2019

PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT ENVIRONMENTAL PROTECTION PLAN (EPP): MARINE OPERATIONS

GRIEG NL

December 2019

Placentia Bay Atlantic Salmon Aquaculture Project
Environmental Protection Plan (EPP):

Marine Operations

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Preface

Grieg NL's Environmental Protection Plan (EPP) for the Placentia Bay Atlantic Salmon Aquaculture Project is a directive document that provides detailed steps to avoid or minimize negative effects on the environment. The EPP covers marine operations in Placentia Bay, Newfoundland and Labrador (NL). The responsibilities and procedures presented in this document are designed to ensure the efficacy of the plan and to allow for ongoing updates to the plan to accommodate improvements. This Preface includes overviews of the following:

- Distribution List
- EPP Responsibilities
- EPP Revision Procedures

Distribution List

The EPP will be provided to relevant Grieg NL personnel, contractors, subcontractors, and government agencies designated as having a surveillance responsibility.

Grieg NL Personnel

- General Manager
- Production Manager
- Environment, Health and Safety Advisor
- Grieg NL Site Manager(s) (Land and Sea) where appropriate

Contractors

- General Manager
- Environment, Health and Safety Manager

Subcontractors

- General Manager
- Environment, Health and Safety Manager

Government Agencies

- Department of Municipal Affairs and Environment (DMAE)
- Department of Fisheries and Land Resources (DFLR)
- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (ECCC)
- Transport Canada

EPP Responsibilities

The responsibilities of Grieg NL and its employees as well as those of contractors and subcontractors are summarized below.

As the proponent, Grieg NL shall:

- Provide approval for the final issued version of the EPP and subsequent revisions.
- Inspect and monitor project activities during marine operations.
- Conduct EPP reviews on a regular and as-needed basis.
- Communicate with relevant government agencies and local stakeholders as required.

The Grieg NL Environment, Health and Safety (EHS) Advisor or their designated representative(s) shall:

- Be responsible for implementation of the EPP.
- Review and approve revision requests.
- Conduct EPP reviews on a regular and as-needed basis.
- Maintain document control.
- Ensure the EPP holders and their personnel are familiar with the EPP and its procedures.
- Strive for compliance with all permits, authorizations, and approval conditions; and ensure that appropriate supervisory personnel are on site during project activities as appropriate.

The Grieg NL Site Managers or their designated representative(s) shall:

- Distribute revisions to EPP holders.
- Be familiar with all aspects of the EPP.
- Confirm that all activities are conducted in accordance with the EPP.
- Hold environmental awareness sessions for each Contractor and its personnel, and other personnel involved in the Project.
- Report on the efficacy of the EPP.
- Attend weekly contractor meetings.
- Identify any deficiencies in the plan and propose appropriate changes.
- Direct appropriate contingency actions and enact external notifications procedures in the event of an incident.
- In his or her absence, designate a qualified replacement.
- Manage the environmental inspection and monitoring needed to meet EPP requirements and reporting requirements of Grieg NL.

EPP holders shall:

- Keep the EPP copy current and enter all revisions on the revision control record.
- Familiarize themselves and their personnel with the EPP and any revisions.
- Initiate changes to improve the EPP.

Contractors, Subcontractors and Site Personnel shall:

- Become familiar with the EPP.
- Become knowledgeable of reporting procedures.
- Comply with the EPP, contract requirements, and applicable laws/regulations.
- Obtain applicable permits, approvals and authorizations in coordination with Grieg NL personnel.
- Attend all required EHS training and orientation programs.
- Report all incidents of non-compliance with the EPP.

EPP Revision Procedures

The EPP is a controlled document and revisions may only be made with the approval of Grieg NL. EPP users are encouraged to submit suggestions for changes and improvements to the EPP, using the *EPP Revision Request Initiation Form* (see below). Upon receipt of suggestions, and where appropriate, designated Grieg NL personnel will prepare a proposed revision to be submitted for approval by Grieg NL's EHS Advisor or another designated representative. Approved revisions will be issued to all members of the EPP Distribution List (see above), accompanied by a Revision Control Record (see below), which will provide the EPP section(s) being superseded and revision instructions. Each revision will also be accompanied by an updated EPP Table of Contents.

Within two working days of receiving an approved EPP revision, EPP users are to:

- Confirm all listed pages have been received in accordance with the Revision Control Record;
- Read the revised text;
- Insert the revised pages into the appropriate position within the EPP, and remove and destroy the superseded pages;
- Confirm the EPP document is in accordance with the updated Table of Contents;
- Enter the revision number and date on the Revision Control Record, and sign; and
- Incorporate the revision into Project activities, and ensure all personnel are familiar with the revision.

Grieg NL Placentia Bay Atlantic Salmon Aquaculture Project Environmental Protection Plan (EPP): Marine Operations

Revision Request Initiation Form

Name:

Affiliation (Position and Company / Government Department):

Date (D-M-Y):

EPP Section to be Revised:

Nature of Revision:

Rationale for Revision:

Suggested Revision:

Please submit to Production Manager, Grieg NL at the following address:
205 McGettigan Blvd., Marystown, NL A0E 2M0

Revision Control Record for the EPP: Marine Operations

Revision Number	Date (D-M-Y)	Revised EPP Section(s)	Revision Instructions and Source	EPP Holder's Signature

List of Acronyms and Abbreviations

~	Approximately
AAR	*Aquaculture Activities Regulations*
BMA	Bay Management Area
BOD	Biochemical Oxygen Demand
BPWMC	Burin Peninsula Waste Management Corporation
CFIA	Canadian Food Inspection Agency
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
DFLR	Department of Fisheries and Land Resources
DFLS	Department of Fisheries and Land Resources
DFO	Fisheries and Oceans Canada
DMAE	Department of Municipal Affairs and Environment
ECCC	Environmental Protection Plan
ECCC-CWS	Environment and Climate Change Canada-Canadian Wildlife Service
ECRC	Eastern Canada Response Corporation
EEMP	Environmental Effects Monitoring Plan
EHS	Environment, Health and Safety
EIS	Environmental Impact Statement
EPP	Environmental Protection Plan
ESA	*Endangered Species Act*
FCR	Feed Conversion Ratio
g	Grams
GAP	Gasoline and Associated Products
HSE	Health, Safety and Environment
IBC	Intermediate Bulk Container
kg	kilogram
km/h	kilometres per hour
L	Litres
m	metres
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBCA	*Migratory Birds Convention Act*
MBR	Migratory Birds Regulations
MCTS	Marine Communication and Traffic Services
mm	millimetres
NL	Newfoundland and Labrador
OCI	Ocean Choice International
pH	Potential of Hydrogen
PPE	Personal Protective Equipment
RAS	Recirculating Aquaculture System
ROV	Remotely Operated Vehicle
SARA	*Species at Risk Act*
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
VEC	Valued Environmental Component
VHF	Very High Frequency
WHMIS	Workplace Hazardous Materials Information System

1.0 Introduction

This Environmental Protection Plan (EPP) has been developed by Grieg NL to describe environmental protection procedures for activities associated with marine operations. The sea cage sites are located in four Bay Management Areas (BMAs) located in the northern portion of Placentia Bay. The EPP has been developed in compliance with a condition of the Project release issued by the provincial Department of Municipal Affairs and Environment (DMAE) at the conclusion of an environmental assessment process. The EPP will serve as a set of instructions for Project-related activities and will list the various environmental permits and authorizations to be issued by different agencies. Separate EPPs have been prepared and approved for marine construction, and construction and operation of the Recirculating Aquaculture System (RAS) Hatchery in Marystown. Note that this EPP generally follows the preliminary EPP outline provided in Section 8.2 of the Grieg NL Environmental Impact Statement (EIS) for the Project (LGL 2018a); however, certain document organization changes were made to reflect that multiple EPP documents will be implemented versus one large EPP for the entire Project.

This Grieg NL EPP is considered a living document and will be reviewed and updated on a regular and as-needed basis throughout the various stages of the Project life. Consequently, this is a controlled-distribution document, intended to be maintained in an updated condition by each listed/approved recipient (see Preface for details).

1.1 Purpose of the EPP

The EPP is an important component of overall Project planning and implementation of Project activities. It is considered part of Grieg NL's overall Environment, Health and Safety management system (see Section 3).

The EPP is a stand-alone document describing the responsible Project staff and environmental protection procedures for activities associated with marine operations. In addition, the EPP clearly outlines responsible company personnel including front-line workers, occupational health and safety and environment staff.

This EPP will be used to ascertain that Grieg NL's environmental-related commitments are implemented, adhered to, and monitored. The EPP will serve to:

- Provide a record of mitigation measures implementation.
- Provide a functional management framework to ensure regulatory compliance and to identify opportunities for continuous improvement in environmental performance.
- Identify and document compliance with applicable legislation, permits and authorizations associated with each Project phase and ensure adequate communication with government environmental surveillance staff.

As stated in the EIS (see Section 2.4.4.3), at the end of Project operations, Grieg NL commits to the removal of all fish and fish products, waste, chemicals, equipment and infrastructure and restoration of the aquatic environment at its sea cage sites. The approach and specific details will be clearly laid out in a Decommissioning and Rehabilitation EPP, which will be submitted to the relevant government agencies for review and which will require approval of the Minister of DMAE. The Decommissioning and Rehabilitation EPP will be submitted to the Province near the end of the operations phase.

1.2 Organization of the EPP

The EPP is organized as outlined below and is designed to address DMAE requirements and facilitate ease of use. The organization of the EPP follows the outline provided in the Grieg NL EIS (see Section 8.2 of the EIS; LGL 2018a) to the extent possible.

Preface: Identifies the distribution list for the EPP and provides document revision and control procedures.

Section 1: Introduction – Lays out the organization of the EPP and overviews the purpose of the document.

Section 2: Overview of the Project – Highlights the key components, location, activities, and timeline for the Project to provide context for the EPP user.

Section 3: Environment, Health and Safety System – Overviews Grieg NL's Environment, Health and Safety (EHS) system, the relationship of the EPP to the Grieg NL Policy on sustainability; the organization, development and implementation of the EPP; and employee environmental orientation.

Section 4: Environmental Protection Procedures – Details environmental protection procedures to be employed during routine marine operations. This section also includes a summary of key environmental concerns associated with Project activities.

Section 5: Contingency Plans – Provides contingency plans for potential unplanned and accidental events such as spills of fuel or other hazardous material and wildlife encounters.

Section 6: Legislation, Permits and Authorizations – Outlines the legislation, required permits, approvals and authorizations for marine operations.

Section 7: Contact List – Provides emergency, advisory and other contact numbers for corporate personnel, contractors, external resources and regulators.

Section 8: Resource Material – Identifies guidelines and resource material relevant to environmental protection measures, mitigation and monitoring.

2.0 Project Description

The Placentia Bay Atlantic Salmon Aquaculture Project has two primary components: (1) a land-based RAS Hatchery located in the Marystown Marine Industrial Park; and (2) sea cage sites located in the northern portion of Placentia Bay that will be used to grow the salmon to market size (Figure 2.1). The development of the Project, including construction and operation of the RAS Hatchery and sea farms, will undergo a phased approach before reaching peak production of seven million salmon per year. It is anticipated that the RAS Hatchery will be operational in Year 2 (note that Year 1 is construction of the RAS Hatchery) and reach full production capacity in Year 6. Transfer of fish to sea cage sites will begin in Year 3. The first harvest at peak production at the sea farms is anticipated to occur in Year 8.

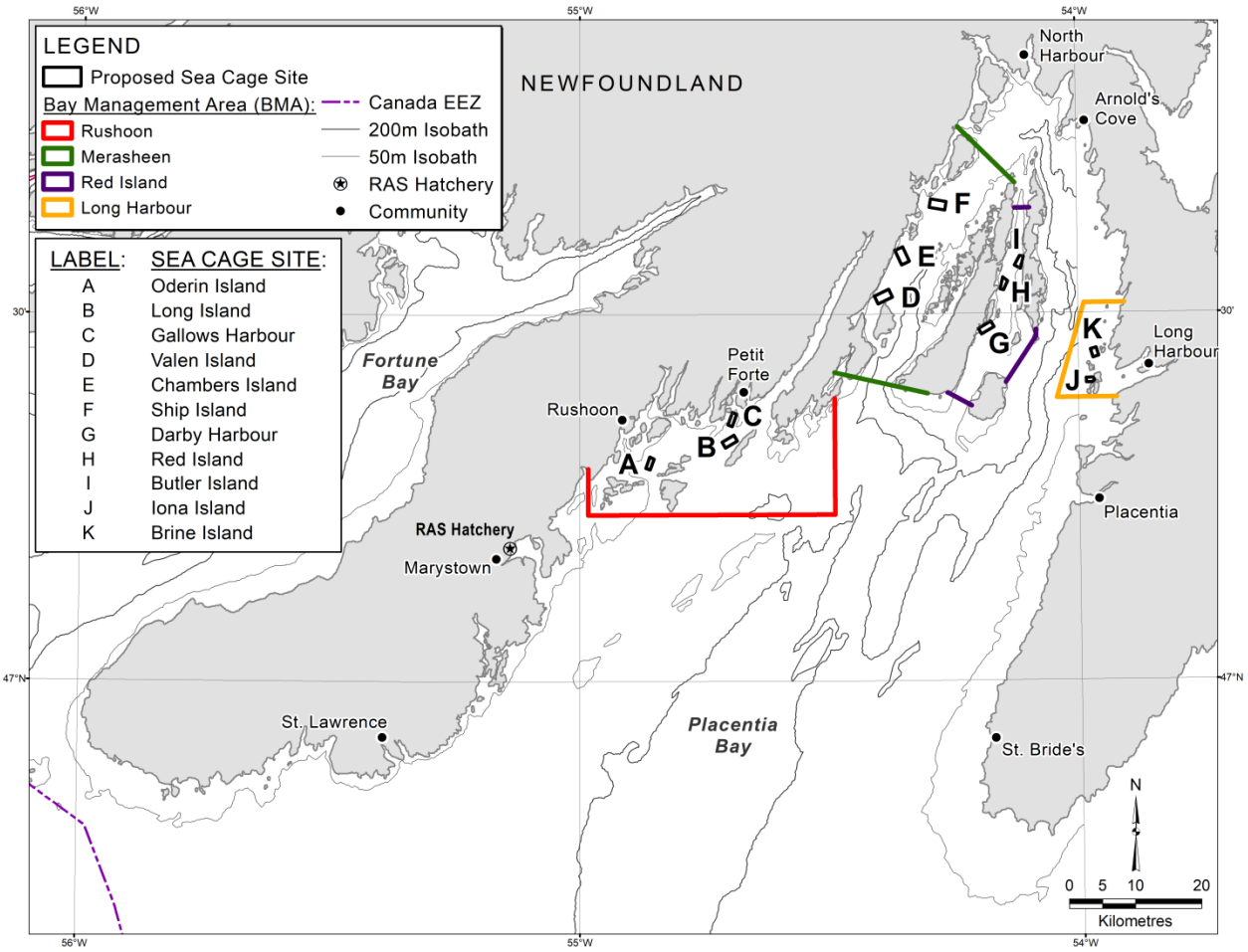

Figure 2.1. The locations of the RAS Hatchery, sea cage sites, and Bay Management Areas for Grieg NL's Placentia Bay Atlantic Salmon Aquaculture Project.

2.1 RAS Hatchery

The RAS Hatchery consists of three primary biosecure facilities (i.e., First-Feeding, Smoltification, and Post-Smolt) that have a total area of 30,000 m^2 (Figure 2.2). The site for the RAS Hatchery in the Marystown Marine Industrial Park was cleared in 2016 and 2017. The lots in the Marystown Marine Industrial Park are already serviced with three-phase power, municipal water and sewer, and a paved access road. The RAS that will be used at the hatchery is considered state-of-the-art and operates by filtering water from the fish tanks so it can be reused. The system uses 300 L of water per minute versus the 500,000 L of water per minute which is typical in a flow-through system that is not reusing any water to accomplish an equivalent production of smolt.

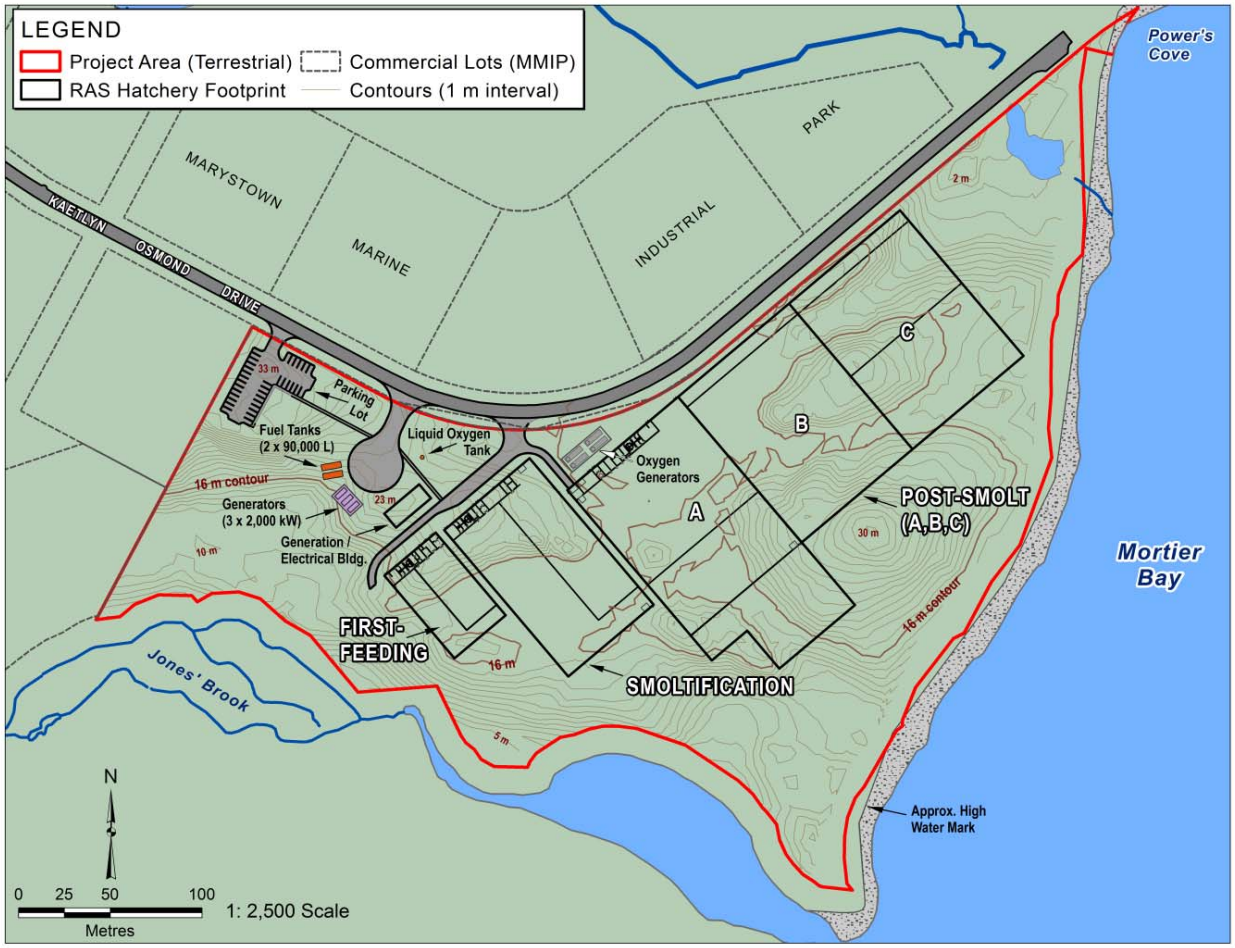

Figure 2.2. Schematic of RAS Hatchery in the Marystown Marine Industrial Park.

2.2 Marine Activities

At the RAS Hatchery, smolt will be grown to sizes ranging from 350–1,400 g and then will be transferred to a well boat and delivered directly to sea cage sites. Eleven sea cage sites will be located within four BMAs, which have been established for biosecurity purposes. Three of the BMAs are planned for semi-annual production and one BMA is planned for seasonal production. The semi-annual and seasonal sea cage sites will each have a maximum of 12 and 6 sea cages, respectively. Each of these sea cages are planned to hold 160,000 salmon. At peak production, there will be seven active sea cage sites with 78 sea cages in operation per year. Each year, the sea cage sites in one BMA will be fallowed before the sea cages will be restocked with salmon.

Each sea cage site will be attended by several vessels including a feed/accommodation barge, satellite feed barge, service vessel, crew vessel, and a work boat. Once salmon have reached market size (~5 kg) they will be transferred to a dead hold vessel and then onto a third-party for processing.

Personnel working at sea cage sites will be transported via dedicated crew vessels. Grieg NL anticipates one-week shifts at sea where personnel will live aboard the feed/accommodation barge. The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination. Crew changes for the proposed sea cage sites in the Rushoon, Merasheen and Red Island BMAs will be conducted in Petit Forte and in Long Harbour for the Long Harbour BMA (Figure 2.3). Note that Grieg NL will not undertake any construction activities in the harbours of Petit Forte and Long Harbour.

During operations, services and supplies for all BMAs will be provided using wharf facilities at two former Ocean Choice International (OCI) premises located on the Burin Peninsula (Figure 2.4). One of the resupply sites will be designated “inflow” and the other “outflow” to prevent cross-contamination of clean/new equipment going to the sea cage sites and used equipment returning for cleaning and servicing. Additionally, the resupply site designated as outflow will receive waste from the sea cage sites. Note that Grieg NL will not undertake any construction activities at the OCI premises in Marystown and Burin.

Further details on project activities during marine operations can be found in Section 2.4.4.2 of the EIS for this Project (LGL 2018a).

2.3 Sea Cage Sites

The sea cage sites (see Figure 2.1) have nominal areas ranging from 0.8–3.2 km^2 and occur in water depths ranging from ~10–308 m. Sites have been selected based on suitable water currents and depths, bottom type, shelter from wind and waves, and input from local users and regulatory agencies. A Site Application will be prepared and submitted to Department of Fisheries and Land Resources (DFLR) for each of the 11 proposed sea cage sites as per the *Aquaculture Activities Regulations* (AAR; DFO 2019).

Semi-annual and seasonal sea cage sites will have 12 or 6 sea cages, respectively; sea cages at each site will be arranged in a line with a feed barge located between the cages. The sea cages and associated mooring system used to house fish will be state-of-the-art, heavy duty Aqualine Midgard Systems. Each sea cage is 50 m in diameter, extends 37 m below the surface, and will consist of a cage net, floating collar, gangway, sinker ring (tube), winches, and fish mortality removal system.

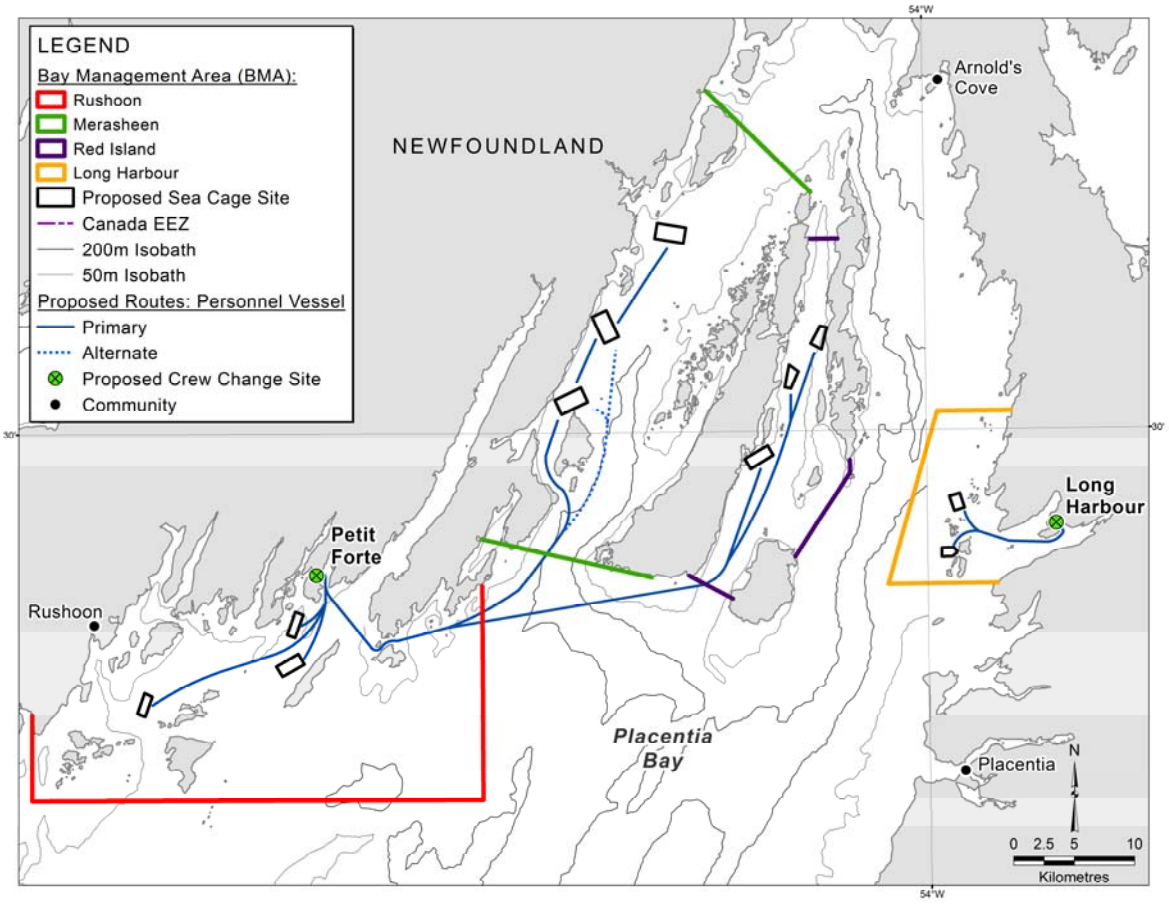

Figure 2.3. Locations of proposed crew change sites and transfer routes to the sea cage sites.

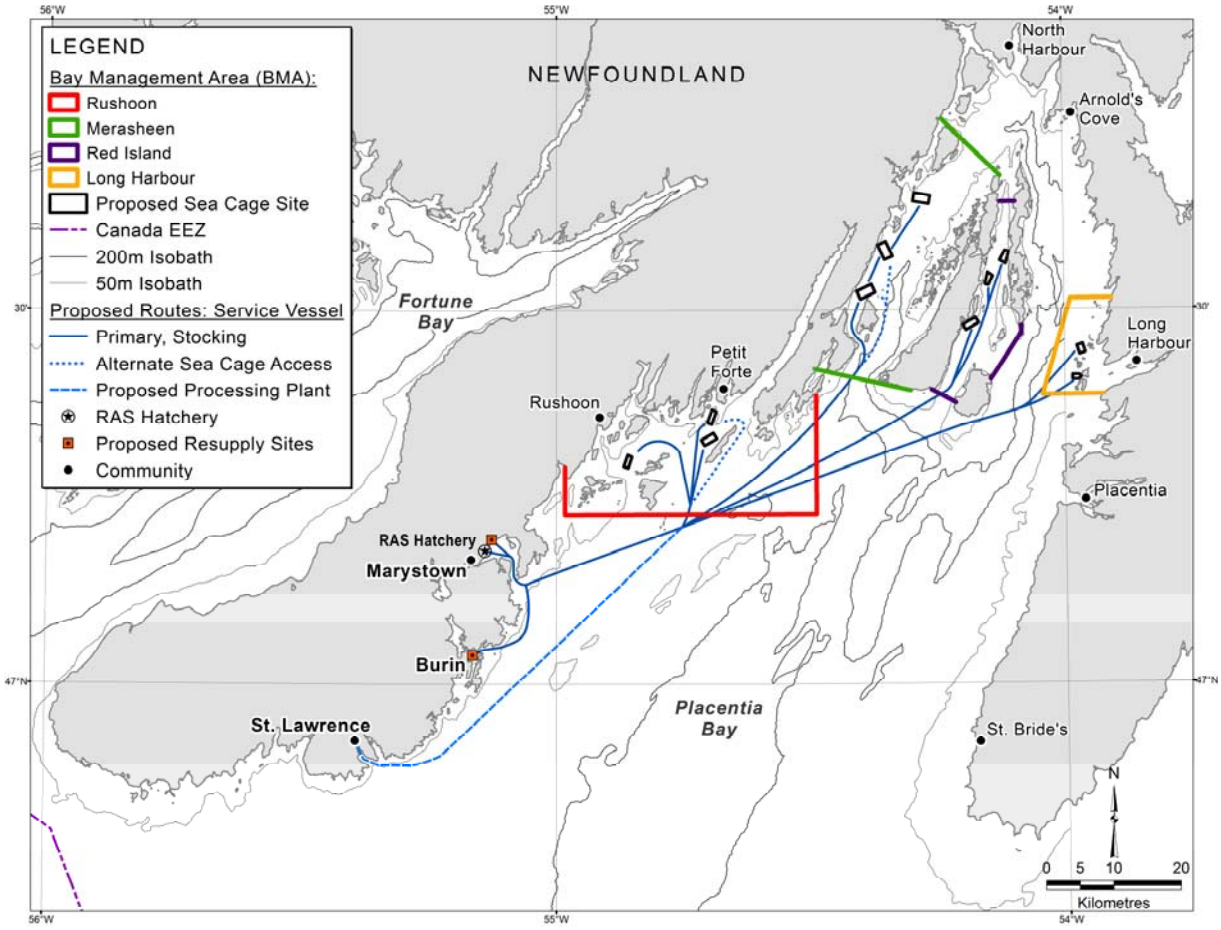

Figure 2.4. Locations of proposed resupply sites and resupply routes to the sea cage sites. Also, shown is the routing to the tentative processing plant in St. Lawrence.

2.4 Best Available Technology

Grieg NL will use the best available technology at the sea cage sites (and RAS Hatchery) along with a number of mitigation measures that go beyond the common aquaculture industry standard. These measures include such approaches as the utilization of sterile triploid all-female Atlantic salmon to minimize potential effects on wild salmon, the use of lumpfish (*Cyclopterus lumpus*) to control sea lice (ratio of 160,000:16,000 wild salmon to lumpfish per sea cage), and fallowing protocols that meet or exceed government requirements.

3.0 Environment, Health and Safety Management System

Grieg NL recognizes environmental protection as one of their guiding principles and a key component of sound business performance. Grieg NL is committed to providing a quality service in a manner that ensures a safe and healthy workplace for its employees and minimizes potential negative effects on the surrounding environment. Grieg NL will operate in compliance with all federal, provincial and municipal environmental legislation, and strive to use pollution prevention and environmental best practices whenever possible.

Grieg NL's EHS system will:

- Integrate the consideration of environmental concerns and interactions into all decision making and activities.
- Promote environmental awareness among its employees and require them to work in an environmentally responsible manner.
- Train, educate and inform its employees about environmental issues that may affect their work.
- Promote sustainability through the practice of reuse, recycle, refurbish and reduce waste.
- Avoid or reduce the use of hazardous materials and products, seek substitutions when feasible, and take all reasonable steps to protect human health and the environment when such materials must be used, stored and disposed of.
- Operate by the highest standards possible to ensure protection of the environment while avoiding unplanned events (spills).
- Develop and maintain appropriate emergency and spill response capabilities.
- Train all employees in best practices for health and safety.
- Provide necessary Personal Protective Equipment (PPE) and instruction for its use and care.
- Develop and enforce safety and health rules, requiring that employees comply with these rules as a condition of employment.
- Investigate every incident, promptly and thoroughly, to determine its cause, and whenever possible, put measures in place to ensure against recurrence.
- Strive to continually improve environmental performance by periodically reviewing and updating EHS policy.

3.1 Roles and Responsibilities

The following section outlines the management structure, roles and responsibilities of personnel for the implementation of Grieg NL's EHS policy for the marine operations phase.

Grieg NL General Manager: Primary person responsible for overall marine operations and associated crew change and resupply sites, including environmental issues. Specific environmental responsibilities include:

- Ensuring environmental considerations are a part of the Project decision making process.
- Ensuring adequate plans and resources are in place to achieve environmental commitments to minimize environmental effects.
- Reviewing incident reports as they are submitted and ensuring the proper course of action is taken to manage unexpected environmental conditions or events.

Grieg NL Production Manager: Primary person responsible for day-to-day marine operations. Reports to the Grieg NL General Manager. Specific environmental responsibilities include:

- Ensuring adequate plans and resources are in place to achieve EPP commitments.
- Approve incident reports as they are submitted and ensuring the proper course of action is taken to manage unexpected environmental conditions or events.

Grieg NL Marine Site Manager(s): Responsible for overseeing Project marine operations. Reports to the Grieg NL General Manager and is responsible for:

- Ensuring compliance with relevant regulations, authorizations, permits and protocols.
- Ensuring documentation is submitted for compliance with Grieg NL policies.
- Coordinating with contractors and owners.
- Reviewing contractor documents.
- Conducting an overview of work being performed by contractors/personnel.

Grieg NL Veterinarian: Responsible for assisting with the implementation of an active surveillance health management program as stipulated in Grieg NL's Fish Health Management Plan. Reports to Grieg NL Production Manager and is responsible for:

- Fish health and oversight of the surveillance programs.
- Identifying disease and the appropriate management and treatment of diseases based on diagnosis.
- Provision of consultation on health-related concerns and observations, including liaison with regulatory veterinarians as required.
- Actively testing fish from Grieg NL's facilities and sites (i.e., the Active Surveillance portion of the Fish Health Management Plan).
- Reporting reportable diseases as per the *Health of Animals Act*.

Grieg NL EHS Advisor: Primary Grieg NL employee responsible for overall environment, health and safety. Reports to the Grieg NL Production Manager and is responsible for:

- Providing environmental orientation to contractors/personnel.
- Providing awareness training on an as-needed basis.
- Identifying potential environmental hazards.
- Determining ways of reducing EHS risks.
- Liaising with relevant authorities and contractors/personnel.
- Keeping up to date and ensuring compliance with current EHS legislation.

Grieg NL EHS Representative: Marine-based personnel designated as employee representatives for EHS. Report to their appropriate Site Manager and are responsible for:

- Ensuring provision of orientation of new employees or awareness training is conducted as required.

- Coordinating routine EHS meetings.
- Maintaining EHS documentation of routine meetings.

Contractor Project Managers: Responsible for specific scopes of work and ensuring the compliance of this specific scope. Report to the Marine Site Manager(s) and are responsible for:

- Ensuring equipment is installed correctly/safely.
- Ensuring adequate resources are in place to achieve environmental commitments outlined in the contract, EPP, and any applicable permits and authorizations.
- Reviewing incident reports related to their specific work scope and employees as they are submitted and ensuring the proper management/resolution course of action is taken.
- Ensuring their scope does not impede or alter the scope or responsibilities of another contractor.

3.2 Owner's Policy

A key component of the Grieg NL EHS system is its sustainability policy, which is overviewed here and promoted throughout the EPP. Ultimately, Grieg NL's vision is to provide Placentia Bay Atlantic salmon for the world. Achieving this vision in a sustainable manner will be met through the company's commitment to the following principles: leadership, transparency, integrity, continuous improvement, inclusivity, and stewardship.

3.2.1 Priorities

Grieg NL's goal is the sustainable production of Atlantic salmon in the waters of Placentia Bay. Based on the expectations of Grieg NL and its stakeholders, the following priorities have been identified as key elements that are important for Grieg NL's achievements, profitability and survival with a focus on local and global sustainability:

- Fish health and welfare;
- Sea lice control;
- Fish escape control;
- Minimal emissions;
- Minimal interactions with wildlife; and
- Climate change.

3.2.2 Commitment and Scope

The sustainability policy will apply to all operations under Grieg NL. Grieg NL will utilize third-party service companies for various aspects of its operations and acknowledge that although Grieg NL cannot control the decisions of these parties, it commits to educate them of its policy. These third-party service providers will be encouraged to align their operating procedures with Grieg NL policy objectives. Grieg NL's priorities and any relevant decisions will be compliant with local, provincial and federal laws and regulations. Grieg NL will strive to exceed legal requirements with respect to sustainability, in order to be innovative and to demonstrate sustainability leadership.

3.2.3 Objectives

Grieg NL commits to:

- Focus on a safe and environmentally friendly food chain that produces quality products for consumers.
  - Strive to improve the feed conversion ratio (FCR) to a near 1:1 ratio.
- Balance profitable growth and innovation with environmental sustainability by using innovative technology and enhanced data collection to improve ecosystem understanding and sustainability decision-making.
  - Utilizing a RAS that requires minimal water consumption during smolt production.
  - Target to utilize fish feed that is produced using protein not designated for human consumption.
- Balance sustainable aquaculture and productive seas to maintain fish health and welfare, while also protecting the shared natural resources of the sea.
  - Utilizing sterile triploid all-female Atlantic salmon for all production in Placentia Bay.
- Providing a work environment that will attract and retain employees with a focus on health and safety, diversity, equity and integrity in the workplace.
  - Direct employment approaching 150 people in the Province upon reaching steady-state production.
- Local value creation, not only by hiring local residents, supporting local industries and utilizing third-party service contractors, but also contributing to the local communities by volunteering and donating resources.
- Publishing an annual Sustainability Report reviewing progress on achieving its goals that will be available to stakeholders and the public.

3.3 Development and Implementation of the EPP

The EPP is an essential component of Grieg NL's EHS system and is intended to ensure that all Project personnel abide by appropriate environmental protection actions, encompassing all Project phases for the sea cage sites. As noted earlier, this is a living document that will be revised as necessary based on review and approval of received suggestions, and to meet the requirements of reviewers and environmental approvals. EPP documents are typically revised as needed to reflect site- and/or task-specific activities as they relate to environmental protection measures and are structured to allow for revisions as Project activities progress. A separate EPP document will be prepared for decommissioning of the sea cage sites.

3.3.1 General Practices and Training

Grieg NL recognizes that communication and training are key to ensuring that Project activities with the potential to create a negative environmental effect are identified, and that preventative and/or mitigation measures are implemented. All Grieg NL employees, contractors, and subcontractors will undergo employee orientation, which includes a review of environmental concerns and procedures. Additionally, multiple mechanisms are in place to ensure that the EPP contents are communicated to employees throughout the Project. A summary of these general practices is provided below.

3.3.1.1 Employee Orientation

Grieg NL recognizes the importance of EHS and is committed to ensuring a safe work environment for its employees, contractors and subcontractors, while also recognizing the importance of procedures and practices that will protect the environment. Grieg NL considers good husbandry and a strong focus on environmental protection essential during all Project phases and will emphasize this message to all new employees are part of their training and environmental orientation, and within Grieg NL's ongoing EHS management system. Grieg NL will ensure that all Project personnel, including contractors and subcontractors, are prepared and capable of completing their jobs competently and responsibly.

Grieg NL will maintain records of all environmental training and orientation sessions, including a description of the presented material, session dates and attendance. All Grieg NL personnel will receive orientation by a supervisor with awareness training. As well, on-going training will be provided on an as-needed basis.

All Project personnel working on site are required to participate in a site-specific Project and environment orientation upon commencement of their employment and periodically thereafter as needed. This orientation will increase awareness of the Grieg NL EPP, including the environmental protections relative to site-specific work activities, regulatory requirements, emergency preparedness and spill response capabilities, as well as client/contractor expectations for individual personnel roles and responsibilities.

Environmental orientation will include the following:

- Details on Grieg NL's EHS management system, EHS policy and obligations under the EPP.
- A presentation on environmental protection procedures to be applied to all work activities.
- Procedures for spill response and environmental emergencies.
- Personnel roles and responsibilities, including emergency preparedness.
- Description of tasks and activities, including any relevant activities that could involve environmental concerns.
- Instruction on specific procedures for environmental protection, including prevention, mitigation measures and documentation.
- The importance of enforcement and compliance with the EPP.

3.3.1.2 Marine Operations Phase

During marine operations at the sea cage sites, Grieg NL has identified the following general mechanisms for dissemination of and conformance to the EPP:

- *Daily Task/Toolbox Safety Meetings*: At the start of each day and the start of each new job, the supervisor shall conduct meetings relevant to the task(s) to be undertaken. The information conveyed to the crew shall include the task plan and precautions that should be taken. Meeting topics shall include hazards (including environmental), permit reviews, site conditions, and special hazards/precautions.
- *Monthly/As-needed HSES Meetings*: The Production Manager will meet monthly or as required with site managers for the marine component of the Project. These informal meetings will

address, among other topics, Health, Safety, Environment and Security issues. These monthly meetings will provide an avenue to discuss any concerns or recent incidents.

- *Annual Environmental Performance Review*: In order to continually improve on its performance, Grieg NL will hold annual environmental performance review meetings. Site managers, along with the Production Manager and/or General Manager, will review environmental performance and compliance at the marine operations sites. These meetings will provide an opportunity to ensure EPP procedures as well as permitting and governmental policies are consistent.

4.0 Environmental Protection Procedures

Environmental protection procedures are provided here for each of the primary marine operations activities. As the marine operations phase proceeds, these procedures may be modified or new procedures implemented, to account for new Project activities, site conditions or engineering changes, and as a result of lessons learned during activities.

For Project activities at the sea cage sites, Grieg NL's personnel/contractors/subcontractors will have Standard Operating Procedures (SOPs) in place which provide step-by-step instructions for conducting various marine operation activities. These SOPs will also contain steps to protect the environment and which are in line with the procedures provided below. Employees, contractors and suppliers are required to follow and adhere to all environmental protection procedures. Also, as per the terms and conditions of the EIS release issued by the DMAE, Grieg NL will adhere to all mitigation, monitoring, and commitments stated in the EIS. These commitments, relative to marine operations, are included below. Grieg NL will also follow all relevant requirements in DFLR's Aquaculture Policy and Procedures Manuel (DFLR 2019).

4.1 General Vessel Operations or Marine Traffic

Environmental Concern

Project vessel traffic may interfere with local fishing boats and other vessel traffic. The potential exists for vessels to collide, run aground and/or sink. Such events may lead to the accidental release of fuel and other hazardous materials to the marine environment. The release of ballast or bilge water could also introduce non-indigenous species or deleterious substances into Placentia Bay. Marine traffic has the potential to disturb marine fauna/flora and habitat through physical presence, noise and discharges.

Environmental Protection Procedures

During the marine operations phase, marine vessel traffic will consist of approximately 27 vessels in use at any one time, including feed/accommodation and satellite barges, service vessels, work boats, crew vessels, well boats, dead hold vessels and feed supply vessels. Vessels at the sea cage sites will typically be stationary or moving at very slow speeds. Transiting vessels will abide by speed limits as provided below. Crew transfer vessels are anticipated to be utilized for one crew change per week.

1. All vessels used for Project-related shipping will comply with applicable shipping regulations including the *Canada Shipping Act* (2001). Grieg NL will require strict compliance with all environmental legislation and all vessels will operate in strict compliance with the Placentia Bay Vessel Traffic Management System.
2. Vessel crew will have adequate training and appropriate certificate of competency as per Transport Canada Regulations.
3. To minimize interference with other marine traffic and local users, several communications tools will be used to make information on transit routes between sea cages and crew change/supply ports available to the public, including Notice to Mariners, announcements on the Broadcast, on-going meetings with local stakeholders, and notifications on Grieg NL and local town websites.

4. All hazardous materials or liquids will be stored on-board and off-loaded in a safe manner to minimize any risk of spills.
5. Project vessels will be equipped with bow thrusters which increase the ability to maneuver around the sea cage sites in a much safer way than traditional vessels. The service vessels are equipped for push and pull purposes (via a customized propulsion system and propellers) and will be equipped with towing brides.
6. Service vessel engines will comply with the new Tier Three Regulations of Transport Canada (and with Annex VI of MARPOL [International Convention for the Prevention of Pollution from Ships] 73/78).
7. Grieg NL will have in place an Emergency Response and Incident Management System Plan detailing procedures to respond to accidents, malfunctions, and emergencies at the sea cage sites and transit routes to the sea cage sites.
8. All Project-related vessels will be in good working order, and all efforts will be made to avoid the discharge of oils, fuels or other such hydro-carbon based compounds into the marine environment.
9. Bilge dumping will be strictly prohibited.
10. Project vessel crews will remain mindful of wind and sea conditions and forecasts such that marine operations are minimized or not conducted during poor weather.
11. All larger Project vessels including the service vessels, well boat, and dead hold vessels will travel at speeds <10 knots.
12. Smaller Project vessels including the crew vessels and work boats will at times exceed 10 knots. It is anticipated that crew vessels will transit to and from sea cage sites at 15 knots.
13. Waste management will be consistent with industry best practices. No waste of any kind will be thrown overboard. Any garbage generated will be collected and separated in accordance with MARPOL 73/78 Annex IV: Pollution by Sewage from Ships, and Annex V: Pollution by Garbage from Ships.
14. Wastes produced from Project vessels, including grey and black water, bilge water, deck drainage, food wastes, discharges from machinery spaces and hazardous and non-hazardous waste material will be managed in accordance with MARPOL, and Grieg NL's Waste Management Plan. Contracted vessels' policies and procedures will be reviewed against Grieg NL's. A licensed waste contractor will be used for any waste returned to shore (i.e., Burin Peninsula Waste Management Corporation [BPWMC]).
15. Air emissions will be those associated with standard operations for marine vessels, in accordance with MARPOL 73/78 Annex VI: Regulations for the Prevention of Air Pollution from Ships.
16. Although not anticipated, should vessels associated with the Project require transit in the vicinity of any of the designated areas containing breeding seabird colonies, they will abide by safe distance regulations in accordance with the area in question, and avoid disturbing the birds to the extent possible, particularly during breeding seasons.
17. All vessels will exercise caution with respect to marine mammals and sea turtles. If these animals are sighted, vessels will reduce speed, alter course as necessary, and then maintain speed and direction.
18. Any marine mammal incidents will comply with the mandatory reporting of as per regulations--http://dfo-mpo.gc.ca/species-especes/mammals-mammiferes/report-rapport/page01-eng.html.

4.2 Storage, Transportation, Transfer, Handling and Disposal of Fuel and Other Hazardous Substances

Environmental Concern

During marine operations, some substances will be used which are or may be classified as hazardous, including petroleum, oil and lubricants; chlorinated and non-chlorinated solvents (e.g., cleaner-degreasers); waste petroleum products (e.g., used engine/motor oil); glycol (e.g., antifreeze), and epoxies. The primary concern regarding the use and storage of fuel or other hazardous materials is an uncontrolled or accidental release into the environment and subsequent negative effects on marine habitat and species, and human health and safety.

Environmental Protection Procedures

The following procedures will be implemented to reduce the likelihood of accidental release of hazardous substances that may result in negative environmental effects:

1. Procedures for the handling of fuels and other hazardous materials as well as contingency plans for spills will be present in hard copy on each Project vessel.
2. A complete inventory of hazardous materials on the job site will be maintained according to the Workplace Hazardous Materials Information System (WHMIS) Regulations and will be made available to regulatory agencies upon request or in case of any emergency.
3. Safety Data Sheets (SDS) will be in place for all hazardous products as per WHMIS 2015 requirements.
4. All subcontractors and Grieg NL employees will be required to observe strict compliance with the requirements of WHMIS regarding employee training, use, handling, storage, and disposal of hazardous materials and labeling and provisions of SDS, as required by WHMIS legislation.
5. Hazardous materials will be properly labelled and stored in an appropriate storage cabinet, cupboard or designated area on board Project vessels.
6. Containers holding hazardous materials will be appropriate for the material being stored and always kept sealed when not in use.
7. The transportation, use, and storage of fuel and other hazardous materials is regulated by The Storage and Handling of Gasoline and Associated Products (GAP) Regulations and Amendments, *Transportation of Dangerous Goods Act* (1992) and *Dangerous Goods Transportation Act* (2006). Employees and contractors will follow all required regulatory policies and procedures.
8. All Occupational Health and Safety regulations regarding the use, storage and training on all required classes of fire extinguishers will be followed.
9. Waste oils, lubricants and other used oil will be stored in a tank or closed container and disposed of regularly under contract with a licensed used oil collector in accordance with the Used Oil Control Regulations (82/02).
10. Greasy or oily rags or other materials at risk of spontaneous combustion will be deposited and stored in appropriate receptacles. This material will be removed from the work site on a regular basis and disposed of in an approved existing waste disposal facility. Removal of these materials from the job site is regulated under the *Transportation of Dangerous Goods Act*.

11. All hazardous materials will be handled according to the provincial *Environmental Protection Act* (2006) and disposed of in accordance with government laws and regulations at an approved off-site hazardous waste disposal facility.
12. Regular inspections of hydraulic and fuel systems on machinery will be performed, and all detected leaks will be repaired immediately. Worn or damaged hoses, seals and fittings will be promptly repaired or replaced.
13. Project barges will be refuelled by a third-party service provider, in accordance with the *Canada Shipping Act* and following Transport Canada's procedures for the refuelling of small commercial vessels.
14. Fuelling and lubrication of equipment will occur in such a manner as to minimize the possibility of contamination to water. All activities will be performed with appropriate spill protection measures.
15. All necessary precautions will be implemented to prevent the spillage, misplacement, and loss of fuels and other hazardous materials used during the marine operations phase.
16. A fuel and other hazardous materials spill contingency plan and appropriate emergency spill equipment will be in place on site.
17. All spills of fuel and hazardous materials will be reported immediately to the EHS Advisor. All spills to the marine environment will be reported immediately in accordance with provincial regulation.
18. Spill kits will be maintained on each Project vessel for quick response purposes and vessel crew will have necessary training to respond to spills.
19. Grieg NL has contacted Eastern Canada Response Corporation (ECRC) to sign a subscriber agreement which would provide access to ECRC`s spill response equipment and services in the event of a spill event that escalates beyond the scope of Grieg NL capabilities. The subscriber agreement will be in place prior to marine construction.
20. All spill response equipment will be selected for its suitability/acceptability for deployment.
21. All employees and contractors will be made aware of the Spill Management Plan and their roles in it.
22. All petroleum-based products used during marine operations, including oils, fuels and greases, will be reused when possible (e.g., waste oil can be collected and burned).
23. When possible, environmentally friendly options will be used (e.g., food-grade grease/oil).
24. The use of products such as paints will be reduced and only used as needed. Unused paint shall be recycled when possible or disposed of at an approved waste disposal area.

4.3 Storage, Transportation, Handling and Dispensing of Fish Feed

Environmental Concern

Feed wastage can increase nutrient input into the environment and potentially contribute to the accumulation of organic waste, which may attract wildlife and potentially cause chemical, physical or biological changes to the surficial sediment below and near the sea cages.

Environmental Protection Procedures

1. Sea cages shall be sited at locations with suitable currents and depth to distribute organic waste (as per AAR 2019).
2. The feed/accommodation barge will be anchored on site via an approved mooring system.
3. Feed will be delivered in bulk transport shipping containers and pumped into vessel cargo holds. If necessary, feed can also be delivered to the barges in large bags using a service vessel's crane.
4. Project service vessels will be equipped with large holds which can be used to carry extra feed, if needed.
5. Feed will be stored within barge cargo holds and delivered to the sea cages via a series of high-density polyethylene feed lines.
6. Feed barges will be equipped with a centralized feed delivery system, including a feed blower, sensors (e.g., oxygen, current, temperature), camera system, feed lines (or pipes), and rotor spreaders.
7. Feed wastage will be minimized via the use of established feeding tables/software used to determine feed type and amount and an automatic feeding system with video monitoring.
8. Fish will be monitored during feeding and feed delivery will be ceased once the salmon have reached ~80% satiation.
9. Sea cage sites will be fallowed in accordance with an established schedule in accordance with the minimum period specified by Bay Management Area principles for licensed sites producing Atlantic salmon (DFLR 2019).

4.4 Storage, Transportation, Handling and Disposal of Solid Waste and Sewage

Environmental Concern

Solid waste (e.g., domestic waste, paper, cardboard, wood, rope, plastic piping, metals, etc.) will be generated periodically during marine operations. The release of solid waste during marine operations is a concern to human health, water quality, and aquatic and terrestrial ecosystems. The release of untreated sewage may pose risks and/or concerns to human health, drinking and marine/freshwater quality and ecosystems. Uncontrolled waste may also attract wildlife, leading to potential human-wildlife encounters or interactions between wildlife and the sea cages.

Environmental Protection Procedures

1. The amount of waste generated and requiring disposal shall be limited as much as possible.
2. All wastes will be handled according to procedures in Grieg NL's Waste Management Plan and in compliance with all relevant regulations.
3. Waste management will be consistent with industry best practices.
4. Scrap steel and plastic products, such as piping, will be retained by Grieg NL for use during repairs. Where this is not practical due to materials being damaged or too small, steel products will be recycled through local companies.
5. Plastic products shall be recycled where possible, with disposal only when no other option remains.

6. All operational debris produced during marine operations, such as general waste, electronic waste and feed bags, will be recycled, reused or reduced as appropriate (e.g., by recycling cardboard, aluminum cans, and electronic waste, and buying feed and products in bulk and with less packaging).
7. No waste of any kind will be thrown overboard. Any garbage generated is to be collected and separated in accordance with MARPOL 73/78 Annex IV: Pollution by Sewage from Ships, and Annex V: Pollution by Garbage from Ships.
8. Wastes produced from Project vessels, including grey and black water, bilge water, deck drainage, food wastes, discharges from machinery spaces and hazardous/non-hazardous waste material will be managed in accordance with MARPOL and Grieg NL's Waste Management Plan. Contracted vessels' policies and procedures will be reviewed against Grieg NL's.
9. Project vessels will be equipped with toilet facilities. Sewage will be stored and transported to shore for treatment.
10. Waste brought to shore will be disposed in accordance with an agreement with the BPWMC.
11. The designated outflow supply site for transporting equipment and supplies will receive waste from the sea cage sites.

4.5 Storage, Handling and Dispensing of Therapeutants

Environmental Concern

If the use of lumpfish, sea lice skirts, sub-feeder and functional feed is not successful at controlling sea lice, Grieg NL may resort to the use of therapeutants if deemed by a veterinarian to be the best option to maintain fish health. It is important that unused, spilled or waste therapeutants are handled properly.

Environmental Protection Procedures

1. Grieg NL will closely follow its Fish Health Management Plan and SOPs for the proper storage, handling, and dispensing of therapeutants. The Fish Health Management Plan and SOPs shall be reviewed and approved by Grieg NL's private veterinarian and relevant regulatory authorities prior to commencement of marine operations.
2. Health Canada will be provided with SOPs for storage, handling and dispensing therapeutant for their review.
3. All therapeutants shall be approved for use in Canada and administered by trained/licensed professionals.
4. Therapeutants, such as SLICE, would be administered in the feed of the fish.
5. Therapeutants would only be considered based on veterinarian advice and the stage of production cycle(s) the affected fish have reached.
6. Depending on the size of affected fish, they may be harvested early instead of using therapeutants to minimize sea lice.
7. Sea lice levels will be continuously monitored as detailed in Grieg NL's Integrated Pest Management Plan; response measures will be promptly utilized to ensure sea lice levels remain low and the use of therapeutants can be minimized or eliminated.
8. Any therapeutants requiring disposal shall be handled according to biomedical waste disposal guidelines and municipal regulations.

9. Grieg NL shall publicly release all reports of detection of federally Reportable Diseases or quarantine or depopulation orders or directives issued by the Provincial Government within 24 hours as per DMAE conditions of EIS release and DFLR Aquaculture Policy 17 (DFLR 2019).
10. Grieg NL shall publicly release all use of therapeutants (including antibiotics, vaccinations, and anesthetics) annually as per DMAE conditions of the EIS release.

4.6 Storage, Transport, Handling and Disposal of Fish Mortalities and Ensilage

Environmental Concern

There is concern that the volume of fish mortalities and ensilage generated during marine operations may not be properly handled and may exceed the capacity of local disposal facilities. Also, there is concern about the potential transfer of disease from fish to wild animals.

Environmental Protection Procedures

1. Personnel are to abide by Grieg NL's Fish Health Management Plan which includes a Fish Disposal Plan to collect, record and process fish in the event of a mass mortality.
2. Dead fish, which typically accumulate at the bottom of sea cages and at the surface, will be monitored via cameras and removed daily from the bottom of the net using a centralized LiftUp system. Any visible moribund fish or surface mortalities will be retrieved, and moribund fish will be euthanized if required.
3. If euthanasia of fish is required, it will be conducted under the training and supervision of Grieg NL support veterinarian and done in a manner which minimizes pain and suffering of fish being used for sampling or culled due to health or production reasons. Euthanasia will be accomplished via an overdose of anaesthetic, complete spinal severance, or a sharp blow on the top of the head ensuring a result of fish that are permanently unresponsive to stimuli. Procedure will be determined based on size and life stage of the Atlantic salmon as recommended in the Canadian Aquaculture Standards (DFO 2004).
4. When handling mortalities from the sea cage sites, personnel will wear rain gear, gloves, and boots, which will be disinfected after each mortality disposal.
5. The dead fish will be pumped from the bottom of sea cages to a fully enclosed, surficial pipe grid and ultimately to mill tanks on the main decks of feed barges.
6. The ensilage process shall occur in a closed environment from the moment mortalities enter the mill tanks.
7. Fish mill tanks will be secured on feed barges at sea cage sites, the covers of which are to be locked when mortalities are not being deposited.
8. Mortalities will be transferred from the mill tanks to integrated ensilage tanks located on the port and starboard sides of the feed barges. Ensilage tanks and stored feed will be kept physically separated on board barges, with ensilage tanks located in the vessel hull below the feed selector valves, and the feed stored in secure silos located ~4 m above the main deck of the barge.
9. Integrated ensilage tanks will be constructed of a minimum 7 mm of steel and painted with an approved anti-acid paint.
10. Food-grade formic acid (85%) will be used in the ensilage process. The acid will be stored on board the barges in designated tanks.

11. Access to the ensilage storage tanks shall be limited to authorized personnel only.
12. Ensilage will be stored in the integrated tanks until it is removed through the ensilage discharge, which shall be secured with a cam-lock.
13. Ensilage will be pumped from the barge tanks to intermediate bulk containers (IBCs) or other designated storage tanks and craned onto service vessels for transport to shore.
14. The designated outflow supply site for transporting equipment and supplies will receive waste, including ensilage, from the sea cage sites.
15. Ensilage shall be stored until sufficient quantities are acquired to justify transport (via a third-party provider) to end users such as a local company in Newfoundland that will use the product as a commercial fertilizer and/or animal feed additive or a feed supply company located in Denmark.
16. Ensilage shall be collected by an approved third party using approved transport containers and disposed in the most economical manner (fertilizer, composting or other viable options).

4.7 Equipment Use and Maintenance

Environmental Concern

Environmental concerns associated with the operation and use of equipment during marine operations include accidental spills and chronic leaks (and to a much lesser extent atmospheric emissions and noise). Emissions, spills, and direct physical disturbances as a result of equipment operation can adversely affect environmental resources.

Marine vessels, on-board generators, cranes, storage tanks, feed/ensilage pipelines, cameras, sensors, Aqualine Midgard sea cage systems, and LiftUp systems will be the primary equipment needed for marine operations at the sea cage sites. In addition, a Remote Operated Vehicle (ROV) will be used to inspect moorings and sea cages.

Environmental Protection Procedures

1. All Project-related equipment will be kept clean and in good working order.
2. The sea cage system and associated mooring will be regularly inspected as described in detail in the Sea Cage Performance EEMP.
3. All efforts will be made to avoid the discharge of oils, fuels or other compounds from equipment to the surrounding environment.
4. All vessels will be inspected and serviced routinely for mechanical condition to ensure there are no leaks that could result in spills of hazardous materials.
5. Equipment inspections and maintenance will be conducted by qualified personnel.
6. Flowlines/pipes, hoses and connections for equipment will be inspected routinely for breaches or defects.
7. Leaks, breaks or compromised hoses, flowlines/pipes and connectors will be reported and repaired immediately.
8. Spill kits will be maintained on each Project vessel.

9. Project vessels will be refuelled by a third-party service provider, in accordance with the *Canada Shipping Act* and Transport Canada's procedures for the refueling of small commercial vessels.
10. Records will be maintained on file for all inspections and maintenance servicing.

4.8 Protection of the Marine Environment

Environmental Concern

There is concern for salmon or lumpfish escape during fish transfer or due to a net breach, nutrification and deposits near the sea cages, and the spread of diseases/parasites to wild fauna. Also, there is concern that escaped fish could potentially interact with their wild counterparts, possibly affecting their biological fitness. Biosecurity measures, monitoring, and proper cleaning of equipment will be imperative to protect the marine environment.

Environmental Protection Procedures

As described in detail in the EIS, Grieg NL will use sterile triploid all-female Atlantic; this will serve to greatly reduce the risk of genetic interactions with wild Atlantic salmon. The likelihood of escapes will be minimized through following regulatory requirements, proper fish transfer procedures and equipment monitoring/maintenance/use, including:

1. Adherence to the Code of Containment (DFA 2014).
2. The day prior to fish transport, all transfer equipment (i.e., pipes, hoses, pumps, counters) shall be checked and prepared, including checking the pipe and hose for breaches.
3. A checklist shall be followed on the day of transfer for personnel at the hatchery.
4. Fish shall only be transferred to the well boat from the RAS Hatchery during suitable environmental conditions (i.e., calm seas).
5. Fish will be transferred via flexible hose transfer pipes, which will only be connected when in use and stored when not in use.
6. Smolt shall be transferred to a well boat via a double pipe (~150 m in length) leading from the Post-Smolt Facility to Mortier Bay. The pipeline shall be constructed such that a protective sacrificial pipe surrounds the transfer pipe, protecting the transfer pipe from wear and abrasions.
7. A reinforced, continuous hose extending ~50 m from the shoreline to the well boat shall be used to transfer the fish. The hose will sit at the water's surface and be continuously monitored by personnel.
8. Fish shall be counted via video monitoring and a counter as they exit the hatchery and as they enter the well boat.
9. Grieg NL shall conduct and record inspections of the portion of sea cages that extend below the water's surface every 30 days as per Aquaculture Policy (DFLR, 2019).
10. Sea cages will be routinely monitored for ice accretion by on-site personnel and/or video camera. Personnel will remove ice as it accumulates, typically using rubber mallets. If necessary, an ice boom will be deployed around sea cages using Grieg NL service vessels, and ice-breaking vessels may be contacted for assistance to break-up or move pack ice or ice floes.

11. Drop nets of appropriate mesh size and sufficient size to cover the entire work area shall be placed under the work area and above the sea surface to contain any fish in the event one is "dropped" while being handled.
12. Grieg NL shall request an emergency recapture licence from DFO to be in place prior to the commencement of marine operations at the sea cage sites as per DMAE conditions of EIS release.
13. Should an escape event occur due to a serious breach in a sea cage net and a recapture response be triggered, Grieg NL personnel shall follow procedures as provided in the Grieg NL Emergency Response Plan. As part of these procedures, fish will be transferred to a well boat where they will be counted and later returned to a replacement net.
14. Approval to proceed with recapture efforts will require authorization by DFO as per DMAE conditions of EIS release. Furthermore, DFO will determine where and how deep recapture nets will be positioned if required.
15. Grieg NL shall mark all imported and grown in-province salmon smolt using methodology approved by the Ministers of Municipal Affairs and Environment and DFLR, for ease of identification in recapture as per DMAE conditions of EIS release.
16. Grieg NL shall publicly release all suspected and confirmed escape events to the public within 24 hours of the suspected escape and/or confirmation of the escape as per Aquaculture Policy 17 (DFLR 2019).
17. Annual escape response drills will be performed on site.

Deposition of organic waste (i.e., biochemical oxygen demand [BOD] matter), such as fish feces, uneaten fish feed, and naturally occurring biofouling material below and near the sea cages could potentially result in nutrification, attract wildlife, and/or cause chemical, physical or biological changes to the surficial sediment. Regulations and specific mitigation measures to minimize nutrification and depositional effects include:

1. Adherence to the AAR (DFO 2019). Grieg NL will also implement the Benthic Habitat Health EEMP, which incorporates AAR requirements.
2. If benthic monitoring conducted as per the AAR finds indicators of threshold exceedance, then additional habitat health monitoring will be required, and no fish restocking will occur at that specific site until sampling results return to accepted levels.
3. Grieg NL personnel will maintain husbandry practices designed to minimize biofouling (e.g., routine sea cage system cleaning and maintenance; routine sea cage inspections using underwater cameras and diver inspection [as needed]; net inspection and in-situ repair via ROV at least every 30 or 90 days and prior to each use; and strength and integrity testing of nets over three years old every 18 months).
4. Sea cage sites and BMAs will be fallowed at the end of each production cycle (i.e., after harvesting) for a minimum of 7 months and a minimum of 4 months, respectively, in accordance with the minimum period specified by Bay Management Area principles for licensed sites producing Atlantic salmon (DFLR 2019). Grieg NL will adhere to all fallowing requirements set out by the Province.
5. Nutrification effects from the deposition of BOD matter will be monitored at sea cage sites.
6. The use of pesticides will be avoided to the extent possible.
7. Therapeutants or antibiotics will only be used on the advice of private and provincial veterinarians and in consideration of fish health and welfare.

8. Feed waste will be minimised by using established feeding tables/software to determine appropriate feed type and amount, and an automatic feeding system which integrates video monitoring and ceases feed delivery at ~80% satiation.
9. The biosecurity procedures designed to minimize or eliminate the occurrence or spread of pathogens (as outlined in points 1 and 4 below) will serve to minimize the potential spread of Non-native/Aquatic Invasive Species (AIS). Grieg NL personnel will assist DFO's monitoring program for AIS by regularly examining sea cages, mooring equipment, and feed barges for AIS occurrence. The monitoring schedule of the sea cage equipment is dependent on many factors (i.e., weather-driven, biological, type of equipment) and will occur every 1-4 weeks during warmer water periods when the risk of biofouling is at its peak. For details on the monitoring schedule, refer to the Sea Cage Performance EEMP. The ROV net cleaner, which is equipped with a camera for inspecting nets, will be used as the primary means for conducting visual inspections.
10. If AIS are detected on Grieg NL equipment (i.e., vase and golden star tunicates), incidences will be reported immediately to DFO at 1-855-862-1814. Pressure washing of the affected net(s) at a sea cage site will not be permitted if tunicates are detected on the net to prevent propagation through fragmentation. Grieg NL will remove tunicates via a ROV or diver(s). Tunicates which are removed will be transported to shore, air-dried (minimum 48 hours), and treated as hazardous waste during disposal. If a large presence of AIS (i.e., affected area deemed too large for removal via a diver or ROV) is detected on a net, the net will be changed out. The affected net will undergo a full disinfection, cleaning and drying (minimum 48 hours) procedure at a shore-based facility. The need for additional mitigation measures will be discussed with DFO upon discovery of AIS on Grieg NL equipment.

To minimize or eliminate the occurrence or spread of disease and parasites from farmed fish to wild fish Grieg NL will implement its Fish Health Management Plan. Specific mitigation measures include:

1. The highest standards in biosecurity procedures will be maintained including cleaning/disinfection of equipment and vessels, personnel movements, maintenance and record keeping procedures for marine operations. These measures will be clearly outlined in a biosecurity plan and numerous SOPs.
2. Health checks by a veterinarian shall be conducted, including sampling a number of fish from each tank at the RAS Hatchery that is being transferred to sea.
3. Fish shall not be transported if there are any health concerns and until the transfer permit from the DFLR, DFO and Canadian Food Inspection Agency (CFIA) is received.
4. The exchange of equipment between sea cage sites will be minimized.
5. Analysis of plankton samples, collected on a weekly basis when possible, will assist in the creation of net cleaning schedules.
6. Sea lice levels will be monitored weekly on a sub-sample of salmon when water temperatures are above 5ºC and weather conditions allow. Based on veterinarian advice, physical monitoring of lice levels on fish will be less frequent at lower water temperatures, although weekly video monitoring will continue.
7. Appropriate mitigation responses will be enacted based on data collected to evaluate the severity of any environmental issues, such as fouling or changes in physio-chemical parameters.

8. Should the use of pesticides be required, Grieg NL shall use pesticide approved for use in Canada, for the specific use intended, by the Pesticide Management Regulatory Agency as per DMAE conditions of EIS release.
9. Pesticides will only be applied by a licenced Pesticide Applicator with the appropriate licence category, in accordance with product direction as per DMAE conditions of EIS release.
10. The judicious use of approved products (antibiotics) in Canada shall be avoided except where absolutely necessary, based on recommendations of private and provincial veterinarians and in consideration of the health and welfare of the fish.
11. In the event of a fish health emergency, like the detection of the Infectious Salmon Anemia (ISA) virus, Grieg NL personnel will immediately notify veterinarians (Grieg NL and Provincial) and DFO as outlined in the Fish Health Management Plan. Additional steps to minimize the spread of disease will be undertaken in consultation with the veterinarians and DFO. It may be necessary to isolate or quarantine the (potentially) infected population from healthy populations.
12. Grieg NL shall publicly release all reports of reportable disease confirmed by official representatives within 24 hours, and all use of therapeutants (antibiotics, vaccinations, anesthetics) and pesticides annually as per DMAE conditions of EIS release. Information will be publicly available on Grieg NL's website.
13. Grieg NL shall fund an environmental monitor to monitor the entire Project prior to sea cage operation and for the first 10 years of Project operations as per DMAE conditions of EIS release.
14. Sea cage sites will be fallowed according to an established schedule that will meet or exceed provincial requirements.
15. Fish mortalities will be removed from the sea cages daily when conditions allow and placed in secure storage on the barges.
16. Grieg NL will sign a Wharf Usage Agreement with the department as per Aquaculture Policy (DFLR, 2019). There will be separate inflow and outflow resupply sites.
17. Only Grieg NL personnel/vessels and third-party providers will access cages and barges at each site.
18. Crew vessels, well boats and service vessels working within an active BMA will adhere to Aquaculture Policy 36 (DFLR, 2019) and Grieg NL Biosecurity plan which includes not travelling directly between BMAs unless they have been cleaned/disinfected after exiting a BMA.
19. When transiting through a BMA, vessels will avoid sea cage sites by at least 1 km, unless a given sea cage site is the vessel's destination.
20. All well boat hatches will be closed when travelling between BMAs.
21. After fish have been harvested, vessels will take the most direct route possible to the designated port, without passing through another BMA.

4.9 Protection of Migratory Birds

Environmental Concern

Migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act* (MBCA). Migratory birds protected by the MBCA generally include all seabirds except cormorants and pelicans, all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles).

Under Section 6 of the *Migratory Birds Regulations* (MBR), it is forbidden to disturb, destroy or take a nest or egg of a migratory bird or be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the current MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities.

Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:

> *5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.*
>
> *(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds.*"

Environmental Protection Procedures

The following procedures will be put into place to ensure that the Project does not pose a threat to migratory birds:

1. No one will approach concentrations of seabirds, sea ducks or shorebirds that may occur at the nearshore marine sites (i.e., crew change and resupply) and along the transit route to the sea cage sites.
2. Project vessels will avoid close approach to areas with known or expected seabird nesting.
3. Care will be taken to ensure proper disposal of food scraps and other garbage to minimize possible attraction of potential predators to migratory birds.
4. All precautions will be taken to prevent fuel leaks from equipment. Staff and crew are aware that under the MBR, "no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds."
5. During nighttime periods, vessels at the sea cage sites will:
    a. Use the minimum number of lights possible, while still ensuring the safety of crews on vessels at night;
    b. Shield lighting for the safety of the employees to emit downward and only to where it is needed, without compromising safety; and
    c. Avoid using solid-burning or slow-pulsing warning lights.
6. Grieg NL will have a Migratory Bird Handling Permit (issued by Canadian Wildlife Service [CWS]) in place should a bird strand on a Project vessel or equipment.
7. Project vessels will be systematically searched (daily) by trained crew members for stranded birds. Records of search effort will be maintained.
8. Bird handling and release protocols as well as reporting requirements issued by Environment and Climate Change Canada-Canadian Wildlife Service (ECCC-CWS) will be followed (Appendix A).

4.10 Marine Fauna Interactions with Sea Cage Sites

Environmental Concern

It is possible that marine mammals, sea turtles, river otters, wild fishes, and birds could become entangled in components of the sea cage systems (e.g., nets, mooring and buoy lines). There could be some risk to human safety, particularly during attempts to release live animals.

Environmental Protection Procedures

1. Sea cage mooring and buoy lines will be kept tensioned so that no loose ropes occur in the water.
2. Bird netting will be placed above the sea cages during the marine operations phase.
3. Predator management will be conducted in a manner that ensures human safety.
4. Any entanglement of marine mammals, river otters, wild fish, and sea turtles will be reported immediately by phone to the Marine Mammal Coordinator, DFO NL Region. The Marine Mammal Coordinator will coordinate a response with Tangly Whales (i.e., the Whale Release and Strandings Group). Grieg NL will provide access and support (as required) to Tangly Whales to respond to the incident. Any entanglements will be carefully documented and reported to DFO.
5. Grieg NL will have the necessary permit under Section 73 of the *Species At Risk Act* in place in the unlikely event that a SARA species becomes entangled in sea cage equipment and requires handling.
6. If all methods to free or remove a marine animal have failed and it is posing a serious threat to either the integrity of the moorings or personnel safety, lethal measures may be considered. Before such actions are taken (by a third-party; firearms will not be stored at the sea cage sites), DFO will be consulted.
7. If a bird becomes entangled, Grieg NL will follow established procedures to release the bird (which will be developed in consultation with ECCC-CWS). Grieg NL will have a Migratory Bird Handling Permit (issued by CWS) in place and will follow reporting requirements.

4.11 Water Quality

Environmental Concern

There is concern that water quality could be affected during marine operations, such as from the release of solid waste, spills of hazardous substances, fouling of sea cage components, and deposits from the sea cage sites. Note that procedures to minimize and address the accidental release of hazardous substances and solid wastes were provided in Sections 4.2 and 4.4, respectively. Likewise, procedures to minimize biofouling and deposits at the sea cage sites were provided in Section 4.8. The procedures listed below outline water quality monitoring which will be undertaken at each active sea cage site and the well boat.

Environmental Protection Procedures

1. Water quality will be monitored, measured and recorded daily at active sea cage sites via in-situ data loggers installed on barges and individual sea cages that will collect data on water temperature, oxygen levels, pH and salinity. Sensors can also be attached to cameras and buoys near the sea cage site perimeters if needed.
2. Water quality data will be wirelessly transmitted to centralized computer stations on the barges and control center in Marystown for real-time viewing and/or logged for historical collections.
3. As required, Grieg NL will submit collected biophysical data including, but not limited to, dissolved oxygen, temperature and salinity at different depths at all active aquaculture marine sites. Submission of this data will occur quarterly to the Aquaculture Development and Aquatic Animal Health Divisions of the Department of Fisheries and Land Resources (DFLR, 2019).
4. Water quality in the hold of the well boat will be monitored during transport of smolt from the RAS Hatchery to the sea cage sites.

5.0 Contingency Plans

Contingency plans to address incidents and unplanned situations that may occur during marine operations have been developed and will be modified as required. Grieg NL has developed a separate Emergency Incident Response Plan that details procedures for personnel health and safety and response to accidents, malfunctions, and emergencies. Within this plan, Grieg NL details reporting and investigation procedures in its Incident Management System Plan as well as spill response in its Spill Management Plan. These documents are the first point of reference for emergency responders in case of an emergency on site. Information provided in this section is meant to support the Emergency Incident Response Plan and be available as an additional reference.

The following contingency plans have been developed to address accidental and unplanned situations that may occur during the marine operations phase:

- Fuel and Hazardous Materials Spills
- Wildlife Encounters (Ship Strikes)
- Extreme Weather Events and Ice
- Extreme Water Temperature Events
- Discovery of a Species at Risk
- Discovery of Historic Resources
- Mass Mortality Event
- Lost/Estranged Gear

Notwithstanding these contingency plans, Grieg NL supports preventative measures as the first line of defence against the possibility of incidents.

5.1 Fuel or Hazardous Materials Spills

Grieg NL will lead and coordinate any field response in consultation with the marine vessel crew to environmental incidents related to their marine operations activities. During marine operations, it is anticipated that in the unlikely event that material is spilled it will be primarily fuel, lube, and hydraulic fluid originating from equipment wear and tear and/or malfunction and in extreme cases vessel grounding or collision. Therefore, in the event of a spill, procedures for responding to hydrocarbon spills outlined herein, shall apply:

1. Assess the situation (Safety First). Personnel shall not approach the spill area without appropriate PPE.
2. Identify priorities while considering the threat to people, property, and the environment.
3. Initiate the appropriate response actions:
    - The individual who discovers the leak or spill will make a reasonable attempt to immediately stop the leakage and contain the flow, where safe to do so.
    - Contact emergency personnel and request additional support if necessary.
    - Reporting: spill location, type of product, estimated volume and weather conditions at the spill site will be determined and reported immediately to Grieg NL's EHS Advisor for further reporting to authorities, as appropriate.

- Initiate the containment and recovery of any free product and/or contaminated material.

4. Dispose of all waste material in the appropriate manner.
5. Restore the site to the satisfaction of the Project representative or governing regulatory body.
6. Document and investigate as required.

Reportable spills applicable to the marine operations activities include a spill or leak in the water, regardless of quantity. Spills meeting the above criterion shall be reported immediately to regulatory authorities via the **Environmental Emergency Report Line at (709) 772-2083 or 1-800-563-9089**. Spills can also be reported to a local Marine Communication and Traffic Services (MCTS) centre or by calling VHF channel 16. Project personnel are also to refer to Grieg NL's Spill Management Plan: Land and Water, and emergency contact phone numbers (first page [i]) and section 4.0, *Emergency Response*, of Grieg NL's Emergency Response Plan. ECCC-CWS will be contacted for spills involving the handling or disturbance of birds.

Grieg NL will sign a subscriber agreement with a local Canadian Marine Response Organization (Eastern Canada Response Corporation [ECRC]; see Appendix B) with the expressed intent to avail of their spill response services for marine construction and operations and these services will be in place throughout the Project should a spill incident exceed the company's ability to respond. All spills require reporting to Grieg NL management. However, the type of spill will dictate if additional resources are required to respond to the spill.

Grieg NL and its subcontractors will take all necessary precautions to prevent a reoccurrence of the incident and the EHS Advisor shall prepare a written report as required.

5.2 Wildlife Encounters

Wildlife encounters pose a potential risk for stress or injury to both the wildlife and site personnel. Birds, fishes, seals, other marine mammals, and possibly river otters may be attracted to Project vessels or sea cage sites during the marine operations period. To minimize the potential for attraction and to reduce the risk to both wildlife and site personnel, the following measures will be implemented:

- Hunting or fishing by Project personnel is not permitted on site.
- Project vessels will have wastes stored and secured appropriately.
- Project vessels will not discharge any waste overboard.
- Project vessels will remain on site at night and vessel lighting will be minimized to the extent possible.

In addition to the above protection measures, the following protocol will be followed in the event of a wildlife encounter that involves potential risk to Project personnel and the wildlife:

- Workers shall not attempt to chase, divert, follow or otherwise harass wildlife.
- All actions in response to wildlife will be the responsibility of Grieg NL. These encounters will be reported to Grieg NL's EHS Advisor.
- Vessels will slow speed and alter course as appropriate should a marine mammal be encountered in the vessel's path.

- Any incidents that result in the displacement or killing of wildlife shall be reported to the EHS Advisor, complete with details on the incident and the names (and contact information) of the persons involved, for reporting as required. Appropriate regulatory agencies will be contacted.
- In the unlikely event that a marine mammal is struck by a Project vessel, DFO will be contacted immediately through their **24-hour emergency contact number (1-888-895-3003)** and appropriate steps will be taken to document the event.

5.3 Extreme Weather Events and Ice

Extreme weather events, such as severe storms, hurricanes or post-tropical storms, can bring strong winds, high waves, and heavy precipitation. Such events can disrupt unsecured materials or equipment, or damage partially installed sea cage components and put Project vessels/personnel at risk. The risk of encountering extreme weather events during marine operations is greatest during hurricane season (late-summer into early-fall) and winter. In anticipation of an extreme weather event, precautionary measures to prevent negative impacts to the environment may include:

- Project vessels will remain in port in anticipation of extreme weather events.
- Loose materials, covering and containers, including waste containers on Project vessels will be secured.
- Sea cage components will be checked and secured prior to the weather event.

Immediately following an extreme weather event, all on-site environmental protection measures will be checked. Any required repairs at the sea cage sites will be completed as soon as conditions allow, before any work occurs. Further details on sea cage system inspections are provided in the Sea Cage Performance EEMP (LGL 2019).

Although sea ice and icebergs are not considered a particular risk to sea cage operations, Grieg NL will routinely (i.e., minimum daily) receive and monitor broadcasts on ice conditions (and/or weather) from the MCTS and receive guidance on the predicted timing and extent of any sea ice (or iceberg) incursions. Grieg NL's application for "standing" with the CCG on the Placentia Bay Traffic Committee should the need arise for assistance with ice is being processed. A three-tiered approach will be used to adaptively manage ice based on the type and size of the ice:

1. Slush, small patches of drift ice, and ice in general less than 5 cm thick will be mitigated through the robust design of the Aqualine sea cage as well the deployment of an ice boom and use of Grieg NL operated service vessels.
2. A multi-purpose vessel (operated by a third-party provider) with ice class capacity will be on standby to mitigate and potentially break-up and/or move 5–15 cm thick ice; more specifically pancake ice, ice cakes, brash ice (<20 m across); small ice floes (20–100 m across); and medium ice floes (100–500 m across).
3. A CCG ice breaker may assist with large ice floes (>500 m across), solid pack ice, and iceberg(s) in the unlikely event these ice conditions are encountered at or near the sea cage sites.

In the rare circumstance of a major ice incursion which cannot be mitigated through the measures outlined above, Grieg NL's Emergency Response Plan details procedures to harvest the fish.

5.4 Extreme Water Temperature Events

Fishes have thermal tolerances with upper and lower temperature limits that are species-specific. Atlantic salmon have a lower temperature limit of approximately -0.75˚C (Elliott and Elliott 2010) and an upper thermal limit range of approximately 22.3-27.5˚C (Anttila et al. 2013). A study by Anttila et al. (2013) suggests that there is substantial variation in both thermal and hypoxia (deficiency of oxygen reaching tissues) tolerance among families of Atlantic salmon due to genetic differences. Regardless, extremes in water temperature can result in mortality in Atlantic salmon, primarily due to a depletion in available oxygen in the case of extreme high temperatures.

The concentration of dissolved oxygen (DO) in water is influenced by a number of factors, including water temperature, salinity and atmospheric pressure. Storm events can also affect how DO varies in the water column. The DO level in water is typically inversely related to temperature and salinity, and directly related to pressure. Generally, warmer, highly saline water near surface contains less dissolved oxygen than cold, lower salinity water at depth (Fondriest Environmental, Inc. 2013).

A routine program will be established for monitoring, measuring, and recording biophysical data at all active sea cage sites on a daily basis throughout the Project. In situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. This daily collected biophysical data will be submitted to the Aquaculture Development and AAHD of DFLR on a quarterly basis. These data will also be available to DFLR upon request in the event of an extreme water temperature event.

5.4.1 Superchill

Although Atlantic salmon can survive temperatures below freezing, if the salmon contact ice crystals in the water mortality may occur. Superchill occurs when the water temperatures fall below freezing and ice nuclei form in the water and then develop across the epidermis of the fish (Speare 2003). This can be detrimental to the health of the fish and result in high mortalities. In Newfoundland, a superchill event resulted in farmed Atlantic salmon mortalities in 2014 (DFA 2015). Superchill can occur in Placentia Bay and affect the Project.

Grieg NL will implement measures to reduce the possibility of fish being affected by a superchill event. Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3 of the EIS). Salmon position themselves vertically in relation to water temperature within sea cages (Oppedal et al. 2011). Therefore, providing the fish with deep nets (i.e., 37 m below surface) will allow the fish to descend deeper into the water that is warmer than the colder surface water. Other mitigation measures which will be implemented by Grieg NL to minimize the effects of a superchill event include the cessation of feeding and other activities that require the fish to come to the surface. Additionally, water temperatures will be monitored daily (as a minimum at surface, mid-cage, and bottom cage), and personnel will be trained to recognize when a superchill event may occur.

5.4.2 Extreme High Temperature Events

Grieg NL has and/or will implement the following mitigation measures to minimize the likelihood of a mass mortality event occurring at its Placentia Bay sea cage sites as a result of extreme high temperature events.

Project Planning—Site Selection: Placentia Bay was selected because it provides deep-water sites that have ideal water temperatures, stratification, and currents to support salmon growth. Grieg NL's sea cage sites are located in the deep channels that run the longitudinal axis and are characteristic of Placentia Bay. Ma et al. (2012) modelled currents and temperature in Placentia Bay and discovered that wind-induced coastal upwelling pumped low temperature water from a deeper layer up to the surface on the west coast of the bay. As a result of the southwesterly winds, surface water temperature along the east coast warmed up. Observations in Placentia Bay support this cooler water temperature along the west coast of the bay where Grieg NL sea cages are located. Grieg NL has been collecting water temperature and DO data in its BMAs since 2016. Maximum water temperature observed at the sea cage sites was 18.4˚C, which occurred in the upper 10 m of the water column for a relatively brief period in August 2019. Below 10 m, maximum water temperatures from 2016-2019 have ranged from 14°C to 17.5°C and at 25 m below 15° C. Water sampled was predominately near or above 100% oxygen saturation and measured DO concentrations were consistently greater than 6 mg/L, typically considered the indicator value below which hypoxic conditions occur for farmed salmon (Mansour et al. 2008).

Project Planning—Production Plan: A stocking density of <15 kg/m^3 will be used in each sea cage, which allows adequate net volume for fish to descend lower in the net if necessary. All-female triploids will be used instead of diploids and the smolt will be graded by size prior to transfer to sea which will allow for more accurate assessment of oxygen requirements.

Selection of Sea Cages, Associated Equipment, and Husbandry Practices: Grieg NL will be using deep (37 m) and large sea cages (50 m diameter) to house its farmed salmon. This will allow salmon to descend lower in the water column to avoid warmer surface temperatures if necessary. Grieg NL's barges are equipped with large generators which can power aeration devices for deployment into the sea cages should DO decrease to levels which are deemed to put salmon health at risk. Additionally, Grieg NL is considering equipping its sea cages with a "lock' system, which will allow the entire net to be lowered deeper into the water column. Nets will be cleaned by a service provider approximately every 10 days during periods when water temperatures would be highest. Maintaining a consistent cleaning program will ensure there is minimal fouling on the nets and ultimately allows for optimum water flow within the sea cage. Each sea cage will be equipped with a LiftUp mortality removal system that will be operated/monitored daily; it is anticipated that there will be no accumulation of fish mortalities. [Note that the LiftUp system is designed to handle a mass mortality event and has a maximum mortality removal capacity of 60 ton/hour (J. Ragnhildstveit, Production Manager, LiftUp, pers. comm., 29 October 2019).]

Visual Monitoring of Fish Behaviour: Salmon behaviour will be monitored during feeding and will provide early warning signs of potential issues with high water temperatures. This will allow Grieg NL to implement modified operational activities (see below) in a more timely fashion and complements the water temperature and DO monitoring at each sea cage.

Water Temperature and DO Monitoring: Water temperature and DO will be monitored continuously in each sea cage at select depths in the water column (i.e., as a minimum at surface, mid-cage, and bottom cage). If water temperatures increase and/or oxygen levels decrease to levels deemed to put salmon health at risk, modified operational activities will be implemented (see below).

Modified Operational Activities: Activities that require the fish to come to surface will be ceased during periods of high water temperatures and/or low oxygen levels. Feeding regimes will be adjusted based on environmental conditions and fish behaviour in consultation with the company veterinarian. Feed will either be reduced, ceased, or alternatively fish may be fed through a sub-feeder. Aeration devices will be available for deployment. If net locks are employed, sea cages in the affected high water temperature areas will be lowered into the water column to minimize exposure of salmon to hypoxic conditions.

If a mass mortality event does occur, Grieg NL will implement its mass mortality response plan (see Section 5.7.

5.5 Discovery of a Species at Risk

The marine species considered at risk (as listed on Schedule 1 of the *Species at Risk Act* [SARA] and/or the Newfoundland and Labrador *Endangered Species Act* [ESA]) which may occur at the sea cage sites are listed in Table 5.1. Fishes, whales, sea turtles, and seabirds considered at-risk may occur at and near the sea cage sites and may be detected by Project personnel.

It is also possible, but unlikely, that the following SARA-listed landbirds may land on Project vessels: Red Crossbill (Endangered), Olive-sided Flycatcher (Threatened), Peregrine Falcon (Special Concern), and Rusty Blackbird (Special Concern).

Marine operations are not anticipated to pose a threat to SARA- or ESA-listed species. To minimize the likelihood of potential negative effects on listed species, the following measures will be implemented:

- All personnel working on site will adhere to all stipulations set out in the SARA, and will be informed that it is illegal to kill, harass, capture or harm any species listed under it.
- Grieg NL will record sightings of any species considered at-risk observed at the sea cage sites and during transit to the sea cage sites. Personnel will receive training from experienced biologist(s) on the identification of the various bird, marine mammal, fish, and sea turtles and the associated data recording procedures. Data will be submitted to DFO and ECCC-CWS as appropriate.
- If a bird species considered at-risk strands on a Project vessel it will be reported to ECCC-CWS immediately and appropriate steps will be followed in consultation with ECCC-CWS.
- If a North Atlantic right whale (considered critically endangered) is sighted, DFO will be contacted immediately and provided with details of the sightings (time, location, heading and activity of whale).

Table 5.1. Species considered at risk in Placentia Bay which have been assessed under the Species at Risk Valued Environmental Component (VEC).

Species	Federal SARA Status	Provincial ESA Status
Fishes		
White Shark (Atlantic pop.)	Endangered	Not listed
Northern Wolffish	Threatened	Not listed
Spotted Wolffish	Threatened	Not listed
Atlantic Wolffish	Special Concern	Not listed
American Eel	Threatened (COSEWIC)	Vulnerable
Banded Killifish (Newfoundland pop.)	Special Concern	Vulnerable
Marine Mammals		
Blue Whale (Atlantic pop.)	Endangered	Not listed
North Atlantic Right Whale	Endangered	Not listed
Northern Bottlenose Whale (Scotian Shelf pop.)	Endangered	Not listed
Fin Whale	Special Concern	Not listed
Sowerby's Beaked Whale	Special Concern	Not listed
Sea Turtles		
Leatherback Sea Turtle (Atlantic pop.)	Endangered	Not listed
Loggerhead Sea Turtle	Endangered	Not listed
Birds		
Ivory Gull	Endangered	Endangered
Piping Plover	Endangered	Endangered
Red Knot	Endangered	Endangered
Barrow's Goldeneye (Eastern pop.)	Special Concern	Vulnerable
Harlequin Duck (Eastern pop.)	Special Concern	Vulnerable

5.6 Discovery of Historic Resources

Historic resource material that is disturbed, destroyed, or improperly removed from the sea cage site(s) represents a cultural loss of information and history that could otherwise be handled and interpreted in an appropriate manner.

In the unlikely event evidence of an archaeological item/site is discovered during marine operations at or during transit to the sea cage sites, the following measures will be taken:

- All work in the immediate area of the discovery shall be stopped until authorized personnel (EHS Advisor) consult with the Provincial Archaeologist and permission has been received to resume work.
- Report the find immediately to the EHS Advisor.
- Record the exact coordinates of the site's visible boundaries. Personnel will not move or remove any artifacts or associated material unless advised to do so by the Provincial Archaeology Office.
- Grieg NL will report the find with the following information to the Provincial Archaeology Office, Culture and Heritage Division, Department of Tourism, Culture, and Recreation, St. John's, and comply with the instruction provided:
  - nature of the find;
  - precise descriptive and map location and the time of the find;
  - nature of the activity resulting in the find;

- identify of the person(s) making the find;
- present location of the material and any protective measures initiated for the material and the site; and
- any extenuating circumstances.

5.7 Mass Mortality Event

If a mass mortality of salmon or lumpfish occurs at the sea cage sites, there is concern that the volume of fish mortalities may not be properly handled and will exceed the capacity of local disposal facilities. Also, there is concern about the potential transfer of disease from fish to wild animals. The following procedures will be undertaken:

- Grieg NL would implement its mass mortality response plan (detailed in Grieg NL's Incident Management System and Fish Disposal Plans) which includes the notification of regulatory agencies, the public and activation of depopulation, if required.
- Mortalities at the sea cage sites will be removed from the bottom of the sea cages using a centralized LiftUp system. Any surface mortalities will be retrieved by personnel.
- Either a well boat or an OCI vessel equipped with industry standard containers will be used to transport the mortalities to a designated outflow wharf in a biosecure manner.
- Biosecure handling and transport as detailed in Grieg NL's Biosecurity Plan will be undertaken to avoid any spillage.
- In the case of a confirmed presence of a reportable fish disease, Grieg NL will contact local providers that are approved to receive the collected mortalities as well as the fish that are live harvested and weigh less than 1 kg.
- Grieg NL shall publicly release all reports of reportable disease confirmed by official representatives within 24 hours as per Aquaculture Policy 2 (DFLR 2019).
- If the mass mortality event is not a result of a reportable disease, the mortalities will be collected and ensilaged for disposal as outlined in Section 4.6.
- Grieg NL will adhere to governmental guidelines and regulations for the disposal of organic material and fish mortalities.

5.8 Lost/Estranged Gear

There is a remote possibility that gear including netting, lines, and structural elements of a sea cage may be lost (i.e., during an extreme weather event). While much of the gear would likely remain in place, entangled in the various mooring lines, some gear might break free to drift and create both a navigation hazard and a source for entanglement with other (e.g., fishing) gear present in the region. This potential type of accident is considered in Grieg NL's Emergency Incident Response Plan. The following procedures will be undertaken:

- Routine inspection schedules will identify issues of equipment that may be wearing or broken and can be repaired or replaced before becoming lost or estranged.

- If extreme weather is approaching these issues will be addressed immediately (i.e., any identified loose equipment will be secured immediately).
- Should gear become lost, Grieg NL will undertake routine surveillance of shoreline, particularly after storms to retrieve lost gear.
- Grieg NL will conduct monthly inspections and clean-up of shorelines of Project debris (as required) within 1 km of each active sea cage site.

6.0 Legislation, Permits and Authorizations

Grieg NL has identified the various legislation, permits and authorizations to which the company subscribes related to environmental aspects of marine operations—see below.

6.1 Legislation

Relevant legislation and regulations for Project marine operations includes the following:

- *Migratory Birds Convention Act*
- *Aquaculture Act*
- *Lands Act*
- *Environmental Protection Act* (provincial)
- *Canadian Environmental Protection Act*
- *Water Resources Act*
- *Occupational Health and Safety Act*
- *Navigation Protection Act*
- *Species at Risk Act*
- *Fisheries Act*
- *Pest Control Products Act*
- *Food and Drugs Act*
- *Historic Resources Act*
- *Aquaculture Activities Regulations* (AAR)
- NL Code of Containment
- NL Aquaculture Policy and Procedures
- *Canada Shipping Act*
- *Endangered Species Act*
- *Transportation of Dangerous Goods Act*
- *Dangerous Goods Transportation Act*

Aspects of the marine operations falling under DFO's mandate will be managed under the AAR, including advanced notification of drug/pesticide use, peak biomass monitoring at the end of each production cycle, and annual reporting.

6.2 Permits and Authorizations

In Canada, the aquaculture industry is regulated and managed by both the federal and provincial governments. Grieg NL is required to adhered to these regulations. A list of required key permits and approvals is provided in Table 6.1. Grieg NL will house and manage permits and authorizations in dedicated software (i.e., *Intelex*, business intelligence software).

Grieg NL may also require a Domestic Movement Permit Application to move Finfish and/or Things within Canada (CFIA/ACIA 5743) from CFIA, depending on the declarations of the reportable disease status of the areas where aquatic animals or equipment will be moved. CFIA must be contacted by Grieg NL prior to domestic movements of fish or equipment.

Table 6.1. Anticipated federal and provincial approvals and permits for the marine operations phase of the Project.

Permit, License or Regulatory Approval	Activity Requiring Approval	Legislation	Regulatory Agency Responsible	Status
Government of Canada				
DFO Approval (managed under AAR)	Operational aquaculture activities in the marine environment	*Fisheries Act*	DFO	In progress (Aquaculture Licensing Process)
Navigation Protection Act Assessment and Approval	Any work in navigable waters	*Navigation Protection Act*	Transport Canada	In progress (Aquaculture Licensing Process)
Migratory Bird Permit	Any activities that could cause mortality, disturbance or require relocation of migratory birds	*Migratory Birds Convention Act*	ECCC-CWS	To be acquired
Aquatic Animal Health Import Permit	Import of fish eggs	National Aquatic Animal Health Program	Canadian Food Inspection Agency (CFIA)	Received.[1]
Government of Newfoundland and Labrador				
Aquaculture Licence	Any aquaculture activities	*Aquaculture Act*	DFLR	In progress (Aquaculture Licensing Process)
Minister's Approval for the Introduction, Transfer and Transport of Fish	Transportation of fish	*Aquaculture Act*	DFLR	To be acquired.
Crown Land Permits	Leasing of land at the sea cage sites	*Lands Act*	DFLR	In progress (Aquaculture Licensing Process)
Water Use Licence/Permit	Marine Aquaculture Water Use	*Water Resources Act*	DFLR	In progress (Aquaculture Licensing Process)
Permit for Flammable and Combustible Liquid Storage	Storage of flammable and combustible liquids	*Environmental Protection Act*	Service NL	To be acquired

[1] CFIA issued Grieg NL an egg import permit, recognizing Stofnfiskur as an approved exporter to Canada, in March 2016 (Permit No. Q-2016-00213-4) and Grieg NL has continued to renew this permit every three months as per the regulations.

[2] Permit not required until fish are ready for transport (i.e., when first smolt are ready for transport to sea).

6.3 Compliance Monitoring

Grieg NL is required to implement compliance monitoring as per the AAR (2019) and the NL Code of Containment. In addition, DFLR Aquaculture Policy and Procedures requires that environmental impacts must be considered, and an adequate plan must be in place to address environmental monitoring and waste management (DFLR 2019).

Regulatory compliance monitoring requirements for the marine operations phase include:

- Provision of an annual report under AAR (2018) providing information on the operations, including if there is potential to deposit deleterious substances into fish-bearing waters and visual monitoring of benthic substrate.
- Documentation and reporting as required under NL Code of Containment including net testing results, inventory reconciliation, and mooring maintenance/replacement.
- Regular inspections of all net, cage and surface mooring components as specified in NL Code of Containment and Grieg NL Maintenance and Inspection of Aqualine cages (details are provided in the Sea Cage Performance EEMP).
- Periodic audits of cage system as specified in NL Code of Containment Procedures for Compliance.
- Periodic audits of the net testing procedures and results as arranged by DFLR.

If applicable, additional compliance monitoring requirements will be added to an updated EPP as permit conditions are received.

6.4 Environmental Effects Monitoring Plans

As a condition of the EIS release, Grieg NL is required to design and conduct eight EEMPs, seven of which are directly related to the marine environment (see Section 8.1 for details). All EEMPs must receive regulatory approval before Grieg NL can be issued an Aquaculture License. Personnel are to refer to the EEMPs for detailed monitoring requirements.

7.0 Contact List

Contact lists will be posted in central, visible locations on each Project vessel. The lists will be kept up to date, and all contacts on the lists will be made aware of their expected role(s) during routine and/or emergency situations.

7.1 Emergency Numbers

Contact information that may be utilized during an emergency is provided in Table 7.1.

Table 7.1. Emergency contact phone numbers for the Project.

Title	Number
Emergency Personnel	911
Search and Rescue	1-800-563-2444
Canadian Coast Guard	1-709-772-4423
Marine Pollution	1-800-563-9089
Emergency Response Organization	TBD
Marine Communication and Transport Center, Placentia	1-709-227-2181
Marine Mammal in Distress	1-888-895-3003
Poaching and Fisheries Violations	1-800-222-8477
Department Fisheries and Land Resources	1-709-292-4111
Fisheries and Oceans Canada (DFO)	1-709-772-5202
Invasive Aquatic Species	1-888-435-4040
ECCC-CWS (Birds)	1-709-772-5568 or 1-506-364-5189
Marystown Ambulance	709-279-2121
Marystown Fire Department	709-279-1333
Burin Peninsula Health Care	709-891-1040
Marystown Police	709-279-3001
Poison Control	1-866-727-1110

7.2 Advisory and Other Contact Numbers

Contact information for appropriate Grieg NL and other advisory personnel are provided in Table 7.2. These designated personnel can be reached at any time, in accordance with established communications protocols.

Table 7.2. Advisory and other contact numbers for marine operations.

Title	Name	Number
Grieg NL General Manager	Knut Skeidsvoll	TBD
Grieg NL Production Manager	Candice Way	TBD
Grieg NL EHS Advisor	Justin Bolt	TBD
Marine Site Manager	TBD	TBD
Assistant Marine Site Manager	TBD	TBD

8.0 Resource Material

Information documents relevant to the Project were included as appendices to the EIS. Hard copies of the EIS and associated documents can be found at Grieg NL's office in Marystown and at public libraries in Marystown (as well as Corner Brook and St. John's). Additionally, EEMPs for the Project are currently being developed and will be posted on the DMAE public website.

8.1 Key Reference Material

Environmental documents previously completed for the Project and relevant to marine operations are listed in Table 8.1. Additionally, the seven EEMPs directly relevant to the marine environment are included in Table 8.1. Personnel are also referred to further documentation included as appendices to and referenced throughout this EPP.

Table 8.1. Key Project reference material relevant to environmental protection procedures for marine operations.

Document Name and Author	Summary	Date
Emergency Incident Response Plan Grieg NL	Details the emergency procedures to be implemented in response to any situation including Incident Management and Spills that may endanger the safety and/or health of people; the environment; property and/or equipment.	May 2018 (update to include Incident Management System in progress)
Waste Management Plan Grieg NL	Details the procedures to be implemented to manage waste associated with the Project.	May 2018 (updated April 2019)
Fish Health Management Plan Grieg NL	Details the procedures for maintaining farmed salmon (and lumpfish) health.	May 2018 (update to include requested Biosecurity, Pest Management and Fish Disposal in progress)
The Cultural, Recreational and Commercial Importance of the Waters of Placentia Bay Component Study Grattan et al. (2018)	Provides a detailed description of the cultural, recreational and commercial usage of Placentia Bay. It focuses on fisheries, tourism, recreational activities, marine navigation, and culturally and ecologically important areas. The study also includes mitigation measures that will be undertaken to protect these uses and areas from the potential effects of the Project, as well as follow-up monitoring.	May 2018
Fish and Fish Habitat Component Study LGL Limited (2018)	Provides a review of the existing fish and fish habitat in Placentia Bay with focus on the sea cage sites, the mitigation measures intended to minimize the potential effects of the proposed Project on fish and fish habitat, and the follow-up monitoring intended to validate the effects conclusions in the EIS.	May 2018
Sustainability Report 2017 Grieg Seafood	Defines Grieg Seafoods five essential principles for sustainable food production in the ocean and introduces a greenhouse gas account which maps emissions from Grieg Seafood as an organization.	April 2018

Document Name and Author	Summary	Date
EEMP: Benthic Habitat Health	An EEMP designed to monitor nutrification effects on benthic habitat due to the deposition of fish feces, uneaten fish feed, and naturally occurring biofouling material from sea cages (i.e., biochemical oxygen demand [BOD] matter).	June 2019
EEMP: Sea Cage Performance	An EEMP designed to monitor the performance of Grieg NL's sea cage system; more specifically, it includes the inspection, maintenance and part replacement methodologies, including scheduling, for the various parts of the sea cage system.	June 2019
EEMP: Climate and Meteorology	An EEMP designed to monitor weather variability, meteorological and metocean conditions at regional and site-specific scales, specifically Placentia Bay in its entirety and at each of the sea cage sites.	In progress
EEMP: Fish, Marine Mammal, Sea Turtle, and Bird	An EEMP designed to monitor and document marine wildlife, with emphasis on species at risk, in the immediate vicinity of the sea cage sites and along established vessel transit routes.	In progress
EEMP: Genetic and Ecological Interactions between Escaped Farmed Atlantic Salmon and Wild Atlantic Salmon	An EEMP designed to monitor the potential effects of genetic and ecological interactions between farmed and wild Atlantic salmon in Placentia Bay.	In progress
EEMP: Genetic and Ecological Interactions between Lumpfish Used as Cleaner Fish and their Wild Counterparts	An EEMP designed to monitor the potential effects of genetic and ecological interactions between lumpfish used as cleaner fish and wild lumpfish in Placentia Bay.	In progress
EEMP: Performance of European Strain Triploid Salmon	An EEMP designed to monitor and document the performance of the farmed European strain triploid Atlantic salmon.	In progress

9.0 Literature Cited

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List of Appendices

Appendix A: Procedures for Handling and Documenting Stranded Birds
Appendix B: ECRC and Grieg NL Letter Subscriber Agreement

Appendix A

Procedures for Handling and Documenting Stranded Birds

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada

Canada

Cat. No.: xx
ISBN: xx

Environment and Climate Change Canada
Public Inquiries Centre
7th Floor, Fontaine Building
200 Sacré-Coeur Boulevard
Gatineau QC K1A 0H3
Telephone: 819-997-2800
Toll Free: 1-800-668-6767 (in Canada only)
Email: ec.enviroinfo.ec@canada.ca

Aussi disponible en français

Table of Contents

1 BACKGROUND

1.1 Document Purpose

This document is intended to provide personnel working on offshore infrastructure (i.e., oil and gas platforms, supply vessels, etc.) with safe and effective procedures for dealing with and documenting live and dead stranded birds.

Disclaimer - The information presented here constitutes advice only. All persons must adhere to all pertinent laws (for example provincial or territorial laws), regulations and permit requirements including but not restricted to the "Migratory Birds Convention Act, 1994" (MBCA) and the "Migratory Birds Regulations" (MBR). It is important to note that some species of birds protected under the MBCA have also been listed in Schedule 1 of the Species at Risk Act (SARA). These species receive protection from both the MBCA and SARA.

This advice does not provide an authorization for harming or killing migratory birds or for the disturbance, destruction or taking of nests or eggs under the MBR. It does not provide a guarantee that the activities will avoid contravening the MBR or other laws and regulations. This is general information not intended to be relied on as official advice concerning the legal consequences of any specific activity. It is not a substitute for the MBCA, the MBR, or any other legislation.

1.2 Supporting documents (as APPENDICES)

Stranded Bird Encounter Datasheet – used for documenting and reporting all live and dead stranded birds (Appendix 1).

Infographic - Procedures for handling and documenting stranded birds – used as a quick reference guide to identify the most appropriate course of action when stranded birds are encountered (Appendix 2).

Common Seabirds of Atlantic Canada – used to help identify the most common seabirds found offshore Atlantic Canada (Appendix 3).

1.3 Bird attraction to coastal and offshore infrastructure

Birds can be attracted to offshore platforms, drilling rigs, and support vessels for a variety of reasons, which can include roosting and/or foraging opportunities, as well as attraction to potentially disorienting light sources. Light sources can include floodlights, operational deck lighting, and flares, which may be particularly attractive at night and in foggy or otherwise inclement weather. Attraction to light sources may result in the collision of birds with lit structures and incineration or partial incineration in flares. In Atlantic

Canada, nocturnal migrants and night-flying seabirds (e.g., storm-petrels) are the birds most at risk of attraction to lights.

1.4 Authorization for capture and handling of migratory birds

The capture and handling of migratory birds requires authorization under the "Migratory Birds Convention Act" and "Migratory Bird Regulations", which can be obtained by contacting:

Canadian Wildlife Service (CWS) – Atlantic Region
Environment and Climate Change Canada
17 Waterfowl Lane
Sackville, NB, E4L 1G6
ec.scfatlpermis-cwsatlpermits.ec@canada.ca

See section 1.6 for contact information when CWS needs be contacted immediately.

1.5 Equipment required for capture and handling of live birds

Most capture and handling of stranded birds can be conducted safely and effectively without specialized equipment. However, all personnel should refer to their companies' Occupational Health and Safety Procedures to identify and minimize potential hazards.

We recommend the following list of equipment be available on offshore infrastructure to help minimize stress to the bird and mitigate any risk of injury to personnel. Please note, all equipment that is used for the capture and handling of stranded birds should be cleaned thoroughly, disinfected, or discarded, as appropriate after use.

1.5.1 Personal protective equipment (PPE) for personnel

- Protective barrier gloves (e.g., disposable plastic, nitrile, or rubber gloves) appropriate for the type of bird handled. Consider heavier-duty gloves (e.g., thick leather, PVC, or plastic gloves) when handling larger birds. Gloves should be clean and free from grease and oil.

- Eye protection (e.g., clear safety glasses, wrap-around sun glasses, or face-shield) is required when handling large birds such as herons, gulls, and gannets (use extreme caution when handling any large bird, or avoid handling altogether as they can be dangerous).

1.5.2 Equipment for the safe and effective capture and handling of live birds

- Box or animal carrier - Cardboard boxes are best for holding migratory birds because the boxes provide a calm, dark environment, and will not damage feathers to the extent that hard-sided animal carriers may. Ventilation holes must be cut or punched into cardboard boxes prior to the placement of birds. The bottom of the box should be lined (see below) to allow the bird to stand without slipping. The box should be large enough to allow the bird to stand. Do not house or transport birds in transparent carriers (e.g., wire cages or aquariums).

- Blankets, sheets, towels or pillow cases (based on size of bird) - for corralling and capturing birds. Pillow cases also work well for short-term transportation and holding of birds until they can be placed into a cardboard box. Towels or a piece of clean carpet can be used to line or pad the box to prevent slipping.

- Nets - Smaller and more agile birds may be better captured with hand-held nets (e.g., butterfly nets with long handles). These are especially useful when birds are in hard-to reach corners or under equipment.

- Field guides and/or cameras (including cell phone cameras) are useful for species identification. Identifying the species can help inform decisions regarding the housing, maintenance, transport, and release of the bird. The images on the "Common Seabirds of Atlantic Canada" (Appendix 3) can help in identifying the most common seabirds found in Atlantic Canada, and the following are useful field guides for birds in general:

- "The Sibley Field Guide to Birds of Eastern North America" (Sibley)
- "A Field Guide to North Atlantic Wildlife" (Proctor & Lynch)
- "Beached Birds – A COASST Field Guide to the North Atlantic" (Hass & Parrish) for identification of dead birds.

1.6 Reporting live and dead stranded birds

All birds found stranded on platforms and vessels should be documented (section 4). Documentation should include photographs whenever possible. The documentation should be sent to CWS annually, or as specified under the conditions of the authorization.

Some circumstances require immediate (within 48 hours) reporting to CWS:

- one or more Species at Risk found alive or dead on platform or vessel;

- 10 or more birds stranded or found dead during a single event or day;

- Any birds found injured or oiled that may require transport to mainland facilities for release or rehabilitation; or

- Any birds for which the identification, status or proper handling protocols are uncertain.

Nova Scotia
Carina Gjerdrum: (902) 426-9641, (902) 233-2506 (cell);
carina.gjerdrum@canada.ca

Newfoundland and Labrador
Sabina Wilhelm: (709) 772-5568, (709) 764-1957 (cell);
sabina.wilhelm@canada.ca

Alternate contact
Becky Whittam: (506) 364-5189, (506) 224- 0152 (cell);
becky.whittam@canada.ca

Though the majority of birds fall under federal jurisdiction, some species (such as owls, raptors, and crows) are the responsibility of provincial governments. If you are unsure, CWS staff listed above can direct you to the appropriate provincial agency, if required.

2 LIVE STRANDED BIRDS: GENERAL PROCEDURES

When live birds are stranded on offshore vessels or platforms, their rapid capture, stabilization, and release can significantly increase their chances of survival. Documentation of the stranding will help to inform mitigation strategies that can minimize impacts on bird populations.

Refer to the "Infographic - Procedures for handling and documenting stranded birds" (Appendix 2) as a quick reference guide to identify the most appropriate course of action when stranded birds are encountered.

2.1 Identify type of bird (i.e., species) that has stranded

Field guides are a useful tool to aid in species identification (section 1.5.2), but when the identification of a species is in doubt, contact CWS (section 1.6). Take a photograph of the bird whenever possible to help confirm species identification.

The "Pelagic Seabirds of Atlantic Canada" is a reference card associated with this document (Appendix 3) that shows images of the most common seabirds found offshore Atlantic Canada.

2.1.1 Birds that may become stranded

Leach's Storm-Petrels (*Oceanodroma leucorhoa*) are abundant, small seabirds that frequently become stranded on vessels and platforms at night. A similar species that may also be found stranded is the **Wilson's Storm-Petrel** (*Oceanites oceanicus*). Storm-Petrels account for 97% of stranded birds reported on offshore platforms and vessels operating on the Grand Banks, Newfoundland and Labrador. The period of greatest risk of attraction to lights on vessels appears to be at the end of the breeding season (September and October) when adults and newly fledged chicks are dispersing from the colonies and migrating to their offshore wintering grounds.

Murre (*Uria* spp.), **Atlantic Puffin** (*Fratercula arctica*), **Razorbill** (*Alca torda*) and **Dovekie** (*Alle alle*) are diving birds that spend a large proportion of their time floating on the surface of the ocean, which makes them highly susceptible to oiling at sea. These migratory birds occasionally strand on platforms and supply vessels.

Other seabirds that occasionally become stranded on vessels or platforms include **shearwaters**, **gannets**, and **gulls**, although these are less likely to be oiled and more likely to be injured or resting.

A number of globally rare seabird species, such as the **Bermuda Petrel** (*Pterodroma cahow*) and **Black-capped Petrel** (*P. hasitata*), are particularly vulnerable to fatal light attraction due to their low population size. Take a photograph if species identification is not certain and contact CWS (section 1.6) for instructions on proper handling, care, and release or collection.

Landbirds include **songbirds** (e.g., sparrows, warblers finches), **waders** (e.g., plovers, sandpipers, herons), and **birds of prey** (e.g., owls, hawks, falcons) that typically do not occur at sea outside of brief migratory periods, but often inhabit coastal areas. Landbirds account for approximately 1% of strandings recorded on offshore platforms and vessels operating on the Grand Banks, Newfoundland and Labrador, but are more frequently found stranded on platforms and vessels in the Sable Island Banks production area. Landbirds typically interact with offshore vessels or platforms during spring or fall migration, particularly during periods of high wind or fog.

2.1.2 Species at Risk

For the purposes of this document, Species at Risk are considered species (or sub-species) listed in Schedules 1, 2 or 3 of the Species at Risk Act and/or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as endangered, threatened or special concern. If any of these species are found stranded alive or dead on offshore platforms or vessels, contact CWS (section 1.6) for instructions on proper handling, care,

and release or collection. The latest list can be found on the Species at Risk Public Registry (www.sararegistry.gc.ca).

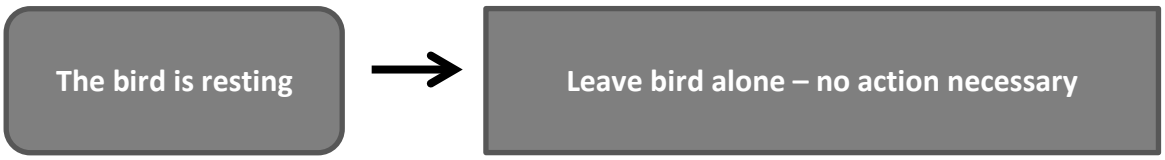
2.2 Identify issue and follow course of action

When a migratory bird is observed on a platform or vessel, it may be resting or it may be truly stranded. A stranded bird may require assistance to leave the structure if it is trapped, exhausted, or wet.

At other times, a stranded bird may be injured and unable to leave the structure under its own power. Identifying the exact nature, cause, and severity of an injury can be very difficult and will often require consultation with an expert. Injured and oiled birds may require expert care whereas other birds may simply need some assistance to be released at sea.

Furthermore, in many cases, birds may recover best if left alone. The following points describe what should be done when stranded birds are observed.

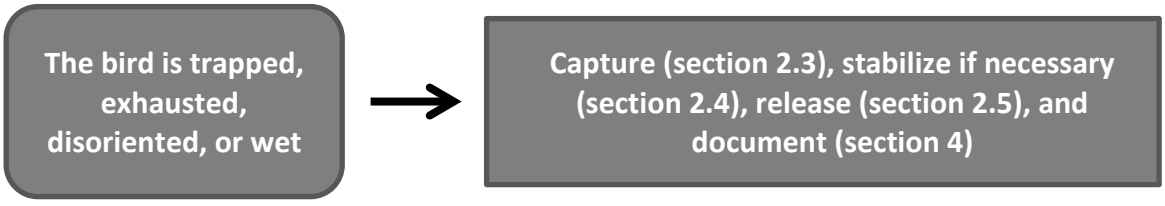
2.2.1 Bird is resting



- A bird that is resting on deck or a railing and is still able to fly and/or walk freely, or is able to leave the platform unassisted.

- Some resting birds may stay with a vessel for several days until they are ready to depart.

2.2.2 Bird is trapped, exhausted, disoriented, or wet



- **Do not attempt to capture birds of prey or large birds (e.g., herons, cormorants, gannets and gulls) as they are able to inflict significant injuries. Contact CWS for further instruction (section 1.6).**

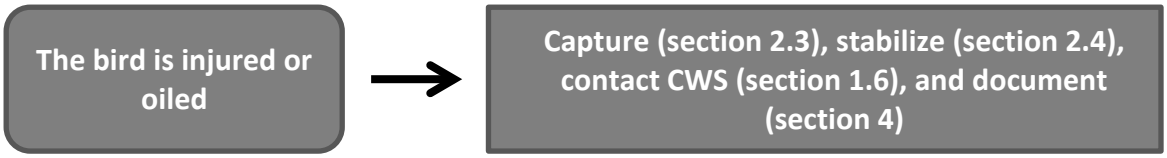
- Most birds that are trapped on deck or in cabins may be captured (section 2.3) and released immediately (section 2.5) if they are not exhausted, disoriented, wet, injured, or oiled.

- Exhausted birds (e.g., those that remain seated or laying on deck for long periods and when approached, cannot fly away or hide in a corner) and wet birds should be captured (section 2.3), placed in a cardboard box in a dry, quiet location (section 2.4), examined every few hours to determine level of activity, and when appear recovered, released as appropriate (section 2.5).

- After a collision, some birds may be disoriented but otherwise uninjured. If the disoriented bird is easily captured, keep it in a box for a few hours to rest and recover (section 2.4), then release at sea (section 2.5).

It is important to determine if a bird is simply wet or if its feathers are coated with oil (some dark birds may appear to be oiled when the feathers are only wet). See section 2.2.3 for information concerning identifying and handling oiled birds.

2.2.3 Bird is injured or oiled



- Birds may sometimes become injured from a collision with a platform or vessel infrastructure.

Broken wing – the wing is held at awkward angle or dangling when standing, walking, or flying. A bird with a broken wing will not survive on its own and should be kept in a darkened box (section 2.4) until further instruction from CWS.

Broken leg or foot – the bird walks or stands with a limp. Some birds may survive with broken legs and may be difficult to capture. Consult with CWS (section 1.6) as some birds with this type of injury may fare best if left alone or released at sea (section 2.5).

- Birds can be oiled at sea or may become oiled when moving around on vessel or platform decks or beneath machinery. Even small amounts of oil or grease can harm a bird's ability to maintain waterproofing, which is the key to feathers' insulation value. Loss of insulation can quickly lead to hypothermia and death.

Confirm presence of oil by

- **looking for oil smudges on glove, towel or paper towel;**
- **feeling for a sticky or filmy substance on feathers;**
- **smelling the feathers for petroleum-like scents.**

Do NOT try to clean an oiled bird. Cleaning an oiled bird requires authorization under the Migratory Bird Regulations, specialized training, and proper facilities.

2.3 Safe capture and handling of live stranded birds

Ensure that personnel always use the appropriate PPE (section 1.5.1) when capturing and handling wildlife, and follow these general rules:

1. **Never attempt to capture a bird if your safety is at risk**. If you are uncomfortable or unable to capture a stranded bird on your own, seek assistance. Do not attempt to capture a bird of prey or large, long-necked birds such as herons, cormorants, gannets, and gulls. The talons and bill can cause serious injury.

2. **Safety first** - for both personnel and the birds. Have appropriate and clean equipment ready (section 1.5). Proper precautions must be taken and safety equipment must be worn during capture and handling (e.g., gloves and eye protection).

3. **Minimize stress to the animal.** House and transport birds in a closed, darkened box or carrier. This is safer and less stressful to the bird.

2.3.1 General techniques

- Briefly examine birds to identify the species and look for signs of injury, oiling, and wetness. What you find will determine the course of action (section 2.2).

- Use towels, blankets, jackets, or sheets to corral the bird into a corner. Gently throw the towel/blanket over the entire bird. Darkness will help calm birds while transferring them to a box. Smaller and more agile birds may be better captured with hand-held nets (e.g., butterfly nets).

Storm-Petrels can be collected by hand as they are easy to pick up, poor walkers, and will not fly up off the deck if the area is well-lit.

Use gloves and eye protection for larger birds, such as murres, puffins, and shearwaters. If possible, secure the bill by firmly but gently, holding it and the head from outside of the blanket or towel.

- Wrap the bird in the towel/blanket, holding securely but gently while handling. When lifting a bird, hold its wings flush to its body in order to prevent flapping, which could lead to injury to the bird.

- If necessary, transfer the bird to a box with adequate ventilation (section 2.4) as soon as possible and gently unwrap the towel or blanket.

- Immediately after handling any birds, dispose of gloves and thoroughly wash hands with soap. Wash clothes if necessary.

2.4 Stabilization of live stranded birds

After capture, stabilization of the bird is important for its rest and recovery. The following are some key points for maintaining birds in preparation for release at sea, or for transportation to the mainland, if required. Remember to always use appropriate PPE when handling the birds (section 1.5.1).

- Keep bird(s) in a cardboard box with adequate ventilation. If possible, keep only one bird per box. However, if multiple stranded birds need stabilization, they can be kept in the same box provided they are not overcrowded. If it is necessary to keep more than one bird in a box, they should all be of the same species. Larger birds (e.g., waders) should be kept in their own box. Long-legged birds (e.g., yellowlegs, whimbrel, and willet) should be kept in a box that is tall enough to allow the birds to remain standing.

- If the bird is suspected of being oiled, it should be kept in a box until further instruction is received from CWS (section 2.2.3). Oiled birds should be kept individually in separate boxes in order to avoid cross-contamination.

- The bottom of the box should be padded with towels to absorb water/oil and provide padding for legs and feet. Avoid other bedding types (i.e., long strips of paper) that may lead to entanglement, especially for smaller species.

- Change towels when wet or oiled.

- A small dish of water can be provided to songbirds, but not to other species and only if they are able to stand. No food should be given to any of the birds in captivity.

- Keep the box in a quiet, cool (but indoors), and dark location.

- Birds should be monitored regularly (every 1-2 hours) for panting as birds can overheat as they recover. If a bird is found to be panting, move the box to a cooler location or increase ventilation.

- If transportation to the mainland is necessary, it should be done within 24 to 48 hours, if possible.

2.5 Releasing birds at sea

Depending on the severity of the birds' injuries and overall condition, some birds may be released at sea. If unsure of the best course of action, contact CWS (section 1.6). Remember to always use appropriate PPE when handling the birds (section 1.5.1).

Storm-Petrels should be released at night to avoid predation from gulls. In circumstances where there are no gulls in the vicinity, the storm-petrels can be released during the day. The stranded storm-petrel should be brought to the forward quarter of the vessel or a poorly lit corner of the platform where the bird will not be attracted to lights or flares and strand itself again. Release by gently letting go of the bird over the side, pointing it away from the vessel/platform.

Other seabirds can be released at sea by gently tossing the bird over the leeward side of the vessel/platform so that wind or waves do not blow the birds back onto the deck.

Landbirds (e.g., songbirds and waders) can be released at sea by placing them on a high perch, somewhere out of the wind where the bird has the opportunity to fly away when it is ready to do so. Depending on the birds' condition, it may remain with the vessel or platform.

Table 1. Considerations for capture and handling of birds that may get stranded.

Bird type	Tips for quick identification	Considerations for capture
Seabirds	• Webbed feet • Bill deep but narrow, pointed or hooked at the tip • Typically black, white, and/or grey • Often poor/awkward walking on deck • Shearwaters, storm-petrels, gannets, murres, puffins, gulls, cormorants.	• Storm-petrels can be caught by hand • Other species of seabird are best captured by throwing towel/blanket over body • All will likely try to bite, and larger species may cause injuries – use gloves and eye protection and secure bill under towel/blanket (shearwaters, murres, puffins) • <u>Do not attempt to capture gannets, gulls or cormorants</u>
Songbirds	• Short thin legs, feet not webbed • Bill short, but thin (warblers) or stubby (sparrows and finches) • Small, typically brown or any mix of colours (black, yellow, red, white.) • Agile, quick flight, often hopping and perching • Sparrows, warblers, finches, etc.	• Corral into corner of a room • Most easily captured with hand-held net • May or may not bite
Waders	• Long thin legs, feet not webbed • Bill generally long and thin however plovers have short beaks. • Small to large, typically brown or grey • Agile, good at walking or running • Plovers, sandpipers, herons	• Plovers and sandpipers: corral into corner of a room, using a net or light towel/sheet for capture • <u>Do not attempt to capture herons</u> - may bite or strike with beak
Birds of prey	• Very strong legs, feet, with long talons • Bill hooked • Medium to large, typically brown or grey • Strong, agile flyers that will most often be found perched on vessel/platform looking to hunt smaller birds • Owls, hawks, falcons	• <u>Do not attempt to capture</u> • Talons and bill can cause serious injury • Contact CWS who will direct the call to the appropriate provincial agency

3 DEAD STRANDED BIRDS: GENERAL PROCEDURES

Dead birds are occasionally found on offshore vessels or platforms. Documentation and/or collection (with appropriate PPE, section 1.5.1) of dead birds will help wildlife managers determine the cause of death.

3.1 Less than 10 birds found dead (in the same event), no Species at Risk, and no oiled bird(s)

- If species identification is uncertain, take a photograph of the dead bird(s). Send the photograph to CWS to confirm species and that the dead bird is not a Species at Risk.

- Document the date, location, species, number of birds that were found, bird condition (i.e., oiled or unoiled), and bird fate using the "Stranded Bird Encounter Datasheet" (Appendix 1).

- After documentation, carcass(es) may be disposed of at sea.

3.2 More than 10 birds found dead (in the same event), Species at Risk, or oiled bird(s)

- When more than 10 individual migratory birds are found stranded in a 24 hour period (and they are not oiled), contact CWS as well as the Canadian Coast Guard Environmental Emergencies Line (1-800-565-1633).

- If you suspect you have a Species at Risk, take a photograph and contact CWS to confirm.

- While wearing disposable gloves, place dead birds in a plastic bag (any type) and tie it shut.
- Document (section 4) the event using the "Stranded Bird Encounter Datasheet" (Appendix 1).
- Contact CWS and arrange to ship to the appropriate CWS contact person as soon as possible (section 1.6).

- If the bird(s) is oiled, contact CWS as well as the Canadian Coast Guard Environmental Emergencies Line (1-800-565-1633).

    - To avoid cross-contamination, individually wrap each bird in aluminum foil and place in its own bag. It is vital that clean gloves are used prior to handling each oiled bird, and that oiled birds are wrapped in foil as soon as they are found.
    - Write date, location and name of collector directly on the bag with permanent marker and attach the data collection form to the bag (or put inside the bag).
    - Document (section 4) the event using the "Stranded Bird Encounter Datasheet" (Appendix 1).
    - Contact CWS and arrange to ship to the appropriate CWS contact person as soon as possible (section 1.6).

- Store any collection bag(s) in a cool place (e.g., outdoors during winter or in portable cooler with ice packs) that is sheltered from scavenging birds.

- After removing and disposing of gloves, thoroughly wash hands with hot water and soap.

4 DOCUMENTATION OF STRANDED BIRDS

Documentation of stranded birds will help to inform mitigation strategies to minimize impacts on bird populations. **All stranded birds (live and dead) should be documented** using the "Stranded Bird Encounter Datasheet" (Appendix 1). The documentation should be sent to CWS annually, or as specified under the conditions of the authorization (section 1.4).

The following fields are used for recording information on stranded bird encounters:

- **Name of facility, vessel or platform** – record the name of the facility, vessel or platform on which the stranded bird was found.

- **General activity** - describe the activity of the facility, vessel or platform (i.e., seismic exploration, drilling, refinery, etc.).

- **Description of search effort** - describe how and where stranded birds are searched for (e.g., opportunistically, systematic searches, etc.)

- **Date** – record the date that the bird(s) was encountered.

- **Location** – record the latitude/longitude of the facility, vessel or platform where bird(s) was encountered, or location name.

- **Bird species** – identify the species encountered. If the identity of the species is in question, take a photograph, if possible.

- **Total number of stranded birds** – indicate the number of birds encountered.

- **Condition of bird(s) when found** –indicate the number of stranded bird(s) found dead, alive, and/or the number found oiled.

- **Action taken** – document the number of stranded birds that were disposed of at sea, released alive, sent ashore, and/or died in care.

- **Weather** – indicate whether there was fog and/or rain at the time of the stranding.

When you find a stranded bird (dead or alive), please take photograph and provide the following information (instructions on following page)

Name of facility, vessel, or platform: _____

General activity: _____

Description of search effort: _____

Grey columns will add up to TOTAL # stranded birds																	
				Found dead			**Captured Alive**										
					Fate		**Oiled****			**Not oiled**							
Date (yyyy/mm/dd)	**Location of stranding** (Lat/Long, or Name)	**Bird species**	**TOTAL # stranded birds**	**# Oiled****	**# disposed of at sea**	**# sent ashore***	**# died in care**	**# released alive**	**# sent ashore***	**# died in care**	**# released alive**	**# sent ashore***	**# disposed of at sea**	**FOG** (yes/no)	**RAIN** (yes/no)	**Comments**

***Provide details for situation where bird(s) sent ashore (i.e., sent to CWS, rehabilitation, etc.); **Contact CWS when any bird is found oiled.**

INSTRUCTIONS FOR RECORDING INFORMATION ON STRANDED BIRD ENCOUNTERS

Name of facility, vessel or platform: indicate the name of the facility, vessel, or platform where the stranding occurred.

General activity: indicate the activity of the facility, vessel or platform (i.e., seismic exploration, drilling, refinery, etc.).

Description of search effort: describe general search methods for stranded birds (e.g., opportunistically, systematic searches)

Date: give the date that the bird(s) was encountered (yyyy/mm/dd).

Location: preferably the latitude/logitude of platform when bird(s) was encountered (in decimal degrees), or location name.

Bird Species: document the species of bird encountered. Take a photograph if identification is uncertain and contact CWS.

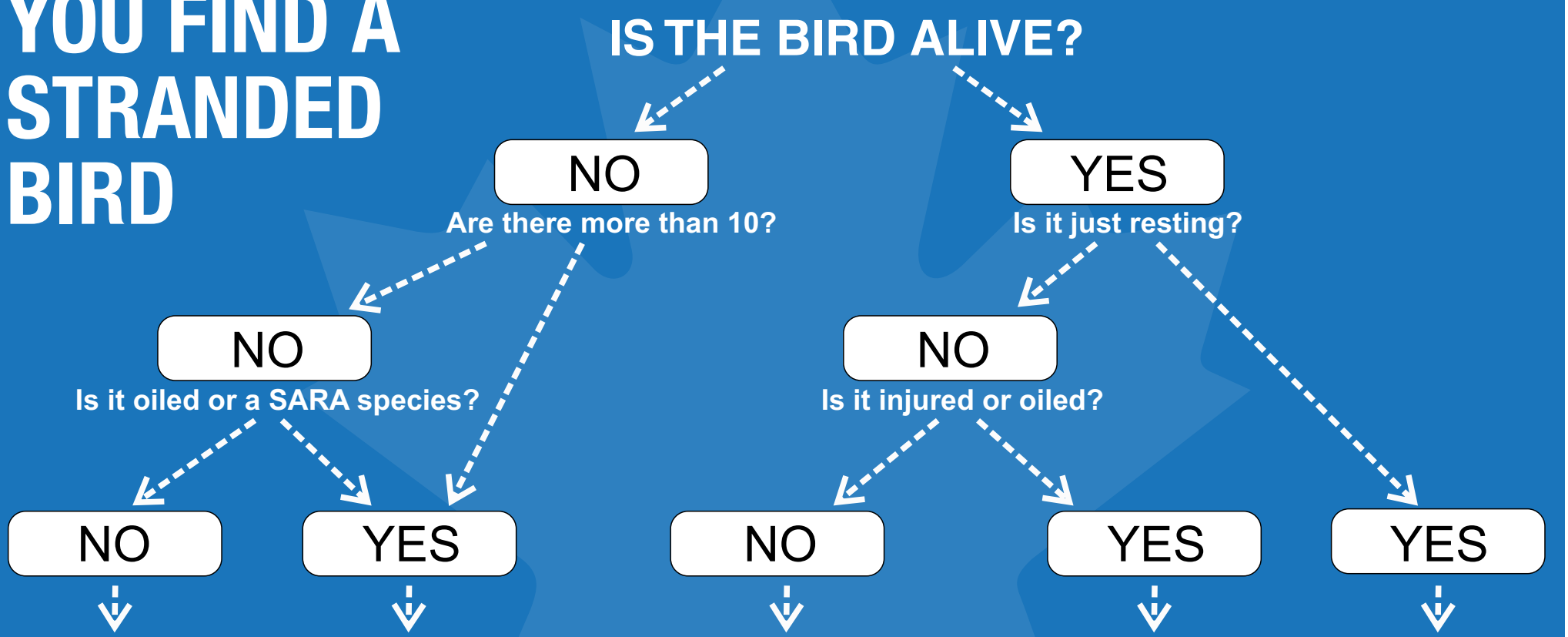
Total # of stranded birds: indicate the number of birds encountered at that particular time. Use multiple lines if more than one species. This column should be the sum of # disposed of at sea, # released alive, and # sent ashore)

Found dead: of the birds found dead, indicate the number that were oiled and the number that were disposed of at sea or sent ashore.

Captured Alive: of those birds found stranded but alive, indicate the number found oiled and the number found not oiled that died in care, as well as the numbers released alive or sent ashore.

FOG and **RAIN:** indicate whether there was fog and/or rain at the time of the stranding (yes or no).

WHAT TO DO WHEN YOU FIND A STRANDED BIRD



DOCUMENT AND DISPOSE OF AT SEA

If you are not sure of the species, photograph and send to CWS to confirm identity

COLLECT, DOCUMENT, AND SEND TO CWS

When 10 or more are found OR when bird(s) is oiled, contact CWS and report incident to CCG Environmental Emergencies Line (1-800-565-1633)

Contact CWS if the stranded bird is a Species at Risk. Collect dead bird(s) and send to CWS

CAPTURE, STABILIZE IF NECESSARY, RELEASE, AND DOCUMENT

DO NOT ATTEMPT TO CAPTURE BIRDS OF PREY OR LARGE SEABIRDS

Capture safely and release as appropriate

Exhausted, disoriented, and wet birds should be placed in box, monitored, then released when they have recovered

CAPTURE, STABILIZE, CONTACT CWS, AND DOCUMENT

DO NOT CLEAN AN OILED BIRD

Injured / oiled birds should be kept in a box until further instruction from CWS

NO ACTION NECESSARY

Resting birds can typically fly, move around freely, or leave platform unassisted

Some birds may stay on deck for several days until they are ready to depart

Document on "Stranded Bird Encounter Datasheet" and take photograph(s) to confirm species identification

WHAT TO DO WHEN YOU FIND A STRANDED BIRD

Reference Card (see full document for details)

Birds occasionally become stranded on offshore infrastructure - this document provides information on safe and effective procedures for the capture, handling, release, and documentation of live and dead stranded birds.

		Office number	Cell number	Email
Nova Scotia Contact	Carina Gjerdrum	(902) 426-9641	(902) 233-2506	carina.gjerdrum@canada.ca
Newfoundland and Labrador Contact	Sabina Wilhelm	(709) 772-5568	(709) 764-1957	sabina.wilhelm@canada.ca
Alternate Contact	Becky Whittam	(506) 364-5189	(506) 224-0152	becky.whittam@canada.ca

For live and dead stranded birds, **take photograph** if species identification is uncertain and report **date, location, species, number of birds stranded, bird condition, and bird fate** on the stranded bird encounter datasheet.

Equipment for capture and handling

- Never attempt to capture a bird if your safety is at risk
- Wear eye protection and clean gloves to protect birds, and you from injury
- Have blankets, sheets, towels or pillow cases to help corral and capture bird.
- A cardboard box with ventilation holes and lined with a blanket or towel may be required to provide a calm, dark environment for holding a bird.

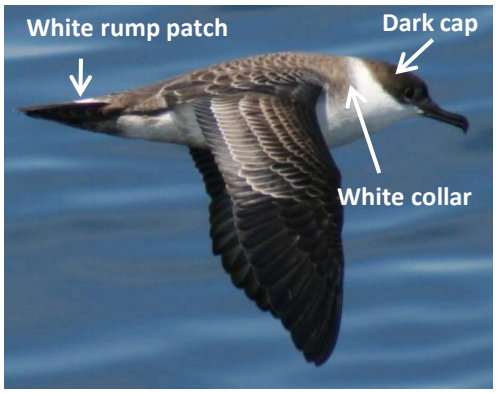
Five easy steps

1. Safety first for you and the birds.
2. Use towels (or other) to corral and catch birds.
3. Check for injury, oiling, or wet feathers.
4. Transfer to cardboard box padded with a towel in the bottom.
5. Keep in cool, quiet, and dark location.

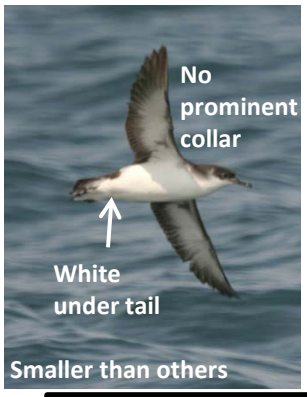
Common Seabirds of Atlantic Canada

Shearwaters

Great Shearwater



Manx Shearwater



Sooty Shearwater

Cory's Shearwater

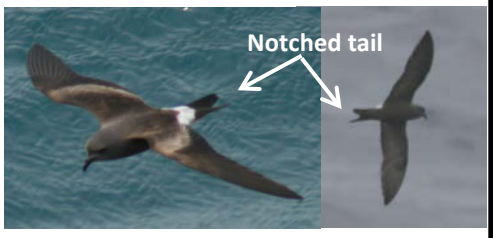
Northern Fulmar

Storm-Petrels

Sparrow-sized species that feed by tapping the surface of the water with their feet while still airborne

Wilson's Storm-Petrel

Leach's Storm-Petrel



Jaegers and Skuas

Adult Jaegers in non-breeding plumage and juveniles are difficult to distinguish from one another

Pomarine Jaeger

Parasitic Jaeger

Long-tailed Jaeger

Great Skua

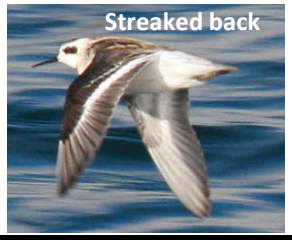
Northern Gannet

Adult

Immature

Phalaropes

Red Phalarope



Red-necked Phalarope

Summer

Winter

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Photo credits: Bruce Mactavish, John Chardine, Brian Patteson, Sabina Wilhelm, Anna Calvert, Carina Gjerdrum, Dave Fifield, and Ian Jones. Update 2017

Common Seabirds of Atlantic Canada

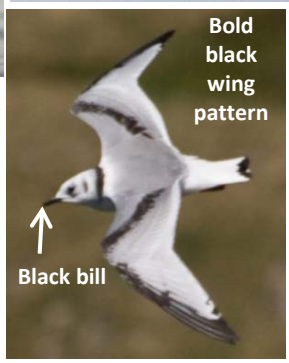
Black wing-tipped Gulls

Black-legged Kittiwake

Breeding adult

Dark wing tips look like they were "dipped in ink"

Winter adult



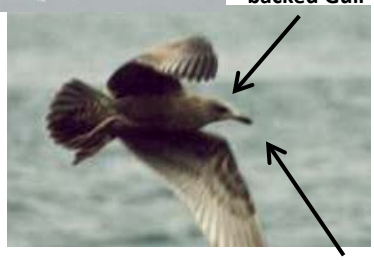
Immature (1st winter)

Herring Gull

Adult

More uniform brown than immature Great Black-backed Gull

Immature (1st winter)



Black bill in 1st winter and black tip in 2nd winter for both species

Great Black-backed Gull

Adult

Marbled underwing coverts

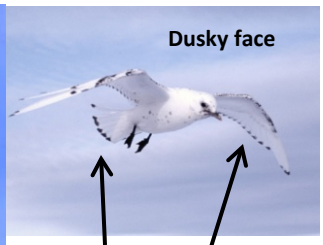
Immature (2nd or 3rd winter)

White wing-tipped Gulls

Ivory Gull

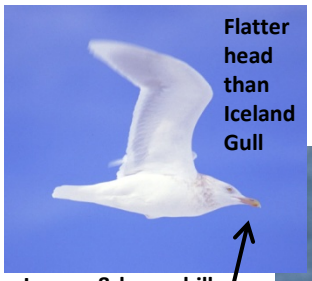
Adult

Immature

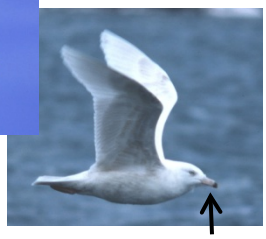


Glaucous Gull

Adult



Immature (2nd winter)



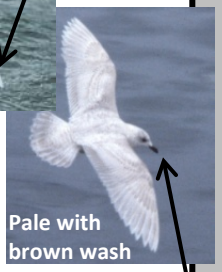
Black bill in 1st winter and black tip in 2nd winter for both species

Iceland Gull

Adult

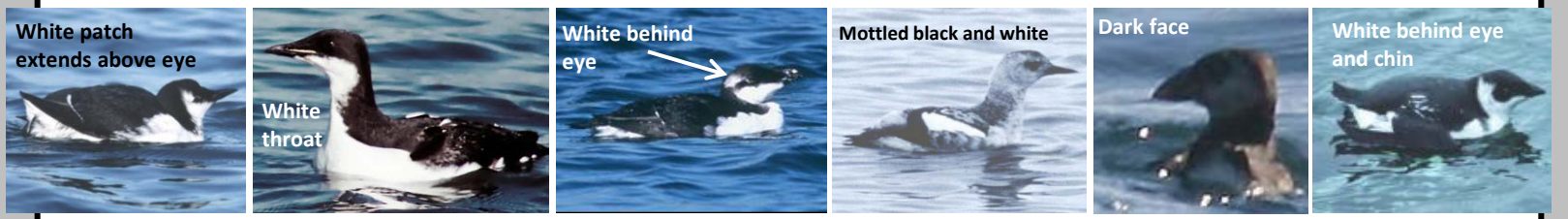
Variable wing tip pattern (sometimes dark tips)

Immature (1st winter)



Alcids - summer

Alcids - winter



Appendix B

ECRC and Grieg NL Letter Subscriber Agreement

ECRC - SIMEC
3 Old Placentia Road, Donavan's Industrial Park
Mount Pearl NL A1N 4P4

February 26, 2019

Grieg NL
205 McGettigan Blvd
Marystown, NL
A0E 2M0

Dear Mr. Power,

Thank you for meeting with us February 22nd to discuss your interest and expressed intention to sign an ECRC Subscriber Agreement for Grieg NL throughout the construction of your project in Placentia Bay and continuing once your operations are established.

ECRC's Subscriber Agreement is renewed on an annual basis; the agreement provides for access to ECRC's spill response equipment and services in the event of an oil spill incident.

During our meeting, you indicated that Grieg NL's policy states all spills be reported to Grieg NL management and that it is your intention to have a first response capability onsite. Should an incident occur and escalate beyond your scope, you can activate your agreement with ECRC to provide additional response resources as required and agreed upon. As an ECRC subscriber, we can also offer support in training on spill response equipment and can provide related consultant services.

It was a pleasure for Dave Champagne and I to meet with yourself and Shalyn Ryan. We look forward to putting a Subscriber Agreement in place for Grieg NL. In the meantime, we are available to answer any additional questions you may have.

Kind regards,

Chris Aylward
ECRC
NL Response Centre Manager