

**Western Newfoundland 2017
Controlled Source
Electromagnetic (CSEM)
Survey – Addendum to
Environmental Assessment**



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1.0 GENERAL COMMENTS

1.1 Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)

Throughout the document, beginning in **Section 4.2 Spatial and Temporal Boundaries**, there is reference made to the *Local Assessment Area (LAA)*. Section 5.1.1 Spatial Boundaries of the Scoping Document that was provided to EMGS on December 14, 2016 stated that the Study Area should be clearly defined. Is the *Local Assessment Area (LAA)* the Study Area?

It is noted that the word Local Assessment Area (LAA) should be replaced with the Study Area throughout the document, as described in Section 5.1.1 Spatial Boundaries of the Scoping Document provided to EMGS on December 14, 2016.

1.2 Department of Fisheries and Land Resources (Government of Newfoundland and Labrador)

Our department would request that, based on the information available, the timing of the survey be conducted during the period which would have the lowest risk on interaction with fish species or fishing activity.

Timing of project activities will be scheduled to reduce potential interactions with commercial fisheries and other marine users. Timing of commercial fishing activities has been taken into account through consultation with various fishery groups such as, One Ocean, FFAW, and Ocean Choice International during the planning stages of the proposed project. Communication with fishery groups will continue throughout the duration of the project through the Fisheries Liaison Officer (FLO). EMGS will hire a FLO, and it is expected that the FLO would be a FFAW-Uniform member.

1.3 Environment and Climate Change Canada (ECCC)

Clarification – Oil-based products in Transmitter and/or Receivers.

It is not stated if oil-based products (e.g. lubricants or fuel) will be used in the transmitter and receivers. The presence or lack thereof of oil-based products in these devices should be stated in the environmental assessment. ECCC recommends that transmitters and receivers without hydrocarbon-based fluids be used.

Oil-based products will not be used in the receivers. Receiver flotation is composed of Trelleborg Eccofloat Type TG28/400 material. The transmitter will consist of both the towfish and the streamer. The towfish will contain the following oil based products:

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- *Main canister:*
 - *Capacity: 400 Liters.*
 - *Type: Tellus 32/46 hydraulic oil.*

- *Junction box:*
 - *Capacity: 20 Liters.*
 - *Type: AK 1000 silicone oil.*

The streamer, referred to as the “solid streamer”, will not contain oil-based products. Unlike some streamers, which are kerosene filled, the streamer chosen for the purpose of this project is made buoyant through the use of thermoplastic rubber.

Mitigations - Stranding

Should storm-petrels or other species become stranded on vessels, the proponent is expected to adhere to the protocol *The Leach’s Storm-Petrel: General Information and Handling Instructions* (attached). A permit will be required to implement this protocol and the proponent must be advised that such a permit must be in place prior to the initiation of proposed activities. Please note that Migratory Birds Convention Act permit applications can be obtained from the Canadian Wildlife service of ECCC (ECCC-CWS) via email at ec.scfatlpermis-cwsatlpermits.ec@canada.ca.

*As there is potential for marine and migratory birds to be attracted to the vessel, the designated seabird and marine mammal observer (SMMO) will conduct routine checks for stranded birds and adhere to *The Leach’s Storm-Petrel: General Information and Handling Instructions* during the release of any stranded birds. It is acknowledged that the proponent requires a permit prior to the initiation of the proposed activities.*

Mitigations - Data Collection

ECCC-CWS has developed a pelagic seabird monitoring protocol (attached) that is recommended for use by experienced observers on all offshore projects. A guide for pelagic seabirds of Atlantic Canada has also been attached, for assistance in identifying pelagic seabirds in the area.

EMGS is committed to following the ECCC-CWS pelagic seabird monitoring protocol and the guide for pelagic seabirds of Atlantic Canada during survey operations.

A report of the seabird monitoring program, together with any recommended changes, is to be submitted to ECCC-CWS on a yearly basis. In an effort to expedite the process of data exchange, ECCC-CWS recommends that the data (as it relate to migratory birds or Species at Risk) collected from the monitoring program be forwarded in digital format to ECCC-CWS following annual program completion (Contact for data is Josh Mailhiot, ECCC-CWS Environmental Assessment Coordinator: joshua.mailhiot@canada.ca). These

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data will be centralized for ECCC-CWS's internal use to help ensure that the best possible natural resource management decisions are made for these species in Newfoundland and Labrador. Metadata will be retained to identify source of data and will not be used for the purpose of publication. ECCC-CWS will not copy, distribute, loan, lease, sell, or use of this data as part of a value added product or otherwise make the data available to any other party without prior express written consent.

Data collected during the monitoring program will be submitted to ECCC-CWS by the onboard SMMO.

Mitigations - Oil Pollution Incidents

The assessment of environmental effects which could result from accidents and malfunctions should include a consideration of potential spill events. The assessment should be guided by the need to ensure compliance with the general prohibitions against the deposit of a deleterious substance into waters frequented by fish (Section 36, *Fisheries Act*) and against the deposit of oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds (Section 5.1, *Migratory Birds Convention Act*). In addition, it should be focused on potential worst-case scenarios (e.g., concentrations of marine birds, presence of wildlife at risk). Based on this analysis, the environmental assessment should describe the precautions that will be taken and the contingency measures that will be implemented to avoid or reduce the identified impacts.

The assessment in Section 7.0 acknowledges the possibility of an accidental hydrocarbon release because of a small on-deck spill or vessel fuel spill. However, given the relatively small volume of hydrocarbon product that could potentially be spilled, the nature of these hydrocarbons to rapidly disperse and evaporate limiting the spill's spatial and temporal extent, and the ability of species to avoid oil spills, effects are predicted to be not significant for Marine Fish, Shellfish and Habitat, Marine Mammals, and Sea Turtles, including Species at Risk. Marine and/or migratory bird species at risk known to occur within the RAA are unlikely to interact with a hydrocarbon spill because they either have strong coastal affinities and are unlikely to occur in the Project Area or occur in winter, which is outside the time frame of the Project. As noted in the assessment, in the event of a hydrocarbon release, the measures outlined in EMGS' Shipboard Oil Pollution Emergency Plan (SOPEP) will be implemented which will reduce the geographic extent and duration of a spill and potential interaction with marine fish, marine mammals and sea turtles, marine and/or migratory bird species (including species at risk) and fisheries.

*EMGS will comply with the general prohibitions against the deposit of a deleterious substance into waters frequented by fish (section 36, *Fisheries Act*) and against the deposit of oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds (section 5.1, *Migratory Birds Convention Act*).*

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In developing a contingency plan that would support the assessment of accidents and malfunctions, and a determination that impacts could be avoided or reduced, it is recommended that the Canadian Standards Association publication, Emergency Preparedness, and Response, CAN/CSA-Z731-03¹ (Reaffirmed 2014), be consulted as a useful reference. All spills or leaks, including those from machinery, fuel tanks or streamers, should be promptly contained, cleaned-up and reported to the 24-hour environmental emergencies reporting system (Phone: 1-800-563-9089).

Comment noted. The SOPEP will be filed with the C-NLOPB as part of the Operations Authorization and will contain measures for spill prevention and response. All spills or leaks, including those from machinery, fuel tanks or streamers, will be promptly contained, cleaned-up, and reported to the 24-hour environmental emergencies reporting system.

Spills could result in significant effects on migratory birds in the event that large numbers of birds, or individual species at risk (SAR), are affected. Migratory birds, including bird species at risk, could be significantly affected if spills affect important habitats or critical habitat for SAR. Disturbance resulting from accidental events during the breeding season in the vicinity of SAR or colonial bird nesting areas could also result in significant effects if it results in nesting failure or site abandonment by the birds.

In the unlikely event that a spill occurs, the spatial boundary of the spill would be limited to the immediate area of the spill within the Project Area. Marine and/or migratory bird species at risk known to occur within the RAA are unlikely to interact with a hydrocarbon spill because they either have strong coastal affinities and are unlikely to occur in the Project Area or occur in winter, which is outside the time frame of the Project. Additionally, there are no seabird colonies or important bird areas within the Project Area. In the event of an accidental event, hydrocarbons are not predicted to reach the shorelines and therefore not predicted to interact with seabird colonies or important bird areas.

Strategies to minimize or prevent accidental or chronic releases must be emphasized in a mitigation program. Proponents are required to demonstrate response preparedness and to identify provisions for ensuring measures are implemented to eliminate or minimize resulting sheens or slicks in the event of accidents and malfunctions involving the release of oil. The following considerations are requested to be factored into the development of a response plan that would help reduce impacts on seabirds:

- Measures for containing and cleaning up spills (of various sizes).
- Equipment that would be available to contain spills.

¹ 1 Canadian Standards Association publication, Emergency Preparedness and Response, CAN/CSA-Z731-03 (<http://shop.csa.ca/en/canada/injury-prevention/canrsa-z731-03-r2009/inv/27019912003>)

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- Specific measures for the management of large and small spills (e.g., breaking up sheens).
- Mitigation measures to deter migratory birds from coming into contact with the oil.
- Mitigation measures to be undertaken if migratory birds and/or sensitive habitat become contaminated with the oil.
- The type and extent of monitoring that would be conducted in relation to various spill events.

In order to assist proponents in preparing a plan for dealing with an oil spill which would potentially threaten migratory birds, ECCC-CWS has prepared a guidance document (attached), a sample protocol document used for oiled birds on beaches (attached), and a protocol for handling non-oiled but dead birds found on vessels (attached).

The SOPEP will be filed with the C-NLOPB as part of the Operations Authorization and will contain measures for spill prevention and response. SOPEP kits on the vessel will contain equipment needed to contain/clean spills. All spills or leaks, including those from machinery, fuel tanks or streamers, will be promptly contained, cleaned-up, and reported to the 24-hour environmental emergencies reporting system. In the unlikely event of a spill which could potentially threaten migratory birds, qualified SMMOs onboard will adhere to ECCC-CWS protocol for handling and documenting oiled and dead birds as applicable.

1.4 Department of National Defence (DND)

MARLANT Safety and Environment (MARL SE) has the following comments:

Please identify a specific individual or office to serve as a Point of Contact (POC) for MARLANT queries and concerns.

Jason Walsh, senior surveyor at Electromagnetic Geoservices Canada, Inc. (EMGS), will serve as a single Point of Contact (POC) for all MARLANT queries and concerns. Contact details are as follows: Phone: 709.746.2642; and Email: jwalsh@emgs.com.

Confirm the appropriate Notice to Mariners will be issued for all underwater activities and any significant surface ventures, such as use of flares, buoys, and unconventional night lighting.

A Notice to Mariners will be issued prior to conducting the proposed controlled source electromagnetic (CSEM) survey. The Notice to Mariners will outline the area where operations will be conducted and will also include a request for a minimum safe distance, as required.

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Publish the appropriate Notice to Airmen of activities that could affect air safety, such as use of balloons, UAVs or tethered airborne devices.

Airborne devices will not be used for CSEM survey operations, as such a Notice to Airmen of activities that could affect air safety, such as the use of balloons, UAVs or tethered airborne devices will not be issued as it does not apply to the proposed project.

The UXO Program has conducted a search of our database and there are no identified UXO sites of concern in that area.

Thank you, comment noted.

Due to the fact that there may be uncharted shipwrecks or unidentified UXO sites or munition dumps and in the event of activities are conducted that have contact with the seabed (such as drilling or mooring), it is strongly advised that operational aids, such as remotely operated vehicles, be used to conduct seabed survey in order to prevent unintentional contact with shipwrecks or dump sites that are not noted on the maps or harmful UXO items that may have gone unreported or undetected.

Prior to CSEM survey operations, EGMS will conduct scouting and bathymetry with the vessel using a single beam echo sounder to collect seabed information for the purpose of towing operations. During towing operations, all equipment is kept 30 m above the seabed and is constantly monitored. Actual contact with the seabed will occur during the deployment of receivers, at which they will free fall to the seabed. Receivers will not be deployed in areas identified as areas of potential UXO or munition sites.

1.5 The St. Lawrence Coalition

Follow-up and monitoring (pages 4.8, 6.6, 6.11, 6.14, 6.26, 6.30, 6.33)

It is clearly established, in the scoping document, that a follow-up and monitoring program should be implemented or at least discussed:

“Discuss the need for and requirements of a follow-up program to verify the accuracy of the EA, to verify the effectiveness of any mitigation measures identified in the EA, or both.” (Section 5.2.14, page 10) However, in numerous sections of the EA Report, the need for a follow-up program, to measure the effectiveness of the mitigation measures, is dismissed as non-necessary. This should be corrected.

As noted in Section 4.9 of the EA, follow-up and monitoring to verify environmental effects predictions or assess the effectiveness of planned mitigation are recommended where there may be uncertainty regarding the effects predictions or the efficacy of mitigation. Follow-up and monitoring is discussed as applicable within the relevant VCs, including Sections 6.2.6 (Marine Fish, Shellfish and Habitat), Section 6.3.6 (Marine

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Mammals and Sea Turtles), Section 6.4.6 (Marine and/or Migratory Birds), Section 6.5.6 (Species at Risk), Section 6.6.6 (Sensitive Areas), Section 6.7.6 (Fisheries and Other Ocean Users), and Section 9.3 (Cumulative Environmental Effects). Where a follow-up monitoring program has not been recommended (e.g., Sections 6.2.6 and 6.6.6), or to provide clarification to the scope of recommended follow-up monitoring programs, relevant sections of each VC may be modified with the following text:

“Because the environmental effects predictions and effectiveness of planned mitigation have been identified with a reasonable level of confidence, no (additional) follow-up and monitoring is recommended.”

We have been reading the documents for the EMGS survey on the EAST coast and something important struck me. On page 1 of the amendment tabled to the C-NLOPB on June 12th, 2017, EMGS affirms that they will have TWO marine mammal observers (MMO) on board the survey ship:

“In addition, the CSEM vessel will have a fisheries liaison officer (FLO) and two marine mammal observers (MMOs) onboard to spot fishing gear in the water during all survey operations, including receiver deployment operations”.

On the contrary, the Western Nfld Environmental Assessment Report tabled to the C-NLOPB on May 2017 talks of only ONE marine mammal observer (page 2.3):

“The survey vessel will also have a Fisheries Liaison Officer (FLO) and a seabird and marine mammal observer (SMMO) on board”.

This is pretty troubling given the wave of Right Whale deaths in the Gulf during this summer (over 11 deaths) and the role that collision with ships has played in the record number of dead whales.

EMGS has committed to having two SMMOs on-board the survey vessel during operations. SMMOs will be trained and experienced qualified professionals capable of identifying both marine birds and marine mammals. Having two SMMOs onboard will increase the effectiveness of monitoring and the likelihood of detecting North Atlantic right whales and other SARA species. In addition, the CSEM vessel moves very slowly (approximately 4 to 5.5 km/h (2-3 knots) thereby reducing underwater noise and the risk of collision with marine mammals.

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1.6 Natural Resources Canada (NRCan)

The Mi'kmaq Confederacy of Prince Edward Island expressed no specific concerns with the CSEM survey project, however noted the significance of the area in relation to Aboriginal and treaty rights, including Food, Social and Ceremonial fisheries.

Comment noted.

The Conseil des Innus de Pessamit requested additional information on the effects of the project. The Innus of Pessamit were invited to direct their questions to EMGS for response. A follow-up email was sent following the close of the comment period but no further requests or comments were received.

Comment noted.

The Conseil des Innus de Ekuanitshit advised that it collaborates with the Malécite of Viger and the Mi'gmaq of Gespe'gewa'gi on oil and gas development in the Gulf of St. Lawrence (in the Innu-Maliseet-Mi'gmaq Alliance for the Protection of the Gulf). They requested additional time and capacity funding to comment. In response, my office offered to arrange a meeting/teleconference call to discuss any issues with the proponent, and nine additional days were provided for the submission of comments. Although there was interest in a meeting, the Innu of Ekuanitshit advised that it could not meet until mid October (after the projected commencement of the survey in the first week of October). Additional comments were submitted August 29, 2017, which outlined the importance of salmon in the Gulf of St. Lawrence to the Innu, Malécite and Mi'gmaq. Other concerns raised in relation to the EA report included: lack of information on potential effects on Aboriginal rights; mischaracterization of the Aboriginal commercial fishery, lack of information on effects of noise and mitigation measures for marine mammals; and the assessment of cumulative effects of noise. Procedural concerns raised in the August 29 letter included: inadequate consultation, stemming primarily from the timing and time available for consultation; as well as the lack of capacity funding provided. Based on the view that there has been inadequate consultation, the Innu of Ekuanitshit have requested that project approval be withheld.

The environmental assessment (EA) included an assessment of Project activity and accidental events on Commercial Fishing and Other Ocean Users (Section 6.7 of the EA). This section included recognition of Indigenous fishing and harvesting that may occur in the Regional Assessment Area (RAA) for commercial communal and/or food, social and ceremonial (FSC) purposes. In Canada, the right to fish traditionally and for moderate livelihood purposes is protected under the Constitution Act, 1982 (Section 35). Various Supreme Court of Canada decisions, such as the "Sparrow decision" in 1992, and the "Marshall decision" in 1999, have affirmed this standing. Following the Marshall decision in 1999, the Marshall Response Initiative was implemented in 2000, which was then replaced in 2007 by the Atlantic Integrated Commercial Fisheries Initiative to create specific commercial-capacity communally-owned fisheries in First Nations communities in

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New Brunswick, Nova Scotia, Prince Edward Island, and parts of the Gaspé region of Quebec. The initiative also looked to increase sustainable economic development and employment opportunities which includes transferring retired licences, buying new licences, acquiring equipment and boats, harvest and management training, business planning and operation (off and onshore).

As per correspondence from Natural Resources Canada, dated August 29, 2017, it is understood that there are licences held by Innu and Mi'gmaq communities whose reserves are in Quebec and which were not identified in the EA (Gardiner, pers. comm. 2017). The EA notes that the Project Area is located within four Northwest Atlantic Fisheries Organization (NAFO) regulatory areas, 4Rd, 4Ss, 4Tf and 4VN. As indicated in the letter, Indigenous communities hold commercial communal fishing licences in 4Ss south of Anticosti Island and in 4Tf around the Magdalen Islands and include licences for the following species:

- *groundfish*
- *cod*
- *turbot*
- *halibut*
- *winter flounder*
- *snow crab*
- *lobster*
- *mackerel*
- *herring*
- *shrimp*

Although these licences were not specifically identified in the EA, it was conservatively assumed that any Indigenous organization that has a licence to fish in the RAA could be exercising that right at any time of the year and therefore could potentially interact with the Project.

These species and others (e.g., Atlantic salmon) may also be harvested by Indigenous peoples for FSC purposes within the RAA and it is important to recognize potential interactions with species which may migrate through the Project Area regardless of whether they are harvested within the Project Area.

The potential interactions on Indigenous fishing activity are similar to those on commercial fishing as described in Section 6.7 of the EA and include effects from noise and light emissions and permitted marine discharges from the survey vessel, vessel interaction during towing operations, and electromagnetic emissions generated from the operations of the CSEM survey. Potential effects on Marine Fish, Shellfish and Fish Habitat were assessed in the EA and were predicted to be temporary and of low magnitude, therefore, indirect effects on Indigenous fisheries activities would also then be comparable.

Several mitigation measures have been proposed to reduce or eliminate potential adverse environmental effects from the Project. Specific mitigation measures proposed

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to manage adverse environmental effects on commercial communal and FSC fishing activities include:

- *Vessel waste discharges will be managed in accordance with MARPOL.*
- *Compacted sand anchors, designed to degrade within one year, will be used for the CSEM receivers.*
- *A FLO will be present onboard the survey vessel to facilitate communication with fishers and provide advice and coordination in regard to avoiding fishing vessels and fishing gear.*
- *Planning will be conducted in cooperation with fisheries stakeholders in advance of the survey to avoid high concentrations of fishing vessels in the Project Area and along the transit route.*
- *A Single Point of Contact (SPOC) will be established to respond to queries and concerns from other ocean users.*
- *The timing and location of proposed activities will be communicated by means of a Notice to Mariners and Notice to Shipping.*
- *In the unlikely event that Project activities damage fishing gear, compensation will be awarded to affected parties in accordance with the Compensation Guidelines Respecting Damages Related to Offshore Petroleum Activity (C-NLOPB and CNSOPB 2002).*

Residual environmental effects on Marine Fish, Shellfish and Fish Habitat were predicted to be not significant due to the proposed mitigation measures and the limited spatial and temporal scale of Project activities. Given the limited spatial and temporal overlap, any indirect effects on Indigenous fishing activities due to potential residual environmental effects on fish species is expected to be negligible.

Damage to fixed fishing gear will be avoided or reduced by use of fisheries mitigation measures, such as Notice to Mariners, the presence of a FLO on board and a SPOC. In addition, the CSEM vessel moves very slowly (approximately 4 to 5.5 km/h (2-3 knots)) and thus there is sufficient time for all parties to react and avoid other gear or vessels. If gear is damaged, the compensation program will alleviate any financial losses.

Overall, the Project has potential to result in adverse effects to a change in Indigenous fishing activities. In consideration of applicable mitigation measures, residual effects on Indigenous fishing activities is considered to be negligible to low in magnitude, restricted to the Project Area, of short duration (within 5 to 15 days (allowing for weather downtime, most likely less than 10 days)), and single frequency (one survey in 2017). Adverse residual environmental effects would be reversible given that compensation would be awarded to replace or repair damaged gear.

In consideration of the criteria for significant environmental effects and the implementation of proposed mitigation, as well as recognition of the limited spatial and temporal scale of Project activities, residual environmental effects of the Project on Indigenous fishing activities is predicted to be not significant.

Although accidental events are less likely to occur during the Project, if they do occur, they are more likely to result in adverse effects on Indigenous fishing activity than routine

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Project activities which are predicted to have a negligible effect. The probability of an accidental spill being of large enough magnitude to cause a significant environmental effect on Indigenous fishing activity however, is very low. The issues related to a hydrocarbon spill and the Indigenous fishery relate to fouling of fishing gear and perceived tainting of catch by petroleum hydrocarbons. In the event of a spill, the implementation of the SOPEP and communication with the Canadian Coast Guard, the C-NLOPB and fishers will reduce the geographic extent and duration of an event to the extent feasible. Compensation will be considered in the event of a spill large enough to affect fishing gear. EMGS will advise the C-NLOPB prior to compensating and settling valid fouled gear/income claims. Adverse residual environmental effects on the Indigenous fishing activity as a result of an accidental hydrocarbon release are predicted to be not significant.

With respect to concerns raised about underwater noise, noise emitted from the survey vessel is expected to be of low frequency (e.g., 1 to 500 Hz), and 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, sea turtles including species at risk. As discussed in Section 6.2.4 and 6.3.4 of the EA Report, sound levels created by the continuous underwater noise of the survey vessel as it moves, is not anticipated to cause effects that would result in direct physical injury to fish species or marine mammals and sea turtles. The avoidance behaviour of some fish species may occur, such as startle responses, and marine mammals may exhibit some behavioural changes such as changes in vocalization and call length, diving rates and/or distances, travelling distances, temporary avoidance of the area, or, during sensitive times of the year, changes in breeding or migration patterns. However, due to the relatively short temporal scope of the project (5-15 days), and the transient movement of the vessel as it moves through its transects, it is anticipated that these sound levels generated by the single survey vessel would not cause significant effects on sensitive areas, or the use of them by marine species. The Gulf of St. Lawrence is a relatively busy route for ocean vessels, and it is not expected that the use of the survey vessel for this short period of time would contribute a measurable increase to the current noise levels of that area to induce significant residual environmental effects on sensitive areas.

EMGS has committed to having two SMMOs on-board the survey vessel during operations. SMMOs will be trained and experienced qualified professionals capable of identifying both marine birds and marine mammals.

The Mi'gmawei Mawiomi Secretariat (MMS), representing the Gesgape'gewa'gi Mi'gmaq governing councils of Gesgapegiag, Gespeg and Listuguj, stated that they have concerns regarding the project, but no specific issues were noted. The MMS stated it was not in receipt of the notification letters sent July 19, 2017, and requested that the consultation request be resent to the MMS Consultation and Accommodation Unit and the comment period be restarted. In response, my office offered to arrange a meeting/teleconference with the proponent to discuss concerns with the project.

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Comment noted.

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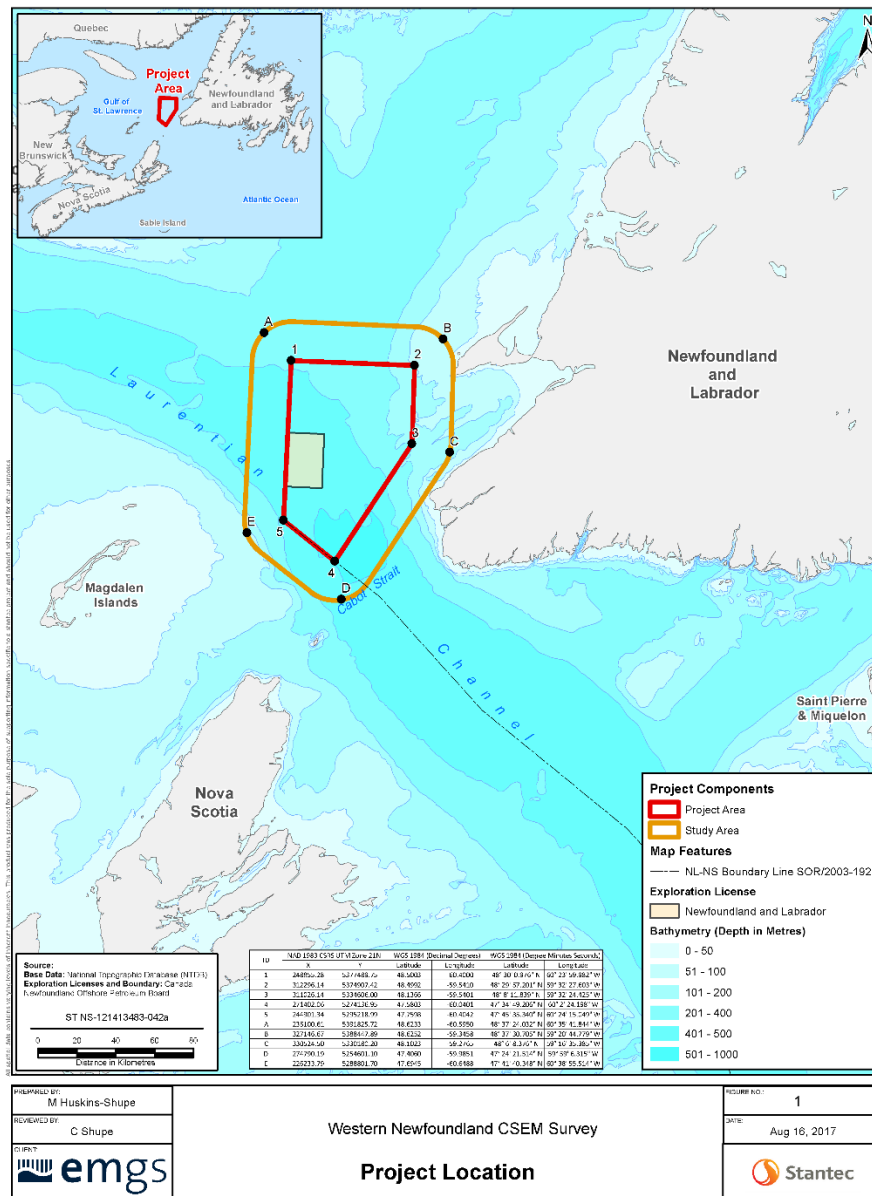
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2.0 SPECIFIC COMMENTS

2.1 Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)

Section 1.2 Regulatory Framework, Figure 1.1 (page 1.2) – This figure should also include the Study Area, as defined in the Scoping document provided to EMGS on December 14, 2016.

Figure 1.1 Project Location is modified as follows:



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Section 2.1 Project Location (page 2.2) – The Study Area Coordinates should be provided in this section.

The Study Area coordinates are as follows:

ID	NAD 1983 CSRS UTM Zone 21N		WGS 1984 (Decimal Degrees)		WGS 1984 (Degree Minutes Seconds)	
	X	Y	Latitude	Longitude	Latitude	Longitude
1	248855.28	5377489.75	48.5003	-60.4000	48° 30' 0.976" N	60° 23' 59.982" W
2	312296.14	5374907.42	48.4992	-59.5410	48° 29' 57.201" N	59° 32' 27.603" W
3	311026.14	5334606.00	48.1366	-59.5401	48° 8' 11.839" N	59° 32' 24.425" W
4	271402.06	5274136.95	47.5803	-60.0401	47° 34' 49.206" N	60° 2' 24.198" W
5	244901.34	5295218.99	47.7598	-60.4042	47° 45' 35.340" N	60° 24' 15.049" W
A	235100.61	5391825.72	48.6233	-60.5950	48° 37' 24.032" N	60° 35' 41.844" W
B	327146.67	5388447.89	48.6252	-59.3458	48° 37' 30.705" N	59° 20' 44.779" W
C	330524.50	5330180.20	48.1023	-59.2765	48° 6' 8.376" N	59° 16' 35.385" W
D	274790.19	5254601.10	47.4060	-59.9851	47° 24' 21.514" N	59° 59' 6.315" W
E	226233.79	5288801.70	47.6945	-60.6488	47° 41' 40.348" N	60° 38' 55.514" W

Section 2.2.1 Survey Vessel Operation (page 2.2) – All project related activities may only occur in the Project Area, including, but not limited to, deployment and testing of survey equipment and vessel turning.

The survey vessel will use dynamic positioning (DP) to hold on station during the deployment and retrieval of the CSEM receivers. Survey vessel operations related to the deployment and testing of survey equipment and turning of vessel will not occur outside of the Project Area.

Section 2.2.1 Survey Vessel Operation (page 2.3, second paragraph) – The FLO and SMMO must be two separate people as to ensure all mitigations involving them can occur uninterrupted.

The FLO and SMMO will be two separate people, as to allow all mitigation measures implemented can occur uninterrupted.

Section 4.3 Issues Scoping and Selection of Valued Components, Fisheries and Other Ocean Users (page 4.5) – The rationale for selection of *Fisheries and Other Ocean Users* as a VC was that the fishery is an important element in both Newfoundland and Labrador and other Gulf of St. Lawrence jurisdictions. However, there is no evidence in the report that commercial fishers in the Gulf of St. Lawrence jurisdiction were consulted.

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As per the Scoping Document, the One Ocean Protocol for Consultation with Fishers was followed. This document provides contact information for fishery organizations in Newfoundland and Labrador whom were consulted.

EMGS will hire a FLO which will facilitate communication with applicable fishery groups throughout the duration of the project.

Section 5.1.2 Atmospheric Environment (pages 5.3 to 5.5) – The climate data provided only goes up to 2010. More up to date information needs to be included.

The climate normal, averages and extremes presented in Section 5.1.2 of the Environment Assessment for the Port Aux Basques weather station, represents the most recent readily available compiled data set for this area. Climate normals are updated by Environment and Climate Change Canada at the completion of each decade.

Section 6.5.4 Assessment of Residual Environmental Effects (page 6.17, first paragraph) - The statement "Many of the Project-related activities are limited to the Project Area...". What project-related activities will occur outside the Project Area?

The only other Project-related activities that would occur outside the Project Area would be transit to and from the project site, which is not included in the scope of the assessment.

Section 6.7.3 Mitigation (page 6.23, fourth bullet) – Please define *high concentrations*. Also, actively fished areas are to be avoided.

Planning will be conducted in cooperation with fisheries stakeholders in advance of the survey to avoid high concentrations of fishing vessels in the Project Area and along the transit route. As a result, any concerns regarding this definition will be discussed at such time.

Section 7.0 Accidental Events (page 7.1, fourth paragraph) – The document reads, "The SOPEP will be filed with the C-NLOPB as part of the Operations Authorization." The SOPEP should be submitted as part of the Operations Authorization application.

In Section 7.0 Accidental Events, page 7.1, fourth paragraph, it is noted that the sentence "The SOPEP will be filed with the C-NLOPB as part of the Operations Authorization", should be replaced with "The SOPEP will be filed with the C-NLOPB as part of the Operations Application."

Section 7.0 Accidental Events (page 7.2, fourth paragraph) – The document reads, "In the event of a spill, the implementation of the SOPEP and communication with the Canadian Coast Guard, the C-NLOPB and fishers will reduce the geographic extent and

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duration of an event to the extent feasible.” How will “communication” reduce geographic extent and duration of a spill event?

In Section 7.0 Accidental Events, fourth paragraph, page 7.2, it is noted that the sentence “In the event of a spill, the implementation of the SOPEP and communication with the Canadian Coast Guard, the C-NOLPB and fishers will reduce the geographic extent and duration of an event to the extent feasible”, should be replaced with the following, “In the event of a spill, the implementation of the SOPEP will reduce the geographic extent and duration of an event to the extent feasible. Communication with the Canadian Coast Guard, the C-NLOPB and fishers will limit the interaction with fishers gear.”

2.2 Fisheries and Oceans Canada (DFO)

Section 4.2 Spatial and Temporal Boundaries (last 2 paragraphs, page 4.2) - The timing of commercial fishing activities and other marine users should be taken into account when scheduling project activities. Please include a statement to address this.

Timing of project activities will be scheduled to reduce potential interactions with commercial fisheries and other marine users. Timing of commercial fishing activities has been taken into account through consultation with various fishery groups such as, One Ocean, FFAW, and Ocean Choice International during the planning stages of the proposed project. Communication with fishery groups will continue throughout the duration of the project through the FLO. EMGS will hire a FLO, and it is expected that the FLO would be a FFAW-Unifor member.

Section 4.3 Issues Scoping and Selection of Valued Components, (2nd and 3rd sentence, Marine Fish, Shellfish, and Habitat paragraph, page 4.4) - Regarding the VC " Marine Fish, Shellfish, and Habitat", recommend changing to " ...Fish Habitat", which includes phytoplankton, zooplankton and benthos (i.e. infauna! and epifaunal invertebrates).

It is noted that the VC “Marine Fish, Shellfish and Habitat” should be replaced with “Marine Fish, Shellfish, and Fish Habitat”.

Section 4.8 Assessment of Cumulative Environmental Effects (page 4.8) - In the 1st and 2nd sentence, change "past, present, or future" to "past, present and/or future". In sentence 2, please define "substantive interaction".

It is noted that “past, present, or future” should be replaced with “past, present and/or future” in Section 4.8 Assessment of Cumulative Environmental Effects, page 4.8, in the first and second sentence.

Substantive interaction refers to an interaction that results in a high magnitude measurable change from baseline conditions.

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Section 5.2.1 Plankton (page 5.8) - "Plankton" should fall under the heading of "Fish Habitat" and should include a description of phytoplankton, zooplankton, and benthos (i.e. infauna and epibenthic invertebrates such as polychaetes and echinoderms), which play an important role in ecosystem structure. Please provide additional description for fish habitat.

It is acknowledged that Section 5.2.1 Plankton, which describes phytoplankton and zooplankton, could be moved to become a subsection of 5.2.2 Marine Fish and Fish Habitat. A brief description of benthic organisms to supplement the current discussion of fish, shellfish, corals and sponges is provided below with respect to polychaetes and echinoderms.

Polychaetes comprise a substantial component of benthic marine communities and are associated with all types of substrates (Christian et al. 2010). Numerous species of polychaetes occur in the waters off Newfoundland and in the Gulf of St. Lawrence including various species of sandworms, lugworms, and tubeworms (Christian et al. 2010). Polychaetes play an important role in marine food chains and can provide food for a variety of fish species and other species of benthic invertebrates (Christian et al. 2010).

Echinoderms such as sea urchins, sea cucumbers, brittle stars, sea stars, sand dollars are also common in the waters off Newfoundland and in the Gulf of St. Lawrence. Echinoderms play an important role in marine food chains and can provide food for a variety of fish species and other species of benthic invertebrates (Christian et al. 2010).

Section 5.2.2 Marine Fish and Fish Habitat (pages 5.8-5. 13) - Invertebrates other than shellfish should be addressed in this EA. Other invertebrates (e.g., polychaetes, echinoderms) can play important roles in ecosystem structure. A comprehensive overview of fish habitat, particularly for species relevant to the fisheries, has not been provided. Please provide additional fish habitat descriptions.

Please refer to the response above and Section 5.2.2 of the EIS for a general description of distribution within Project Area.

Section 5.2.6 Species at Risk, Table 5.11 - Atlantic Cod (Laurentian North population, Laurentian South population (pages 5.36-5.37) - Because two populations are being described, efforts should be made to clarify whether one or both populations are being referenced.

In Table 5.11, the Potential for Occurrence for the Laurentian North Population of Atlantic Cod was determined to be moderate, while that of the Laurentian South Population was determined to be high. Based on the information below, it is possible for both of these populations to have distributional overlap with the Project Area and thus, both populations are described.

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Atlantic cod in the Laurentian North Population combine the stocks identified for management purposes by DFO as (1) St. Pierre Bank (NAFO 3Ps) and (2) Northern Gulf of St. Lawrence (NAFO 3Pn4RS). These stocks are located north of the Laurentian Channel, bordering the south and west coast of Newfoundland and the south coast of Quebec.

Atlantic cod in the Laurentian South Population comprise three DFO-recognized management units (1) Southern Gulf of St. Lawrence (NAFO 4TVn November to April), (2) Cabot Strait (NAFO 4Vn May to October), (3) Eastern Scotian Shelf (NAFO 4VsW). These stocks range from the southern Gulf of St. Lawrence to the eastern Scotian Shelf and many overwinter along the southern slope of the Laurentian Channel.

Section 5.2.6 Species at Risk, Table 5.11 - Roughead Grenadier, American Plaice (Newfoundland and Labrador population), Striped Bass (Southern Gulf of St. Lawrence population), White Hake (Southern Gulf of St. Lawrence population), Spiny Dogfish (Atlantic population), and Northern Bottlenose Whale (Davis Strait-Baffin Bay-Labrador Sea population) - Information on the expected distributional overlap with the project should be included for these species.

Roughhead Grenadier: Based on review of COSEWIC (2007), Roughhead Grenadier does not regularly occur in the Gulf of St. Lawrence and does not have distributional overlap with the Project Area.

Atlantic Plaice (Newfoundland and Labrador Population): There are three separate stocks of the Newfoundland and Labrador Population of American Plaice that are recognized for management/assessment purposes: (1) those off Labrador and the northeast coast of Newfoundland (NAFO 2GHJ3K), (2) those on the Grand Banks (NAFO 3LNO), and (3) those on the St. Pierre Bank (NAFO 3Ps). This population also includes fish in NAFO 3Pn which is not formally assessed. The western extent of this population is Cape Ray (southwestern tip of Newfoundland). The deep Laurentian Channel bounds the southern limit of this population, as it is deeper than their preferred depth range of 100-300m. It is possible for there to be distributional overlap in the eastern extent of the Project Area, as this is the western extent of the distribution of this population.

Striped Bass (Southern Gulf of St. Lawrence Population): The Southern Gulf of St. Lawrence Population of Striped Bass occurs in the southern Gulf of St. Lawrence, primarily on the east coast of New Brunswick, but also part of the coast of Nova Scotia, Prince Edward Island, and eastern Québec (Chaleur Bay and Gaspé), but there is only a single spawning population (Northwest Miramichi River). Striped Bass stay in relatively shallow coastal waters along the southern edges of the Gulf and do not have distributional overlap with the Project Area.

White Hake: White hake from the Southern Gulf of St. Lawrence population are not found in the central portion of the southern Gulf of St. Lawrence where the waters are cold and unsuitable for the species. White hake vacate the shallow waters of the Gulf of St.

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Lawrence in autumn and early winter as water temperature declines and as the area becomes iced over in January (Dickie and Trites 1983; Clay and Hurlbut 1989; Clay 1991 in COSEWIC 2013). They overwinter in the 2-5°C (Dickie and Trites 1983 in COSEWIC 2013) deeper water of the Cabot Strait. When spring returns and ice breakup is underway, they migrate back into the waters of the southern Gulf where they spawn beginning in June. This population of white hake is primarily found southwest of the Laurentian Channel (COSEWIC 2013) and may have distributional overlap with the Project Area. However, due to the timing of the Project (all Project Activities to be completed by December), and the fact that this population does not return to the deeper waters of the Laurentian Channel until early winter so may not be distributional overlap with Project Activities in the Project Area.

Spiny Dogfish (Southern Gulf of St. Lawrence Population): The Southern Gulf of St. Lawrence group of spiny dogfish is considered a “sink” population in that the area was colonized abruptly in 1985, and the same group has resided in the area ever since (COSEWIC 2007). The presence of spiny dogfish in deep warmer waters of the Laurentian Channel in winter research trawl surveys confirm that at least some of those dogfish from the Southern Gulf of St. Lawrence group remain in the Gulf year-round (COSEWIC 2007). A comparison of spiny dogfish distribution from research trawl surveys in the Southern Gulf of St. Lawrence, and off southern Newfoundland indicate that dogfish move offshore into deeper, warmer waters in winter, and in the summer, tend to occur in shallower coastal waters in the southern Gulf (COSEWIC 2007). As the Southern Gulf of St. Lawrence group moves seasonally between coastal areas in the Laurentian Channel, it is possible for there to be distributional overlap with this species in the Project Area during Project Activities in the fall.

Northern Bottlenose Whale (Davis Strait-Baffin Bay-Labrador Sea Population): Based on review of COSEWIC 2010, northern bottlenose whales from the Davis Strait-Baffin Bay-Labrador Sea Population do not regularly occur in the Gulf of St. Lawrence and have no distributional overlap with the Project Area.

Section 5. 2.6 Species at Risk, Table 5.11 - American Plaice (Newfoundland and Labrador population (page 5.41) - Two different depth ranges are provided for this species. The appropriate depth range should be clarified.

The depth range of adult American plaice is primarily 100-300 m (COSEWIC 2009). Juvenile American plaice inhabit a more limited depth range (<200 m) (COSEWIC 2009).

Section 5.2.6 Species at Risk, Table 5.11 - Atlantic Sturgeon (St. Lawrence populations. Maritimes populations (last sentence, 1st paragraph, page 5.42) - "Population could pass through as transient" is unclear. It should be clarified if this means that Atlantic Sturgeon may be present in the Project Area on a transient basis (e.g., area could be a migration route).

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Atlantic sturgeon are highly migratory and are known to have extensive coastal migrations of distances up to 1,500 km (COSEWIC 2011). While Atlantic sturgeon at different latitudes display some differences in life histories, the general pattern is an annual spring migration to freshwater to spawn and then a return to the marine environment following spawning (COSEWIC 2011).

The western extent of the occurrence of the Maritimes population of Atlantic sturgeon overlaps with the Project Area. The southern extent of occurrence of the St. Lawrence population overlaps with the northern extent of Maritimes population, and this area of distributional overlap also overlaps with a small portion of the northwest corner of the Project Area; thus, it is possible for individuals from the St. Lawrence population to occur in this portion of the Project Area, but it is more likely for individuals of the St. Lawrence population to occur in the Project Area. It is also possible for individuals of both populations to move through the Project Area during spring and fall migration, though it is believed that some adults in the Gulf of St. Lawrence overwinter in freshwater (COSEWIC 2011).

Section 5.2.6 Species at Risk, Table 5. 11 - Loggerhead Sea Turtle (page 5.47) - This species is listed as Endangered under SARA Schedule 1. This should be corrected in Section 5.2.6 Species at Risk (1st sentence, 8th paragraph, page 5.53), and Table 6.3 (page 6.20).

As per Schedule 1 under the Species at Risk Act (SARA), Table 5.11 – Loggerhead Sea Turtle, page 5.47 has been revised to reflect the loggerhead sea turtle’s SARA status as Endangered.

It is also noted that in Section 5.2.6 Species at Risk (first sentence, eighth paragraph, page 5.53), “There are two sea turtle species at risk that have been known to occur within the RAA: the SARA-listed endangered leatherback sea turtle and the COSEWIC-assessed endangered loggerhead sea turtle” should be replaced with “There are two sea turtle species at risk that have been known to occur within the RAA: the SARA-listed endangered leatherback sea turtle and the SARA-listed endangered loggerhead sea turtle”.

Table 6.3 – Relative Occurrence of Species at Risk within the Project Area (page 6.3) has been revised to reflect the Loggerhead Sea Turtle’s SARA status as Endangered.

Section 5.2.7 Sensitive Areas (pages 5. 53-5.54) - Significant Benthic Area (SBA) delineations for corals and sponges have been identified for this area, and should be included in this report (Canadian Science Advisory Secretariat Science Advisory Report 2017/007). Gulf and Quebec Regions have identified candidate areas for potential protection in SBAs in and adjacent to the PA, LAA, and the RAA (Kenchington et al., 2016).

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Kenchington, E., L. Beazley, C. Lirette, F.J. Murillo, J. Guijarro, V. Wareham, K. Gilkinson, M. Koen Alonso, H. Benoit, H. Bourdages, B. Sainte-Marie, M. Treble, and T. Siferd. 2016. Delineation of Coral and Sponge Significant Benthic Areas in Eastern Canada Using Kernel Density Analyses and Species Distribution Models. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/093. vi + 178 p. (http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRec h/2016/2016_093-eng.html)

Coral and sponge areas have been discussed in Section 5.2.2.3 of the assessment. Following review of Kenchington et al. 2016 and as noted in Section 5.2.2.3, it is acknowledged that coral and sponge areas are present in the Gulf and the Laurentian Channel. Sponge locations are identified on Figure 28 of the Kenchington et al. 2016 report, including identification of significant sponge areas. Significant sponge areas are present within the RAA; however, are not present within the Project Area. Sea pen locations are identified on Figure 31 of the Kenchington et al. 2016 report, including identification of significant sea pen areas. Significant sea pen areas are present within the RAA; however, are not present within the Project Area.

Section 5.2.7:1 Ecologically and Biologically Significant Areas (page 5.54) - The wording of this paragraph is not accurate and should be replaced as follows: "Canada's Oceans Act authorizes DFO to conserve and protect living aquatic resources and their supporting ecosystems through the development of a well-designed network of Marine Protected Areas (MPAs) and other effective area-based conservation measures. The Estuary and Gulf of St. Lawrence (GOSL) has been identified as one of five priority Bioregions to undergo MPA Network Planning. Ecologically and Biologically Significant Areas (EBSAs) are areas that have particularly high ecological or biological significance which may facilitate provision of a greater than usual degree of risk aversion in the management of an important design feature of MPA Networks. DFO has identified 10 EBSAs within the GOSL Bioregion; three of which are located within the RAA (Figure 5.6). As outlined in Table 5.12 these include the West Coast of Newfoundland EBSA, the South Fringe of the Laurentian Channel, and the Western Cape Breton EBSA."

It is noted that the wording in Section 5.2.7:1 Ecologically and Biologically Significant Areas (page 5.54) should be replaced to, "Canada's Oceans Act authorizes DFO to conserve and protect living aquatic resources and their supporting ecosystems through the development of a well-designed network of Marine Protected Areas (MPAs) and other effective area-based conservation measures. The Estuary and Gulf of St. Lawrence (GOSL) has been identified as one of five priority Bioregions to undergo MPA Network Planning. Ecologically and Biologically Significant Areas (EBSAs) are areas that have particularly high ecological or biological significance which may facilitate provision of a greater than usual degree of risk aversion in the management of an important design feature of MPA Networks. DFO has identified 10 EBSAs within the GOSL Bioregion; three of which are located within the RAA (Figure 5.6). As outlined in Table 5.12 these include the

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West Coast of Newfoundland EBSA, the South Fringe of the Laurentian Channel, and the Western Cape Breton EBSA”.

Section 5.2.7. 1 Ecologically and Biologically Significant Areas (page 5.54) - Lower portions of the PA, LAA and/or RAA appear to have a small portion overlap/adjacent to the Scotian Shelf Bioregion and the Newfoundland and Labrador Shelves Bioregion, which are also priority Bioregions for MPA Network Planning. The ESS Laurentian Channel and Slope EBSA is also located here (King et al., 2016) and should be mentioned.

King, M., Fenton, D., Aker, J. and Serdyska, A. 2016. Offshore Ecologically and Biologically Significant Areas in the Scotian Shelf Bioregion. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/007. (<http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2016/2016007-eng.html>)

It is acknowledged that a portion of the RAA overlaps the Scotian Shelf Bioregion as illustrated in Figure 1 of King et al. 2016. The Scotian Shelf Bioregion includes the Scotian Shelf, the offshore Canadian portions of the Gulf of Maine and Georges Bank, the Scotian Slope and the deep water beyond the slope (King et al. 2016). Within the Scotian Shelf Bioregion, there are 18 EBSAs (see figure 16 of King et al. 2016). EBSA 15, Laurentian Channel, falls within the RAA. The Laurentian Channel and Slope EBSA is an area of high primary productivity, high zooplankton and fish biomass, important for groundfish, migratory route for several species, sensitive benthic communities, and small fish and invertebrate species richness. A portion of the RAA is adjacent to the Newfoundland and Labrador Shelves Bioregion which has 14 EBSAs; however, are not located within the RAA (DFO 2013).

Section 5.2.7. 1 Ecologically and Biologically Significant Areas (page 5.56) - Table 5.12 is missing the Laurentian Channel and Slope EBSA (in PBGB Area/NL Shelves Bioregion). The AOI is noted but not the EBSA (DFO, 2016).

DFO. 2016. Marine Protected Area Network Strategy for the Estuary and Gulf of St. Lawrence Bioregion. (<http://www.dfo-mpo.gc.ca/oceans/publications/mpaegsl-egslamp/index-eng.html>)

The Laurentian Channel and Slope EBSA has been added to Table 5.12.

Section 5.2.7.2 Areas of Interest (page 5.56) - It is anticipated that the Laurentian Channel AOI will receive Ocean's Act MPA designation before the end of 2017, and should be noted.

Section 5.2.7.2 Areas of Interest (page 5.56) should be modified as follows:

The Laurentian Channel Area of Interest overlaps with the southeastern corner of the RAA (Figure 5.6). In 2010, the Laurentian Channel (to the southeast of Cabot Strait and

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approximately 100 km from the Project Area) was announced as an Area of Interest for potential designation as a MPA under the Oceans Act (DFO 2011b). On June 24, 2017, the Canada Gazette proposed the Laurentian Channel Marine Protected Area Regulations would be made under subsection 35(3) of the Oceans Act, commencing a 30-day public consultation period (Canada Gazette 2017). The public consultation period closed on July 24, 2017. the Government of Canada is required to consider all input provided during the consultation period upon formulating the final regulations that will establish and govern the proposed MPA. This process is expected to be complete by the end of 2017.

The Laurentian Channel was designated as an Area of Interest due to its ecological and biological significance, including hosting the highest concentration of black dogfish in Canadian waters and being the only place where their young occur. It is an important spawning, nursery and feeding area for a variety of species including smooth skate, monkfish, pollock, and the COSEWIC-assessed porbeagle shark and white hake, and a migration route for marine mammals (DFO 2011b). This Area of Interest also provides overwintering habitat for cod and redfish stocks whose populations have been identified by COSEWIC as threatened or endangered.

Section 5.2. 7.3 Other Marine Fish Sensitive Areas (page 5. 57) - Please provide references for the Potential Redfish Mating Area and Potential Redfish Larvae Extrusion Area.

DFO (Fisheries and Oceans Canada). 2011. Recovery Potential Assessment of Redfish (Sebastes fasciatus and S. mentella) in the Northwest Atlantic. DFO Can. Sci. Advis. Sec., Sci. Advis. Rep. 2011/044. 18 pp

Section 5.3.1.3 Aboriginal Fisheries (2nd and 3'd paragraph, pages 5.72-5.73) - Licencing information for the Qalipu Mi'kmaq First Nation Band and MAMKA is dated, footnoted as 2011. Updated information (e.g., 2014 and 2015) should be provided.

Based on 2016 commercial communal data provided by DFO, the Qalipu Mi'kmaq First Nation hold 11 commercial communal enterprises, 10 of which hold groundfish licences in NAFO Division 4R. There is one enterprise that holds a licence to harvest lobster in Lobster Fishing Area (LFA) 13A, with the remainder holding licences to harvest lobster in LFA 13B, north of the Project Area. Nine enterprises hold licences for snow crab in Crab Management Areas 12, 12C, 12E or 12F (DFO pers. comm. 2017). Additionally, licences are held for harvesting herring, mackerel and scallop within the RAA. The Mi'kmaq Alsumk Mowimsikik Koqoey Association hold five enterprises with vessels less than 39'11". There are four enterprises which hold a licence to harvest lobster, with three of the enterprises holding a groundfish and snow crab quota (DFO pers. comm. 2017).

Section 5.3.2.1 Hunting (1st paragraph, final sentence. page 5.73) - The seal data presented comes from the province and is significantly different than the value DFO

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assigns for those years and is inconsistent with the Landed Value data presented for other species. DFO data for seals should be included.

The commercial seal hunt in Atlantic Canada dates back over 200 years, growing throughout the 20th century, largely to meet the demand for fur (Alexander et al. 2010). Although today the number of sealers is greatly reduced, the hunt remains a valuable economic and cultural practice in the Gulf of St. Lawrence and Newfoundland and Labrador regions. The hunt occurs annually, usually from November 15 to June 14, with the majority of sealing occurring between March and May (AMEC 2014). Two species are harvested in the Gulf, harp seal and grey sea. DFO provides statistics on the number of seals harvested each year in Canada. According to DFO (2016), in 2016 there were approximately 9,710 commercial seal licence holders, of which less than 1,000 were estimated to be active. DFO recorded approximately 66,800 harp seals and 1,612 grey seals harvested in Canada in 2016 (DFO 2016.)

Section 6.2.1 Residual Environmental Effects Significance Criteria (sentence 1, paragraph 1, page 6.2) - In this context "change" could refer to a positive alteration, and should be associated with negative alterations. Recommend adding "negative" before "change". This comment also applies to Section 6.3.1 Residual Environmental Effects Significance Criteria (sentence 1, paragraph 1, page 6.6) and Section 6.4.1 Residual Environmental Effects Significance Criteria (sentence 1, paragraph 1, page 6.12).

It is noted that in Section 6.2.1 Residual Environmental Effects Significance Criteria (first sentence, first paragraph, page 6.2), "A significant adverse residual environmental effect on Marine Fish, Shellfish and Habitat is defined as one that affects fish and/or shellfish populations, 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", should be replaced with the following, "A significant adverse residual environmental effect on Marine Fish, Shellfish and Habitat is defined as one that affects fish and/or shellfish populations, or a portion thereof, in such a way as to cause a decline or negative change in abundance and/or distribution of the population over one or more generations".

In the same context, it is noted that the word "negative" before "change" should be inserted in Section 6.3.1 Residual Environmental Effects Significance Criteria (first sentence, first paragraph, page 6.6) and in Section 6.4.1 Residual Environmental Effects Significance Criteria (first sentence, first paragraph, page 6.12).

Section 6. 2.2 Project Interactions (paragraph 3, page 6.3) - Please provide a description affected, depth of disturbance, affected species). Is there any potential for species to be transported between sites by attachment to receivers? If this is a potential issue then it should be addressed in the mitigations. The issue of species introductions/movement is also relevant to Section 6.2.3 Mitigation (5th bullet, page 6.3), Section 6.5.3 Mitigation (5th

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bullet, page 6.16), Section 6.6.3 Mitigation (5th bullet, page 6.28), Section 6.7.3 Mitigation (2nd bullet, page 6.32), Section 10.0 Summary and Conclusion (6th bullet, page 10.1).

Section 6.2.2 Project Interactions (third paragraph, p. 6.3): Deployment of the receivers to the seafloor will result in temporary, localized benthic disturbance: The receivers will be attached to compacted sand anchors, each with the dimensions of 920 mm X 810 mm X 102 mm. It is expected receivers will be placed at depths of 400-500 m. When placed, each sand anchor will cover an area of the seafloor of approximately 0.75 m². There will be approximately 70 of these anchors, representing a total area of 52 m² that would be disturbed. The receivers will be in the water between 5 to 15 days, while the sand anchors will be left in place after the survey is finished. These anchors and made up of compacted sand and will degrade to natural substances within 9-12 months of placement.

Receivers will be deployed and retrieved from the same locations, thus there is no potential for species to be transported between sites by attaching to receivers. The placement of these sand anchors may affect benthic organisms such as polychaetes, echinoderms, shellfish, corals, and sponges if they are located directly in the path of placement. Deployment of these sand anchors on the seafloor may also cause temporary sediment resuspension if deployed on soft substrates. Those organisms located directly in the path of placement may be physically affected, however the total area affected (52 m² or less) is miniscule compared to the Project Area and Laurentian Channel.

Section 6.2.3 Mitigation (5th bullet, page 6.3): Compacted sand anchors, designed to degrade within one year, will be used for the CSEM receivers: Because these anchors will remain on the seafloor once the survey is finished, and that the receivers will be deployed and retrieved from the same locations, there is no potential for species to be introduced or moved between sites as they relate to fish and fish habitat.

Section 6.5.3 Mitigation, 5th bullet point: Vessels will follow established shipping lanes in proximity to shore and will travel at speeds not exceeding 24 km/hour (14 knots), except as needed in the case of an emergency: It is unlikely that a vessel travelling through established shipping lanes would cause species introduction or cause movement of species related to fish and fish habitat.

Section 6.6.3 Mitigation (5th bullet, page 6.28): Compacted sand anchors, designed to degrade within one year, will be used for the CSEM receivers: Because these anchors will remain on the seafloor once the survey is finished, and that the receivers will be deployed and retrieved from the same locations, there is no potential for species to be introduced or moved between sites as they relate to fish and fish habitat.

Section 6.7.3 Mitigation (2nd bullet, page 6.32): Compacted sand anchors, designed to degrade within one year, will be used for the CSEM receivers: Because these anchors will

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remain on the seafloor once the survey is finished, and that the receivers will be deployed and retrieved from the same locations, there is no potential for species to be introduced or moved between sites as they relate to fish and fish habitat.

Section 10.0 Summary and Conclusions (6th bullet, page 10.1): Compacted sand anchors, designed to degrade within one year, will be used for the CSEM receivers: Because these anchors will remain on the seafloor once the survey is finished, and that the receivers will be deployed and retrieved from the same locations, there is no potential for species to be introduced or moved between sites as they relate to fish and fish habitat.

Section 6.2.3 Mitigation (2nd bullet, page 6.3) - Species at risk should be recorded by the SMMO. This comment also applies to Section 6.3.3 Mitigation (1st bullet, page 6.7), Section 6.5.3 Mitigation (1st bullet, page 6.16), Section 6.6.3 Mitigation (2nd bullet, page 6.28), Section 10.0 Summary and Conclusion (2nd bullet, page 10.1).

The SMMO will record species at risk. It is noted that this should be added to the following: Section 6.2.3 Mitigation (bullet 2, page 6.3); Section 6.5.3 Mitigation (bullet 1, page 6.16); Section 6.6.3 Mitigation (bullet 2, page 6.28); and Section 10.0 Summary and Conclusions (bullet 2, page 10.1).

Section 6.2.3 Mitigation (3rd bullet, page 6.3) - Regarding the sentence "In areas where water depth is greater than 500 m, the EM source will not be initiated", ramp-up procedures are relevant to all depths, not only in depths greater than 500m. This sentence should be revised. Ramp-up procedures should also apply to Species at Risk. Regarding " ...20 minutes have elapsed ..." The Statement of Canadian Practice recommends a 30 minute wait since the last sighting. This sentence should be revised accordingly. These comments also apply to 6.3.3 Mitigation 2nd bullet, page 6.7), 6.5.3 Mitigation (2nd bullet, page 6.16), Section 6.6.3 Mitigation (3rd bullet, page 6.28), Section 10.0 Summary and Conclusions (3rd bullet, page 10.1).

It is noted that in Section 6.2.3 Mitigation, bullet 3 (page 6.3) is revised to commit to the following measure:

- *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, sea turtle, or species at risk 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 30 minutes have elapsed since the last sighting.*

It is noted that the revised commitment also applies to the following mitigation measures: Section 6.3.3 Mitigation, bullet 2, page 6,7; 6.5.3 Mitigation, bullet 2, page 6.16; Section 6.6.3 Mitigation, bullet 3, page 6.28; and Section 10 Summary and Conclusions (bullet 3, page 10.1).

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Section 6.2.4 Assessment of Residual Environmental Effects (page 6.4 - 6.5) - Please describe the consequences for species that cannot move away from the disturbance (e.g., benthic invertebrates).

Benthic invertebrates such as polychaetes, echinoderms, shellfish, corals, and sponges may be physically affected by the placement of sand anchors. There may also be temporary sediment resuspension when the anchors are laid on the seafloor. These sand anchors will remain on the seafloor once the survey is finished and will provide hard substrate for benthic organisms. However, these anchors are designed to degrade to natural substances between 9-12 months after deployment.

The maximum area of seafloor impacted by these anchors is expected to be 52 m², if approximately 70 receivers are used, representing a miniscule area compared to the Project Area and the Laurentian Channel. These anchors will provide hard substrate for 9-12 month during and after which recolonization by benthic invertebrates can occur. Once degraded, the small sections of the seafloor impacted by these anchors will continue to provide substrate for benthic organisms.

In a similar assessment of the effects of CSEM in Eastern Newfoundland, it was determined that the area involved with sand anchor/receiver placement is small and should rapidly return to normal (LGL 2014). As a result, it was suggested there would be negligible residual effects on fish habitat in the Project Area and any effects were predicted to be not significant (LGL 2014).

Section 6.2.4 Assessment of Residual Environmental Effects (paragraph 13, pages 6.5- 6.6) - Animals are often attracted to physical structures on the seafloor. Please describe whether receivers may attract species and if so, the potential consequences. There will be some impact on the benthic habitat and associated species - this should be noted. These comments are also relevant to Section 6.6.4 Assessment of Residual Environmental Effects (paragraph 5, page 6.29).

In a similar assessment of the effects of CSEM in Eastern Newfoundland, it was determined that placement and retrieval of receivers may cause a small disturbance to fish as the receivers descend and ascend through the water column (LGL 2014). The magnitude of this disturbance would be very small and short in duration. As there are no lights on the receivers, they should not attract fish once settled on bottom.

Benthic invertebrates with preference for hard substrates may be attracted to the sand anchor once the receivers have been retrieved, but this would be of no detriment to these species, and may provide suitable habitat prior to degrading.

Section 6.2.5 Determination of Significance (page 6.6) - The effects assessment should incorporate uncertainty and the level of confidence associated with a prediction which should be noted and an explanation provided. This applies to each valued component.

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A level of confidence has been provided in bold below for each VC.

Marine Fish, Shellfish and Habitat - 6.2.5 Determination of Significance

*In consideration of the proposed mitigation measures and the limited spatial and temporal scale of Project activities, residual environmental effects on Marine Fish, Shellfish and Habitat are predicted to be not significant. **This conclusion has been determined with a moderate to high level of confidence based on a good understanding of the general effects of a controlled source electromagnetic survey on Marine Fish, Shellfish and Habitat and the effectiveness of mitigation measures discussed in Section 6.2.3.***

Marine Mammals and Sea Turtles - 6.3.5 Determination of Significance

*In consideration of the significance criteria and the implementation of proposed mitigation measures, as well as in limited spatial and temporal scale of Project activities, residual environmental effects on Marine Mammals and Sea Turtles are predicted to be not significant. **This conclusion has been determined with a moderate level of confidence given the low likelihood of animals being present and remaining within close proximity of the controlled source electromagnetic survey and the effectiveness of mitigation measures discussed in Section 6.3.3.***

Marine and/or Migratory Birds - 6.4.5 Determination of Significance

*In consideration of the proposed mitigation measures and the limited spatial and temporal scale of Project activities, residual environmental effects on Marine and/or Migratory Birds are predicted to be not significant. **This conclusion has been determined with a high level of confidence based on an understanding of the general effects of the controlled source electromagnetic survey and the effectiveness of mitigation measures discussed in Section 6.4.3.***

Species at Risk - 6.5.5 Determination of Significance

*In consideration of the nature and timing of Project activities, adverse residual environmental effects of the Project on Species at Risk are predicted to be not significant. The Project is not predicted to jeopardize the achievement of self-sustaining population objectives or recovery goals for Species at Risk and will not result in permanent loss of critical habitat as defined in a recovery plan or an action strategy. Although Species at Risk may occur within the vicinity of Project activities, effects are not expected to be inconsistent with applicable allowable harm assessments, or to necessitate a request for an incidental harm permit. Project-related residual environmental effects are not expected to contravene the prohibitions under Sections 32(1), 33, or 58(1) of SARA. **This conclusion has been determined with a moderate to high level of confidence based on an understanding of the general effects of the controlled***

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source electromagnetic survey and the effectiveness of mitigation measures discussed in Section 6.5.3.

Sensitive Areas - 6.6.5 Determination of Significance

*The Project is predicted to have limited interaction with Sensitive Areas. The Project is not expected to alter habitat of Sensitive Areas physically, chemically or biologically, in quality or extent, to such a degree that there is a decline in abundance lasting more than one generation of key species (for which the Sensitive Area was designated) or a change in community structure, beyond which natural recruitment (reproduction and immigration from unaffected areas) would not sustain the population or community in the Sensitive Area and would not return to its original level within one generation. The Project is predicted to not result in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy. Adverse residual environmental effects on Sensitive Areas are therefore predicted to be not significant. **This conclusion has been determined with a moderate to high level of confidence based on an understanding of the general effects of the controlled source electromagnetic survey and the effectiveness of mitigation measures discussed in Section 6.6.3.***

Fisheries and Other Users - 6.7.5 Determination of Significance

*In consideration of the criteria for significant environmental effects and the implementation of proposed mitigation, as well as recognition of the limited spatial and temporal scale of Project activities, residual environmental effects of the Project on Fisheries and Other Ocean Users are predicted to be not significant. **This conclusion has been determined with a high level of confidence based on a good understanding of the general effects on commercial species inhabiting the Project Area and the effectiveness of mitigation measures discussed in Sections 6.7.3.***

Section 6.3.3 Mitigation (5th bullet, page 6.7) - Should include "species at risk". This comment also applies to Section 10.0 Summary and Conclusions (7th bullet, page 10.1).

It is noted that in Section 6.3.3 Mitigation, bullet 5, page 6.7:

- 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.*

Should be replaced with the following:

- 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, sea turtles including species at risk.*

It is also noted that this comment applies to Section 10.0 Summary and Conclusions, bullet 7, page 10.1.

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Section 6.3.6 Follow-up and Monitoring (page 6.11) - Data collected on marine mammal and sea turtle observations should also be reported to the C-NLOPB.

Data collected by the SMMO concerning marine mammal and sea turtle (and shark) observations during the CSEM program will be compiled and provided to C-NLOPB and DFO.

Section 6.5 Species at Risk (2nd sentence, paragraph 3, page 6.15) - There are 23 species populations listed on Schedule 1 of SARA, including populations for two sea turtle species. This should be revised.

Section 6.5 Species at Risk (second sentence, third paragraph, page 6.15) is revised as follows:

A total of 45 Species at Risk have been identified to have the potential to occur within the RAA, including 22 species of marine fish, seven species of marine mammals, 14 species of marine and/or migratory birds, and two species of sea turtles. Of these species, 22 species have populations that are listed on Schedule 1 of SARA, including four species of marine fish, five species of marine mammals, twelve species of marine and/or migratory birds, and two species of sea turtles.

In addition, Table 5.11 Species at Risk Occurring in the RAA and Table 6.3 Relative Occurrence of Species at Risk Within the Project Area have been updated to reflect the Endangered status of loggerhead sea turtles.

It is also noted that in Section 5.2.6 Species at Risk (first sentence, eighth paragraph, page 5.53), "There are two sea turtle species at risk that have been known to occur within the RAA: the SARA-listed endangered leatherback sea turtle and the COSEWIC-assessed endangered loggerhead sea turtle" should be replaced with "There are two sea turtle species at risk that have been known to occur within the RAA: the SARA-listed endangered leatherback sea turtle and the SARA-listed endangered loggerhead sea turtle". **Section 6.5.1 Residual Environmental Effects Significance Criteria (3rd bullet, page 6.15)** - This bullet should read "results in temporary or permanent loss of critical habitat." Also, "recovery strategy" and "action plan" should be used instead of "recovery plan" and "action strategy". These comments also apply to Sections 6.5.5 Determination of Significance (2nd sentence, page 6.26), 6.6.1 Residual Environmental Effects Significance Criteria (2nd bullet, page 6.27), 6.6.5 Determination of Significance (3rd sentence, page 6.30).

It is noted that in Section 6.5.1 Residual Environmental Effects Significance Criteria, bullet 3, page 6.15:

- *Results in permanent loss of critical habitat as defined in a recovery plan or an action strategy.*

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Should be replaced with the following:

- *Results in loss of critical habitat as defined in a recovery plan or action strategy.*

It is also noted that this comment applies to the following: Section 6.5.5 Determination of Significance, second sentence, page 6.27; Section 6.6.1 Residual Environmental Effects Significance Criteria, bullet 2, page 6.27; and Section 6.6.5 Determination of Significance, third sentence, page 6.30.

Section 6. 5.2 Project Interactions (2nd last sentence. page 6.16) - Regarding "EM emissions generated by the CSEM source can potentially result in physiological and/ or behavioural changes in fish Species at Risk." - other species (e.g. marine mammals) that could be affected physiologically and/or behaviourally by EM emissions should be included. This comment also applies to Section 6.6.2 Project Interactions (3rd sentence, 1st paragraph, page 6.27).

The term 'fish' has been modified in the noted sentences as follows:

*EM emissions generated by the CSEM source can potentially result in physiological and/or behavioural changes in **various** Species at Risk.*

*EM emissions generated by the CSEM source can potentially result in physiological and/or behavioural changes in **certain marine** species, particularly those that can sense weak EM currents and/or rely on geomagnetic cues for migration.*

Section 6.5.3 Mitigation (3rd bullet. page 6.16) - The EM source should be shut down for all water depths if a SARA-listed species is observed within the safety zone.

The EM source will be shut down if a SARA-listed species is observed within 500 m of the energy source, regardless of water depth at the time.

Section 6.5.4 Assessment of Residual Environmental Effects (final sentence. 1st paragraph, page 6 .17) - This sentence should apply to all species at risk, not just fish species.

In Section 6.5.4 Assessment of Residual Environmental Effects, first paragraph, last sentence, page 6.1.7, It is noted that the sentence, "Water depths in the Project Area vary from 50 to 550 m which influences the marine fish species at risk that are likely to occur" should be replaced with the following statement, "Water depths in the Project Area vary from 50 to 550 m which influences the marine species at risk that are likely to occur".

Section 6.5.4 Assessment of Residual Environmental Effects (7th paragraph, page 6.23) - The frequency range expected from vessel operation should be included here to demonstrate the overlap with sensitivities reported in sea turtles.

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Noise emitted from the survey vessel is expected to be of low frequency (e.g., 1 to 500 Hz).

Section 6. 6 Sensitive Areas (page 6.26-6.27) - There are missing sensitive areas that should be included: significant coral and sponge areas (Kenchington, 2016), ESS Laurentian Channel and Slope EBSA, NL Shelves Laurentian Channel and Slope EBSA, and IBAs located outside the PA but within the RAA (e.g., Magdalen Islands).

Coral and sponge areas have been discussed in Section 5.2.2.3 of the assessment and Important Birds Areas are discussed in Section 5.2.5.4.

Table 5.12 should be modified as shown in the bold below.

Table 2.1 EBSAs in the Project Area RAA

EBSA	Size (km ²)	Significance
Western Cape Breton	8,198	Major feeding and spawning area for several meroplankton and groundfish.
		Highest meroplankton abundance (eggs and larvae) among all the identified areas in the Gulf.
		Cape Breton Channel is a migration corridor in spring and fall towards the Atlantic for the COSEWIC assessed Atlantic cod and white hake.
		Important summer feeding area for witch flounder and COSEWIC assessed white hake.
Southern Fringe of the Laurentian Channel	5,941	Important feeding ground and wintering area for pelagic fish and groundfish.
		The middle of the channel serves as wintering areas for groundfish species such as Atlantic cod. The EBSA only partially covers an important wintering area for the Atlantic cod, leaving out the southern slope in the Cabot Strait.
		The southeastern boundary of this area serves as a spring and fall migration corridor for southern Gulf species such as Atlantic cod, coastal white hake and other groundfish species.
West Coast of Newfoundland	18,238	Important for groundfish as a spawning area and nursery for juveniles.
		Concentration area for the COSEWIC assessed juvenile Atlantic cod, redfish, American plaice and SARA-listed Atlantic wolffish.
		The channel in the Cabot Strait represents a migration corridor and refuge for several species of pelagic fish such as Atlantic herring, capelin, silver hake and pollock.
Laurentian Channel and Slope	21,484	An area of high primary productivity, high zooplankton and fish biomass, important for groundfish, migratory route for several species, sensitive benthic communities, and small fish and invertebrate species richness.

Source: DFO 2007, DFO 2014

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Section 6.6.2 Project Interactions (last sentence 1st paragraph page 6.27) - It should be mentioned that benthic species could be impacted by the deployment of receivers to the seafloor.

The following sentence has been modified to the following:

The deployment of the receiver packages will require dropping anchors on the seafloor, which would result in disturbance to potentially important benthic habitat and benthic species within the Sensitive Areas.

Section 6.6.3 Mitigation (page 6.28) - To prevent harm to important benthic habitats, including significant coral and sponge areas, receivers should not be deployed on known coral and sponge locations. This comment also applies to Section 6.2.3 Mitigation (page 6.3) and Section 10.0 Summary and Conclusions (pages 10.1-10.2).

EMGS will not deploy receivers on currently known coral and significant sponge locations.

Section 6. 6.4 Assessment of Residual Environmental Effects (Survey Vessel Operations. page 6.29) - Residual effects of vessel noise should also be discussed.

As discussed in Section 6.2.4 and 6.3.4, sound levels created by the continuous underwater noise of the survey vessel as it moves, is not anticipated to cause effects that would result in direct physical injury to fish species or marine mammals and sea turtles. The avoidance behaviour of some fish species may occur, such as startle responses, and marine mammals may exhibit some behavioural changes such as changes in vocalization and call length, diving rates and/or distances, travelling distances, temporary avoidance of the area, or, during sensitive times of the year, changes in breeding or migration patterns. However, due to the relatively short temporal scope of the project (5-15 days), and the transient movement of the vessel as it moves through its transects, it is anticipated that these sound levels generated by the single survey vessel would not cause any significant effects on sensitive areas, or the use of them by marine species. The Gulf of St. Lawrence is a relatively busy route for ocean vessels, and it is not expected that the use of the survey vessel for this short period of time would contribute a measurable increase to the current noise levels of that area to induce significant residual environmental effects on sensitive areas.

Section 6.6.4 Assessment of Residual Environmental Effects, Receiver Deployment and Retrieval (page 6.29) -Reference to corals and sponges when discussing impacts to benthic habitat should be included.

Coral and sponge areas have been discussed in Section 5.2.2.3 of the assessment. Following review of Kenchington et al. 2016 and as noted in Section 5.2.2.3, it is acknowledged that coral and sponge areas are present in the Gulf and the Laurentian

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Channel. Sponge locations are identified on Figure 28 of the Kenchington et al. 2016 report, including identification of significant sponge areas. Significant sponge areas are present within the RAA; however, are not present within the Project Area. Sea pen locations are identified on Figure 31 of the Kenchington et al. 2016 report, including identification of significant sea pen areas. Significant sea pen areas are present within the RAA; however, are not present within the Project Area.

Section 6.7.1 Residual Environmental Effects Significance Criteria (3rd paragraph, page 6.31) - Additional information should be provided for scientific research. Interference with research activities or changes to species distributions would both hinder scientific research.

It is understood that DFO stock assessment surveys and research activities throughout the maritime marine environment, with the potential to overlap with the proposed Project. Scientific research vessels have been considered in the assessment of Other Ocean Users. EMGS will communicate in advance with DFO to eliminate any potential conflict with research vessel cruises. As discussed in detail in Section 6.2 (Marine Fish, Shellfish and Habitat), Section 6.3 (Marine Mammals and Sea Turtles) and Section 6.4 (Marine and/or Migratory Birds), it is also noted that residual effects to species is predicted to be negligible to low given short duration of the proposed Project and localized geographic areal extent.

Section 6.7.1 Residual Environmental Effects Significance Criteria (paragraph three, page 6.31) is revised as follows:

*A **significant adverse residual environmental effect** on Other Ocean Users is one that has a detrimental effect on the use of the Gulf of St. Lawrence and Cabot Strait by marine traffic and, military activity, or scientific research activity, causing a long-term change in the established traffic patterns or interference with military the implementation of these activities and/or results of scientific research.*

Section 6.7.3 Mitigation (6th bullet, page 6.32) - Include posting of advisories with the Canadian Coast Guard and the CBC Fisheries Broadcast.

As per section 6.7.3 Mitigation, EMGS is committed to communicating the timing and location of proposed activities by means of a Notice to Mariners and Notice to Shipping, and by posting of advisories with the Canadian Coast Guard and the CBC Fisheries Broadcast.

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

Section 3.0 Consultation and Engagement (page 3.1) - There are strong indications from science that redfish and other groundfish resources are on the rise in the Gulf. On the west coast there has been a significant increase in Atlantic halibut, which is harvested by long line (not haddock).

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It is noted that in Section 3.0 Consultation and Engagement, page 3.1, “Atlantic haddock” should be replaced with “Atlantic halibut”.

Section 3.0 Consultation and Engagement, Table 3.1 Comments raised during Consultations (page 3.2) - FFAW-Unifor members do not generally use trawl gear for the species that have been fished in the Project Area. An exception would be redfish but a fishery for redfish in 2017, if opened, would be limited.

Thank you, comment noted. Table 3.1 has been revised (see bolded text) to reflect that FFAW-Unifor members do not generally use trawl gear for the species that have been fished in the Project Area, except for the redfish fishery, which if opened in 2017, would be limited.

Table 2.2 Comments Raised during Consultations

Comment	Response
General	
Do you need to go through the Canada-Nova Scotia Offshore Petroleum Board process as well?	No, as the survey grid remains on the NL side, just need to adhere to the Canada-Newfoundland and Labrador Offshore Petroleum Board process.
Receiver Deployment/Retrieval	
Are the receivers equipped with a GPS?	No, but the acoustic anchor release acts in the same fashion.
With no GPS how do you account for drift during deployment?	The first receiver deployed basically sets the alignment of the receivers that follow.
How close to target position does the anchor/ receiver need to be?	The goal is to position a receiver within 200 m from a pre-defined target position. Larger allowance can be accepted depending on survey layout. Actual location of receiver is recorded with a high accuracy.
How loud is the acoustic signal of the anchor release? Could there be a “wave” of retrieval	Retrieval of the 74 (or less) receivers will take place over a three-day period, so there will a sound generated during the release approximately once per hour. The receivers themselves are low-noise and the source generates low frequencies ranging from 0.05 to 10.00 Hz.
If an anchor does not settle in the proper location, do you retrieve and replace	No, just set the second receiver to set the second for the remainder of the grid and retrieve both at the end of the survey.
Do you receive data as the survey progresses?	QA/QC data with respect to towing depth, etc., but not EM data. That is processed from retrieved receivers. No real-time monitoring of receivers except tracking during ascent and descent.
Does the source stay at depth due to towing speed?	No, the source (towfish and tailfish) has neutral buoyancy and is water depth-dependent; it is towed 30 m above the seabed. The source is towed approximately 450 m behind the vessel at 500 m water depth (due to 40° angle) and the source itself is 340 m in length.

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Table 2.2 Comments Raised during Consultations

Comment	Response
Receiver Loss	
How often are receivers lost? How are they recovered?	Approximately 1 in 1,000 deployments, through loss of ability to detach from the anchor. Deterioration of the anchor will eventually release the receiver, which will float to the surface. The receiver has a placard with information if found.
If a receiver is lost, is notification of the position provided (e.g., Notice to Shipping (NOTSHIP))	Yes, location is made public to mariners.
Is it possible that the receivers will be caught up in trawls? (question from EMGS)	FFAW-Unifor vessels do not trawl. An exception would be redfish but a fishery for redfish in 2017, if opened, would be limited.
Anchor	
How big is the anchor?	The anchor is 170 kg, as is the receiver. The anchor is 1 m x 1 m x 0.1 m, made of patented soluble cement, which dissolves to reduce the concrete to disaggregated sand. The anchor deteriorates within 6 to 12 months (it deteriorates faster in colder water)
Is the anchor recovered? The video seems to indicate that it is	No, the anchor is left in place and eventually deteriorates. The retrieved receiver is immediately placed on a new anchor for redeployment.
Fisheries Liaison Officer (FLO)	
While there may be only minimal amount of fishing in the Project Area, it is recommended that you use an FLO	It is EMGS's intention to use an FLO. They have contracted a local crewing company to provide logistics for the NL programs, including hire of FLO. While not explicitly stated, it is expected that the FLO would be an FFAW-Unifor member.
Would there be a separate FLOs for the east coast and west coast surveys?	Unlikely given the time frame (approximately 1.5 months for the east coast survey and 10 days for the west coast survey (not including weather down time)), unless EMGS has a crew change between the programs.
When will you know if the survey is proceeding? Need to be able to slot FLO (and SMMO if required) into schedule?	Will probably know by June. A local crewing company will be responsible for hiring FLO.
East coast survey is likely to happen in August/September 22, and west coast survey after that (comment from EMGS)	Most FFAW-Unifor fishers will be available at that time to act as an FLO.
Survey Details	
Where is the Project Area?	The Project Area is primarily over Exploration Licence 1153 ("Old Harry").
Is there much movement when towing the source?	No, use vessel to stay within the grid line. Not much tailfishing; and the solid streamer that is now used provides a more stable tow line. OCI noted there was a 0.5 knot (0.3 m/s) current in the area.

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Table 2.2 Comments Raised during Consultations

Comment	Response
How long will the survey last?	Approximately 10 days (1.5 to 2 days receiver deployment, 3 days survey, 3 days receiver retrieval). Weather down-time could extend this timeframe by a few days.
Will the survey be conducted this year?	Not 100% yes, but things are lining up that indicates that the survey will be conducted this year. However, the west coast survey will only be conducted if the east coast survey goes ahead. Currently planned for last week September/first week October.
Survey is currently planned for last week September/first week October. Will there be any conflict with fishing activity?	OCI's offshore fleet will be fishing east and north, so no interaction with project. FFAW-Unifor indicated that there will likely be no interaction with their members during this Project. FFAW-Unifor indicated that while there is a west coast fishery in September/October, there is limited activity in the Project Area.

Section 5.2.7 Sensitive Areas (pages 5.53-5.57) - As the Potential Redfish Mating Area (September-December) overlaps with the Project Area (September-October) with respect to timing, further information regarding how the project may impact redfish mating is warranted in this assessment.

Redfish are ovoviviparous in that fertilization is internal and females bear live young (DFO 2011a). As a result, redfish do not deposit eggs and will not be impacted by placement of receiver anchors on the seafloor. Mating takes place between September and December, and females carry the developing embryos until they are extruded as free swimming larvae between April and June (DFO 2011a). In the Gulf of St. Lawrence, Deepwater redfish extrude their larvae three to four weeks earlier than Acadian redfish (DFO 2011a). Redfish larvae prefer water temperatures between 4-11°C, and depths of less than 30 m; despite the preference for certain depths, they have been observed in the upper 200 m of the water column in the Gulf of St. Lawrence (COSEWIC 2010).

Mating and larval extrusion do not necessarily occur in the same locations resulting in a Potential Redfish Mating Area (September - December) and a Potential Redfish Larvae Extrusion Area (April - July) identified by DFO that would occur in different locations and be enforced during different times of the year. Project Activities are scheduled to occur between August 1 and December 1, 2017 and will overlap with the redfish breeding period (September to December). While there will be temporal and spatial overlap between Project Activities in the Project Area, and redfish mating in the Potential Redfish Mating Area, any effects are predicted to be not significant. In a similar assessment of the effects of CSEM in Eastern Newfoundland, it was predicted that low frequency CSEM covering a small area over a short period of time will have no discernable health effects

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on marine biota (including fish eggs and juveniles) (LGL Limited 2014). Potential concerns were identified for species that use geomagnetism to navigate, or electro-reception to find food (LGL Limited 2014), but redfish are not one of these species.

Similarly, it will be unlikely that the noise generated by the survey vessel will cause injury to fish or their larvae. Noise emitted from the survey vessel will likely be in the range of 170 to 180 dB RMS re 1 µPa @ 1 m, which is below the noise level needed to elicit damage for fish that are two grams or heavier (peak levels of noise that are above 206 dB re 1 µPa and cumulative SELs of 187 dB re 1 µPa) (Fisheries Hydroacoustic Working Group 2008). Breeding redfish will weigh more than two grams and therefore, it will be extremely unlikely that direct injury to fish will occur due to the operation of the survey vessel.

Section 6.1 Overview of Project Interactions and Potential Effects, Table 6.1 Potential Project-VC Interactions (page 6.1) - While we recognize it is unlikely that there would be interaction between the fishery and receiver deployment and retrieval due to the mitigation measures proposed (i.e. FLO onboard, Notice to Shipping, etc.) there is still a potential for interaction and it should be noted as such in Table 6.1.

Table 6.1 has been revised to reflect the potential interaction between the fishery and receiver deployment and retrieval. It is noted; however, that an interaction is unlikely given the proposed mitigation measures.

Table 2.3 Potential Project-VC Interactions

Project Activities and Physical Works	Valued Component					
	Fish, Shellfish and Habitat	Marine Mammals and Sea Turtles	Marine and/or Migratory Birds	Species at Risk	Sensitive Areas	Fisheries and Other Users
Survey Vessel Operation (noise, lights, marine discharges, towing operation)	X	X	X	X	X	X
Operation of CSEM Source	X	X		X	X	X
Receiver Deployment and Retrieval	X			X	X	X

In addition, this potential interaction is noted in Section 6.7.

“The survey vessel will emit noise and light, as well as permitted marine discharges during operation. Although it will be moving at slow speeds, particularly during towing

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operations, there is the potential for interaction with Fisheries and Other Ocean Users who may be transiting the area.

The operation of the CSEM source will generate underwater EM emissions. To the extent that these emissions temporarily affect the local distribution of commercial fish species, Fisheries and Other Ocean Users (e.g., DFO research surveys) could also potentially be affected by this activity.

Although unlikely, deployment of the receiver to the seafloor and retrieval of receiver packages, there is potential for interaction with Fisheries and Other Ocean Users who may be transiting the area.”

Section 9.3 Follow-up and Monitoring (page 9.3) - It is understood that the receiver bases that are left on the ocean floor following the survey are designed to disintegrate in about a year. Has the proponent returned to a survey site and done testing to confirm that this is the case? There is a potential concern that a commercial fish harvester could hook a receiver base for example in the spring or summer next year (2018). Have there been any incidences of this occurring in other jurisdictions?

The dissolvable anchor is patented under the title “Controlled deterioration of non-reinforced concrete anchors”. In one case an anchor was revisited with a ROV in the Gulf of Mexico, where it had dissolved as expected after approximately one year on the seabed. During production, for each batch producing 500 anchors, a sample is set aside for testing. Each batch is also marked with a batch number which is tracked to deployment.

Appendix C, Commercial Fishing Locations by Species, Figure 2, Commercial Fisheries Activity by Year Greenland Flounder Halibut - Is this information for Greenland halibut (also known as turbot)?

It is noted that in Appendix C, Commercial Fishing Locations by Species, Figure 2 Commercial Fisheries Activity by Year Greenland Flounder Halibut should be replaced with Figure 2 Commercial Fishing Activity by Year Greenland Halibut.

Appendix C, Commercial Fishing Locations by Species, Figure 7, Commercial Fisheries Activity by Year Snow Queen Crab - The species predominately fished in Newfoundland and Labrador is snow crab *Chionoecetes opilio*. It may sometimes be referred to as queen crab in the market.

*It is noted in Appendix C, Commercial Fishing Locations by Species, Figure 7, Commercial Fisheries Activity by Year Snow Queen Crab, that the species predominately fished in Newfoundland and Labrador is snow crab *Chionoecetes opilio*, which is sometimes referred to as queen crab in the market.*

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2.4 The St. Lawrence Coalition (SLC)

Section 1.1 Project Justification (page 1.1) - The proponent offers no convincing justification for the project. Over the years, a very large number of scientists, fishermen associations, tourist associations, municipalities, private citizens, as well as numerous First Nations around the Gulf of St. Lawrence have expressed strong concerns over oil exploration in the Gulf. In view of this, and the fact that any eventual drilling will be met with fierce opposition, it is surprising to see a proposal to continue further oil exploration in the Gulf. The proponent should offer an extensive justification for this CSEM project.

This environmental assessment has been submitted to support an application for a Geophysical Program Authorization in accordance with the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2017). EMGS is confident that this project can be undertaken in a safe and environmentally responsible manner in accordance with C-NLOPB requirements.

Section 2.2.1 Survey Vessel Operation (page 2.2) - The proponent will have a seabird and marine mammal observer (SMMO) on-board the survey vessel. Considering the difficulty of accurately observing marine mammals during the course of operations, while attending to stranded seabirds, we believe that this job should be split between two persons: a marine mammal observer and a seabird specialist. In addition, these persons should be adequately trained and be certified to perform these important tasks. What will be their qualification? Will they be certified observers? The EA Report is silent about these aspects.

EMGS will have two SMMOs on-board the survey vessel during operations. SMMOs will be trained and experienced qualified professionals capable of identifying both marine birds and mammals.

Section 2.4 Project Schedule (page 2.6) - We read on page 2.6 that the project could be performed between August and December 2017, pending regulatory authorizations. Yet, on page 2.1 we can read that the survey could be performed between August and November 2017. This should be clarified. We read on page 2.6 that the timing of the survey will depend on "EMGS' client priority and circumstances". This requires clarification: 1) who is this client of EMGS? 2) What is meant by the "priorities and circumstances" of the client?

The CSEM survey will be performed between August 1 and December 1, 2017. EMGS is still in the process of finalizing the project, as such an exact start date is not presently known. The CSEM survey is a multi-client project. EMGS will obtain ownership of the data and will have the future right to sell it to interested parties.

Section 3.0 Consultation and Engagement Table 3.1 Comments Raised during Consultations, Fisheries Liaison Officer (page 3.3) - We learn on page 3.3 that EMGS

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intends to deal with a Fisheries Liaison, most likely a member of FFAW-Unifor. Has such a liaison been considered with fishing associations from other provinces, considering that their members could also be active in the Project Area? Have any contacts been made with fishing associations from other provinces?

Given that the proposed CSEM survey falls entirely within the western offshore waters of insular Newfoundland, consulting with a Fisheries Liaison from fishing associations in other provinces has not occurred. As per the Scoping Document, the One Ocean Protocol for Consultation with Fishers was followed. This document provides contact information for fishery organizations in Newfoundland and Labrador, with whom were consulted.

Section 3.0 Consultation and Engagement, Table 3.1 Comments Raised during Consultations, Survey Details, Project Area (page 3.3) - On page 3.3, the "project zone" is described as corresponding with exploration licence 1153 (Old Harry). Yet, on page 1.2, Figure 1.1 clearly shows that the "project zone" is much larger than the 1153 exploration licence. This should be clarified.

*Table 3.1 Comments Raised during Consultation, Survey Details, Project Area, page 3.3, indicates that the "Project Area is **primarily** over Exploration Licence 1153 ("Old Harry")"; however, the "project zone" extends beyond Exploration Licence 1153 as depicted in Figure 1.1. The Project Area was described as primarily over Exploration Licence 1153 ("Old Harry") to provide a point of reference during consultation.*

Section 5.2.2.3 Coral and sponges (pages 5.12 and 5.13) - Up to 14 taxa of coral, including sea pens and gorgonian corals, can be found in the Laurentian Channel. These can also be found "within or near the Project Area", according to the Environmental Assessment Report. The dropping of the CSEM receivers as well as their accompanying cement bases by EMGS could be a definite perturbation factor to these fragile organisms. No mitigation measures, such as photographs of the sea bottom prior to the placement of the receivers, seem to have been considered in order to minimize the impact on these sessile organisms. This should be corrected.

While there are up to 14 taxa of corals in the Gulf of St. Lawrence, sea pens and soft corals are the most common groups and have wide distributions throughout the Gulf. Based on studies such as Kenchington et al. (2010, 2016), there are substantial concentrations of sea pens in the Project Area and the Laurentian Channel. The sand anchors to which the receivers will be attached have the potential to physically affect and/or disturb sea pens during the laying of these anchors. Placement of anchors may also cause temporary sediment resuspension which may also disturb sea pens. There will be approximately 70 sand anchors laid and they will remain on the seafloor after receivers are retrieved. These sand anchors will degrade into natural substances within 9 to 12 months after placement.

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The dimensions of the sand anchor are 920 mm X 810 mm X 102 mm, and the footprint of each of these will be approximately 0.75 m². If 70 of these are used, this would represent a total area of approximately 52 m². While there is an abundance of sea pens in the region, the overall effect on sea pen populations is anticipated to be low, as the disturbed area represents a miniscule area compared to the Project Area and Laurentian Channel as whole, where sea pens are ubiquitous.

Section 5.2.3 Marine Mammals, Table 5.6, North Atlantic Right Whales (page 5.14) - On page 5.14, as well as in five other instances in the EA Report, the North Atlantic Right Whale is mentioned as being endangered and “rarely” seen in the Gulf of St. Lawrence. These sections should definitely be updated in view of the dramatic events of summer 2017. During a span of 4 weeks, eight North Atlantic Right Whales were found dead in the waters of the Gulf. Considering that their total population is only 525 individuals, this is truly a major concern towards the survival of the species. Preliminary necropsies have revealed that the two major causes of death were impacts with ships and entanglement with fishing gear. DFO even closed early the crab fishing season to prevent further deaths. In that context, it seems irresponsible to hold the CSEM surveys in Fall 2017, adding to the pressure on this extremely fragile species. EMGS affirms that a marine mammal observer will be on-board to monitor any approaching marine mammal. The North Atlantic Right Whale is one of the most difficult marine mammals to observe considering that its back is barely visible above the surface of the sea. What particular measures will be used to remove any threat to the Right Whale?

The proponent is aware of and continues to monitor scientific reporting on the unfortunate recent events involving the unusual occurrence, and mortality, of North Atlantic right whales within the Gulf of St. Lawrence. North Atlantic right whales historically aggregate to feed in the Bay of Fundy and Roseway Basin, and their occurrence in the Gulf of St. Lawrence in such numbers is unprecedented. As noted in the IR, preliminary necropsies at the time of preparing this response suggest the two major causes of death were entanglements with fishing gear and ship strikes. While transiting between the shorebase (likely in St. John's) and the survey area, the survey vessel will generally travel at an average speed of 22 to 24 km/hr (12 to 13 knots) but will abide by any measures put into place by the federal government, such as the requirement for large vessels to slow down to 10 knots. During the survey, the vessel will travel with an average speed of approximately 4 to 5.5 km/hr (2 to 3 knots), speeds that are well below those responsible for the majority of vessel strikes.

In light of recent events concerning North Atlantic right whales, the Project's mitigative commitments have been expanded as follows:

- *The number of SMMO onboard CSEM surveys has been increased from one to two, so as to increase the effectiveness of monitoring and the likelihood of detecting*

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North Atlantic right whales and other SARA species. SMMOs will be trained and experienced qualified professionals.

- *Should a North Atlantic right whale (or any listed SARA species) be observed within 500 m of the energy source, the EM source will be shut down immediately, regardless of the water depth at the time of sighting.*

Section 5.2.6 Species at Risk, Table 5.11 Species at Risk Occurring in the RAA, Beluga Whale (page 5.45) - In Table 5.11, the Beluga Whale (St. Lawrence Estuary population) is said to be "Threatened" in Annex I of the *Species at Risk Act*. This needs to be updated as this population of Beluga is now considered "Endangered" in Annex I of SARA.

Section 5.2.6 Species at Risk, Table 5. 11 – Species at Risk Occurring in the RAA (page 5.47) has been modified to reflect the Beluga Whale's (St. Lawrence Estuary population) SARA status as Endangered.

Table 6.3 – Relative Occurrence of Species at Risk within the Project Area (page 6.3) has been modified to reflect the Beluga Whale's (St. Lawrence Estuary population) SARA status as Endangered.

Section 5.2.7.2 Areas of Interest (page 5.56) - Two major updating of Section 5.2.7.2 need to be made:

a.) Laurentian Channel MPA (Marine Protected Area). The EA Report refers to this area, in the Laurentian Channel, as being a simple "area of interest" to DFO. This needs to be updated since the proposed regulation of the official MPA has been recently published in the Canada Gazette.

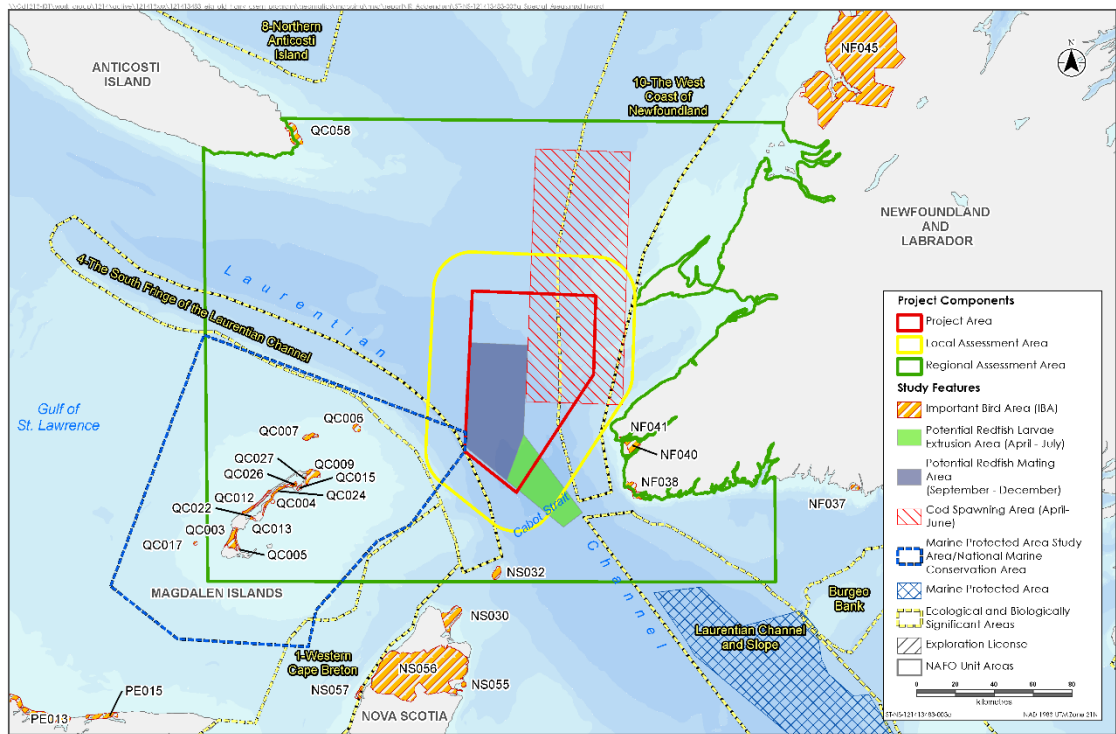
b.) Magdalen Islands Marine Protected Area Project (attached). A vast 15,000 km² area around the Magdalen Islands is being considered as an area of interest for a marine protected area (MPA) by the federal and Québec governments. This area should be added to Figure 5.6 and to Section 5.2.7.2.

a) *It is noted that the Laurentian Channel MPA Regulations were recently released for a 30-day public consultation period which closed on July 24, 2017. Following consideration of input received during this period, the process to regulate the Laurentian Channel as an MPA is expected to be complete by 2017 (Canada Gazette 2017).*

b) *The Magdalen Island Marine Protected Area Project has been added to Figure 5.6, provided below.*

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The following shall be added to Section 5.2.7.2.

The Magdalen Islands Marine Protected Area Project overlaps the southeastern portion of the RAA. The area under review for MPA designation is approximately 16,500 km² and located in the area around the Magdalen Islands (CPAWS 2012). The waters around the Magdalen Islands provide habitat to several species not found in other north-eastern ocean waters given the warm waters of the semi-shallow basin (CPAWS 2012). There are over 200 bird species as well as many fish and shellfish species (CPAWS 2012).

Section 6.2.4 Assessment of Residual Environmental Effects (page 6.3) - It is clearly determined that some organisms are negatively influenced by strong electromagnetic fields, notably species or groups such as eels, salmon, sharks, crustaceans, etc., who use such natural fields to navigate. The EA report minimizes any residual environmental effects of the CSEM survey and says the residual effects are both spatially and temporally negligible. Based on the Precautionary Principle, the C-NLOPB should refuse the CSEM project.

The EA clearly recognizes that "EM emissions generated by the CSEM source can potentially result in physiological and/or behavioural changes in fish species, particularly



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those that are able to sense weak EM currents and/or rely on geomagnetic cues for migration” (page 6.3) and species encompassed in this characterization include the species groups mentioned. However, given that the instantaneous geographic areal extent of potential exposure would be 0.5 - 2 km², with a duration of exposure of approximately 12 to 21 minutes (LGL 2014; EA page 6.5), we believe that the conclusion of negligible, short-term effects is valid and reasonable.

Section 6.6.3 Mitigation, ramp-up procedures (page 6.28) - In section 6.6.3, as well as in various other sections of the EA Report, it is proposed to use ramp-up procedures based on the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment. However, this Statement has been criticized by numerous marine mammal scientists as being too permissive. The proponent’s ramp-up procedure should definitely be strengthened to be more in line with current scientific knowledge².

The Project has committed to employing ramp-up and shutdown procedures for the CSEM source. Given the nature of the program (i.e., introduction of an electromagnetic signal into the marine environment) and the short survey period, residual environmental effects of the Project are predicted to be not significant, and the implementation of these mitigation measures adds to the conservatism of this conclusion. It is noted that the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment was developed expressly to specify “the mitigation requirements that must be met during the planning and conduct of marine seismic surveys” (Government of Canada, 2005) and is therefore not directly applicable to CSEM surveys.

² Weir, C.R. and S.J. Dolman. 2007. Comparative Review of the Regional Marine Mammal Mitigation Guidelines Implemented during Industrial Seismic Surveys, and Guidance Towards a Worldwide Standard. *Journal of International Wildlife Law and Policy*, 10:1– 27

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