

**Fugro - Offshore Seafloor and
Seep Sampling Program
(2017-2027) Environmental
Assessment - Addendum**



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Addendum

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Table of Contents

1.0	GENERAL COMMENTS	1
1.1	Fish, Food and Allied Workers (FFAW-Unifor).....	1
1.2	Environment and Climate Change Canada (ECCC)	2
2.0	SPECIFIC COMMENTS	3
2.1	Canada-Newfoundland and Labrador Offshore Petroleum Board	3
2.2	Fisheries and Oceans Canada (DFO)	9
2.3	Environment and Climate Change Canada (ECCC)	31
2.4	Fish, Food and Allied Workers (FFAW-Unifor).....	31

1.0 GENERAL COMMENTS

1.1 Fish, Food and Allied Workers (FFAW-Unifor)

The overall study area for this EA is quite large as is the temporal scale of the project (2017-2027). While fisheries data has been examined in the document it needs to be recognized by the proponent that there is a regime shift happening (from a shellfish dominated to groundfish dominated fishery) in our dynamic marine environment. Our fisheries will likely change over the span of this ten year project. Our fisheries science work is likely to change as well. *It is critical that effective and regular communication ensue with the fishing industry, as committed in the EA, throughout the EA lifespan so that the proponent is kept apprised of ongoing developments with fisheries in the vast project area.*

It is paramount that Fugro ensures that the equipment used for seabed sampling is safely secured. Failure to do so and losing the equipment would result in a hazard for fishing vessel towing gear on the seabed. This issue does not appear to be addressed fully in the document.

Fugro acknowledges that there is an ongoing regime shift happening in the Study Area. Fugro will provide an annual update that will not only include an update to the fisheries data, but a record of consultation with fishers' groups to better understand the changing nature of the industry. Fugro remains committed to effective and regular communication with the fishing industry throughout the EA lifespan so that they are kept apprised of ongoing developments with fisheries in the Project Area.

Fugro will employ the use of a rail type LARS to safely control the core weight and barrel during launch and recovery to deck. During active coring operations, the gravity piston corer will be tethered to Dextron® 12 Plus of 16 mm, 12-Strand Dyneema fiber rope with a mean breaking strength of 23,600 kg, spooled on a purpose-built coring winch with a SWL of 5,000 kg. Rope tension and payout will be closely monitored by the operator to guard against excessive loads. In addition, an acoustic locator beacon is fitted to the core weight head, providing the location and depth of the corer in real time.

1.2 Environment and Climate Change Canada (ECCC)

Please note that ECCC comments on the Scoping Document and Project Description are still applicable.

Acknowledged. ECCC's comments on the Scoping Document informed the preparation of the Environmental Assessment (EA), including (but not limited to):

- *Inclusion of the ECSAS program data*
- *Obtaining a Live Seabird Salvage Permit*
- *Seabird Observer will be used*
- *Mitigation measures including avoidance of seabird colonies*
- *Commitment to update list of Species at Risk Act Schedule 1 species during annual updates to the environmental assessment*

2.0 SPECIFIC COMMENTS

2.1 Canada-Newfoundland and Labrador Offshore Petroleum Board

Section 1.3 Regulatory Context, pg 1 – The *Canada-Newfoundland Atlantic Accord Implementation Act* should be the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*.

The Sentence is amended to read:

The proposed Project will require authorizations pursuant to section 138 (1)(b) of the Canada-Newfoundland and Labrador Atlantic Accord Implementation Act and section 134(1)(b) of the Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act (the Accord Acts).

Section 2.3.1, High-resolution Multibeam Sonar Data, 1st para, pg 5 – “Additional multibeam data may be acquired over other areas within the Project Area in subsequent years”. The maximum size of the area in which data may be acquired each year for the 2018 to 2027 time period should be provided.

The size and location of target survey areas for any given year will be primarily based on future year Call for Bid (CFB) Sectors within the C-NLOPB scheduled land tenure system. These areas are typically less than 25,000 km².

Section 2.3.1, High-resolution Multibeam Sonar Data, 3rd para, pg 5 – Please define “normal” transit speeds. Also, provide the range of survey line spacing.

For this work, normal survey speeds are expected be 14.8 to 18.5 km/h (8 to 10 knots). Survey line spacing will be a function of water depth and observed data quality; notionally one to five times the observed water depth.

Section 2.3.3, Heat Flow Measurements, 2nd para, pg 6 – “Heat flow measurements are anticipated to be collected at up to 20 locations in 2017, with potential for additional sampling in 2017 or subsequent years”. How many additional sampling locations, besides the 20 identified, will be included in 2017. Also, provide the maximum number that may be obtained each year from 2018 to 2027.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Between 15 to 20 Heatflow measurements will be made in 2017. Heatflow measurement locations will be selected based on the geophysical data, so that the optimal locations for area-wide heat flow modelling as well as for heat flow probe penetration into the seabed are identified. It is anticipated that the maximum number of heatflow measurements in any given year would be on the order of 25.

Section 2.4 Vessels, pg 6 – “Survey vessels will be able to conduct MBES, SBP, heat flow and piston coring elements.” How many survey vessels will be operating during a program and what are their roles?

The 2017 survey is planned to be conducted using two vessels. The MV Fugro Discovery will conduct the geophysical data acquisition, while a local offshore supply vessel will be mobilized to conduct the heat flow measurements and piston coring. While the timeline of field operations for the two vessels may have some overlap at the beginning, the two sets of activities will essentially happen in sequence with the sampling locations being selected and cored after the geophysical data acquisition and review.

Geophysical data acquisition is now expected to commence late September (week 39) and last for approximately two weeks. The sampling program will commence at or near the end of the geophysical program and is expected to last approximately 30 days.

Section 2.7 Mitigation Measures, 3rd Bullet, pg 7 – Will one individual act as both the marine mammal observer (MMO) and the seabird observer?

It is intended that the MMO and Seabird Observer roles would be filled by a single person qualified to perform both sets of duties. If this is not possible in any given year then the duties will be filled by two people, each qualified for their respective role.

As the 2017 sampling program will be conducted by a vessel other than the geophysical vessel and will not be operating seismic or bathymetric sonars, it is understood that a MMO is not required to be onboard the sampling vessel. It is understood and acknowledged that a seabird observer will be required on the sampling vessel.

The requirement for a FLO on either vessel will be discussed and agreed with FFAW-Unifor. C-NLOPB will be advised of these discussions.

Section 2.7 and Table 2.2 have been updated accordingly (see Section 2.2 of this Amendment).

Section 2.7 Mitigation Measures, 3rd Bullet, pg 8 – Will SIMOPS only be conducted in 2017?

Bullet is amended as follows:

Simultaneous Operations (SIMOPS) will be conducted in any given year when there is potential for multiple operations to coincide in time and location. It is currently known that seismic surveys will be ongoing in the Orphan Basin during the 2017 seeps program and Fugro has had correspondence with the operator of that project to initiate plans for SIMOPS.

Section 2.7 Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, pg 9, Disturbance of Marine Mammals/Seabirds - As per the Geophysical, Geological, Environmental and Geotechnical Guidelines (C-NLOPB 2017), Operators are expected to implement a seabird and marine mammal observation program throughout all C-NLOPB authorized program activities. Such a program should involve designated observer(s) trained in marine mammal and seabird observations. The results of the marine mammal and seabird monitoring program should be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six (6) months after termination of the fieldwork. Data on the marine mammal and seabird observations must be submitted to the C-NLOPB.

Third and fourth rows of Table 2.2 (see Section 2.2) have been amended to include the following commitment

Results and data from the marine mammal monitoring program will be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six months after termination of the fieldwork.

Results and data from the seabird monitoring program will be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six months after termination of the fieldwork.

Section 2.7 Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, pg 9, Interference with Fishing Activities – “There will be **MMO/bird observer on board the vessel**” to mitigate against interference with fishing activities. The duties of a FLO (not the MMO/bird observer) would normally assist in mitigating against interference with fishing activities.

The sentence is amended as follows:

Requirements for a Fisheries Liaison Officer (FLO) to be on board the vessels will be agreed with FFAW-Unifor. Requirements will be based on time and location of survey activities of each vessel, and level of likelihood that survey activities will overlap with fishing activity.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Section 2.7 Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, pg 9, Potential disruption to Post-season Trap Survey – It should be the Operator, not the FLO that establishes communications with industry and DFO regarding the post-season crab surveys. The FLOs role would be to communicate with fishers during program activities.

Table 2.2 amended as follows:

Fugro will endeavor to obtain the time and locations of the DFO Collaborative Post-Season Trap Survey to prevent any potential disruption to these activities.

Section 2.7 Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, pg 9, Potential conflict/damage to fixed gear – The commitment was previously made to consult with OO, FFAW-Unifor, OCI, and ASP with regard to fishing activities.

Table 2.2 amended as follows

Fugro will continue to consult with One Ocean, the FFAW-Unifor Petroleum Industry Liaison, Ocean Choice International, and Association of Seafood Producers regarding the location and timing of fishing activity and will avoid areas during times of heavy fixed gear use.

Section 2.8 Environmental Management, 1st sentence, pg 11 – Who will receive the plan developed by Fugro and what will be the timeframe for submission?

Text has been amended as follows

As shown by the mitigation measures described in Section 2.7, Fugro **intends** to reduce the potential effects to the commercial fisheries, **by ensuring timely and informative communications**, (e.g., notifications on the Fisheries Broadcast and Notices to Shipping), **employing FLO's as agreed with FFAW-Unifor**, avoidance of areas during times of heavy fixed gear use, **coordination with DFO science survey activities to minimize interference, observance of protected areas, etc.** In addition, **Fugro will develop and implement a damage compensation program to promptly settle claims for loss and/or damage that may be caused by survey operations. The compensation program will be consistent with the C-NLOPB guidelines and past practices and will cover damage to fishing gear and vessels caused by the survey vessel(s) or gear, and includes the value of any harvest lost as a direct result of the incident. Procedures for responding to a claim, similar to those outlined in the One Ocean Protocol document, will be implemented in the event of an incident. Incidents will be reported to the C-NLOPB, through their 24-hour answering service at 709-682-4426 (709-778-1400 during working hours) and the reports on contacts with fishing gear will include the exact time and location of initial contact, loss of contact, and a description of any identifying markings on the gear. The compensation program will be submitted to C-NLOPB for program approval as required.**

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Section 2.8 Environmental Management, pg 11 – A copy of the compensation program should be submitted with the application to carry out geophysical activities.

Sentence updated as follows

The compensation program will be submitted to C-NLOPB for program approval as required.

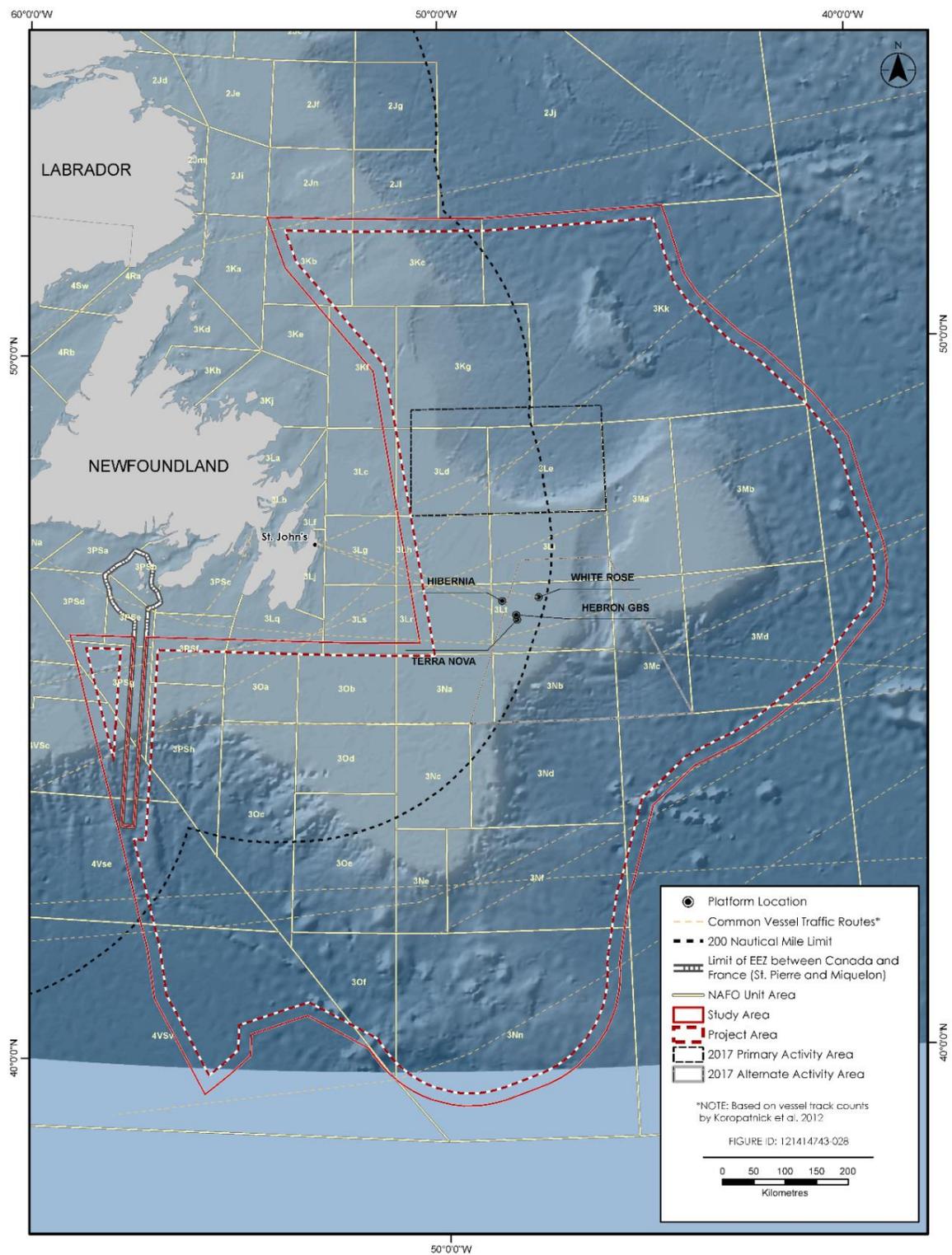
Section 2.8 Environmental Management, pg 11 – Information and reporting requirements for incidents, including contact with fishing gear, can be found in the Incident Reporting and Investigation Guidelines (CNLOPB/CNSOPB 2012).

Acknowledged.

Section 3.4.2 Other Users Marine Shipping, pg 25 – Provide information on shipping lanes and marine traffic through the Study Area.

Of the 17 ports in the eastern region of Newfoundland used for both domestic and international shipping activities, nine accommodate both domestic and international shipping, four are used for domestic shipping, and four are used exclusively for international shipping (Amec 2014). There were approximately 698 international shipping movements handling 16,654 t of total tonnage and 3,044 domestic shipping movements handling 27,248 t of total tonnage in the eastern region of Newfoundland in 2011 (most recent data, Statistics Canada No Date a; Statistics Canada No Date b). International routes commonly used by vessels to transit through the Study Area; the highest density traffic routes are illustrated in Figure 2-1.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM



Source: Koropatnick et al. 2012, data files provided by S. Coffen-Smout, DFO, Dartmouth, NS.

Figure 2-1 Common Vessel Traffic Routes in the Study Area

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

References:

Amec Environment and Infrastructure. 2014. Eastern Newfoundland Strategic Environmental Assessment. Final Report, 2014. Available at: <http://www.cnlopb.ca/sea/eastern.php>.

Koropatnick, T., S.K. Johnston, S. Coffen-Smout, P. Macnab and A. Szeto. 2012. Development and Applications of Vessel Traffic Maps Based on Long Range Identification and Tracking (LRIT) Data in Atlantic Canada. Can. Tech. Rep. Fish. Aquat. Sci. 2966: 27 pp. <http://www.dfo-mpo.gc.ca/Library/345629.pdf>

Statistics Canada. No date a. 2011 International Shipping – Number of movements, vessel capacity, and tonnage transported by province or territory and port – Newfoundland and Labrador. Available online at: <http://www.statcan.gc.ca/pub/54-205-x/2011000/t142-eng.htm>

Statistics Canada. No date b. 2011 Domestic Shipping – Number of movements, vessel capacity, and tonnage transported by province or territory and port – Newfoundland and Labrador. Available online at: <http://www.statcan.gc.ca/pub/54-205-x/2011000/t229-eng.htm>

Section 6.1.4 Operation of Vessels, pg 43 – Please clarify the meaning of the “where possible” in the context of the sentence, “...to monitor and report on marine mammal and sea turtle sightings during vessel operation to avoid marine mammals or sea turtles (including SAR), where possible.”

Observations will be conducted during daylight hours only. The sentence is revised to read:

An MMO will be on board the geophysical survey vessel to monitor and report on marine mammal and sea turtle sightings during vessel operation during daylight hours as mitigation against disturbance to marine mammals or sea turtles (including SAR).

2.2 Fisheries and Oceans Canada (DFO)

Section 2.7 Key Mitigation Measures and Table 2.2, pgs 7 to 10 - Given the potential for impact of sound on marine mammals (including Species at Risk) from multi-beam echo sounder (MBES) and sub-bottom profiling (SBP) survey activities it is felt that the Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment should be, adhered to, and included in the list of key mitigation measures for the project. This section and table should be amended accordingly.

Section 2.7 and Table 2.2 are amended as follows:

2.7 KEY MITIGATION MEASURES

The scope of work for the proposed Project includes multi-beam bathymetry; seabed heat flow measurements; collection of seabed cores; acoustic sub-bottom profiling; and sampling of potential natural seabed seeps. Interactions with the environment is primarily associated with the operation of the vessel(s) and the collection of sediment samples. The following mitigation measures are proposed for the Project.

- Fugro will contract vessels with equipment, protocols, and procedures for the prevention of pollution by oil, sewage, and associated waste materials in accordance with the Canadian Shipping Act and international standards and certification authorities.
- For the 2017 program, seabed samples will not be taken in water depths less than 500 m or greater than 3,000 m.
- A marine mammal observer (MMO) observer will be on board the **survey vessel that will be conducting multibeam echosounder and sub-bottom profiling operations.**
- **A seabird observer will be onboard the both the geophysical survey vessel and the sampling vessel.**
- **The project will adhere to the Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment**
- **Requirements for a Fisheries Liaison Officer (FLO) on board the vessels will be agreed with FFAW-Unifor. Requirements will be based on time and location of survey activities of each vessel, and level of likelihood that survey activities will overlap with fishing activity. C-NLOPB will be advised of the outcome of such discussions.**
- There will be ongoing consultation between Fugro and stakeholders, including One Ocean and the fishers groups (FFAW-Unifor Petroleum Industry Liaison, OCI, and ASP). This will include identifying the location and timing of their members who fish in the area and will avoid areas during times of heavy fixed gear use.
- **Simultaneous Operations (SIMOPS) will be conducted in any given year when there is potential for multiple operations to coincide in time and location. It is currently known that seismic surveys will be ongoing in the Orphan Basin during the 2017 seeps program and Fugro has had correspondence with the operator of that project to initiate plans for SIMOPS**
- Sampling will occur in a sequence that creates the least disruption to local fishers based on consultation with the fishers groups.
- A minimum distance of 2 km will be maintained from active seabird colonies.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

- *Survey vessels will not enter or attempt to conduct survey work in restricted or protected areas (Northwest Atlantic Fisheries Organization (NAFO) coral / sponge closure areas, known shipwrecks, and seabird colonies).*
- *Data collection will occur over a 24-hour period; therefore, lighting is required at night for safety purposes. As there is potential for marine and migratory birds to be attracted to the vessels at night, the vessel crews will conduct routine checks for stranded birds and release of stranded birds per the protocol outlined in Best Practices for Stranded Birds Encountered Offshore Atlantic Canada (Environment Canada 2015) and the Leach's Storm Petrel: General Information and Handling Instructions (Williams and Chardine 1999).*
- *A Live Seabird Salvage permit will be acquired from the Canadian Wildlife Service (CWS) prior to operations and stranded birds (or bird mortalities) will be reported to CWS during the program.*
- *Fisheries and Oceans Canada (DFO) will be contacted prior to start of the Project to determine where DFO research vessels are conducting surveys. The order of sampling locations will be revised, where necessary, to avoid conflict with DFO research vessels.*
- *The Department of National Defence will be contacted prior to start of the Project to determine where naval exercises are being conducted and the order of sampling locations will be revised, if necessary, to avoid interaction with naval vessels.*
- *If in the unlikely event of a lost corer, a full risk assessment of the impact would be undertaken with consultation with relevant parties, and appropriate action then undertaken for recovery, if required.*

Potential effects from Project-related activities and Fugro's commitment / mitigation measure to address the potential effect are summarized in Table 2.2.

Table 2.2 Commitment / Mitigation Measures

Potential Effects of Related Activities	Commitment / Mitigation Measure	Status
<i>Disturbance of Marine Mammals / seabirds</i>	<i>The program (collecting cores) is non-intrusive and its duration is short.</i>	<i>Operations to be communicated in Weekly Reports.</i>
Disturbance of Marine Mammals	The Project will adhere to the Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment	
<i>Disturbance of Marine Mammals</i>	A marine mammal observer (MMO) will be on board the geophysical survey vessel that will be conducting multibeam echosounder and sub-bottom profiling operations.	MMO to complete daily and weekly observation reports. Results and data from the marine mammal monitoring program will be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six months after termination of the fieldwork.
<i>Disturbance of Seabirds</i>	A seabird observer will be onboard both the geophysical survey vessel and the seabed sampling vessel.	Sea bird observer to complete daily and weekly observation reports. The results of the seabird monitoring program will be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six months after termination of the fieldwork.
<i>Interference with Fishing Activities</i>	Requirements for a Fisheries Liaison Officer (FLO) to be on board the vessels will be agreed with FFAW-Unifor. Requirements will be based on time and location of survey activities of each vessel, and level of likelihood that survey activities will overlap with fishing activity	C-NLOPB will be advised of the outcome of discussions with FFAW-Unifor related to requirement for FLO
<i>Potential disruption to the Post-Season Trap Survey</i>	Fugro will endeavor to obtain the time and locations of the industry-DFO Collaborative Post-Season Trap Survey to prevent potential disruption to the activities	<i>Communications to be established with DFO.</i>
<i>Potential conflict / damage to fixed gear</i>	<i>The vessel will avoid areas during times of heavy fixed gear use.</i>	FFAW-Unifor will provide direction for avoidance of areas of heavy fixed gear use
<i>Potential conflict to other vessels</i>	<i>Fugro will post Notices to Shipping.</i>	<i>Notice to Shippers will be posted immediately prior to start of survey</i>

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Potential Effects of Related Activities	Commitment / Mitigation Measure	Status
Potential conflict / damage to fixed gear	Fugro will continue to consult with One Ocean and the FFAW- Unifor Petroleum Industry Liaison, Ocean Choice International, and Association of Seafood Producers regarding the location and timing of fishing activity and will avoid areas during times of heavy fixed gear use.	Meetings held with OO, FFAW-Unifor, OCI, and ASP. Communications ongoing
Interference with Fishing Activities	Fugro will time the sampling of the identified areas in a sequence that creates the least disruption to local fishers.	FLO will provide direction to reduce / avoid disruption to local fishers
Disturbance to seabirds	The vessel will maintain a minimum distance of 2 km from active seabird colonies.	Minimum 2-km distance will be maintained from active seabird colonies
Stranding / Injury / Mortality to birds	As there is potential for marine and migratory birds to be attracted to the vessel at night, the vessel crew will conduct routine checks for stranded birds and release of stranded birds per the Best Practices for Stranded Birds Encountered Offshore Atlantic Canada (Environment Canada 2015).	Seabird observer to complete daily and weekly observation reports. The results and data from the seabird monitoring program will be included in the EA mitigation and monitoring report submitted to the C-NLOPB no later than six (6) months after termination of the fieldwork
Stranding / Injury / Mortality to birds	A Live Seabird Salvage permit will be acquired from the Canadian Wildlife Service prior to operations.	Permit received for geophysical survey vessel. Application to be made for Sampling Vessel. Expected to receive permit prior to Operation start date.
Potential conflict with DFO Research Vessels	Fugro will contact DFO prior to start of the Project to determine where DFO research vessels are conducting surveys and will revise the sampling location order to avoid conflict with DFO research vessels.	Contact: George Sheppard, DFO
Potential conflict with DND Vessels	Fugro will contact DND prior to start of the Project to determine where naval exercises are being conducted and will revise the sampling location order if necessary to avoid interaction with naval vessels.	Contact: MARLANT (Maritime Forces Atlantic) Headquarters Safety and Environmental Officer for Commander
Potential damage to fishing gear	A compensation program will be made available by Fugro consistent with C-NLOPB guidelines and past practices. This program will cover damage to fishing gear (or vessels) caused by the survey vessel or survey gear, and includes the value of harvest lost as a direct result of an incident. Any and all incidents will be reported to the C-NLOPB.	Fugro will have a compensation program in place consistent with C-NLOPB guidelines and past practices

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Potential Effects of Related Activities	Commitment / Mitigation Measure	Status
<i>Potential damage to fishing gear</i>	<i>If in the unlikely event of a corer is lost, then a full risk assessment of the impact would be undertaken with consultation with relevant parties, and appropriate action then undertaken for recovery if required.</i>	<i>Risk assessment of retrieving / not retrieving a lost core would be conducted with relevant parties</i>
<i>Potential pollution of the marine environment</i>	<i>Fugro will contract a vessel that has equipment and protocols and procedures in place for prevention of pollution by oil, sewage and associated waste materials in accordance with the Canadian Shipping Act and international standards and certification authorities.</i>	

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Section 3.2 Species at Risk, Table 3.1, pgs 14-15 - Regarding the Northern bottlenose whale (Scotian Shelf population) with footnotes B,E – E refers to “Management Plan anticipated in 2017” which should be changed to “Action Plan” which was recently posted on the public registry (see http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=2940).

Regarding the Sowerby's beaked whale with footnotes B,C – C refers to “Action Plan anticipated in 2017” which should be changed to “Management Plan” which was recently posted on the public registry (see http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=2938).

A summary describing the presence/distribution/behavior/habitat of Species at Risk with potential to occur within the study area should be included.

Atlantic wolffish occur in Newfoundland in water depths of <100 to 400 m at temperatures ranging from -0.5°C to 6.5°C (Amec 2014), with the Southeast Shoal and the Tail of the Banks EBSAs home to a high concentration.

Northern wolffish are found in the deep waters (150 to 1000 m) of the Grand Banks and Flemish Cap in spring and fall. They live in the open ocean and feed on benthic crustaceans and invertebrates (COSEWIC 2012a).

Spotted wolffish are found in the deep water (typically 50 to 800 m) off Newfoundland on substrate of coarse sand and a sand and shell mix with rocks, in temperatures ranging from -1°C to 6°C (COSEWIC 2012b).

White shark (Atlantic population) is rare in the northwest Atlantic as it is the northern edge of their range, but there have been sightings recorded on the northeast Newfoundland shelf. They migrate seasonally, are highly mobile and range from the surface to depth of 1,300 m (COSEWIC 2006b, in BP 2016).

Blue whale (Atlantic population) has been observed primarily in the St. Lawrence Estuary and shallow coastal zones during the spring, summer, and fall and occur in the winter off southern Newfoundland. They also frequent the Davis Strait during the summer (Beauchamp et al. 2009; LGL 2014; Waring et al. 2016).

Fin whale (Atlantic Population) regularly occur from early summer to late fall in northeastern and eastern Newfoundland waters, feeding on small schooling fish such as herring and capelin, squid, and crustaceans including mysids and krill (DFO 2017a).

North Atlantic right whale is found from the coastal waters of the US to Newfoundland and the Gulf of St. Lawrence (DFO 2014). There have been rare sightings off southern Newfoundland (Sergeant 1966 in Husky Energy 2012; Gaskin 1991, in Husky Energy 2012).

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Northern bottlenose whale (Scotian Shelf population) occur in predominantly deep offshore areas in the North Atlantic, primarily in The Gully and adjacent canyons of the eastern Scotian Shelf; and Davis Strait, Baffin Bay, and Labrador Sea (Reeves et al. 1993, in Husky Energy 2012). The Scotian Shelf population is estimated at 163 individuals (Whitehead and Wimmer 2005, in Husky Energy 2012), with a relatively restricted distribution; their home range is thought to be a few hundred kilometres or less (Wimmer and Whitehead 2004, in Husky Energy 2012).

Sowerby's beaked whale. This species is only found only in the cold temperate waters of the North Atlantic (COSEWIC 2006a; DFO 2017b). with the estimated population (i.e., approximately 7,100 individuals) combining sightings of all *Mesoplodon* spp. beaked whales (Waring et al. 2015). Numbers in Newfoundland are unknown, with most information based on stranding records or a few opportunistic sightings (Lien and Barry 1990, in Husky Energy 2012). They would likely occur relatively low numbers, in the deeper waters of the Study Area.

Leatherback sea turtle (DFO 2013) they can be found in both the shelf and offshore slope waters In the Northwest Atlantic as well as in the Gulf of St. Lawrence (COSEWIC 2012f, in BP 2016) from April to December (highest densities are July to September). In Atlantic Canadian waters the species is commonly found off the south coast of Newfoundland, the southern Gulf of St. Lawrence, in the shelf waters off Cape Breton Island, and in offshore Scotian Slope waters (LGL 2014).

Ivory Gull nest in the high-Arctic from May to early June and live near the edges of pack ice in the North Atlantic Ocean outside their breeding season, particularly in the Labrador Sea and the Strait of Belle Isle areas of Newfoundland (COSEWIC 2006b). They have been observed in the offshore waters of eastern Newfoundland. Piping plover (*melodus* subspecies) red knot *rufa* ssp., roseate tern, harlequin duck, and Barrows goldeneye are shore birds / coastal birds and are unlikely to be present within the Study Area.

References

AMEC Environment and Infrastructure. 2014. Eastern Newfoundland Strategic Environmental Assessment. Final Report, 2014. Available at: <http://www.cnlopb.ca/sea/eastern.php>.

Beauchamp, J.,H. Bouchard, P. de Margerie, N. Otis and J.Y. Savaria. 2009. Recovery Strategy for the Blue Whale *Balaenoptera musculus* (Northwest Atlantic Population) in Canada [Final]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa, ON. 62 pp.BP Canada Energy Group ULC. 2016. Scotian Basin Exploration Drilling Project Environmental Impact Statement. Volume 1: Environmental Impact Statement. Prepared by Stantec Consulting Ltd., Halifax, NS.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2006a. COSEWIC assessment and update status report on the Sowerby's beaked whale *Mesoplodon bidens* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON. vi + 20 pp.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2006b. COSEWIC Assessment and Update Status Report on the Ivory Gull *Pagophila eburnean* in Canada. Ottawa, ON. vi + 42 pp.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2011. COSEWIC Assessment and Status Report on the Northern Bottlenose Whale *Hyperoodon ampullatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. xii + 31 pp.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2012a. COSEWIC assessment and status report on the Northern Wolffish *Anarhichas denticulatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. x + 41 pp.

COSEWIC [Committee on the Status of Endangered Wildlife in Canada]. 2012b. COSEWIC Assessment and Status Report on the Spotted Wolffish *Anarhichas minor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 44pp. Available from: http://www.sararegistry.gc.ca/default_e.cfm.

DFO (Fisheries and Oceans Canada). 2013. Report on the Progress of Recovery Strategy Implementation for the Leatherback Sea Turtle (*Dermochelys coriacea*) in Canada for the Period 2007-2012. Species at Risk Act Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa, ON.

DFO (Fisheries and Oceans Canada). 2014. Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters [Final]. Species at Risk Act Recovery Strategy Series, Ottawa, ON. vii + 68 pp.

DFO (Fisheries and Oceans Canada). 2017a. Management Plan for the fin whale (*Balaenoptera physalus*), Atlantic population in Canada. Species at Risk Act Management Plan Series, DFO, Ottawa, ON. iv +38 pp.

DFO (Fisheries and Oceans Canada). 2017b. Management Plan for the Sowerby's Beaked Whale (*Mesoplodon bidens*) in Canada [Final]. Species at Risk Act Management Plan Series. Fisheries and Oceans Canada, Ottawa, ON. iv + 46 pp.

Husky Energy. 2012a. Husky Energy White Rose Extension Project Environmental Assessment. Prepared by Stantec Consulting Ltd., St. John's, NL, for Husky Energy. St. John's, NL.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

LGL Limited. 2014. *Environmental Assessment of BP Exploration (Canada) Limited's Tangier 3-D Seismic Survey*. BP Document No. NS-HS-REP-BP-B01-0001. March 2014.

Waring, G.T., Josephson, E., Maze-Foley, K., Rosel, P.E. (eds.). 2015. *US Atlantic and Gulf of Mexico marine mammal stock assessments -- 2014*. NOAA Tech Memo NMFS NE 231; 361 p.
http://docs.lib.noaa.gov/noaa_documents/NMFS/NEFSC/TM_NMFS_NE/TM_NMFS_NE_231.pdf.

Waring, G.T., E. Josephson, K. Maze-Foley and P.E. Rose. 2016. *NOAA Fisheries – Marine Mammal Stock Assessments*. Available from:
<http://www.nmfs.noaa.gov/pr/sars/draft.htm>

Table 3.1 is amended as follows.

Table 3.1 SARA-listed Species at Risk with Potential to Occur within the Study Area

Common Name	Scientific Name	SARA Status ¹	Potential for Occurrence in the Study Area ²	Timing of Presence
Marine Fish				
Atlantic wolffish ^A	<i>Anarhichas lupus</i>	Special Concern (Schedule 1)	High	Year-round
Northern wolffish ^{B,C}	<i>Anarhichas denticulatus</i>	Threatened (Schedule 1)	High	Year-round
Spotted wolffish ^{B,C}	<i>Anarhichas minor</i>	Threatened (Schedule 1)	High	Year-round
White shark (Atlantic population) ^D	<i>Carcharodon Carcharias</i>	Endangered (Schedule 1)	Low	July to October
Marine Mammals				
Blue whale (Atlantic population) ^{B,C}	<i>Balaenoptera musculus</i>	Endangered	Low	Year- round (highest concentrations from June to September)
Fin whale (Atlantic Population) ^{B,E}	<i>Balaenoptera physalus</i>	Special Concern	High	Year- round (highest concentrations from June to October)
North Atlantic right whale ^{B,C}	<i>Eubalaena glacialis</i>	Endangered	Low	May to September
Northern bottlenose whale (Scotian Shelf population) ^{B,F}	<i>Hyperoodon ampullatus</i>	Endangered	High	Year-round
Sowerby's beaked whale ^{A,B}	<i>Mesoplodon bidens</i>	Special Concern	Low	Year-round
Sea Turtles				
Leatherback sea turtle ^{B,C}	<i>Dermochelys coriacea</i>	Endangered (Schedule 1)	Moderate	June to November
Birds				
Ivory Gull ^B	<i>Pagophila eburnea</i>	Endangered	Likely	April
Piping Plover (melodus subspecies)	<i>Charadrius melodus melodus</i>	Endangered	Unlikely	Unlikely
Red Knot rufa ssp	<i>Calidris canutus rufa</i>	Endangered	Unlikely	Unlikely
Roseate Tern	<i>Sterna dougallii</i>	Endangered	Unlikely	Unlikely
Harlequin Duck	<i>Histrionicus histrionicus</i>	Special Concern	Unlikely	Unlikely
Barrows Goldeneye	<i>Bucephala islandica</i>	Special Concern	Unlikely	Unlikely

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Common Name	Scientific Name	SARA Status ¹	Potential for Occurrence in the Study Area ²	Timing of Presence
<p>Notes:</p> <ol style="list-style-type: none"> <i>The Species at Risk Act establishes Schedule 1 as the official list of wildlife species at risk. However, note that while Schedule 1 lists species that are extirpated, endangered, and threatened, the prohibitions do not apply to SOCC or those on Schedule 2 or 3 regardless of status.</i> <i>This qualitative characterization is based on expert opinion, and an analysis of understood habitat preferences across life-history stages, available distribution mapping, and sightings data for each species within the Study Area.</i> <p>A = Management Plan B = Recovery Strategy C = Action Plan anticipated in 2017 D = Recovery Strategy anticipated in 2017 E = Management Plan anticipated in 2017 F = Action Plan</p>				

Section 3.4.2 Other Users Offshore Oil and Gas, pg 25 - Production activities are mentioned in this section; however, other offshore oil and gas activities that overlap the study area should be included (e.g. exploratory programs, other geophysical/seismic programs).

The text is amended as follows

Offshore Oil and Gas

Offshore oil and gas production activities have been occurring off the coast of Newfoundland and Labrador for approximately 20 years, and exploration has occurred for decades. There are three production platforms (Hibernia, Terra Nova, and White Rose), with Hebron scheduled to begin drilling in 2017. **There are currently four exploration drilling programs undergoing environmental assessment through the Canadian Environmental Assessment Act, 2012 process:**

- **Husky Oil Operations Limited, focusing on the Jeanne d'Arc Basin and one Exploration Lease (EL) in the southern Flemish Pass)**
- **Statoil Canada Limited, focusing on the northern Flemish Pass**
- **ExxonMobil Canada, focusing on the Jeanne d'Arc Basin and Southern Flemish Pass**
- **Nexxen Energy, focusing on the northern Flemish Pass / Cap area**

There are approximately 15 seismic programs proposed for the Study Area, as well as a controlled-source electromagnetic survey.

Section 3.7 Sensitive Areas, pg 33 - A brief description and/or summary of the characteristics of sensitive marine areas within the study area should be included and Section 3.7 amended accordingly.

Section 3.7 is amended as follows:

The Study Area contains a number of sensitive and special areas, including Ecologically and Biologically Significant Areas (EBSAs), Vulnerable Marine Ecosystems (VMEs), NAFO identified coral and sponge closure areas, seamounts, Bonavista Cod Box, Marine Protected Areas and Areas of Interest, and preliminary Representative Marine Areas (Figure 3-10).

Ecologically and Biologically Significant Areas

EBSAs are identified according to pre-established criteria (DFO 2004a). DFO has identified five EBSAs in the area: Southeast Shoal and Tail of the Banks; Southwest Shelf Edge and Slope; Northeast Shelf and Slope; Lily Canyon-Carson Canyon; and Virgin Rocks.

- **The Southeast Shoal and Tail of the Banks EBSA notable for having the warmest bottom water temperatures on the Grand Banks and a well-defined gyre that**

drives high rates of primary production (CPAWS 2009) and supports reproducing populations of groundfish and capelin (Walsh et al. 2001; Fuller and Myers 2004).

- *The Southwest Shelf Edge and Slope EBSA is an area of high productivity due to upwelling processes, and is an important marine area on the Grand Banks because of the high coral species richness, groundfish biomass, and seabird diversity (Kulka and Miri 2003; Ollerhead et al. 2004; Edinger et al. 2007). Cetaceans and leatherback sea turtles are known to congregate in the area to feed (CPAWS 2009).*
- *The Northeast Shelf and Slope EBSA is not considered unique but supports spotted wolffish and Greenland halibut populations, contains two important coral areas at Tobin's Point and Funk Island Spur, and is a known feeding area for marine mammals, particularly harp seals, hooded seals, and pilot whales (CPAWS 2009).*
- *Lily Canyon-Carson Canyon EBSA is variably productive, but at times can be highly productive and is strongly influenced by the Labrador Current. The area is biologically important due to the abundance of Iceland scallop, as well as feeding and overwintering of marine mammals (Ollerhead et al. 2004; CPAWS 2009).*
- *The Virgin Rocks EBSA supports several fish species (Ollerhead et al. 2004) as well as marine birds. An estimated 1,000 to 2,000 common eiders commonly overwinter near the Virgin Rocks (CPAWS 2009). The site has high plankton productivity as well as dense kelp beds in the rocky shallow subtidal (CPAWS 2009).*

Vulnerable Marine Ecosystems

NAFO has identified the following VMEs with the goal of managing deep-sea fisheries and the potential environmental effects that such fishing could have:

- *Canyons - NAFO has identified 13 canyons: Denys Canyon; Cameron Canyon; Jackman Canyon; Guy Canyon; Hoyles Canyon; Kettle Canyon; Clifford Smith Canyon; Lilly Canyon; Carson Canyon; and Unnamed Canyons 1, 2, 3, and 4. These deep-water areas support a rich, diverse community (Gordon and Fenton 2002), ranging from corals and sponges to deep-water fishes and marine mammals (Whitehead et al. 1997; Strain and Yeats 2005; Edinger et al. 2010).*
- *Seamounts and Knolls – include the Newfoundland Seamounts and Beothuk Knoll. Seamounts support habitat-structuring communities such as coral and sponges, and attract aggregations of deep-sea fishes, as well as their predators.*

NAFO Coral, Sponge, and Seapen Closure Areas

Coral areas can be important habitats providing protection and areas for nurseries, feeding, breeding, and spawning for numerous species. DFO has developed the Coral and Sponge Conservation Strategy for Eastern Canada, which includes the identification of DFO and NAFO closures zones in areas of important coral and sponges (DFO 2015). The coral closures designated by NAFO include the Coral Protection Zone in Division 3O (closed by NAFO in 2007 to bottom-contact fishing gear) and an additional 12 important coral and sponge zones around the Flemish Cap (DFO 2015; NAFO 2016).

Bonavista Cod Box

The Bonavista Cod Box was identified as being important as an Atlantic cod spawning area (AMEC 2014), and was designated as an experimental protected area in 2003.

Marine Protected Areas

The 2.09 km² Eastport Marine Protected Areas on the Bonavista Peninsula, insular Newfoundland, was established in October 2005 and an Area of Interest at Leading Ticks, also on the Island of Newfoundland. Both of these areas are outside the Study Area.

The southern Grand Bank has been identified as an area of ecological importance in offshore Newfoundland and Labrador. A large portion of the area has been identified by Parks Canada as a Preliminary Representative Marine Area as it is known as a feeding area for whales, a breeding area of capelin and to have known to have several species of corals present (Fuller and Myers 2004).

Important Bird Areas

Important Bird Areas (IBAs) are discrete areas that support nationally or globally important groups of birds. Although IBAs are not legally protected, they are often found within areas that have been designated as protected areas by federal or provincial authorities. There is a total of 17 IBA sites associated with eastern Newfoundland.

References:

CPAWS (Canadian Parks and Wilderness Society). 2009. Special Marine Areas in Newfoundland and Labrador: Areas of Interest in Our Marine Backyards. Prepared for CPAWS-NL. Available at: http://cpaws.org/uploads/pubs/report_nlmarineguide.pdf.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

DFO (Fisheries and Oceans Canada). 2015. *Coral and Sponge Conservation Strategy for Eastern Canada 2015*. 70 pp. Available at: <http://waves-vagues.dfo-mpo.gc.ca/Library/363832.pdf>.

Edinger, E., K. Baker, R. Devillers and V. Wareham. 2007. *Coldwater Corals off Newfoundland and Labrador: Distributions and Fisheries Impacts*. World Wildlife Foundation, Toronto, ON. 31 pp.

Edinger, E.N., O.A. Sherwood, D.J.W. Piper, V.E. Wareham, K.D. Baker, K.D. Gilkinson and D.B. Scott. 2010. *Geological features supporting deep-sea coral habitat in Atlantic Canada*. *Continental Shelf Research*, 31(2, Suppl.): S69-S84.

Fuller, S.D. and R.A. Myers. 2004. *The Southern Grand Bank: A Marine Protected Area for the World*. World Wildlife Fund Canada. Halifax, NS. 99 pp.

Gordon, D.C. and D.G. Fenton (Editors). 2002. *Advances in understanding the Gully ecosystem: A summary of research projects conducted at the Bedford Institute of Oceanography (1999-2001)*. *Canadian Technical Report on Fisheries and Aquatic Sciences*, 2377: vi + 84 pp.

Kulka, D.W. and C.M. Miri. 2003. *The status of thorny skate (Amblyraja radiata Donovan, 1808) in NAFO Divisions 3L, 3N, 3O and Subdivision 3Ps*. *Northwest Atlantic Fisheries Organization Science Council Research Document*, 03/57: 86 pp.

NAFO (North Atlantic Fisheries Organization). 2016. *31st Annual Meeting – September 2009: Delineation of Existing Bottom Fishing Areas in the NAFO Regulatory Area*. Available at: <http://www.nafo.int/fisheries/frames/fishery.html>. Accessed August 4, 2016.

Ollerhead, L.M.N., M.J. Morgan, D.A. Scruton and B. Marrie. 2004. *Mapping spawning times and locations for 10 commercially important fish species found on the Grand Banks of Newfoundland*. *Canadian Technical Report of Fisheries and Aquatic Sciences*, 2522: iv + 45 pp.

Strain, P.M. and P.A. Yeats. 2005. *Nutrients in the Gully, Scotian Shelf, Canada*. *Atmosphere-Ocean*, 43: 145-161.

Walsh, S.J., M. Simpson, M.J. Morgan, K.S. Dwyer and D. Stansbury. 2001. *Distribution of juvenile yellowtail flounder, American plaice and Atlantic cod on the Southern Grand Bank of Newfoundland: A discussion of nursery areas and marine protected areas*. *Northwest Atlantic Fisheries Organization Science Council Research Document*, 01/78: 49 pp.

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Whitehead H., S. Gowans, A. Faucher and S.W. McCarrey. 1997. Population analysis of northern bottlenose whales in the Gully, Nova Scotia. *Marine Mammal Science*, 13(2): 173-185.

Section 5.3 Project Interactions, Table 5.2, pg 38 - The potential interaction of the use of MBES and SBP and Marine Fish and Shellfish (fish habitat) should be included. The Operation of vessels (e.g. lighting) has potential interaction with Species at Risk as well as Marine Fish and Shellfish (fish habitat) (e.g. attraction of marine biota to vessel lighting). This potential interaction should be included.

Table 5.2 is revised

Table 5.2 Project-VEC Interaction

Activity	Species at Risk	Fisheries and Other Ocean Users	Marine and Migratory Birds	Marine Mammals and Sea Turtles	Marine Fish and Shellfish (fish habitat)	Sensitive Areas
Operations						
Use of MBES and SBP	X	X	-	X	X	-
Collection of Heat Flow Measurements and Core Samples	-	X	-	-	X	-
Collection of Surface Samples	-	X	-	-	-	-
Operation of Vessels	X	X	X	X	X	-
Accidental Event						
Loss of Diesel Fuel Due to Damage / Sinking of the Vessels	X	X	X	X	X	X
Collision with Vessels	X	X	-	X	-	-
Notes: 'X' means potential interaction '-' means interaction not likely						

Section 5.3 Project Interactions, pg 38 - Standard environmental effects descriptors (e.g. magnitude, duration, extent, frequency, reversibility) should be included and described in this section of the EA Report.

Table 6.1 is added

Table 6.1 Characterization of Residual Environmental Effects

Characterization	Quantitative Measure or Definition of Qualitative Categories
Direction	<p>Positive – a residual environmental effect that moves measurable parameters in a direction beneficial to the VEC relative to baseline</p> <p>Adverse – a residual environmental effect that moves measurable parameters in a direction detrimental to the VEC relative to baseline</p> <p>Neutral – no net change in measurable parameters for the VEC relative to baseline</p>
Magnitude	<p>Negligible – no measurable change to VEC</p> <p>Low – a measurable change to VEC but within the range of natural variability; will not affect population viability or to commercial fisheries in low-use areas</p> <p>Moderate – measurable change to VEC but not posing a risk to population viability or to commercial fisheries in moderate-use areas</p> <p>High – measurable change to VEC that exceeds the limits of natural variability and may affect long-term population viability or to commercial fisheries in high-use areas</p>
Geographic Extent	<p>Project Area – residual environmental effects are restricted to the Project Area</p> <p>Study Area – residual environmental effects extend into the Study Area</p>
Frequency	<p>Single event – effect occurs once</p> <p>Multiple irregular event – effect occurs at no set schedule</p> <p>Multiple regular event – effect occurs at regular intervals</p> <p>Continuous – effect occurs continuously</p>
Duration	<p>Short-term – effect extends for a portion of the duration of Project activities</p> <p>Medium-term – effect extends through the entire duration of Project activities</p> <p>Long-term – effects extend beyond the duration of Project activities and continue after well abandonment</p>
Reversibility	<p>Reversible – will recover to baseline conditions before or after Project completion</p> <p>Irreversible – permanent; the residual environmental effect is unlikely to be reversed</p>

Section 6.0 Environmental Effects Assessment, pgs 40-44 - This section should include a table with a summary of the assessment of residual effects of the project activities with significance ratings and associated levels of confidence.

Tables 6.2 and 6.3 are added

Table 6.2 Summary of Residual Effects for Routine Operations and Accidental Events

Valued Component	Project Activity	Residual Effect Characterization					Significance of Residual Effect	Likelihood of Significant Effect
		Magnitude	Extent	Duration	Frequency	Reversibility		
Species at Risk	Use of MBES and SBP	L	PA	St	IR	R	N	N/A
	Operation of Vessel(s)	L	PA	ST	C	R	N	N/A
	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	L	PA	ST	IR	R	N	N/A
	Collision with Vessel(s)	L	PA	ST	IR	R	N	
Fisheries and Other Users	Use of MBES and SBP	L	PA	ST	IR	R	N	N/A
	Collection of Heat Flow Measurement and Core Samples	L	PA	ST	IR	R	N	N/A
	Collection of Surface Samples	L	PA	ST	IR	R	N	N/A
	Operation of Vessel(s)	L	PA	ST	C	R	N	N/A
	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	L	PA	MT	IR	R	N	N/A
	Collision with Vessel(s)	L	PA	ST	IR	R	N	N/A
Marine Fish and Shellfish (Fish Habitat)	Use of MBES and SBP	L	PA	ST	IR	R	N	N/A
	Operation of Vessel(s)	L	PA	ST	C	R	N	N/A
	Collection of Heat Flow Measurement and Core Samples	L	PA	ST	IR	R	N	N/A
	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	L	PA	ST	IR	R	N	N/A

FUGRO - OFFSHORE SEAFLOOR AND SEEP SAMPLING PROGRAM (2017-2027) ENVIRONMENTAL ASSESSMENT - ADDENDUM

Valued Component	Project Activity	Residual Effect Characterization					Significance of Residual Effect	Likelihood of Significant Effect					
		Magnitude	Extent	Duration	Frequency	Reversibility							
Marine Mammals and Sea Turtles	Use of MBES and SBP	M	PA	ST	IR	R	N	N/A					
	Operation of Vessel(s)	L	PA	ST	C	R	N	N/A					
	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	L	PA	ST	IR	R	N	N/A					
	Collision with Vessel(s)	L	PA	ST	IR	R	N	N/A					
Marine and Migratory Birds	Operation of Vessel(s)	L-M	PA	ST	C	R	N	N/A					
	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	N	PA	ST	IR	R	N	N/A					
Sensitive Areas	Loss of Diesel Fuels Due to Damage / Sinking of the Vessel(s)	L-M	PA	ST	IR	R	N	N/A					
Magnitude: N: Negligible L: Low M: Moderate H: High		Geographic Extent: PA: Project Area SA: Study Area		Duration: ST: Short-term MT: Medium-term LT: Long-term		Frequency: S: Single event IR: Irregular event R: Regular event C: Continuous		Reversibility: R: Reversible I: Irreversible		Significance: S: Significant N: Not Significant		Likelihood: U: Unlikely L: Likely N/A: Not applicable	

Table 6.3 Summary of Residual Environmental Effects

VC	Significance of Residual Environmental Effect		Confidence of Residual Environmental Effects Rating
	Routine Operations	Accidental Events	
Species at Risk	N	N	H
Fisheries and Other Users	N	N	H
Marine Fish and Shellfish (Fish Habitat)	N	N	H
Marine Mammals and Sea Turtles	N	N	H
Marine and Migratory Birds	N	N	H
Sensitive Areas	N	N	H
Key: N = Not significant residual environmental effect (adverse) S = Significant residual environmental effect (adverse) N/A = Not Applicable			H = High Level M = Medium Level L = Low Level

Section 6.1.1 Use of MBES and SBP, para 2, last sentence, pg 40 - Regarding the sentence "...since this Project will be operating in depths nominally less than 3,000 m, power levels will be lower than the maximum output." The maximum power level planned for use during this planned project and how it relates to levels that overlap and/or interact with marine fish, marine mammals and sea turtles should be provided and this section amended accordingly.

Without having done trials in the area the maximum power levels to be used are unknown at this time. The sentence in the EA report was meant to be a general statement of expectations. As the required output power is not known at this time, the maximum possible power output was considered for environmental effects assessment purposes.

Section 6.1.2 Collection of Heat Flow Measurements and Core Samples, para 3, first sentence, pg 41 – There appears to be text missing from this sentence "The deployment of the corer and probe have the potential to interact with and Marine Fish and Shellfish."

The sentence is amended to remove the "and" and now reads:

The deployment of the corer and probe have the potential to interact with Marine Fish and Shellfish, particularly the benthic environment including coral and sponge areas.

Section 6.3 Cumulative Environmental Effects, pg 43 - The description provided is not adequate and requires additional details / information on other relevant ocean users (e.g. marine transportation traffic). It should include a consideration of environmental effects that are likely to result from the proposed project in combination with other projects or activities that have been or will be carried out. Only with this information, combined with a prediction of future activity, can the prediction of not significant be made.

The section is amended as follows:

The incremental amount of Project-related vessel traffic will be negligible compared to existing vessel traffic in the region (see Figure 2-1 of this Addendum for an illustration of common vessel traffic routes in the Study Area (Section 2.1)). The program will be conducted over a 40- to 50 day-survey and the vessel will be on-station one to two hours to collect a core. MBES and SBP will only be used to refine core placement; and MMO / SBO will be on board the survey vessel. As described in Section 2.3.4, the core will be lowered in a controlled manner and only free-fall the last few tens of metres to penetrate the seabed, so there will be no interaction with the VCs, and will thus not result in a cumulative environmental effect. The sound and light generated by the survey vessel will have limited temporal and spatial scope as the samples will be collected from within the entirety of a defined program area. With the exception of deploying and retrieving the corer, the survey vessel will be able to yield as necessary to other vessel activity. An FLO will be on board the survey vessel and a Fisheries Broadcast Notice / Notice to Mariners/Shippers will be posted to alert marine traffic to the presence of the survey vessel.

Overlapping environmental effects between the Project activities and similar effects from other oil and gas exploratory programs or development projects are not anticipated as the Project activities are transitory, with low magnitude, and limited in spatial extent. SIMOPS and ongoing communications will be conducted with the active geophysical programs in the general vicinity of the Primary Activity Zone to reduce the potential for cumulative environmental effects on the VECs. DFO and Department of National Defence will be contacted in advance of the survey to provide notification of sampling locations so that cumulative environmental effects can be avoided. In general, Project mitigation measures proposed in Section 2.7 will also reduce overall potential for cumulative environmental effects. Therefore, the adverse residual cumulative environmental effect on Species at Risk, Commercial Fisheries and Other Users, Marine and Migratory Birds, Marine Mammals and Sea Turtles, Marine Fish and Shellfish and Sensitive Areas is predicted to be not significant.

2.3 Environment and Climate Change Canada (ECCC)

Section 2.7 Key Mitigation Measures, 3rd bullet, pg 8 - Quote "SIMOPS will be conducted with operators of other exploration activities (e.g., seismic survey proposed for the Orphan Basin in 2017)". The proponent should define SIMOPS.

SIMOPS = Simultaneous Operations.

See amended bullet list in Section 2.2 of this Amendment

Section 2.7 Key Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, pg 9 - Disturbance of Marine Mammals/Seabirds. It is stated that bird observations will be made in transit, and that the observer will complete daily and weekly observation reports. The Canadian Wildlife Service of Environment and Climate Change Canada (ECCC-CWS) recommends that it be clearly stated that the Eastern Canada Seabird at Sea (ECSAS) protocol be used for observing and reporting seabirds on the vessel. ECCC- CWS can provide an updated blank database for ease of data entry. It is important that seabird observations are made according to the standardized protocol so that results from these surveys are comparable to other surveys and contribute to our broader knowledge of seabird abundance and distribution in Eastern Canada.

The ECSAS program can be cited as follow: Gjerdrum, C., D.A. Fifield, and S.I. Wilhelm. 2011. 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 + 36 pp.

Acknowledged. The program will use the ECSAS protocol. We accept your offer to provide an updated blank database. Thank you.

2.4 Fish, Food and Allied Workers (FFAW-Unifor)

Section 2.7 Key Mitigation Measures, Table 2.2 Commitment/Mitigation Measures, Interference with fishing activities, pg 9 - The table should read "there will be a FLO onboard the vessel".

Table 2.2 is amended to read:

Requirements for an FLO to be on board the vessels will be agreed with FFAW-Unifor. Requirements will be based on time and location of survey activities of each vessel, and level of likelihood that survey activities will overlap with fishing activity