Environmental Assessment
MKI Southern Grand Banks Seismic Program, 2014–2018
Addendum

Prepared by

LGL LIMITED
environmental research associates

for

Multi Klient Invest AS

&

TGS-NOPEC Geophysical Company ASA

29 May 2014
Project No. SA1250

Environmental Assessment of MKI Southern Grand Banks Seismic Program, 2014–2018 Addendum

Prepared by

LGL Limited
environmental research associates
388 Kenmount Road, Box 13248, Stn. A.
St. John's, NL A1B 4A5
Tel: 709-754-1992
rbuchanan@lgl.com
jchristian@lgl.com
www.lgl.com

Prepared for

Multi Klient Invest AS
Lilleakerveien 4C, P.O. Box 251
Lilleaker, 0216, Oslo, Norway

and

TGS-NOPEC Geophysical Company ASA
1051 Clay Road
Houston, Texas, 77043, USA

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GENERAL COMMENTS

Environment Canada – CWS

Please note that EC's previous comments on the scoping document and project description (submitted to you on 15 January 2014) are still applicable to the project as described in the EA report.

Please note that documents mentioned in the comments are as follows:

- Protocol for Collecting Dead Birds from Platforms.pdf;
- Birds and Oil - CWS response plan guidance updated June 2012.pdf;
- O'Hara and Morandin.pdf;
- Stranded Bird Encounters Datasheet.xls; and
- Oiled Birds Protocol.pdf

Response: EC's comments on the scoping document and project description pertaining to birds discuss regulatory requirements under the *Migratory Birds Convention Act* and complementary regulations *(Migratory Birds Regulations),* the *Species at Risk Act*, and the *Canadian Environmental Protection* Act. They also provide guidelines for the preparation of the EA regarding information sources, distribution and abundance of species, impact pathways, mitigation, effects of the environment on the project, effects of accidents and malfunctions, cumulative effects, and follow-up monitoring. These comments were addressed, and assisted in the preparation of the EA.

Fish, Food and Allied Workers (FFAW)

There is a recurring mention within the Environmental Assessment about the utilization of a 7 day temporal pre-research survey separation. It is the understanding of the FFAW|Unifor that this is being accepted by DFO when it comes to their Spring and Fall Research Vessel Trawl Surveys, but it is not feasible to be utilized in connection with the execution of the Industry-DFO Collaborative Post-Season Trap Survey for Snow Crap. If there are further questions on these matters it would be worthwhile to communicate with the shellfish research scientists at DFO. The reviewer would suggest that in the document when there is any mention of the 7 day temporal separation, it **has** to specify what science context this applies. Any possible impact, be it negative or positive, on the Industry-DFO Collaborative Post-Season Trap Survey for Snow Crab cannot be accepted.

Response: MKI commits to maintain regular communication with DFO, the FFAW, independent fishers, and managers of other key corporate fisheries in the area throughout survey operations. As stated in Appendix 2 of the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2012):

a) Surveys should be scheduled, to the extent possible, to reduce potential for impact or interference with Department of Fisheries and Oceans (DFO) science surveys. Spatial and temporal logistics should be determined with DFO to reduce overlap of seismic operations with research survey areas, and to allow an adequate temporal buffer between seismic survey operations and DFO research activities.

b) Seismic activities should be scheduled to avoid heavily fished areas, to the extent possible. The operator should implement operational arrangements to ensure that the operator and/or

its survey contractor and local fishing interests are informed of each other's planned activities.

The Proponent contacted DFO regarding temporal and/or spatial separation between seismic activity and the Industry-DFO Collaborative Post-Season Trap Survey for snow crab. Avoidance measures previously voiced by the FFAW (e.g., maintaining a distance of ~20 nm from crab survey stations prior to their sampling) may be viewed as a precautionary measure; however, there is currently no indication of official acceptance of avoidance protocols by DFO (E. Dawe, DFO, NL, pers. comm., 2014).

The 7-day temporal buffer associated with the DFO RV surveys is based on the available scientific literature (e.g., Engås et al. 1996; Hassel et al. 2004; Løkkeborg et al. 2012). These studies suggest inter-specific variability in terms of behavioural effects of exposure to seismic airguns. However, the temporary nature of these effects are reflected in all three studies; thus the 7-day temporal buffer.

SPECIFIC COMMENTS

Canada – Newfoundland and Labrador Offshore Petroleum Board

Section 2.0 Project Description, 1st para, line 3, pg 6 – If 2D and 3D programs using two different vessels are proposed for the same year, then the cumulative effect should be assessed.

Response: In 2014, MKI will acquire 2D seismic data only—i.e., 2D and 3D seismic surveys by MKI will not occur simultaneously in the Project Area in 2014. Note that the Project Area is very large ~722,291 km^2 (see Figure 1.1 on page 2 of the EA). While it is possible that 2D and 3D seismic surveys by MKI could take place in the same year within the Project Area during 2015-2018, it is highly unlikely that these two activities would occur in close proximity to each other. Given the anticipated spatial separation between potential 2D and 3D seismic surveys occurring in the same season, the likelihood of significant residual effects on VECs is considered minimal. Further details on the potential of cumulative effects from concurrent 2D and 3D surveys within the MKI Project Area would be provided in an EA Update submitted to the C-NLOPB when survey details are available.

Section 2.1 Spatial and Temporal Boundaries, page 6 – Only 4 coordinates of the Project Area have been provided. The reviewer can identify at least 8 more, please provide all coordinates of the Project Area.

Response: In terms of spatial boundaries, the Project Area is irregularly shaped. The coordinates (decimal degrees, WGS84 projection) of the six maximum extents of the Project Area are as follows (see Figure 1.1):

- Northwest: 45.914ºN, 57.631ºW;
- North-central: 46.286ºN, 47.468ºW;
- Northeast-1: 45.979ºN, 40.960ºW;
- Northeast-2: 45.417ºN, 40.887ºW.
- South-central: 38.658ºN, 47.411ºW; and
- Southwest: 41.546ºN, 55.727ºW.

Section 2.1 Spatial and Temporal Boundaries, page 6 – The coordinates for the Study Area should be provided.

Response: The Study Area is also irregularly shaped. The coordinates (decimal degrees, WGS84 projection) of the six maximum extents of the Study Area are as follows (see Figure 1.1):

- Northwest: 45.998ºN, 57.858ºW;
- North-central: 46.466ºN, 47.477ºW;
- Northeast-1: 46.112ºN, 40.789ºW;
- Northeast-2: 45.407ºN, 40.634ºW.
- South-central: 38.478ºN, 47.364ºW; and
- Southwest: 41.427ºN, 55.907ºW;

Section 2.2.6.1, Seismic Vessel page 9 - It should be Gibraltar.

Response: Edit all instances of "Gibraltor" to "Gibraltar."

Section 2.2.8, Seismic Streamers, last line, page 9 – It is not evident that both 2D programs with one streamer and 3D programs with up to 16 streamers have been assessed.

Response: MKI have acquired many 3D surveys around the world using spreads of 10 and 14 streamers with a towing depth of 15 to 25 m. We can therefore confidently say that these types of 3D towing configurations have been carefully assessed. The recently introduced Titan Class Ramforms are equipped with 26 streamer reels and have towed configurations of 14 and 16 streamers. As this EA covers the next five years and 3D within this project is not anticipated to take place until 2016 at the earliest, it is not unreasonable to consider that these type of streamer spreads would become more commonly used. Details on future 3D towing configurations would be provided in an EA Update submitted to the C-NLOPB when survey details are available.

Section 3.2.3.1, Temperature, page 25 – "...in all regions and coldest March in all regions..." this is an awkward sentence and needs to be addressed.

Response: Edit "…in all regions and coldest March in all regions…" to "…in all regions and coldest in March in all regions…" in Section 3.2.3.1, p.25.

Section 3.3.1, Major Currents in the Study Area, paragraph 4, page 28 – This is a very awkward paragraph with multiple grammatical errors. "In *the* Laurentian Channel...", "...on the eastern side of *the* Cabot Strait...", "...along the western side of *the* Laurentian Channel."

Response: Edit Section 3.3.1, paragraph 4, p.28 to the following:

"The fourth influence on ocean circulation in the Study Area is the water exchange with the Gulf of St. Lawrence through the Laurentian Channel. In the Laurentian Channel, the currents flow into the Gulf of St. Lawrence along the east side of the channel and out of the Gulf along the west side. The flow into the Gulf of St. Lawrence on the eastern side of the Cabot Strait is mainly barotropic with a speed of 20 cm/s (Han et al. 1999 *in* Oceans 2014). The flow out of the Gulf of St. Lawrence on the western side of the Cabot Strait flows mainly along the western side of the

Laurentian Channel. A smaller portion flows along the inner Scotian Shelf and onto the Mid-shelf (Han 2003 in Oceans 2014)."

Section 3.3.1, Major Currents in the Study Area, paragraph 5, page 28 – "...which creates strong northwest winds, *cold* air and sea..."

Response: Edit "…which creates strong northwest winds, cod air and sea temperatures…" to "…which creates strong northwest winds, cold air and sea temperatures…" in Section 3.3.1, paragraph 5, p.28.

Section 4.2.1.3, Plankton, page 35 – "The spring bloom *tends* to be..."

Response: Edit "The spring bloom trends to be…" to "The spring bloom tends to be…" in Section 4.2.1.3, p.35.

Section 4.2.1.4, Benthos, page 38 – "...would include barnacles, tunicates, *bryozoans*,..."

Response: Edit "…would include barnacles, tunicates, bryzoans…" to "…would include barnacles, tunicates, bryozoans…" in Section 4.2.1.4, p.38.

Section 4.2.1.4, Benthos, Subsection Deep-water Corals and Sponges last paragraph, page 41 – It should be *hexactinellid*.

Response: Edit "Siliceous hexactinelid sponges can form reefs…" to "Siliceous hexactinellid sponges can form reefs…" in the last paragraph in Section 4.2.1.4, p.41.

Section 4.3.3.1, page 56 – The section's title is misspelled, it should be *Historical*.

Response: Edit the title of Section 4.3.3.1 from "Historial Fisheries" to "Historical Fisheries" on p.56.

Section 4.3.3.2 Study Area Catch Analysis, 2005-2010, Subsection Fishing Gear in the Study Area, 1st paragraph, page 61 – If trawls and dredges accounted for 47% of the total catch weight and pots/traps and gillnets (fixed gears) accounted for 37% of the total catch weight, where is the other 16% of total catch weight?

Response: There was an error in the reported percentage of total catch weight for pots/traps and gillnets (fixed gears); therefore, edit "Pots/traps and gillnets, fixed gears, accounted for 37% (24 and 13%, respectively) of the total catch weight during this period" To "Pots/traps and gillnets, fixed gears, accounted for 47% (34 and 13%, respectively) of the total catch weight during this period" in the first paragraph of Section 4.3.3.2, p.61. The percentages of total catch weight for trawls and dredges (47%) and pots/traps and gillnets (fixed) (47%) combine to account for 94% of the total catch weight in the Study Area between May and November, 2005 to 2010. The remaining 6% of total catch weight was harvested using seines (Danish and purse; <0.1 and 0.1% of total catch, respectively), troller lines (<0.1%), hand lines (baited; <0.1%), rod and reel (<0.1%), harpoon and electric harpoon (both <0.1%), longlines (5%), trap nets (<0.1%), and hagfish barrels (1%).

Section 4.3.8 Industry and DFO Science Surveys, last paragraph, page 87 – "Research station locations in relation to the Study Area *and Project Areas* are shown in Figure 4.42."

> ***Response:*** Edit "Research station locations in relation to the Study Area are shown in Figure 4.42" to "Research station locations in relation to the Study and Project areas are shown in Figure 4.42" in the last paragraph of Section 4.3.8, p.87.

Section 4.4 Seabirds, last paragraph, page 89 – There are several other birds on Schedule 1 that may traverse the Study Area. These should be identified and discussed.

> ***Response:*** Seven species of birds on Schedule 1 were considered for assessment in the Species At Risk section — Ivory Gull (endangered), Red Knot *rufa* subspecies (endangered), Piping Plover (endangered), Roseate Tern (endangered), Ross's Gull (threatened), Harlequin Duck eastern population (special concern), and Barrow's Goldeneye eastern population (special concern). Of those, we concluded that Ivory Gull was the sole species with a realistic probability of occurring in the Study Area, but only during winter in an extreme ice year. However, the proposed seismic program will not occur during the winter so there would be no interaction between the proposed project and the Ivory Gull. (Ivory Gull is addressed on p.89 of the EA.) Red Knot and Piping Plover are terrestrial shorebirds. Piping Plover nest in small numbers at a few sites along the south coast of Newfoundland. Harlequin Ducks and Barrrow's Goldeneyes occur along the south coast of Newfoundland as well, but both are coastal species that typically occur close to the shore. The Study Area is far offshore and none of Piping Plover, Red Knot, Harlequin Duck, or Barrow's Goldeneye is expected to occur there. Ross's Gull and Roseate Tern are very rare in Newfoundland waters. There is no evidence that Ross's Gull occurs at sea on the southern Grand Banks or farther south. Roseate Tern breeds in small numbers on Sable Island, Nova Scotia, well east of the Study Area. Roseate Tern is accidental in Newfoundland, with only one known record. It is improbable that the very small numbers of Roseate Terns nesting on Sable Island, or elsewhere in Nova Scotia, would use the Study Area.

Section 4.4.2 Information Sources, first paragraph, page 90 – It should read SEA maps, not SAE maps.

> ***Response:*** Edit any instances of "SAE" to "SEA" in the EA.

Section 4.5 Marine Mammals and Sea Turtles, page 102 – A general discussion of sea turtles should be included here.

> ***Response:*** The general discussion on sea turtles can be found in Section 4.5.5, p.120. The beginning of Section 4.5 focuses on marine mammals.

Table 4.10, page 103 – There are three instances where "palagic" is used. The reviewer assumes it is meant to be "pelagic", if so, this needs to be corrected.

> ***Response:*** Edit all instances of "palagic" to "pelagic" in the EA.

Section 4.6.1.3 Northern Bottlenose Whale, paragraph 2, page 127 – It should read, "The recovery goal for this population is to..."

Response: Edit "The recovery goal for this population it to…" to "The recovery goal for this population is to…" in Section 4.6.1.3, paragraph 2, p.127.

Table 4.14, page 135 – It should read, "Important migratory corridor for various fishes."

Response: Edit the last bullet point in the Key Attributes column for the Laurentian Channel and Slope entry from "Important migratory corridoe for various fishes" to "Important migratory corridor for various fishes" in Table 4.14, p.135.

Table 5.1, page 142 - only 4 coordinates of the Project Area have been provided. The reviewer can identify at least 8 more, please provide all coordinates of the Project Area.

Response: As stated in response to a similar comment above, in terms of spatial boundaries, the Project Area is irregularly shaped; therefore, edit Table 5.1, p.142 to reflect the following coordinates (decimal degrees, WGS84 projection) of the maximum extents of the Project Area:

- Northwest: 45.914ºN, 57.631ºW;
- North-central: 46.286ºN, 47.468ºW;
- Northeast-1: 45.979ºN, 40.960ºW;
- Northeast-2: 45.417ºN, 40.887ºW.
- South-central: 38.658ºN, 47.411ºW; and
- Southwest: 41.546ºN, 55.727ºW;

Section 5.2.2 Program Consultations, pg 139 – In Section 4.34 Traditional and Aboriginal Fisheries on page 77 it is stated that portions of the Study Area waters are used by the Conne River Band Council (Miawpukek First Nation Government). Were they included in the consultations undertaken for the proposed MKI seismic program?

Response: MKI included the Conne River Band Council in their engagement strategy and provided them with an information package containing a Project Overview, Survey Location Map, and Mitigation Measures to be undertaken. MKI understands the importance of Aboriginal Consultation in accordance with the fiduciary obligations of the Crown and strategy adopted by the Government of Canada. To this end, it is understood that the Government of Canada will undertake consultation with First Nations. However, should the Government require additional input to the consultation process through Proponent engagement of the Miawpukek First Nation, MKI can undertake direct engagement of the Band.

Section 5.2.2 Program Consultations, pg 140 – Please report on the consultations with the C-NSOPB and the Government of France.

Response: MKI have consulted with the C-NSOPB about the project. Permitting with the C-NSOPB would only be necessary if the seismic vessel were to move across into Nova Scotia territorial waters with an active seismic array. MKI have confirmed to the C-NSOPB that all seismic lines will be terminated within the Project Area. The C-NSOPB wanted assurance that Nova Scotia fishermen who fish within the Project Area are informed about the survey. MKI have committed to include Elizabeth MacDonald from the C-NSOPB Environment Group on our weekly reports and notices going out to fishermen. Elizabeth MacDonald has agreed to distribute this information to the relevant fishing groups in Nova Scotia.

MKI have also consulted with the French authorities in St. Pierre et Miquelon and have confirmed that there will be no operations during the 2014 season within or in close proximity to French territorial waters. Permitting to allow the acquisition of seismic lines in French territory in future years has commenced and a visit to St. Pierre et Miquelon to meet the various governing bodies is currently being organized and expected to take place in June.

Section 5.6.3.1 Avoidance of Commercial Fishing Areas, page 154 – "~~To the best of its ability~~, MKI will avoid active fishing areas during the seismic survey." This is more appropriate statement.

Response: During the seismic survey MKI will avoid areas where heavy fishing activity is taking place. As stated in the response to the previous FFAW general comment on page 1 of this Addendum, MKI will adhere to the C-NLOPB guidelines pertaining to 'Interactions with Other Ocean Users' outlined in Appendix 2 of the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2012).

Section 5.8.4.1 Underwater Sound, subsection Behavioural Effects (Invertebrate Fisheries), paragraph 1, page 171 – Anecdotal information requires multiple observations (in these cases it would require multiple fish harvesters observing the same events). If it is only a single report from a fish harvester, which it appears to be, then the "anecdotal" needs to be removed and the observation by each fish harvester needs to be properly described as a single observation.

Response: Noted.

Section 5.9.2, Marine Transportation, pgs 216-219 – More detail should be provided on the amount of traffic in the area and not just the routes.

Response: Revise the 3rd paragraph in Section 5.9.2, p.217, to the following:

"In mapping and analyzing vessel tracks from February 2010 to February 2011 using the Long Range Identification and Tracking (LRIT) data in Atlantic Canada, Koropatnick et al. (2012) found high levels of traffic along the Grand Banks centered in the northwest and north-central regions of the Project Area. Between March 2010 and February 2011, 50 to 250 vessels were recorded in the Project Area (see Figures 7 and 8 *in* Koropatnick et al. 2012), with the greatest number of vessel tracks observed in August 2010 (18 to 36 vessels; see Figure 9A *in* Koropatnick et al. 2012) and the fewest observed in February 2010 (8 to 18 vessels; see Figure 9B *in* Koropatnick et al. 2012). LRIT is a global, satellite-based system used to track identification and position data for passenger/cargo vessels >300 gross tonnage on international voyages (Koropatnick et al. 2012); the Proponent was unable to obtain additional/updated data, as the LRIT data is only available to participating governments (Flag States) (CCG 2013). Similar analysis using the Eastern Canada Vessel Traffic Services (ECAREG) data, which monitors inbound commercial shipping traffic weighing ≥500 gross tonnage or transporting dangerous/pollutant cargo, indicated that in 2000, 40 to 105 vessels were observed in the Project Area (DFO 2007); this data is also proprietary, and the Proponent was unable to obtain additional information. The Automated Mutual Assistance Vessel Rescue System (AMVER), a computer-based voluntary global ship reporting system sponsored by the U.S. Coast Guard, indicated that 5 to 14 vessels were observed in a given month in the Project Area in 2012 and 2013 (2013 data includes January to June) (USCG 2013). The majority of traffic was observed in the northwest and north-central regions of the Project Area using both the ECAREG and AMVER data.

Section 5.9.3 Other Oil and Gas Activities, 1st para, pg 220 – Although historically there have been two or three seismic programs operating during any one season, there has been an increase in the number of seismic programs operating in Newfoundland and Labrador waters in a given year. For example, MKI is proposing to conduct up to two programs (i.e. 2D and 3D) with two vessels in the same year between 2015 and 2018.

> ***Response:*** It is unclear what types of geophysical programs the reviewer is including in Seismic Programs. The text as written on p.220 (first paragraph) is accurate in that it refers specifically to 2D or 3D seismic programs. The C-NLOPB maintains a geophysical activity summary, currently ranging from 1996 to 2013 (http://www.cnlopb.nl.ca/exp_stat.shtml), which indicates that from 2009 to 2013 there were zero to four 2D or 3D seismic surveys in a given year. If the reviewer is including wellsite and geohazard surveys (which periodically use small airgun arrays—typically four airguns for geohazard surveys for short duration programs) in addition to 2D and 3D seismic surveys in Seismic Programs, then in recent years, the number of programs which are employing airgun arrays in Newfoundland and Labrador waters have been variable, with two to seven wellsite surveys and zero to two geohazard surveys in a given year from 2009 to 2013.

Section 5.9.3 Other Oil and Gas Activities, 3rd para, line 2, pg 220 – MKI is included as an example of another seismic program. Further discussion is warranted regarding MKI's plans to conduct 2 separate programs in the same year.

> ***Response:*** In Section 5.9.3 it is noted that "Different seismic programs could potentially be operating in close proximity. During these periods, marine mammals may be exposed to noise from each of the seismic survey programs. It will be in the interests of the different parties for good coordination between programs in order to provide sufficient buffers and to minimize acoustic interference. Effects on marine mammals (and other VECs) are predicted to be not significant."

Section 5.9.3 Other Oil and Gas Activities, 3rd para, line 6, pg 220 – Please expand on the statement "However, there are uncertainties regarding this prediction".

> ***Response:*** Expand the statement as follows:
>
> "However, there are uncertainties regarding this prediction, as the number of programs scheduled to occur within the same area during the same time period is unknown at this time."

Section 5.9.3 Other Oil and Gas Activities, 3rd para, line 8, pg 220 – Future activity of seismic programs (2014-2018). Are you referring to activities in 2015-2018?

> ***Response:*** Yes, edit "(2014-2018)" to "(2015-2018)."

Environment Canada (EC) – Canadian Wildlife Service (CWS)

Section 2.2.10 Logistics and Support, page 12 - Aircraft, particularly helicopters, have been known to cause significant negative impacts to migratory birds during various life stages (i.e. chick rearing, moulting). Mitigation measures such as timing and adjusting the altitude and pattern of helicopter flight lines can minimize disturbance. Helicopter use near seabird breeding colonies should be avoided from May 1st - August 31st (with an end-date of September 30th for Northern Gannet Colonies).

Response: Helicopter flights are not planned for the 2014 program, but may occur during the 2015-2018 programs. MKI acknowledges the potential effects of helicopter overflights on birds and has addressed the potential effects of helicopter activity in Section 5.8.6.4, p.194, of the EA. There it states that helicopter flights will be operated at a minimum altitude of 300-450 m (~1,000-1,500 ft) when in transit to minimize any potential effects on seabirds. To the existing text, as a new paragraph following the 1st paragraph, add the following:

"Helicopters can have a significant negative impact on nesting seabirds. The Seabird Ecological Reserve Regulation under the Wilderness and Ecological Reserves Act states that aircraft may be no closer than 300 m from a Seabird Ecological Reserve during the nesting season. Helicopter use near seabird breeding colonies will be avoided from 1 May to 31 August (with an end-date of 30 September for Northern Gannet Colonies). Specifically, the Witless Bay Ecological Reserve will be avoided during the nesting season time period of 1 May to 31 August, and the Cape St. Mary's Ecological Reserve will be avoided 1 May to 30 September."

Section 4.4.2 Information Sources, page 90 - It should be noted in this section that the ECSAS program is ongoing. Updated information in the region that have been collected since the publication of Fifield et al. 2009 can be obtained by contacting Carina Gjerdrum, EC-CWS pelagic seabird biologist, at Carina.gjerdrum@ec.gc.ca.

Response: In Section 4.4.2, p.90, insert the following after the 2nd sentence in the 2nd paragraph:

"The ECSAS program is ongoing and additional information on bird occurrence in the region has been collected since the publication of Fifield et al. (2009). However, Fifield et al. (2009) was used here as distance sampling and detection probability were accounted for in their analyses. The new data have not yet been analyzed."

Section 4.4.2 Information Sources, paragraph 3, page 90 - Quote: "Some seabird nesting colonies have been re-surveyed since the SEA and that information has been incorporated here."

Population numbers for seabird colonies in this report are in large part from dated sources, and should be updated through the use of the most recent information available. Seabird colony numbers are routinely assessed and updated by EC-CWS and its partners, and data are compiled and stored in the CWS Atlantic Region Colonial Waterbird Database. These data can be obtained by contacting Sabina Wilhelm, EC-CWS colonial seabird biologist, at Sabina.wilhelm@ec.gc.ca.

Response: Numbers for seabird colonies are presented in Table 4.8. That table does include some new numbers that have become available since the SEA; however, more new data are available. The Proponent contacted Sabina Wilhelm at CWS, who kindly reviewed that table. She provided updated numbers for five of the 11 colonies listed there. There were no updates to the other six listed colonies. Table 4.8 has been updated with the revised numbers obtained from Sabina Wilhelm. The revised table is presented below in response to the comment "**Table 4.8 Estimated Numbers of Pairs of Colonial Seabirds Nesting at Important Bird Areas (IBAs) and other Important Sites (not designated IBAs) along Newfoundland's South Coast, page 9.**" No references to the table in the text of the EA needed to be revised.

Section 4.4.3.1 Overall Pelagic Seabird Distribution and Abundance, page 91 - It should be noted in this section that the ECSAS program is ongoing. Updated information in the region that have been collected since the publication of Fifield et al. 2009 can be obtained by contacting Carina Gjerdrum, EC-CWS pelagic seabird biologist, at Carina.gjerdrum@ec.gc.ca.

> ***Response:*** See above. This comment was addressed with the addition of new text in Section 4.4.2 Information Sources, p.90.

Table 4.7 Monthly Relative Abundance of Seabird Species with Reasonable Likelihood of Occurrence in the Study Area, page 92 - It should be noted in this section that the ECSAS program is ongoing. Updated information in the region that have been collected since the publication of Fifield et al. 2009 can be obtained by contacting Carina Gjerdrum, EC-CWS pelagic seabird biologist, at Carina.gjerdrum@ec.gc.ca.

> ***Response:*** See above. This comment was addressed with the addition of new text in Section 4.4.2 Information Sources, p.90.

Table 4.8 Estimated Numbers of Pairs of Colonial Seabirds Nesting at Important Bird Areas (IBAs) and other Important Sites (not designated IBAs) along Newfoundland's South Coast, page 93 - Population numbers for seabird colonies in this report are in large part from dated sources, and should be updated through the use of the most recent information available. Seabird colony numbers are routinely assessed and updated by EC-CWS and its partners, and data are compiled and stored in the CWS Atlantic Region Colonial Waterbird Database. These data can be obtained by contacting Sabina Wilhelm, EC-CWS colonial seabird biologist, at Sabina.wilhelm@ec.gc.ca.

> ***Response:*** The Proponent contacted Sabina Wilhelm at CWS, and received updated population numbers for breeding pairs of seabirds at Important Bird Areas on 14 May 2014; these updates are not anticipated to result in changes to the effects predictions of the EA. Revise Table 4.8, p.93, to the following:

Table 4.8. Estimated Numbers of Pairs of Colonial Seabirds Nesting at Important Bird Areas (IBAs) and other Important Sites (not designated IBAs) along Newfoundland's South Coast.

Species	Witless Bay Islands IBA[m]	Mistaken Point IBA[m]	Western Head	Cape St. Mary's IBA[m]	Corbin Island IBA	Middle Lawn Island IBA	Green Island IBA	Grand Colombier Island IBA	Miquelon Cape IBA	Penguin Islands	Ramea Colombier Island
Northern Fulmar	22[a,c]			Present[a]							
Manx Shearwater						7[e]					
Leach's Storm-Petrel	313,743[k]				100,000[d]	8,773[l]	103,833[b]	363,787[i]		100[d]	1,000[d]
Northern Gannet				14,789[g]							
Herring Gull	3,600[k]		100[d]	39[m]		20[d]	Present[f]	60-100[j]	265[d]		
Great Black-backed Gull	65[k]		15[d]	7[m]		6[d]		10-20[j]			25[o]
Black-legged Kittiwake	13,428[n]	4,750[h]	1,100[d]	10,000[d]				196[j]	2,415[d]		50[o]
Arctic and Common Terns							Breeding[f]			Present[n]	<100[d]
Common Murre	260,000[n]	~ 100[h]	27[d]	15,484[g]				>3[j]			
Thick-billed	600[d]			1,000[d]							
Razorbill	700[n]	Present[h]	7[d]	100[d]				>50[j]			
Black Guillemot	20+[d]	Present[h]	20[d]	Present[d]				>46[j]	Present[d]		
Atlantic Puffin	302,200[k]	50[d]						9,543[j]			75[d]
TOTALS	**~894,378**	**>4,900**	**1,269**	**>41,419**	**100,000**	**8,806**	**>103,833**	**>373,695**	**>2,680**	**>100**	**~1,250**

Sources: [a] Stenhouse and Montevecchi (1999a); [b] Russell (2008); [c] Robertson et al. (2004); [d] Cairns et al. (1989); [e] Fraser et al. (2013), [f] www.ibacanada.ca; [g] CWS (unpubl. data); [h] Parks and Natural Areas (unpubl. data); [i] Lormée et al. (2012); [j] Lormée et al. (2008) as cited in Lormée et al. (2012)); [k] CWS unpubl. data (censused in 2011 and 2012); [l] CWS unpubl. data (censused 2006); [m] Parks and Natural Areas unpubl. data (censused 2011); [n] 5 = CWS unpubl. data (censused 2007, 2011, 2013); [o] 7 = CWS unpubl. data (censused 2007).

Section 5.6.5.3 Ramp-Up/Soft Start, page 157 - We recommend to always perform a ramp-up/soft start of the airgun prior to use. This beneficial management practice will help deter migratory birds from diving in the area.

> ***Response:*** Environment Canada's recommendation is acknowledged. A ramp-up is required before starting or restarting an air source array after it has been shutdown for more than 20 minutes, per the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*. MKI will follow this requirement.

Section 5.6.5.7 Seabird Strandings, page 158 - A protocol for handling non-oiled but dead birds found on the vessel is attached.

> ***Response:*** Add the following text to the end of the existing paragraph — "If more than 10 birds are found dead (and are not associated with a pollution event), the carcasses will be collected and sent ashore to the CWS per the guidelines provided in the CWS document '*Protocol for Collecting Dead Birds from Platforms*.' It is acknowledged that a federal salvage permit will be required."

Section 5.6.5.7 Seabird Strandings, page 158 - Quote: "MKI will request the ships to minimize lighting on board to the extent that it does not affect safety."

In Atlantic Canada, nocturnal migrants and night-flying seabirds (e.g. storm-petrels) are the migratory birds most at risk of attraction to lights and flares. Attraction to lights at night or in poor visibility conditions during the day may result in collision with lit structures or their support structures, or with other migratory birds. Disoriented migratory birds are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of depredation.

To minimize risk of incidental take of migratory birds due to human-induced light, Environment Canada recommends at minimum the following beneficial management practices:

- The minimum amount of pilot warning and obstruction avoidance lighting should be used on tall structures;
- The use of only strobe lights at night, at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada, is recommended; and
- Using the minimum number of lights possible is recommended.

> ***Response:*** Environment Canada's recommendations are acknowledged and will be followed to the extent that safety and Transport Canada regulations allow. Outdoor lighting will be minimized as much as possible at night. However, the streamer and gun decks are open to the stern of the vessel and are in operation around the clock. They require ample and continuous lighting for safety.

Table 5.2 Summary of Mitigations Measures by Potential Effect, page 161 - Quote: "Temporary or permanent hearing damage/disturbance to marine mammals."

EC recommends adding migratory seabirds to this category in addition to marine mammals. Ramp-up of airguns should be listed as a potential mitigation used to deter migratory birds from the location.

Response: Ramp-ups will be implemented per the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*. Section 5.8.6.1, p.190, states "The ramp-up period for the airguns may mitigate the potential for physical harm by dispersing some birds from the immediate program area."

Add a new section to Table 5.2 as follows:

Under the column "Potential Effects," as a new cell below "Temporary or permanent hearing damage/ disturbance to Species at Risk or other key habitats;" insert "Temporary or permanent hearing damage/disturbance to seabirds."

Opposite that, under the column "Primary Mitigations," insert in the new cell "Ramp-up of airguns."

Table 5.2 Summary of Mitigations Measures by Potential Effect, page 161 - Strategies to minimize or prevent accidental or chronic releases must be emphasized in a mitigation program. Proponents are required to demonstrate response preparedness and to identify provisions for ensuring measures are implemented to eliminate or minimize resulting sheens or slicks in the event of accidents and malfunctions involving the release of oil. The following considerations are requested to be factored into the development of a response plan that would help reduce impacts on seabirds:

- Measures for containing and cleaning up spills (of various sizes) either at the drill site or during transport;
- Equipment that would be available to contain spills;
- Specific measures for the management of large and small spills (e.g., breaking up sheens);
- Mitigation measures to deter migratory birds from coming into contact with the oil;
- Mitigation measures to be undertaken if migratory birds and/or sensitive habitat becomes contaminated with the oil; and
- The type and extent of monitoring that would be conducted in relation to various spill events.

In order to assist proponents in preparing a plan for dealing with an oil spill which would potentially threaten birds, EC-CWS has prepared a guidance document (attached), as well as a sample protocol document used for oiled birds on beaches (attached).

Response: Table 5.2 is meant to present a summary of potential effects and primary mitigation measures. It is not meant to provide details regarding spill response protocols and equipment. Those details are discussed in Section 5.6.6.4 (Response to Accidental Events). Effects and mitigations regarding seabirds and spills are discussed in Section 5.8.6.7 (Accidental Releases). The considerations in the above comment are addressed in MKI's oil spill response plan (see Section 2.2.14 [Accidental Releases]), with the possible exception of deterring migratory birds from coming into contact with oil. Deterring birds from an offshore spill is virtually impossible and could, in fact, create additional safety issues (e.g., firing flares and pyrotechnics, sending people out in small craft). The safety of the ship and crew must come first. To the extent possible, considering ship and crew safety, and equipment availability, MKI will endeavour to follow the recommendations outlined in the CWS documents *Birds and Oil — CWS Response Plan Guidance* (update June 2012) and *Protocol for Collecting Birds During an Oil Spill Response*.

Section 5.8.6.3 Vessel Lights, 1st paragraph, page 194 - Change from "migratory bird salvage permit" to "live seabird handling permit".

> ***Response:*** In the 4th paragraph in Section 5.8.6.3, at the top of p.194, edit "Migratory Bird Salvage Permit" to "Live Seabird Handling Permit."

Section 5.8.6.4 Helicopter Presence, page 194 - Aircraft, particularly helicopters, have been known to cause significant negative impacts to migratory birds during various life stages (i.e. chick rearing, moulting). Mitigation measures such as timing and adjusting the altitude and pattern of helicopter flight lines can minimize disturbance. Helicopter use near seabird breeding colonies should be avoided from May 1st - August 31st (with an end-date of September 30th for Northern Gannet Colonies).

> ***Response:*** Helicopter flights are not planned for the 2014 program, but may occur during the 2015-2018 programs. MKI acknowledges the potential effects of helicopter overflights on birds and has addressed the potential effects of helicopter activity in Section 5.8.6.4, p.194, of the EA. There the EA states that helicopter flights will be operated at a minimum altitude of 300-450 m (~1,000-1,500 ft) when in transit to minimize any potential effects on seabirds. To the existing text, as a new paragraph following the 1st paragraph, add the following:
>
> "Helicopters can have a significant negative impact on nesting seabirds. The Seabird Ecological Reserve Regulation under the Wilderness and Ecological Reserves Act states that aircraft may be no closer than 300 m from a Seabird Ecological Reserve during the nesting season. Helicopter use near seabird breeding colonies will be avoided from 1 May to 31 August (with an end-date of 30 September for Northern Gannet Colonies). Specifically, the Witless Bay Ecological Reserve will be avoided during the nesting season time period of 1 May to 31 August, and the Cape St. Mary's Ecological Reserve will be avoided 1 May to 30 September."

Section 5.8.6.7 Accidental Releases, 1st paragraph, page 195 - Quote: "It is expected that solid streamers also will be used during the subsequent 2D and 3D seismic surveys (2015-2018), but details have not been finalized yet."

We recommend a commitment to using solid streamers instead of liquid streamers. If liquid streamers are used, a contingency plan for mitigating potential leaks in the streamers must be made. Please consult O'Hara and Morandin (2010; attached) for information regarding the effects that even very small quantities of oil can have on thermoregulatory ability in migratory birds.

> ***Response:*** MKI will only use solid streamers.

Section 5.8.6.7 Accidental Releases, 4th paragraph, page 195 - Quote: "The illegal discharge of oily bilge water off the southeast coast of Newfoundland is a chronic problem (Wiese and Ryan 1999, 2003)."

With regard to the above statement, EC advises the proponent that although chronic ship-source oil pollution continues to threaten wildlife in eastern Canadian waters, Wilhelm et al. (2009) have documented a decline in oiled bird occurrences and oil pollution detections in recent years.

Please refer to the following article:

Sabina I. Wilhelm, Gregory J. Robertson, Pierre C. Ryan, Stan F. Tobin, Richard D. Elliot, 2009. Re-evaluating the use of beached bird oiling rates to assess long-term trends in chronic oil pollution. Mar. Poll. Bull. 58(2): 249-55.

Response: Revise the sentence quoted above to read:

"The illegal discharge of oily bilge water off the southeast coast of Newfoundland has been a chronic problem (Wiese and Ryan 1999, 2003)."

Then insert the following after that sentence:

"Wilhelm et al. (2009) have documented a decline in oiled bird occurrences and oil pollution detections in recent years."

Table 5.20 Summary of Mitigations Measures, page 221 - EC recommends adding migratory seabirds to this category in addition to marine mammals. Ramp-up of airguns should be listed as a potential mitigation used to deter migratory birds from the location.

Response: See the earlier response to this comment. A new item has been added to the table in response.

Section 5.10 Mitigations and Follow-up, 4th paragraph, page 222 – Quote: "It is understood by MKI that a CWS Migratory Bird Handling Permit will be required and that it will be secured as it has been in the past."

The permit should be referred to as a Migratory Birds Convention Act (MBCA) permit, not a Canadian Wildlife Service (CWS) permit.

Response: In the last paragraph in Section 5.10, p.222, remove "CWS" where it refers to the permit and replace with "*Migratory Birds Convention Act*."

Fisheries and Oceans Canada (DFO)

Section 4.3.3 Domestic Fisheries, page 56 - Since the seismic program is planned to continue into 2018 and the Environmental Assessment report utilizes catch and effort data only up to 2010, it would be prudent to periodically revisit the potential impacts on commercial fisheries if the fish activity or the planned seismic activity varies significantly from that described in this report.

Response: DFO only provides georeferenced commercial catch and effort datasets up to and including 2010. Catch data for 2011 and 2012 were also provided by DFO as ranges of catch weight and catch value within 6 min × 6 min cells (latitude × longitude). Figures based on these 2011 and 2012 commercial fishery databases were included in the EA.

MKI will renew its commitment to provide the most up to date commercial fisheries data in future EA Updates which will be submitted to the C-NLOPB.

Section 4.3.3.1 Historical Fisheries, 1st paragraph, last two sentences, page 57 - It should be noted that American Plaice has been under moratoria in 3M since 1996 and in 3LNO since 1995. It is suggested that the 2nd last sentence be deleted and replaced with "*Atlantic Cod and American Plaice in a number of NAFO Divisions remain priority species for Canada and rebuilding plans are currently in place for several of these stocks.*"

Response: Revise the second-last sentence of the 1st paragraph on page 57 "American plaice remains an important target species in 2010; however, snow crab has replaced Atlantic cod as a principal species" to "Atlantic cod and American plaice in a number of NAFO Divisions remain priority species for Canada and rebuilding plans are currently in place for several of these stocks."

The Div. 3LNO population of American Plaice is the largest in Newfoundland and Labrador, and is considered to have been historically the largest flatfish population in the northwest Atlantic (DFO 2012a). Over a 47-year time series, abundance has declined by approximately 96%. The primary factor thought to be responsible for the decline of American Plaice stocks is overfishing, although increased natural mortality may also have played a role, particularly in Div. 2J3K and Div. 3LNO (COSEWIC 2009). COSEWIC last assessed the Newfoundland and Labrador American plaice population in 2009 and determined that the decline in plaice appeared to have ceased, however numbers remained below a precautionary threshold estimated for this stock. They also stated that some significant and poorly regulated bycatches are negatively influencing recovery. Further adding to the problem of bycatch are fishing gears that are size selective, cropping large individuals, and reducing population reproductive potential. There has also been evidence of increased natural mortality which has slowed the recovery of Newfoundland and Labrador's American plaice population (COSEWIC 2009).

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area, page 103 - When referring to *SARA* listed species the population should also be identified.

Response: The populations for *SARA* listed species are identified in the text of Sections 4.5.2, 4.5.3, and 4.6. Revise Table 4.10 as follows:

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area.

Species – Population	Study Area		Habitat	*SARA* Status[a]	COSEWIC Status[b]
	Occurrence	Season			
Baleen Whales (Mysticetes)					
North Atlantic right whale – North Atlantic	Rare	Summer	Coastal & shelf	Schedule 1: Endangered	E
Humpback whale – Western North Atlantic	Common	Year-round, but mostly May-Oct.	Coastal & banks	Schedule 3: Special Concern	NAR
Blue whale – Atlantic (*Balaenoptera musculus*)	Rare	Year-round, but mostly spring	Coastal & pelagic	Schedule 1: Endangered	E
Fin whale – Atlantic (*Balaenoptera physalus*)	Common	Year-round, but mostly summer	Slope & pelagic	Schedule 1: Special Concern	SC
Sei whale – Atlantic (*Balaenoptera borealis*)	Uncommon	May-Sept.?	Pelagic	NS	DD
Minke whale (*Balaenoptera acutorostrata*)	Common	Year-round, but mostly May-Oct.	Shelf, banks & coastal	NS	NAR
Toothed Whales (Odontocetes)					
Sperm whale (*Physeter macrocephalus*)	Common	Year-round, but mostly summer	Pelagic, slope & canyons	NS	NAR; MPC
Northern bottlenose whale – Scotian Shelf	Uncommon	Year-round	Pelagic, slope & canyons	Schedule 1: Endangered	E
Sowerby's beaked whale – Atlantic (*Mesoplodon bidens*)	Rare	Summer?	Pelagic, slope & canyons	Schedule 1: Special Concern	SC
Beluga whale – St. Lawrence Estuary (*Delphinapterus leucas*)	Rare	Winter or Summer?	Coastal & ice edge	Schedule 1: Threatened	T
Killer whale – Northwest Atlantic/Eastern Arctic	Uncommon	Year-round, but mostly June-Oct.	Widely distributed	NS	SC
Long-finned pilot whale (*Globicephala melas*)	Common	May-Sept.	Mostly pelagic	NS	NAR
Common bottlenose dolphin (*Tursiops truncatus*)	Uncommon	Summer	Coastal & pelagic	NS	NAR
Short-beaked common dolphin (*Delphinus delphis*)	Common	Summer	Shelf & pelagic	NS	NAR
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Common	Year-round, but mostly June-Oct.	Shelf & slope	NS	NAR
White-beaked dolphin (*Lagenorhynchus albirostris*)	Common	Year-round, but mostly June-Sept.	Shelf	NS	NAR
Striped dolphin (*Stenella coeruleoalba*)	Uncommon	Summer	Shelf & pelagic	NS	NAR
Risso's dolphin (*Grampus griseus*)	Uncommon	Year-round?	Slope	NS	NAR
Harbour porpoise – Northwest Atlantic	Uncommon	Year-round, but mostly spring-fall	Shelf, coastal	Schedule 2: Threatened	SC
True Seals (Phocids)					
Harbour seal (*Phoca vitulina*)	Uncommon	Year-round	Coastal	NS	NAR
Harp seal (*Pagophilius groenlandicus*)	Uncommon	Year-round, but mostly winter-spring	Pack ice & pelagic	NS	NC; HPC
Hooded Seal (*Cystophora cristata*)	Uncommon	Year-round, but mostly winter-early	Pack ice & pelagic	NS	NAR; HPC
Grey seal (*Halichoerus grypus*)	Uncommon	Summer?	Coastal & shelf	NS	NAR

Note: ? indicates uncertainty.

[a] Species designation under the Species at Risk Act (http://www.sararegistry.gc.ca); NS = No Status.

[b] Species designation under COSEWIC (http://www.cosewic.gc.ca); E = Endangered, SC = Special Concern, DD = Data Deficient, NAR = Not at Risk, NC = Not Considered, LPC = Low-priority Candidate, MPC = Mid-priority Candidate, HPC = High-priority Candidate.

[c] The Davis Strait-Baffin-Bay-Labrador Sea population may also occur in the proposed survey area; this population has no status under *SARA*.

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area, page 103 - Please note that Schedule 1 of the *SARA* is the official list of *SARA* species. Schedules 2 and 3 identify species to be assessed by COSEWIC using revised criteria when *SARA* came into effect. Table 4.10 should be amended to delete the wording "Schedule 3 Special Concern" and "Schedule 2 Threatened" from the "*SARA* status" column for Humpback Whale and Harbour Porpoise respectively.

> ***Response:*** The populations for *SARA*-listed species in Table 4.10, p.103 were in reference to populations that occur within the Study Area. Species are listed under *SARA* on Schedules 1 to 3, with only those designated as *endangered* or *threatened* on Schedule 1 having immediate legal implications. Nonetheless, attention must be paid to all of the *SARA*-listed species because of their sensitivities to perturbation and the potential for status upgrades. Schedule 1 is the official legal list of wildlife Species at Risk in Canada. Once a species/population is designated, the measures to protect and recover it are implemented. Schedules 2 and 3 of *SARA* identify species that were designated "at risk" by COSEWIC prior to October 1999 and must be reassessed using revised criteria before they can be considered for addition to Schedule 1. As of 7 May 2014, NW Atlantic harbour porpoise was still listed as Schedule 2 "*threatened*" on the *SARA* website, albeit "*special concern*" by COSEWIC. Similarly, NW Atlantic humpback whale was still listed as Schedule 3 "*special concern*" by *SARA* while "*not at risk*" by COSEWIC.

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area, page 103 - The Davis Strait-Baffin Bay-Labrador Sea population of Northern Bottlenose Whale should be included in this table as individuals from this population may occur in the Project Area/Study Area.

> ***Response:*** See revisions to Table 4.10 above; this population has been added as a footnote.

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area, page 103 - Sperm Whale is a mid-priority candidate species under COSEWIC. This should be amended accordingly in the table.

> ***Response:*** Edit "LPC" to "MPC" to reflect the mid-priority candidate status of sperm whale under COSEWIC in the COSEWIC Status column in Table 4.10, p.103 (see revised Table 4.10 above).

Table 4.10 Marine Mammals Known or Expected to Occur in the Southern Grand Banks Study Area, page 103 - Hood Seal and Harp Seal are both high priority candidate species under COSEWIC. The respective sections of the table should be amended accordingly.

> ***Response:*** Edit "MPC" to "HPC" to reflect the high-priority candidate status of harp and hooded seals under COSEWIC in the COSEWIC Status column in Table 4.10, p.103 (see revised Table 4.10 above).

Section 4.5.3 Toothed Whales (Odontocetes) and 4.5.3.1 Sperm Whale, pages 111- 117 - The last sentence should refer to COSEWIC assessments under Schedule 2 rather than *SARA* listings.

> ***Response:*** Revise the sentence to read "In addition, COSEWIC has assessed the harbour porpoise as *threatened* (Schedule 2), and has designated the Northwest Atlantic/Eastern Arctic population of killer whales as *special concern* and the sperm whale as a mid-priority candidate species."

Section 4.5.3 Toothed Whales (Odontocetes) and 4.5.3.1 Sperm Whale, pages 111- 117 -As noted Sperm Whale is a mid-priority candidate species under COSEWIC as such the last sentences of both the 1st paragraph Section 4.5.3 and 1st paragraph Section 4.5.3.1 (page 111) should be amended accordingly.

Response: Revise last sentence in 1st paragraph in Section 4.5.3 to read "In addition, COSEWIC has assessed the harbour porpoise as *threatened* (Schedule 2), and has designated the Northwest Atlantic/Eastern Arctic population of killer whales as *special concern* and the sperm whale as a mid-priority candidate species."

Revise last sentence in 1st paragraph in Section 4.5.3.1 to read "However, they are a mid-priority candidate species under COSEWIC."

Section 4.5.3 Toothed Whales (Odontocetes) and 4.5.3.1 Sperm Whale, pages 111- 117 - The Davis Strait-Baffin Bay-Labrador Sea population of Northern Bottlenose Whale should be detailed in Section 4.5.3.1 as individuals from this population may occur in the Project Area/Study Area.

Response: The Northern Bottlenose Whale is detailed in Section 4.6. It is noted that "It is unclear to which population animals occurring in Labrador and Newfoundland, including the Study Area, belong (DFO 2011c; Harris et al. 2013)." Revise Section 4.6.1.3 as follows, to include additional information on the Davis Strait-Baffin Bay-Labrador Sea population of Northern Bottlenose Whale:

"4.6.1.3 Northern Bottlenose Whale

The distribution of northern bottlenose whales is restricted to the North Atlantic, primarily in deep, offshore areas with two regions of concentration: the Gully and adjacent submarine canyons on the eastern Scotian Shelf, and Davis Strait off northern Labrador (Reeves et al. 1993). The Scotian Shelf population is designated *endangered* under Schedule 1 of *SARA* and by COSEWIC. The Davis Strait-Baffin Bay-Labrador Sea population has no status under *SARA* but is considered *special concern* by COSEWIC.

Throughout their range, northern bottlenose whales were harvested extensively during industrial whaling, which likely greatly reduced total numbers (COSEWIC 2011). The total abundance of northern bottlenose whales in the North Atlantic is unknown. However, the current estimate for the Scotian Shelf population is 143 individuals (O'Brien and Whitehead 2013). The recovery goal for this population is to "achieve a stable or increasing population and to maintain, at a minimum, current distribution" (DFO 2010e). The size of the Davis Strait- Baffin Bay-Labrador Sea population is uncertain (COSEWIC 2011; Whitehead and Hooker 2012).

The Scotian Shelf population appears to be highly concentrated in a small region of the eastern Scotian Shelf around the deep waters of three underwater canyons: The Gully; Shortland Canyon; and Haldimand Canyon (Wimmer and Whitehead 2004). The Gully Marine Protected Area, and areas deeper than 500 m in Haldimand and Shortland Canyons, have been designated as critical habitat (DFO 2010e). Although most sightings occur during the summer, there are winter occurrences and the population presumably remains within this region year-round (Reeves et al. 1993). The calving season of the Scotian Shelf population peaks in August (Whitehead et al. 1997). The Davis Strait population is considered to occur in Newfoundland and Labrador year-round, with mating and births occurring from April to June, with a peak in April (Benjaminsen 1972 *in* COSEWIC 2011).

It is unclear to which population animals occurring in Labrador and Newfoundland, including the Study Area, belong (DFO 2011c; Harris et al. 2013). No matches of photo-identified individuals have been made between the Scotian Shelf and the Baffin-Labrador populations (COSEWIC 2011), and nuclear and mitochondrial markers revealed very little interchange between these two populations (Dalebout et al. 2006). The encounter rate during boat surveys was 0.03 encounters/h for the Labrador-Davis Strait population, and 0.50 for the Gully (COSEWIC 2011 *as cited in* Whitehead and Hooker 2012). Occurring primarily in deep waters over canyons and the shelf edge, whales tagged on the Scotian Shelf routinely dove to depths over 800 m and remained submerged for over an hour (Hooker and Baird 1999). Foraging apparently occurs at depth, primarily on deep-water squid and fish (COSEWIC 2011; DFO 2011b). Northern bottlenose whales travel in small groups that may consist of individuals of different age and sex classes, although males appear to form long-term associations with other mature males (Gowans et al. 2001).

Near the Study Area, northern bottlenose whales have been detected acoustically between the eastern Scotian Shelf canyons and the Laurentian Channel (Harris et al. 2007). Sighting records also exist for the Grand Banks (Harris et al. 2007; Whitehead and Hooker 2012). Based on the DFO cetacean sightings database, 20 groups of northern bottlenose whales have been sighted (see Table 4.11) in the deeper waters and near the shelf break of the Study Area from March to September (see Figure 4.45). Northern bottlenose whales are expected to, at least, enter the Study Area occasionally, but there is insufficient information to determine to which population whales in the Study Area belong."

Section 4.5.4 True Seals (Phocids), last sentence, page 117 - In regards to the last sentence of this section, Hooded Seal and Harp Seal are both high priority candidate species under COSEWIC. This sentence, as well as similar references to hooded and harp seal in Sections 4.5.4.3 (page 119) and Section 4.5.4.4 (page 119) respectively, should be amended accordingly.

Response: Revise last sentence in 1st paragraph to read "None of these species are designated under *SARA*; however, hooded and harp seals are currently considered *high-priority candidate* species by COSEWIC."

Revise last sentence of 1st paragraph in Section 4.5.4.3 to read "Hooded seals have no status under *SARA* and are considered *not at risk* by COSEWIC; however, they are currently a *high-priority candidate* species (see Table 4.13 in Section 4.6)."

Revise last sentence of 1st paragraph in Section 4.5.4.4 to read "COSEWIC considers the harp seal as a *high-priority candidate* species, but it does not have a status under *SARA* (see Table 4.13 in Section 4.6)."

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - The title of this table should be revised to read as, "*SARA-listed and COSEWIC-assessed Marine Species that May Occur in the Study Area*" as species are assessed by COSEWIC, not listed.

Response: Revise the title of Table 4.13, p.124, to read "*SARA*-listed and COSEWIC-assessed Marine Species that May Occur in the Study Area."

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 -When referring to *SARA* listed species the population should also be identified.

> ***Response:*** The populations for *SARA*-listed species in Table 4.13, p.124, were in reference to populations that occur within the Study Area. In cases where there is more than one population for a particular species within the Study Area, it was noted in parentheses with the species name (e.g., Fin whale [Atlantic population]; Atlantic cod [NL population]). Atlantic salmon is an exception, as there are many populations of this species within the Study Area. In this particular case, Atlantic salmon is noted to contain "various populations" which includes: the south Newfoundland population, southwest Newfoundland population, eastern Cape Breton population, and more. Since Atlantic salmon may migrate long distances and different populations may intermingle with one another, the populations have been consolidated for the purposes of listing the status of Atlantic salmon under *SARA* and COSEWIC.

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - The Right Whale should be referred to as the North Atlantic Right Whale.

> ***Response:*** Edit "Right whale" to "North Atlantic right whale" in the Common Name column in Table 4.13, p.124.

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - Atlantic salmon should be listed as separate populations with their respective COSEWIC status.

> ***Response:*** The populations for *SARA*-listed species in Table 4.13, p.124, were in reference to populations that occur within the Study Area. In cases where there is more than one population for a particular species within the Study Area, it was noted in parentheses with the species name (e.g., Beluga whale [St. Lawrence population]). Atlantic salmon is an exception, as there are many populations of this species within the Study Area. In this particular case, Atlantic salmon is noted to contain "various populations" which includes: the Labrador population, northeast Newfoundland population, Quebec eastern north shore population, and more. Since Atlantic salmon may migrate long distances and different populations may intermingle with one another, the populations have been consolidated for the purposes of listing the status of Atlantic salmon under *SARA* and COSEWIC.

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - The Davis Strait-Baffin Bay- Labrador Sea population of Northern Bottlenose Whale should be included in this table as individuals from this population may occur in the Project Area/Study Area.

Response: Add the Davis Strait-Baffin Bay-Labrador Sea population of Northern Bottlenose Whale to Table 4.13 as follows:

Species		*SARA* Schedule 1			COSEWIC			
Common Name	**Scientific Name**	***Endangered***	***Threatened***	***Special Concern***	***Endangered***	***Threatened***	***Special Concern***	***Candidate Species***
Northern bottlenose whale (Davis Strait-Baffin Bay-Labrador Sea population)	*Hyperoodon ampullatus*						X	

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - Hood Seal and Harp Seal are both high priority candidate species under COSEWIC their status in this table should be amended as per earlier comments.

Response: Edit "Mid priority" to "High priority" to reflect the high-priority candidate status of harp and hooded seals under COSEWIC in the COSEWIC Candidate Species column in Table 4.13, p.124.

Table 4.13 *SARA* Schedule 1 and COSEWIC-listed Marine Species with Reasonable Likelihood of Occurrence in the Study Area, page 124 - Sperm Whale is a mid- priority species under COSEWIC its status in this table should be amended as per earlier comments.

Response: Edit "Low priority" to "Mid priority" to reflect the mid-priority candidate status of sperm whale under COSEWIC in the COSEWIC Candidate Species column in Table 4.13, p.124.

Section 4.6 Species at Risk, page 125 - The document, "Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters" should be referenced in this section; as such the listing provided in the 3rd sentence 2nd paragraph should be amended accordingly to include North Atlantic Right Whale.

Response: To add the Recovery Strategy, edit the 2nd paragraph, p.125, to read "Under *SARA*, a recovery strategy and corresponding action plan must be prepared for *endangered*, *threatened*, and *extirpated* species. A management plan must be prepared for species considered as *special concern*. Final recovery strategies have been prepared for seven species currently designated as either *endangered* or *threatened* under Schedule 1 and potentially occurring in the Project Area: (1) the North Atlantic right whale (DFO 2014); (2) the leatherback sea turtle (ALTRT 2006); (3) the spotted wolffish (Kulka et al. 2007); (4) the northern wolffish (Kulka et al. 2007); (5) the blue whale (Beauchamp et al. 2009); (6) the Scotian Shelf population of the northern bottlenose whale (DFO 2010b); and (7) the St. Lawrence Estuary population of beluga whale (DFO 2012b). In addition, a management plan has been prepared for the Atlantic wolffish (Kulka et al. 2007), currently with *special concern* status on Schedule 1 of *SARA*."

Section 4.6 Species at Risk, page 125 - Please note that the Recovery Strategy for the St. Lawrence Estuary Population of Beluga Whale is no longer considered "proposed", the final version is now posted on the *SARA* Public Registry, and as such the 4th sentence 2nd paragraph (page 125) should be amended to reflect the same.

Response: See revision to 2nd paragraph, p.125, above. The 2012 Final Recovery Strategy supersedes the Draft Recovery Strategy that was referenced as DFO (2011b) in the EA.

Section 4.6 Species at Risk, 3rd paragraph, page 125 - states, "*MKI will monitor SARA issues through the law gazettes, the Internet and communication with DFO and Environment Canada, and will adaptively manage any issues that may arise .....during the course of the Project (2014-2018), and will continue to monitor any status changes*." We would like to emphasize the importance of these statements as well as request that the proponent revise the latter statement to include future identification of critical habitat during the life of the project.

> ***Response:*** The following text should be added to the statement in question – "including any future identification of critical habitats."

Section 4.6.1.1 North Atlantic Right Whale, first paragraph, last sentence, page 126 - this should be revised as critical habitat has been identified and is no longer considered "proposed".

> ***Response:*** The additional critical habitat was outlined in the Recovery Strategy that was released in April 2014 after the submission of the EA. It supersedes the previous Recovery Strategy by Brown et al. (2009). Revise last sentence of first paragraph to read "Grand Manan Basin in the Bay of Fundy and Roseway Basin on the southwestern Scotian Shelf are designated as Critical Habitat (DFO 2014)."
>
> Also, within Section 4.6.1.1, in light of the new Recovery Strategy, revise the 1st paragraph as follows:
>
> "The North Atlantic right whale is listed as *endangered* on Schedule 1 and COSEWIC; it is one of the world's most critically endangered large whale populations (Clapham et al. 1999; IWC 2001). North Atlantic right whale populations were originally severely depleted by commercial whaling. The population is currently estimated to number approximately 350 individuals (DFO 2014). The interim Recovery Goal for the North Atlantic right whale is "To achieve an increasing trend in population abundance over three generations" (DFO 2014). Grand Manan Basin in the Bay of Fundy and Roseway Basin on the southwestern Scotian Shelf are designated as Critical Habitat (DFO 2014)."
>
> In the 2nd paragraph within Section 4.6.1.1, revise references to "Brown et al. (2009)" to "DFO (2014)."

Section 5.6 Mitigation Measures, pages 149-161 - It is strongly recommended that the proponent be required to, and commit to, adhere to all relevant minimum mitigations outlined in the SOCP including the Planning Seismic Surveys, Safety Zone and Start-up, Shut-down of Air Source Array(s), Line Changes and Maintenance Shut-downs, Operations in Low Visibility and Additional Mitigative Measures and Modifications sections of the SOCP.

> ***Response:*** MKI will follow the guidelines in the *Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment* (SOCP) as noted on page 2 of the EA (section 1.1, last paragraph). MKI will follow established monitoring and mitigation procedures for seismic programs offshore Newfoundland and Labrador, including several mitigation measures that go above and beyond the minimum requirements in the SOCP.

Section 5.6 Mitigation Measures, pages 149-161 - The measures proposed to avoid interference with fisheries science surveys appear adequate. It should be noted that DFO did not specifically prescribe the temporal and spatial separation measures outlined in section 5.6.3.3.

Response: The temporal and spatial separation measures outlined in Section 5.6.3.3, p.154, indicate that "The avoidance protocol includes a 30 km (16 nm) spatial separation and a 7 day pre-research survey temporal separation." These measures are based on the available scientific literature (e.g., Engås et al. 1996; Hassel et al. 2004; Løkkeborg et al. 2012), which, as stated in an above comment, suggest temporary inter-specific variability in terms of behavioural effects of exposure to seismic airguns, and on issues raised during previous consultations with stakeholders.

Section 5.8.8 Species at Risk VEC, page 212 -"*lf species not currently designated on Schedule 1 of SARA do become listed on this legal list during the remainder of the life of the Project (2014-2018), the Proponent will reassess these species considering the prohibitions of SARA and any recovery strategies or action plans that may be in place*," As noted previously DFO would like to emphasize the importance of this statement as well as request that the proponent revise the latter statement to include future identification of critical habitat during the life of the project.

Response: MKI is committed to staying current with *SARA* requirements and upholding recovery strategies and/or action plans necessary to mitigate any effects that the 2014-2018 Seismic Program may have on *SARA*-listed species.

Revise the statement on page 212: "lf species not currently designated on Schedule 1 of *SARA* do become listed on this legal list during the remainder of the life of the Project (2014-2018), the Proponent will re-assess these species considering the prohibitions of *SARA* and any recovery strategies or action plans that may be in place" to: "lf species not currently designated on Schedule 1 of *SARA* do become listed on this legal list during the remainder of the life of the Project (2014-2018), the Proponent will re-assess these species and identify their critical habitat considering the prohibitions of *SARA* and any recovery strategies or action plans that may be in place."

Section 5.8.8 Species at Risk VEC - As noted earlier (for Section 4.6), the document "Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters" should be referenced in this section, as such the listing provided in the 3rd sentence (page 215) should be amended accordingly to include North Atlantic Right Whale.

Response: The Recovery Strategy that was released in April 2014 after the submission of the EA. It supersedes the previous Recovery Strategy by Brown et al. (2009). Revise the 3rd sentence of the 1st paragraph on p. 215 to read "There are finalized recovery strategies for leatherback sea turtles (ALTRT 2006), blue whales in Atlantic Canada (Beauchamp et al. 2009), the Scotian Shelf population of northern bottlenose whales (DFO 2010e), North Atlantic right whales (DFO 2014), and the St. Lawrence Estuary population of beluga whales (DFO 2012b)."

Section 5.8.8 Species at Risk VEC - The document, "*Recovery Strategy for Northern Wolffish (Anarhichas denticulatus) and Spotted Wolffish (Anarhichas minor), and Management Plan for Atlantic Wolffish (Anarhichas lupus) in Canada*" should be referenced in this section.

Response: The draft version of the document, "Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada" is cited as Kulka et al. (2007).

Note that Kulka et al. (2007) was cited in Section 4.6 and Section 4.6.1.9. As indicated in Kulka et al. (2007), one of the recommended recovery actions is to identify and mitigate impacts of human activities on wolffishes. These human activities include oil and gas activities. The seismic survey-related mitigations that apply to the Fish and Fish Habitat VEC (see Section 5.8.4 of the EA) also apply to the three wolffish species. Considering the typical deep-dwelling habits of these fishes and the fact that they do not have swim bladders, potential significant effects of exposure to airgun sound (key activity with most potential to cause effect) on the wolffishes are unlikely. Not having a swim bladder means that wolffishes rely primarily on the detection of particle motion rather than sound pressure. The particle motion component of sound attenuates much more quickly than the sound pressure component so wolffishes on or near the sea bottom should not be affected by the airgun discharges.

Section 5.8.8 Species at Risk VEC - Please note that the Recovery Strategy for the St. Lawrence Estuary Population of Beluga Whale is no longer considered "proposed", the final version is now posted on the *SARA* Public Registry. As such, the 4th sentence page 215 should be amended accordingly.

Response: See revision to the 3rd sentence of the 1st paragraph on p. 215 as noted above.

Table 5.18 Assessment of Effects of project Activities on Species at Risk VEC, page 213 - The row for Support Vessel under Underwater Sound has been left blank, was this an accidental omission? Please explain and/or provide values

Response: Yes, this was an accidental omission. The row for Support Vessel should have the same values as those for the Seismic and Supply vessels, with Magnitude 0-1; Geographic Extent 1-2; Frequency 6; Duration 1-2; Reversibility R; and Ecological/Socio-Cultural ad Economic Context 2. It would have a Negative Environmental "Disturbance (N)" Effect.

Fish, Food and Allied Workers (FFAW)

Section 2.2 Project Overview, Page 7 - Spelling: on board vs. onboard, there is a lack of consistency in the language use.

Response: Edit all instances of "onboard" to "on board" in the EA.

Section 2.2.6.2 Support Vessel, page 9 - The FLO should lead the communications with fishing vessels in the vicinity of the Seismic Program, not the master of the support vessel.

Response: MKI recognize that one of the main roles of the FLO onboard the seismic vessel is to lead communications with fishing vessels in the area.

Section 4.2.2.1 Macro-invertebrate and Fish Species Harvested during Commercial Fisheries, Snow Crab subsection, second paragraph, Page 43 - There is an introduction of CW without any explanation of what this is. Although the reviewer is aware of this notion, as this is a public document any abbreviations have to be explained.

Response: Revise "CW" in the 2nd paragraph, p.43, to "Carapace width" to increase clarity and understanding for persons reviewing the document.

Section 4.2.2.1 Macro-invertebrate and Fish Species Harvested during Commercial Fisheries, Snow Crab subsection, third paragraph, Page 43 - "due to a recent warm oceanic regime" would be better and more accurate to read "due to a warming oceanographic regime".

> ***Response:*** To increase accuracy and clarity, revise the statement in the 3rd paragraph, p.43, "due to a recent warm oceanic regime" to "due to a warming oceanographic regime."

Section 4.2.2.1 Macro-invertebrate and Fish Species Harvested during Commercial Fisheries, Atlantic Cod subsection, Page 47 - Atlantic Cod section has no mention or discussion of 3Ps Cod, which is an independent stock within the Study Area. It is a significant point that the Cod in 3Ps is not mentioned, especially as this is a stock being harvested year round.

> ***Response:*** The statement "For management purposes, cod in this population are treated as three separate stocks by DFO: (1) northern Labrador cod (NAFO Divisions 2GH), (2) "northern cod" i.e., those found off southeastern Labrador, the Northeast Newfoundland Shelf, and the northern half of Grand Bank (NAFO Divisions 2J3KL, and (3) southern Grand Bank cod (NAFO Divisions 3NO). Cod in the Study Area are considered to be those of the southern Grand Bank (3NO) cod stock and the 'northern cod' (3L)" should be amended to include cod stocks in 3Ps, as well as stocks in 3Pn, and 4RS to provide the reader with a broad view of the cod stocks in Newfoundland and Labrador waters. Therefore revise the above statement to "For management purposes, cod in this population are treated as five separate stocks by DFO: (1) northern Labrador cod (NAFO Divisions 2GH), (2) "northern cod" i.e., those found off southeastern Labrador, the northeast Newfoundland Shelf, and the northern half of Grand Bank (NAFO Divisions 2J3KL, (3) southern Grand Bank cod (NAFO Divisions 3NO), (4) southern Newfoundland cod (3Ps), and (5) northern Gulf cod (4RS3Pn). Cod in the Study Area are considered to be those of the southern Grand Bank (3NO), 'northern cod' (3L) and southern Newfoundland (3Ps) cod stocks."

Section 4.2.2.1 Macro-invertebrate and Fish Species Harvested during Commercial Fisheries, Atlantic Cod subsection, Page 48 - There is clear evidence within academic and governmental stock research that there have been strong signs of improvements to the abundance of cod.

> ***Response:*** While there have been some improvements in the abundance of cod in some NAFO Divisions, particularly 2J + 3KL and 3NO (DFO 2011), it is still classified as *endangered* by COSEWIC and *SARA*. In COSEWIC's last assessment of the Newfoundland and Labrador population of Atlantic cod, it was stated that since the groundfish moratorium in 1992, "the population has remained at a very low level with little sign of substantive recovery" (COSEWIC 2010). The assessment does mention that many recent surveys indicate an increase in the abundance of cod over a 3-year period (2007-2010); however, the change in abundance has been very small in comparison to the decline of cod in the past three generations. There continue to be many threats to the survival and recovery of Atlantic cod such as fishing, predation, and ecosystem changes that, combined with the already low abundance of cod, make this population particularly vulnerable.

Section 4.2.2.1 Macro-invertebrate and Fish Species Harvested during Commercial Fisheries, Stimpson's Surf Clam subsection, Page 50 - In the discussion of Clam it is worth noting that the entire quota is held by a single company in Nova Scotia.

Response: The offshore clam fishery operates on the Grand Bank and Banquereau Bank. As stated in the above comment, one company, Clearwater, located in Bedford, NS, holds all three harvest licences for this resource. The licence holder may utilize up to four vessels; two vessels are currently in operation, primarily fishing on Banquereau (C. MacDonald, DFO, NS, pers. comm., 2014).

Section 4.3.1 Information Sources, Page 54 - Unit Area (UA) is first defined here, but is also used in long form on page 44. The UA short form is used several times before being define on page 54. For document consistency, introduce the short form at first use in document and then follow through with it.

Response: Edit the first appearance of reference to Unit Areas (last paragraph, Section 4.2.2.1, Snow Crab, p.43) from "…the Southern Grand Bank (NAFO UAs 3Lt, 3Nb, 3Nd, 3Ne and 3Nf)…" to "the Southern Grand Bank (NAFO Unit Areas [UAs] 3Lt, 3Nb, 3Nd, 3Ne and 3Nf)…" Edit any instances of "Unit Area" to "UA" after this Section in the EA.

Section 4.3.1 Information Sources - The reviewer would like to know if all of the groups listed actively engaged in the consultations, or is this a list of who was contacted by the component.

Response: All of the groups listed in Section 4.3.1 were actively engaged with face to face meetings as indicated in Appendix 1: Consultation Report.

Section 4.3.3.1 Historical Fisheries, Pages 56 and 57 - In the context of the changing composition of the commercially harvested species, it is worth to note how there have been changes to the environmental regime that impacts the species composition – independent of the harvesting activity.

Response: Shifts in environmental conditions favoring crustaceans (e.g., colder water temperature) and swift decreases in groundfish predators from declines in Newfoundland and Labrador's groundfish stocks in the early 1990s resulted in rapid growth of crustacean populations such as northern shrimp and snow crab.

All fish have physiological limits within which they can survive, such as sea temperatures and salinities (Rose 2005). Frank et al. (1990) analyzed the effects of changes in oceanographic conditions induced by a global increase in atmospheric CO_2, and their models predicted a general warming and freshening of the continental shelf waters, leading to shifts in the geographic distribution of important commercial groundfish stocks, earlier arrival times and later departures for highly migratory large pelagics, and – in combination with increased water column stratification – decreased organic material reaching the seabed. Rose (2005) inferred that capelin and Atlantic herring react strongly and quickly to climate change, owing to their physiological limits and potential for fast population growth; this was verified through the examination of historical data from Icelandic and Greenland waters, which warmed considerably during 1920 to 1940, resulting in capelin, Atlantic herring, Atlantic cod, and other species shifting north very quickly.

Table 4.5, Page 86 - There is no qualifier for what measurement is used for the "Mean Catch Depth Range".

> ***Response:*** Edit the column heading "Mean Catch Depth Range" to "Mean Catch Depth Range (m)" in Table 4.5, p.86 of the EA. Mean depth values, in metres, are given for catch data within the DFO Research Vessel Survey Database, which was the data source used to generate Table 4.5. Catch weights and species caught were tabulated in accordance with the depth ranges listed in Table 4.5.

Section 4.3.8 Industry and DFO Science Surveys, Page 87 - There appears to be a diminishing of the importance of the Industry-DFO Collaborative Post-Season Trap Survey for Snow Crab, it is a survey that has been ongoing for over a decade using conventional commercial equipment.

> ***Response:*** Revise the last paragraph on page 87 to the following:
>
> "Members of the FFAW have been involved in a DFO-industry collaborative post-season snow crab trap survey for over 10 years, in order to "allow the fishing industry to more accurately assess and ultimately better manage the valuable snow crab resource" (FFAW|Unifor 2014). Data from these surveys are incorporated into the scientific assessment of snow crab, and as a result harvesters and managers have improved partnership and high confidence in the accuracy of recent stock status assessments (FFAW|Unifor 2014). This survey, which is conducted every year, typically starts around September 1 and may continue until November before completion.
>
> The station locations, ~1,500 in total, are determined by DFO and do not change from year to year. Several of the southern stations fall within northern portions of the Study Area. Research station locations in relation to the Study Area are shown in Figure 4.42."

Section 5.8.5.1 Underwater Sound, Avoidance subsection, page 181 – Avoidance needs to mention Cod as it is a rebounding stock that is harvested in 3Ps (in the Study Area) year round.

> ***Response:*** Revise the first sentence in the *Avoidance* subsection in Section 5.8.5.1, p.181, to the following:
>
> "The potential effects of seismic sound on fishery catch success can be mitigated by avoiding heavily fished areas when these fisheries are active (particularly the snow crab, cod, yellowtail flounder and redfish areas) to the greatest extent possible."

Section 5.8.5.2 Vessel Presence (including towed seismic equipment), Avoidance subsection, page 185 - any direct mention of "fixed gear" should be removed, as all active fishing grounds have to be avoided.

> ***Response:*** Reword the *Avoidance* subsection, Section 5.8.5.2, p.185, as follows:
>
> First sentence, first paragraph: "As discussed above, potential impacts on fishing gear will be mitigated by avoiding active heavily fished areas during the seismic survey to the extent possible."
>
> First sentence, second paragraph: "The principal mitigation will also be avoidance, based on route selection aimed at deviating around active heavily fished areas."

Section 5.8.5.2 Vessel Presence (including towed seismic equipment), Page 186 - The locations of the Industry-DFO Post-Season Trap Survey for Snow Crab have been fixed for the past decade.

> ***Response:*** The above comment appears to be in reference to the last paragraph under the *Avoidance* heading in Section 5.8.5.2, p.186. It is known that the station locations for the Industry-DFO Post-Season Trap Survey for Snow Crab are fixed. The reference in this paragraph to "exchange detailed locational information with those involved in the surveying" is in relation to MKI's commitment to a 7-day pre-research survey temporal separation, as discussed in a previous comment. Information relating to scheduled trap surveying within the Project Area is directly relevant to this mitigation measure.

Figure 5.4 Page 218 - it would be appear to have been pertinent to include the shipping lanes for Terra Nova and White Rose petroleum production also.

> ***Response:*** Figure 5.4, p.218, was obtained from the Sydney Basin Offshore Area SEA (JW 2007). The Proponent was unable to obtain track data for shipping lanes for the Terra Nova and White Rose petroleum production facilities, however it is assumed that vessels follow the most direct route possible (given sea and ice conditions) between the production sites and St. John's Harbour. The following figures were produced by Husky (Oil) for the *White Rose Oilfield: Comprehensive Study Report* (see Figure 2.2 *in* Husky 2001) and by Petro-Canada for the *Development Application: Terra Nova Development Environmental Impact Statement* (see Figure 5.5-1 *in* Petro-Canada 1996) to represent helicopter and supply vessel routes for the White Rose platform and Terra Nova FPSO, respectively:

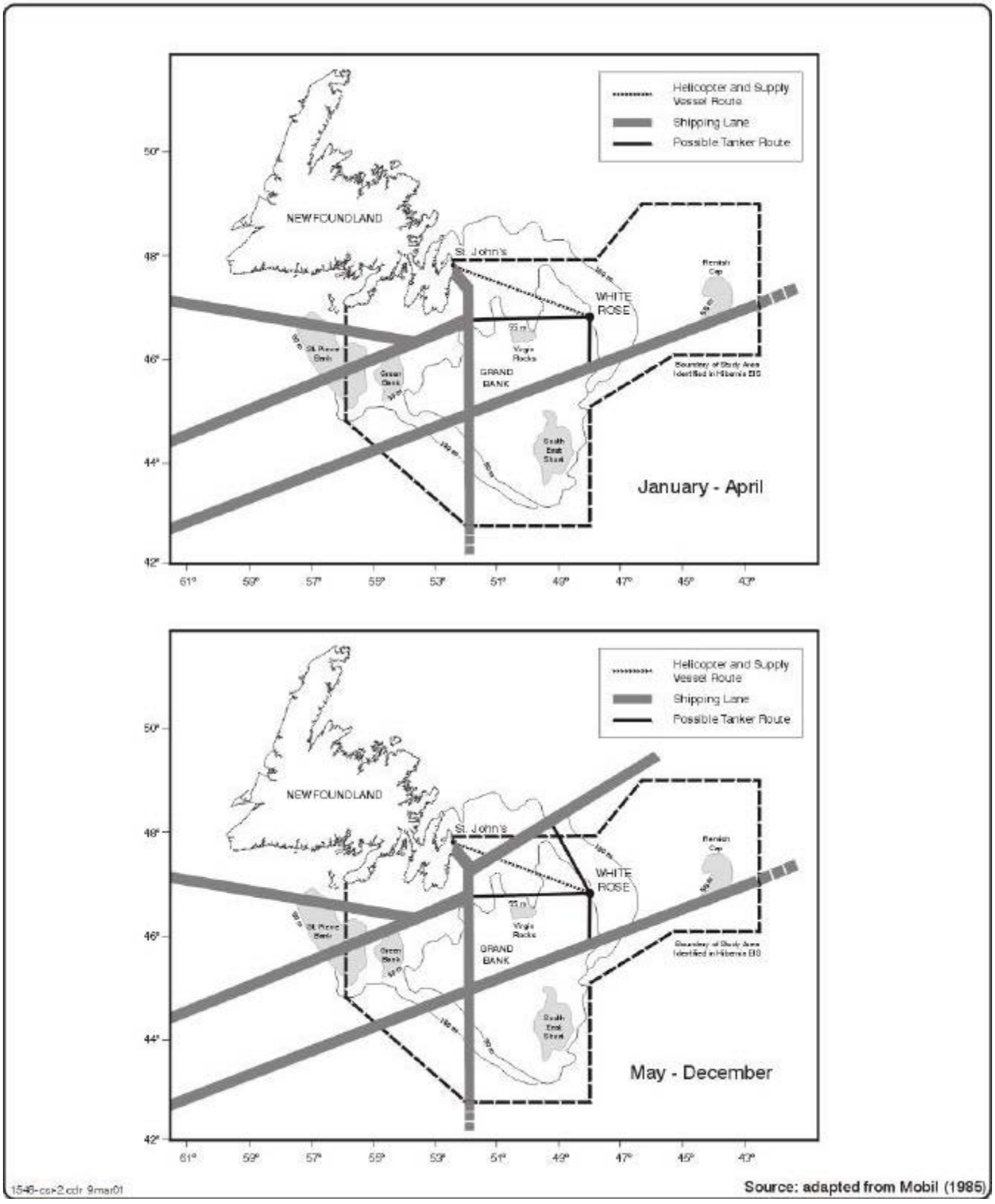

Figure 1. Transportation Routes Relevant to White Rose.

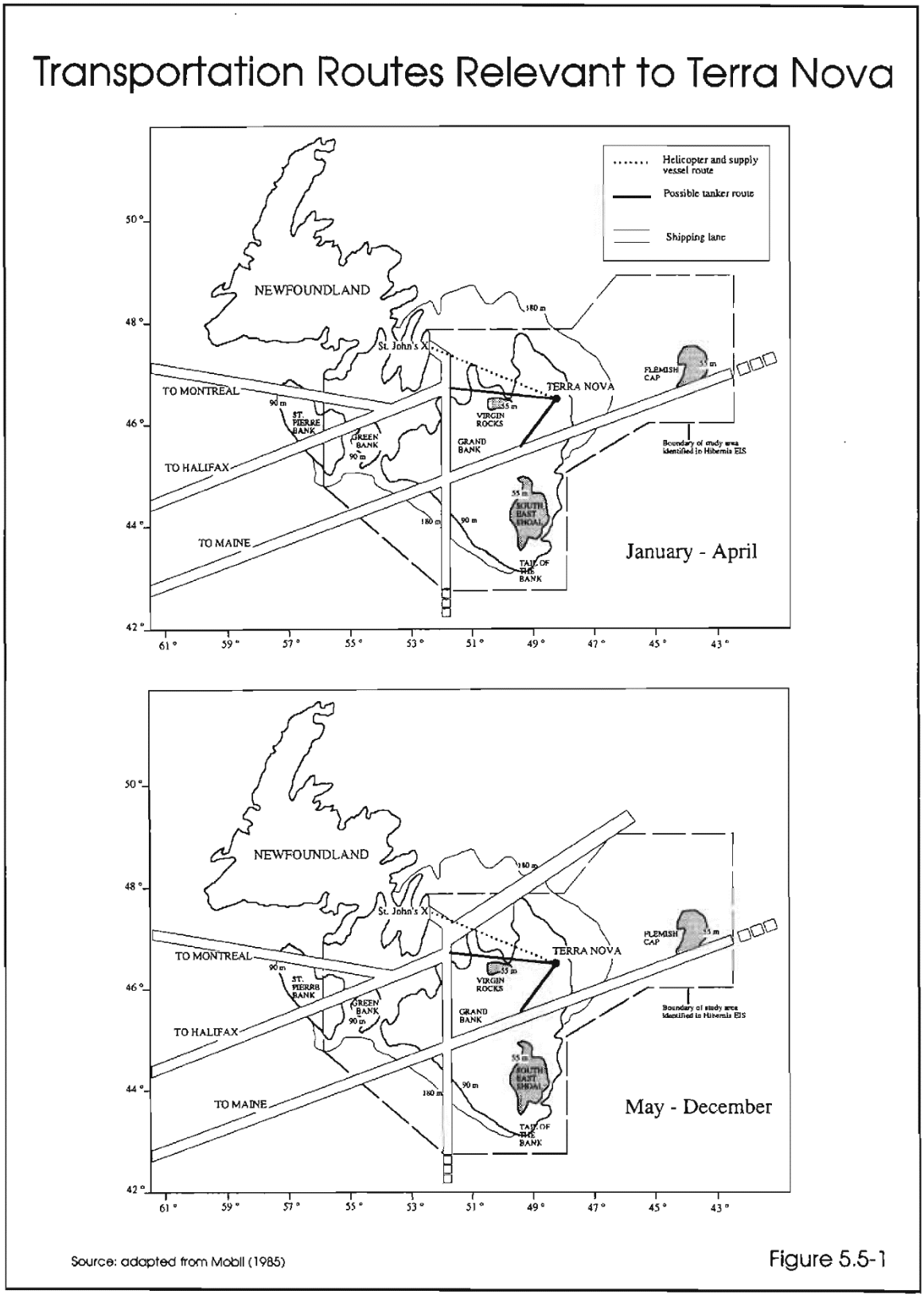

Figure 2. Transportation Routes Relevant to Terra Nova.

Section 5.9.3 Other Oil and Gas Activities, first paragraph, Page 220 - this may hold true historically, but in recent years there has been an increase in the Seismic Programs operating in Newfoundland and Labrador waters in a given year.

> ***Response:*** It is unclear what types of geophysical programs the reviewer is including in Seismic Programs. The text as written in the 1st paragraph, p.220, is accurate in that it refers specifically to 2D or 3D seismic programs. The C-NLOPB maintains a geophysical activity summary, currently ranging from 1996 to 2013 (http://www.cnlopb.nl.ca/exp_stat.shtml), which indicates that from 2009 to 2013 there were zero to four 2D or 3D seismic surveys in a given year. If the reviewer is including wellsite and geohazard surveys (which periodically use small airgun arrays—typically four airguns for geohazard surveys for short duration programs) in addition to 2D and 3D seismic surveys in Seismic Programs, then in recent years, the number of programs which are employing airgun arrays in Newfoundland and Labrador waters have been variable, with two to seven wellsite surveys and zero to two geohazard surveys in a given year from 2009 to 2013.

Section 5.9.3 Other Oil and Gas Activities, third paragraph, Page 220 – this paragraph should mention the proposed Southern Grand Banks Seismic Program proposed by GXT.

> ***Response:*** Edit "There is potential for cumulative effects with other seismic programs proposed for 2014-2018 (e.g., Statoil, Husky, MKI)" to "There is potential for cumulative effects with other seismic programs proposed for 2014-2018 (e.g., Statoil, Husky, MKI, GXT)" in the third paragraph in Section 5.9.3, p.220. Note that currently only the proposed GXT seismic program would also occur within the same area as the proposed MKI Southern Grand Banks seismic program. The other seismic programs of MKI, Statoil and Husky would be conducted outside of MKI's proposed Study Area for the Southern Grand Banks seismic program.

Appendix 1, Page A1-1: It is factually impossible that the Azores are in any way considered to be west of Newfoundland and Labrador.

> ***Response:*** Edit "The Azores are located about 1,600 km west-south west of the Study Area" to "The Azores are located about 1,600 km east-southeast of the Study Area" in the Response column for the FFAW and One Ocean entry in Appendix 1, p.A1-1.

Appendix 1, Page A1-2 – With reference to the NL Dept. of Fisheries and Aquaculture Stakeholder participants, it should read Tom Dooley.

> ***Response:*** Edit "Tom Duly" to "Tom Dooley" in the Stakeholder Participants column for the NL Dept. of Fisheries and Aquaculture entry in Appendix 1, p.A1-2.

Department of National Defence (DND)

The proponent is reminded that DND is likely to be operating in the vicinity of the Study Area in a non-interference manner during the project timeframe; thus, there is potential for interaction with naval operations in areas where seismic activities will occur. Please keep DND informed of dates and locations of seismic activities.

Response: MKI commits to informing DND regarding dates and locations of seismic activities throughout the Project.

Harbour Authorities of Francois, Lamaline, Point-au-Gaul and Lawn

The Harbour Authorities of the South Coast of Newfoundland communities of Francois, Lamaline, Point-au-Gaul and Lawn submitted letters to the C-NLOPB in February 2014 in which they expressed concern about the potential effects of the proposed Southern Grand Banks seismic program on the St. Pierre Bank fisheries.

Response: MKI acknowledges the comments and concerns expressed by the Harbour Authorities of Francois, Lamaline, Point-au-Gaul and Lawn. During the 2014 season there are no plans to carry our seismic surveying around the St. Pierre Bank. The operational focus for the survey during 2014 is to concentrate on the eastern half of the Project Area, to the eastern side of the Grand Banks and around the Tail of the Bank. It should also be noted that much of the survey will be conducted in the deep water areas beyond the shelf break in water depths of 1,500 meters and deeper. Information on the survey is being made available through a newsletter which will contain a Project Overview, Survey Location Map and Mitigation Measures as well as links to public documents such as the Project Description and Environmental Assessment which are placed for review on the Canada-Newfoundland and Labrador Offshore Petroleum Board's website. Further, during operations, MKI will hold weekly status and communication meetings with the FFAW/Unifor and representatives from other relevant fishing organizations. Forward looking acquisition plans will then be distributed to designated interested groups. Further consultations for additional phases of the project will be conducted with stake holders and communities as required.

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