Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL A1A 4Y6
Tel: (709) 576-1458
Fax: (709) 576-2126

Environmental Assessment of Ptarmigan Energy Inc. Geophysical Program for Anticosti Basin Offshore Western Newfoundland and Labrador
EL 1120; EL 1128 and EL 1127 (2012 to 2021)

Response to EA Report Comments of Reviewers

Prepared for:

Ptarmigan Energy Inc.
801 Torbay Road
Torbay, NL A1K 1A2

File No. 121510837

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TABLE OF CONTENTS

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
Department of National Defence (DND) - General Comments		
1.	DND is likely to be operating in the vicinity of the Study Area in a non-interference manner during the project timeframe.	Ptarmigan Energy will use appropriate communication channels to inform other ocean users of their location and activities during the seismic program.
2.	Due to the inherent dangers associated with UXO and the fact that the Atlantic Ocean was exposed to many naval engagements during WWII, should any Suspected UXO be encountered during the course of the proponent's operations it should not be disturbed/manipulated. The proponent should mark the location and immediately inform the Coast Guard. Additional information is available in the 2012 Annual Edition – Notices to Mariners, Section F, No. 37.	Comment noted. Ptarmigan Energy will inform Coast Guard if any Suspected UXO is encountered during the Project.
3.	In the event of activities which may have contact with the seabed (such as drilling or mooring), it is strongly advised that operational aids, such as remote operated vehicles, be used to conduct seabed surveys in order to prevent unintentional contact with harmful UXO items that may have gone unreported or undetected.	Comment noted. In the event of future activities that will interact with the seabed (such as drilling or mooring), operational aids will be used to prevent unintentional contact with harmful UXOs.
Fisheries and Oceans Canada – General Comments		
4.	Please be advised that the "Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment" (SOCP) specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys, in order to minimize impacts on life in the oceans. These requirements are set out as minimum standards to be implemented during the planning and conduct of seismic programs. As such it is advised that the proponent 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 Mitigation Measures and Modifications sections of the SOCP.	Ptarmigan Energy will adhere to the *Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment* (SOCP).
5.	This geophysical program covers a long timeframe (2012-2021) and the document does indicate that there will be EA validation with respect to species at risk updates and validity of mitigation measures. This is important since requirements for species at risk may change (e.g. new species could be listed, critical habitats could be identified, new recovery strategies/management plans/action plans could be available, etc.). The proponent should to refer to the Species at Risk Public Registry (www.sararegistry.gc.ca) to get the most up to date information/requirements for future EA validations.	In the case of an EA validation (in future), the Species at Risk sections will be updated as indicated by the Reviewer, as well as in consideration of other relevant legislative and regulatory changes.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
Fisheries and Oceans Canada – Specific Comments		
Section 2.2.6, Seismic Vessel, p. 13, Table 2.1		
6.	Please clarify/confirm "Total Area km^2".	The total area that will be surveyed during the proposed seismic survey is 1,014 km^2. Please also see Figure 2-4 appended at the end of this response table.
Section 2.3 Mitigation, p. 19		
7.	This section states that "mitigation measures may include ramp-ups, implementation of ramp-up delays and shut downs for marine mammals and sea turtle species, dedicated MMOs and FLO". As previously stated in the general comment section, the SOCP requirements are set out as minimum standards to be implemented during the planning and conduct of seismic programs.	Comment noted. Please also refer to the response for Comment No. 4.
Section 5.10, Noise/Acoustic Environment, p. 51, Table 5.4		
8.	The line referring to Baleen whale sound is incorrect as baleen whale sounds cover a much larger bandwidth and range of source levels than the values presented. Sources levels presented here refer 20 year old documents. More recent figures would be more accurate and relevant. Also some values are given for measurements at 1 km and not at 1 m. (See Hildebrand 2009, NRC 2003)	The correct information is available in NRC (2003). Marine mammal vocalizations cover a wide range of frequencies, from less than 10 Hz to greater than 200 kHz (NRC 2003). Baleen whale vocalizations are much lower in frequency than toothed whales and frequencies are rarely above 10 kHz (NRC 2003). Table 5.4 in the EA is revised and appended at the end of this response table. National Research Council (NRC). 2003. *Ocean Noise and Marine Mammals*. Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals. The National Academies Press: Washington, D.C. 208 p.
Section 6.2, Table 6.4 COSEWIC Assessed Species		
9.	• Smooth Skate (Laurentian–Scotian population) should be included with the table. It was assessed by COSEWIC in May 2012 as special concern. • For Killer Whale, the Northwest Atlantic/Eastern Arctic population	A revised Table 6.4 with the Reviewer's recommended changes is appended at the end of this response table.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
	should be specified. • Thorny skate are widely distributed on the shelf off western Newfoundland and thus have a high potential for occurrence in the area. Also please revise statement in last paragraph on page 207 (i.e. high potential). • For Northern Bottlenose Whale, the Davis Strait/Baffin Bay/Labrador Sea population should also be included in the table. Within the report it states that it is uncertain to which population individuals sighted in the Gulf of St. Lawrence belong (could be either Scotian Shelf or DS/BB/LS population).	
Section 6.2.2, Wolffish, p. 70		
10.	The document indicates that a national recovery plan was established in 2003 for northern and spotted wolffish and a management plan was developed for Atlantic wolffish. This should be corrected, as the final Recovery Strategy and Management Plan were posted on the public registry in 2008.	Comment noted. The 2008 Recovery Strategy and Management Plan is the correct year for the most reference on the Plan.
Section 6.2.2, Wolffish, p. 70, last paragraph		
11.	The surveys were not directed at Wolffish but rather to multiple fish and invertebrates species. Also, signs of stock recovery apply to NAFO 2J3KLNOPs and not to the study area in 4R. The same statement applies to comments on distribution and temperature as indicated in this paragraph.	The last paragraph on p. 70, however, refers to information from Simpson *et al.* (2012) which does specifically assess all three species of wolffish and discusses their status in the Northwest Atlantic Ocean. The paragraph discusses the population generally and does not refer to NAFO Division 4R specifically. Simpson, M.R., L.G.S. Mello, C.M. Miri and M. Treble. 2012. A pre-COSEWIC assessment of three species of wolffish (*Anarhichas denticulatus*, *A. minor*, and *A. lupus*) in Canadian waters of the Northwest Atlantic Ocean. DFO Canadian Science Advisory Secretariat Research Document 2011/122.
Section 6.2.2, Northern Wolffish, p. 71, last paragraph		
12.	Statements in this section apply to NAFO 2J3KLMNOPs and not to the Study Area in 4R.	The information presented on page 71 refers to northern wolffish in Newfoundland waters generally

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		and not specifically to 4R.
Section 6.2.2, Spotted Wolffish, p. 72, last paragraph		
13.	It should be clarified that data/information on Wolffish species biology, distribution, abundance trends, etc., as presented in Simpson et al. and Dutil et al. are from surveys covering different regions (south and eastern NL & Labrador shelves, Gulf of St. Lawrence + west coast NL, respectively). As such Wolffish from these regions may not represent single populations, and abundance and distribution trends are not necessarily the same in these regions. These considerations are important and should be emphasized when assessing anthropogenic impacts on Wolffish and other fish species under this section.	Comment noted.
Section 6.2.2, Atlantic Cod, p. 76		
14.	The Southern DU of Atlantic Cod does not occur in the area.	Comment noted. Atlantic cod is to be removed from Section 6.2.2.
Section 6.2.2, Atlantic Cod, p. 79		
15.	The distribution of Atlantic cod from the southern Gulf survey is for September only, not all year.	Comment noted. The information on p. 79 is to be revised to indicate September only and not indicative of year-round distribution.
Section 6.2.2, Winter Skate, p. 81, Figure 6-14		
16.	Clarification is needed for Figure 6-14. What do the “dots” represent? How are tows with no catch represented?	The source for Figure 6-14 is from the St. Lawrence Global Observatory website. As it is unclear to the Reviewer, this figure is to be replaced with the distribution figure from Swain et al. (2006), which is appended at the end of this response table. Swain, D.P., J.E. Simon, L.E. Harris and H.P. Benoit. 2006. Recovery potential assessment of 4T and 4VW winter skate (*Leucoraja ocellata*): biology, current status and threats. Canadian Science Advisory Secretariat Research Document 2006/003.
Section 6.2.2, American Plaice, p. 95, paragraph 2		

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
17.	Reference to "Currently, this northern Gulf stock is exploited at a low level, with a small directed fishery as well as some by-catch in other fisheries" should be DFO SAR 2011/043.	The reference is corrected to: Morin, R., J. Gauthier, and M. Fowler. 2011. Recovery potential assessment of the Maritime Designatable Unit of American plaice (*Hippoglossoides platessoides*). DFO Canadian Science Advisory Secretariat Report 2011/043. 30 p.
Section 6.2.2, Cusk, p. 98-99, Figure 6-25		
18.	This shows the distribution of Cusk catch rates (and not the distribution of Cusk in the NW Atlantic), which may or may not be used as a proxy for Cusk distribution. If data presented are from random RV surveys (not clear from text), then the proxy hypothesis is likely accurate. Further clarifications about the data should be provided.	Figure 6-25 was obtained from the 2003 COSEWIC Assessment and Status Report on the Cusk. It is entitled 'Distribution of *Brosme brosme* in the western north Atlantic'. It is from the East Coast of North America Strategic Assessment Project that includes data from DFO and the U.S. National Marine Fisheries Service. From the ECNASAP report: *"These are by far the most comprehensive sets of fishery-independent groundfish data available for the east coast of North America. Standard resource assessment trawl survey data were obtained from each source for 1970-94, although little sampling was conducted in the Northern Gulf of St. Lawrence and off northern Labrador in the earlier years. Corrections were made to handle taxonomic errors and inconsistencies in species coding systems among the surveys, and the data sets were merged into a single file format (see Brown, et al., 1996 for details). No attempt was made to standardize the data for the possible effects of differing survey gear. The overall dataset contains 55,043 tows with 26,286,369 individuals from 412 species (including some aggregate groups)."*

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		For more information please refer to the East Coast of North American Strategic Assessment Project Groundfish Atlas http://www2.mar.dfo-mpo.gc.ca/science/ecnasap/webengl.html http://aczisc.dal.ca/96ecnasap_groundfish.pdf
Section 6.2.2, American Eel, p. 113		
19.	The text should be updated to say that COSEWIC re-assessed American Eel in 2012, as threatened (changed from 2006, special concern). This was updated in the table, but not in the text.	The text in the EA is to be revised as indicated by the Reviewer.
20.	Considering that historically eels occurred in all accessible freshwater, estuaries and coastal marine waters, it is reasonable that eels are highly likely to occur in the vicinity of the Study Area.	Comment noted. Text on p. 113 is to be revised to: "Historically American eel occurred in all accessible freshwater, estuaries and coastal marine waters [connected to the Atlantic Ocean]. American eel is expected to have a high likelihood of occurring in the Study Area." Table 6.4 in the EA is revised as well and is appended to this response table.
Section 6.2.3, Marine Mammals Species at Risk, Fig. 6-36, p. 118		
21.	This figure does not represent the "*general distribution of blue whales in the Gulf*" since it is a map based only on the data from a research group operating mainly from a single area in Mingan. DFO has additional sightings data throughout the Gulf, including western Newfoundland, in the proposed Study Area. Please contact DFO for additional data.	DFO was contacted and sightings data from Western Newfoundland were requested. Responses from Veronique Lesage (Mont-Joli, QC), Andéanne Demers (Mont-Joli, QC), and Jack Lawson (Newfoundland and Labrador) indicated that there is no public sightings data available on blue whale in western Newfoundland. Following our data request DFO provided the following report on blue whales occurring in the St. Lawrence Estuary http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2012/2012_052-eng.pdf . The previously cited Lesage *et al.* (2007) document was also provided by DFO experts. Lesage *et al.*

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		(2007) note that the distribution of blue whale sightings was non-uniform within the Gulf survey area, with most sightings occurring northeast of Pointe-des-Monts. Lesage *et al.* (2007) summarize existing knowledge of blue whales in Gulf of St. Lawrence: "In the Gulf of St. Lawrence, line-transect aerial surveys conducted in 1982 and 1995–1996, and long-term more localized studies using small vessels or aircrafts in the northern Gulf detected blue whales near Pointe-des-Monts, Sept-Îles/west Anticosti, Gaspé, and the Strait of Belle Isle areas (Hammond et al. 1990; Kingsley and Reeves 1998; Sears 1979; Sears et al. 1981; Sears et al. 1990; Sears and Williamson 1982). Reports of ice-entrapment of blue whales in St Georges Bay to the southwest of Newfoundland prior to the 1990s also suggest the presence of blue whale aggregations in this sector during winter (Stenson et al. 2003a). A compilation of anecdotal sightings and small-scale systematic surveys around Newfoundland supports the use of St Georges Bay and the head of the Esquiman Channel by blue whales (Lawson 2003; Lien 1980)."
Section 6.2.3, Marine Mammals Species at Risk, pg. 123-124		
22.	While it is likely that "*there is a low probability that beluga whales could occur in the Study Area*" some large groups, including one with more beluga than the estimated Gulf of St. Lawrence population, have been reported swimming along the west coast of Newfoundland recently.	Comment noted.
Section 6.2.3, Marine Mammals Species at Risk, p. 125		
23.	The description of the DFO aerial survey results of 2007 as presented needs clarification. This 2007 aerial survey is currently cited in Lawson and Gosselin 2009 and 2011.	The reference is corrected to Lawson and Gosselin (2009). Laswon, J.W. and J.-F. Gosselin. 2009. Distribution and preliminary abundance estimates for cetaceans seen during Canada's Marine Megafauna Survey. DFO Canadian Science

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		Advisory Secretariat. vi + 28 p.
Section 6.2.3, Marine Mammals Species at Risk, p.127		
24.	Citing Gosselin and Lawson (2004) in a discussion of Gulf harbour porpoise is incorrect – this study was of the Gully area on the offshore Scotian Shelf.	Comment noted. Correct references to be cited include Kingsley and Reeves 1998; Tournois 2003; Lawson et al. 2004; COSEWIC 2006; and Lesage et al. 2006 (all available in reference list).
Section 6.2.3, Marine Mammals Species at Risk, Figure 6-42, p. 128		
25.	Lesage et al. (2007) did not conduct surveys – a summary review and data analysis was conducted.	Comment noted. Lesage et al. (2007) provide a summary of three aerial surveys as well as a literature review of marine mammal distribution in the Gulf of St. Lawrence and Estuary. Figure 6-42 was taken from Lesage et al. (2007) and that is why it was cited as the reference. Lesage et al. (2007) did not cite any other reference associated with the map image.
Section 6.2.3, Killer Whale, p. 129		
26.	The document states that “the Northwest Atlantic/Eastern Arctic population of the Killer Whale…has not gained protection under SARA (considered data deficient)”. The data deficient part should be removed since Killer Whale (Northwest Atlantic/Eastern Arctic) was assessed as special concern, not data deficient.	Thank you for the correction. Table 6.4 in the EA is revised with the Reviewer’s recommended changes and is appended at the end of this response table.
Section 6.6.3, Other Identified Sensitive Areas, Eelgrass Beds, p. 166		
27.	This section states "...*Other than those noted in the special marine areas (CPAWS 2009), there are no identified eelgrass beds as part of a Sensitive Area within or near the Study Area. Eelgrass beds have been identified along the southern extent of the Study Area (Figure 6-2)” and “Eelgrass meets DFO’s criteria of an Ecologically Significant Species (DFO 2009a) and is protected under the Fisheries Act*." In addition to the presence of eelgrass "along the southern extent of the Study Area" Figure 6-2 also identifies eelgrass within the Bay of Islands outside of the CPAWS identified Blow me Down Sensitive Area. The map of Sensitive Areas Fig 6-50 on p. 163 should be amended to include a depiction of all eelgrass beds within the Study Area as Sensitive Areas and included in the Section 7.7 Sensitive Areas effects assessment, as an accidental event resulting in the release of hydro carbons could potentially affect eelgrass beds.	It is noted that eelgrass occurs outside the CPAWS-identified Sensitive Area at Blow Me Down and elsewhere on the southern extent of the Study Area (Figure 6-2). Figure 6-50 is revised and is appended at the end of this response table. The potential environmental effects of an accidental event (hydrocarbon spill) on Sensitive Areas (including eelgrass beds) are discussed in Section 7.7.3.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
Section 6.7, Fisheries and Other Oceans Users p. 168		
28.	DFO recommends that the average landed volume and landed value for each of the commercial species caught in the Project/Study Area over the 2006-2011 periods be quantified. Also, since several fleets (i.e. inshore, nearshore, mid-shore and offshore) operate in the area, harvest different species and have different dependencies, DFO recommends that either a separate overview for these fleets be provided or at least they be differentiated in terms of dependence on the area and possible impacts on their respective fishery and fishing patterns. Additionally, the profile should specify the number of vessels, harvesters and relative species dependency.	Comment noted. Data on average landed volume and landed value for commercial fish species caught in the Study Area from 2010 and 2011 are provided as an appended section at the end of this response table.
Section 6.7, Fisheries and Other Oceans Users p. 169, last paragraph		
29.	Please note that the DFO Science advisory schedule referenced, lists meetings not DFO research vessel survey schedules. It is recommended that the proponent contact DFO directly during the planning of yearly programs to obtain up to date DFO research survey schedules.	Comment noted. Prior to initiating the seismic survey, Ptarmigan Energy will contact DFO directly to obtain current information on dates of DFO research surveys and other activities occurring in western Newfoundland waters.
Section 6.7.2, Atlantic Cod, p. 173		
30.	Please note that there was a directed fishery for 3Pn4RS cod in 2011, with a Total Allowable Catch and season.	Comment noted. Data on average landed volume and landed value for commercial fish species caught in the Study Area from 2010 and 2011 are provided in a table which is appended at the end of this response table.
Section 7.3.2, Mitigation, p. 209		
31.	This section states that the seismic operations will cease if the observer sights a species at risk within ramping-up period. Section 8 of the SOCP states that *"The air source array(s) must be shut down immediately if any of the following is observed by the Marine Mammal Observer in the safety zone (a) a marine mammal or sea turtle listed as endangered or threatened on Schedule 1 of the Species at Risk Act."* (i.e., not just during the ramping up period).	Comment noted. Please also refer to the response to Comment No. 4.
32.	The proponent should describe in more detail what is meant by the statement "*The use of strategies to detect and avoid marine mammals*	Ptarmigan Energy will adhere to the SOCP and will use (at a minimum) the mitigation measures

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
	during night time (i.e., when Marine Mammal Observers are unable to use visual surveys) will be encouraged during seismic surveys." Please be advised that section 11 and 12 of the SOCP outlines the minimum mitigation measures that should be implemented for operations in low visibility. Specifically the SOCP states: **Operations in Low Visibility Mitigation Measures** 11. Under the conditions set out in this section, cetacean detection technology, such as Passive Acoustic Monitoring, must be used prior to ramp-up for the same time period as for visual monitoring set out in section 6. Those conditions are as follows: a. the full extent of the safety zone is not visible; and b. the seismic survey is in an area that i. has been identified as critical habitat for a vocalizing cetacean listed as endangered or threatened on Schedule 1 of the *Species at Risk Act*, or ii. in keeping with the considerations set out in sub-section 4(b), has been identified through an environmental assessment process as an area where a vocalizing cetacean is expected to be encountered if that vocalizing cetacean has been identified through the environmental assessment process as a species for which there could be significant adverse effects. 12. If Passive Acoustic Monitoring or similar cetacean detection technology is used in accordance with the provision of section 11, unless the species can be identified by vocal signature or other recognition criteria: a. all non-identified cetacean vocalizations must be assumed to be those of whales named in sections 8(a) or (b); and b. unless it can be determined that the cetacean(s) is outside the safety zone, the ramp-up must not commence until non-identified cetacean vocalizations have not been detected for a period of at least 30 minutes.	outlined by the Reviewer to detect for marine mammals in low visibility, including Passive Acoustic Monitoring, or possibly marine mammal deterrent devices to prevent migration of marine mammals within the safety zone when air guns are temporarily inactive, and if the area is not identified as critical habitat for vocalizing cetaceans listed as endangered or threatened on Schedule 1 of SARA**.**
Section 7.3.4, Marine Mammals Species at Risk Effects Assessment, Effects of Sound from 2D and 3D Seismic Survey, p. 221, paragraph 2		
33.	"TTS refers to exposure to sound resulting in a nonpermanent elevation in hearing sensitivity" is incorrect; TTS is a non-permanent decrease in hearing sensitivity.	Please note that the definition used in the assessment (p. 221) is stated within Western Newfoundland Strategic Environmental Assessment (C-NLOPB 2005, p. 212).

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		It is noted that DFO has provided the correct definition: "TTS is a non-permanent decrease in hearing sensitivity".
Section 7.3.4, Marine Mammals Species at Risk Effects Assessment, Effects of Sound from 2D and 3D Seismic Survey, p. 221		
34.	This section discusses the "high frequency" hearing group, with functional hearing from approximately 180 to 200 kHz (Southall et al. 2007)." This is incorrect as Southall et al say: 200 Hz to 180 kHz.	Thank you for the correction. The correct statement is: the high frequency hearing group of marine mammals has functional hearing from approximately 200 Hz to 180 kHz (Southall *et al.* 2007). Southall, B.L., A.E. Bowles, W.T. Greene Jr., D. Kastak, D.R. Ketten, J.H. Miller, P.E. Nachtigall, W.J. Richardson, J.A. Thomas and P.L. Tyack. 2007. Marine mammal noise exposure criteria: initial scientific recommendation. *Aquatic Mammals* 33: 411-521.
Section 7.3.4, Marine Mammals Species at Risk Effects Assessment, Behavioural and Physiological Changes, p. 223, paragraph 3		
35.	As per the previous comment, the SOCP indicates that if SARA-listed marine mammals or sea turtles are observed in the safety zone, air source arrays must be shut down immediately (not just during ramp-up as indicated in this section).	Comment noted. Please also refer to the response for Comment No. 4.
Section 7.5.3, Environmental Effects Assessment, Follow-up, p. 249		
36.	The operator is encouraged to submit any sightings data to Dr. Jack Lawson (DFO, Science Branch, NL Region) at jack.lawson@dfo-mpo.gc.ca for inclusion in the federal national sightings database.	Comment noted. Sightings data collected by the Marine Mammal Observer during the seismic surveys will be submitted to DFO (Dr. Jack Lawson) to be included as part of the sightings database.
Fish, Food and Allied Workers – General Comments		
37.	Fish harvesters indicated to the proponent that the species of immediate concern would be herring and mackerel, if the program is pursued between September and December. This is not adequately captured in the EA Report. Pelagic fish would be most directly impacted by seismic activity, due to their location in the water column.	The concerns of the FFAW regarding pelagic species such as herring and mackerel are noted. Mitigations in place include: - Adherence to S*tatement of Canadian Practice on Mitigation of Seismic Noise in the Marine Environment* - Ramping up procedures

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
		- Use of trained observer - Use of FLO - Use of best practices and industry standards
38.	Further to this, it was indicated to harvesters at July meetings indicated the program area had been downsized to 1,014 m^2, yet the EA Report indicates that the area is 1,014 km^2. This discrepancy requires clarification.	Please refer to the response for Comment No. 6.
39.	It is important that the area provides significant economic return for many fishing enterprises that primarily harvesting on the west coast of Newfoundland. Fishing activity can change from year to year and during the season as well. It is very important that Ptarmigan Energy maintain a regular communication with the FFAW to keep apprised of ongoing developments with fisheries in the project area throughout the duration of this Environmental Assessment (2012-2021).	Comment noted. Ptarmigan Energy will maintain regular communication with FFAW prior to, during, and following the seismic program, as well as prior to any future programs. A FLO will also be present on one of the two vessels throughout the seismic survey.
Environment Canada /Canadian Wildlife Service – Specific Comments		
Section 6.2.5 Marine Bird Species at Risk - Piping Plover		
40.	Figure 6-47 Identified Piping Plover Habitat in Western Newfoundland The area referenced as “Grand Codroy Provincial Park” should correctly be labelled “Codroy Valley Provincial Park”.	Comment noted.
Section 6.2.5 Marine Bird Species at Risk - Piping Plover		
41.	“A 2006 census in Newfoundland identified 48 nesting adult Piping Plovers, an increase from 39 birds in 2001.” This information should be updated, due to new information being available. A census was coordinated by EC-CWS in 2011, which found 51 adult Piping Plovers on 16 beaches in Newfoundland.	Comment noted.
Section 6.2.5 Marine Bird Species at Risk - Piping Plover		
42.	“Piping Plover have not been found on the northeast coast since 1987.” EC-CWS recommends rewording this sentence to “Nesting Piping Plover have not been found on the northeast coast since 1987.”	Comment noted.
Section 7.3.6 Marine Bird Species at Risk Effects		
43.	It should be stated in this section as to what mitigation measures the observer will undertake.	Comment noted. Please refer to Section 7.6.2 of the EA.
Section 7.6.2 Mitigation		
44.	EC-CWS has developed a pelagic seabird monitoring protocol that is	Comment noted. Ptarmigan Energy will provide

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
	recommended for use by experienced observers on all offshore projects. A guide for pelagic seabirds of Atlantic Canada has also been attached for assistance in identifying pelagic seabirds in the area.	the Pelagic Seabird Monitoring Protocol and Guide for Pelagic Seabirds of Atlantic Canada to the observer for use during the seismic program. **Pelagic Seabird Monitoring Protocol:** Gjerdrum, C., D.A. Fifield, and S.I. Wilhelm. 2012. Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic seabird surveys from moving and stationary platforms. Canadian Wildlife Service Technical Report Series No. 515. Atlantic Region. vi + 37 pp. **Guide to Pelagic Seabirds of Atlantic Canada:** http://www.cnlopb.nl.ca/pdfs/mkias/seabirdid.pdf
45.	A report of the seabird monitoring program, together with any recommended changes, is to be submitted to EC-CWS on a yearly basis. In an effort to expedite the process of data exchange, EC-CWS would appreciate that the data (as it relate to migratory birds or Species at Risk) collected from the monitoring program be forwarded in digital format to its office following completion of the study. These data will be centralized for EC-CWS's 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. EC-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.	Comment noted. A report on seabird monitoring by the observer will be submitted to EC-CWS annually.
Section 7.6.3 Effects Assessment - Accidental Events		
46.	This section should make reference to the oil spill response plan for the project. The oil spill response plan for the project should furthermore be provided to EC-CWS for review. Strategies to minimize or prevent accidental or chronic releases should be emphasized in a mitigation program. Proponents are required to demonstrate response preparedness and to identify provisions for ensuring	The vessel Ship Oil Pollution Emergency Plan (SOPEP) would cover the management of any oil spill response during a seismic program, The vessel SOPEP will be in accordance with both CSA and IMO requirements.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
	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); • 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.	Upon the selection of a contractor and identification of a vessel, the relevant SOPEP and any associated bridging documents prepared by Ptarmigan will be provided to the C-NLOPB and EC-CWS for review.
Canada-Newfoundland and Labrador Offshore Petroleum Board – Specific Comments		
Section 2.0, Project Description, Figure 2-1, p. 5		
47.	EL 1120 does not include a land component.	Thank you for the correction on Figure 2-1. Figure 2-1 is to be removed. Please refer instead to Figures 2-2 and 2-4.
Section 2.1 Spatial and Temporal Boundaries, p. 6		
48.	The first sentence of this section does not reflect what is depicted in Figure 2-1. The "Project Area", "Study Area", and the proposed "2012 to 2014 Project Area" need to be clearly defined. This should include the lat and long and total size in km^2. The Project Area should include an area to facilitate vessel line changes. Figure 2-1 should be revised to clearly identify the "Project Area", "Study Area", and the "2012 to 2014 Project Area".	**Project Area**: The Project Area includes Exploration License (EL) 1120, EL 1127 and EL 1128 as well as a 10 km turning radius. The area to be surveyed in the first stage of this work is a 1,014 km^2 area within Exploration License EL 1120 which is 140,100 hectares in size. **Study Area**: Project Area plus a 35 km buffer zone. **Future Project and Study Areas (beyond 2014)** will be determined at a future date and provided in the EA validation.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
49.	Need to clearly define the temporal boundary for seismic surveys and geohazard surveys. It is stated that "if there are access limitations due to fishery activities in the area, then seismic activities will be confined to the October to May period." It is not clear if seismic surveys are proposed year-round or just the October to May period.	Seismic surveys may occur at any time of year, although every effort will be made for the 3D seismic survey to occur at a time when it does not interfere with fisheries (i.e., cod, mackerel) in the area. Please note that there will be additional consultation with FFAW prior to the activity taking place in order to confirm the survey area and timing with local fishers. The geohazard survey and additional seismic surveys may occur at any time of year between 2012 and 2021. These will be addressed in future EA validations.
Section 2.2.5 Site Plans, Figure 2-4		
50.	Please revise Figure 2-4 to include a legend and legible text. The above comment on Section 2.1 should be reflected in this figure.	Comment noted. Figure 2-4 has been revised and is appended at the end of this response table.
Section 2.2.9 Environmental Management, p. 18, bullets 2 and 3		
51.	Both references to the C-NLOPB's GGEGPG are referenced as 2012 in this section but as 2011 in Section 8.0 - References. Please properly reference the most recent GGEGPG and the draft scoping document.	Comment noted. The correct references are provided below: C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012a. *Geophysical, Geological, Environmental and Geotechnical Program Guidelines*. iii + 30 pp. Available at URL: http://www.cnlopb.nl.ca/pdfs/guidelines/ggegpg.pdf. C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012b. *Ptarmigan Energy Inc. Geophysical Program for Anticosti Basin Offshore Western NL – 2012-2018*. DRAFT Scoping Document. 16 April 2012. 10 p.
Section 2.3 Mitigation, p. 19		
52.	The C-NLOPB concurs with comments provided by DFO on this section. The SOCP requirements are set out as minimum standards to be implemented during the planning and conduct of seismic programs.	Comment noted. Please refer to the response for Comment No. 4.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
Section 3.0 Consultation with Stakeholders, pg. 20-22		
53.	It is noted throughout this section that meetings were scheduled after the EA report was submitted. Please provide details of these consultation sessions. See specific comments below on this section regarding this matter.	
Section 3.2 Meetings with Government Departments and Agencies, p. 21		
54.	Did any meetings get scheduled and/or occur? If so, please provide the details.	No formal consultation occurred. Agencies were contacted during the preparation of the assessment for the purpose of data collection.
Section 3.4 Qalipu Mi'kmaq First Nation Band, p. 21, paragraph 2, last sentence		
55.	Did these meetings occur? If so, provide details.	Additional consultation with the Qualipu Mi'kmaq First Nation during the week of July 23, 2012 in conjunction with Ptarmigan's consultations in Stephenville and Lark Harbour. Craig Boland and Derek Sullivan met with Qalipu CEO Annie Rendall. The Qalipu are very supportive of Ptarmigan's activities in the region.
Section 3.5 Fish, Food and Allied Workers, p. 21		
56.	Has Ptarmigan held their follow up meeting? If so, provide details.	Consultations were held in Stephenville and Lark Harbour on July 24th and 25th respectively. These events were planned and carried out in consultation with the FFAW to ensure full consultation with the fisher community in the area.
Section 4.2.6 Mitigation, p.27, paragraph 2, last sentence		
57.	Please properly reference the GGEGPG with 2012a.	Comment noted. GGECPG 2012a should be referenced. C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012a. *Geophysical, Geological, Environmental and Geotechnical Program Guidelines*. iii + 30 pp. Available at URL: http://www.cnlopb.nl.ca/pdfs/guidelines/ggegpg.pdf.

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
Section 6.1.3 Benthic Invertebrates, Figure 6-5 Interpolated Sponge Densities		
58.	What does the pink colour represent?	Pink represents area outside data range (i.e. not surveyed on the figure shown). Refer to Kenchington *et al.* (2010) for more information. Kenchington, E., C. Lirette, A. Cogswell, D. Archambault, P. Archambault, H. Benoit, D. Bernier, B. Brodie, S. Fuller, K. Kilkinson, M. Levesque, D. Power, T. Siferd, M. Treble, and V. Wareham. 2010. Delineating coral and sponge concentrations in the biogeographic regions of the east coast of Canada using spatial analyses. *DFO Canadian Science Advisory Secretariat Research Document 2010/041*. vi + 202 p.
Section 6.7 Fisheries and Other Ocean Users		
59.	Provide a "Key Fisheries" subsection that includes, but is not limited to, harvested species showing their significance with respect to quantity, value and percent of total harvest.	Three tables are provided at the end of this response table that present this information for 2010 and 2011 in 4R.
Section 7.0 Environmental Effects Assessment, pg. 205		
60.	Both 2D and 3D seismic programs, as well as geohazard programs, are proposed. It appears that only 2D and 3D seismic programs have been assessed and therefore the assessment of the project, as proposed, is incomplete.	Future geohazard programs, if required, will be addressed in future assessments (EA validations) as the spatial and temporal scope of any geohazard work is not known at this time.
Section 7.8.2 Mitigation, pg. 262		
61.	It is noted in Section 2.2.6 that a pilot or "chase" vessel will be available to communicate with other vessels (i.e., commercial fishing vessels). Is this the case? If so, it should be identified as mitigation for fisheries and other ocean users.	Yes, a pilot vessel will be leading the seismic vessel and communicating with other vessels (FLO onboard). It is noted that the pilot vessel should be identified as a mitigation measure.
Section 7.8.3 Environmental Effects Assessment, Table 7.17, pg. 265		
62.	Adherence to the GGEGP Guidelines should be included as a mitigation measure.	Comment noted. Refer to the response for Comment No. 56.
St. Lawrence Coalition – Specific Comments		
Section 7.2 Environmental Effects of Project on the Environment, p. 207		
63.	The high intensity sound waves produced during seismic surveys do not	Comment noted. A summary of literature on the

Comment Number	Designated Group	Ptarmigan Energy Inc. Response
	leave visible traces on the surface of the water. However, among the scientific community, opinion is far from unanimous that they are harmless (http://www.nrdc.org/oceans/files/seismic.pdf). Results are constantly accumulating on the potential impacts that seismic surveys can have on numerous species such as marine mammals and commercial fish species. The public, including the commercial fishermen, are very wary of these surveys which, in addition, are often a source of conflict with fishermen's associations.	potential environmental effects of seismic sound on fish and invertebrates, marine mammals, marine birds and sea turtles are provided in the EA in Sections 7.3.2, 7.3.3, 7.3.4, 7.3.5, 7.3.6, and 7.4.3.
64.	The high intensity submarine sound waves can directly affect the physical integrity of certain species by causing internal lesions and even death (http://www.cnlopb.nl.ca/pdfs/husky/h3dea01.pdf). Behavioural changes are frequently observed with possible consequences on the species' survival rate. In addition, the sound waves generated in the water greatly increase the surrounding sound level hundreds, if not thousands, of kilometres away, interfering with marine mammals that depend on sound for numerous activities such as communication, feeding and travel.	Comment noted. Please refer to the response for Comment No. 61.

SUPPLEMENTARY INFORMATION

Addendum Response to Comment Nos.6 and 50:

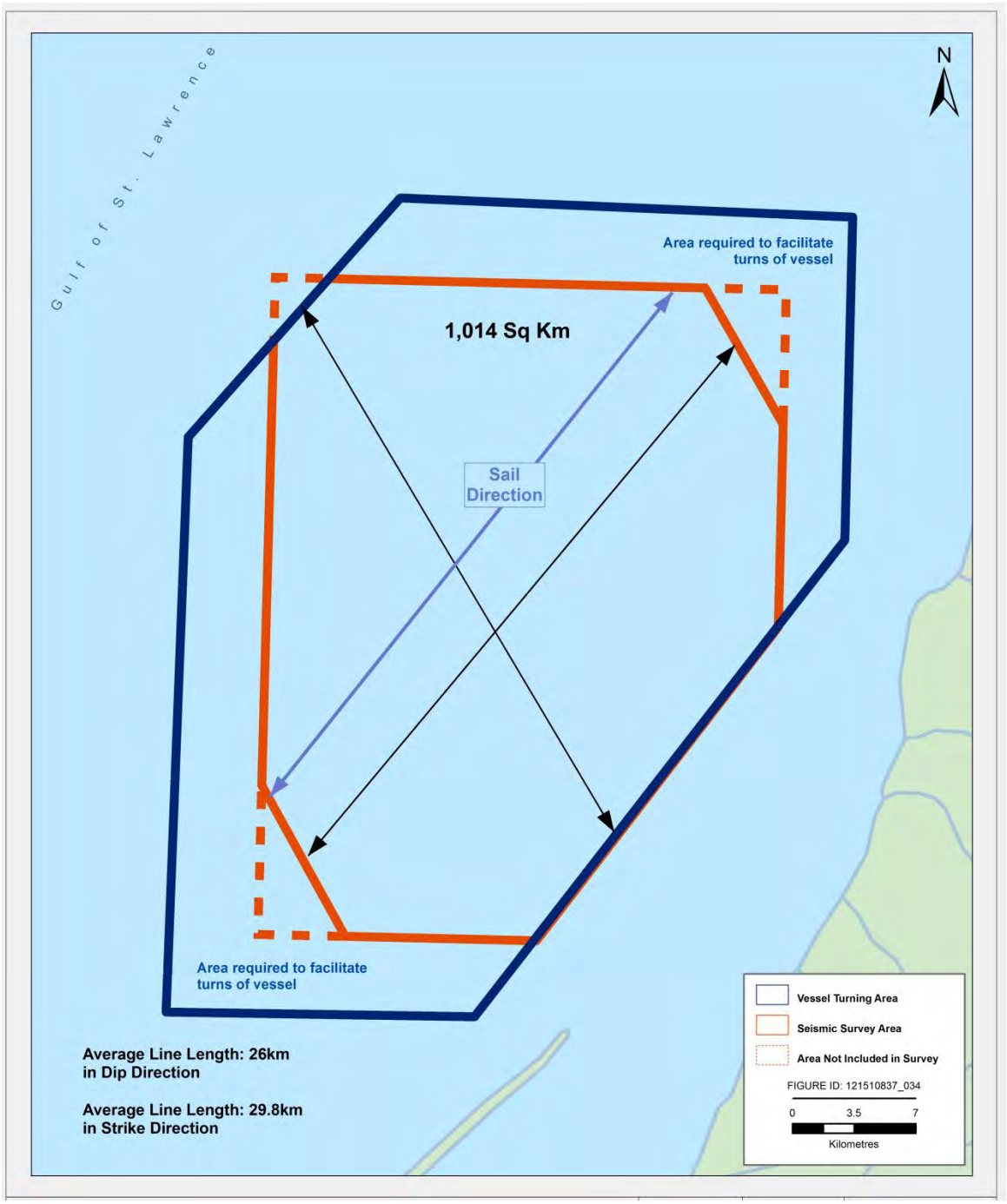

Figure 2-4 Proposed 2012/2014 Seismic Survey with Strike (Sail) Direction

Addendum Response to Comment No. 8:

Table Error! No text of specified style in document..**1 Approximate Source Pressure Levels and Frequency Ranges of Natural and Anthropogenic Sounds in the Marine Environment**

Sound Sources	Source level (dB re 1 uPa –m, as provided in original reference)	Frequency Band of Major Amplitude	Normal Duration	Directionality	Reference
Naturally Occurring Sounds					
Sperm Whale Click	236 rms*	5 to 40 kHz	10's of microseconds	Focused	Møhl et al. 2003
Bottlenose Dolphin	225 peak to peak	Very broad band in kHz range	70 microseconds	Focused	Nachtigall et al. 2003
Killer Whale	224 peak to peak	12 to 80 kHz	80 to 120 microseconds	Focused	Au 2004
Baleen whale sounds	190 rms	Up to 10 kHz	10's of seconds	Omni-directional	NRC 2003
Anthropogenic Sounds					
7900 Cubic-inch Air Gun	259 Peak	5 to 500 Hz	30 ms	Vertically focused	Richardson et al. 1995
Multibeam Sonar	237 rms	15.5 kHz	50 ms	Vertically focused	USA Federal Register 2003
US Navy 53C Mid-range Sonar	235 rms	Centre Frequency of 2.6 and 3.3 kHz	Variable, 0.5 s over 2 s period	Horizontally focused	NOAA and US Dept. Navy 2001
Echosounders	235 Peak	Variable 1.5 to 36 kHz	A few ms	Strongly vertically focused	Clay and Medwin 1977
GLORIA-type Sidescan Sonar	28 Peak	6 to 7 kHz	Continuous	Vertically focused	SCAR 2002
Acoustic Deterrence Device	205 rms	8 to 30 kHz	Variable 1.5 to 500 ms	Omni-directional	Gordon and Northridge 2002
Supertanker	190 Peak @ 6.8 Hz	6.8 Hz	Weeks	Omni-directional in vertical plane	Richardson et al. 1995
Pile Driving	135 Peak @ 1 km	30 to 40 Hz, and 100 Hz	Days	Omni-directional	Richardson et al. 1995

Sources: NRC 2003; OGP/IAGC, 2004; C-NLOPB 2005
*rms is the root mean square and provides a measure of magnitude

Addendum Response to Comment Nos. 9, 19, and 25:

Table 6.4 Species Assessed as "At Risk" by COSEWIC that May Occur in the Study Area

Common Name	Species Name	COSEWIC Designation	Potential for Occurrence in Study Area
Marine Fish			
Atlantic Cod (Laurentian North population)	*Gadus morhua*	Endangered	High potential for occurrence. Benthopelagic species that inhabit coastal waters as juveniles. Adults prefer deeper waters up to 500 m. Resident populations are located within the coastal waters of Newfoundland.
Atlantic Cod (Laurentian South population)		Endangered	Moderate potential for occurrence. Benthopelagic species that migrates from the southern Gulf to the waters of Cape Breton between May to October.
Atlantic Cod (Newfoundland and Labrador population)		Endangered	Low potential for occurrence. Atlantic cod from this population inhabit waters from the northern tip of Labrador to the southern Grand Banks.
Atlantic Cod (Southern population)		Endangered	Low potential for occurrence. Atlantic cod from this population inhabit waters from the Bay of Fundy and Southern Nova Scotia to the southern extent of the Grand Banks.
Atlantic Bluefin Tuna	*Thunnus thynnus*	Endangered	Low potential for occurrence in Study Area. Atlantic bluefin tuna may occur in Gulf of St. Lawrence following food stocks in July through December but concentrate in southern Gulf of St. Lawrence.
Winter Skate (Southern Gulf of St. Lawrence population)	*Leucoraja ocellata*	Endangered	Moderate potential for occurrence. Located within the southern Gulf of St. Lawrence. Closely associated with the seafloor and commonly inhabits waters from shallow to over 300 m, and is most common at depths of less than 150 m. Occurs year-round. Non-migratory spawning occurs in fall. Eggs and larvae may be present up to 22 months after spawning.
Winter Skate (Eastern Scotian Shelf population)		Threatened	Low potential for occurrence. Located on Eastern Scotian Shelf. Closely associated with the seafloor and commonly inhabits waters less than 100 m in depth.
Winter Skate (Northern Gulf-Newfoundland population)		Data Deficient	Low to moderate potential for occurrence. Limited data on this population but appears to be a small population in northern Gulf of St. Lawrence. Closely associated with the seafloor and commonly inhabits waters less than 100 m in depth.
Roundnose Grenadier	*Coryphaenoides rupestris*	Endangered	Low potential for occurrence. Closely associated with the seafloor and commonly found inhabiting waters 800 to 1,000 m in depth. Could occur year-round. Non-migratory spawning occurs in fall.
Porbeagle Shark	*Lamna nasus*	Endangered	Moderate to high potential for occurrence. May occur in Gulf of St. Lawrence from May to December. Occur most commonly in water less than 100 m.

Common Name	Species Name	COSEWIC Designation	Potential for Occurrence in Study Area
Deepwater Redfish (Gulf of St. Lawrence - Laurentian Channel population)	*Sebastes mentalla*	Endangered	Low potential for occurrence. Closely associated with the seafloor and commonly found inhabiting waters 350 to 500 m in the Gulf of St. Lawrence. Spawning occurs in fall.
Deepwater Redfish (Northern population)		Threatened	Low potential for occurrence. Closely associated with the seafloor, commonly found inhabiting waters 350 to 500 m in depth
Acadian Redfish (Atlantic population)	*Sebastes fasciatus*	Threatened	Moderate to high potential for occurrence. Closely associated with the seafloor and commonly found inhabiting waters 150 to 300 m. Mature individuals may occur in Study Area from May to October. Spawning occurs in fall.
Shortfin Mako	*Isurus oxyrinchus*	Threatened	Low to moderate potential for occurrence. A pelagic species that migrates north following food stocks may occur in Study Area. Most common in Gulf of St. Lawrence in summer and fall months.
American Plaice (Maritime population)	*Hippoglossus platessoides*	Threatened	High potential for occurrence. Closely associated with the seafloor and commonly found at depths of 37 to 700 m where soft sediments are present. The Maritime population is common to the Gulf of St. Lawrence and may be present within Study Area. Spawning occurs in April/May. Larvae may be present in the water column between May and June.
American Plaice (Newfoundland and Labrador population)		Threatened	Low potential for occurrence. Closely associated with the seafloor commonly and found at 37 to 700 m where soft sediments are present. The Newfoundland and Labrador population is located from the Grand Banks north to the northern tip of Newfoundland.
Cusk	*Brosme brosme*	Threatened	Low potential for occurrence. Commonly found between the Gulf of Maine and southern Scotian Shelf. Uncommon along the continental shelf off Newfoundland and Labrador and within the Gulf of St. Lawrence.
Atlantic Sturgeon (Great Lakes/Gulf of St. Lawrence populations)	*Ancipenser oxyrinchus*	Threatened	Low potential for occurrence. Highly migratory species capable of travelling great distances. Occur over the continental shelf regions to at least 50 m depths, and may occur in Study Area
Atlantic Sturgeon (Maritimes populations)		Threatened	Low potential for occurrence. Highly migratory species capable of travelling great distances. Occur over the continental shelf regions to at least 50 m depths, and may occur in Study Area
Spiny Dogfish (Atlantic population)	*Squalus acanthias*	Special Concern	Low to moderate potential for occurrence. Commonly found from the intertidal zone to the continental slope in water depths up to 730 m. Most abundant between Nova Scotia and Cape Hattaras, North Carolina.
American Eel	*Anguilla rostrata*	Threatened	High potential for occurrence. Adult American eels migrating from freshwater streams to the Sargasso Sea, or rearing on the continental shelf.
Atlantic Salmon (Anticosti island population)	*Salmo salar*	Endangered	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.

Common Name	Species Name	COSEWIC Designation	Potential for Occurrence in Study Area
Atlantic Salmon (South Newfoundland population)		Endangered	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Atlantic Salmon (South Newfoundland population)		Threatened	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Atlantic Salmon (Gaspé-Southern Gulf of St. Lawrence population)		Special Concern	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Atlantic Salmon (Quebec Eastern North Shore population)		Special Concern	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Atlantic Salmon (Quebec Western North Shore population)		Special Concern	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Atlantic Salmon (Inner St. Lawrence population)		Special Concern	Moderate potential for occurrence. Juvenile and adult Atlantic salmon occur in Gulf of St. Lawrence.
Blue Shark (Atlantic population)	*Priomace glauca*	Special Concern	Low potential for occurrence during summer and late fall, very unlikely at other times of year. Commonly found in pelagic waters in water depths up to 350 m.
Basking Shark (Atlantic population)	*Cetorhinus maximus*	Special Concern	Moderate potential for occurrence from May to September, otherwise very low potential. Occurs in offshore waters and coastal waters of Gulf of St. Lawrence.
Thorny Skate	*Amblyraja radiata*	Special Concern	High potential for occurrence in Study Area. Most common in northeastern Newfoundland and on Grand Banks and commonly occurs at depths from 200 to 600 m.
Smooth Skate (Laurentian-Scotian population)	*Malacoraja senta*	Special Concern	Low potential for occurrence. Centre of distribution is Scotian Shelf but also occurs in Gulf of St. Lawrence. This DU accounts for 90% of the species' estimated abundance. There have been recent increases in natural mortality of adults in southern Gulf of St. Lawrence
Marine Mammals and Sea Turtles			
Harbour Porpoise (Northwest Atlantic population)	*Phocoena phocoena*	Special Concern	Moderate potential for occurrence. Occurs in both offshore and coastal waters of the Gulf of St. Lawrence. Occurs regularly in coastal bays and inlets during summer.
Killer Whale (Northwest Atlantic/ Eastern Arctic population)	*Orcinus orca*	Special Concern	Low potential for occurrence. Distribution is not well documented, but killer whales are a widespread, far-ranging species. Sightings in this region are reported occasionally in Gulf of St. Lawrence.

Common Name	Species Name	COSEWIC Designation	Potential for Occurrence in Study Area
Northern Bottlenose Whale (Davis Strait/Baffin Bay/Labrador Sea)	*Hyperoodon ampullatus*	Special Concern	Low potential for occurrence. May occur in Gulf of St. Lawrence occasionally.
Loggerhead Sea Turtle	*Caretta caretta*	Endangered	Low potential for occurrence. Widely distributed in pelagic (greater than 200 m) waters. Juveniles concentrate along the edge of the Gulf Stream. Occurs occasionally in the Gulf of St. Lawrence in summer months.

Addendum Response to Comment No. 16:

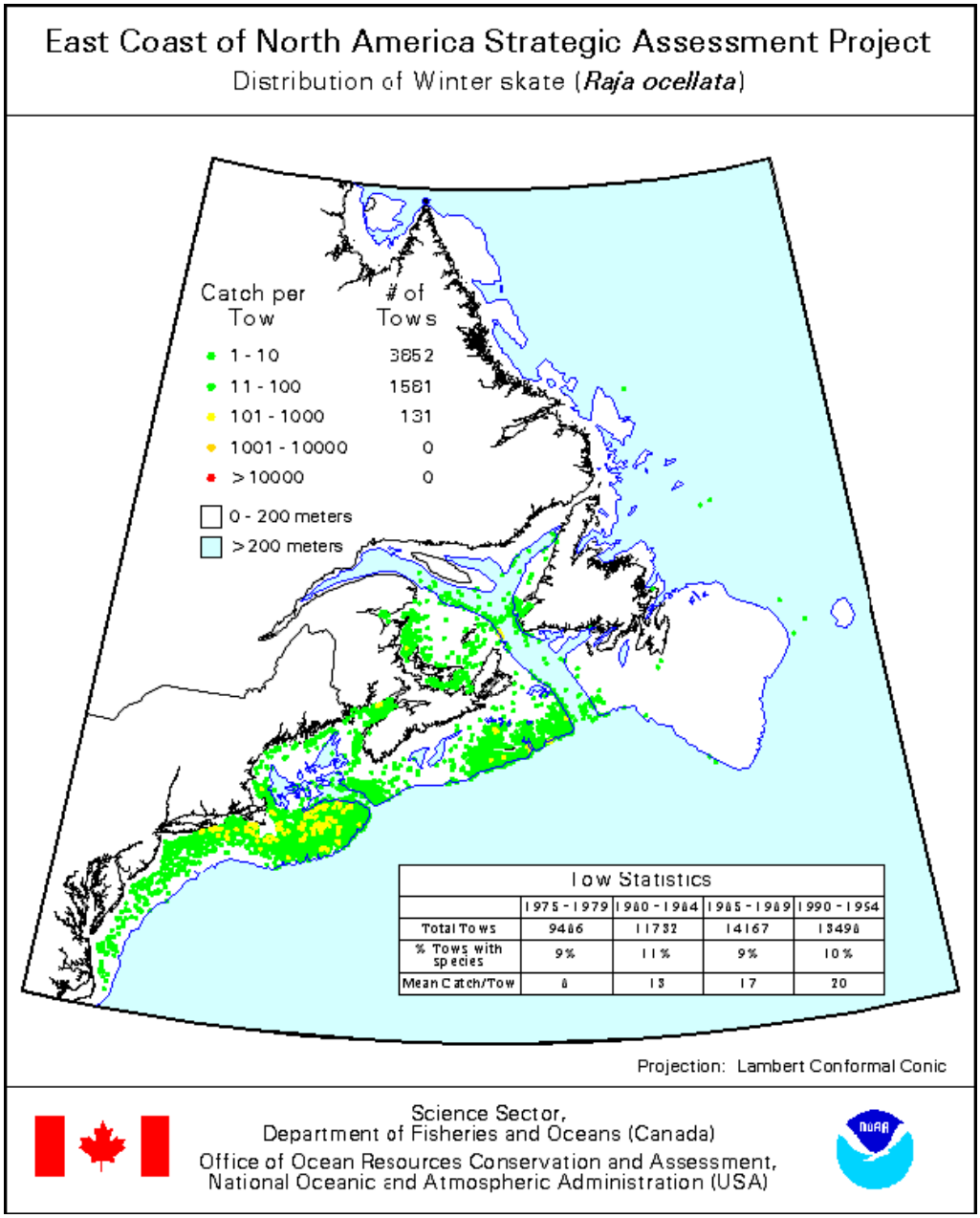

Figure 6-14 Distribution of Winter skate in Atlantic Canada

Addendum Response to Comment No. 27:

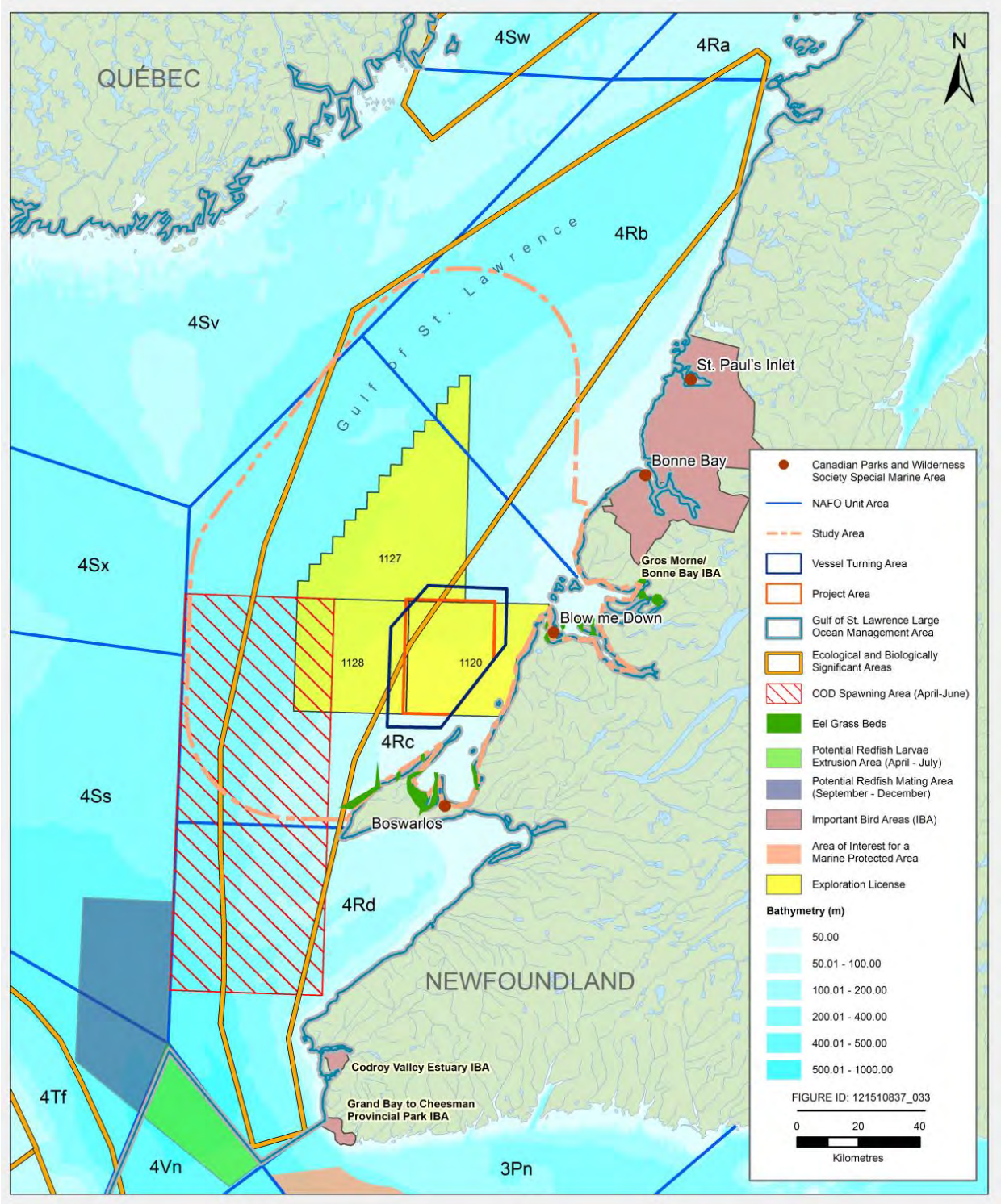

Figure 6-50 Sensitive Areas Within and Near to the Study Area

Addendum Response to Comment Nos. 30 and 58

Information for Section 6.7:

Fishing in 4Rc occurs from April to November, with very little fishing between December and March. May to July is the busiest period for fishing in 4Rc, with lobster and snow crab fisheries occurring mainly in April to July, and finfish fisheries more common from July to September. Fixed gear (gillnets, longline, hand line and pots) is used more commonly than mobile gear (trawls seines, dredges). The most economically valuable fisheries in 4Rc in recent years have been lobster, mackerel, herring, snow crab and cod, although the highest catches are from mackerel, herring, capelin and cod, illustrating how valuable lobster and snow crab can be (Table 6.X).

Table 6.X The Landed Weight and Dollar Value of Species Caught Commercially in 4Rc, 4Rd

NAFO Division	4Rc		4Rd		4Rb	
Species	**Weight (kg)**	**Landed Value ($)**	**Weight (kg)**	**Landed value ($)**	**Weight (kg)**	**Landed Value ($)**
Mackerel	2,359,445	2,295,534	1,650,694	1,604,594	5,083,479	4,090,705
Herring	1,969,689	861,607	10,621,851	4,597,405	6,104,644	78,954,096
Eel	116	832	7,925	58,035	3,765	33,935
Skate	2,298	174	5,406	3,177	3,466	2,278
Capelin	654,091	174,852	60,409	16,148	2,170,192	580,148
American Plaice	4,770	8,613	81,459	232,271	20,010	30,430
Atlantic Halibut	18,088	213,390	30,600	403,759	393,517	3,379,893
Haddock	n/a	n/a	19	36	4	6
Cod	142,954	282,417	531,394	1,401,208	959,190	2,288,325
Cusk	0	0	17	10	0	0
Greenland Halibut	10,276	44,350	4,676	17,266	3,816,059	9,955,931
Witch Flounder	229	344	n/a	n/a	n/a	n/a
Monkfish	2	1	569	908	7	6
Pollock	0	0	112	127	14	51
Redfish	353	506	242,371	275,698	10,964	10,496
White Hake	38	42	5,499	7,156	1,369	2,520
Lobster	134,147	2,149,341	301,491	4,916,353	218,127	3,526,838
Snow Crab	138,762	380,613	79,491	79,491	147,299	880,363
Shrimp	26,047	24,732	n/a	n/a	n/a	n/a
TOTAL	**5,461,305**	**6,437,348**	**13,623,982**	**13,613,641**	**18,932,106**	**103,736,021**
Source: DFO 2011						

The Newfoundland and Labrador Department of Fisheries and Aquaculture report there are no aquaculture operations within the Project Area. The nearest aquaculture operations are two blue mussel farms located in Piccadilly Bay (Port au Port) (www.fishaq.gov.nl.ca).

DFO carries out annual Research Vessel (RV) surveys. Data collected by DFO during the 2010 and 2011 RV surveys (Table 6.Y) were analyzed to determine the potential for underused species, as well as the most abundant species by catch weight in the Ptarmigan Study Area (NAFO Division 4Rc). In 2010, the highest catches by weight were of Atlantic cod (33.7 percent), northern shrimp (17.1 percent), redfish (16.8 percent) and American plaice (6.1 percent). In 2011, the pattern was similar, with Atlantic cod (22.4 percent), northern shrimp (18.7 percent), redfish (12.1 percent), and Greenland halibut (5.2 percent) accounting for the majority of species (brittle stars, sponge, comb jelly and other miscellaneous invertebrates were excluded). Catches of other species were relatively low.

Table 6.Y Species with the Highest Catch Weights during Research Vessel Surveys in 2010 and 2011 that include the Ptarmigan Study Area

Area	Study Area (NAFO Division 4Rc)		Study Area (NAFO Division 4Rc)	
Year	2010		2011	
Gear	Campelen 1800 Shrimp Trawl (Lined)		Campelen 1800 Shrimp Trawl (Lined)	
Total Weight Landed (kg)	1,461.97		1,931.87	
Species	Weight Caught (kg)	Percent of Total (kg)	Weight Caught (kg)	Percent of Total (kg)
Alligatorfish	0.08	0.01	0.01	0.00
Atlantic plaice	88.91	6.08	48.70	2.52
Atlantic cod	493.04	33.72	434.01	22.47
Atlantic halibut	1.94	0.13	75.86	3.93
Atlantic herring	7.13	0.49	4.29	0.22
Atlantic hookear sculpin	0.46	0.03	0.20	0.01
Atlantic wolffish	34.53	2.36	18.42	0.95
Capelin	3.10	0.21	1.08	0.06
Common grenadier	0.87	0.06	1.05	0.05
Fourbeard rockling	0.36	0.02	0.17	0.01
Fourline snakeblenny	1.74	0.12	0.97	0.05
Greenland halibut	48.60	3.32	100.59	5.21
Mailed/Moustache sculpin	7.14	0.49	5.45	0.28
Newfoundland eelpout	3.34	0.23	3.42	0.18
Northern hagfish	7.80	0.53	2.45	0.13
Northern shrimp	250.56	17.14	351.04	18.17
Norwegian shrimp	0.24	0.02	0.37	0.02
Redfish (*Sebastes* spp.)	246.05	16.83	232.99	12.06

Year	2010		2011	
Gear	Campelen 1800 Shrimp Trawl (Lined)		Campelen 1800 Shrimp Trawl (Lined)	
Total Weight Landed (kg)	1,461.97		1,931.87	
Species	Weight Caught (kg)	Percent of Total (kg)	Weight Caught (kg)	Percent of Total (kg)
Sea urchin	0.31	0.02	0.91	0.05
Sevenline shrimp	0.49	0.03	0.84	0.04
Shortfin squid	5.13	0.35	8.10	0.42
Smooth skate	10.06	0.69	7.05	0.36
Snow crab	1.39	0.09	0.10	0.01
Striped pink shrimp	22.26	1.52	3.05	0.16
Thorny skate	48.10	3.29	18.03	0.93
Witch Flounder	39.91	2.73	7.55	0.39
White barracudina	0.54	0.04	1.43	0.07
White hake	19.07	1.30	33.35	1.73
Yellowtail flounder	n/a	n/a	2.26	0.12

The depths at which these species were caught during the 2010 and 2011 RV surveys varied greatly. The mean depth of capture for 2010 was 191.6 m and for 2011 was 174.6 m. The mean depths and depth range (minimum and maximum depths) for species with the highest catch weights are shown in Table 6.Z. Species that were caught at shallow depths include Atlantic cod, fourline snakeblenny, sea urchin and striped pink shrimp. Species that were caught at greater depths included Atlantic herring, white barracudina, capelin, common grenadier, Greenland halibut (turbot), northern hagfish, northern shrimp, Norwegian shrimp and smooth skate. Species caught over a wide range of depths included yellowtail flounder, witch flounder, thorny skate, snow crab, Atlantic plaice and Atlantic wolffish.

Table 6.Z Mean, Minimum and Maximum Catch Depth during DFO Research Vessel Surveys in 4Rc for 2010 and 2011

Year	2010		2011	
Species	**Mean Catch Depth (m)**	**Range (m)**	**Mean Catch Depth (m)**	**Range (m)**
Alligatorfish	167.8	126 to 218	77.5	70 to 100
Atlantic plaice	195.4	74 to 310	198.8	48 to 315
Atlantic cod	169	74 to 289	168.6	48 to 315
Atlantic halibut	180	172 to 194	269.5	265 to 274
Atlantic herring	213.5	178 to 294	220	70 to 315
Atlantic hookear sculpin	185.7	98 to 310	195.8	97 to 315
Atlantic wolffish	185.7	98 to 294	115.6	43 to 250
Capelin	241.6	178 to 310	279.1	249 to 315
Common grenadier	246.8	178 to 310	279.1	249 to 315
Fourbeard rockling	242.1	172 to 310	275.8	249 to 315
Fourline snakeblenny	105	74 to 130	99.8	70 to 118
Greenland halibut	238.6	127 to 310	279.1	249 to 315
Mailed sculpin	162.2	74 to 294	141.2	43 to 315
Newfoundland eelpout	112.7	98 to 130	95.75	70 to 118
Northern hagfish	234.8	178 to 294	279.5	249 to 315
Northern shrimp	226.6	126 to 310	256.8	97 to 315
Norwegian shrimp	266.8	212 to 310	281.6	265 to 315
Redfish (*Sebastes* spp.)	204.6	98 to 310	198.9	43 to 315
Sea urchin	147.8	74 to 263	104	48 to 250
Sevenline shrimp	139.1	74 to 216	96.3	70 to 118
Shortfin squid	197.4	98 to 268	279.5	265 to 315
Smooth skate	236.6	172 to 310	276.3	249 to 315
Snow crab	178.8	98 to 310	145.3	43 to 274
Striped pink shrimp	156.3	74 to 234	79.7	43 to 118
Thorny skate	198.7	74 to 310	202.0	48 to 315
Witch Flounder	201.5	74 to 310	224.3	70 to 315
White barracudina	274.5	228 to 310	279.5	249 to 315
White hake	254.6	172 to 310	279.5	249 to 315
Yellowtail flounder	201.5	74 to 310	224.3	70 to 315

Source: DFO 2011