mention of diurnal/vertical migrations that many species, especially plank-piscivorous fish, endure on a daily basis.

- *“... [Atlantic salmon] marine survival is thought to be a contributing factor to recently observed declines in populations, but the mechanism for this is poorly understood (Bradbury et al. 2015, 2016).”*
    - Consider herring gillnet mortality in NL and driftnet mortality in Greenland Atlantic salmon as bycatch.

- *“whereas some large pelagics (such as sharks) have migration pathways that carry them across extensive portions of the Atlantic Ocean (Dewar et al. 2011; Curtis et al. 2014).”*
    - Insufficient to say “such as sharks”. Mention the white shark and shortfin mako in particular, including that these species are listed as both Endangered by COSEWIC and Vulnerable worldwide by IUCN. In doing so, you need to then also include the proper reference for shortfin mako, as Curtis et al. 2014 is for great whites and Dewar et al. 2011 is a swordfish article.

3.2.1.5 Species at Risk and Otherwise of Conservation Concern

- *“In addition to those species that are listed as being at risk or otherwise designated as being of conservation concern, a number of other species have been identified by Indigenous groups or others as being of particular cultural significance”*
    - Give specific examples here, they are laid out later in this document and it would be easy to mention, such as gaspereau (alewife) and American shad.
    - This should come after the section on American eel and Atlantic salmon, both of which <u>are</u> of conservation concern.

- *“Atlantic salmon are known to overwinter in the Labrador Sea, which is just north of the Study Area, and may see their migration route to their overwintering habitat passing directly through the eastern portion of this region (Reddin and Friedland 1993; Reddin*

2006). There has, however, been limited research to date on this, and the information that is available through past studies is not at a resolution that allows for an identification and understanding of particular areas that are used by Atlantic salmon in the Study Area."

- Of course! To quote section 3.4.1.1, "*the use of bottom trawls means that the gear can only be used on certain substrate types and at certain depths, thereby introducing bias in the dataset towards certain species and habitat types. This type of gear is also not conducive to collecting data on larval or pelagic life stages of certain species of fish, or for data on fish that are found in the pelagic zone or upper water column (such as capelin or Atlantic salmon)."* This should not be understated here.

- *"American eels are a catadromous species, spawning in salt water and living most of their lives in estuaries or freshwater. All individuals spawn in the Sargasso Sea, with spawning migrations occurring in the fall when adult eels leave their fresh water environments to migrate across the Continental Shelf waters before traversing through deeper waters to reach their spawning habitats. American eels spawn from February to April after which the adult eels die, and eggs and larvae float north in the Gulf Stream and eventually metamorphose into glass eels. Before reaching estuaries, eels will gain pigmentation and then move into freshwater or estuarine systems where they will live for approximately 9 to 22 years before returning to salt water to spawn. This species is most likely to be present in the Study Area during their migration back to their fresh water habitats as they follow the Gulf Stream and move northward."*
  - Reword this first half of this paragraph as follows; "The American eel is a catadromous fish species, spending most of its life in freshwater and estuarine environments, but must return to saltwater to spawn (Citation). All individuals spawn in the Sargasso Sea (citation), leaving their freshwater habitat in fall to migrate across the Continental Shelf and reach their deepwater spawning sites. American eels spawn from February to April, after which the adults die (citation) and the eggs and lepto-cephalic larvae float north at the whim of currents such as the Gulf Stream to return to their freshwater environment (citation). …
  - In review please ensure that, in this section and across the entire document, you refer to freshwater and saltwater as either one word or hyphenated (fresh-water, etc.). Pick one and be consistent.
- *"They are, however, mainly associated with the warmer waters of the Gulf Stream and therefore are not observed north of the Grand Banks due to the colder Labrador Current (Sedberry and Loefer 2001)."*
  - Use "warm" to describe the Gulf Stream. Using a relative word like warmer is confusing and awkward to the reader if no previous reference point to compare what it is "warmer" than has been given.

    - Due to the influence of the colder Labrador Current

- *"On-going studies include coordinated international sampling and research around stock boundaries, and mixing and reproductive behaviours."*
    - Please clarify which interest groups are performing these sampling and research projects.
    - Confusing sentence structure, consider revision.
- *"Atlantic bluefin tuna are listed as endangered by COSEWIC (Collette et al. 2011a, 2011b; COSEWIC 2011)."*
    - Bigeye tuna are also listed as vulnerable by IUCN (Collette et al. 2011) and are below their biomass for maximum sustainable yield, thus this should also be mentioned in this section.

3.2.2 Marine and Migratory Birds

- The Leach's Storm-Petrel (*Hydrobates leucorhous*) has recently earned a designation of Vulnerable on the IUCN (BirdLife International 2018a) Red List, mainly due to the alarming and rapid decline of populations within the study area. The two largest colonies in the world, which are also experiencing the most dramatic decline (40-50% since the 1980s), are Baccalieu Island and the Witless Bay Ecological Reserve. The foraging locations for both of these colonies are known to be contained within the study area (shelf edge, Orphan Basin and Flemish Cap).

- *"A variety of marine and migratory bird species occur within the Study Area and in adjacent marine and coastal regions. This includes seabirds and other avifauna that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities."*
    - Could combine these sentences and be less vague.

- *"The federal Migratory Birds Convention Act and its regulations protect most migratory birds found in Canada and wildlife in Newfoundland and Labrador is also managed under the provincial Wildlife Act and its regulations."*
    - Provide a reference for this act, please.

- *"Marine-associated birds that may occur within the Study Area and its adjacent environments can be generally divided into three categories: seabirds, waterfowl and divers, and shorebirds."*
    - Marine birds instead of marine-associated.
    - Remove the word "may". These birds occur in the study area, this is a fact.

- *"The timing of species presence and density varies considerably depending on the species. Some taxa are abundant year-round (e.g., large gulls and kittiwakes, many alcid species, fulmars, and shearwaters) while some are more likely to be present in particular seasons (e.g., phalaropes, gannets and terns)."*
    - Change to the following: "The timing of species presence and density varies considerably with some taxa being abundant year-round (e.g., large gulls and kittiwakes, many alcid species and fulmars) while some are more likely to be present in particular seasons (e.g., phalaropes, gannets, shearwaters and terns)."
    - Shearwaters are only here in summer through fall, not year-round.

3.2.2.1 Seabirds

- *"A diverse assemblage of seabirds occur in the marine waters off Eastern Newfoundland including cormorants, gannets, phalaropes, gulls, terns, alcids (auks), jaegers and skuas, and tubenoses (fulmars, petrels and shearwaters)"*
    - Phalaropes are shorebirds, not seabirds.

- *"The highest abundance of seabirds occurs in November (driven mainly by high numbers of Northern Fulmars and Black-legged Kittiwakes."*
    - Please specify "within the study area"
    - Please remove the open bracket after November
    - *"Canada has a global responsibility for the species; more than 60 percent of the world's population of Leach's Storm-Petrels breed in Canada."*
        - More importantly, Atlantic Canada specifically provides breeding habitat for 40-50% of the world population. This responsibility is hence even greater for Newfoundland/Atlantic Canada in particular.

- *"The causes of Leach's Storm-Petrel population decline are multi-faceted, but offshore activities are often considered to be a contributing factor."*
    - Please change to "known to be a <u>considerable</u> contributing factor.", and include a citation.
    - Add: "Foraging ranges of at least three of the largest Leach's Storm-Petrel colonies in eastern Canada overlap with established Canadian offshore oil and gas fields during the breeding season." Please cite the studies where this information can be found. Many of these data are collected for the Canadian Wildlife Service by Dr. April Hedd. (Hedd et al. 2018) Current work in the Montevecchi lab has also confirmed this (S.M. Collins and W.A. Montevecchi unpublished data)

- *"Many seabirds, including Leach's Storm-petrels, aggregate around offshore structures, such as platforms and vessels, as they are attracted to their night lighting, food availability and other visual cues."*

- Consider mentioning that this enhanced warm water and food availability is due to upwelling around offshore platforms. Provide the appropriate references for this information (Montevecchi 2006, Ronconi et al. 2015).

- *"Population declines of between 40 and 55 percent have been observed at all three of Newfoundland's largest Leach's Storm-Petrel colonies, including Baccalieu Island which is the largest colony in the world"*
  - Please insert appropriate references (Wilhelm et al. 2015, 2019)
  - Please add to the end of the sentence: "and the islands within the Witless Bay Ecological Reserve which, combined, are the second largest colony in the world."

- *"Leach's Storm-petrel is the most frequently recorded species stranding on offshore platforms (90 percent of reports), with peak strandings occurring in September and October."*
  - Please insert the appropriate references (Davis et al. 2017, Baillie et al. 2005)

- *"This coincides with the fledging period, suggesting that many Leach's Storm-Petrels affected are recent fledglings."*
  - It is also speculated that a significant number of juveniles succumb to light attraction, suggesting that although fledging success is high, recruitment of breeding adults is low. Consider adding this to the end of the paragraph.

Figure 3.7

- The figure shows that several regions within the heart of the Study Area are data-deficient in Dec-Mar. It would be necessary to have a more robust understanding of seabird abundance in these regions before any oil and gas exploration is conducted in these regions.

- *"Common Murres from large Newfoundland and Labrador breeding colonies over-winter locally in offshore regions of the Grand Banks. Millions of Thick-billed Murres from Canadian Arctic and North Atlantic colonies aggregate in winter within the Labrador Sea and Grand Banks region."*
  - Please provide appropriate references for this information (McFarlane Tranquilla et al. 2013, 2015, Montevecchi et al. 2012)

- *"Alcids are particularly vulnerable to oiling as they spend much of their time on the ocean's surface relative to more aerial species due to their high wing-load (and high cost of flight)."*
  - Murres are prolific divers and spend more time on the ocean due to higher wing-loading (C. M. Burke unpubl. data) and to their pursuit-diving foraging strategy.

- *"They tend to congregate over relatively small, productive areas and their sensitivity to oiling is highest during the post-breeding moulting period."*
    - The inclusion of statements such as this, about their sensitivity to oiling, is important and necessary for a document like this however you must cite this information.

- "*Thick-billed Murres from Greenland and Iceland are of international conservation concern due to declining breeding populations and some of those populations have been Red-Listed by the IUCN.*" and "*The Study Area also provides important wintering habitat for Black-legged Kittiwakes from breeding populations spanning the North Atlantic. This species has undergone widespread decline in the last decade and is regionally Red-Listed (IUCN) in much of its range*."
    - Simply stating that these species are "Red-Listed" is not sufficient information. It is more critical to provide their global conservation status, which for Black-legged Kittiwakes is "Vulnerable" as per the IUCN in 2018. Please also cite these statements when making them.

Seabirds of Tropical and Extralimital Origin Ranging Within the Study Area

- See Ventura et al. 2020 (https://doi.org/10.1098/rspb.2019.1775) demonstrating foraging tracks of "Vulnerable" (BirdLife International 2018b) Desertas Petrels, of which there are 250-999 breeding pairs in the world, breeding in the Madeiran islands ranging near the southern edge of the Grand Banks.

- Also of high concern is the fact that foraging tracks of another Madeiran petrel species, the "Endangered" Zino's Petrel (~65-80 breeding pairs in the world) similarly encroaches the southern Grand banks. Please refer to Monica C. Silva's submitted commentary for further information.

- Additionally, the non-breeding range of White-tailed Tropicbirds breeding in Bermuda has been found to extend into the Grand Banks and overlaps with the Study Area from May-July (Mejias et al. 2017).

- Cory's Shearwaters are a Northeastern Atlantic species with increasing numbers occurring off the coast of Newfoundland and Nova Scotia (Gjerdrum, Loch & Fifield 2018), aggregating in areas of high chlorophyll-a production, and deserve to be mentioned along with the other seabirds listed in this section.

3.2.2.2 Waterfowl and Divers

- *"Most species of sea ducks spend much of the year at sea (generally close to shore). Waterfowl occur in large numbers in marine habitats off Eastern Newfoundland, especially during the winter months. However, they tend to prefer more coastal habitats and are unlikely to occur frequently in the offshore parts of the Study Area. "*
    - Consider re-wording to the following "Large numbers of sea ducks occur in marine habitats off Eastern Newfoundland, especially during the winter months. However, they tend to prefer more coastal habitats and are unlikely to occur frequently in the offshore parts of the Study Area."

3.2.2.3 Shorebirds

- *"While a number of species, such as Least Sandpiper, Spotted Sandpiper, Greater Yellowlegs, Piping Plover, Semipalmated Plover, Eastern Willet, Wilson's Snipe, American Woodcock and Killdeer nest in Newfoundland (Warkentin and Newton 2009), others are present only during migration."*
    - Remove "Eastern" before Willet. Eastern Willet is a sub-species of Willet, whereas the rest of the birds in the list are species.

- It is a glaring omission that Red-necked and Red Phalaropes were not included in this shorebirds section. Of all species of shorebird, phalaropes are the only species that would actively spend extended periods of time on the ocean surface within the Study Area. Red-necked Phalaropes at least are known to pass through the Study Area during migration (van Bemmelen et al. 2019- https://www.frontiersin.org/articles/10.3389/fevo.2019.00086/full). Red Phalaropes also occur in pelagic waters in Atlantic Canada to a lesser extent.

3.2.2.5 Key Areas and Times

- *"The Study Area is outside of the foraging range of most species during the breeding season, with the exception of Leach's Storm-petrels (Hedd et al. 2018)."*
    - Change to the following: "The Study Area is outside of the foraging range of most species during the breeding season, although Leach's Storm-Petrels frequently forage within the study area (Hedd et al. 2018, S.M. Collins and W.A. Montevecchi unpubl. data) and Northern Gannets ranging from Cape St. Mary's and likely Baccalieu can forage within the western boundary of the Study Area in late summer (August-September, K. d'Entremont unpubl. data)."

- *"Some Southern Hemisphere-breeding species spend the summer months (austral non-breeding season) in the Study Area, including large numbers of Great Shearwaters.*
    - Large numbers of Sooty Shearwaters as well, please include.

    - See “Seabirds of Tropical and Extralimital Origin Ranging Within the Study Area” above.

- *“In the winter months, certain groups are absent or scarce, such as gannets, terns, cormorants, and phalaropes.“*
    - Shearwaters are also scarce in winter. They are seasonal migrants in fall-summer.

- *“Most of Eastern Canada’s population of Common Murres and approximately a third of the region’s Thick-billed Murres overwinter in the waters off Eastern Newfoundland.”*
    - Please provide a reference for this statement. Also read McFarlane Tranquilla et al. 2014 https://doi.org/10.1371/journal.pone.0090583 and McFarlane Tranquilla et al. 2013 https://doi.org/10.3354/meps10053 regarding winter distribution of murres migrating from several Arctic colonies.

- *“The east coast of Newfoundland also contains five Ecological Reserves which provide critical habitat for breeding seabirds: 1) Funk Island (significant for Common Murres, Northern Gannets and other species), Baccalieu Island (also designated an EBSA and is the largest Leach’s Storm-petrel colony in the world), Witless Bay (significant numbers of breeding Atlantic Puffins and other species including Common Murre, Black-legged Kittiwakes, Gulls), Mistaken Point (wintering area for large numbers of Common Eiders, important for Purple Sandpipers), and Eastport MPA (multiple species). Finally, a total of 21 Important Bird Areas have been identified in this region.”*
    - Only Funk Island has a number by it. Because you are listing out these Ecological Reserves in numbers, every one of them should be numbered.
    - Witless Bay Ecological Reserve is home to the second largest number of breeding Leach’s Storm-Petrels in the world. Please include this in the “significant numbers of”
    - Eastport MPA is an MPA (Marine Protected Area) and not an Ecological Reserve. This needs to be in a different section if you are going to comment on it.
    - Cape St. Mary’s must be included in this list of Ecological Reserves, and the list should not be limited to the “east coast”. It is home to upwards of 100,000 breeding seabirds (large numbers of Northern Gannets, Common Murres, and Black-legged Kittiwakes). This is particularly important due to the foraging ranges of these species from Cape St. Mary’s overlapping with the study area, and of Common Murres and Black-legged Kittiwakes occurring frequently in the offshore region of the Grand Banks.
    - This paragraph ends by stating that 21 IBA’s are in the region. Which region? The east coast of Newfoundland or Newfoundland as a whole? Without providing

a reference for this statement it is difficult to ascertain whether this information is accurate.

3.2.3 Marine Mammals and Sea Turtles

- In the section on baleen whales, it may be relevant to include that vessel strikes are one of the biggest threats to survival of these whales. This is directly relevant as exploratory drilling activities will increase vessel traffic within the study area.

- There is no mention in this section of polar bears in the study area, even though polar bears have been sighted on pack-ice in and around the East Coast of Newfoundland frequently. The study area is approximately 70km offshore from the Bonavista peninsula, and it is likely that polar bears could end up in the boundaries of the Study Area. The polar bear is listed as Vulnerable on the IUCN Red List (Wiig et al. 2015) and by COSEWIC (COSEWIC 2008). No matter how infrequent, the polar bear and its Vulnerable statuses should not be ignored in this section of the report and should at the very least have a statement such as
    - "Polar bears (*Ursus maritimus*) are occasional visitors to the island of Newfoundland and the offshore area. However, polar bear sightings in the Study Area are considered extra-limital observations occurring when individuals drift south to NL on icebergs or pack-ice carried southward with the Labrador Current (COSEWIC 2018)." - https://nloffshorestudy.iciinnovations.com/mapviewer/
- *"The available information indicates that marine mammal (cetacean) species that are known or considered likely to be present include …"*
    - Cannot use the word cetacean to describe marine mammals. Cetacea is an infraorder encompassing all whales, but does not include the pinnipeds, ursids or mustelids that are also "marine mammals".

- *"...odontocetes (toothed whales, dolphins and porpoises) …"*
    - Dolphins and porpoises are examples of toothed whales, so instead say "odontocetes (toothed whales, such as sperm whales, dolphins and porpoises)..."
    - Cuvier's beaked whale have been seen within and near the study area (BP 2018, DFO Sightings Database, Figure 3.9) and yet are not mentioned in this paragraph. This species is pelagic, spending most of its time below 1000m and feeds on deep-sea squid and fish species, diving to the deepest depths of any known mammal (almost 3000m, Schorr et al. 2014). The depths at which this species lives and its inconspicuous surface behaviour precludes it from being sighted often in marine mammal surveys, but likely inhabit the deep waters in and around the study area for at least part of the year. This species is data deficient on the IUCN Red List, however, are known to beach themselves for unknown reasons and are thought to be particularly sensitive (as many group-living odontocetes are) to anthropogenic noise pollution (NOAA 2015).

- *“Many of these species are considered to be at risk or otherwise of special conservation concern, although there are no formally designated critical habitats for any of these species in or near the Study Area.”*
    - The innuendo of this sentence leads the reader to think less of the overwhelming concern for marine mammals and can be fixed by rearranging the order of phrases to say “Although there are no formally designated critical habitats for any of these species in or near the Study Area, the species found to be present in the Study Area throughout the year include several that are designated as being at risk under the federal Species at Risk Act (SARA) or have been identified as species of conservation concern by COSEWIC. Marine mammals and turtles are considered ecologically, economically, culturally, and recreationally important to various groups, including government departments and agencies, indigenous groups and other interested parties.”. That way, the emphasis is on how many of the marine mammals inhabiting the study area are at-risk rather than on how the government has yet to formally declare the region as a special “critical habitat”.

- *“Toothed whales, including dolphins and porpoises, that occur within the Study Area include: long-finned pilot whales, killer whales, beluga whales, Sowerby’s beaked whales, northern bottlenose whales and sperm whales, as well as the short-beaked dolphin, Risso’s dolphin, Atlantic white-sided dolphin, white-beaked dolphin, striped dolphin, common bottlenose dolphin and harbour porpoise. Most of these species are thought to be year-round residents of the Study Area, with the exception of Risso’s and common bottlenose dolphins which are found only in the summer months, and beluga whales which are observed in the winter.”*
    - “Killer whales” should be referred to as Orcas throughout
    - Orcas are Delphinids and should be included in the latter half of the sentence with the dolphins and harbour porpoise for consistency.
    - No mention in this paragraph nor on the GIS tool of narwhals, yet they’ve been known to occasionally travel south in winter months, as far as Conception Bay. Narwhal is included in the legend of Figure 3.9 and listed as Near Threatened by IUCN (Lowry, Laidre & Reeves. 2017) and Special Concern by COSEWIC (2004).
    - Citations for the statements made on the presence of animals, year-round or occasional, are needed.

- *“Seals that are known to occur in the Study Area include harp seal, harbour seal, hooded seal and grey seal. In general, each of these seal species can occur at most times of the year. Seal species can vary in their habitat preferences. For example, while harp and hooded seals both use the southern portion of pack ice to give birth and nurse their pups, hooded seals move to deeper waters of the shelf edge and slope following pupping, while harp seals remain in shallower waters of the continental shelf (Andersen et al. 2013; Hamill et al. 2015).”*

    - This being the only paragraph on pinnipeds is inadequate, particularly considering the IUCN status of hooded seals as Vulnerable (Kovacs 2016) and the importance of the Continental Shelf for feeding, especially of the non-migratory grey seal whose largest breeding colony in the world is on Sable Island, NS, just west of the Study Area.
    - As mentioned, pack ice is vital to the rearing of harp and hooded seal pups, and the lack of information regarding pack ice distribution and density and seal sightings in this report is unacceptable.

- *"Both loggerhead and leatherback sea turtles are listed as endangered under SARA and by COSEWIC (Government of Canada 2019)."*
    - Hawksbill turtles are Critically Endangered on the IUCN Red List (Mortimer & Donnelly 2008). Green turtles are Endangered on the IUCN Red List (Seminoff 2004). Kemp's Ridley are Critically Endangered on the IUCN Red List (Wibbels & Bevan 2019). Omitting this from the assessment because there is no official SARA or COSEWIC status of these vagrant species is irresponsible, knowing that they occur in the Study Area on occasion.

3.3 Socioeconomic Environment

- *"The Study Area is also used for a variety of human activities, including important, diverse and dynamic commercial fisheries as well as a number of other marine uses."*
    - Consider detailing "other marine uses". This is a very vague and uninformative sentence.

3.3.1.4 Recreational Fisheries

- *"Recreational fishing takes place in both coastal and inland waters around the Island of Newfoundland and the coastal areas of Labrador."*
    - Should be restated to say "Recreational fishing takes place in coastal, inshore and inland waters around Newfoundland and Labrador".

- *"Owing to the Study Area's distance from shore, no recreational or food fishery activities are known or expected to occur within this offshore region itself."*
    - This is true, however any activities affecting those fish involved in recreational fisheries that may pass through or inhabit the study area at any time of year will indirectly affect the recreational fisheries (for Atlantic cod, Atlantic salmon, etc.).

3.3.3 Other Marine Activities

- *"Marine-based tourism and recreational activities occur along the coastline of Eastern Newfoundland and elsewhere. Many boat tours, sea kayaking routes, coastal hiking trails, marinas, beaches, bird watching areas, campsites, trailer parks and picnic sites are located in coastal areas. Cruise vessel traffic is also present around Newfoundland and Labrador, primarily during the summer and fall seasons and concentrated in and near St. John's"*
    - Needs to be emphasized that the study site is less than 50 km offshore from Cape Spear/St. John's harbour, and any activities for offshore oil and gas exploratory drilling would have huge effects on the aforementioned "recreational activities".

3.3.4 Health, Social and Economic Conditions (Newfoundland and Labrador)

- *"Eastern Newfoundland, and the Northeast Avalon in particular, are affected by oil and gas exploration and development activity and its fluctuations, but the region has a relatively diverse economy owing to the presence of other sectors including transportation, healthcare, education, government services, and tourism."*
    - In addition and equally importantly, the technology sector (NATI 2019).

3.4.1.1 Marine Fish and Fish Habitat

- *"The distribution and abundance of demersal fish and invertebrates within large portions of the Study Area are relatively well studied through annual standardized multi-species government RV surveys by the Government of Canada (DFO) within the EEZ, and by NAFO and the European Union (EU) outside the EEZ on the Flemish Cap and southeastern portion of the Grand Banks. These datasets form a key component of the analysis and existing environment descriptions provided in the Regional Assessment, and were used to describe benthic invertebrates and finfish distributions throughout the region."*
    - And yet there are no data presented in this report on any invertebrate species other than coral and sponges, not even economically-relevant species such as snow crab.

3.4.1.2 Marine and Migratory Birds

- *"Most of the available information on waterfowl / divers and shorebirds comes from the existing and available literature and data, with some exceptions."*

    - Not sure what this sentence is trying to say. If available information does not come from existing data and literature, where else would it come from?

- *"With new technologies, CWS now has the capability to deploy electronic tags on species previously too small to monitor (such as Leach's Storm-petrel). This provides valuable new information on their distribution and habitat use."*
    - Even with this technological advancement, migration patterns of juveniles are currently unknown. The degree to which they are affected by offshore oil platforms and vessels is currently unknown but is suspected to be very high. It is possible that high juvenile mortality caused by collisions and strandings on vessels and oil platforms may be a major contributing factor to population declines due to the lack of recruitment of breeding adults.

Section 3 References

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Chapter 4 - POTENTIAL EFFECTS AND THEIR MANAGEMENT

This section comprehensively details the potential effects of exploratory drilling and provides a thorough list of mitigation and management strategies. The information provided in this section, however, is severely under-referenced which leads to the reader questioning the validity of the provided information. Further, many of the claims made here do not fully represent the current knowledge and literature. We have provided some references that support the information given, as well as references that oppose some of the claims that are made in this chapter. Additionally, and as is the case with many sections of this report, there is a lack of information on the effects of various aspects of oil exploration and production on numerous species. This lack of information cannot be presented as a lack of effect on the species. As a minor note, “behaviour” is spelled incorrectly numerous times in this chapter. Please fix it to be in the Canadian spelling.

4.1 Issues and Interactions

- This section is comprehensive and well laid out

4.2 Effects of Planned Exploratory Drilling Activities

- *“For the most part, these EAs and the resulting EA decisions have concluded that the potential effects of offshore exploration drilling in the Study Area are relatively well understood and entail relatively minor, localized and temporary disturbance at any one location and time. They have also indicated that, with the implementation of typical and industry standard mitigation (see Section 4.5), are unlikely to result in significant adverse effects on any aspect of the environment.”*
    - This overstatement assumes its own conclusion and needs to be tempered as a reality check. There have been no independent observers on exploratory drill rigs, so the situation at present is one of no independent assessment. ‘No information’ cannot be used to infer ‘no problem’.
    - Long-term effects of seabird attraction to lighting and flares, seafloor damage, noise and disturbance to marine wildlife are not well understood as there are many factors to research and it is difficult to quantify in ever-changing environments.
    - Newfoundland has recently experienced two recent major oil spills from the Hibernia platform; this calls for higher industry standard mitigation.

4.2.1.1 Presence and Operation of Drill Rigs

- *"The presence and operation of a drill rig at an individual well site results in the introduction of a number of disturbances into the marine environment, including underwater noise and vibrations, light emissions and other discharges, as well as resulting in possible issues related to aquatic invasive species."*
    - Consider changing the last phrase to say " as well as the possible introduction and resulting issues related to aquatic invasive species"

- *"All associated discharges such as wastewater, sewage, deck drainage, ballast, and air emissions from the drill rig must also be managed in accordance with applicable regulations and guidelines."*
    - What are the applicable regulations and guidelines? Please outline them here or provide a reference where they can be found.

- "*Any future exploratory activities within the Study Area itself will be situated at least 50 (and in most cases, several hundred) kilometers offshore, which is far from coastal breeding sites and other identified special and sensitive coastal areas for birds. This is also well beyond the ranges of most species that nest in Newfoundland and Labrador, and of migrating birds which tend to fly closer to land. There are also some species that spend considerable time in the offshore marine environment and are therefore particularly vulnerable to disturbance."*
    - A very large portion of the world's breeding seabirds' nest off the shores of Newfoundland's east coast, many of these birds such as millions of Leach's Storm-Petrels travel hundreds of kilometres a day to feed during the summer months when it is most likely much of the exploratory activity will take place. (e.g. Hedd et al. 2018). Importantly note that the Grand Banks is a global hotspot for seabirds. Large numbers of seabirds use the Grand Banks on an annual basis (Canada 2020), with an estimated 40 million seabirds on an annual basis. Note as well that the Funk Island Ecological Seabird Reserve, the site of the large Common Murre colony in the world is situated 50 km off the NE coast (funkisland.ca).
    - Current offshore oil production rig projects overlap with the foraging ranges of Leach's Storm-Petrels (Hedd et al. 2018; S.M. Collins and W.A. Montevecchi unpublished data), the winter ranges of Common and Thick-billed Murres (McFarlane Tranquilla et al. 2013), Dovekies, Black-legged Kittiwake (Huettman and Diamond 2000, Frederickson et al. 2012), Northern Fulmars and fall incursions of Atlantic Puffins (Lowther et al. 2002).
    - Migrating passerine birds do tend to fly closer to land, but are also commonly found offshore, blown by winds or attracted to the lights and sounds of oil tankers and rigs (R. A. Blackmore, pers. comm.). These vessels may act as a place to rest for small songbirds migrating south in the fall, and even as shelter during

storms.

- *"While the attraction of birds to offshore platforms and resulting injury or mortality has been identified as an important area of concern, it is often noted in these EAs that the short-term nature of a drill rig's presence and operation at a particular site, and the localized zone of visibility of such lighting (typically up to 5 km, see Module 8), reduces the potential for interactions and resulting effects."*
    - Moving vessels can be considered short-term in the same way as exploratory drill rigs, and these vessels are known to strand huge numbers of seabirds. Further, as stated earlier in this report (section 3.2.2.1), attraction to light can result in considerable additional energy expenditure. Birds tend to be attracted from one light source to another, so the introduction of multiple exploratory drill rigs within the study area will increase the number of anthropogenic lights that may cause strandings, fatal collisions, or simply unnecessary energy expenditure. It is well known that bird attraction to light is episodic and difficult to monitor adequately without a robust experimental monitoring design (Burke et al. 2014). To date, this has simply not been done. It is the cumulative effects that need to be considered here. Perhaps make a reference to section 5 in this paragraph.

- *'Mitigation measures such as minimizing the amount (and adjusting the intensity, duration and frequency) of artificial lighting to the degree possible, as well as protocols for locating and releasing any birds that may become stranded on offshore installations, can also help reduce any such effects. ´*
    - Will there be a designated environmental observer on boards to assist with these measures?

- *"Based on the underwater sound levels typically generated by a drill rig and the sound level thresholds identified in the literature (Modules 2 and 9), it is often considered unlikely that marine mammals or sea turtles would be exposed to sound levels from drilling that are capable of causing injury."*
    - What do you mean "it is often considered unlikely"? Who considers this unlikely? Even if the sounds produced by drilling are in fact unlikely to cause physical harm to marine mammals, constant noise pollution and other anthropogenic underwater noises travel far distances and interrupt communication, which may indirectly lead to strandings and death. This is mentioned later in this paragraph as "*These may include interference with communication, alterations in activity or localized avoidance responses*", but the damage that these interferences may have on some marine mammal species needs to be stressed.

4.2.1.2 Drilling and Associated Marine Discharges

- Tissue contamination of scallops by compounds found in marine drilling fluid and synthetic-based muds has been observed near Terra Nova (DeBlois et al. 2014).

- *"Any cuttings accumulations on the seabed are also eventually recolonized following the completion of the well."*
    - Where is the reference?
    - What does "eventually" mean in this context?

4.2.1.3 Vertical Seismic Profiling

- *'Underwater noise resulting from the use of seismic equipment during VSP activities may result in temporary displacement of some marine species, particularly marine mammals, but is not usually predicted to result in injury or mortality.'*
    - Unclear and misleading wording
    - Anthropogenic noise is thought to impair communication in pods of odontocetes, lead to strandings/beachings of particular vulnerable species (see Cuvier's Beaked whale), and cause physical injury to individuals near the site of noise. Sound travels further in water than in air, and so noise, especially low-frequency noises such as those produced by seismic equipment, can have effects that are quite far-reaching and detrimental.

4.2.1.5 Well Abandonment or Suspension

- *"Individual marine animals that are sensitive to lighting and noise emissions may temporarily avoid the area during these activities."*
    - A bigger concern is that these activities will attract numerous species due to the novel light and sound sources. This may result in more interactions between marine animals and the well sites
    - If exploring for oil, drilling an exploratory well, and taking down the exploratory well produces novel sound and light pollution, then the claim that these effects will be short term is unfounded.

- This section is very underwritten. Increases in oil and gas production and subsequent abandonment of wellheads and infrastructure without clear plans for proactive monitoring and maintenance is disturbing. The northern half of the Study Area is prone to frequent ice variability, including iceberg scouring. Active rigs have ice prevention measures, but abandoned infrastructure is susceptible to damage, particularly as Arctic ice melts due to climate change. Operators are not liable if incidents occur caused by "a natural phenomenon of exceptional, inevitable and irresistible character" (Government of Canada 1985), and the C-NLOPB Compensation Guidelines (2017) do not cover

damage to infrastructure post-abandonment, thus the liability for spills or incidents caused by ice scouring to the seabed and abandoned wells falls to the Federal government (Part 6, Government of Canada 2009, K. M. Young pers. comm.). Canadian Environmental Protection Act (CEPA) is used to approve the abandonment of oil and gas infrastructure and outlines the need for field monitoring of these abandoned sites to prevent harm to the ecosystem. This monitoring should be considered in the case of ice scouring, with strict guidelines to the regularity of review.

4.3.1 Spill Prevention

- *"While the oil spill probability analysis, completed for recent EAs and as part of this Regional Assessment (Module 3), indicate that a large spill is an extremely unlikely occurrence due to these spill prevention procedures required of, and implemented by each operator, the number and magnitude of recent spills in the Study Area is a clear reminder that, despite best efforts, such accidental events do occur."*
    - This cannot and should not be understated. Introducing more exploratory drilling and another oil production rig will result in more marine traffic and will increase the potential for future spills.

4.3.3 Spill Behaviours and Response Measures

- *'A typical, overall finding of these recent analyses is that most spilled oil will travel eastwards, with minimal potential for shoreline contact, although given their project and site specific inputs to such modeling their specific findings about the fate and behavior, and thus the likely geographic extent and duration of their footprints, this has been found to be quite variable.'*
    - Grammar and spelling: site-specific, modelling, behaviour
    - Marine biota may be affected whether or not the spill contacts the shoreline. The footprints of hydrocarbon spills need to be publicly accessible.

4.6.1 Identifying and Implementing Generic Requirements for All Future Exploratory Drilling Projects

- *"5) It is recommended that operators be required to demonstrate concrete, measurable steps to minimize light attraction effects on migratory birds, including the following (which include some measures covered in Section 4.5 above, along with several additional mitigation and monitoring requirements):"*
    - The use of different wavelengths (non-white) of light on oil platforms could significantly reduce seabird attraction (Montevecchi 2006, Poot et al. 2008). If necessary, Rebke et al. (2019) recommend blinking light at low frequency, and if continuous light is needed, red light should be used. Please include these references in subclause c. Poot et al. (2008) also make the case for green light.

Findings are contradictory, please compare references and provide the best available evidence.
    - This recommendation as a whole (5. a-g) is well considered and comprehensive

Chapter 4 References

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Chapter 5 - CUMULATIVE EFFECTS

This chapter understates the potential cumulative effects of exploratory drilling and oil production on the environment. There is a lack of data on the long-term cumulative effects of these activities, but this data deficiency cannot be interpreted as an absence of cumulative effects. Although this report pertains specifically to exploratory drilling, the purpose of exploratory drilling is to create new oil production rigs. If exploratory drilling is allowed in ecologically important areas, this will lead to the increased development of oil production in these areas, the impacts of which are severe and detrimental to the environment. The maps outlining the overlap between projected drill sites and current activities are very well done and helpful to the reader, however, a map outlining the overlap of drill sites with special areas needs to be included for completeness and to mediate the obvious bias of the assessment.

5.1.1 Marine Fish and Fish Habitat

- *"Oceanographic variability due to climate change has also had implications for all trophic levels, resulting in increased plankton and fish productivity during warm periods and the reverse in cold conditions (Drinkwater et al 2014)."*
    - For capelin, warmer temperatures resulting in earlier sea ice retreat have resulted in a decreased productivity during warmer years (Buren et al. 2014)

    - Capelin have a restricted spawning temperature range of 2-12C (Crook, Maxner & Davoren 2017)
    - Capelin is a forage species and a linchpin for food web integrity.

Table 5.23

- *“Use of fishing gear and resulting entanglement of marine birds or mammals”*
    - As well as, more frequently, non-target fish species, particularly in gillnet fisheries.

- Other Marine Traffic: “*Vessel movements are highly transitory with limited environmental effects, minimizing potential effects in any particular location and time”*
    - It is known that noise pollution from vessel movements inhibits communication signals in whales which reduces their ability to use their habitat due to reduced habitat quality.
    - Ship ballast causes species introductions which alters habitat.
    - Marine exhaust fumes pollute the waters and directly affect the quality and safety of ocean habitat, and increase carbon footprint more oil production will only exacerbate.
    - Vessels traffic produces light and chemical pollution which inhibit the ability of seabirds to occupy their marine habitat and forage effectively.
    - Individual vessels are highly transitory, but increased vessel traffic in an already busy area augments the chances of vessel strikes, migratory bird strandings, etc.

5.1.2 Marine and Migratory Birds

- *"That species is thought to be particularly vulnerable to the effects of offshore activities through attraction to artificial light sources resulting in collision and strandings."*
    - References for this statement: (Ellis et al. 2013, Environment Canada 2015, Baillie et al. 2005)

- Common Murres, Great Shearwaters, Northern Fulmars, Atlantic Puffins and Dovekies are also at significant risk to light attraction as they forage offshore (Burke, Montevecchi & Wiese 2012)

- The 2019 oil spill was located directly through the normal foraging path of Leach’s Storm-Petrels (S.M. Collins and W.A. Montevecchi unpublished data)

5.1.3 Marine Mammals and Sea Turtles

- Please cite Weilgart 2007

- *“As a result of existing marine activities in the Study Area (see Tables 5.1 and 5.2) and naturally occurring oceanographic sounds, the region’s underwater environment is likely already quite noisy at particular locations and times (Module 2).”*
    - This cannot be understated when considering proposals for new activity, especially something as destructive and noisy as exploratory oil and gas drilling. In this context it conveys an excuse to add to the noise, but rather should be made clear as rationale against increasing anthropogenic noise.

- *“Marine mammals and sea turtles may also be affected by other natural factors and processes, as well as the disturbances which may be associated with other types of human activities in the marine environment.”*
    - This sentence is unnecessary and redundant to the previous sentence. Restating it in this way distracts from the effects that anthropogenic noise, including and especially the activities relating to offshore oil and gas have on marine animals.

- *“The widespread and migratory nature of marine mammals and sea turtles increases the potential for individuals and populations to be affected by multiple disturbances in various locations, and thus, for cumulative effects to occur. This is reflected in the fact that many of the marine mammals and sea turtles species found in the Study Area have been designated (and are therefore protected) as species at risk or are otherwise of conservation concern (Section 3.2 and Module 5).”*
    - Turtle is singular here, not plural
    - As species at risk under SARA, COSEWIC or NL ESA! Many of these vagrant migratory species are of great conservation concern under IUCN and other global distinctions. Make this clear, and good examples of species where this is the case (such as hawksbill turtles) would help the reader understand this point further.

5.2.2 Effects, Interactions and Key Areas of Uncertainty

- This is very thorough and well laid out

5.3.4 Key Areas of Potential Activity and Effects Interaction and Overlap

- A map outlining the overlap of potential drill sites with special areas (Figures 3.10 and 3.11) would be enlightening and should also be included here

Table 5.5

- Lighting

    - Flares can be seen from about 25 km away (Transport Canada 2004), depending on fog and weather conditions.

- The predicted drill sites strongly overlap with seabird colony foraging areas along the east coast of Newfoundland (S.M. Collins and W.A. Montevecchi unpublished data)

- Underwater noise (VSP)
    - Marine mammals and sea turtles are stated to be most affected by vessel and industrial noise, no matter how frequent, however, the spatial and temporal consideration information pertains only to fish.

- No mention in this table of potential effects of offshore drilling on chlorophyll-a (phytoplankton) spatiotemporal composition in the study area or surrounding waters

5.4 Committee Findings and Recommendations

- Because the projected drilling sites are very near to existing oil production sites that are within ecologically important/sensitive areas, the cumulative and long-term effects are likely to be much more significant than this chapter implies. No doubt, the greatest contributor to cumulative effects is the increased hydrocarbon footprint of more oil production. In light of the ongoing climate crisis (ECCC, parliament's declaration of a "climate emergency, Paris Agreement, etc.), this has to be acknowledged and highlighted.

Chapter 5 References

Baillie, S. M., Robertson, G. J., Wiese, F. K., & Williams, U. P. (2005). Seabird data collected by the Grand Banks offshore hydrocarbon industry 1999–2002: Results, limitations and suggestions for improvement. Canadian Wildlife Service Technical Report Series, 434: 1–47.

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Chapter 7 - SUSTAINABILITY, CLIMATE CHANGE AND OTHER CONSIDERATIONS

Overall, this section is biased. There is a much greater emphasis on the positive economic effects and little detail is given towards the environmental sustainability of exploratory drilling. In section 7.1.5, the report outlines that it is beyond the scope of the committee *“to make determinations about the overall sustainability of the oil and gas industry as a whole”*, however you discuss the economic contributions of the oil and gas industry at length. As the goal of exploratory drilling is to lead to oil and gas production, the sustainability and climate change effects of both activities cannot be understated. Much of this chapter seems to use data deficiency as evidence for the lack of effects. We must stress that data deficiency cannot be treated as evidence for or against a claim. If anything, this chapter supports your recommendations for increased research.

7.1.2.2 Health and Well-Being

- *"The various regulatory requirements that pertain to spill prevention"*
    - Such as? Include a reference to documents (CEPA?) which outline these regulatory requirements

7.1.5 Summary and Conclusions

- This entire paragraph is very important for this section and well written, however, this needs to be mentioned earlier in the section. During the reading of this section, the sustainability of the oil industry as a whole is the underlying assumption so having this caveat early on acknowledge these concerns.

Table 7.1

- Overall, the table needs to be referenced

- *“provided they implement mitigation efforts”*
    - These mitigation efforts need to be specifically incorporated into policy to ensure that the companies do implement these measures. Companies will not spend money on these efforts if they are not required to do so.

- Migratory Birds Convention
    - The MBCA does not specifically address mitigation efforts for light attraction and few mitigation efforts are currently being employed
    - Unless these "associated mitigation and monitoring measures" are specifically incorporated into the regulations, the implications for meeting this obligation will be negative

- United Nations Convention on Biological Diversity
    - *“large accidental hydrocarbon release, which is an unlikely event”*
        - oil spills with dramatic effects are not that unlikely
        - Not to mention, it only takes one large event to have disastrous and pervasive effects on a marine ecosystem

- ICCAT
    - *"general studies near production products have not revealed any adverse effects on fish health"*
        - which studies (include references)? Many studies do show adverse effects on fish by oil pollution.
        - Reference supporting this claim: (Mathieu et al. 2011)
        - Reference against this claim: (Grizzle 1986)

- Polar Bear Conservation
    - “*Polar bears do not typically occur in most parts of the Study Area*.”
        - Is this accurate? Polar bears occur somewhat frequently on the northeast coast of Newfoundland and the Bonavista peninsula when pack-ice is present. To quote the GIS tool developed by this committee, “Polar bears (*Ursus maritimus*) are occasional visitors to the island of Newfoundland and the offshore area. However, polar bear sightings in the Study Area are considered extra-limital observations occurring when individuals drift south to NL on icebergs or pack-ice carried southward with the Labrador Current (COSEWIC 2018).” - https://nloffshorestudy.iciinnovations.com/mapviewer/. Please provide a citation with ice cover data, or if data are not available, state it as such (See Chapter 7.1.4, “*A lack of information on some components and issues means that assumptions must often be made that a species or activity is indeed present at particular locations and times, and is therefore “available” to be affected by future drilling activity.*“). At the very least, consider rewording this section in the table to reflect that polar

bears are in fact known to occur within parts of the Study Area, otherwise the message seems misguiding.

Section 7 References

Grizzle, J. M. (1986). Lesions in fishes captured near drilling platforms in the Gulf of Mexico. Marine Environmental Research, 18: 267-276.

Mathieu, A., Hanlon, J., Myers, M., Melvin, W., French, B., DeBlois, E. M., E. M., King, T., Lee, K., Williams, U. P., Wight, F. M., & Janes, G. (2011). Studies on fish health around the Terra Nova Oil Development Site on the Grand Banks before and after discharge of produced water. In Produced Water (pp. 375–399). Springer, New York. https://doi.org/10.1007/978-1-4614-0046-2_20.

8 SUMMARY AND CONCLUSIONS

"The Committee understands that the federal Minister of the Environment and Climate Change intends to make a regulation, informed by the findings of this Regional Assessment (Section 1.4), which will set out the conditions that future exploratory drilling projects in the Study Area would need to meet in order to be exempt from federal impact assessment (IA) requirements under the Impact Assessment Act."

- It is our considered opinion that exploratory drilling projects should under no circumstances be exempted federal impact assessment (IA) requirements.

"*the ordering (and thus, the numbering) of these recommendations in this section therefore does not correspond to their presentation earlier in this report."*

- In a formal report for clarity, internal consistency and logic the recommendations should follow in sequential order as addressed in the previous text.

Recommendation 2 is a robust and important regulation needed for all offshore exploration activity and should not be a condition of exemption from a federal IA.

Recommendation 5 should specify mitigation measures to reduce flaring at night and during September, October and November and to eliminate the skyward projection of light which does nothing to enhance worker safety.

Recommendation 6 useful recommendation for enhancing knowledge about seabird movments but should not be used to replace independent seabird observers on rigs.

Recommendation 7 – *"*Operators include general awareness regarding seabird strandings as part of their overall training / orientation programs for offshore workers (Section 4.6.1, p 114)."

- Offshore workers are currently restricted by confidentiality restrictions from reporting bird observations and/or concerns. They should be given the freedom and transparency to report what they observe.

Recommendation 8 should be removed is a proviso biased to corporate oil, putting ocean ecosystem integrity on lower level of significance.

Recommendations 10, 11, 12 – because we argue that exploratory offshore drilling should not be exempt from federal IA, we suggest that these be removed.

Recommendation 13 – GIS tool appears to be a very useful capability that could help enhance information transparency in the offshore.

Recommendations 14 – 18 – appear helpful.

Recommendations 19 – 23 can be usefully applied. Recommendation 21 is especially timely given the state of the Leach's Storm-Petrel.

Recommendations 26 - 29 – will increase offshore biological data, its transparency and accessibility.

Recommendation 30 – should be removed as it is superfluous as the committee is recommending exploratory drilling in these areas.

Recommendation 31 – appears useful.

Recommendation 32 – this information should publically available not just to indigenous groups.

Recommendations 33 – 38 - appear useful

Recommendation 39 – these plans should consider and include environmental costs and risks

8.4 Conclusion

"reducing the need for lengthy, project-specific IA reports that to date have rarely added new information or findings to the decision-making process"

- Inadequate data collection by operators on the Grand Banks underlie the lack new information [it simply has not been collected]

"*The Committee was faced with the dilemma of whether or not to recommend that certain areas within the Study Area should be closed to exploratory drilling, as was advocated by a number of participants. As outlined in the report, no government agency with offshore environmental responsibility provided advice that supported designating*

such exclusion areas or offered recommendations for additional mitigative measures within such areas."

- This is clearly an inadequate short-coming of responsible government agencies.

Additions

Why is none of the following included in the current draft if it's publicly available online under the https://nloffshorestudy.iciinnovations.com/mapviewer/ Section 5b? Please consider incorporating these species descriptions, as all five are of economic and/or ecological importance:

"White Shark

- White sharks are large pelagic apex predators found throughout the Atlantic Ocean. While evidence from some recent tagging programs suggest that this species could be mating off Sable Island, NS, they are not known to breed within the Study Area. Some undertake migrations to feed in the rich areas off the Grand Banks. They then migrate further south or across the Atlantic to warmer waters, where they likely mate (Curtis et al. 2014). This species prefers relatively warmer water, and mostly remains in the Gulf Stream south of the Grand Banks. They are capable of diving down to 1,280 m and consume marine mammals, carrion, seabirds, squid and many fish species (COSEWIC 2006). They are listed as Endangered by COSEWIC and SARA, with no critical habitat yet determined in Canadian waters (COSEWIC 2006). No targeted fishery exists in Canada, and their main threat is by-catch as part of other commercial fisheries as well as illegal catch for sale on the black market (COSEWIC 2006). OBIS (2019) has records of white sharks around the Grand Banks, typically over deeper waters. Ocearch (2019) has attached satellite tags to several white sharks and publishes near-real time locations. Individual sharks are tracked along the east coast of Canada, with many overlapping with the Study Area along the southern Grand Banks and Flemish Cap (accessible at https://www.ocearch.org/tracker).

Deepwater redfish

- Deepwater redfish are a relatively long-lived, commercially harvested plank-piscivore that are distributed on the slopes of the Grand Banks and Flemish Cap. Deepwater redfish have wide depth ranges of 138 m to 1,200 m (Nogueira et al. 2017) with relatively high abundances beyond shelf depths (greater than 250 m). Redfish undergo nocturnal vertical migrations to feed on zooplankton and fish (Scott and Scott 1988, Templeman 2010) and are considered semi-pelagic, despite mainly inhabiting shelf slope and deep channel areas (COSEWIC 2010a). Redfish species are ovoviviparous, relying on internal

fertilization with breeding occurring between October and January (COSEWIC 2010a, Coad and Reist 2018). The larvae are released in spring to early summer and are primarily found from surface waters to the upper 200 m of the water column (Anderson 1984, 1994). Redfish larvae have also been found associated with sea pens, suggesting that sea pen fields could act as nursery grounds for this species (Baillon et al. 2012). The Southwest Slope EBSA is considered an important spawning area for redfish (Wells et al. 2019). High abundances of deepwater redfish are found along the shelf's edge and along the Grand Banks, Flemish Pass, and northeastern Newfoundland slope. Redfish will migrate to spawn and are present in various parts of the Study Area at different times of the year.

Capelin

- Capelin are a schooling, pelagic, planktivore that are of great ecological importance as a trophic link between plankton and predatory species (including predatory fish, marine mammals and seabirds) (Davoren and Montevecchi 2003, Rose 2005, Trenkel et al. 2014, Maxner et al. 2016, Lewis et al. 2019). Capelin are a short lived species that undertake large annual spawning migrations from offshore feeding areas on the Newfoundland Shelf to coastal waters in Newfoundland embayments and to offshore spawning grounds on the Southeast shoal in the summer (June – August) (Maxner et al. 2016, DFO 2019). This species is also characterized by high post-spawning mortality with up to 100% of males and 50-75% of females dying after spawning (Shackell et al. 1994, Lewis et al. 2019). Since the collapse of the Newfoundland Capelin stock in 1991, spawning has been delayed by a month compared to the pre-collapse period (DFO 2019). Capelin currently spawn at beaches and deep-water sites (< 40 m) close to beaches in July and August in the northeastern bays of Newfoundland (DFO 2019). Capelin eggs adhere to the sediment and hatch date is dependent on temperature. Capelin larval emergence and survival are related to onshore wind events which increases the chance of a match between zooplankton prey and larval emergence (Leggett et al. 1984), although later spawning has resulted in fewer matches between larval emergence and onshore wind events post-1991 (Murphy et al. 2018). Capelin also spawn on the Southeast Shoal (15-50 m) (Carscadden et al. 1989). In addition to their ecological importance, capelin are also an important inshore commercial fishery (DFO 2019).
- As Canadian RV surveys are based on bottom trawls, the dataset likely underrepresents the abundance of this pelagic species. However, the RV dataset is useful for determining relative abundances and presence within the Study Area. Capelin are primarily captured along the shelf of the Grand Banks at depths less than 600 m deep, and are not considered a key species on the Flemish Cap (Frank et al. 2005). As illustrated above, capelin were a key species of Northeastern and Southeastern Grand Bank assemblages, as well as the Orphan Basin. High abundances of capelin are found on the northeast

Newfoundland slope along the continental shelf, and in some nearshore areas. These are areas of high plankton abundance during the Spring and Fall blooms, and inshore areas are spawning grounds for capelin.

Sand Lance

- Sand lance are a small semi-pelagic planktivore that are common throughout the southern Grand Banks and are typically found between 1-11°C (Winters 1989, Wells et al. 2017, Coad and Reist 2018). This species has a unique life history where it alternatively burrows into sand or small gravel substrates and swims pelagically in schools (Winters 1989, Coad and Reist 2018). Sand lance abundance has been increasing since the 1950s and they are an important prey species for predatory fish, marine mammals and seabirds especially since the collapse of the Newfoundland capelin stock (Winters 1983, Baillie and Jones 2004, Friedlaender et al. 2009, Wells et al. 2017). The larvae of these species are planktonic, and they seek bottom areas after reaching 35 mm in size (Amec 2014). Sand lance are mainly present in southern shelf areas at depths less than 250 m deep. As illustrated above, sand lance were a key species of Northeastern and Southeastern Grand Bank assemblages. Areas of high abundance for sand lance are throughout the central Grand Banks and along the southern Newfoundland Shelf. Sand lance are not known to migrate to spawn, and are present in the Study Area year-round.

Atlantic cod

- Atlantic cod are a demersal groundfish that occupy a broad range of benthic habitats and are typically found above 500 m depth. They release pelagic eggs that are found in the water column from April to November, typically during the peak of the phytoplankton and zooplankton blooms. Once hatched, juvenile cod seek areas of high habitat complexity to reduce predation (Coad and Reist 2018). As adults, they opportunistically consume squid, fish such as capelin and sand lance, crab, shrimp and polychaetes (COSEWIC 2010b). Atlantic cod are a socially and commercially valuable fish, and due to changing environmental conditions and overfishing, stocks collapsed in the early 1990s (COSEWIC 2010b). Today the stock is much diminished compared to historic levels, although some populations are showing signs of recovery (Koen-Alonso et al. 2010, DFO 2018d, Gonzalez-Troncoso et al. 2018).
- Atlantic cod are found throughout the Grand Banks of Newfoundland, on the northeast Newfoundland Shelf, and further north into Labrador and the Arctic. Canadian RV trawls find high abundances towards the shelf edge of the Grand Banks and Flemish Pass, Flemish Cap, the northeast Newfoundland slope, as well as south of the Island of Newfoundland. These areas include important spawning grounds, such as the southeast shoal of the Grand Banks, as well as important feeding areas that have high prey density including abundant capelin and sand lance. Atlantic cod also follow the inshore spawning migration of capelin along with other piscivores to feed, and so may move in and out of the Study Area during migrations."

In doing so, please include that capelin spawning is dependent on water temperature, whereby both beaches and deep-water spawning sites are used throughout the spawning season, with a restricted tolerable temperature range of 2-12^{o}C (Crook, Maxner and Davoren 2017).

The GIS decision support tool has many useful, comprehensive and well-structured tables (Section 5b Table 6, Section 5c Tables 4-6, etc) that are very important to understanding species abundance, conservation, and areas of concern. Including each of those tables in this report would be redundant, but referencing them along with acknowledging that this report is not comprehensive is quite necessary. An example would be after listing a few ecological reserves of importance in Section 3.2.2.5, discreetly mention that a full list of Key Areas and their importance for seabird conservation is listed in Section 5c, Table 6 of the GIS tool. In doing so, many comments from our review about how inadequate some sections are in their presented information and any considerations this omissions have for biasing this assessment are rectified.