

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



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Abbreviations

ASP	Atlantic Seafood Producers
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
EA	environmental assessment
FFAW-Unifor	Fish Food & Allied Workers-Unifor
FLO	Fisheries Liaison Officer
Fugro	Fugro GeoSurveys
MBES	multi-beam echosounder
OCI	Ocean Choice International
SBP	sub-bottom profiler
VEC	Valued Ecosystem Component

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Introduction
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1.0 INTRODUCTION

This document serves as an Amendment to the Environmental Assessment (EA) of Fugro GeoSurveys (Fugro) seafloor mapping and seep sampling exploration program (the Project) in the eastern Newfoundland offshore area. The Amendment assesses the environmental effects of extending the Project activities into December, 2017 through 2027 (from the current May to November, 2017 through 2027 timeframe).

All Project activities assessed in the original EA (Stantec 2017a) will occur in the Project Area defined in that EA (Figure 1-1 below) during the extension.

1.1 PREVIOUS ENVIRONMENTAL ASSESSMENT REVIEW AND DETERMINATION

Fugro's original EA assessed its seafloor mapping and seep sampling exploration program during May to November (any year during the 2017-2027 timeframe). The original EA received a positive determination from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) on October 13, 2017. No previous amendments of the original EA have been proposed.

1.2 THE OPERATOR

Fugro provides geoscience data of various types to oil and gas exploration and production companies worldwide. These include geohazard and engineering datasets for production and development. In recent years Fugro has also conducted considerable seep investigations to provide data for integration into exploration programs. Multi-client programs, such as the one proposed, are routinely conducted by Fugro throughout the world. Fugro also offers advanced data processing, analysis, and visualization / presentation methods, for integration with client data. Fugro will be the operator of the sampling program and proponent for the purposes of this EA.

1.3 CONTACTS

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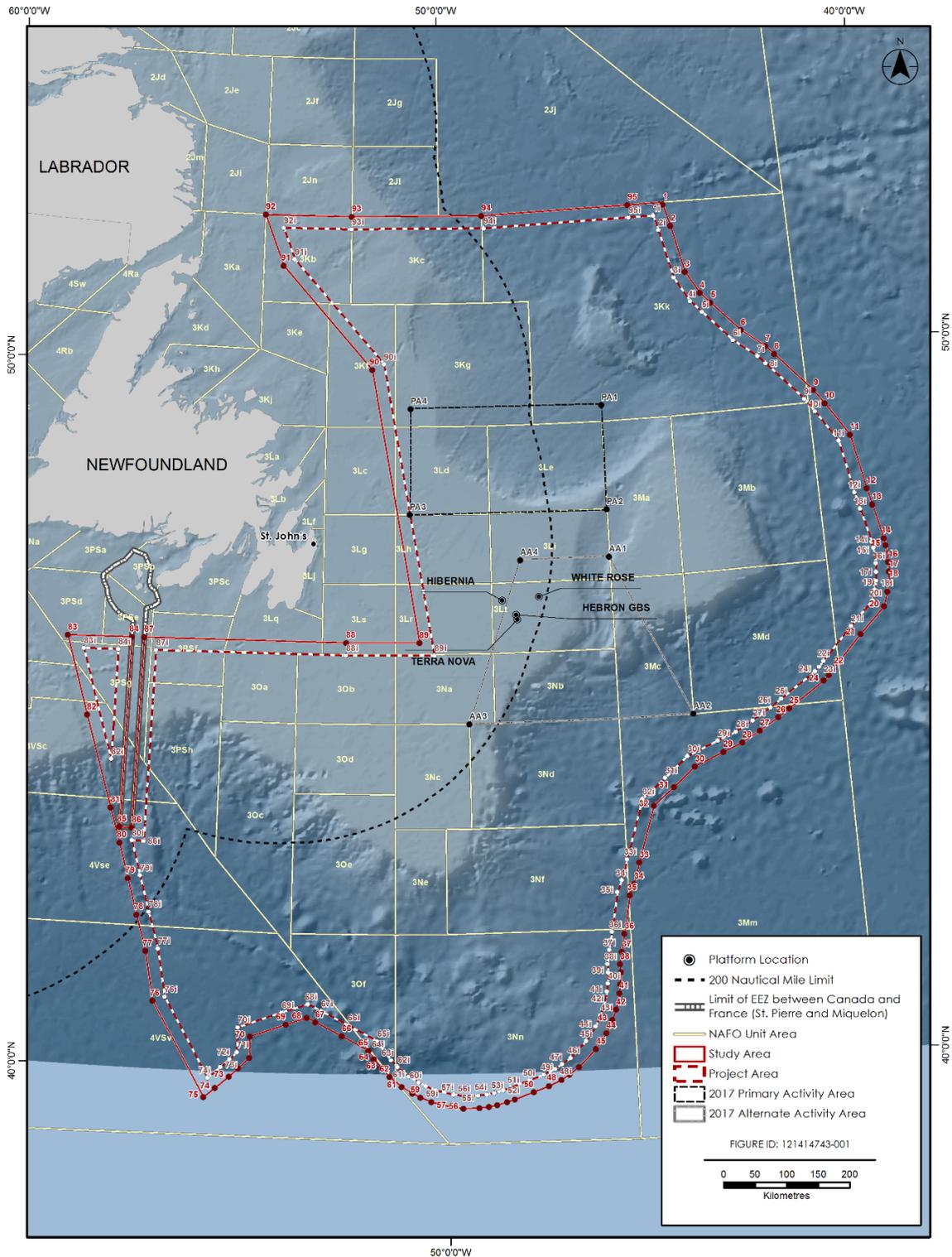


Figure 1-1 Study and Project Areas, including 2017 Activity Areas

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Project Description
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2.0 PROJECT DESCRIPTION

2.1 PROJECT AS ORIGINALLY PROPOSED

As detailed in the original EA (Stantec 2017a), Fugro will conduct a sampling program to identify areas of potential natural seabed seeps of hydrocarbons, which involves the collection of the following data:

- acquiring multi-beam sonar data
- acoustic sub-bottom profiling (SBP)
- conducting seabed heat flow measurements using a thermal probe for shallow seabed core locations
- collecting seabed cores using a gravity core method
- sampling potential natural seabed seeps (by collecting water samples)

A combination of data could be collected in each year, between 2017 and 2027. As of November 3, 2017, Fugro has completed the multi-beam bathymetry and SBP components of the 2017 program and has commenced seabed sampling operations.

2.2 PROPOSED PROJECT ACTIVITY AMENDMENT

Fugro is proposing to extend the original temporal scope (May to November in 2017 through 2027) to May to December in any year between 2017 and 2027.

2.3 KEY MITIGATION MEASURES

The scope of work for the Project includes multi-beam bathymetry; seabed heat flow measurements; collection of seabed cores; acoustic SBP; and sampling of potential natural seabed seeps. Interactions with the environment are primarily associated with the operation of the vessel(s) and the collection of sediment samples. The following standard 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 will be on board the survey vessel that will be conducting multi-beam echosounder (MBES) and SBP 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*

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- Requirements for a Fisheries Liaison Officer (FLO) on board the vessels will be agreed with Fish Food & Allied Workers-Unifor (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. The 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, Ocean Choice International (OCI), and Atlantic Seafood Producers (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 a 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
- Survey vessels will not enter or attempt to conduct survey work in restricted or protected areas (Northwest Atlantic Fisheries Organization 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 prior to operations and stranded birds (or bird mortalities) will be reported to Canadian Wildlife Service 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

The original Project was released from the EA review process on October 13, 2107. In addition to implementing the mitigation measures listed above (first condition of release), the following conditions were applied to the Project:

- The Operator shall employ an FLO on all vessels used for the purposes of conducting work or activity pursuant to this authorization.
- The Operator, or its contractors, shall shut down the SBP if a marine mammal or sea turtle listed as Endangered or Threatened (as per Schedule 1 of the *Species at Risk Act*) is observed in the safety zone when the sound source is active. The safety zone shall have a radius of at least 500 m, as measured from the centre of the sound source.

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- No later than January 31, 2018, the Operator shall submit a report to the C-NLOPB describing the progress, including potential environmental effects, and the implementation of mitigation measures of its 2017 program. It shall include, but not be limited to, copies of the FLO, marine mammal observer, and seabird observer reports that were produced during the program.

2.4 STAKEHOLDER CONSULTATION

Fugro has and will continue to consult with other stakeholders throughout the life of the Project.

Throughout the project so far, Fugro has consulted with and provided updates to:

- One Ocean
- ASP
- OCI
- FFAW-Unifor
- DFO
- Department of National Defence

Fugro has also notified these stakeholders of intent to request an extension of the sampling end date timeframe through December 31.

DFO indicated that the fall survey has completed Northwest Atlantic Fisheries Organization Divisions 2H, 3O, and 3N. The survey has completed almost 33 percent in Division 2J, and have not yet started work in Division 3K. DFO provided coordinates of survey locations and Fugro confirmed that although some do fall within the EA area, none fall within the planned 2017 work area; DFO confirmed that there will be no interference.

FFAW-Unifor indicated they have no concerns related to the extension and end date to December 31; no other stakeholders have responded to date.

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3.0 EFFECTS OF THE PROPOSED TEMPORAL SCOPE EXTENSION ON THE ENVIRONMENT

3.1 VALUED ECOSYSTEM COMPONENTS

The six Valued Ecosystem Components (VECs) identified in the original EA (Stantec 2017a) are:

- Species at Risk
- Fisheries and Other Ocean Users
- Marine and/or Migratory Birds
- Marine Mammals and Sea Turtles
- Marine Fish and Shellfish (fish habitat)
- Sensitive Areas

As the original EA (Stantec 2017a) was submitted in June 2017 and an Addendum (Stantec 2017b) was submitted in September 2017, none of the existing environment information requires an update.

3.2 PROJECT INTERACTIONS

Fugro is proposing to conduct a seafloor and seep sampling program that includes the following activities: sampling of natural seabed seeps; conducting seabed heat flow measurements; collecting shallow seabed cores; collecting high-resolution bathymetry and backscatter via MBES and SBP. Potential Project-VEC interactions are identified in Table 3.1. The primary interactions from routine Project activities with the VECs comprises the collection of substrate cores and operation of the vessels.

3.3 ENVIRONMENTAL EFFECTS ASSESSMENT

The characterization of residual environmental effects is provided in Table 3.2. Significance criteria for each VEC is provided in Table 3.2. A summary of the assessment of residual environmental effects is provided in Table 3.4 and 3.5. All residual environmental effects predictions of routine activities and accidental events made in the original EA (Stantec 2017a) remain the same.

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Table 3.1 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						

Table 3.2 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>

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Characterization	Quantitative Measure or Definition of Qualitative Categories
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>

Table 3.3 Residual Environmental Effects Significance Criteria for by VEC

VEC	Criteria
Species at Risk	A significant adverse residual environmental effect on all species listed in Schedule 1 of <i>Species at Risk Act</i> as “Extirpated”, “Endangered” or “Threatened” is one that results in a non-permitted contravention of any of the prohibitions stated in sections 32 to 36 of <i>Species at Risk Act</i> .
Fisheries and Other Users	A significant adverse residual environmental effect is one where the Project results in a net loss of commercial fisheries that is not compensated consistent with C-NLOPB guidelines and past practices and as outlined in the One Ocean Protocol document.
Marine and Migratory Birds Marine Mammals and Sea Turtles Marine Fish and Shellfish	A significant adverse residual environmental effect is defined as one that affects VEC populations and/or habitat, or a portion thereof, in such a way as to cause a decline or change in abundance and/or distribution of the population over one or more generations. Natural recruitment (reproduction and in-migration from unaffected areas) may not re-establish the population to its original (i.e., pre-Project) level within several generations or avoidance of the area becomes permanent.
Sensitive Areas	A significant adverse residual environmental effect is one that alters the valued habitat of the identified Sensitive Area physically, chemically, or biologically, in quality or extent, to such a degree there is a decline in abundance of key species or species at risk or a change in community structure, beyond which natural recruitment (reproduction and immigration from unaffected areas) would not return the population or community to its former level within several generations.

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Table 3.4 Summary of Residual Effects for Routine Operations and Accidental Events

VEC	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	N/A
Fisheries and Other Ocean 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 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

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VEC	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 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					
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	

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Table 3.5 Summary of Residual Environmental Effects

VEC	Significance of Residual Environmental Effect		Confidence of Residual Environmental Effects Rating
	Routine Operations	Accidental Events	
Species at Risk	N	N	H
Fisheries and Other Ocean Users	N	N	H
Marine and Migratory Birds	N	N	H
Marine Mammals and Sea Turtles	N	N	H
Marine Fish and Shellfish (Fish Habitat)	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

3.4 CUMULATIVE ENVIRONMENTAL EFFECTS ASSESSMENT

The incremental amount of Project-related vessel traffic will be negligible compared to existing vessel traffic in the region. 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 be used to identify seabed sampling targets and marine mammal observer / seabird observer will be on board the survey vessel as required. 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 VECs, 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. A Fisheries Liaison Officer will be on board the survey vessel as required 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 (DND) will be contacted in advance of the survey to provide notification of sampling locations so that cumulative environmental effects can be avoided.

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Fugro has considered the points raised and data provided by DND. It is noted that none of the items identified fall within the 2017 work area; however, it is acknowledged that they may fall within future work areas and therefore is addressed as part of the 10-year assessment for the program.

Fugro maintains a database of known seabed infrastructure and obstructions such as telecommunications cables, shipwrecks, oil wells, pipelines. According to Fugro's internal database, five communication cables, one well, and four shipwrecks exist within the 2017 survey area. As there is uncertainty associated with the positions of historical shipwrecks and communication cables, a 1,000-m buffer has been placed about the communication cables, and a 500m buffer e placed around the well and known shipwrecks. Coring and heat flow operations will not occur within these buffers.

Regarding the recommendation to use operational aids, in the case of the seeps program being assessed there is the advantage of having mapped the survey area with high-resolution MBES and SBP prior to conducting the seabed sampling. The MBES provides bathymetry, backscatter (seabed hardness), and water column data, which are all evaluated and interpreted in order to identify target locations for coring. This data evaluation also serves as an operational aid in identifying seabed obstructions.

In general, Project mitigation measures proposed in Section 2.3 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 (fish habitat), and Sensitive Areas is predicted to be not significant.

3.5 CONCLUSION

In the original EA (Stantec 2017a) Fugro is proposing to conduct a seafloor and seep sampling program between May and November in one or more years within 2017 and 2027 timeframe in the eastern and southern portion of Newfoundland and Labrador offshore area to determine the presence and likely locations of geological structures that might contain hydrocarbon deposits. The program includes the following activities: sampling of natural seabed seeps, conducting seabed heat flow measurements, collection of shallow seabed cores, high-resolution bathymetry and backscatter via MBES, and SBP. As discussed above, interaction with the environment will be limited and environmental effects negligible; therefore, follow-up monitoring is not required for this Project. With the implementation of mitigation measures described in Section 2.3, residual adverse environmental effects from routine Project activities, accidental events and cumulative effects are predicted to be not significant. The proposed temporal extension of May through December in any year between 2017 and 2027 does not change this conclusion.

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4.0 REFERENCES

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