Environment Canada Environnement Canada

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March 15, 2011 File No.: 4194-10

Ms. Elizabeth Young
Canada Newfoundland Offshore Petroleum Board
Fifth Floor, TD Place
140 Water Street
St. John's, NF A1C 6H6

Dear Ms. Young:

RE: EA Report – Old Harry Exploratory Drilling Program 2012-2014 EAS 2011-074B

As requested in your letter of December 22, 2011, Environment Canada has reviewed the environmental assessment report for the above noted project. Our comments are provided below with the exception that we have not yet completed review of Chapter 8 – Accidental Events and the oil spill trajectory modelling report. EC comments regarding accidental events will follow as soon as they are available which is anticipated to be early April. Quotes from the environmental assessment document are in italics and EC's response is in normal type. Where references to studies in addition to those cited in the environmental assessment have been made, the full citations have been added to the end of our comments.

The following EC comments stem from the department's mandate under the *Migratory Birds Convention Act* (MBCA) and Section 36 of the *Fisheries Act.* Pertinent EC expertise, and related comments, also originate with the *Canadian Environmental Protection Act* (CEPA), the *Canadian Wildlife Act,* and the *Species at Risk Act* as well as *Department of the Environment Act.*

REVIEW COMMENTS

2.11.13 Air Emissions

There are unlikely to be an air issues resulting from normal operations of the exploratory drilling for this proposal.

On page 24, the proponent commits to reporting in accordance with the OWTG and the National Pollution Release Inventory. This commitment is redundant as there are no reporting requirements for exploratory drilling under these initiatives.

On page 25, the proponent makes reference to Environment Canada's authority to regulate emissions from marine diesel engines of less than 37 kW. It is unclear if this authority relates to the proposed project.

4.1.11 Ice

Page 103, 1st paragraph, sentence 6: *"All sea ice in EL 1105 is first-year ice, ranging in its un-deformed thickness from 30 to 120 cm (SLGO 2011; Figure 4.20).*

Comment: Not all sea ice in EL1105 is greater than 30cm (first-year ice), especially at the start of the winter season. Also, your reference to Figure 4.20 is in error … Figure 4.20 in the EA report is a tide map.

- Rephrase this sentence. Say something like "All sea ice in EL 1105 is seasonal ice, with undeformed thicknesses normally not reaching the thin first-year ice category (30-70cm) until March. Predominant ice thicknesses greater than 70cm are generally not observed until mid-April, towards the very end of the ice season in the Gulf." Also – cite the 1981-2010 CIS Atlas for the information. See your own description at the bottom of p.108, where this is correctly described.

- Insert a new figure to replace the erroneous reference to Figure 4.20. Use a figure from the CIS online atlas, for example: http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&n=AE4A459A-1&wsdoc=C3DAE7C6-0C7E-11E0-9694-185EF62D62D6

Page 103, 1st paragraph, sentence 7: *"Daily graphs such as depicted in Figure 4.24 are available as a seasonal service from http://slgo.ca/en/ocean/data/ice-concentration.html, starting in December / January through May / June."*

Comment: The charts (not graphs, unless you meant to say graphics) published on the SLGO website are *forecasts* produced by a computer model. This computer model uses CIS analysis data for input. Real CIS analysis charts, NOT model forecast graphics, should be used here, where describing climatological sea ice conditions in the Gulf of St. Lawrence.

- Replace Figure 4.24. Use either the corresponding Ice Stage chart for 31 Jan 2011, found on the CIS web site archive: http://ice-glaces.ec.gc.ca/www_archive/AOI_12/Charts/sc_a12_20110131_WIS57SD.gif or the one for 07 Feb 2011: http://ice-glaces.ec.gc.ca/www_archive/AOI_12/Charts/sc_a12_20110207_WIS57SD.gif

- In these charts, note that ice stage relates to ice thickness according to last (bottom) table on the following webpage: http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&n=4FF82CBD-1&wsdoc=19CDA64E-10E4-4BFF-B188-D69A612A0322

- Also - Replace the reference to SLGO with the appropriate reference to the CIS web page.

Page 104, p.105, and p.106:

Comment: The paragraphs on these pages were copied nearly verbatim from the CIS 1971-2000 sea ice climatic Atlas. Passages and phrases copied word-for-word should be in quotation marks, followed by the appropriate reference. No quotation marks are used and no references are given for the copied sentences until the end of each paragraph, making it appear that the information was paraphrased from this source or that only the last sentence is from this source.

- ***The above is plagiarism and needs to be corrected*.** Simply changing a word in the copied sentence (e.g. replacing significant with substantive so that the sentence has not been copied verbatim in its entirety) is not sufficient.

- Also, note that there are two editions of the Atlas. The first is for 1971-2000 and was published in **2002**. The second is for 1981-2010 and was published online in **2011**. The reference given on pages 104-106 is Environment Canada 2011, but the reference at the end of the report (p. 447) says this is for the 1971-2010 Atlas. Please change the reference on p.447 to say "Sea Ice Climatic Atlas for the East Coast 1981-2010". Also correct the web link if necessary.

- Also, p.104, 2nd paragraph, sentence *3 "Typical rates of motion over the Madeleine of 3 to 5 nm per day."* makes no sense as it is written. This sentence was mis-copied and needs to be corrected (and correctly referenced, with quotation marks).

Page 107, Figure 4.27: This figure is captioned *"Maximum pack ice extent in March"* but shows the chart for the end of March when sea ice retreat has already begun. Maximum ice extents occur in the first half of March, not at the end of March.

Comment: Either replace the ice chart shown with one from either the 12th or 19th of March, or change the caption to read "Maximum pack ice extent at the end of March".

Page 108, Figure 4.28: The caption for this figure says it is the *"Maximum pack ice extent in April",* yet the chart shown is that of February 19 (identical to that in Figure 4.26).

Comment: Replace this chart with one that is actually from April.

P.108, 1st paragraph, sentence 1 reads: *"The Project Area is located in an area that ranges from 51 to 84 percent 30-Year frequency for the presence of sea ice (green and purple color bands) depending upon the month."*

Comment: Because the chart used in Figure 4.28 was wrong, this sentence is wrong. The 30-year frequency of presence of sea ice in the project area ranges from 51 to 84% during the peak of the season (late February and early March), then drops to 16-50% in early April and to less than 15% by the end of April. This sentence needs to be corrected as indicated.

P.108, 1st paragraph, sentences 2-5 + P.109, Figures 4.29 and 4.30 (4.31) reads: *"Ice formation for the 2010/2011 year (Environment Canada 2011) is presented in Figure 4.29. Based on the average and median data for percentage ice coverage, the 2010/2011 season would be considered a "below average" ice coverage year. The maximum ice coverage year was March 1, 1993 (Figure 4.30) and the minimum ice coverage year was March 1, 2010 (Figure 4.31). EL 1105 is located in the area that has an average ice freeze up date of January 29 (Figure 4.31)."*

Comment: Figure 4.29 is missing as described in the text. The actual Figures 4.29 and 4.30 on p.109 actually correspond to Figures 4.30 and 4.31 as described in the text. "Figure 4.31" is referred to in relation to 2 different charts in the text: 1) what is actually Figure 4.30 on p.109, and 2) the dates of freeze-up chart, labelled Figure 4.31 on p.110.

- Insert a new Figure 4.29 (the chart for the ice formation for the year 2010/2011).

- Correct the figure numbers for Figures 4.29, 4.30 and 4.31, so that 4.29 becomes 4.30, and 4.30 becomes 4.31, and 4.31 becomes 4.32 … to match what is described in the text.

- Correct the Figure numbers (captions and in the text) by adding 1 to their numbers, for the rest of the figures in all of Section 4.

P.108, 1st paragraph, sentence 5 reads*: "EL 1105 is located in the area that has an average ice freeze up date of January 29 (Figure 4.31)."*

Comment: From the Freeze-up chart, the average freeze-up date is February 12, not January 29.

- Correct the date given in sentence 5 from January 29 to February 12.

P.110, 1st, 2nd and 3rd paragraphs:

Comment: See plagiarism notes for P.104-106.

- Use quotation marks and correctly reference sections copied verbatim or nearly verbatim from the CIS Atlases.

P.110, 3rd paragraph, sentence 1:

Comment: The CIS Atlas makes clear the jump between this paragraph and the one before it by adding a section title "Ice Features in the Area". In this environmental assessment, the lack of section header leads to a confusing disjoint between the two paragraphs.

- Modify the first sentence of this paragraph to make clear that ice dispersal is no longer being discussed and that the topic has changed to Ice Features.

- Suggestion: -- During the peak of the ice season, "ice in the central part of the Gulf produces an ice cover of large floes of thick ice, combined with new ice formation, from Gaspé Passage to Cape Breton Island" (Environment Canada, 2011). -- Again, as indicated, use correct quotations and referencing of text copied word-for-word from the CIS Atlas to avoid plagiarism.

P.111, 1st paragraph:

Comment: See plagiarism notes for P.104-106, P.110.

- Use quotation marks and correctly reference sections copied verbatim or nearly verbatim from the CIS Atlases.

p.111, 2nd paragraph:

Comment: Most of the text in this paragraph was copied from a paragraph which exists in the older 1971-2000 CIS Atlas (published 2002) but which was removed from the more recent 1981-2010 CIS Atlas (published 2011). Thus, in addition to plagiarizing much of the text, you have also used the wrong reference.

- Use quotation marks and correctly reference sections copied verbatim or nearly verbatim from the CIS Atlases.

- Correct the reference to Environment Canada (2002) and add a second reference to the list on page 447 to include this second, earlier version of the Alas.

4.1.12 Icebergs

The report's short paragraph on iceberg describes typical iceberg motions from the Strait of Belle Isle and along the Québec shore in the Gulf of St-Lawrence; their graphics does not portray this motion.

Although this iceberg preferred trajectory is correct, the study makes no attempt to describe iceberg climatology.

The following statements are derived from the CIS archive of iceberg reconnaissance from 1987 to today.

1- Icebergs have been spotted in the Strait of Belle Isle during every month of the year during the past 25 years.

2- Deeper intrusion of icebergs in the Gulf of St-Lawrence and along the west coast of Newfoundland can only occur after the pack ice becomes increasingly mobile during the spring months; this typically occurs in April, May and June.

3- No icebergs have ever been spotted south of 48°30' N in the Gulf of St-Lawrence.

4- Icebergs sighted south of Newfoundland were never seen west of 59° W.

5- The primary water current flow in the Laurentian Channel would prevent icebergs from approaching this area from the east.

6- For any iceberg to approach the drill site from the west would mean the iceberg would first have to drift west of Anticosti Island and out through the Onguedo Passage (south of Anticosti Island).

7- Few icebergs have been spotted west of Anticosti Island (back in April of 1987).

8- No icebergs have ever been sighted south of Anticosti Island.

12.1 Potential Effects of the Physical Environment on the Project

Page 422, section 12.1, 3rd paragraph, sentence 3 reads: "The effects of ice on the Project will be minimal because most of the Project Area is often free of sea ice and subject to relatively few icebergs most of the year."

Comment: The effects of ice on the project will be minimal because the drilling, as indicated in the second bullet after the first paragraph on this page, will be conducted during ice-free periods and because the area is free of sea ice for most of the year. This could be made clearer.

4.2 Meteorology

Physical Environment (4.0)

- There seem to be errors in the numbering of sections in Chapter 4.0 Physical Environment. Section 4.1 titled Geology includes several subsections that do not belong there, on physical oceanography, currents, tides, waves, and storm tracks.

Waves (4.1.9)

- This section relies entirely on the statistical summary of waves at one point within the Project area, based on the MSC50 Wind and Wave Hindcast Dataset. Measurements from scientific buoys in other parts of the Gulf of Lawrence may be useful (link below). The definition of peak wave period and significant wave height should be provided.

- The column and row headings for Tables 4.2 – 4.5, showing the percent occurrence of peak wave period against significant wave height (SWH), are reversed. This error is repeated in the text which states that the majority of significant wave heights are 7 to 9 m, when those values apply to wave periods. Similarly the values for the typical peak period correspond to wave heights. Imagine a 7 m wave every 2 seconds, as the text would suggest.
- The percentages are given to the 2nd decimal place, insufficient to indicate the occurrence of the most extreme values. Table 4.1 shows that significant wave heights of 7.0 m or more occur in each of the 4 seasons but this is not evident the tables for MAM or JJA. Table 4.1 shows that significant wave heights of 9.0 m or more occur in the fall and winter seasons, but this is not evident in the table for the fall (OND).
- The last paragraph of this section seems misplaced.

Storm Tracks in the Gulf of St. Lawrence (4.1.10)

- This section contains 3 figures that inadequately describe the intended subject. Figures 4.21 and 4.22 barely cover the Gulf of St Lawrence and thus cannot show major storm tracks for both extra-tropical and tropical cyclones that approach from the south or southwest and track northeastwards over the Gulf of St Lawrence and the Atlantic Provinces.
- Figure 4.23 is very hard to read. It is missing the panel for the winter season (DJF); the summer panel (JJA) is repeated twice.
- Tropical cyclones/transitioning tropical cyclones need to be considered (ref. below)

Climate (4.2.1)

- The caption for Table 4.6 should indicate that the monthly precipitation values are means. The monthly extremes were not included, even though that is part of the standard description of station climate normals from EC.
- occurrence of freezing precipitation and freezing spray should be explicitly described in Ch 4; their effects are discussed in the Effects of the Environment on the Project, 12.1 12.1.
- Since the project includes helicopter operations, climatology relevant for aviation should be included for the project area from the drilling platform to any shore-based facilities. That includes information on hazards such as low level turbulence and icing, and information on the frequency of low cloud ceilings (as well as visibility).

Wind Climate (4.2.2)

- The wind climate was described solely from the MSC50 dataset for a single point in the Project area. This is insufficient to give a full picture of the conditions over the entire Project and Study Area. The analysis should include hourly mean and gust wind speeds from land/island stations in the surrounding area. Local effects and elevation differences need to be considered.
- Tables 4.6 to 4.10, percent occurrence of winds by speed and direction, give values only to the 2nd decimal, insufficient to show the occurrence of the most extreme winds.
- There should be some discussion/description of local effects including mountain or lee waves, known locally as Wreckhouse Winds (in NL) and Les Suetes Winds (in NS) that can be hurricane force (measured by the Wreckhouse and Grantd Etang autostations).

Visibility and Fog (4.2.3)

- This section gives information for Port-aux-basques that may under-represent the frequency of low visibiliies over the Project area or along the west coast of Newfoundland. Other station data should be used as well, including Les Iles de la Madeleine. Statistical summaries and marine weather observations archived in the ICOADS (International Comprehensive Ocean Atmosphere Dataset) based on ship reports, would provide information on visibility over the water.

- The text incorrectly states that visibility in an earlier report was assessed using the AES40 dataset. The AES40 includes only wind and wave information.
- The caption for Table 4.11 does not adequately describe the values reported.

Climate Change (4.3)

- This section includes discussion only of sea-level change. This section should describe changes in ice frequency that have occurred over the last few decades, and the effect of reductions in ice cover (longer fetch allowing higher waves to build, and more frequent occurrence of adverse weather)

Marine Transportation

- There is very little consideration of the effects of the project on marine traffic, or vice versa, even though the drilling location overlaps with the main shipping lane from the Cabot Strait through the Gulf of St. Lawrence to Montreal. The material is hard to find, being included Ch 5, Biological Environment, or in sub-sub-sections titled Commericial Fisheries and Other Users, or neglected altogether.

Potential Effects of the Physical Environment on the Project (12.1)

- delays in aviation operations due to adverse flying weather could be significant but was not mentioned

Additional Source of Information

- **NOAA Historical Hurricane Tracks, at NOAA Coastal Services Center**

http://www.csc.noaa.gov/digitalcoast/tools/hurricanes/index.html

- Hart, R.E. and Evans, J.L., 2001. A Climatology of the Extratropical Transition of Atlantic Tropical Cyclones, *Journal of Climate,* **14**, pp. 546-564.
- Meteorological Service of Canada (Atlantic). 2005. *A Climatology of Hurricanes for Canada – Improving our Awareness of the Threat*, available on CD-ROM from Environment Canada.
- Scientific Buoy Data, St Lawrence Global Observatory (SLGO); Maurice Lamontagne Institute: http://ogsl.ca/app-sgdo/en/accueil.html and http://slgo.ca/en/buoys/data.html
- Nav Canada Local Area Weather Manuals:

http://www.navcanada.ca/NavCanada.asp?Content=contentdefinitionfiles%5Cpublications%5Clak%5Cdefault.xml,

Migratory Birds

An issue throughout the EA report is the standard formatting of the species names and guild names of migratory birds. The standard formatting is that common bird names should be capitalized except after a hyphen (*i.e.* Harlequin Duck, White-winged Crossbill), except where the last two words are hyphenated (*i.e.* Wilson's Storm-Petrel). Additionally, groups or guilds of birds should not be capitalized where a specific species is not mentioned (*i.e.* alcids, phalaropes, waterfowl, cormorants, *etc.*). Quotes from the environmental assessment have been corrected in this review to fit the standard formatting rule.

SPECIFIC COMMENTS

Section 5.2 Species at Risk

Tables 5.1 and 5.2 do not take into account the Yellow Rail (*Species at Risk Act* (SARA)-listed species of special concern) and the Red Knot (*rufa* subspecies; proposed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)). Yellow Rails can be

found at the upper levels (drier margins) of estuarine and salt marshes. In winter, the rails are known to use coastal wetlands. Currently, among the most important areas for migrating Red Knots in eastern Canada is along the North Shore of the Gulf of St. Lawrence in Quebec, and some also stage among the Magdalen Islands. Avian species listed under the "*Especе menacee ou vulnerable du Quebec act"* should be included in this list to reflect birds present on the Magdalen Islands.

A section should be added here concerning shorebirds and their habitats used during migration. Aubry and Cotter (2007) provide valuable information on shorebirds and areas used as stopover sites (feeding and resting) during migration. Stopover sites can be crucial for shorebirds because of their migration behaviour, which often consists of long stops to substantially increase energy reserves before taking off for long, uninterrupted flights. These feeding grounds are vulnerable to oil spills and impacts should be assessed. See also Fradette (1992) and Mousseau *et al*. (1976) for more information on the subject.

5.2.2 Bird Species at Risk

Red Knot should be discussed in this section.

Table 5.2 Species at Risk

Migratory birds such as Red Knot may occur throughout the Gulf coastal areas (beaches and intertidal flats) during migration, and should be added to this table.

5.2.2.3 Piping Plover

"A census in Newfoundland in 2006 identified 48 nesting adult Piping Plovers, an increase from 39 birds in 2001."

2011 was also a census year for Piping Plover (PIPL). As an update, 51 Piping Plovers (21 pairs, 9 singles) were recorded on 16 beaches in Newfoundland during 2011.

"Piping Plovers have not been found on the northeast coast since 1987."

A single Piping Plover was recorded on the northeast coast during the 2011 International Piping Plover Census.

"In 2009, a pair of nesting Piping Plovers was identified in Gros Morne National Park for the first time since 1975 (Newfoundland and Labrador Department of Environment and Conservation 2010)."

Additionally, a pair of Piping Plovers has nested in Gros Morne National Park in 2010 and 2011.

"Piping Plover habitat is protected under SARA, which provides a residence description of the *melodus* (and *circumcinctus*) subspecies (SARA 2010)."

Piping Plover, as well as other migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act* (MBCA). Migratory birds protected by the MBCA generally include all seabirds except cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles). Most of these birds are specifically named in the Environment Canada publication, *Birds Protected in Canada under the Migratory Birds Convention Act*, Canadian Wildlife Service Occasional Paper No. 1.

Under Section 6 of the Migratory Birds Regulations (MBR), it is forbidden to disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its

carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the current MBR, no permits can be issued for the incidental take of migratory bird caused by development projects or other economic activities.

Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:
"5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.
(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds."

Piping Plover critical habitat is identified in the draft *Recovery Strategy for Piping Plover,* which is open for public consultation until April 2012 (currently accessible at http://www.registrelep-sararegistry.gc.ca/document/default_e.cfm?documentID=923). Under SARA, the general prohibitions and critical habitat protection prohibitions only apply on federal land, in the exclusive economic zone of Canada, or on the continental shelf of Canada unless otherwise stipulated by an Order. However, the expectation is that provinces will ensure that effective protection is put in place for critical habitat on non-federal lands.

Applicable prohibitions under SARA include:
"32 (1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species"; and

"33. No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada."

"This species is not expected to occur in offshore areas of the Gulf, such as within the Study Area…"

It should be noted that the migration patterns, migration routes, migration height, and other aspects of migration are unknown for this species. The Piping Plover also nests on the Magdalen Islands, where approximately 40 pairs are present each year. It is important to note that critical habitat for this species has been identified in the draft Recovery Strategy.

5.2.2.4 Roseate Tern

Please remove "peripheral" from "small peripheral colonies of Roseate Terns nesting on Sable Island and the Magdalen Islands".

Critical habitat has been identified for Roseate Terns on Sable Island and the Magdalen Islands. (see http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=913). It is important to note, however that Roseate Terns are often difficult to identify, as they can breed in the same locations as other tern species. Hence, numbers could be underestimated.

5.2.2.5 Horned Grebe

The factors limiting Horned Grebe populations in Canada are not known, but several possible causes for the decline have been identified, including oil spills on their wintering grounds.

5.2.2.6 Harlequin Duck

Harlequin Duck can be found offshore of the Magdalen Islands (near île Brion and Rocher-aux-Oiseaux) during migration periods.

5.2.2.7 Barrow's Goldeneye

More recent information suggests slightly more Barrow's Goldeneye wintering in the Gulf of St. Lawrence and Estuary than identified in the environmental assessment. Mid-winter surveys conducted in waters of Quebec, Prince Edward Island, Nova Scotia and New Brunswick in February / March 2009 tallied 6,800 wintering Barrow's Goldeneye, most of which (approximately 6,250) were in Quebec, with the remainder in the Gulf of St. Lawrence zone of the Maritime Provinces (surveys were not conducted in Newfoundland and Labrador, or along the Atlantic coast of Nova Scotia). Please contact EC-CWS for more information concerning this unpublished data.

5.5 Marine Birds (Waterfowl Paragraph)

Geese should be discussed in the "waterfowl" paragraph.

"Eiders typically nest on coastal islands and raise their broods in coastal waters"

Eiders tend to nest on islands where fresh water is available. During incubation, eider females leave the nest site to drink fresh water. Ducklings may benefit significantly from access to fresh water prior to departure from colonies.

"Outside of the breeding season, sea ducks are found only on coastal waters."

Sea ducks can also be found over reefs and banks at depths where benthic prey are accessible. They are additionally known to migrate across large ocean expanses and over land.

It should be noted that Bufflehead, Common Goldeneye and Red-breasted Merganser are sea ducks, not bay ducks.

5.5 Marine Birds (Shorebird Paragraph)

Purple Sandpiper needs to be mentioned in this section. Purple Sandpiper regularly overwinter in the Gulf of St. Lawrence, and mainly use rocky coastal habitats. It thus differs somewhat from other shorebirds mentioned. See the "*Québec Shorebird Conservation Plan*" for more details (available at www.ec.gc.ca/Publications/default.asp?lang=En&xml=03F99E30-EFBE-42C3-ABA9-90F2A0CC57EB).

"Outside of the breeding season, most shorebirds forage along coastal beaches, mud flats or salt
marshes,"

The words "exposed and estuarine" should be added as adjectives to "mud flats or salt marshes". The statement should be more precise and should indicate that shorebirds concentrate in coastal areas (mud/sandflats, barachois, saltmarshes, *etc.*) in western Newfoundland during fall migration (July to October) and on rocky ledges, shorelines and islands in winter (*e.g.* Purple Sandpiper).

"Some of the more abundant shorebird species found in the Gulf include Semipalmated Sandpiper, Semipalmated Plover, Greater Yellowlegs and Blackbellied Plover."

It should be noted that in addition to consideration of overall abundance, the proportion of a species' continental population is important.

The shorebird list should be completed: Shorebirds that occur off western Newfoundland include Semipalmated Plover (in list), Piping Plover (in list), Killdeer (to be added), Black-bellied Plover (in list), American Golden-plover (to be added), Ruddy Turnstone (to be added), Whimbrel (to be added), Spotted Sandpiper (to be added), Willet (in list), Greater Yellowlegs (in list), Lesser Yellowlegs (to be added), Red Knot (to be added), Pectoral Sandpiper (to be added), White-rumped Sandpiper (to be added), Least Sandpiper (to be added), Dunlin (to be added), Short-billed Dowitcher (to be added), Semipalmated Sandpiper (in list), Sanderling (to be added), Stilt Sandpiper (to be added), American Oystercatcher (to be added), Purple Sandpiper (to be added).

5.5 Marine Birds (Seabird Paragraph)

"Pelagic seabirds feed at sea over deep waters".

This should be replaced with "Pelagic seabirds typically feed at sea over deep waters".

Greater Shearwater should be replaced with "Great Shearwater" throughout the document.

Wilson's Storm-Petrel should be added to the list of common pelagic seabird species found in the Gulf.

5.5 Marine Birds (Meritic and Pelagic Seabirds Paragraph)

An inclusive interpretation of the term 'seabird' is fine, but is not reflected in the tally of "18 different species" breeding in the Gulf of St. Lawrence. A list of these species would be useful to include. It should be noted that the Gulf is also important to pelagic seabirds that do not breed in the Gulf. These should be listed as well and treated here.

"To this end, seabirds can be classified into two groups based on their vulnerability to oil pollution."

Species vulnerability more likely represents a continuum from 'least vulnerable' to 'most vulnerable'. Also, here only direct effects are presented. Knowledge of indirect effects (such as effects of oil pollution via food-chain) should be provided as well.

"Highly vulnerable species also have low reproductive rates such that…"

These seabirds thus rely on correspondingly high rates of adult survival. These traits are among the general characteristics of seabirds and apply to less vulnerable species as well.

"Some species such as cormorants and sea ducks are highly susceptible to oiling but have relatively high reproductive rates and are able to recover from mortality events more rapidly."

Some sea ducks, such as eiders, also have lower annual reproductive rates and correspondingly higher adult survival rates.

"Pelagic seabirds considered to be highly vulnerable to oil pollution include…"

The phalaropes should be included in this list.

"Seabirds such as storm-petrels, terns and gulls that spend relatively little time on the water are not considered to be vulnerable."

"not considered to be vulnerable" should be changed to "are considered to be less vulnerable"

Table 5.12 Marine Birds that Could Occur in the Vicinity of Exploration Licence 1105 and off Western Newfoundland
Purple Sandpiper and Red Knot should be added to the list of shorebirds. Loons and grebes are mentioned above, but not in this list. The area for which this list applies should be better defined.

5.5.1.1 Seabirds

The figures (5.49 to 5.56) require refinement. Data for the 'Gulf' (versus 'Vicinity of EL1105') include a broad combination of sites, including sites near colonies and other physical features that contribute to concentrating marine bird densities at sea. This would tend to bias figures in a way that overestimates abundance measures for 'Gulf', underemphasizing the relative value of 'Vicinity of 1105'. Use of averages is also problematic given the distribution of count data. Maps would serve far better to contrast the relative importance of 'Vicinity of EL 1105' within the Gulf and beyond, across species. This suite of figures uses only *Programme intégré pour le recherche des oiseaux pélagiques* (PIROP) data, but should include significant amounts of newer *Environment Canada's Eastern Canadian Seabirds at Sea* (ECSAS) data for the Gulf.

Fifield *et al*. 2009, cited as the source of estimates of avian density of the area, includes only Gulf of St. Lawrence data from the Cabot Strait, north to Belle-Isle Strait. As such, densities presented in table 5.13 are derived from observations in the eastern Gulf only and may not well represent the rest of the Gulf. Additional data for much of the Gulf, within ECSAS, are now available through EC-CWS. It should also be noted that the database can be queried across spatial scales.

Figure 5.49 Monthly Seabird Abundance of Black-legged Kittiwake in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Vicinity should be defined, so as to know what distance from EL 1105 data were included.

Y-axis - Count data are not normally distributed. Also, many seabird species have a patchy distribution. These factors make the use of averages problematic. Use of maxima is more informative.

X-axis - Breeding season months should be shown. Birds may be absent from areas where ship-based surveys occur, but be present at colonies and their seaward extensions (foraging range from colonies) during the breeding season.

Black-legged Kittiwake breed in the Gulf of St. Lawrence; the breeding season should be considered across species. For example, how might breeding behaviour affect patterns of distribution and abundance at sea? How might congregation of individuals at breeding colonies affect their relative vulnerability?

It should be noted that this table shows abundance as detected during offshore ship-based surveys only, as opposed to additional consideration of colony counts for breeding species.

Figure 5.50 Monthly Seabird Abundance of Large Auks in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Large auks breed in the Gulf of St. Lawrence.

Figure 5.51 Monthly Seabird Abundance of Northern Fulmars in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Northern Fulmar do not breed in the Gulf of St. Lawrence in significant numbers.

Figure 5.52 Monthly Seabird Abundance of Greater Shearwater in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Great Shearwater are not known to breed in the Northern Hemisphere.

Figure 5.53 Monthly Seabird Abundance of Dovekie in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Dovekie do not breed in Canada in significant numbers.

Figure 5.54 Monthly Seabird Abundance of Storm-Petrels in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
Leach's Storm-Petrel do breed in the Gulf of St. Lawrence, but Wilson's Storm-Petrel do not breed in the Northern Hemisphere. Both species are confounded in this figure.

Figure 5.55 Monthly Seabird Abundance of Northern Gannets in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
It should be noted that 69% of entire North American population of Northern Gannet occurs in and/or is associated with three colony locations within Gulf of St. Lawrence. See http://bna.birds.cornell.edu/bna/species/693/articles/demography for further details.

Figure 5.56 Monthly Abundance of Total Seabirds in the Gulf of St. Lawrence and in the Vicinity of Exploration Licence 1105
This figure suggests a total, but it should be specified that this applies only to linear densities quantified using offshore ship-based surveys, as opposed to consideration of birds at colonies or using migratory corridors potentially segregated from at-sea survey data.

5.5.1.1 Seabirds (page 206; Black-legged Kittiwakes)

"*Black-legged Kittiwakes are the most abundant species"*
This should be changed to "Black-legged Kittiwake is the most abundant species"

"Black-legged Kittiwake abundance decreases"
It should be stated if this is absolute or relative abundance.

5.5.1.1 Seabirds (page 206; Auks)

"From March through May, the large auks are the most abundant seabird species in the Gulf. Large auk abundance peaks in April then decreases until September, when very few large auks are present."

Numbers of auks for the Gulf of St. Lawrence may still be high in the fall, as birds may congregate at colonies.

5.5.1.1 Seabirds (page 206; Northern Fulmar)

"In June, Northern Fulmar is the most abundant pelagic seabird in the Gulf."

This may suggest that the area is of particular importance to this species, as Northern Fulmar is not known to nest in significant numbers anywhere in the Gulf of St. Lawrence or Newfoundland and Labrador. Large North American colonies are located in the Arctic.

5.5.1.1 Seabirds (page 206; Great Shearwater)

"Greater Shearwater are the most abundant pelagic…"

This should be changed to “Great Shearwater is”. Throughout this paragraph there is a confusing use of plural versus singular species names, and associated verb conjugations.

5.5.1.1 Seabirds (page 206; Dovekie)

It should be noted that the vast majority of Dovekie do not breed in Canada.

5.5.1.1 Seabirds (page 206; Leach’s Storm-Petrel and Wilson’s Storm-Petrel)

Given the concentration of Leach's Storm-Petrel at breeding colonies, some treatment of the relative abundance of Wilson's Storm-Petrel seems warranted.

5.5.1.1 Seabirds (page 206; Northern Gannet)

It should be noted that small numbers of Northern Gannet are detected during Christmas Bird Counts into December. The comment concerning densities is only accurate in the case of birds detected during offshore ship-based surveys. Total numbers for the Gulf essentially should be stable and increase as young of the year are added to the total population at sea, following departure from colonies. It is unclear whether or not the density numbers have been calculated from colony counts. Note also that small numbers of Northern Gannets are present into December, rather than until December.

5.5.1.1 Seabirds (page 206; Seasonal Abundance)

The effort map from Fifield *et al*. 2009 (Figure 5) would be appropriate to show here. “Seasonal distributions” should be “seasonal distribution”. The reference of summary of data by seabird group is presented as being in Table 5.12, but is actually in Table 5.13.

5.5.1.1 Seabirds (page 207; Seasonal Abundance)

“Seabird abundance in the Gulf was highest in the fall (September and October)”

This statement should only concern the far eastern and north-eastern Gulf of St. Lawrence; densities for the remainder of the Gulf should not be inferred from these data. A clear caveat should be presented for this section.

“This is likely attributable to the presence of large numbers of newly fledged young from local seabird colony sites, as well as an influx of wintering Greater Shearwater from the South Atlantic.”

This is possible, but there may be other plausible explanations, such as higher productivity, prey availability, migration, and others.

“Comparatively, some of the lowest seabird abundances were observed in the fall in both the Scotian Shelf-Gulf of Maine and the Newfoundland and Labrador Shelf.”

Given the ranges presented, it is difficult to make this statement with certainty. Acknowledgement of the variance should be included here.

“The data indicate that this is largely attributable to the fact that large numbers of Northern Gannet are not present in these areas during the fall and higher concentrations of Greater Shearwater are present in the Gulf during the fall than in either the Scotian Shelf or the Grand Banks.“

The relative distribution and abundance of the most abundant species would tend to drive the "all waterbirds" patterns discussed. A species-by-species treatment may be more appropriate.

Table 5.13 Seasonal Weighted Median (and range) of Densities (birds/km^2) by Seabird Group in Each of the Three Ocean Regions in Atlantic Canada
Phalaropes should be included in this table. It is also not clear where the weighted medians (and range) were obtained (*i.e.* Fifield *et al*. 2009?). Additionally, "Ocean Regions" should be referred to as Marine Biogeographic Units. See DFO 2009 for more information.

5.5.1.1 Seabirds (page 208; Overall seabird abundance)

"Overall seabird abundance in the Gulf was lowest during the summer months (May through August)."

It should be noted that this was measured offshore via ship-based surveys, without considering proportion of populations at colonies and their seaward extensions.

"Seabird abundance in both the Scotian Shelf-Gulf of Maine and the Newfoundland and Labrador Shelf were also relatively low in the summer months."

This statement is contrary to data shown in Table 5.13 that shows measures (maxima) being greatest for 'All Waterbirds' during summer months, despite a large proportion of birds being constrained to colonies and their seaward extensions (foraging range of breeding adults). These varying statements need to be reconciled.

5.5.1.1 Seabirds (page 208; ECSAS data for spring)

"The ECSAS data indicate that Northern Fulmar, Northern Gannet and murres (spp.) are the most
abundant seabirds in the Gulf during the spring (March and April)."

It should be noted that this data concerns the far eastern and north-eastern Gulf of St. Lawrence only.

"However, Northern Gannet are not abundant in these regions, probably due to the fact that 70 percent of the Northern Gannet in Canadian waters nest in the Gulf."

It should be noted that 69% of the total North American population of this species is associated with colonies located within the Gulf.

5.5.1.1 Seabirds (page 208; ECSAS data for summer)

"The ECSAS data indicate that murres (spp.), Northern Fulmar and Northern Gannet are the most
abundant seabirds in the Gulf during the summer months"

This should be further specified that these are the most abundant seabirds "observed at sea".

5.5.1.1 Seabirds (page 209; ECSAS data for fall)

There is no mention of winter distribution; potential effects of ice extent and occurrence of ice-associated species would be appropriate.

"It should be noted that large gulls are not one of the seabird guilds presented in the PIROP data."

Herring Gull, Great Black-backed Gull, Iceland Gull, and Glaucous Gull data for the Gulf of St. Lawrence all are available within PIROP.

"The seasonal abundance patterns for the two data sets are similar but not identical."

It is not clear which data sets are being referred to.

"It is not possible to determine with certainty whether the differences between the two data sets are attributable to changes in the relative abundance of seabird species or are attributable to differences in the way the data were collected or processed."

It is possible to query and merge PIROP and ECSAS datasets to generate data that can be mapped to illustrate relative distribution and abundance for the Gulf. Survey effort also can be mapped (spatially and temporally), and further considered. EC-CWS should be contacted for assistance with accessing the relevant data from these databases.

5.5.1.2 Coastal Waterfowl

Maps should be presented to illustrate relative abundance and distribution. As contrasts were made with adjacent Marine Biogeographic Units for seabirds, the same could be done here to show the relative importance of sites within Atlantic Canada.

"Other areas with relatively high concentrations of eider breeding pairs include the eastern tip of the Gaspé Peninsula, the New Brunswick coast and the portion of the North Shore of Québec extending from the Mingan Archipelago to Sept-Îles."

It should be noted that there are large colonies of eider in the St. Lawrence estuary. Maps with locations of these colonies can be found in the Quebec Management Plan for the Common Eider S*omateria mollissima dresseri* (The Joint Working Group on the Management of the Common Eider 2004). Discussion of eider colonies should extend to these colonies as well. It should additionally be noted that there are large eider colonies in western Newfoundland; EC-CWS should be contacted for further information on the Newfoundland and Labrador eider colonies.

"In general, during the winter months, large concentrations of coastal waterfowl can occur along the North Shore of Québec between Sept-Îles and the Mingan Archipelago, along the shores of Anticosti Island and along the eastern tip of the Gaspé Peninsula."

During the summer, very large numbers of eider can be found moulting along the southern shore of Anticosti Island and the North Shore of Québec (Rail and Savard 2003; EC-CWS Unpublished data). About 12,000 eiders have been observed wintering offshore of the Magdelan Islands (mostly close to île Brion and Rochers-aux-Oiseaux) (EC-CWS Unpublished data). Numerous scoters can also be found during the spring (migration) and summer (moulting period) on the North Shore of Québec between Sept-Îles and Natashquan (Rail and Savard 2003). Please contact EC-CWS for access to the aforementioned unpublished data concerning eiders.

It is stated that there are relatively high concentrations of eider breeding pairs found in New Brunswick. These high concentrations are likely referring to birds nesting on the Fundy coast of New Brunswick; it should be noted that there are relatively low concentrations of eider breeding pairs found on the Northumberland coast of New Brunswick, which is the coast that is affected by this project.

The environmental assessment identifies that “coastal waterfowl (all species)” use the Gulf, Estuary and the Bay du Chaleur during spring migration. Specific reference should be made to the importance of these areas to migrating Scoters (refer to the Sea Duck Joint Venture website for more information: http://seaduckjv.org/index.html)

5.5.2.1 Seabirds (Page 209)

“Figures 5.49 to 5.56”
Data derived from ECSAS, PIROP or both need to be presented as maps, then interpreted. Please contact EC-CWS for assistance.

“Compiled in survey blocks”
Maps are needed in this section in order to properly and intuitively interpret the data. The current presentation inadequately contrasts the value (to marine birds) of EL 1105 with other areas in the Gulf.

“Black-legged Kittiwake and Northern Fulmar (Figures 5.49 and 5.51, respectively) are the most abundant species at this time of the year and the only pelagic seabirds recorded in the area.”

Dovekie is not mentioned in this section, but was mentioned in statements made previously in the document. Dovekie should be discussed here as well.

5.5.2.1 Seabirds (Page 210)

“Seabirds that breed in the Gulf would already have arrived and begun nesting.”

As such, abundance measures for the Gulf of St. Lawrence derived from at-sea distribution would be underestimated, given that large proportions of populations are concentrated at colonies (incubating birds) and their seaward extensions.

“Pelagic seabird abundance decreases substantially in July, as does the number of seabird species present (Figure 5.56).”

Abundance decreases at sea, as measured during ship-based surveys.

“Many seabirds are feeding nestlings in July and adults may tend to forage more frequently in areas adjacent to colony sites.”

Change to “Many seabirds are feeding nestlings in July and adults tend to forage more frequently in seaward extensions of colonies.”

“Storm-Petrels are also the most abundant pelagic seabird guild in August (Figure 5.54). Pelagic seabird abundance increases substantially in August; however, species richness remains low.”

It is difficult to quantify species richness when species are often (appropriately) lumped within guilds.

“..influx of wintering Greater Shearwater and the cessation of nesting activity at seabird colonies,”

This should be changed to “influx of wintering Great Shearwater and the departure of adults and young from seabird colonies,”

“The Cabot Strait would provide a migration corridor for seabirds moving out of the Gulf and into the Atlantic Ocean, increasing the number of seabirds present.”

It should be stated as to how many potential migration corridors exist.

"In addition, the level of effort in the PIROP sampling program also decreases at this time, resulting in fewer seabirds being detected."

Further discussion of effort and related impacts on interpretation of data and maps would be appropriate in this section.

5.5.3 Long Term Trends for Nesting Seabirds (page 213)

"In each of the census periods, three species accounted for over 75 percent of the total seabird population – Northern Gannet, Black-legged Kittiwake and Common Murre."

It is not clear if this refers to the breeding population, migrating population, or other. This would not include species migrating through the Gulf or wintering within the Gulf.

Figure 5.57 Sensitive Areas Located near Exploration Licence 1105
This map should also include locations of important seabird colonies (Rocher aux oiseaux, Pointe de l'est, Île Bonaventure, Refuge des îles Sainte-Marie, Refuge de la baie des Loups, *etc.*). This map should also include locations for colonies that host important proportions of Eastern Canadian populations of certain species (*e.g.*, Northern Gannet, Horned Grebe). Additionally, Piping Plover critical habitat should be identified on this map.

Section 5.7.1 Ecological and Biologically Sensitive Areas

There is no mention of the proposed National Marine Conservation Area (NMCA) around the Magdalen Islands. NMCA are under *Canada's National Parks Act*. Please contact M. Nelson Boisvert (Parks Canada; nelson.boisvert@pc.gc.ca; 418-649-8213) to obtain more information on this proposed protected area (*e.g.* maps).

There are many provincial wildlife habitats (designated under the *Conservation et mise en valeur de la faune act*) on the Magdalen Islands, some of which are included in the different Important Bird Areas (IBA), National Wildlife Areas (NWA), or Migratory Bird Sanctuaries (MBS):

- Aire de concentration d'oiseaux aquatiques de l'Île de l'Est.
- Refuge faunique de la Pointe-de-l'Est.
- Colonie d'oiseaux sur une île ou une presqu'île de l'étang de l'Est # 2,# 3.
- Colonie d'oiseaux sur une île ou une presqu'île de l'Île Shag (Havre-aux-Maisons).
- Colonie d'oiseaux sur une île ou une presqu'île de l'Île Rouge, Havre-Aux-Maisons.
- Colonie d'oiseaux en falaise de l'Île aux Goélands, Étang-du-Nord.
- Aire de concentration d'oiseaux aquatiques de la Plage de l'ouest #2 20-12-04.
- Aire de concentration d'oiseaux aquatiques de la Plage de l'Ouest # 1 20-12-03.
- Colonie d'oiseaux en falaise du Sud du Havre-Aux-Basques # 3-Colonie 2D.
- Colonie d'oiseaux sur une île ou une presqu'île du Sud du Havre-Aux-Basques # 1,# 2.

Please contact the Ministère des Ressources naturelles et de la Faune du Québec for more information (*e.g.* georeferenced maps) : services.clientele@mrnf.gouv.qc.ca

5.7.3 Vulnerable Seabird Nesting Sites

"Lock et al. (1994) list 136 known colonies of vulnerable seabirds in the Gulf. Seabird colonies are patchily distributed around the Gulf."

These could be presented as a list, though such a list would not address the 'continuum' of vulnerability across species. Lock *et al*. 1994 is in large part out of date; EC-CWS has more up-to-date information and should be contacted to provide as required.

"There are only six colonies along the western shore of Newfoundland."

This statement requires a reference, as it is unclear if the source is Lock *et al*. 1994.

"Four of the six colonies are found at the mouth of the Humber River. The lack of seabird colonies on the west coast of Newfoundland is attributable to a general lack of suitable nesting sites and the relatively low productivity of the waters along this coast. Seabird species breeding in these colonies include Black-legged Kittiwake, Great Cormorant, Double-crested Cormorant and Black Guillemots, with Black-legged Kittiwake the most abundant species."

The wording should be revised to emphasize that it is seabirds vulnerable to oil pollution which are being discussed; there are numerous additional seabird colonies along the southwest coast of Newfoundland and Labrador, namely those of Herring Gull, Great Black-backed Gull and Ring- billed Gull, which should also be mentioned.

"The southern portion of the Gulf is not an important area for nesting vulnerable seabirds. Only 13 colonies of vulnerable seabirds are found along the portion of the Gulf that borders Nova Scotia. Fourteen colonies are present in Prince Edward Island and five colonies are present in New Brunswick. All of these colonies are occupied primarily by Double-crested Cormorants and Great Cormorants. The paucity of seabird colonies in the southeastern part of the Gulf is believed to be attributable to oceanographic conditions rather than a lack of suitable nesting habitat."

This paragraph should be revised to properly reflect the high importance of this area for breeding seabirds, especially the Great Cormorant. The North American breeding and wintering range for this species is centered in the eastern part of the Gulf (*e.g.*, Magdalen Islands, southwest Newfoundland, Prince Edward Island) with the largest concentrations occurring on Cape Breton Island (see "Birds of North America"), including the largest North American colony located in IBA NS001 (this IBA also hosts various breeding alcids, kittiwakes, and Leach's Storm-Petrel, and should be included in the list of IBAs below). If an oil spill occurred at the proposed study site, it would likely have a significant impact on the North American Great Cormorant population.

The text should be changed to best to present both (1) number of colonies and (2) estimated breeding pairs for a region; *i.e.* stating "only 13 colonies" can be unintentionally misleading and can downplay the importance of an individual colony, as some colonies can host several thousand breeding pairs. Recent data exists which has been collected by EC-CWS (and summarized in reports), which show that seabird populations have increased in the Maritime portion of the Gulf, particularly in New Brunswick, which now also hosts Black-legged Kittiwake colonies. Cape Breton also hosts important Great Black-backed and Herring Gull populations. Please contact EC-CWS for this information.

"Refuge des Isle Ste-Marie"

This should be Refuge des îles Ste-Marie.

"…each of which supports more than 10,000 pairs of seabirds."

Other sites (including groupings of neighbouring islands) that have hosted and potentially could host 10,000 pairs of seabirds include: Île du Corossol, Archipel Mingan, Refuge de la Baie des loups, and Refuge de la Baie de Brador. Other St. Lawrence estuary sites include: Île Blanche, Île Bicquette, Île aux Pommes, Battures aux Loups-Marins, Québec. Tabusintac, in New Brunswick, has hosted and potentially could host 10,000 pairs.

"Each of these IBAs lies more than 75 km away from the Project."

The size of the IBAs (Important Bird Areas) should be noted.

"A number of Piping Plover habitat locations, though not designated as IBAs, were also identified on the coast of Newfoundland (Stephenville Crossing, Sandy Point, Flat Pay Peninsula, Searston, Little Codroy, East of Windsor Point, J.T. Cheeseman Provincial Park, Jerret Point-Windsor Point, Big Barrachois, Second) (LGL 2007)."

There is a Piping Plover breeding beach on the Magdalen Islands that should be added to this paragraph. Additionally, the overall Gulf of St. Lawrence population of Piping Plover as a proportion of the Canadian population should be noted. These areas should be added to Figure 5.57.

"The nearest vulnerable seabird colony to EL 1105 is the large seabird colony on Rocher aux Oiseaux"

Perhaps reword as 'colony of vulnerable seabirds'. It is unclear if the intended meaning is that the colony itself is vulnerable. If the colony itself is vulnerable, it should be explained why other Magdalen Island colonies would not also be vulnerable. The following text should be corrected accordingly.

There are many other seabird colonies on Magdalen Islands. See Chapdelaine and Rail (2004), or contact EC-CWS for a list of Magdalen Island seabird colonies. Data can also be extracted from the *Banque informatisée des oiseaux de mer du Québec* (BIOMQ). See also Fradette (1992) and Mousseau *et al*. (1976) for more information on the subject.

Table 5.18 Important Bird Areas for Marine Birds
An additional IBA site for Nova Scotia is NS055, located at the same latitude as NS057 but on the other side of the peninsula; this site is important for Great Cormorants.

Table 7.1 Routine Project Activity Interactions with Valued Ecosystem Components
Direct and indirect effects of light attraction on marine fauna (*e.g.*, migratory birds, fish) should be added to this table.

5.8.2.5 Bird Hunting

Summaries of the Regulations for Migratory Game Bird Hunting season dates, bag and possession limits are set by the Federal government, and while proposals for hunting of migratory game birds may be published in the Newfoundland and Labrador Hunting Guide, these should be accessed via the Environment Canada website, as the information contained in the Guide may not be accurate (not available at the time of publications of the guide). The link to these regulations is as follows: http://www.ec.gc.ca/rcom-mbhr/default.asp?lang=En&n=8FAC341C-1

It should be specified that "There is no open season for Harlequin Ducks *in Atlantic Canada or in Quebec*", as such seasons do exist elsewhere in Canada.

7.1.1 Presence of the Drill Platform

"Tasker et al. (1986) observed that bird density (birds/km^2) was seven times greater within a 500-m radius of a platform than in the surrounding area."

Higher densities around platforms can be the result of direct (light attraction) and indirect (reef effect or light attraction of prey) effects. Hence, such a finding is not surprising.

"During exploration drilling, vessel traffic and the drill rig may affect seabirds by attracting them to
lighting."

Migrating landbirds are also sometimes attracted to lighting (*e.g.* Blackpoll Warbler).

"Seabirds primarily navigate by sight, and lights can be an eye-catching visual cue (Wiese et al. 2001)."

Procellariiform seabirds also use olfactory cues to navigate (Nevitt and Bonadonna 2005). For example, dimethyl sulfide is known as an attractant.

"However, 52 Leach's storm petrels were recovered and released with no mortality observed during monitoring on board a Terra Nova vessel over a three-week period during the summer of 1998 (Husky Oil 2000)."

Given certain environmental conditions (*e.g.*, wind speed and direction), characteristics of Leach's Storm-Petrels (*e.g.*, relatively low mass), and quantified occurrence of known predators of this species (*e.g.*, Great Black-backed Gull) at and in the vicinity of platforms (EC-CWS unpublished data), it is likely that some unknown proportion of individuals entering into contact with the flare or otherwise negatively affected by the flare would not be recovered during monitoring. This expectation would apply more so to injured and dead birds that had fallen directly into the water. An analogous fate could be expected for migratory passerines similarly affected by flares, and/or lights (Dryson M. unpublished study). See Wiese *et al*. 2001 and De Groot 1996 for further information, and please contact EC-CWS for more information concerning the unpublished data and studies.

"Therefore, the effects of discharges of these fluids on marine birds (including Species at Rick) will be negligible."

"Species at Rick" should be "Species at Risk."

7.1.5.3 Biological Effects - Marine Birds (page 329)

"The lack of data regarding seabirds and seismic activity (as well as sounds associated with other offshore oil and gas activities) may be a reflection of the fact that there is little evidence that problems occur (Davis et al. 1998) or maybe as a result of the paucity of data."

Dedicated studies are required to elucidate potential effects and generate relevant data.

7.2.2.1 Presence of the Drill Platform- Marine Bird Species at Risk (page 344)

"All other marine birds considered within this VEC would occur in nearshore / coastal waters of the Study Area and would therefore not interact with the presence of the drilling platform."

An exception could possibly be during migratory movements over ocean expanses. Spatial patterns during migration remain poorly understood for avian Species at Risk (and most other avian species).

7.2.2.4 Supply Vessels – Marine Bird Species at Risk

"Helicopters servicing the Project will avoid major colonies and will fly at a minimum of 600 m above sea surface whenever possible, limiting potential for disturbance."

Helicopters should also avoid nesting areas for Species at Risk.

7.5 Marine Birds

"The following families of marine birds occur within the Study Area and could potentially be affected: Procellariidae (fulmars and shearwaters), Hydrobaridae (storm-petrels), Sulidae (gannets), Phalaropodinae (phararopes), Laridae (gulls, terns, kittiwakes, jaegers, skuas) and Alcidae (dovekie, murres, razorbills, puffins)."

Depending on project timing, migratory landbirds could also be affected.

"The zones of influence of other routine Project activities are generally limited to the Project Area."

It should be noted that birds nesting at colonies on the Magdalen Islands could be expected to forage within the project area.

"Due to a general lack of suitable nesting sites along the west coast of Newfoundland, there are only six colonies along the western shore of Newfoundland, four of which are found at the mouth of the Humber River."

See comments in section 5.7.3 related to the importance of this area to breeding birds, and note that gull colonies have not been included in this tally.

7.5.2.1 Effects Assessment – Presence of Platform

"Existing knowledge related to marine birds and lighting on the platform is provided in Section 7.1.1"

Landbirds should be considered in this section.

"Marine birds attracted to flares may result in mortalities, but while gas flaring produces light that may attract birds, heat and noise generated by the flare may also deter birds from the immediate area, minimizing potential effects."

This point requires further investigation, and should be elaborated upon.

7.5.2.5 Drilling Noise / Vertical Seismic Profiles

"Exiting knowledge indicates that marine birds diving in close proximity to a loud underwater sound could be injured."

"Exiting" should be "existing"

7.5.3 Mitigation

"a pelagic marine bird monitoring program will be implemented according to the protocols developed by EC-CWS and Corridor will include a trained observer among their staff"

This should be rephrased as "a pelagic marine bird monitoring program with EC-CWS (ECSAS) protocols will be implemented and Corridor will include trained observer(s) among their staff."

"Corridor will have a Bird Handling Permit and will comply with the requirements for documenting and reporting any stranded birds (or bird mortalities) to the CWS during the 20 to 50 day drilling program."

There should additionally be a requirement for training to differentiate Leach's Storm-Petrel from Wilson's Storm-Petrel, so that proper species' identification can be attained when handling storm-petrels.

8.7.1.2 Marine Bird Species at Risk

The Magdalen Islands Horned Grebe should be discussed here.

"and survival (Vangilder and Peterle 1980; Trivelpiece et al. 1984)"

It should be noted that reduced survival is of adults as well as offspring.

"Although oil spills at sea have the potential to kill tens of thousands of seabirds (Clark 1984; Piatt et al. 1990), some studies suggest that even very large spills may not have long-term effects on seabird populations (Clark 1984; Wiens 1995)."

The veracity of this statement depends on how 'populations' are defined, especially for Species at Risk.

"Piping plover are known to breed in western Newfoundland."

Piping Plover are also known to breed in the Magdalen Islands, and elsewhere in the Gulf of St. Lawrence.

Harlequin Duck would be present (if at all) in very low densities along the west coast of Newfoundland. Cape St. Mary's would represent the largest wintering area in Newfoundland for the eastern population, but should not be affected by a localized spill of diesel fuel. See Souliere and Thomas 2009 for further details and maps concerning Harlequin Duck occurrences.

The largest proportion of eastern population Barrow's Goldeneye winters in a few localized areas some distance west of the proposed drill site along the Quebec North Shore, the St. Lawrence Estuary, Anticosti Island, and the Bay du Chaleur. During the breeding season these birds are nesting on interior lakes adjacent to the Quebec North Shore, and so would not be exposed to potential oil spills. An oil spill adjacent to these primary wintering areas could have very significant implications in terms of population sustainability. This potential occurrence has been flagged as a primary concern in the "Management Plan for the Barrow's Goldeneye (*Bucephala islandica*), Eastern Population, in Canada" (found at http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1566). There exists a chance an oil spill could occur from any supply or other vessel using the shipping lane, however the risk is relatively small assuming the oil spill modeling for this project (Section 2.12.3) is accurate.

8.7.2 Marine Ecosystems

"Based on modelling conducted by SL Ross (2011; see Section 2.12 for summary), there will be no interaction between a spill at the wellsite and coastal ecosystems (algal, eelgrass and saltmarsh communities) (Figure 2.20). A diesel spill from a vessel accident could potentially affect the coastline and this is discussed below."

Several marine bird species are strongly associated with eelgrass habitat and saltmarsh habitat. The residual (long-term) presence of hydrocarbons from a spill could directly (through oiling) and or indirectly (through effects on prey or shelter) impact marine birds in aforementioned habitats outside the immediate time frame of the accident itself.

"As condensate product from a surface spill would form a thin slick on the ocean surface and only disperse into the top 30 m of the water column (Section 2.12.2.4), it is unlikely that there would be an interaction between a surface spill and deep-water corals and sponges."

It should be noted that this is where the highest proportion of available prey for marine birds is concentrated.

8.7.4 Marine Birds

"Diving species such as Black Guillemot, murre (spp.), Atlantic Puffin, Dovekie, eider (spp.), Long-tailed Duck, scoters, Red-breasted Merganser (Mergus serrator), and loons (spp.) are considered to be the most susceptible to the immediate effects of surface slicks (Leighton et al. 1985; Chardine 1995; Wiese and Ryan 1999; Irons et al. 2000)."

Grebes should be included in this list.

"There also appears to be a strong seasonal effect, as significantly higher proportions of alcids (along with other seabird groups) are oiled in winter versus summer (Wiese and Ryan 1999)."

This is necessarily a function of the location, size and importance (percentage of a population) of bird congregations (colonies, seaward extensions, migration staging areas, wintering areas).

"Other species such as Northern Fulmar, shearwaters (spp.), storm-petrels (spp.), gulls (spp.), and terns (spp.) are vulnerable to contact with oil because they feed over wide areas and make frequent contact with the water's surface. They are also vulnerable to the disturbance and habitat damage associated with oil spill cleanup (Lock et al. 1994)."

Phalaropes should be added to this list.

"Shorebirds may be more affected by oil spills than has been suggested by carcass counts."

Phalaropes and other coastal species should be added to this list.

"The west coast of Newfoundland supports six vulnerable seabird colonies, with four of the six found at the mouth of the Humber River, the waterway leading to the Port of Corner Brook."

The large and important marine bird colonies in the Magdalen Islands should be mentioned here. The known or expected foraging range of species nesting at these (and other) Gulf colonies should be added as well.

"A survey of an extensive area around the well after the well was capped (11 days after the blow-out) observed a total of seven oiled marine birds (three Dovekies and four murres), with no obvious oiling of gulls, kittiwakes and fulmars (Martec Ltd. 1984, in Hurley and Ellis 2004)."

It is also important to report that most oiled birds are never recovered, and that oiled carcasses can disappear very quickly in the marine environment, especially in light of this study having been conducted after the well was capped, rather than during the release of the oil. See Wiese 2002, Hlady and Burger 1993, Page *et al*. 1990, and Ford *et al*. 1987 for further details.

"Some studies have suggested that oil pollution is unlikely to have major long-term effects on bird productivity or population dynamics (Clark 1984; Butler *et al*. 1988; Boersma *et al*. 1995; Erikson 1995; Stubblefield *et al*. 1995; White *et al*. 1995; Wiens 1995, 1996; Seiser *et al*. 2000)."

Some studies (such as Harvey *et al*. 1981 and Leighton 1993) do show long-term effects of oil pollution on birds (*e.g.*, birds having ingested oil no longer contribute to the reproductive output of a species); the different aspects of this issue concerning long-term effects of oil pollution on birds should be included and discussed.

"The west coast of Newfoundland supports six vulnerable seabird colonies, with four of the six found at the mouth of the Humber River, the waterway leading to the Port of Corner Brook. The lack of seabird colonies is attributable to a general lack of suitable nesting sites and the relatively low productivity of the waters along this coast. There are also some relatively large tern colonies present along the west coast of Newfoundland."

See comments in section 5.7.3 regarding: 1) underestimation of the number of seabird colonies (*i.e*. gull colonies are not accounted for here), 2) underestimating the importance of this area to seabirds by not presenting the number of breeding pairs; there are thousands of pairs of kittiwakes, gulls, cormorants and terns breeding in the southwest part of insular Newfoundland, and 3) the importance of this area to Great Cormorant, who have a restricted breeding range in North America.

"… it is unlikely that an accidental spill would affect a large number of birds or that the effects would be measurable at a population level."

An exception to this statement would be the Great Cormorant.

11.0 Follow-up and Monitoring

"Routine checks will be done for stranded birds that may have been attracted to vessel lighting."

Documentation should include photographs, following a pre-determined protocol, established with EC-CWS.

"Corridor will use a Marine Mammal Observer during the drilling program."

The aforementioned seabird observer(s) should be listed here as well.

I trust that this information will be of assistance in your review of this proposal. If you wish to discuss these comments or have further questions, please do not hesitate to contact me at your convenience.

Yours truly,

Original Signed by Glenn Troke

Glenn Troke
Environmental Assessment Coordinator
Environmental Protection Operations Directorate
EPOD/NL

cc Michael Hingston

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