



**EMGS 2022 Controlled-source
Electromagnetic Survey**

Response to Regulator Comments

August 19, 2022

Prepared for:

Electromagnetic Geoservices Canada,
Inc.

Prepared by:

Stantec Consulting Ltd.

EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

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Abbreviations

Accord Acts	<i>Canada-Newfoundland and Labrador Atlantic Accord Implementation Act and Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act</i>
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
COSEWIC	Committee of the Status of Endangered Wildlife in Canada
CSEM	controlled-source electromagnetic
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
EA	environmental assessment
ECCC	Environment and Climate Change Canada
EEZ	Economic Exclusion Zone
EL	Exploration Licence
EM	electromagnetic
EMGS	Electromagnetic Geoservices Canada Inc.
FFA	Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture
FFAW-Unifor	Fisheries, Food and Allied Workers-Unifor
FLO	Fisheries Liaison Officer
km	kilometre
km/hr	kilometre per hour
m	metre
m ²	square metre
MARLANT	Maritime Forces Atlantic
MBCA	<i>Migratory Birds Convention Act, 1994</i>
mm	millimetre
NAFO	North Atlantic Fisheries Organization
NARW	North Atlantic right whale
NL	Newfoundland and Labrador
nm	nautical mile
OECM	Other Effective Conservations Measure
SARA	<i>Species at Risk Act</i>
SiBA	Significant Benthic Area
SMMO	seabird and marine mammal observer
SOCP	Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment
U.S.	United States
VC	Valued Component



Table of Contents

ABBREVIATIONS	I
1.0 INTRODUCTION.....	1-1
2.0 CANADA-NEWFOUNDLAND AND LABRADOR OFFSHORE PETROLEUM BOARD.....	2-1
3.0 FISHERIES AND OCEANS CANADA	3-1
4.0 ENVIRONMENT AND CLIMATE CHANGE CANADA-CANADIAN WILDLIFE SERVICE	4-1
5.0 DEPARTMENT OF NATIONAL DEFENCE.....	5-1
6.0 NEWFOUNDLAND AND LABRADOR DEPARTMENT OF FISHERIES, FORESTRY, AND AGRICULTURE	6-1
7.0 FISH, FOOD AND ALLIED WORKERS-UNIFOR	7-1

LIST OF FIGURES

Figure 1 New Figure: Illustration of EM Source Relative to Surface	2-2
Figure 2 New Figure: 2022 Program Lines	2-5
Figure 3 New Figure: Receiver and Anchor	3-3
Figure 4 Revised Figure 4-1: Corals and Sponges in the Regional Area.....	3-7



1.0 INTRODUCTION

Electromagnetic Geoservices Canada, Inc. (EMGS) is proposing to conduct a controlled source electromagnetic (CSEM) survey in the Orphan Basin in offshore Newfoundland and Labrador (NL).

This document is intended to fulfill requirements for an environmental assessment (EA) in accordance with the requirements of the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) pursuant to the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (the Accord Acts).

The C-NLOPB, in consultation with its fishery and environmental review agencies, reviewed the EA for the Project. The C-NLOPB determined the EA report does not satisfy all of the information requirements outlined in the Scoping Document provided to EMGS on January 31, 2022. This document addresses the consolidated comments provided to EMGS by the C-NLOPB on July 20, 2022, to allow the C-NLOPB to complete a determination report at the conclusion of the assessment.

Underlined text in EMGS's response indicates revisions added to original EA text.



2.0 CANADA-NEWFOUNDLAND AND LABRADOR OFFSHORE PETROLEUM BOARD

Section 1.1. Project Overview: “This EA has been prepared in accordance with the Electromagnetic Geoservices Canada Inc. – Controlled Source Electromagnetic Survey in the Orphan Basin and South Bank (2022) Draft Scoping Document (Scoping Document; Appendix A)”. The C-NLOPB notes that the final scoping document was provided to EMGS on January 31, 2022, and should be referenced here.

EMGS Response:

Section 1.1. Project Overview is revised to read as follows:

“This EA has been prepared in accordance with the Electromagnetic Geoservices Canada Inc. – Controlled Source Electromagnetic Survey in the Orphan Basin and South Bank (2022) Draft Scoping Document (Scoping Document; Appendix A), provided to EMGS on January 31, 2022.”

Section 2.2 Project Location, Figure 2-2: The Project / Study Area boundary illustrated in Figure 2-2 does not capture the entire area of the Exploration Licences [ELs] included in the figure (i.e., between points E and F). If there isn’t a particular reason or constraint for excluding that portion of the EL, the C-NLOPB recommends adjusting the boundary of the Project / Study Area to include the entirety of EL 1147.

EMGS Response:

The Project Area was developed to avoid key fisheries, especially the Greenland halibut (turbot) fishery, based on DFO commercial fisheries data. The Project Area (and reasoning) was used in the Project Overview that was provided to fisher groups.

Section 2.4.2 CSEM Source Operation: It is stated that the CSEM towed subsea system is approximately 1,800 m and includes a single streamer comprised of tow and conductor cables and a solid flotation section. However further along in the section it is stated that the CSEM towed system occupies relatively little sea-space and other vessels can pass safely as close at 1 km astern. Please provide rationale for the discrepancy.

EMGS Response:

The estimated water depth is approximately 1,800 m, resulting in a layback from the stern of vessel to the source will be approximately 1,500 m (varies due to subsea, surface currents and ships speed); the streamer itself is 600 m, towed approximately 30 m above the seabed (Figure 1).



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

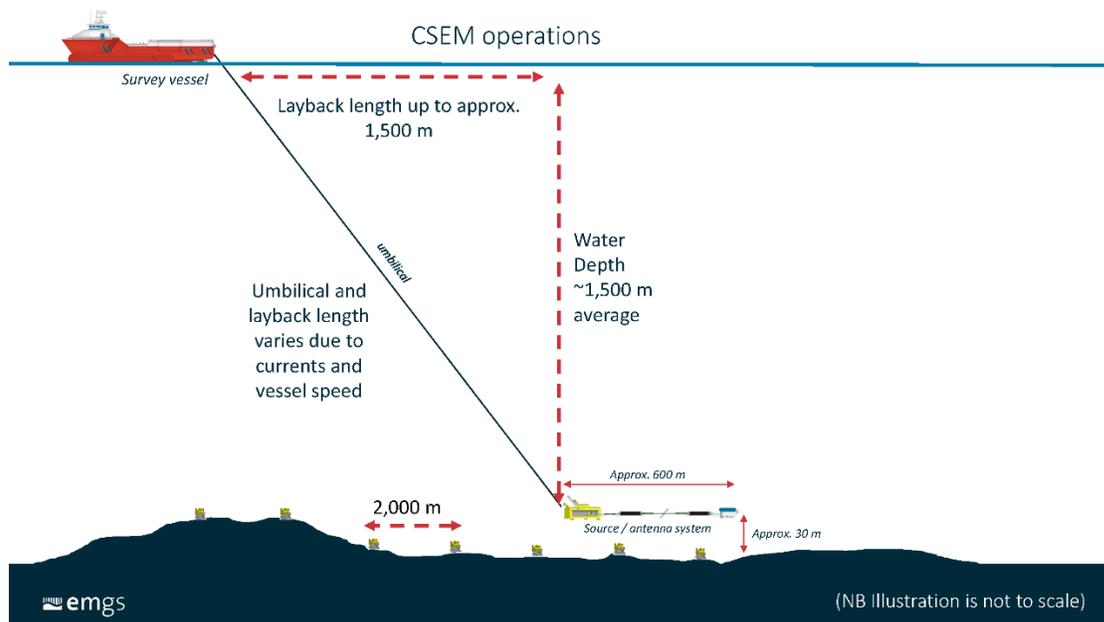


Figure 1 New Figure: Illustration of EM Source Relative to Surface

While it is true a vessel can cross over the CSEM source, it is not preferred and a Closest Point of Approach of approximately 2 km (1 nm) astern is typically requested during the survey (the vessel travels at 4 km/hr [2kts] during the data acquisition and has limited maneuverability). This is a navigation or safety of operations request but in theory a vessel can pass astern at 1 km without issues.

The text in Section 2.4.2, page 2.5 is revised as follows

The CSEM towed subsea system has a layback of approximately 1,500 m and includes a single 600-m streamer comprised of tow and conductor cables and a solid flotation section.

The text in Section 2.4.2, page 2.6 is revised as follows:

As such, a CSEM survey occupies relatively little “sea-space” and while other vessels can *theoretically* pass safely as close as 1 km astern, a Closest Point of Approach of approximately 2 km (1 nm) astern is typically requested during the survey.

Section 2.6 Standard Mitigation Measures: As per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2019), an SMMO [seabird and marine mammal observer] will be on board to record seabird, shark, and marine mammal and sea turtle observations (including transit to and from the Project / Study Areas) and oversee ramp up procedures. You will require at least two observers because of the 12 hour shift limit and daylight exceeding 12 hours.

EMGS Response:

Acknowledged. There will be two SMMOs on board during the survey.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Section 2.6 Standard Mitigation Measures: "The EM [electromagnetic] source will be ramped up over a 20-minute period. In areas where water depth is greater than 500 m, the EM source will not be initiated if a shark, marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting. Please clarify if this means any shark, marine mammal or sea turtle.

EMGS Response:

Section 2.6 Standard Mitigation Measures 6th bullet is revised to read as follows:

- "The EM source will be ramped up over a 20-minute period. The EM source will not be initiated if a shark, marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting."

EMGS's ramp-up procedure is:

- Surveyor notifies SMMO and Officer on Watch 30 minutes prior to ramp-up of source
- SMMO conducts minimum 20-minute search of a 500 m radius if visibility permits
- If no shark, marine mammal, sea turtle or protected species observed, SMMO to verify to surveyor permission to ramp-up (soft start) source.
- Ramp-up of source with low amperage gradually increasing over 20-minute period prior to start of line.
- If a shark, marine mammal, sea turtle or protected species is observed within the 500-m radius of the energy source, the SMMO will notify the surveyor to delay the ramp-up.
- The SMMO will continue observations for an additional 20 minutes since last sighting within 500-m radius; if no shark, marine mammal, sea turtle or protected species is observed, SMMO to notify surveyor to commence ramp-up

Note that the EM source is towed approximately 30 m above the seabed in water depths greater than 500 m (see Figure 1). There is no surface equipment or energy / sound source associated with this program. The CSEM source system is hanging by an umbilical cable and is immediately lowered down to just above the seafloor before the source is ramped up.

Section 2.4.3 CSEM Receiver Deployment and Retrieval AND Section 6.1 Marine Fish and Shellfish: "It is understood from the Project Description that approximately 40 to 100 m² of seabed will be affected by the placement of anchors, which will dissolve within 4 to 12 months of placement. How does the proponent plan to ensure that anchors will not be placed in areas with sensitive coral and sponge densities to mitigate possible effects of damage (due to placement) or smothering (once the anchors dissolve)? There doesn't appear to be a good discussion of potential effects described within Section 6.1 relating to benthic environments.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

EMGS Response:

Anchor placement for receivers in sensitive areas is illustrated in Figure 2. The revised 2022 program involves up to three tow lines with 0.75 m² compacted sand anchors with receivers placed 3 km apart. The primary focus of the 2022 program are the two lines that cross EL 1147, and includes 11 anchors located within the sea pen Significant Benthic Area (SiBA) (covering a total of 8 m²). There is potential to collect data along one line in EL 1145, which has 20 anchors located within the sea pen SiBA (covering 15 m²).

Anchors are deployed within a 50-m radius target area; it is not possible to control exactly where they land within that target circle. Depending upon water depth, it can take up to one hour for the anchors / receivers to reach the bottom given their buoyancy. Potential effects of anchors on benthic habitat (in sensitive areas) are discussed in Section 6.5.4.3. As the anchors consist of natural materials that do not contain any deleterious substances and will become sand after time in water, there is limited impact on the substrate of non-sensitive benthic habitat.

Section 3.0 Consultation and Engagement: Has the proponent engaged with other government departments such as Fisheries and Oceans Canada [DFO] and Environment and Climate Change Canada [ECCC]?

EMGS Response:

In July 2022 we received 12 inputs on the EA report from DFO and 3 inputs from ECCC-CWS that are addressed later in this document.

Section 6.3.3 Mitigation: “Environment and Climate Change Canada has developed new (draft) guidance to support the development of vessel and platform specific systematic stranded bird survey protocols. EMGC should refer to the attached guidance when developing systematic stranded bird survey protocols. The following guidance documents are attached:

- a) ECCC-CWS [Canadian Wildlife Service] Guidance for developing systematic stranded bird survey protocols for vessels and platforms
- b) Appendix 1 – Stranded Bird Encounter Datasheet
- c) Appendix 2 – Infographic and Reference Card – What to do when you find a stranded bird?
- d) Appendix 3 – Seabird Identification Photo Card
- e) Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada”

EMGS Response:

Thank you. EMGC will incorporate the guidance when developing their systematic stranded bird survey protocols for this Project



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

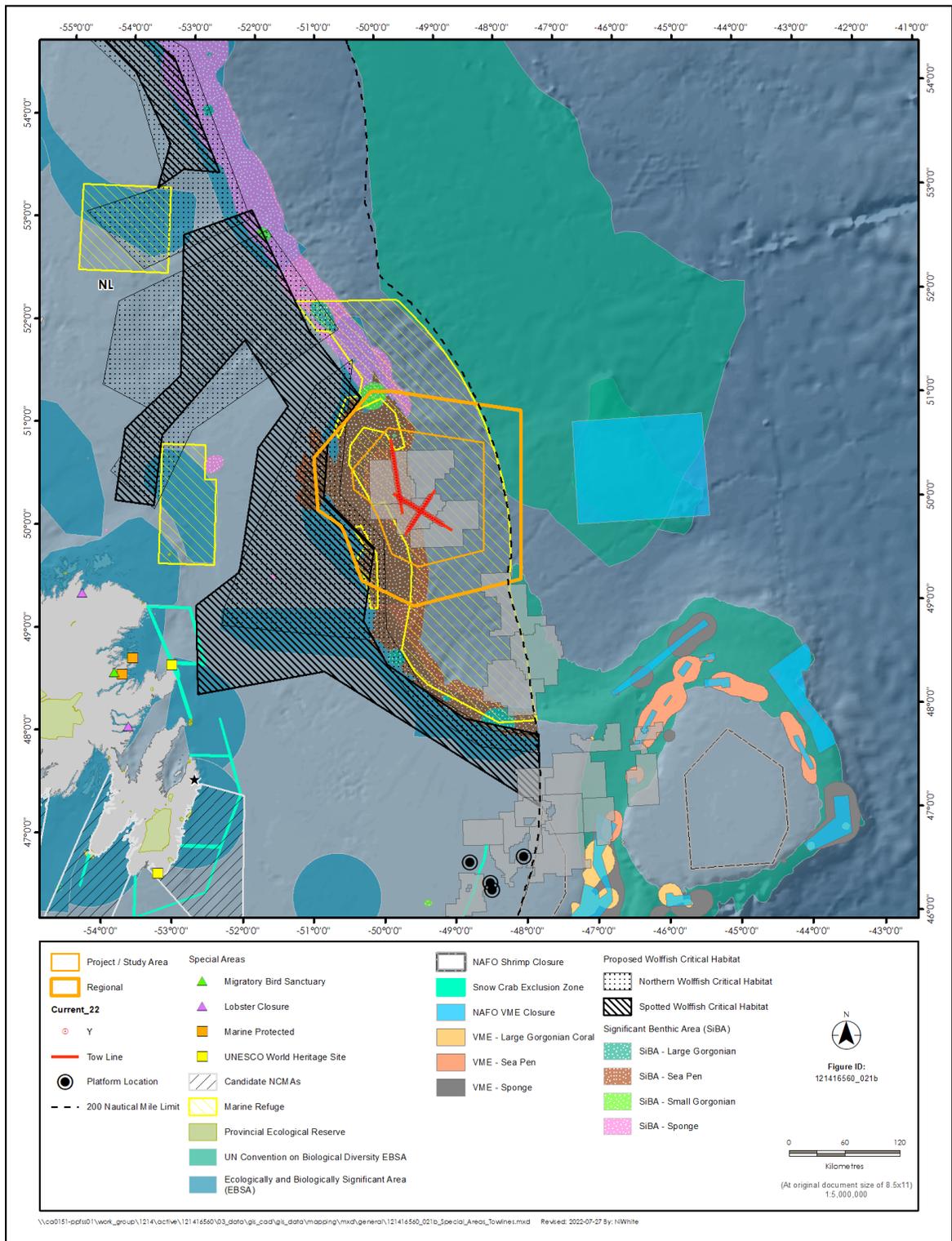


Figure 2 New Figure: 2022 Program Lines



3.0 FISHERIES AND OCEANS CANADA

Page 2.1; Section 2.1; paragraph 1:

"The purpose of the Project is to collect data to inform potential future exploration drilling programs within the two target Project / Study Areas in 2022"

"The "two target project / study areas" are not clearly identified/illustrated within the EA document. Is this statement an error carried over from the original Project Description? DFO Recommends revision of text for clarification."

EMGS Response:

Correct, this statement is an error carried over from the original Project Description. Page 2.1; Section 2.1; paragraph 1 is revised as follows:

"The purpose of the Project is to collect data to inform potential future exploration drilling programs within the target Project / Study Area in 2022."

Page 2.1; Section 2.1; paragraph 2: "Final survey location maps will be submitted to the C-NLOPB four to six weeks prior to acquisition start-up. Prior to conducting the survey, an array of receivers will be placed on the seabed approximately 1 to 3 km apart.

"In DFO's response to the C-NLOPB in Jan. 2022 pertaining to the Department's review of the project description and draft scoping document, DFO identified that "A detailed description of the project and components should be included within the EA Report, and include the number of receiver anchors to be placed on the seafloor at each Project / Study Area, a diagram of the anchor grid pattern, and mitigations to avoid impacts to corals/sponges, specifically within the Northeast Newfoundland Slope". DFO acknowledges that additional information will be submitted four to six weeks prior to acquisition start-up, however, please note that DFO will require the outstanding information to complete a *Fisheries Act* review related to works, activities or undertakings proposed within the boundaries of the Northeast Slope Marine Refuge, which has been established under the *Fisheries Act* for the conservation and protection of benthic communities, specifically corals and sponges.

DFO will require time to complete a *Fisheries Act* review, and encourage the operator to provide the outstanding information as soon as possible to minimize the risk of delays."

EMGS Response:

Anchor placement for receivers in sensitive areas is illustrated in Figure 2. The 2022 program involves up to three tow lines with 0.75 m² compacted sand anchors with receivers placed 3 km apart. The primary focus of the 2022 program are the two lines that cross EL 1147, and includes 11 anchors located within the sea pen SiBA (covering a total of 8 m²). There is potential to collect data along one line in EL 1145, which has 20 anchors located within the sea pen SiBA (covering 15 m²).



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Page 2.4; Section 2.3; Paragraph 1: "The Project is planned to be conducted in summer / fall 2022, pending authorization from the C-NLOPB. It is estimated that the Project (surveying both Project / Study Areas within one season) will require less than 30 days to complete (not including downtime associated with weather).

This statement identifies an estimated timeline of 30 days to complete survey operations at ""both Project / Study Areas". Please provide clarification with respect to "both project areas" (See comment #1). Please confirm that the 30 day timeline is accurate for activities planned for summer / fall 2022?"

EMGS Response:

This statement is an error carried over from the original Project Description. Page 2.4; Section 2.3; Paragraph 1 is revised as follows:

"It is estimated that the Project (surveying the Project / Study Area within one season) will require less than 30 days to complete (not including downtime associated with weather)."

EMGS confirms that 30 days is the estimated timeline planned for summer / fall 2022 [Note: EMGS is planning to acquire up to three permitted lines as per Figure 2 and has estimated up to 21 days survey time if the full program is acquired plus time to mobilize / demobilize].

Page 2.6; Section 2.4.3; Paragraph 1: "During the survey, CSEM seabed nodes (receivers) are deployed on the seabed along towlines. It takes approximately 1 hour to deploy a receiver and the same for recovery in the Project/Study Area water depths. It is anticipated that 54 to 131 receivers would be used in the survey (Table 2.3). The general composition of the node consists of a data acquisition unit, electrical and magnetic sensors, and a positioning transponder, all attached to compacted sand anchor (920mm x 810 mm x 102 mm) in order to provide negative buoyancy during deployment and stability while on the seafloor; the anchors are each approximately 0.75m² and remain on the seafloor after receiver retrieval (Figure 2-4). Approximately 40 to 100 m² of seabed will be affected by the anchors, which will dissolve within 4 to 12 months of placement."

A diagram or map of expected receiver / anchor placement should be included in this section. See comment # 2.

EMGS Response:

Anchor placement for receivers in sensitive areas is illustrated in Figure 2. The 2022 program involves up to three tow lines with 0.75 m² compacted sand anchors with receivers placed 3 km apart. The primary focus of the 2022 program are the two lines that cross EL 1147, and includes 11 anchors located within the sea pen SiBA (covering a total of 8 m²). There is potential to collect data along one line in EL 1145, which has 20 anchors located within the sea pen SiBA (covering 15 m²).



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Page 2.7; Section 2.4.3; Paragraph 3: These anchors are expected to deteriorate on the sea floor within approximately 4 to 12 months, depending on seawater temperature.

"DFO anticipates that a number of receivers will be deployed within the boundaries of the Northeast Newfoundland Slope Closure (Marine Refuge). The Northeast Newfoundland Slope Closure is an Other Effective Conservation Measure (OECM) established through the Fisheries Act for the purposes of conserving and protecting corals and sponges and contributing to the long term conservation of biodiversity.

The deployment of the receivers have potential to damage and/or crush coral and sponges species in the Marine Refuge. Furthermore, the deterioration of the concrete anchors leave behind material classified as deleterious substances in larger quantities with respect to fish and fish habitats. To offset potential destruction and/or damage to coral and sponges as a result of receiver placement and to avoid localized impacts to corals and sponges in the vicinity of the anchor location as a result of anchor deterioration, DFO is requesting that the operator consider deployment of a number of anchors within the Marine Refuge that are constructed of concrete that will not deteriorate and remain as permanent structures to promote the colonization of corals and provided additional fish habitat.

DFO are available to further discuss this option, if required."

EMGS Response:

Anchor placement for receivers in sensitive areas is illustrated in Figure 2. The 2022 program involves up to three tow lines with 0.75 m² compacted sand anchors with receivers placed 3 km apart. Depending on the number of lines towed, 11 to 31 compacted sand anchors placed 3 km apart would remain. A total of 8 to 15 m² of the seabed would be covered. A picture of the anchors (and receiver) is provided in Figure 3. EMGS is investigating the possibility of using concrete anchors and will make best effort to replace some of the compacted sand anchors (which do not contain any deleterious substances) given the limited lead time.



Figure 3 New Figure: Receiver and Anchor



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Page 2.12; Section 2.6; Bullet #6 & Page 6.2; Section 6.1.3; Bullet #3:

Section 2.6

- The EM source will be ramped up over a 20-minute period. In areas where water depth is greater than 500 m, the EM source will not be initiated if a shark, marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting.

Section 6.1.3

- The EM source will be ramped up over a 20-minute period. Regardless of water depth, the electromagnetic source will not be initiated if a shark, marine mammal, or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 30 minutes have elapsed since the last sighting...

DFO notes a discrepancy between the mitigations outlined in Section 2.6 and Section 6.1.3 and recommend editing mitigations for consistency and alignment with mitigation outlined in the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (SOCP).

Note that the SOCP currently does not specify procedures pertaining to water depths and states that ramp up shouldn't commence until none of the species, identified in Section 7 of the SOCP, are identified in the safety zone for at least 30 minutes.

DFO acknowledges that the SOCP may not apply to specifically to Controlled-source Electromagnetic Surveys but encourages the operator to apply SOCP mitigations where appropriate. A clear rationale should be provided for mitigations that deviate from the SOCP."

EMGS Response:

Section 2.6 Standard Mitigation Measures 6th bullet is revised to read as follows:

- "The EM source will be ramped up over a 20-minute period. The EM source will not be initiated if a shark, marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting."

Section 6.1.3 3rd bullet is revised as follows:

- "The EM source will be ramped up over a 20-minute period. Regardless of water depth, the electromagnetic source will not be initiated if a shark, marine mammal, or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting."



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

EMGS's ramp-up procedure is:

- Surveyor notifies SMMO and Officer on Watch 30 minutes prior to ramp-up of source
- SMMO conducts minimum 20-minute search of a 500 m radius if visibility permits
- If no shark, marine mammal, sea turtle or protected species observed, SMMO to verify to surveyor permission to ramp-up (soft start) source.
- Ramp-up of source with low amperage gradually increasing over 20-minute period prior to start of line.
- If a shark, marine mammal, sea turtle or protected species is observed within the 500-m radius, the SMMO will notify the surveyor to delay the ramp-up.
- The SMMO will continue observations for an additional 20 minutes since last sighting within 500-m radius; if no shark, marine mammal, sea turtle or protected species is observed, SMMO to notify surveyor to commence ramp-up

Note that the EM source is towed approximately 30 m above the seabed in water depths greater than 500 m (see Figure 1). There is no surface equipment or energy / sound source associated with this program. The CSEM source system is hanging by an umbilical cable and is immediately lowered down to just above the seafloor. It is very unlikely that a SARA species will be under the moving EM source and if so, it would be for a very short period.

Page 2.12; Section 2.6; Bullet #7: "In areas where water depths are less than 500m, the EM source will be shut down if a SARA-listed species is observed within 500m of the energy source.""

The SOCP specifies that the energy source is shut down immediately if a marine mammal or sea turtle listed as endangered or threatened on Schedule 1 of the SARA is observed within the 500m safety zone and does not identify specific water depths which this condition applies. DFO recommends revision of text to align with the SOCP."

EMGS Response:

Page 2.12; Section 2.6; Bullet #7 is revised as follows:

- "Regardless of water depth, the EM source will be shut down if a marine mammal or sea turtle or shark listed as endangered or threatened on Schedule 1 of the SARA is observed within the 500 m safety zone."

EMGS's ramp-up procedure is:

- Surveyor notifies SMMO and Officer on Watch 30 minutes prior to ramp-up of source
- SMMO conducts minimum 20-minute search of a 500 m radius if visibility permits
- If no shark, marine mammal, sea turtle or protected species observed, SMMO to verify to surveyor permission to ramp-up (soft start) source.
- Ramp-up of source with low amperage gradually increasing over 20-minute period prior to start of line.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

- If a shark, marine mammal, sea turtle or protected species is observed within the 500-m radius of the energy source, the SMMO will notify the surveyor to delay the ramp-up.
- The SMMO will continue observations for an additional 20 minutes since last sighting within 500-m radius; if no shark, marine mammal, sea turtle or protected species is observed, SMMO to notify surveyor to commence ramp-up

Note that the EM source is towed approximately 30 m above the seabed in water depths greater than 500 m (see Figure 1). There is no surface equipment or energy / sound source associated with this program. The CSEM source system is hanging by an umbilical cable and is immediately lowered down to just above the seafloor before the source is ramped up.

Page 4.6; Section 4.2.2; Paragraph 1: The Northeast Newfoundland Slope Closure (Marine Refuge) is not depicted on Figure 4-1 or identified in the Section 4.2.2 text. The Northeast Newfoundland Slope Closure is an Other Effective Conservation Measure (OECM) established through the Fisheries Act for the purposes of conserving and protecting corals and sponges and contribute to the long term conservation of biodiversity. Additional information can be found at <https://www.dfo-mpo.gc.ca/oceans/oecm-amcepz/refuges/northeastnewfoundlandslope-talusnordestdeterreneuve-eng.html>. DFO recommends that the Northeast Newfoundland Slope Closure boundary be included in Figure 4-1 and proposed project interactions inside the Marine Refuge identified and considered throughout the EA.

EMGS Response:

The Northeast Newfoundland Slope Closure (Marine Refuge) is illustrated in Figure 4-10 (Sensitive Areas in the Regional Area) and listed in Table 4.8 (Sensitive Areas in the Project / Study and Regional Areas) in Section 4.6 (Sensitive Areas) of the EA. Figure 4 provides a revised Figure 4-1 that includes the Northeast Newfoundland Slope Closure (Marine Refuge).

Section 4.2.2 is revised as follows:

“Within the Regional Area, corals are most abundant in the Northeast Newfoundland Shelf and Slope, the Flemish Pass and Flemish Cap, with the latter having the highest coral diversity overall (Murillo et al. 2011). The Flemish Cap is also where most sponges are found offshore Newfoundland. Vulnerable Marine Ecosystems in the region are located near the edge of the Flemish Cap for sponges and corals. The Project / Study and Regional Areas overlap with the Northeast Newfoundland Slope Closure, an OECM established through the *Fisheries Act* for the purposes of conserving and protecting corals and sponges and contribute to the long-term conservation of biodiversity. The Northeast Newfoundland Slope Closure is approximately 55,353 km² and has a high concentration of cold-water, structure-forming corals and sponges that provide habitat for many other species (DFO 2019). There is overlap with SiBAs for sea pens along the western portion of the Project / Study Area (Orphan Basin; which overlaps with the Northeast Newfoundland Slope Closure) and Regional Area (Northeast Shelf and Slope). Small SiBAs for sponges and small gorgonians are located within the northern boundary of the Regional Area (Figure 4-1).”



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

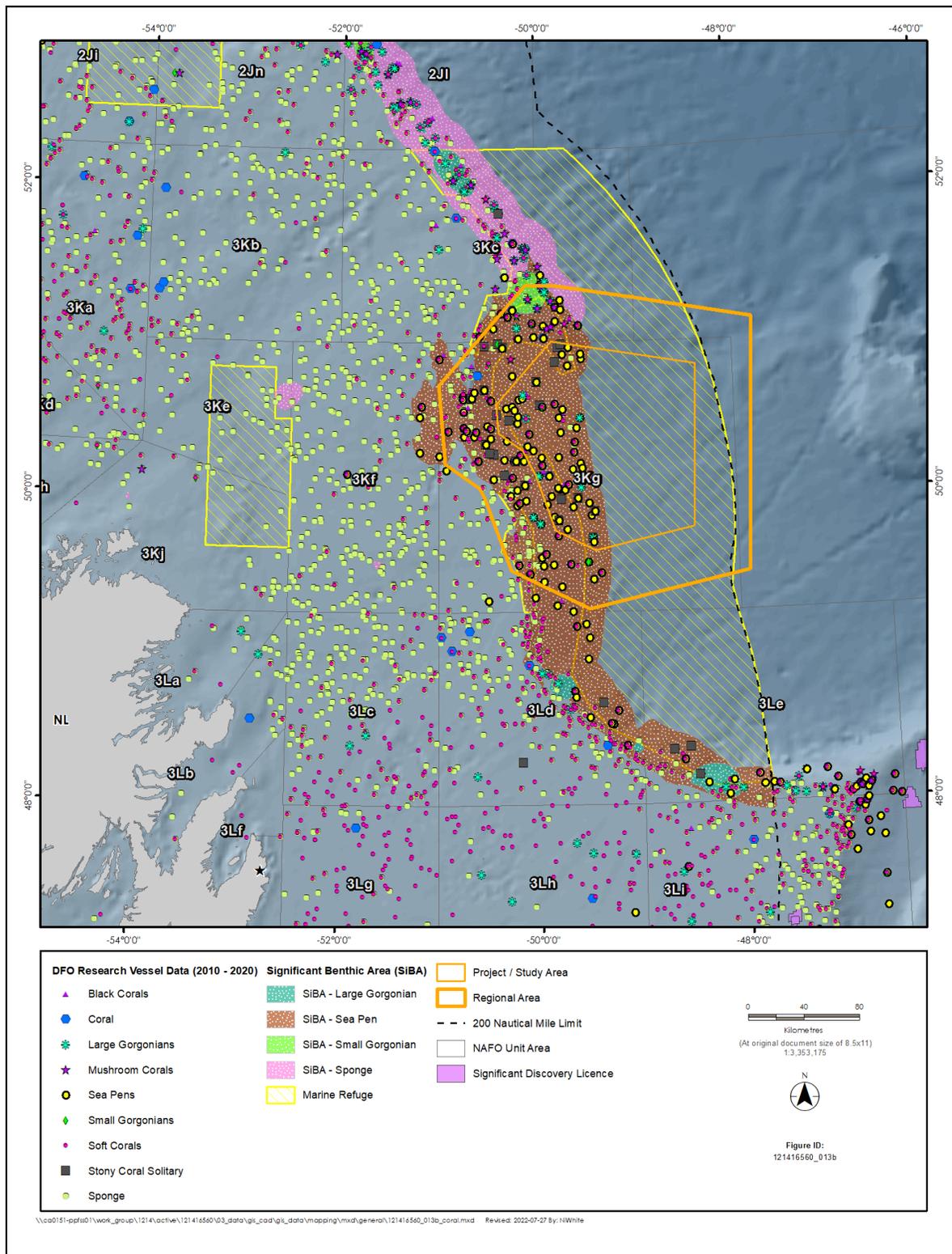


Figure 4 Revised Figure 4-1: Corals and Sponges in the Regional Area



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

New Reference:

DFO (Fisheries and Oceans Canada). 2019. Northeast Newfoundland Slope Closure is. Available at: <https://www.dfo-mpo.gc.ca/oceans/oecm-amcepz/refuges/northeastnewfoundlandslope-talusnordestdeterreneuve-eng.html>.

Page 5.2; Section 5.1; Paragraph 3: "Refer to Figure 2-1 for a depiction of the Project / Study Area and Regional Area

"Figure 2-1 does not depict the project/study area and Regional Area. Please reference the appropriate figure."

EMGS Response:

Page 5.2; Section 5.1; Paragraph 3 is revised as follows:

"Refer to Figure 2-2 for a depiction of the Project / Study Area and Regional Area."

Page 5.2; Section 5.2: "Based on the results of the issues scoping exercise described above, the following VCs [Valued Components] are considered in this EA document:

- Marine Fish and Shellfish
- Marine Mammals and Sea Turtles
- Marine and/or Migratory Birds
- Species at Risk
- Fisheries and Other Ocean Users

Section 6.5 Sensitive Area have been omitted from the list of VCs. DFO recommend editing to include Sensitive Areas as a VC."

EMGS Response:

Page 5.2; Section 5.2: is revised as follows:

"Based on the results of the issues scoping exercise described above, the following VCs are considered in this EA document:

- Marine Fish and Shellfish
- Marine Mammals and Sea Turtles
- Marine and/or Migratory Birds
- Species at Risk
- Sensitive Areas
- Fisheries and Other Users"



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Page 6.25; Section 6.5.4; Paragraph 1: "Because of the anticipated schedule, Project activities are not expected to overlap with sensitive time periods of key resources for some of the Sensitive Areas found within the Project / Study Area."

Please elaborate on this statement and identify the Sensitive Area and specific sensitive time periods of key resource that are avoided a result of project scheduling."

EMGS Response:

Page 6.25; Section 6.5.4; Paragraph 1 is revised as follows:

"Because of the anticipated schedule, Project activities are not expected to overlap with sensitive time periods of key resources for some of the Sensitive Areas found within the Project / Study Area. In NL, the spawning period of the sea pen *Anthoptilum grandiflorum* ranges from April (in southern Newfoundland) to July (in Labrador) (Baillon et al. 2014). Northern wolffish spawn late in the year (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2012) (critical habitat for northern and spotted wolffish occurs within the Regional Area but not the Project / Study Area).

New References:

Baillon, S., J.-F. Hamel, V.E. Wareham and A. Mercier. 2014. Seasonality in reproduction of the deep-water pennatulacean coral *Anthoptilum grandiflorum*. Mar. Biol. 161: 29-43.
<https://doi.org/10.1007/s00227-013-2311-8>

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2012. 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. Available at: https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_Northern%20Wolffish_2013_e.pdf

Page 6.6; Section 6.2.3: "The following mitigation measures will be used to reduce adverse environmental effects on Marine Mammals and Sea Turtles:

- An SMMO will be on board to record marine mammal and sea turtle observations and oversee ramp up procedures.
- The EM source will be ramped up over a 20-minute period. In areas where water depths are greater than 500 m, the EM source will not be initiated if a marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting.
- The EM source will be turned off when data are not being collected (e.g., during vessel turns).
- Vessel waste discharges will be managed in accordance with MARPOL.
- Low vessel speed (4 to 5.5 km/hr [2 to 3 knots]) will reduce underwater noise and the risk of collision with marine mammals and sea turtles.
- Dead or distressed marine mammals or sea turtles and SARA-listed species will be reported to the C-NLOPB and DFO."



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

"Recommend editing mitigations for consistency and alignment with mitigation outlined in the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (SOCP).

Please include mitigations pertaining to shut down of energy source if a marine mammal or sea turtle listed as endangered or threatened on Schedule 1 of the SARA is observed within the 500m safety zone.

Note that the SOCP currently does not specify procedures pertaining to water depths."

EMGS Response:

Page 6.6; Section 6.2.3 2nd bullet is revised to read as follows:

- "The EM source will be ramped up over a 20-minute period. Regardless of water depth, the EM source will not be initiated if a shark, marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone of the energy source. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 20 minutes have elapsed since the last sighting."

EMGS's ramp-up procedure is:

- Surveyor notifies SMMO and Officer on Watch 30 minutes prior to ramp-up of source
- SMMO conducts minimum 20-minute search of a 500 m radius if visibility permits
- If no shark, marine mammal, sea turtle or protected species observed, SMMO to verify to surveyor permission to ramp-up (soft start) source.
- Ramp-up of source with low amperage gradually increasing over 20-minute period prior to start of line.
- If a shark, marine mammal, sea turtle or protected species is observed within the 500-m radius of the energy source, the SMMO will notify the surveyor to delay the ramp-up.
- The SMMO will continue observations for an additional 20 minutes since last sighting within 500-m radius; if no shark, marine mammal, sea turtle or protected species is observed, SMMO to notify surveyor to commence ramp-up

Note that the EM source is towed approximately 30 m above the seabed in water depths greater than 500 m (see Figure 1). There is no surface equipment or energy / sound source associated with this program. The CSEM source system is hanging by an umbilical cable and is immediately lowered down to just above the seafloor before the source is ramped up.

Page 6.25, Section 6.5.4.3: Section 6.5.4.3. states that benthic habitat will be "temporarily disturbed" and that effects "on the sea pen population are [...] predicted to be temporary (with disturbed areas recolonized from adjacent areas)"

In updated Figure 2 in the Addendum, the survey lines overlap sea pen SiBAs inside the NE Slope OECM. In these overlap areas any anchor making contact has the potential to crush/kill, or otherwise damage any sea pens present. Sand seeping from the dissolvable anchors may have impacts on sea pens in the dispersion area, which is larger than the impact footprint from the anchor contacting the bottom. The impact of increased sedimentation on sea pens specifically has not been studied. However, sedimentation has been shown to reduce the ability of other coral species to feed and in some cases



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

may lead to polyp mortality (Gass and Roberts 2006; Brooke et al. 2009; Liefmann et al. 2018). Sea pens have slow growth rates, meaning that once a colony is destroyed or threatened it takes a considerable amount of time (decades) for sea pens to re-establish. It therefore seems unsuitable to describe the effects as temporary, particularly when considering the key ecosystem functioning role sea pens play in seafloor systems (recycling of organic matter, substrate stabilization, and providing essential habitat for juvenile fish, including those with commercial value).

EMGS Response:

EMGS acknowledges that sand seeping from the dissolvable anchors may have impacts on sea pens in the dispersion area, which is larger than the impact footprint from the anchor contacting the bottom and that it can take a considerable time for sea pens to re-establish. Given this, the duration of the effect is revised to long-term. The text is revised as follows

“The Project / Study Area is located within a SiBA for sea pens (with small patches of sponge and large and small gorgonian corals), which could potentially be injured or killed as a result of anchor placement. The predicted disturbed area from receiver deployment on the sea pen population is small (but may extend beyond the physical footprint of the receiver [0.75 m²]) and effects are predicted to be long-term (with disturbed areas recolonized from adjacent areas).”



4.0 ENVIRONMENT AND CLIMATE CHANGE CANADA- CANADIAN WILDLIFE SERVICE

2.6 Standard Mitigation Measures: “The SMMO will be on board to conduct routine checks for stranded bird and Canadian Wildlife Service (CWS) bird handling and release procedures (e.g., Environment and Climate Change Canada 2016) will be implemented if stranded birds are encountered on the vessel.”

ECCC-CWS notes that the location of the survey is located relative to known foraging habitats of Leach’s Storm-petrel (COSEWIC-assessed as Threatened in November 2020), particularly from important breeding colonies at Gull and Baccalieu Island. The project has the potential for increased interactions with Leach’s Storm-petrel and other migratory birds, particularly with respect to attraction to artificial lighting and potential strandings on vessels and project infrastructure (per Gjerdrum et al. 2021, storm-petrels are the most commonly stranded species in NL (93%) based on reports from 1998-2018). The location and proposed timing of activities overlap with peak storm-petrel stranding period (mid-September to mid-November) when young Leach’s Storm-petrel fledge and make their first flight offshore.

The prompt location of stranded birds through daily, systematic searches of vessel(s) increases the potential of reducing harm and/or mortality of stranded birds. Gjerdrum et al. 2021 states per reports, 98% of stranded storm-petrels found alive were successfully released back to the ocean.

ECCC-CWS recommends that the proponent develop and implement vessel-specific systematic search protocols for stranded birds that will be undertaken by trained, experienced observers. Additionally, ECCC-CWS notes that new guidance has been developed, to complement the Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (ECCC, 2017), regarding the development and implementation of systematic stranded bird protocols. Guidance has been attached for the proponent’s consideration.

- ECCC-CWS Guidance for Developing Systematic Stranded Bird Survey Protocols for Vessels and Platforms.
- Appendix 1 – Stranded Bird Encounter Datasheet
- Appendix 2 – Infographic and Reference Card – What to do when you find a stranded bird?
- Appendix 3 – Seabird Identification Photo Card

Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada Stranded seabird datasheet (2022)”

EMGS Response:

EMGS will use trained SMMOs for this program. ECCC-CWS guidance will be used the provided guidance material for the search and documentation of stranded seabirds.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

2.6 Standard Mitigation Measures: "In accordance with the MBCA [*Migratory Birds Convention Act, 1994*], a Federal Migratory Bird Permit will be obtained from the CWS for handling stranded birds that may be encountered on the vessel. A salvage report will be filed with CWS as required by the permit."

ECCC-CWS notes that Permit applications can be obtained from via email at: Permi.Atl@ec.gc.ca. Any data collected from stranded bird surveys during the survey should be documented using the stranded bird datasheets and hard or scanned copies of datasheets sent to CWS at: ec.scfatldonneesei-cwsatliadata.ec@ec.gc.ca."

EMGS Response:

EMGS filed the permit application on July 27, 2027

N/A: Given the high potential for migratory bird strandings, particularly Leach's Storm-petrel in mid-September to mid-November, ECCC-CWS recommends that the proponent consider including stranded seabird awareness training for all members on the vessel, to ensure that individuals are adequately informed of potential impacts to migratory birds. ECCC-CWS is able to provide awareness materials for the proponent's consideration, if desired.

EMGS Response:

EMGS will use trained SMMOs for this program. The SMMOs will provide stranded seabird awareness training for all members on the vessel.



5.0 DEPARTMENT OF NATIONAL DEFENCE

Section 6.6.3 Mitigation: "It is noted that "advance communication with DFO and Department of National Defence during survey planning will limit potential for conflict with research vessel cruises or military activities."

Please identify a point of contact for communications with Maritime Forces Atlantic (MARLANT) Safety and Environment, Department of National Defence."

EMGS Response:

The EMGS point of contact for communications with MARLANT Safety and Environment, Department of National Defence is:

Atle J. B. Lund
Electromagnetic Geoservices
E al@emgs.com
M +47 916 42 636 (Norway)



6.0 NEWFOUNDLAND AND LABRADOR DEPARTMENT OF FISHERIES, FORESTRY, AND AGRICULTURE

Section 3.0, Consultation and Engagement: It mentions that the proponent met with the Fish, Food and Allied Workers (FFAW) to discuss the project. It is also mentioned that a Fisheries Liaison Officer [FLO] will be onboard the survey vessel to facilitate communication with fishers and provide advice and coordination regarding avoiding fishing vessels and fishing gear. The Newfoundland and Labrador fishing industry is an important ocean stakeholder. Engagement with fish harvesters should continue to be a top priority throughout the assessment process and throughout the lifetime of the project if permitted to proceed.

EMGS Response:

Acknowledged. EMGS continues to engage with FFAW-Unifor, who will be providing the FLO for this program.

Section 4.7.1 Summary of Key Commercial Fishing Activity in the Project / Study Areas: FFA [NL Department of Fisheries, Forestry, and Agriculture] would like to note that, during consultation, FFAW indicated Greenland halibut (turbot) as the primary species harvested during the summer along the shelf area to the west of the project/study area. Additionally, Section 4.7.1 Summary of Key Commercial Fishing Activity in the Project / Study Areas also includes 2020 data from Fisheries and Oceans Canada (DFO) that shows turbot landings accounting for 95 per cent weight and value of domestic harvesting activity in the study area. Turbot is an important commercial species for Newfoundland and Labrador harvesters; it was the most valuable groundfish species exported from the province in 2020.

EMGS Response:

Acknowledged. Project description information was provided to Ocean Choice International (OCI), who are an important participant in the turbot fishery. OCI indicated they had no concerns with the Project as planned (e.g., timing, duration)

Section 4.2.3 Fish Assemblages: The proponent notes that pelagic species, such as capelin, exhibit inshore offshore migrations. July and August are important months for capelin in terms of spawning and fishing. Table 4.3 indicates that there is a high potential for capelin to be found in the project area and further highlights June, July, and August as spawning times for capelin. While capelin usually spawn in June/July, it is important to consider that they are extremely temperature sensitive, which can result in highly variable spawning times each year.

EMGS Response:

Acknowledged.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

Section 4.5 Species at Risk: There have been increased sightings of the endangered North Atlantic Right Whale (NARW), *Eubalaena glacialis*, in Newfoundland and Labrador waters in recent years. The NARW is particularly vulnerable to extinction, being that it is a slow growing species with only approximately 336 animals remaining worldwide. DFO and Transport Canada have implemented a number of protective measures in an effort to minimize interactions with NARWs. From an economic perspective, Canada is now required to demonstrate stringent efforts to protect marine mammals to meet the United States (U.S) Import Provisions under the Marine Mammal Protection Act so that Canada may continue to export fish and seafood to the U.S. While the proponent considers that NARWs and other marine mammals could be in the area during experimental trials, they should also be aware of the possibility that interactions with NARWs can affect Canada's ability to export seafood.

EMGS Response:

Acknowledged. The vessel will travel approximately 18.5 km/hr (10 knots) while transiting between the survey area and an existing shorebase located in St. John's. The survey is conducted using a single line towing the EM source 30 m above the seabed. During the survey, the vessel will travel with an average speed of approximately 4 to 5.5 km/hr (2 to 3 knots).

Section 4.7.1 Summary of Key Commercial Fishing Activity in the Project / Study Areas: It is noted that the Regional Area's eastern extent of the project boundary extends just beyond Canada's Exclusive Economic Zone (EEZ) where the Northwest Atlantic Fisheries Organization (NAFO) holds jurisdiction over commercial fishing activity in those areas. It is advised that the proponent seek to include data from NAFO on fishing activity that might occur during the summer and fall in the project area that extends just beyond the EEZ. In addition to domestic fishing fleets, there may also be international vessels actively fishing in this area during the timeframe of the project.

EMGS Response:

Project activities (including vessel turning and gear deployment) will occur within the Project / Study Area, which is within the EEZ. No Project activities occur in the Regional Area; therefore, there are no interactions with international fisheries in this region.

Section 6.2.3 Mitigation: It is stated that the electromagnetic source will not be initiated if a marine mammal or sea turtle is observed 30 minutes prior to ramp-up within a 500m safety zone of the energy source. It furthers states that ramp-up will not occur until the animal has moved beyond the 500m zone or 20 minutes have elapsed since the last sighting. It is unclear what rationale was used for determining the appropriate amount of wait time before beginning ramp-up when there has been a sighting (i.e., 30 minutes) or for when a marine mammal or sea turtle has been last sighted (i.e., 20 minutes). The rationale behind determining the appropriate size of the safe zone (i.e., 500m) is also unclear. There is concern that these timeframes and the size of the safe zone may not be sufficient in protecting marine mammals and/or sea turtles from the electromagnetic fields. It should be noted that research on the effects of electromagnetic fields resulting from electromagnetic surveys on the behavior of electrosensitive animals is still very limited.



EMGS 2022 CONTROLLED-SOURCE ELECTROMAGNETIC SURVEY

EMGS Response:

The rationale is based on the SCOP, which was developed for seismic surveys. As per DFO Comment on Page 2.12; Section 2.6; Bullet #6 & Page 6.2; Section 6.1.3; Bullet #3 (emphasis added):

"DFO acknowledges that the SOCP may not apply to specifically to Controlled-source Electromagnetic Surveys but **encourages the operator to apply SOCP mitigations where appropriate**. A clear rationale should be provided for mitigations that deviate from the SOCP."

CSEM surveys are conducted with only one line towing a source approximately 30 m above the seabed (i.e., the source is not emitted at the surface).

Section 6.5 Sensitive Areas: The study area for the Controlled Source Electromagnetic Survey overlaps with the Northeast Slope Marine Refuge, as well as additional Significant Benthic Areas for sea pens outside of the Refuge. The Northeast Slope Marine Refuge was created to protect slow-growing, fragile cold-water corals and sponges and is closed to bottom contact fisheries. In section 6.5.4.3 of the Environmental Assessment Report for the Orphan Basin and South Bank Controlled Source Electromagnetic Survey 2022, it is provided that receiver packages are temporarily anchored on the seafloor and that when they are retrieved, the anchor is not retrieved and remains on the seafloor. While it is recognized that the anchors will dissolve within 4 to 12 months, the deployment of receivers and anchors is concerning as approximately 100 m² of benthic habitat will be disturbed. Sea pens, which are thought to be the dominant species of coral in the area, have slow growth rates meaning that once a colony is destroyed or threatened it takes a considerable amount of time for sea pens to re-establish. Cold-water corals and sponges provide essential habitat for juvenile fish, including those that are commercially valuable.

EMGS Response:

Acknowledged. Anchor placement for receivers in sensitive areas is illustrated in Figure 2. The 2022 program involves up to three tow lines with 0.75 m² compacted sand anchors with receivers placed 3 km apart. The primary focus of the 2022 program are the two lines that cross EL 1147, and includes 11 anchors located within the sea pen Significant Benthic Area (SiBA) (covering a total of 8 m²). There is potential to collect data along one line in EL 1145, which has 20 anchors located within the sea pen SiBA (covering 15 m²).



7.0 FISH, FOOD AND ALLIED WORKERS-UNIFOR

Section 2.2 Project Location: We would like to note that this is a single year application, and that only activities in the Orphan Basin are considered and assessed.

EMGS Response:

Acknowledged.

