Addendum to the Environmental Assessment of Chevron's North Grand Banks Regional Seismic Program, 2011-2017

Prepared by

LGL LIMITED
environmental research associates

for

Chevron

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LGL Project No. SA1119-1

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Preface

This addendum contains Chevron's responses to reviewer comments on the "Environmental Assessment of Chevron's North Grand Banks Regional Seismic Program, 2011-2017". Comments and responses are organized by the regulatory agency and groups that submitted comments. Comments are provided in italic font and responses in normal font.

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Fisheries and Oceans Canada (DFO)

General Comment: *Please be advised that the Department of Fisheries and Oceans (DFO) recommends that Chevron adhere to the "Statement of Practice with Respect to the mitigation of Seismic Sound in the Marine Environment" (SOCP) when conducting seismic programs. The SOCP specifies the mitigation requirements that must be met during 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 in order to minimize impacts on life in the oceans. These requirements are set out as minimum standards, which will apply in all non-ice covered marine waters in Canada.*

Marine Mammal Observers (MMO) are noted a few times through the document. It is suggested that the role of the MMO be better described within the EA Report to ensure reviewers that the best possible methods will be employed.

DFO conducts scientific surveys in the general area of the proposed program. The timing of the DFO scientific surveys will vary from year to year; therefore, the proponent should contact DFO to ensure there are no timing conflicts.

Response:

Re: Role of the MMO

The primary role of the MMO (sometimes referred to as the Environmental Observer or EO) is to implement mitigation measures outlined in the SOCP and included in the C-NLOPB (2011) *"Geophysical, Geological, Environmental and Geotechnical Program Guidelines".* MMOs are specifically tasked with:

- detecting blue whales, North Atlantic right whales and leatherback sea turtles (i.e., species listed as Endangered on Schedule 1 of *SARA*; there are no marine mammals or sea turtles listed as Threatened in the Study Area) within, or about to enter, the safety zone and initiating immediate shutdown of the airgun arrays; delaying ramp-ups when a marine mammal (or sea turtle) is sighted within the safety zone; ensuring that airgun ramp-up procedures are followed, and
- documenting the reactions of marine mammals (and sea turtles) to seismic operations and documenting locations and abundance of marine mammals (and sea turtles).

MMOs monitor for marine mammals and sea turtles during all daylight hours the airgun(s) are operational, during the 30-minute period before ramp up, and during most other daylight hours. Monitoring is typically conducted from the bridge and/or bridge wings of the seismic vessel and reticle binoculars are used to aid the MMO in distance estimates. MMOs typically conduct 2-3 hour watches followed by a 2 hour break; this is repeated about three times per day depending on the hours of daylight. Data collection protocols closely follow those outlined in Moulton and Mactavish (2004) and recommended for use by C-NLOPB (2011).

Biologists that perform MMO duties also conduct systematic seabird surveys periodically each day when weather conditions permit and search the vessel for stranded birds. Stranded birds are handled and released in accordance with appropriate protocols (Williams and Chardine, n.d.).

References:

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2011. Canada-Newfoundland and Labrador Offshore Petroleum Board. Geophysical, Geological, Environmental and Geotechnical Program Guidelines, February 2011.

Moulton, V.D., and B.D. Mactavish. 2004. Recommended seabird and marine mammal observational protocols for Atlantic Canada. LGL Rep. SA775-1. Rep. from LGL Ltd., St. John's, NL, for Environmental Studies Research Funds, Calgary, AB. 71 p.

Williams, U. and J. Chardine. n.d. The Leach's Storm-Petrel: General information and handling instructions.

Re: Potential conflicts between planned seismic survey activities and annual DFO scientific surveys.

The first paragraph in the relevant section (in Section 4.3.5 of the EA) currently reads as follows:

"Fisheries research surveys conducted by DFO, and sometimes by the fishing industry, are important to the commercial fisheries to determine stock status, as well as for scientific investigation. In any year, there may be overlap between the Study and/or Project Areas and DFO research surveys in NAFO 3KLM, depending on the timing in a particular year. Typically, DFO conducts a spring survey in sections of 3LNOPs (April-July), and a fall survey of 2HJ3KLMNO (September / October to December). The fall survey may employ two-vessels. The deeper waters of 3L (slope areas) are typically surveyed in October, and the shallower areas in November or December. The 2011 schedule has not yet been complete (as of February 2011), but exacting timing is likely to vary somewhat in each future Project year (B. Brodie, pers. comm. February 2011). Because of this, it will be necessary to maintain contact with DFO throughout each work season."

The last two sentences seem to speak to the point DFO has raised regarding potential conflicts. These sentences should be re-phrased as follows:

"The schedule for the 2011 survey season has not yet been finalized (B. Brodie, pers. comm. February 2011). Since the timing of DFO scientific surveys will vary from year to year, Chevron will contact relevant DFO managers at the start of each program year to ensure there are no timing conflicts."

Comment (Section 4.2.5, Page 28): *It is recommended that the authors' include deepwater sponges within the EA Report as well as the NAFO coral/sponge fisheries closures. The following link may also help:*

http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_041_e.pdf

Response: Change the title of Section 4.2.5 to "Deep-water Corals and Sponges" and add the following text and figure to Section 4.2.5:

Sponges also provide significant deep-sea habitat, enhance species richness and diversity, and exert clear ecological effects on other local fauna. Sponge grounds and reefs support increased biodiversity compared to structurally-complex abiotic habitats or habitats that do not contain these organisms (DFO 2010).

Morphological forms such as thick encrustations, mounds, and branched, barrel- or fan-like shapes influence near-bottom currents and sedimentation patterns. They provide substrate for other species and offer shelter for associated fauna through the provision of holes, crevices, and spaces. Siliceous hexactinellid sponges can form reefs as their glass spicules fuse together such that when the sponge dies the skeleton remains. This skeleton provides settlement surfaces for other sponges, which in turn form a network that is subsequently filled with sediment (DFO 2010).

Although some of the siliceous spicules of non-reef-forming species dissolve quickly, there is some accumulation of shed spicules forming a thick sediment-stabilizing mat, which constitutes a special bottom type supporting a rich diversity of species. Organisms commonly associated with sponges and sponge grounds include species of marine worms and bryozoans, as well as higher fauna. Live glass sponge reefs have been show to provide nursery habitat for juvenile rockfish and high-complexity reefs are associated with higher species richness and abundance (DFO 2010).

In 2008 and 2009, the NAFO Scientific Council identified areas of significant coral and sponge concentrations within the NAFO Regulatory Area. Based on these identifications, areas for closure to fishing with bottom contact gear were delineated. Figure 1 below shows the locations of 11 of these areas that occur either within or close to the Study Area. Implementation date of the closures started on 1 January 2010 (NAFO website: http://www.nafo.int/about/annrep/ar09/fc-index.html). Given the nature of seismic and geohazard surveys, survey equipment is not expected to come in contact with the seafloor and deep-water corals and sponges.

Reference:

DFO (Fisheries and Oceans Canada). 2010. Occurrence, susceptibility to fishing, and ecological function of corals, sponges, and hydrothermal vents in Canadian waters. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/041.

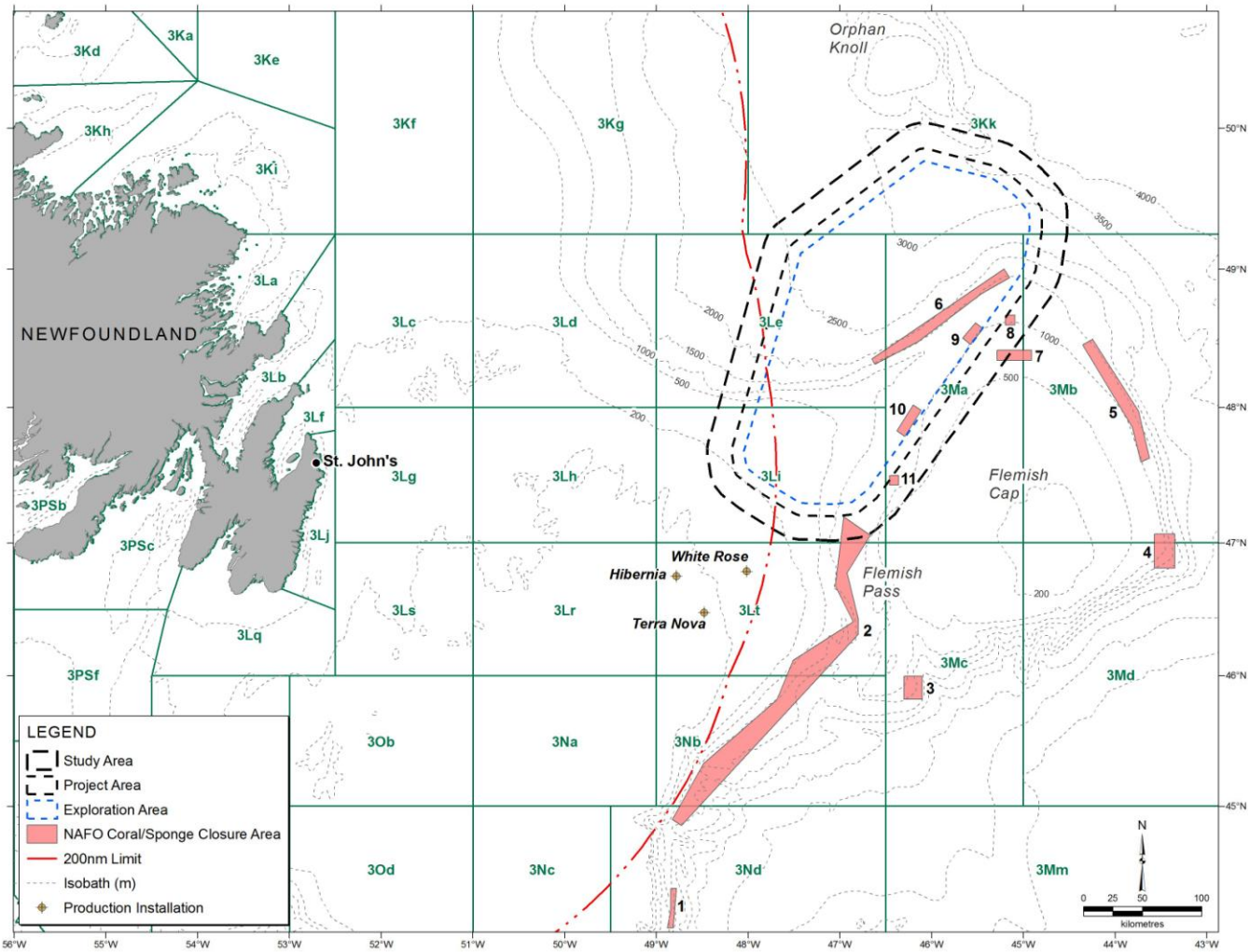

Figure 1. Locations of NAFO Coral/Sponge Closure Areas relative to the Chevron Study, Project, and Exploration areas.

Comment (Section 4.2.8, Page 40, Table 4.4): *It is stated that Greenland Halibut spawn in "winter months." There may be some major spawning during this time, but evidence suggests a very poorly defined spawning season for this species with multiple peaks in spawning activity and even some degree of spawning observed throughout the entire year.*

Response: Agreed that text in Table 4.4 should be revised to reflect the uncertainty associated with the timing of spawning activity by Greenland halibut and that there may be some degree of this activity throughout the year.

Comment (Section 4.2.8, Page 40, Table 4.4): *It is stated that Redfish have no Planktonic stage, while that is true to some degree, the larvae are by no means benthic (which is what may be interpreted from "no planktonic stage"). Redfish larvae have been collected in shallow surface layers and therefore may be susceptible to any surface spills. In addition, Redfish exhibit diurnal variation coming off bottom at*

night making them more vulnerable at these times to any impacts to pelagic zones compared to bottom dwelling behaviour.

Response: Agreed that text in Table 4.4 should be revised to remove any implication that redfish larvae are benthic. It should be noted in Table 4.4 that redfish exhibit diurnal vertical movement, thereby occupying different parts of the water column.

Comment (Section 4.3.2, Page 45, 3rd sentence): *It is suggested to replace the term "formerly underutilized species" with "other", as "formally underutilized species" implies that they were present, but not fished. It may be that they were not there previously.*

Response: On p. 45, replace "formerly underutilized species" with "other species" as DFO suggests.

Comment (Section 4.3.3.1, Page 50, 2nd sentence): *It is stated that the "study area overlaps with parts of SFA 6". However, SFA 6 ends at the 200 mile limit. Please clarify whether the study area does or does not overlap with SFA 6.*

Response: On p. 50, the sentence that reads "The Study Area overlaps with parts of Shrimp Fishing Area (SFA) 6, 7 and 3M (see following map)." should read "The Study Area overlaps with parts of Shrimp Fishing Area (SFA) 7 and 3M (see following map)." (i.e., delete the number 6 since the Study Area overlaps with SFA 7 but not with SFA 6.)

Comment (Section 4.3.3.2, Page 61, 2nd sentence): *It is suggested that the word "Landed" be placed before the word "Prices" to distinguish between prices paid to harvesters and final market prices.*

Response: On p. 61, replace "Prices" with "Landed prices" as DFO suggests.

Comment (Section 4.3.4, Page 66, 2nd paragraph): *This sentence is confusing and should be rewritten.*

Response: The sentences referenced on p. 66 presently read: "Shrimp harvesting uses mobile shrimp trawls. These are modified stern otter trawls, for both inshore and offshore vessels, though some use beam trawls. Over the past several years offshore Newfoundland and Labrador, shrimp vessels and survey ships, with good communications, typically avoid each other without interference to either industry, which has been noted by industry participants during previous consultations."

Replace this paragraph with:

"Shrimp are harvested with shrimp trawls, a mobile fishing gear which is, essentially, a modified stern otter trawl. As industry participants have noted in previous consultations, with good communications at sea, shrimp vessels and survey ships have usually managed to avoid each other without interference to either industry."

Comment (Section 4.5.1.2, Page 81): *DFO has population estimates for many cetacean and pinniped species in Atlantic Canada. These are based on systematic surveys such as those detailed in Lawson and Gosselin (2009) and Stenson et. al. (2011). These figures could be quoted in place of the NOAA estimates unless the latter includes species for which the DFO surveys did not enough sighting events to generate an acceptable estimate.*

Response: For most marine mammal species, the NOAA Stock Assessment estimates include the data reported in Lawson and Gosselin (2009). For cetacean species where the NOAA Stock Assessments were not appropriate to use (e.g., humpback whales), abundance estimates provided in Lawson and Gosselin (2009) were provided or other sources of information were cited (e.g., COSEWIC status reports). Stenson et al. (2011) report that total harp seal pup production in 2008 was estimated to be 1.63 million (SE=110,400). They note that this is significantly higher than estimated previously and is inconsistent with previous predictions obtained from the harp seal population model.

References:

Lawson, J.W. and J.F. Gosselin. 2009. Distribution and preliminary abundance estimates for cetaceans seen during Canada's Marine Megafauna Survey – A component of the 2007 TNASS. DFOCan. Sci. Advis. Sec. Res. Doc. 2009/031. 28 p.

Stenson, G.B., M.O. Hammill and J.W. Lawson. 2011. How many harp seal pups are there? Additional results from the 2008 surveys. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/137. iv + 19 p.

Comment (Section 4.5.1.3, Page 81, 3rd sentence): *Based on aerial searches and acoustic recordings, the south eastern edge of the Grand Banks remains an area populated by cetaceans during the winter. Therefore, the statement "although some individual baleen whales may be present in offshore waters of NL…" is not necessarily accurate.*

Response: DFO has placed autonomous acoustic recorders at the east and southeast edges of the Grand Banks and have recorded mysticete and odontocete calls throughout the winter (J. Lawson, Research Scientist, DFO, pers. comm.). PAL surveillance imagery, records, and observations by DFO staff have also shown there to be quite a few humpbacks and other large whales out in this area through the winter. Based on these observations, change the sentence referenced above to "Some baleen whales are present in offshore waters of Newfoundland year-round but most species presumably migrate to lower latitudes during winter months."

Comment (Section 4.5.1.5, Page 91): *More information should be provided on the importance of the area for feeding Harp and Hooded Seals. The area of the NE Grand Banks, slope and Flemish Pass is critical for seals during the spring when they need to replenish their energy reserves. Satellite telemetry studies have shown that this area is used extensively by Hooded Seals in May. By late May they have left the area for the moulting ice, although harps are still present through June. Harp Seals tend to remain on the continental shelf while Hooded Seals dive in the deep shelf waters.*

Response: The Chevron EA referred the reader to LGL (2008) for a more detailed review of the biological background information on marine mammals, including seals. The following text for hooded and harp seals is taken from Sections 5.6.1.21 and 5.6.1.22 of LGL (2008), respectively:

Hooded Seals

"Data collected from satellite transmitters deployed on hooded seals in the Gulf of St. Lawrence indicate that some females feed near the Flemish Cap after breeding while migrating to Greenland waters (G.B. Stenson, unpubl. data). Tagged males migrating to Greenland in early summer were recorded along the Grand Banks shelf edge near the Flemish Pass. It appears that males spend little time foraging in this area (G.B. Stenson, unpubl. data). Little is known regarding their winter distribution, although it is believed that the majority of seals remain offshore; they have been seen feeding off the Grand Banks in February. Surveys in the early 1990s suggested that the offshore waters on the northern edge of the Grand Banks might be an important over-wintering area for hooded seals (Stenson and Kavanagh 1994)."

Harp Seals

"Surveys conducted during the early 1990s suggested that offshore waters on the northern edge of the Grand Banks in NAFO fishing area 3L were an important over-wintering area for these animals during those years (Stenson and Kavanagh 1994). …Similarly, data from satellite transmitters deployed on harp seals suggest that the Grand Banks is an important wintering area for some seals (Stenson and Sjare 1997)."

References:

LGL. 2008. Environmental assessment of StatoilHydro's Jeanne d'Arc Basin area seismic and geohazard program, 2008-2016. LGL Rep. SA947. Rep. by LGL Limited, Canning and Pitt Associates Inc., and Oceans Ltd., St. John's, NL for StatoilHydro Canada Ltd., St. John's, NL. 174 p + appendices.

Stenson, G.B. and D.J. Kavanagh. 1994. Distribution of Harp and Hooded Seals in offshore waters of Newfoundland. Northwest Atlantic Fisheries Organization, Scientific Council Studies 21:121-142.

Stenson, G.B. and B. Sjare. 1997. Seasonal distribution of Harp Seals, *Phoca groenlandica*, in the Northwest Atlantic. ICES. C.M. 1997/10 p.

Comment (Section 4.5.1, Page 92): *It is noted in the EA Report that Grey Seals are considered rare in the Study Area. DFO have indicated, in their review, that Grey Seals would be unlikely to be this far offshore and there is no evidence that they would be found in the area.*

Response: Remove grey seals from the list of seals that may occur in the Study Area. Delete grey seals from p. 92 of the EA.

Comment (Section 4.6, Page 93): *The word "designated" should be replaced with "listed" throughout these sections when referring to SARA listed species. The term "designated" would be more appropriate when referring to species that have been assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), but not listed on SARA.*

Response: Replace "designated" with "listed" when referring to *SARA*-listed species. Also, use "designated" versus "listed" when referring to species that have been assessed by COSEWIC.

Comment (Section 4.6, Page 94, 2nd paragraph): *There is also a final recovery strategy posted on the SARA Registry for the North Atlantic Right Whale, with critical habitat identified in the Grand Manan Basin (Bay of Fundy) and Roseway Basin (Scotian Shelf). Please make note of this.*

Response: On p. 94, add North Atlantic right whale to the list of endangered or threatened species with final recovery strategies in place. On p. 98, add the following sentence: "Critical habitat has been identified for the North Atlantic right whale in the Grand Manan Basin (Bay of Fundy) and Roseway Basin (Scotian Shelf)".

Comment (Section 4.6.1, Page 95, Table 4.13): *It should be noted that for Atlantic Salmon designatable units (DU) occurring in NL, only the South Newfoundland DU was assessed as threatened by COSEWIC. Similarly, for the Deepwater Redfish, it is the Northern DU that was assessed by COSEWIC as threatened.*

Response: It is noted that the only Atlantic salmon DU linked to NL that has COSEWIC designation (i.e., threatened) is the South Newfoundland population. However, other Atlantic Canadian populations may also use the Study Area during migratory movements. It is noted that only the Northern DU of Deepwater Redfish is designated by COSEWIC as threatened.

Comment (Section 4.7, Page 99): *This section of the EA Report notes that "there are a variety of regulatory frameworks that deal directly or indirectly with sensitive areas…", yet the Oceans Act is mentioned. Oceans Act Marine Protected Areas are established by DFO to protect and conserve important fish and marine mammal habitats, endangered marine species, unique features and areas of high biological productivity or biodiversity.*

Response: The *Oceans Act* should be added to the list of examples of regulatory frameworks in Section 4.7. In addition, the following text should also be added to this section:

"The *Oceans Act* Marine Protected Areas (MPA) are established by the Fisheries and Oceans Canada to protect and conserve important fish and marine mammal habitats, endangered marine species, unique features and areas of high biological productivity or biodiversity."

Comment (Section 4.7.1, Page 99): *In referring to the Placentia Bay/Grand Banks Large Ocean Management Area, the existence of the Ecologically and Biologically Significant Area (EBSA) (i.e., the Northeast Shelf and Slope within the study area) as a potential Area of Interest (AOI) is accurate. However, it should also be noted within the EA Report that the Oceans Act provides the Minister of Fisheries and Oceans with a leadership role for coordinating the development and implementation of a federal network of Marine Protected Areas (MPA), of which can include areas within and outside of the Integrated Management (IM) area that has yet to be developed specifically within the Region to date. Therefore, there is potential for subsequent identification of EBSAs, AOI, MPAs and other sensitive areas in the study area within the future.*

Response: The following text should be added to Section 4.7.1.

"The *Oceans Act* provides the Minister of Fisheries and Oceans with a leadership role for coordinating the development and implementation of a federal network of MPAs, which can include areas within and outside of the Integrated Management (IM) area that have yet to be developed within the Region. Therefore, there remains potential for further identification of EBSAs, AOI, MPAs and other sensitive areas within the Study Area."

Comment (Section 5.6.5, Page 191): *The word "designated" should be replaced with "listed" throughout these sections when referring to SARA listed species. The term "designated" would be more appropriate when referring to species that have been assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), but not listed on SARA.*

Response: Replace "designated" with "listed" when referring to *SARA*-listed species. Also, use "designated" versus "listed" when referring to species that have been assessed by COSEWIC.

Department of National Defence

Comment: *It was observed that the information provided to the C-NLOPB by the Department of National Defence (DND), through the Federal Coordination Regulations process, has not been included in the report. This is unacceptable. The assessment of the possible presence of this wrecked submarine and the potential for the presence of unexploded ordinates (UXO) is extremely important. DND and the C-NLOPB requests that Chevron Canada Resources include the information provided to the C-NLOPB by the DND, through the Federal Coordination Regulations process, and provided to Chevron Canada Resources, via the Draft Scoping Document Review Comments, by the C-NLOPB on February 14, 2011 in the assessment report for the proposed project.*

Response: During the preparation of the EA, the information provided by DND concerning the possible presence of a wrecked submarine and unexploded ordinates was considered. Given the nature of seismic and geohazard surveys, survey equipment is not expected to come in contact with wrecks and/or UXO on the seafloor. Also, the recorded location of the recorded wreck is outside of the Project Area. As recommended by DND, in the highly unlikely event that suspected UXO are encountered during the course of seismic and geohazard operations, Chevron and its subcontractors will not disturb or manipulate UXO, will mark the location, and immediately inform the Coast Guard.

Environment Canada (EC)

Comment (Seabird Data Collection): *This survey provides a good opportunity to collect additional seabird data from the area. CWS has developed a pelagic seabird monitoring protocol that we are recommending for all offshore projects. This protocol is a work in progress and we would appreciate feedback from the observers using it in the field. A guide sheet to the pelagic seabirds of Atlantic Canada is available through CWS in Mount Pearl. In an effort to expedite the process of data exchange, the Canadian Wildlife Service would appreciate that the data (as it relate to migratory birds or species at risk) collected from these surveys be forwarded in digital format to our office following completion of the study. These data will be centralized for our internal use to help ensure that the best possible natural resource management decisions are made for these species in Newfoundland and Labrador.*

Metadata will be retained to identify source of data and will not be used for the purpose of publication. The Canadian Wildlife Service will not copy, distribute, loan, lease, sell, or use of this data as part of a value added product or otherwise make the DATA available to any other party without the prior express written consent.

Response: A seabird data collection program will be undertaken aboard the seismic vessel by experienced biologists. Survey methods will closely follow the Eastern Canada Seabirds at Sea (ECSAS) Standardized Protocol for Pelagic Seabird Surveys from Moving and Stationary Platforms (Wilhelm et al. 2010 unpublished). The seabird data will be provided to CWS in digital format for the purposes of natural resource management. It is understood that CWS "will not copy, distribute, loan, lease, sell, or use of this data as part of a value added product or otherwise make the DATA available to any other party without the prior express written consent". In addition, a seabird (and marine mammal) monitoring report will be submitted to the C-NLOPB in accordance with their "Geophysical, Geological, Environmental and Geotechnical Program Guidelines" (C-NLOPB 2011).

Reference:

Wilhelm, S.I., C. Gjerdrum, and D.A. Fifield. 2010. Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic seabird surveys from moving and stationary platforms. Canadian Wildlife Service, Mount Pearl, NL and Dartmouth, NS. Unpublished report.

Fish, Food and Allied Workers (FFAW)

General Comment: *To clarify a point made in the document (page 196), fishing gear may only be retrieved from the water by the gear owner (i.e. fish license owner). This includes buoys, radar reflectors, rope, nets, pots, etc. associated with fishing gear and/or activity. If gear contact is made during seismic operations it should not be retrieved or retained by the seismic vessel. There are conditions that may warrant gear being retrieved or retained if it becomes entangled with seismic gear, however, further clarification on rules and regulations regarding fishing gear should be directed to the Conservation and Protection Division of Fisheries and Oceans Canada (NL Region). Also, to clarify, shrimp harvesting for the inshore fleet generally starts April 1 (not August) and could continue to October (Page 103).*

It is important that Chevron maintain regular communication with the FFAW to keep apprised of ongoing developments with fisheries in the project area. Harvesters are spread out over a wide geographic area and communication is vital to the safety of all involved. As stated in the document, "good communication is one of the best ways to minimize interference with fishing activities."

The unknown long term effects of seismic activities continue to concern harvesters. There have been reports from harvesters that fish behaviour has been affected following seismic blasts and shellfish have disappeared from areas following seismic work being undertaken. There have also been reports from vessel captains that ground fish catches have been impacted when oil and gas activities have been ongoing. While the research has not determined any direct mortality of fish or shellfish attributable to seismic activity there may be behavioural changes that could affect migration and/or reproductive spawning activities as well as movement of the exploitable biomass in an area. This, in turn, can impact catch rates in years to come. There is need for further research on impacts on seismic activity on important commercial species including shrimp, crab, turbot and Atlantic cod to address data gaps.

The commercial fishery will be actively prosecuted by FFAW members at the time that Chevron is proposing to conduct its program in 2011 and beyond. While historical fishing patterns have been detailed in the document, fishing activity can change from year to year and during the season as well. As noted in the document the southwest corner of the project area is heavily fished by about 300 vessels in the inshore fleet for crab, shrimp and turbot. The offshore fleet and other international vessels may also be fishing in the area during the summer months.

In addition to the deployment of a Fisheries Liaison Officer onboard the seismic vessel, to mitigate potential conflicts with fishing vessels and fishing gear (both towed and fixed) in the southwest corner of the project area, we recommend the company consider the deployment of a Fisheries Guide Vessel when they work this heavily fished area. The loss of fishing time, catch and/or gear that may be associated to mitigate conflicts should be considered.

Response:

Re: Clarification of gear handling procedures

In response to a statement on page 196 of the EA which noted that the survey vessel would retrieve and retain any floating debris from contact with fishing gear if it was safe to do so, the FFAW said this statement needed to be clarified as follows:

"… . fishing gear may only be retrieved from the water by the gear owner (i.e. fish license owner). This includes buoys, radar reflectors, rope, nets, pots, etc. associated with fishing gear and/or activity. If gear contact is made during seismic operations it should not be retrieved or retained by the seismic vessel. There are conditions that may warrant gear being retrieved or retained if it becomes entangled with seismic gear, however, further clarification on rules and regulations regarding fishing gear should be directed to the Conservation and Protection Division of Fisheries and Oceans Canada (NL Region)".

Chevron agrees fully with this statement of clarification. The above text should be added to the statement made on p. 196 of the EA.

Re: Start date of the 3L shrimp fishery (vessels < 65 feet)

It is acknowledged that the annual 3L shrimp season generally opens on 1 April. However, the statement that "shrimp harvesting usually starts 1 August" was made by FFAW representative (N. Bussey) at the 21 February meeting with Chevron. He noted that [although the shrimp fishery opens in early April], many fishers prefer to take their offshore crab quota first before turning to the harvest of their shrimp allocations. Mr. Bussey also noted that - for many fishers – it is usually not until around early August, or in some cases mid-August, when most of the crab fishers have completed their harvest of that species.

Re: Concerns about potential effects of seismic operations on various species of fish

It is acknowledged that the FFAW and many fishers continue to remain concerned about the potential effects of seismic survey operations on their harvesting activities and on various key species that the exploit in the marine environment.

Re: Suggestion for the deployment of a Fisheries Guide Vessel

The Union's Petroleum Industry Liaison manager made this suggestion for an additional vessel at the 21 February 2011 meeting between Chevron, its consultants and FFAW officials. The reference to this suggestion is on page 104 of the EA where it is noted:

"The meeting ended with some discussion of the FLOs for the survey vessels, and the FFAW's Petroleum Industry Liaison manager also mentioned that the Union has the capability to provide 'guide' vessels for the survey. There was also some discussion about whether the FLO should be located on the survey vessel or on the 'picket' vessel".

During the 21 February 2011 meeting, Chevron noted a number of concerns with the potential use of a Fisheries Guide Vessel including concerns about safety; the uncertainty a suitable vessel could be found;

and the fact the presence of a FLO would ensure good communication during seismic/fishing operations. Chevron's planned utilization of a FLO is consistent with the Risk Management Matrix Guidelines (see below) approved by the One Ocean Board of Directors in September 2010. Chevron is committed to ensuring open and frequent communications with the FFAW before and during the 2011 North Grand Banks seismic operations.

Risk Management Matrix Guidelines

for the utilization of Fisheries Liaison Officers and Fisheries Guide Vessels
for the Fishing and Petroleum Industries of Newfoundland and Labrador

LEVEL OF FISHING ACTIVITY	SEISMIC OPERATIONS					TRANSIT-TOW OPERATIONS			
	VPS	EMS	WSS	2D	3D	Drill Ship	Drill Rig	FPSO	GBS
Fishery Closed in Area									
Fishery Open- No Recent Fishing in Area									
Fishery Open-Area Actively being Fished									

	The Petroleum Industry Liaison at the Fish, Food and Allied Workers (FFAW) Union should be notified in advance of all seismic, transit and tow operations outside of the Field Safety Zone
	The use of a Fisheries Liaison Officer should be considered in consultation with the FFAW
	The use of a FLO and Fisheries Guide Vessel should be considered in consultation with the FFAW

NOTES:
1. The Matrix provides useful criteria and considerations for mitigative and safe practices for the fishing and petroleum industries. The Matrix is a guideline for industry consultations and does not in any way replace them.
2. The Matrix is designed for seismic, transit and tow operations located outside a field or exploration operation safety zone.
3. Fisheries Guide Vessels will be commercially registered fishing vessels and part of the FFAW's Guide Vessel Program.
4. Fishing activity referenced in the Matrix refers to fixed fishing gear/equipment only.
5. Operators accept liability for compensation of any fisheries gear damage that is directly attributable to an operation.

Acronyms:

2D Two-Dimensional Seismic
3D Three-Dimensional Seismic
EMS Electromagnetic Survey
FPSO Floating Production Storage Offloading Vessel
GBS Gravity Base Structure
VSP Vertical Seismic Profiling
WSS Well Site Survey

One Ocean was established in 2002 as the inter-industry liaison organization for the fishing and petroleum industries in Newfoundland and Labrador. Its mandate is to facilitate cooperation, communication and information exchange between the two marine sectors. The Risk Management Matrix Guidelines for the Utilization of Fisheries Liaison Observers and Fisheries Guide Vessels for the Fishing and Petroleum Industries in NL, (Matrix) was developed by members of One Ocean. Its application should be developed in collaboration with industry, regulators and One Ocean. Contact One Ocean at 709 778 0511.

For more information on regulations please reference the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) Geophysical, Geological Environmental and Geotechnical Program Guidelines 2008: http://www.cnlopb.nl.ca/pdfs/guidelines/ggegpg.pdf The C-NLOPB is the authority responsible for the administration of the regulations pertaining to all exploration for, and production of, hydrocarbons in the Newfoundland and Labrador offshore area.

Comment: *In a 13 May 2011 email to Darren Hicks (Environmental Analyst at the Canada-Newfoundland and Labrador Offshore Petroleum Board), the FFAW's Petroleum Industry Liaison manager wrote:*

"To clarify a point in the document (page C-1), it is unreasonable for Chevron to encourage or ask a fish harvester to shift or set his gear away from the project area such that the seismic ship can pass through without incident. Setting gear in an area outside normal fishing grounds may result in loss of catch, increased expenses and therefore decreased revenue for the harvester. Exploration activities should not be to the detriment of the harvester."

Response: The FFAW's manager is referring to Appendix C of the EA. This Appendix describes the responsibilities of participants involved in providing Single Point of Contact (SPOC) Services to the Newfoundland and Labrador Offshore Sector. The FFAW's comment refers to a paragraph in the "Operational Responsibilities, Protocols and Communications" (i.e. Protocols) section of the SPOC document.

Among other items, the SPOC document explains the procedures to be followed by the onboard Fisheries Liaison Officer (FLO), the seismic operator - and the SPOC onshore -when fishing gear is present in the vicinity of survey operations.

The Protocols section notes: "The main threat of conflict with exploration activities is usually from fixed fishing gear … .. [However] fishers are not required to move fishing gear from the exploration work area. All gear in the path of the petroleum exploration work must be avoided [by the seismic vessel] and other clear areas pursued instead, if encountered". (Emphasis added)

The FFAW's comment is directed specifically to the wording of the last sentence of the following paragraph which reads:

"If obstructing fishing gear is located by the exploration or scout vessel, the exact positions and name or CFV number on the gear would be recorded and relayed to the FLO and the SPOC. At sea the FLO, and on land the SPOC, will try to contact the gear owners (based on the name or CFV information). The FLO and SPOC will attempt to determine the plans / schedule of the gear owner with respect to that gear, and will encourage the owner to communicate with the exploration vessel / FLO at sea, and to shift the gear in question into a different area the next time it is hauled, though this may not result in any significant change of location".

The FFAW's interpretation of the last sentence is that the survey vessel operator will, and also has the right to, ask the fisher to move his gear. In its response, the FFAW objects to this action noting that "it is unreasonable for Chevron to encourage or ask a fish harvester to shift or set his gear away from the project area such that the seismic ship can pass through without incident'.

The FFAW goes on to say - correctly - that such an action could "result in loss of catch, increased expenses and therefore decreased revenue for the harvester".

We agree with the FFAW's statement that it is possible that a fisher may suffer economic loss if he decides to shift his gear, voluntarily, to another location at the request of a seismic vessel.

However, the Protocols do not state that the fisher is required to move his gear if asked to do so by the seismic vessel operator. All they say is that the FLO (or in some cases the SPOC) may reasonably ask the fisher to "shift the gear in question into a different area the next time it is hauled". The decision is entirely with the harvester in question; he can decide to stay where he is, or he might voluntarily comply with the request to shift his gear the next time he hauls it at the location in question.

We are not aware of any cases in the offshore where a fisher was forced to move his gear out of the path of a survey line. There are a couple of cases (e.g. during the 1990s in Bay St. George) in which inshore crab fishers agreed to move their gear off planned seismic lines as part of an overall compensation

program worked out in advance with these fishers. There is also at least one instance where an offshore seismic vessel waited for several days after the close of the (offshore) crab season for fishers to remove their gear from the path of a survey line.

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Comment: *Legends in some of the Figures are confusing. For example, Figure 1.1's legend should start with Study Area, not Project area as it is the larger area. There are several instances of this. However, there are some that are properly described in the Legend, for example, Figure 4.7. Please be consistent and accurate.*

Response: The different colours and lengths of the dashed lines used in the map Legends accurately represent the Exploration, Project, and Study areas depicted on the maps in the EA. For future submissions, Chevron will endeavour to present the standard areas used in its offshore EAs (i.e., Project and Study areas) in the same order in map Legends.

Comment: *All references to the "Geophysical, Geological, Environmental and Geotechnical Program Guidelines" throughout the report should be changed from 2008 to 2011 as they were updated in 2011. Please refer to www.cnlopb.nl.ca .*

Response: References to C-NLOPB (2008) should be changed to C-NLOPB (2011) and the corresponding citation should be:

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2011. Canada-Newfoundland and Labrador Offshore Petroleum Board. Geophysical, Geological, Environmental and Geotechnical Program Guidelines, February 2011.

Comment (Section 1.1.1, pg 3): *Along with the documentation submitted to the C-NLOPB, CCL should "outline CCL's planned activities for the upcoming year".*

Response: Chevron will provide the C-NLOPB with an outline of their planned activities during the first quarter of each year that work is proposed in 2012-2017.

Comment (Section 1.1.1, pg 3, para. 1): *Depending on the changes to the project, an "amendment" might not be the only option available to CCL.*

Response: The comment is noted and Chevron will consult with the C-NLOPB as noted in the EA during the first quarter of each year that seismic or geohazard survey work is planned in 2012-2017.

Comment (Section 2.2, para. 1, pg 6): *The Geophysical, Geological, Environmental and Geotechnical Program Guidelines state that "Operators are expected to implement a **seabird** and marine mammal observation program throughout survey activities. Such a program should involve a designated observer **trained** in marine mammal and **seabird** observations".*

Also, as stated in the Guidelines, "A report on the monitoring program and its results should be submitted to C-NLOPB no later than one year after completion of the survey."

Response: As noted in the EA, Chevron will implement both a marine mammal and seabird observational program and observations will be conducted by trained observers (biologists). Also, a monitoring report (see Section 5.8) will be submitted to the C-NLOPB within one year after completion of the survey.

Comment (Section 2.3, pg 11): *Mitigation measures are summarized in Section "5.8" not "5.9". Please ensure that the table contains a complete list of measures detailed throughout the EA (e.g. seabird observations).*

Response: The reference to Section 5.9 should be changed to Section 5.8. Table 5.18, Summary of Mitigation Measures is complete. The conduct of systematic seabird counts is not considered a mitigation measure; it is a means to collect scientific data.

Comment (Section 3.2.1, Page 19, para. 3, line 3): *"…large annual variation in the steric height over…". Steric – of or relating to the spatial arrangement of atoms in a molecule. Is this what the author intended? If not, then please address.*

Response: In oceanography, steric height is a sea level change due to changes in temperature and salinity and hence, density of the seawater.

Comment (Section 4.3.1.1, Page 41, para. 3): *Why is most of this paragraph in parentheses? Please clarify or address.*

Response: The purpose of the text in parentheses is to further elaborate and explain the nature and accuracy, etc., of the DFO catch and effort data. This text is in brackets because it is supplementary to the main focus of the description of the DFO catch data. In other EA reports, this statement is presented in a footnote.

The brackets can be removed altogether. This would not alter or affect the content or meaning of the paragraph.

Comment (Section 4.3.5, para. 1, pg 67): *Although reference is made to "pers. comm." in the report, they are not included in the reference section.*

Response:

A list of personal communications cited in the EA is provided below.

Personal Communications

Brodie, William. Senior Science Coordinator/Advisor, NAFO, Science Branch, Fisheries and Oceans Canada, St. John's, NL.

Chidley, Gerard. Fisherman. Renews, NL.

Dawe, Earl. Research Scientist, Fisheries and Oceans Canada, St. John's, NL.

Federizon, Ricardo. NAFO Fisheries Commission Coordinator, Halifax, NS.

Fudge, Derek. Manager, Fleet Administration and Scheduling, Ocean Choice International, Marystown, NL.

Lawson, Jack. Research Scientist, Fisheries and Oceans Canada, St. John's, NL.

Payne, Jerry. Research Scientist, Fisheries and Oceans Canada, St. John's, NL.

Saunders-Lee, Robyn. Petroleum Industry Liaison, Fish, Food and Allied Workers Union (FFAWU), St. John's, NL.

Thorne, Henry. Fisherman. Thornlea, NL.

Yetman, Larry. Staff Officer, Marine Mammals/Foreign, Resource Management and Aboriginal Fisheries, Fisheries and Oceans Canada, St. John's, NL.

Comment (Section 4.6.1.2, pg 97): *The Fin Whale is listed under Schedule 1 of the SARA. The profile of this species should be included in the report.*

Response: Fin whales were profiled in Section 4.5.1.3 of the EA. Section 4.6.1 focused on those species listed on Schedule 1 as *endangered* or *threatened*.

Comment (Section 4.6.1.1, Table 4.13, Page 95): *Either match the text in the document with Table 4.13 or match Table 4.13 with the text so it flows logically. Also, please fix Table 4.13 so "Seabirds" is consistent with "Marine Mammals", "Sea Turtles" and "Marine Fish."*

Response: Please see the following revised table.

Table 4.13 *SARA*-listed and COSEWIC-designated marine species that potentially occur in the Study Area.

Species		*SARA*[a]			COSEWIC[b]		
Common Name	**Scientific Name**	**Endangered**	**Threatened**	**Special Concern**	**Endangered**	**Threatened**	**Special Concern**
Marine Fish							
Northern wolffish	*Anarhichas denticulatus*		Schedule 1			X	
Spotted wolffish	*Anarhichas minor*		Schedule 1			X	
Atlantic wolffish	*Anarhichas lupus*			Schedule 1			X
Atlantic cod	*Gadus morhua*			Schedule 3			
Atlantic cod (NL[a] population)	*Gadus morhua*				X		
Porbeagle shark	*Lamna nasus*				X		
White shark	*Carcharodon carcharias*				X		
Roundnose grenadier	*Coryphaenoides rupestris*				X		
Atlantic salmon (various)	*Salmo salar*				X	X	X
Cusk	*Brosme brosme*					X	
Shortfin mako shark	*Isurus oxyrinchus*					X	
American plaice (NL population)	*Hippoglossoides platessoides*					X	
Acadian redfish (Atlantic population)	*Sebastes fasciatus*					X	
Deepwater redfish	*Sebastes mentella*					X	
Blue shark (Atlantic population)	*Prionace glauca*						X
Basking shark	*Cetorhinus maximus*						X
Roughhead grenadier	*Macrourus berglax*						X
Spiny dogfish (Atlantic population)	*Squalus acanthis*						X
Marine Mammals							
Blue whale	*Balaenoptera musculus*	Schedule 1			X		
North Atlantic right whale	*Eubalaena glacialis*	Schedule 1			X		
Fin whale (Atlantic population)	*Balaenoptera physalus*			Schedule 1			X
Sowerby's beaked whale	*Mesoplodon bidens*			Schedule 3			X
Harbour porpoise	*Phocoena phocoena*		Schedule 2				X
Killer whale (NW Atlantic/ E Arctic populations)	*Orcinus orca*						X
Sea Turtles							
Leatherback sea turtle	*Dermochelys coriacea*	Schedule 1			X		
Loggerhead sea turtle	*Caretta caretta*				X		
Seabirds							
Ivory Gull	*Pagophila eburnea*	Schedule 1			X		

Sources: [a]*SARA* website (http://www.sararegistry.gc.ca/default_e.cfm) (as of Feb. 2011); [b]COSEWIC website (http://www.cosewic.gc.ca/index.htm) (as of Feb. 2011).

Comment (Section 5.7, pg 195): *The C-NLOPB public registry should be revisited.*

Response: The C-NLOPB public registry was reviewed as late as possible during preparation of the EA to ensure that the cumulative effects section included the most up-to-date listing of potential oil and gas industry projects. Chevron will consult the C-NLOPB public registry as well as contact the C-NLOPB directly prior to the start of their seismic operations to obtain the most recent information on other operators in and near the Chevron Project Area. In addition, the public registry will be reviewed during the preparation of future amendments to the EA, including the Validation process.