Amendment to the Environmental Assessment of Statoil's Geophysical Program for the Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019

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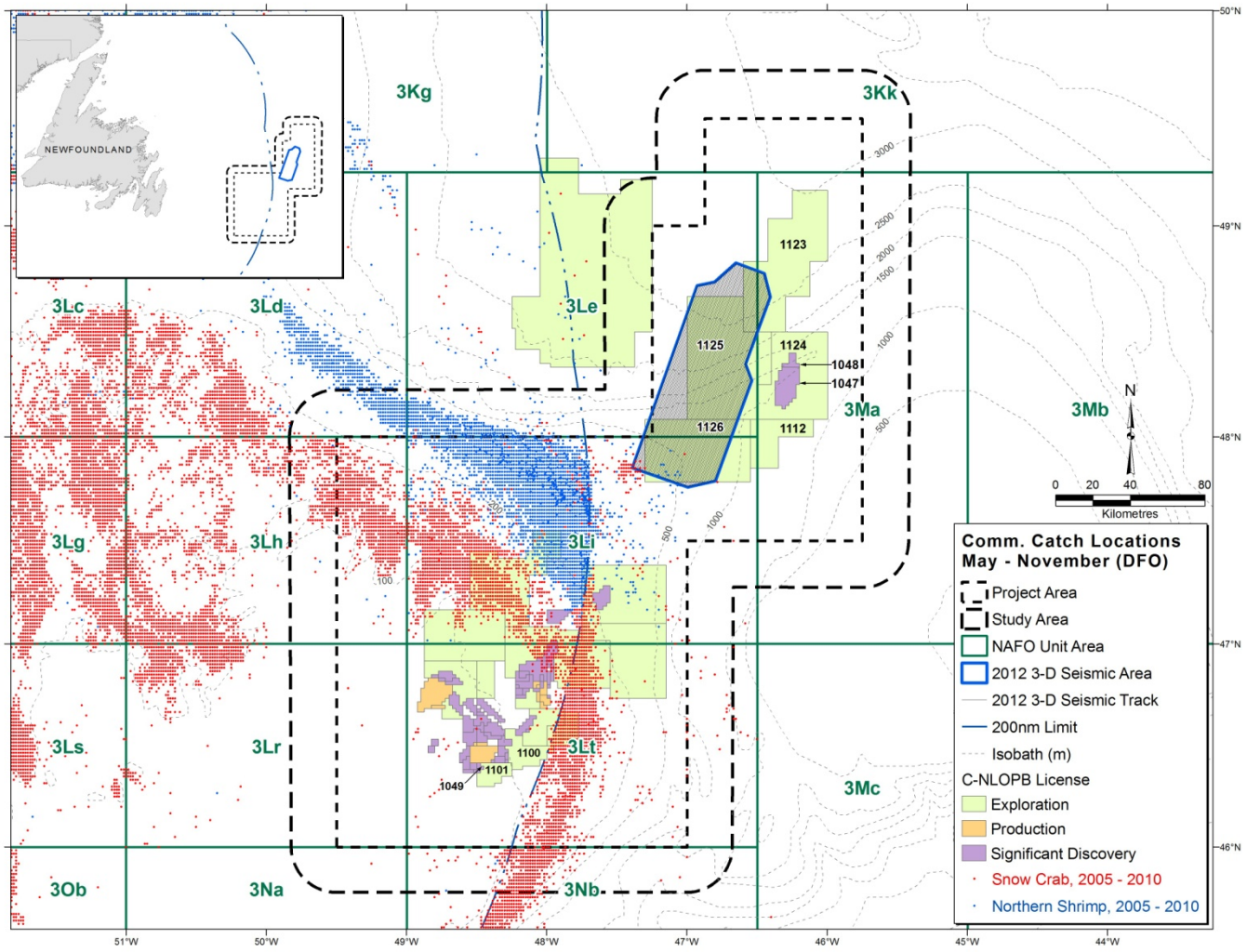
1 Introduction

Pursuant to its previously approved environmental assessment "*Environmental Assessment of Statoil's Geophysical Program for the Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019*"(CEAR No. 11-01-60411) Statoil proposes to conduct a 3D seismic survey over its leases 1123, 1125 and 1126 on the northern Grand Banks in 2012. Figure 1 shows the proposed extent of the 3D survey area relative to the geographic scope of the original assessment and traditional patterns of snow crab and northern shrimp fishing activity.

Figure 1: Statoil's 2012 3D Seismic Survey Area in relation to the geographic scope of the original assessment and patterns of snow crab and northern shrimp fishing activity

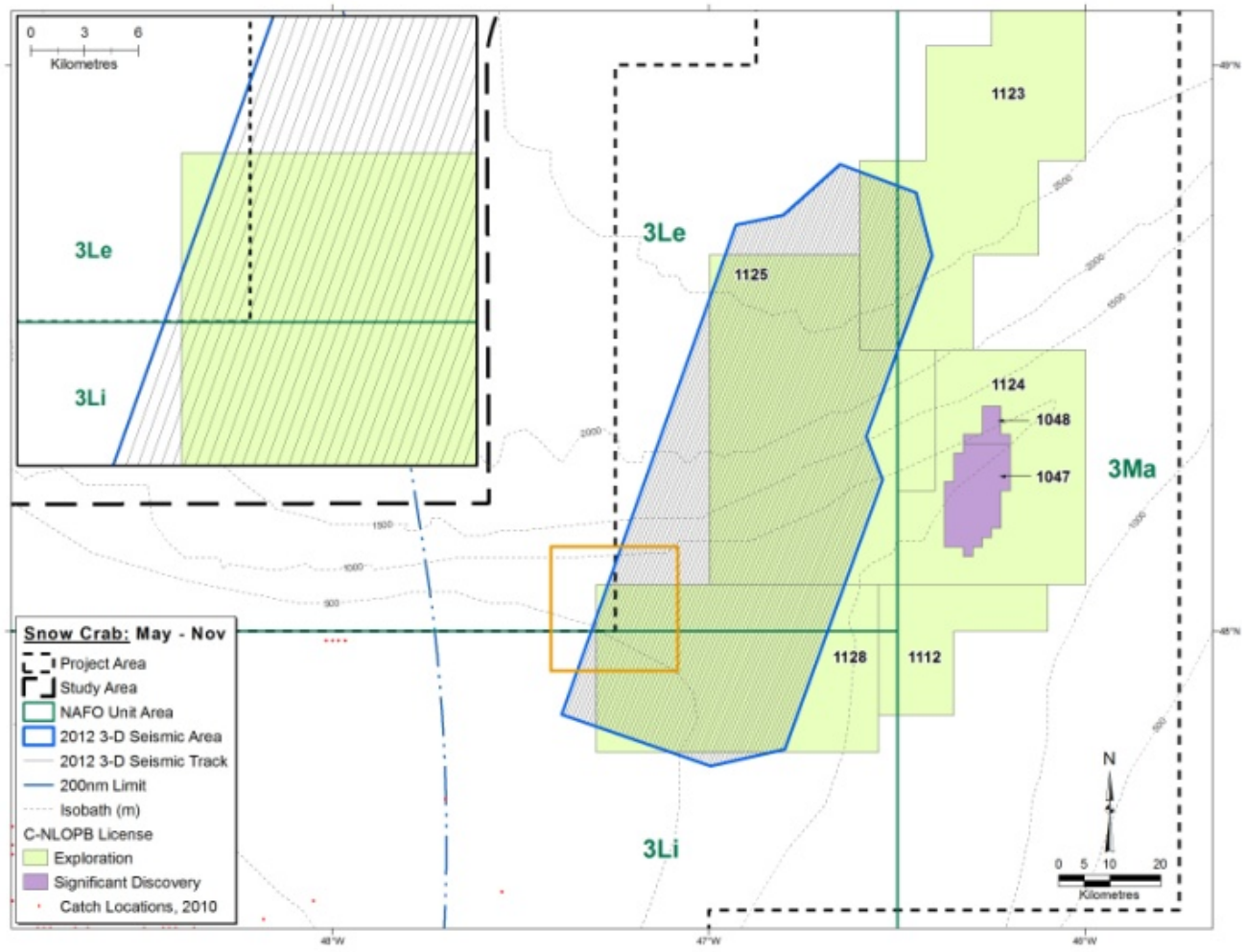


The southwestern corner of the 3D survey block encompasses a specific area of prospectivity. To encompass this area the survey lines would need to go just outside the *Project Area* defined in the original assessment. This proposed extension of the survey lines outside the *Project Area* boundary is the subject of this amendment.

2 3D Survey Design Relative to Project Area Boundary

Figure 2 depicts the proposed pattern of seismic survey track lines in relation to the original environmental assessment *Project Area* and *Study Area* boundaries. The survey track lines extend a maximum of approximately five (5) kilometers across the *Project Area* boundary with the north south distance of the survey lines being approximately 14 kilometers from their exit to their re-entrance into the *Project Area*. The area encompassed by this wedge-shaped portion of the survey is approximately 30 square kilometers. At no point does the survey approach the *Study Area* boundary that was defined as 25 kilometers outside the *Project Area* boundary (LGL, 2011 – Section 2.2)

Figure 2: Detail of Survey Lines in Southwestern Portion of the 3D Survey Area in Relation to the Project and Study Area Boundaries



The original environmental assessment was based on alternating air gun arrays of 5085 cubic inches each generating a source of 109.9 bar-m (~255 dB re 1 μPa (0-p)). The array designed for the 2012 survey will have alternating air gun arrays of 4700 cubic inches each with a source level of 119.5 bar-m (~255 dB re 1 μPa (0-p)). For the originally assessed and proposed arrays the expected received SPL decibel levels (re 1 μPa (0-p)) at 16 kilometers from each array are approximately 176.75 and 177.51 decibels, respectively. The received level at 20 kilometers from the array specified for the 2012 survey is estimated at 175.49 decibels re 1 μPa (0-p) as compared to an estimate of 172.79 decibels re 1 μPa (0-p) at 25 kilometers for the originally specified array - a difference of 2.7 dB re 1 μPa (0-p).

3 Review of the Conclusions of the Original Environmental Assessment

3.1 Introduction

Statoil has reviewed the information presented in the original environmental assessment in light of the need to extend the survey outside the project area boundary during the 2012 survey.
The following discusses the implications for those VECs identified in the original assessment potentially affected by the excursion of the seismic survey outside the *Project Area* boundary described in this amendment.

Given the minor nature of the survey excursion outside the *Project Area* boundary the only VECs identified in the original assessment that may be affected are commercial fisheries, marine mammals and sea turtles and species at risk. The key issues related to these VECs in this instance are two-fold. First, the potential for interference with commercial fisheries activity due to the presence of the survey vessel and streamers and secondly, the effects of the seismic survey sound energy on adjacent fisheries and on marine mammals and sea turtles and species at risk.

3.2 Commercial Fisheries

The extension of the survey lines does not bring the survey in that area significantly closer to the areas of active fishing (see Figure 1) in a way that would pose additional risk to those activities. The distance to the most active fishery, northern shrimp, is still 20 kilometers or more away. There is no incremental risk of physical interference in the immediate area of the survey's actual excursion outside the *Project Area.*

Notwithstanding the above however, the extreme southwestern end of the survey lines and hence the turns at the end of those lines, come near an area where snow crab fishing activity has occurred from time to time over the years. Appendix 1 provides a series of figures, by year, showing the patterns of snow crab fishing in this area over time. It is unknown if this area will be subject to snow crab fishing in 2012. The established mitigation measures that include consultation with fishers through One Ocean and the Fish Food and Allied Workers Union (FFAW), which is ongoing for this year's survey operations; the use of a Fisheries Liaison Officer; Notices to Shipping; and, effective use of survey picket vessels; all in accordance with C-NLOPB guidelines,[1] will mitigate interference with any crab fishery that may occur in this specific area.

Apart from the potential for physical interference with fishing gear and vessels, the issue of the effect of the sound energy generated in the water column by the air gun arrays and its potential effect on fish catch has arisen generally and locally. Statoil recognizes that this arose as a significant concern for the northern shrimp fishery in 2011. This issue is an ongoing topic of discussion with the fishing industry by Statoil and other oil and gas operators in preparation for 2012 survey activities. Notwithstanding the lack of definitive evidence to demonstrate a causal link with catch reductions of commercial species of primary concern here (northern shrimp and snow crab) these discussions indicate that fishing industry representatives consider that a 20 kilometers separation between an active air gun array and fishing operations is an acceptable measure pending defensible scientific studies on this issue. Since the Statoil 2012 3D survey will be at least 20 kilometers distant from the main northern shrimp and crab fishing areas this, in combination with the management measures noted above, should prove to be effective to minimize the risk of effects on the commercial fisheries for these species as a whole. While Statoil cannot commit to maintaining this separation from all fishing activities

[1] *Geophysical, Geological, Environmental and Geotechnical Program Guidelines, C-NLOPB, January 2012*

on this or future surveys it will make every practicable effort to minimize real or potential interference in consultation with fisheries interests.

3.3 Marine Mammals, Sea Turtles & Species at Risk

Section 5.6.4 of the original environmental assessment carried out a detailed assessment on the implications for marine mammals and sea turtles of a seismic survey of the type proposed by Statoil for 2012. The conclusions of that assessment were that the effects of a survey of this type, in light of the assessment criteria used, *were not significant* based on the sound source levels evaluated. The less than three (<3) decibel change (re 1 μPa (0-p)) in the sound source level at the *Study Area* boundary consequent on this amendment is not a significant change with respect to the original assessment. Furthermore, this < 3 dB change (re 1 μPa (0-p)) will only occur for 3 to 3.5 hours, the period of time the array is sailed outside of the Project Area boundary (See Figure 2).

The changes in estimated decibel levels arising from this amendment do not exceed the criteria upon which the original assessment concluded that overall no significant effects on marine mammals and sea turtles were likely and hence one of the bases upon which the original assessment was accepted (Section 5.6.4 – *subsection* Sound Criteria for Assessing Effects). The original assessment noted that there is potential for disturbance and temporary or permanent hearing threshold shift effects to marine mammal and sea turtle species in the unlikely event that any of these species were very close to the array. The employment of Marine Mammal Observers on the survey to assist the implementation of the of the C-NLOPB guidelines aimed at protecting marine mammals, sea turtles and species at risk will help mitigate these risks. The foregoing argument with respect to the effects of survey sound energy applies equally to the issue of species-at- risk with respect to the change invoked by the survey ranging marginally outside the *Project Area* boundary. Neither does the physical presence of the survey vessel and streamers passing outside the *Project Area* pose additional risk to the currently designated species-at-risk that might occur in the *Study Area* (Appendix 2) . This means the effects of the change proposed in this amendment for species-at-risk are not significant; based on the criteria employed in the original environmental assessment.

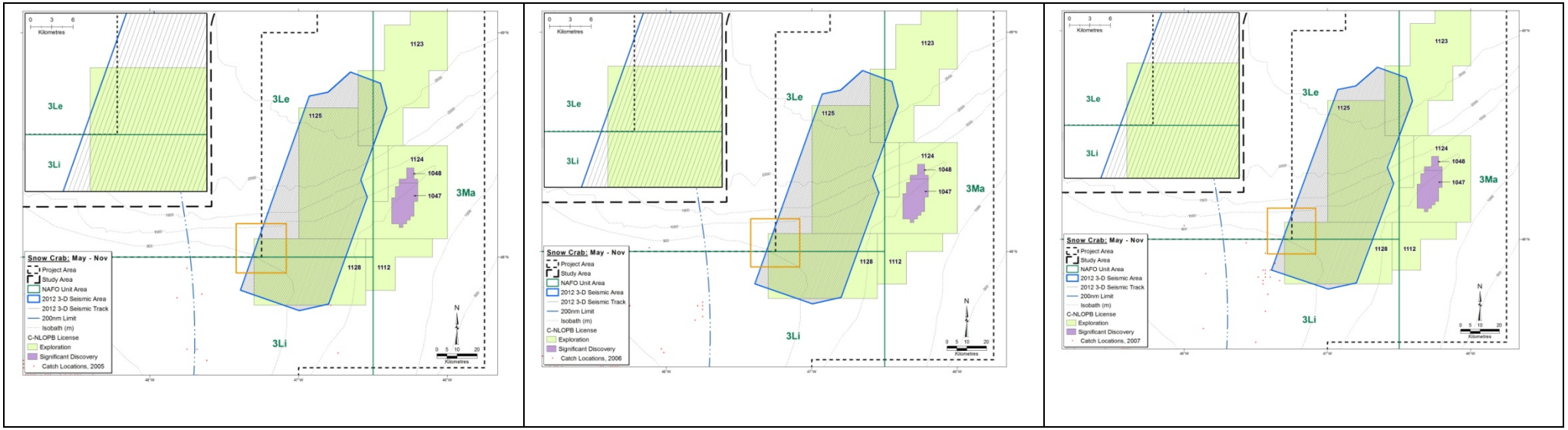
4 Conclusion

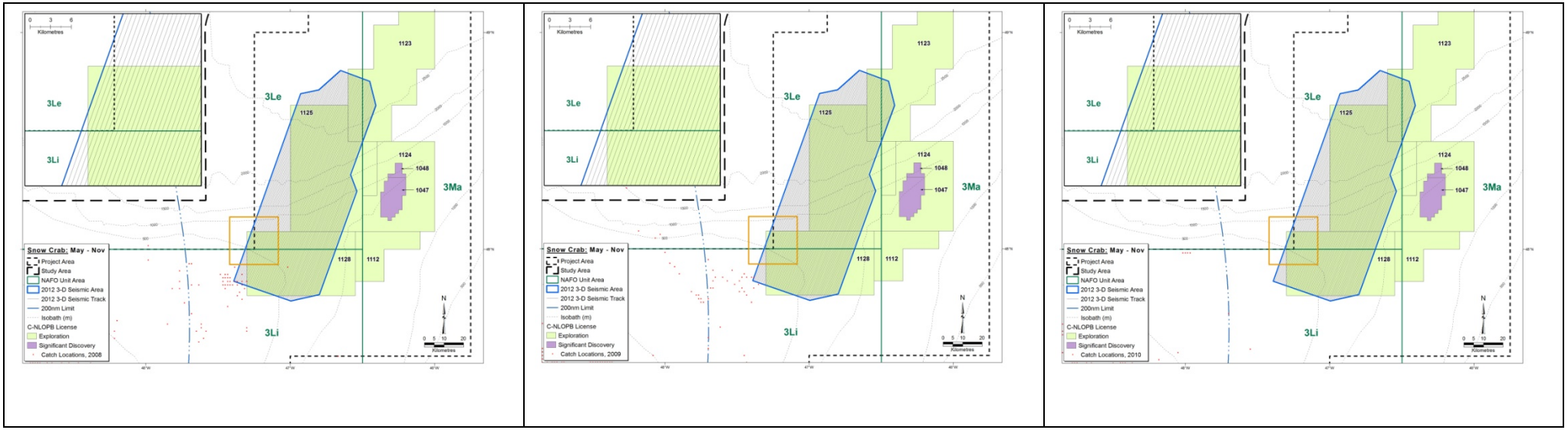
Notwithstanding that to achieve its planned purpose the 2012 3D survey lines need to carry on outside the Project Area boundary as described in this amendment, Statoil has concluded that, with the application of the mitigation measures committed to in the original assessment, the conclusions reached in that assessment are still valid.

5 Literature Cited

LGL Limited. 2011. Environmental assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019. LGL Rep. SA1121. Rep. by LGL Limited, in association with Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for Statoil Canada Ltd., St. John's, NL. 227 p. + appendices.

Appendix 1: Crab Fishery Adjacent to SW Corner of Survey Area 2005 through 2010




3Le
3Li
3Ma
1123
1125
1124
1048
1047
1128
1112
Snow Crab: May - Nov
Project Area
Study Area
NAFO Unit Area
2012 3-D Seismic Area
2012 3-D Seismic Track
200nm Limit
Isobath (m)
C-NLOPB License
Exploration
Significant Discovery
Catch Locations, 2008
Catch Locations, 2009
Catch Locations, 2010
Kilometres
N

Appendix 2 - Current Listing of SARA and COSEWIC Listed Species in the Statoil Study Area[2]

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
Common Name	Scientific Name	Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate[3]
Birds								
Ivory Gull	*Pagophila eburnean*	1			X			
Marine Fish								
Northern wolffish	Anarhichas denticulatus		1			X		
Spotted wolffish	Anarhichas minor		1			X		
Atlantic wolffish	Anarhichas lupus			1			X	
Atlantic cod	*Gadus morhua*			3				
Atlantic cod (Newfoundland & Labrador population)	*Gadus morhua*				X			
Atlantic Salmon (various regional populations)	*Salmo salar*				X	X	X	
Porbeagle shark	*Lamna nasus*				X			
White shark	*Carcharodon carcharias*	1[4]			X			
Roundnose Grenadier	*Coryphaenoides rupestris*				X			
Cusk	*Brosme brosme*					X		
American Shad	*Alosa sapidissima*							MPC
Alewife	*Alosa pseudoharengus*							MPC
Capelin	*Mallotus villosus*							MPC

[2] *Green Shade means a final Recovery Strategy is in place but no Critical Habitat has been identified nor have Action or Management plans been finalized for these species with the exception of the North Atlantic Right Whale (see footnote 8). Note that two other species that have recovery strategies, the Atlantic Walrus and Grey Whale, have been extirpated from Eastern Canadian waters and therefore are not listed in the above table.*

[3] *Candidate COSEWIC species are classified as High (H), Medium (M) or Low (L) Priority Candidate (PC) species*

[4] *June 2011*

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
Common Name	Scientific Name	Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate[3]
Haddock	*Melanogrammus aeglefinus*							MPC
Shortfin mako shark	*Isurus oxyrinchus*					X		
Blue shark	*Prionace glauca*						X	
American Eel	*Anguilla rostrata*						X	
Roughhead grenadier	*Macrourus bersgla*						X	
Bluefin Tuna	*Thunnus thynnus*				X			
Spiny eel	*Notacanthus chemnitzi*							MPC
Pollock	*Pollachius virens*							MPC
Spinytail Skate	Bathyraja spinicauda							MPC
Ocean pout	*Zoarces americanus*							MPC
American Plaice (Newfoundland & Labrador Population)	*Hippoglossoides platessoides*					X		
Acadian Redfish *(Atlantic Population)*	*Sebastes fasciatus*					X		
Deepwater Redfish *(Northern Population)*	*Sebastes mentella*					X		
Spiny Dogfish	*Squalus acanthias*						X	
Basking Shark	*Cetorihinus maximus*						X	
Marine Mammals								
Blue whale	*Balaenoptera musculus*	1			X			
Humpbacked whale	*Megaptea movaeanglia*			3				
North Atlantic right whale[5]	*Eubalaena glacialis*	1			X			
Fin whale (Atlantic population)	*Balaenoptera physalus*			1			X	

[5] *A critical habitat statement exists for this species however; it is rare in the study area considered in this assessment with one sighting of two individuals recorded in the DFO cetacean database.*

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
Common Name	Scientific Name	Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate[3]
Killer Whale (NW Atlantic & Eastern \Arctic Populations)	*Orcinus orca*						X	
Sperm whale	*Physeter macrocephalus*							LPC
Cuvier's Beaked Whale	Ziphius cavirostris							MPC
Sowerby's beaked whale	*Mesoplodon bidens*			3			X	
Northern Bottlenose whale (Davis Strait/Baffin Bay/Labrador Sea)	Hyperoodon ampullatus						X	
Harbour porpoise	*Phocoena phocoena*		2				X	
Hooded seal	*Cystophora cristata*							LPC
Harp seal	*Phoca groenlandica*							LPC
Ringed seal	*Pusa hispida*							HPC
Reptiles								
Leatherback sea turtle	Dermochelys coriacea	1			X			
Loggerhead sea turtle	*Caretta caretta*				X			