

**ADDENDUM FOR  
ENVIRONMENTAL ASSESSMENT OF  
CONOCOPHILLIPS CANADA  
LAURENTIAN SUB-BASIN  
SEISMIC PROGRAM, 2010-2013**

**Prepared by**



**for**



**25 March 2010  
Project No. SA1047**



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ENVIRONMENTAL ASSESSMENT OF  
CONOCOPHILLIPS CANADA  
LAURENTIAN SUB-BASIN  
SEISMIC PROGRAM, 2010-2013**

**Prepared by**

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## **Introduction**

This is an Addendum to the Environmental Assessment of ConocoPhillips Canada Laurentian Sub-basin Seismic Program, 2010-2013. It has been prepared in response to comments provided to ConocoPhillips Canada by the Canada-Newfoundland Offshore Petroleum Board (letter dated 26 February 2010).

This Addendum is organized as closely as possible to the order of the original EA. Reviewers' comments are in italics and the Proponents' responses are in normal font.

## **General Comments**

### **Comment G-1**

#### ***Commercial Fishery***

*The commercial fishery is very important to many communities on the south coast of Newfoundland. Fishing activity occurs throughout the year and a fair amount of this activity occurs on the slope of the continental shelf. As can be seen from the various descriptions, tables and figures included in the document there are multiple species harvested. No dollar figures were placed on annual catch in the Study Area but an average of 8604 tonnes (Table 4.4) of landed product for a three year time period is significant for the industry as a whole. More importantly, this is significant for the many people living in our coastal communities who are employed in the fishery.*

*There have been serious concerns brought forward by harvesters about the crab resource in 11Sx (western side of the St. Pierre channel) that "disappeared" for several years following seismic work in the area in 2004 and/or 2005. The crab resource seems to have rebounded in 2008 and 2009 but there were at least two years (2006 and 2007) when they were unable to fish in the area (11Sx) following seismic work being undertaken. This concern has been noted in the report (p. 161). There is an inherent fear among harvesters that should seismic work proceed again near crab grounds that the crab resource may again disappear. As well, there have been reports by harvesters that fish behaviour has been affected following seismic blasts. While the research has not determined any direct mortality of fish attributable to seismic activity, it needs to be recognized that there may be behavioural changes that could affect migration and/or reproductive and spawning activities that could impact the fishery in the future. Given the unknown long term effects of seismic activities, these concerns are valid.*

*In terms of timing of the seismic program, the FFAW recognize that there is a narrow window of time for the company to acquire a seismic vessel and conduct their program while the weather is still reasonable. However, the period of time from May to October, when the seismic work is being proposed, is very busy for the inshore fleet. (In addition to commercial fishing activity, an industry crab survey, a collaborative project between the FFAW and DFO, is conducted in the fall of the year in the area as well). To mitigate potential conflicts with fishing vessels and fishing gear the FFAW recommend the company consider utilizing a fishing industry guide vessel as well as a Fisheries Liaison Officer during the program.*

## **Response G-1**

The importance of commercial fisheries to communities on Newfoundland's south coast is noted.

It is also noted that some fishers are concerned about the potential impact of seismic sound on snow crab. However, although not entirely conclusive, available scientific evidence provides more support for the idea that exposure to seismic sound does not significantly impact snow crab. As for behavioural effects, some studies have suggested that catch rates might be temporarily affected by seismic sound. However, there is no evidence to support the idea that catch rates are affected indefinitely. Application of appropriate mitigations, such as temporal and spatial avoidance, should minimize effects.

ConocoPhillips Canada (CPC) is presently evaluating the potential use of a fishing industry guide vessel and is planning on using a FLO.

## **Comment G-2**

### ***Consultations***

*There are potential disturbances upon the behaviour and distribution of finfish and shellfish from seismic surveys. Given that harvesting of multiple species occurs within the planned Study Area, ongoing consultations with fishing representatives within the Project Area is needed to ensure minimal impacts to fishing operations and appropriate mitigation measures are employed.*

## **Response G-2**

Ongoing communication between CPC/contractors and the fishing industry is essential to successfully minimize impacts of seismic surveying on the fishing industry.

## **Comment G-3**

### ***Mitigations***

*There is no mention of how mitigation measures will be implemented or augmented during times of poor visibility (e.g., at night, in fog, during periods of high seas). It is also unclear how "safety zones" can be adequately monitored under these conditions.*

## **Response G-3**

Technology such as night vision devices have not been shown to provide an adequate ability to detect marine mammals within the safety zone during periods of darkness (Holst 2004; MacLean and Koski 2005). Alternative cetacean detection approaches, such as Passive Acoustic Monitoring (PAM), are currently not well developed for widespread use as a monitoring technique suitable for implementing mitigation measures (see response to comment regarding Subsection 5.9, p. 296 below). CPC will follow mitigation measures outlined in DFO's *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* and in C-NLOPB (2008) for operations in low visibility.

## **Specific Comments**

### **Comment S-1**

**Subsection 1.1 Relevant Legislation and Regulatory Approvals, pg 3** – After the first sentence insert the sentence “Authorizations for geophysical activities are typically issued for approximately six months”.

### **Response S-1**

Please insert as suggested.

### **Comment S-2**

**Subsection 4.2.1.3 Biological, Deep-sea Corals, pg 25** - For future EAs in the region, it would be useful to include the following, recently published report on coral distribution in the Maritimes region.

*Cogswell, A.T., E.L.R. Kenchington, C.G. Lirette, K. MacIssac, M.M. Best, L.I. Beazley and J. Vickers. 2009. The current state of knowledge concerning the distribution of coral in the Maritime Provinces. Can. Tech. Rep. Fish. Aquat. Sci. 2855: v + 66p.*

### **Response S-2**

So noted. The suggested reference will be used for future EAs in the region.

### **Comment S-3**

**Subsection 4.2.1.6 Commercially Targeted Fish in the Study Area – Atlantic Cod, pg 29** - Although Atlantic Cod are listed in the section on Commercially Targeted Fish, the profile does not appear until the SARA section. Unless specified, it may appear to have been overlooked. Please reference the appropriate section.

### **Response S-3**

A reference should be included in Subsection 4.2.1.6, referring to Subsection 4.6.1.13 of Species at Risk in which a full profile of Atlantic cod is provided.

### **Comment S-4**

**Subsection 4.2.1.7 Fish Not Commercially Targeted in the Study Area - Capelin, pg 38** - Information in this section should be updated to include ‘Capelin are often found along the coasts, especially during spawning season, and occur predominantly offshore while immature and maturing. However, Capelin do not normally ‘roll’ on sand, but usually fine to coarse gravels are the preferred substrate. On beaches, capelin usually spawns at 5-8.5 °C but has been observed to spawn at 4-10 °C. On the bottom, spawning temperatures can be as low as 2 °C on the Southeast Shoal. Males and most females do not survive to spawn a second time. Additionally, spawning now goes into the month of August, and eggs



that are produced are yellow, not red, as stated in the EA. Once hatched, larval Capelin, especially after they are in the bays and offshore in the fall are distributed deeper, rather than near the surface’.

Frank, K.T., J. E. Carscadden, and W. C. Leggett. 1993. Causes of spatio-temporal variation in the patchiness of larval fish distributions: differential mortality or behaviour? *Fish. Oceanogr.* 2:114-123.

Nakashima, B. S. and J. P. Wheeler. 2002. Capelin (*Mallotus villosus*) spawning behaviour in Newfoundland waters - the interaction between beach and demersal spawning. *ICES J. Mar. Sci.* 59:909-916.

Scott, W. B. and M. G. Scott. 1988. *Atlantic Fishes of Canada*. pp 145-150.

This information along with the appropriate references was provided previously during the Southern Newfoundland Strategic EA.

#### **Response S-4**

The Southern Newfoundland SEA was finalized after this EA was submitted. The recommended material and relevant references incorporated into the SEA capelin profile are as follows:

“Capelin (*Mallotus villosus*) is a small pelagic species that has a circumpolar distribution in the Northern hemisphere (DFO 2006a). Capelin are members of the smelt family (Osmeridae), olive in color with an elongated body and exhibit pronounced sexual dimorphism during spawning. Capelin are often found along the coasts during the spawning season and occur predominately in offshore waters (e.g., Grand Banks) while immature and maturing. Migration towards the coast precedes spawning on beaches or in deeper waters (Nakashima and Wheeler 2002; DFO 2006a). The preferred spawning substrate is usually fine to coarse gravels. On beaches, capelin usually spawn at 5 to 8.5°C, but have been observed to spawn at 4 to 10°C. Beach spawning is more prevalent at night. On the bottom, spawning temperatures can be as low as 2°C as observed on the Southeast Shoal. Capelin are able to spawn at the age of two and males and most females usually die following spawning. Spawning commences in early June and may continue through July or August depending upon tides, winds and water temperatures (Scott and Scott 1988; Nakashima and Wheeler 2002).

Eggs are yellow in color, 1 mm diameter and are attached to the substrate. Incubation varies with ambient temperature and lasts approximately 15 days at 10°C (Scott and Scott 1988). Once hatched, larval capelin can be found at the surface to depths >40 m (Frank et al. 1993). Capelin prey consists of planktonic organisms comprised of primarily of euphausiids and copepods. Capelin feeding is seasonal with intense feeding late winter and early spring leading up to the spawning cycle when feed ceases. Feeding recommences several weeks after cessation of spawning (Scott and Scott 1988).

Capelin are major component in marine ecosystem dynamics as they facilitate the transfer of energy between trophic levels, principally between primary and secondary producers to higher trophic levels (DFO 2006a). Capelin predators comprise most major fish species including Atlantic cod, haddock, herring, flatfish species, dogfish and others. Several marine mammal species including minke whales, fin whales, harp and ringed seals as well as a variety of seabirds also prey on capelin.

Other than the fishery, the primary cause of capelin mortality is predation and as such variations in capelin abundances are directly linked to natural causes (DFO 2006a). Capelin have a short life span (usually five years or less), abundances are linked to a few age classes. Management of capelin fisheries tends to be conservative as a result of the prominent role of capelin in the marine ecosystem.

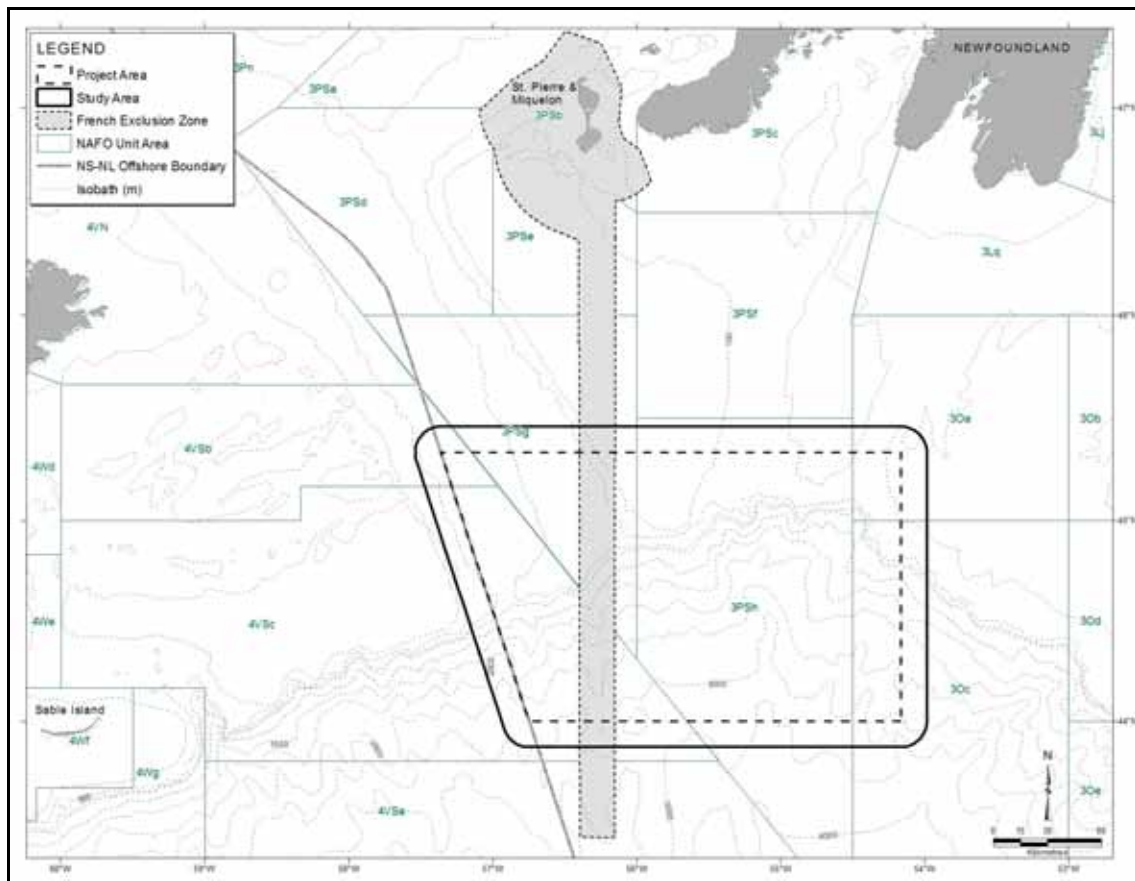
It is important to note that though capelin are not specifically harvested within the Study Area, some stocks migrate to areas where they may be commercially exploited. For example, the St. Pierre Bank (3Ps) stock is fished in Placentia Bay. The NAFO SA2 + Div. 3KL stock, which spends a portion of their life cycle within the Study Area, is fished from St. Mary's Bay to White Bay. In addition, a third stock, the Southeast Shoal or 3NO Capelin stock, spawns on the bottom on the Southeast Shoal and is commercially targeted.”

**Comment S-5**

*Subsection 4.3.2 Overview, Figure 4.1, pg 46 - Please provide legible fishing zones labels.*

**Response S-5**

A revised Figure 4.1 is provided below.



### **Comment S-6**

*Subsection 4.3.3 Historical Fisheries, Figure 4.2 and §4.3.4 Study Area Commercial Fisheries 2006 to 2008, Table 4.4 pgs 48-49 - The information contained in Fig. 4.2 and Table 4.4. does not coincide. For example, total harvest in 2008 is 7,331 t in Table 4.4, but Figure 4.2 indicates that the invertebrates catch weight alone was close to 31,000 t. Please verify.*

### **Response S-6**

The catch weight data in Figure 4.2 and Table 4.4 do not coincide because they represent two different areas. As specified in the text, Figure 4.2 indicates 1989-2008 harvesting in the six NAFO Unit Areas (3Oac, 3Psg, and 4Vsb) that comprise portions of the Study Area, an area much larger than the Study Area itself, while Table 4.4 indicates the quantity of the domestic harvest by species recorded within the Study Area only from 2006 to 2008.

### **Comment S-7**

*Subsection 4.3.4 Commercial Fisheries, pg 49 - The report acknowledges the significant fisheries and commercial species occurring within the study area during 2006 to 2008. However, there is little discussion regarding the fairly extensive and periodically lucrative 3Ps scallop fisheries that have occurred in parts of the study area over the past 20 years, even though they were not significant during 2006 to 2008.*

### **Response S-7**

The following text should be added to the introductory paragraph of Subsection 4.3.3 on “Historical Fisheries”.

“Scallop fisheries, largely targeting Iceland scallop and some sea scallop on St. Pierre Bank, have also been periodically important except during recent years (DFO 2001; DFO 2006b).”

### **Comment S-8**

*Subsection 4.3.5 Traditional and Aboriginal Fisheries, pg 75 - At its first instance in the text, the acronym (FSC) should be provided for the term Food, Social and Commercial fisheries. In addition, the term IQ fisheries should be spelled out as individual quota the first time it appears.*

### **Response S-8**

So noted.

### **Comment S-9**

*Subsection 4.4.1 Seabirds, pg 77 – CWS is pleased to see references to the recently collected CWS data throughout the species accounts in this section. There are a few instances where the report claims that*

*there are zero birds of a given species in a given area during a given period. For example on page 94, line 6: "... 0 birds/km<sup>2</sup> in November through January..." in reference to Storm-Petrels in the study area. In most cases this is due to the fact that there is very little (or no) survey effort in the given area during the given period. This fact is duly noted in the section on "Data Gaps", but stating that there are zero birds in an area may mislead the reader. It would be far preferable to simply state that there is insufficient data to judge that species distribution during the given period in the given location when there is little data available. For any instances where zeros are reported in the text of this section, please indicate if this is due to a lack of data or if there are reports indicating no birds.*

### **Response S-9**

In instances in Subsection 4.4.1 where bird densities are reported to be 0 birds/km<sup>2</sup> due to lack of data, 'insufficient data' should replace '0 birds/km<sup>2</sup>'.

### **Comment S-10**

*Subsection 4.4.2.2 Hydrobatidae, Table 4.8, pg 93 – For Miquelon Cape the table should indicate "breeding" for Razorbills (Cairns et al. 1989).*

### **Response S-10**

So noted.

### **Comment S-11**

*Subsection 4.5.1 Marine Mammals, 1st para, last sentence, pg 120 - During the 2007 aerial survey by DFO, the highest density of marine mammals were sighted on transects that were located in and near Placentia Bay, and the proposed seismic project area.*

### **Response S-11**

So noted and confirmed by follow-up conversations with Dr. J. Lawson (cetacean biologist, Fisheries and Oceans, St. John's, NL).

### **Comment S-12**

*Subsection 4.5.1.2 Toothed Whales, 3rd para, last sentence, pg 127 - Pilot whales are NOT considered abundant year-round residents of Newfoundland since the collapse of the squid stocks several decades ago. It is thought that their numbers and group size have declined markedly, and groups are found reliably in only a portion of these waters.*

### **Response S-12**

No published information is available to support this comment with the possible exception of aerial surveys conducted in 2007 (Lawson and Gosselin 2009). However, Dr. J. Lawson (cetacean biologist,

Fisheries and Oceans, St. John's, NL) confirms that he has personally observed a decrease in the nearshore abundance of pilot whales in recent years, which is coincidental with the collapse of squid stocks.

#### **Comment S-13**

***Subsection 4.6 Species at Risk, 2nd sentence, pg 135*** - It states that "attention must be paid to all of the SARA-listed species" when referring to species on Schedule 1, Schedule 2 and Schedule 3 of SARA. The wording should be clarified; only species on Schedule 1 of SARA are considered to be officially SARA-listed.

#### **Response S-13**

Schedule 2 and 3 species are given some consideration because of potential for them to be upgraded to Schedule 1 legal status.

#### **Comment S-14**

***Subsection 4.6 Species at Risk, 1st para, pg 138*** - The information in this paragraph on Recovery Strategies and Management Plans needs to be updated and corrected. For example, the document states that "Currently, there are only two final recovery strategies and no action plans, or final management plans in place for species listed under Schedule 1, and which are known to occur in the Study Area". Note that there are final Recovery Strategies posted on the SARA Registry for Northern Wolffish/Spotted Wolffish (2008), Leatherback Turtle (2007) and North Atlantic Right Whale (2009). There is also a proposed Recovery Strategy for Blue Whale (2009) and a final Management Plan for Atlantic Wolffish (2008) posted. Please refer to the SARA Registry website ([www.sararegistry.gc.ca](http://www.sararegistry.gc.ca)) for the most up to date information.

#### **Response S-14**

So noted. The EA indicated that there was a draft Recovery Strategy available for blue whales. Since the production of the EA, there is now a final Recovery Strategy for blue whales (Beauchamp et al. 2009). A proposed Recovery Strategy for northern bottlenose whales (DFO 2009) has also been posted on the SARA Registry since the EA was produced. As the reviewer indicated, the EA should be changed to note that final Recovery Strategies are available for northern and spotted wolffish and a final Management Plan is available for Atlantic wolffish (Kulka et al. 2007).

#### **Comment S-15**

***Subsection 4.6.1.4 Leatherback Turtle, pg 142*** - The EA underestimates the presence of Leatherback Turtle in the Study Area. A population of Leatherback Turtle is known to migrate between the Gulf of St. Lawrence and from the southern coast of Newfoundland along the western bank of the Laurentian Channel to/from the Scotian Slope. There occupancy period ranges from June to November, although migration through the Study Area is likely to be highest from August to November. From the 2007 DFO aerial survey data, there were estimated to be more than 1,000 leatherbacks present on the south coast of Newfoundland in the late summer (as yet uncorrected for animals diving). That being said

*Leatherback Turtles can be expected in the Study Area throughout their entire leatherback northern foraging period (i.e. May to November). This includes ephemerally-resident foraging animals, as well as those transiting through the Study Area to arrive on the shelf proper. Contact Michael James, DFO-Maritimes [(902) 426-3515], for any further information regarding the Leatherback Turtle.*

### **Response S-15**

So noted. Extensive information was provided in Subsection 4.6.1.4 of the EA regarding the presence of sea turtles in and near the proposed Study Area, concluding that leatherback sea turtles “are likely a regular occupant during summer and fall.” The text provided in Subsection 4.6.1.4 of the EA supports the reviewer’s comment that leatherback sea turtles could occur in the Study Area from June to October, but would be most common from August to October.

Additional information from satellite-tagged individuals suggests that leatherback sea turtles occur in the Study Area from the end of June to early November, although peak occurrence is likely from August to late October (M. James, Fisheries and Oceans, pers. comm.). Dr. James described how telemetry data indicate the presence of two predictable concentrations of leatherbacks from late June to September: one in the southern Gulf of St. Lawrence and another using the Laurentian Channel and St. Pierre Bank. The second concentration area is typically centered slightly north of the proposed Project Area, although there is some overlap with the northern portion of the Project Area. A mass exodus occurs from late September to early November, when perhaps thousands of turtles may transit through the Project Area on their southward migration. Preliminary critical habitat off southern Newfoundland is currently under consideration by DFO; this proposed area is located north of the Project Area.

No information regarding 2007 DFO aerial survey estimates of leatherback sea turtles off the south coast was available when the EA was prepared. Since then, the most recent leatherback sea turtle estimate for the August 2007 survey period was 415 turtles, which is considered a minimum since it has not been corrected for availability or perception bias (J. Lawson, Fisheries and Oceans, pers. comm.).

### **Comment S-16**

*Subsection 4.6.1.8 Beluga Whale, pg 145 - It is mentioned that Beluga whales are sometimes observed in Newfoundland waters that are presumably from the St. Lawrence population. It is DFOs understanding that Beluga whales from Arctic populations also occur in the region.*

### **Response S-16**

So noted. Although COSEWIC (2004) indicates that beluga whales observed in Nova Scotia and southern Newfoundland are presumably individuals from the St. Lawrence Estuary population, it is unclear if individuals from Arctic beluga whale populations also occasionally occur in Newfoundland waters. Sightings of single animals or small groups sporadically occur in Newfoundland waters, particularly in eastern and northeastern Newfoundland. An unprecedented sighting of around 1,000 belugas, possibly from animals typically wintering in Davis Strait, occurred off St. Anthony in late April 2009 (<http://www.cbc.ca/canada/newfoundland-labrador/story/2009/04/25/whales-migration.html>).

**Comment S-17**

*Subsection 4.6.1.9 Wolffishes, pg 146 - The last sentence in this section states that “the northern and spotted wolffish were... added to Schedule 1 of SARA ... legally protecting the species and its critical habitat.” Note that there is currently no critical habitat identified for these species.*

**Response S-17**

So noted.

**Comment S-18**

*Subsection 4.6.1.11 Harbour Porpoise, 1<sup>st</sup> para, pg 147 - The following sentence should be revised: “Harbour porpoises found in the Atlantic are considered Threatened (Schedule 2) on SARA”. The species is on Schedule 2 of SARA, which is not the official list (i.e. Schedule 1) therefore, it is not considered Threatened under SARA.*

**Response S-18**

So noted. The suggested text revision should be done.

**Comment S-19**

*Subsection 4.6.1.13 Atlantic Cod, pg 149 - It would be useful to note that Atlantic cod will be re-assessed by COSEWIC in April 2010.*

**Response S-19**

So noted. Indication of reassessment of Atlantic cod by COSEWIC in April 2010 should be added to the text

**Comment S-20**

*Subsection 4.6.1.16 Winter Skate, 2nd Sentence, pg 150 - So as not to confuse SARA-listed species with COSEWIC assessed species, the second sentence should be revised from “The SG population is listed as endangered...” to “The SG population has been designated as endangered...by COSEWIC...” This will be consistent with the text used in the other sub-sections under Section 4.6.*

**Response S-20**

So noted. Please revise the text accordingly.

**Comment S-21**

*Subsection 4.7 Potentially Sensitive Areas, pg 157 - A comma should not be used when referring to the Oceans Act Marine Protected Areas.*

### **Response S-21**

So noted. Please correct the punctuation.

### **Comment S-22**

*Subsection 4.7 Potentially Sensitive Areas, 2nd para, 1st Bullet, pg 158 - The term, EBSA is an Ecologically and Biologically Significant Area not sensitive area.*

### **Response S-22**

So noted. Please revise the text accordingly.

### **Comment S-23**

*Subsection 4.7 Potentially Sensitive Areas, 3rd para, pg 158 - It is stated that a number of EBSAs have either been designated or proposed by DFO. EBSAs for the PBGB LOMA have been identified and described by Science, they have not been designated. As for legal implications, an area that has been identified as an EBSA has been highlighted as an area that has particularly high ecological or biological significance and that a greater than usual degree of risk aversion in the management of activities in these areas should be exercised. Identification as an EBSA does not give it any special legal status; it simply provides guidance on the standard of management that is considered to be appropriate.*

*DFO - NL Region has identified 11 EBSA's within the PBGB LOMA as potential Areas of Interest (AOIs) for MPA designation and five of the 11 EBSAs were put forward for formal consultations with stakeholders. The two EBSAs that partially occur within the study area: the Laurentian Channel and Slope and the Southwest Shelf Edge and Slope, as well as, the St. Pierre Bank which abuts the Study Area, were included in the five that were put forward for the formal consultation. Following consultations, DFO NL Region will put forward one of the five EBSAs as the regional AOI for MPA designation by 2012.*

*In addition, this section does not make any reference to DFO Maritimes Region candidate AOIs for a future MPA pursuant to the Oceans Act or the Eastern Scotian Shelf Integrated Management Initiative (ESSIM) Strategic Plan for the LOMA, which are located adjacent to the western boundary of the proposed project Study Area.*

### **Response S-23**

It is noted that EBSAs have not been designated by DFO, but rather identified and described by DFO. Five of the eleven EBSAs identified within the PBGB LOMA, including the three EBSAs that either partially occur within or occur immediately adjacent to the Study Area, were put forward for formal consultation, and DFO NL Region will eventually identify one of them as the regional AOI for MPA designation by 2012.



Located adjacent to the western boundary of the proposed Study Area are DFO Maritimes Region candidate AOIs for a future MPA pursuant to the *Oceans Act* or the Eastern Scotian Shelf Integrated Management Initiative (ESSIM) Strategic Plan for the LOMA. Two of the areas under consideration by DFO Maritimes Region, St. Annes Bank and Misaine Bank/Eastern Shoal, are located nearest the Study Area ([www.dfo-mpo.gc.ca/oceans/e/ocmd/mpa/booklet-e.html](http://www.dfo-mpo.gc.ca/oceans/e/ocmd/mpa/booklet-e.html)).

### **Comment S-24**

*Subsection 5.2 Consultations, pg 160 - The EA places the proposed seismic program in context of Newfoundland and Labrador. Although the NS-NL Offshore Boundary indicates that the Study Area falls into the C-NLOPB jurisdiction, the Study Area does extend into DFO Maritimes Region fisheries waters and, where appropriate, recognition should be given in the EA to the implications of the proposed program on the fisheries in this region. In particular, the pelagic longline and groundfish fisheries that operate in DFO Maritimes Region waters were not identified in the consultation section of the EA.*

### **Groundfish Fishery, DFO Maritimes Region**

*It is likely that groundfish fisheries will fish in areas proximal to the Study Area. The groundfish fishing fleet representative in DFO Maritimes Region contact information is:*

*Nellie Baker-Stevens  
PO Box 55  
Musquodoboit Harbour, NS  
B0J 2L0  
Phone: 902-845-2408  
Phone: 902-497-1787 (cell)  
Fax: 902-845-2629  
Email: nellie@esfpa.ca*

### **Pelagic Longline and Harpoon Fisheries, DFO Maritimes Region**

*It is possible that pelagic fisheries may fish from time to time near the edge of Banquereau Bank on the Laurentian Channel side, proximal to the Study Area. The pelagic longline and harpoon fishing fleet representatives in DFO Maritimes Region contact information is:*

*Southwest Nova Tuna Association  
Sam Elsworth  
Phone: 902-543-6457  
Email: sam.fish@ns.sympatico.ca*

*Nova Scotia Swordfisherman's Association (longline fleet)  
Troy Atkinson  
Phone: 902-457-4968  
Email: hiliner@ns.sympatico.ca*

*Swordfish Harpoon Association (also head of the Atlantic Shark Association)*  
*Patrick Gray*  
*Phone: 902-471-2301 (cell) – Long delay before his phone rings*  
*Email: pocket.fisheries@ns.sympatico.ca*

*Offshore Large Pelagics Licence Holder*  
*Andy Henneberry*  
*Phone: 902-456-7950*  
*Fax: 902-868-2638*

#### **Response S-24**

The Study Area boundary was originally selected to account for any potential effects from sound outside the Project Area in the case that survey lines are conducted along the margins of the ELs. The 2010 program as presently planned will occur well within the ELs and any potential effects will be confined within Newfoundland waters. If the 2010 plans change to run lines close to the edges of the ELs or if future surveys intend to do so, CPC will consult with the appropriate parties in Nova Scotia.

Any fishers operating in or near the survey area (s) will be aware of CPC seismic program (s) through Notices to Shipping and direct communications with the FLO. Ship's personnel will be made aware of potential fishing locations through reference to the fisheries maps.

#### **Comment S-25**

*Subsection 5.2 Consultations, pg 160 – Were any public meetings held in communities. If so, please provide details such as when and where were they held and what were the approximate numbers that attended. Section 5.2.1.3 on pg 161 mentions Marystown on September 15.*

#### **Response S-25**

As mentioned in the text, a brief meeting was held in Marystown. Other consultations are listed in the Appendix. An additional meeting is planned in Marystown prior to the proposed seismic program.

#### **Comment S-26**

*Subsection 5.2 Consultations, pg 160 -Fisheries and Oceans should be referred to as Fisheries and Oceans Canada.*

#### **Response S-26**

So noted.

#### **Comment S-27**

*Subsection 5.2.1.3 One Ocean and FFAW, last sentence, pg 161 – Please explain the sentence “It was agreed that any additional...from the Board.” What post-EA consultations? What recommendations from the “Board”?*

### **Response S-27**

It is CPC's intention to continue the consultations with One Ocean and FFAW with the objective of fine-tuning the mitigations to minimize any potential effects on the fisheries.

### **Comment S-28**

**Subsection 5.7.1 Effects on Fish and Fish Habitat VEC, pg 172** - *It is not appropriate to disregard the effects on fish habitat in the onset of the effects analysis. Even if it is determined that the effects are negligible at an early stage, they still should be considered as it was initially identified as a VEC and can be treated with zero rating in the significance table.*

### **Response S-28**

So noted. Delete this prediction at the onset of the effects analysis. Fish habitat is subsequently considered in the section.

### **Comment S-29**

**Subsection 5.7.1.1 Effects of Sound, 6th para, pg 175** - Wysocki et al. (2009) is mentioned as having determined that a species had "...the best hearing sensitivity". Please present more information about the location or fish species to provide context or relevance to this discussion. It is not clear the purpose of this study in the analysis of the effects.

### **Response S-29**

One intention of this reference to Wysocki et al. (2009) was to make the point that hearing sensitivity is quite variable between different fish taxonomic groups, in this case the red-mouthed goby (*Gobius cruentatus*), the Mediterranean damselfish (*Chromis chromis*), and the brown meagre (*Sciaena umbra*). The second intention of the reference to Wysocki et al. (2009) was to point out that the same species (i.e., the brown meagre) exhibited the best hearing sensitivity both in terms of sound pressure and particle motion.

### **Comment S-30**

**Subsection 5.7.2 Effects on the Commercial Fisheries VEC, last paragraph, line 1, pg 191** – *The “C-NLOPB 2004 Guidelines” are the “Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2008)”.*

### **Response S-30**

The text should be revised to reflect the comment.

### **Comment S-31**

**Subsection 5.7.2 Effects on the Commercial Fisheries VEC, last paragraph, line 4, pg 191** – *The name of Appendix 2 is “Environmental Planning, Mitigation and Reporting”.*

### **Response S-31**

The name of Appendix 2 should be revised as indicated.

### **Comment S-32**

*Subsection 5.7.2.2 Conflict with Fish Gear, pg 194 – Fishing Gear Compensation” mentions the “CNLOPB Guidelines”. It would be helpful to readers to clarify whether the guidelines referred to are the C-NLOPB/CNSOPB Compensation Guidelines Respecting Damages Related to Offshore Petroleum Activity, or another guideline of a similar nature. If it is the C-NLOPB Guidelines, they are “2008” not “2004”. It is also Section II (1d).*

### **Response S-32**

The reference to ‘C-NLOPB Guidelines’ in Subsection 5.7.2.2, Conflict with Fishing Gear should be clarified as suggested in the comment.

### **Comment S-33**

*Subsection 5.7.3.6 Helicopters, pg 204 – Avoidance of seabird colonies should be identified as a mitigative measure for helicopters.*

### **Response S-33**

So noted. It is not only mitigation but also a legal requirement. The following text should be added to Subsection 5.7.3.6.

Canadian Wildlife Service guidelines recommend that aircraft not approach closer than 8 km seaward and 3 km landward of a major seabird colony from 1 April to 1 November (Nettleship 1980). All project aircraft will fly at minimum altitudes of 600 m whenever possible and pilots will be instructed to avoid repeated overflights of concentrations of birds and/or important bird habitats (including minor seabird colonies).

### **Comment S-34**

*Subsection 5.7.4.2 Categories of Noise Effects, pg 205 – Baleen Whales” extrapolates on the lack of deterrence of gray whales and bowhead whales from migration routes when exposed to seismic sounds, to conclude with the suggestion that all species of baleen whales are unlikely to experience prolonged effects from any single seismic survey. While this may be plausible, references to peer reviewed scientific literature to support this statement would help to strengthen this conclusion.*

### **Response S-34**

Pages 213 to 217 of the EA provided an extensive literature review (including peer-reviewed and grey scientific publications) of documented behavioural disturbance effects of seismic surveys on baleen whales. While the greatest volume of literature is available for responses of grey, bowhead, *and humpback* whales (emphasis added), information was also provided on behavioural responses by blue,

sei, fin, and minke whales (see the Subsection titled “Rorquals”), including several studies occurring off Atlantic Canada. Thus, all baleen whale species potentially occurring in the Study Area were addressed in the review of potential behavioural effects (with the exception of North Atlantic right whales, which are unexpected in the Study Area and have not been studied for behavioural effects). Furthermore, it is noted on p. 212 that,

*“Disturbance includes a variety of effects, including subtle to conspicuous changes in behaviour, movement, and displacement. Behavioural reactions of marine mammals to sound are difficult to predict in the absence of site- and context-specific data. Reactions to sound, if any, depend on species, state of maturity, experience, current activity, reproductive state, time of day, and many other factors (Richardson et al. 1995; Wartzok et al. 2004; Southall et al. 2007; Weilgart 2007).”*

### **Comment S-35**

**Subsection 5.7.4.2 Categories of Noise Effects, 2nd para, pg 210** - It is possible that the intermittent nature of seismic pulses near the source could allow for hearing and echolocation in the quieter periods between pulses. However, it is also possible that at greater ranges the signal pulses from the airgun array become “smeared” in time such that the periods between the peak energy of pulses are also filled with sound energy above ambient levels. In this case, there may be more opportunities for sound masking.

### **Response S-35**

So noted. As described on p. 210 of the EA:

*“A single airgun array might cause appreciable masking in only one situation: When propagation conditions are such that sound from each airgun pulse reverberates strongly and persists for much or all of the interval up to the next airgun pulse (e.g., Simard et al. 2005; Clark and Gagnon 2006). Situations with prolonged strong reverberation are infrequent, in our experience.”*

### **Comment S-36**

**Subsection 5.7.4.2 Categories of Noise Effects, 2nd para, pg 228** - *Sighting and satellite tracking information strongly suggests that the south coast of Newfoundland is an important feeding area for leatherback turtles in Atlantic Canada. It appears that most of the sighted and tracked turtles are concentrating their travels and feeding in areas nearer to shore than the proposed activities, so it is unlikely that these turtles will be adversely impacted by seismic sounds over greater distances.*

### **Response S-36**

This comment does not agree with a previous reviewer’s comment that the Project Area may be an important migration route. No change to the original text is necessary. Dr. James (DFO, pers. comm.) also noted that there is a nearshore bias in leatherback sea turtle sighting reports. In contrast, telemetry data indicates that the majority of the individuals using southern Newfoundland waters occur somewhat offshore and, thus, the potential for CPC’s seismic program to affect leatherback sea turtles remains.

See the response to Comment S-15 for additional information.

It should be noted that sea turtles will be included in the same mitigation plan as marine mammals, per guidelines provided by C-NLOPB (2008) and the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*.

#### **Comment S-37**

***Subsection 5.7.4.2 Categories of Noise Effects, 3rd para, pg 233*** - *This section suggests that turtles may need a longer time to swim away from seismic operations. If this is in fact true, then this should be taken into account when prescribing mitigation measures by ensuring a longer than average ramp-up period is conducted where appropriate.*

#### **Response S-37**

CPC will comply with the ramp-up guidelines provided by the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* and by C-NLOPB (2008). Ramp-up will be delayed if a sea turtle is observed anywhere within the safety zone during a 30-minute watch prior to commencement of ramp-up. This will allow sufficient time for sea turtles to leave the affected area. Additionally, if a leatherback sea turtle is first detected during the ramp-up period, the airgun array will immediately be shut-down until the animal(s) has been observed to leave the safety zone or at least 20 minutes have passed since the animal was last observed.

#### **Comment S-38**

***Subsection 5.7.4.2 Categories of Noise Effects, pg 234*** - *On this page and elsewhere, correct spelling of “harour seal” and “harour porpoise”*

#### **Response S-38**

So noted. These misspellings should be corrected.

#### **Comment S-39**

***Subsection 5.7.4.2 Categories of Noise Effects, 2nd para, pg 237*** - *Although it is stated in the text that it is unlikely that an odontocete would remain close to a large airgun array, several observers on seismic vessels have reported to DFO Science that they have observed pilot whales approaching the central, higher-frequency source in the centre of an airgun array while the array was operating. If this is true, then it is possible that the loud sounds of the array are not sufficient to override the curiosity of these whales.*

#### **Response S-39**

CPC would appreciate receiving the documentation on such events. An important aspect of sound propagation is that received levels of low-frequency underwater sounds diminish close to the water's surface because of pressure-release and interference phenomena that occur at and near the surface (Urick

1983; Richardson et al. 1995). Pilot whales swimming at the surface near the towed seismic gear would likely experience lower levels of sound than pilot whales farther away but at deeper depths.

**Comment S-40**

*Subsection 5.7.5 Effects of the Project on Species at Risk, last para, pg 260 - It is mentioned that most SAR whales and leatherback turtles are not expected to occur regularly in the study area. Please see the previous comments concerning this issue.*

**Response S-40**

This statement is based on available sightings data and is believed to be valid within the constraints of the data. The previous comments on leatherbacks are contradictory.

The available data suggest that *most* of these species are not regular occupants (emphasis added). However, additional text was provided for specific species in the EA, including (Section 5.7.5, p. 261):

“It is extremely unlikely that a North Atlantic right whale will occur in the Study Area. No confirmed sightings of North Atlantic right or beluga whales have been made in the Study Area and there have been five reported sightings of leatherback sea turtles (see Section 4.6). Fin whales, listed as Special Concern, are expected to occur regularly in the Study Area, particularly during summer months. Blue whales were more common than expected during the 2005 CPC seismic monitoring program (see Section 4.6 and Moulton et al. 2006b), although they are generally considered uncommon in pelagic areas of Newfoundland waters.”

It should be noted that leatherback sea turtles may be regular occupants foraging in the Project Area (particularly along the northern boundary) from June to September or migrants through the Project Area from late September to early November. Leatherbacks are expected to be most common in the Project Area from September to late October. Northern bottlenose whales are also known to concentrate in canyons on the eastern Scotian Shelf (including The Gully and Haldimand and Shortland canyons), but there are no known areas of concentrations within the Study Area.

**Comment S-41**

*Subsection 5.9 Mitigations and Followup, Table 5.18, pg 269 - The temporal boundaries for the proposed project are May-October, 2010 initially, and potentially any time within 2011, 2012 or 2013 for further data collection thereafter. As stated in the EA, some fish and invertebrate species that occur in the Study Area will be spawning during the May-October timeframe, and the potential for spawning times to overlap during the unknown times for the 2011-2013 surveys also exists. While ConocoPhillips has stated that they will adhere to mitigation measures outlined in the Statement of Canadian Practice with Respect to Mitigation of Seismic Sound in the Marine Environment (the Statement), it is not explicitly stated in the mitigation section (i.e. “Table 5.18 - Summary of Mitigation Measures”) that fish or invertebrate spawning times will be avoided during the survey. Part 5 (c) of the Statement identifies that each seismic survey must be planned to avoid dispersing aggregations of spawning fish from known spawning areas.*

## **Response S-41**

Fish spawning times and locations within the Study Area are quite diverse and widespread in both time and space. No critical spawning habitat has been identified here.

## **Comment S-42**

*Subsection 5.9 Mitigations and Follow-up, pg 269 - DFO Maritimes Region highlights Section 12 of the 'Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment' and the use of Passive Acoustic Monitoring (PAM) or similar detection technology as a further mitigation measure that can be used during periods of low visibility. The application of a PAM device (or other marine manual detection technology) as a mitigation measure for the proposed program has not been discussed in this EA document.*

*Another potential conflict that is not discussed in the EA is with any potential marine science that may be on-going in the Study Area. On this note, they should be aware that DFO Science at BIO has two current meters moored on the Laurentian Fan. For more information, the Proponent can contact DFO Scientist John Loder by phone at [902-426-3146] on these moorings and future science initiatives within the area.*

## **Response S-42**

The presumed objective of PAM outlined in the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* is to detect marine mammals during periods of low visibility or darkness when the full safety zone is not visible. This is a measure to limit the risk of hearing impairment (or other physical effects) to cetaceans considered “at risk.” Moulton et al. (2009) note several potential limitations of PAM, including

- Cetaceans must be vocalizing to be detected.
- Relatively calm sea states are needed to minimize interference from background noise.
- Low-frequency baleen whale calls are nearly impossible to detect since vessel noise is in the same frequency band, and some high-frequency (typically odontocete) calls are also difficult to detect since they are highly directional and do not propagate well. The bandwidth of hydrophones must also be large enough to detect high frequency cetacean calls (up to 60 kHz).
- It is difficult to distinguish the species and number of animals calling.
- If a towed hydrophone array is used to detect calls, it must be towed sufficiently far behind the stern of the vessel to reduce interference from ship noise and at a depth of at least 15 to 20 m to receive the best signals. It is also difficult to localize calls unless at least two hydrophone arrays are used.
- If sonobuoys are deployed to detect calls, many must be deployed to cover a large area and study period since they are usually only effective for short durations and ranges. Sonobuoys also typically have a small bandwidth (20 kHz and lower for DIFAR sonobuoys), so some higher frequency cetaceans will not be detectable.
- If ocean-bottom hydrophones are employed, they cannot be monitored in real-time and typically have a narrow bandwidth that only allows low-frequency baleen whales to be detected.



- If hull-mounted hydrophones are used, they have low sensitivity and increased background noise due to positioning on the vessel.

Software, such as PAMGUARD, is now available to support PAM, but has been shown to have limited success and inconsistent results (Simard 2009). Simard (2009) also notes that the efficiency of PAM is particularly affected by typically high noise levels at the hydrophones, limiting the ability to detect cetacean calls. The Joint Nature Conservation Committee (JNCC) recently issued guidelines for seismic surveys and noted that PAM is still in development as a research tool and monitoring technique (JNCC 2009).

Suggested contact with BIO regarding ongoing marine science projects in the area has been noted.

**Comment S-43**

*Subsection 5.9 Mitigations and Follow-up, last para, pg 270 – Such a program should involve a designated observer trained in “marine mammal and seabird observations”.*

**Response S-43**

CPC will have qualified MMO/SBOs on board during the program.

**Comment S-44**

*Section 6.0 Literature Cited, pg 277 – Delete “CNOBP 2004”.*

**Response S-44**

Please delete CNOBP 2004.

**Comment S-45**

*Appendix A, pg A-1 - SARA Lewis does not need to be italicized or capitalized as it is a person, not an act in this circumstance.*

**Response S-45**

So noted.

## **Environmental Assessment Report Review Comments for Project Planning**

### **Seabirds**

*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. Attached is a version of the protocol for experienced observers. 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 of ConocoPhillips Canada.*

### **Response**

CPC is planning to have a qualified seabird observer (s) on board.

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