Fixed Aids to Navigation

Replacement Class Screening Report

Canadian Coast Guard
Newfoundland and Labrador

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Acronyms

ACCDC – Atlantic Canada Conservation Data Centre

BMP – Best Management Practices

CCG – Canadian Coast Guard – Newfoundland and Labrador Region

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

DFO – Department of Fisheries & Oceans Canada - Newfoundland and Labrador Region

DFO / RPS – Department of Fisheries & Oceans / Real Property Services

EA – Environmental Assessment

FA – Federal Authority

Fixed Aids – Fixed Short-Range Aids to Navigation

NWPA – *Navigable Waters Protection Act*

RA – Responsible Authority

RCSR – Replacement Class Screening Report

RPSS-DFO –Real Property Safety and Security Branch

SARA – *Species at Risk Act*

TC – Transport Canada

the Act – *Canadian Environmental Assessment Act*

the Agency – *Canadian Environmental Assessment Agency*

the Registry – *Canadian Environmental Assessment Registry*

VEC – Valued Ecosystem Component

1. Introduction

The Newfoundland and Labrador Region of the Canadian Coast Guard (CCG) consists of 28,956km of coastline and 2.5 million km^2 of continental shelf (Canadian Coast Guard, 2008, http://www.ccg-gcc.gc.ca/e0003330). As a special operating agency within the Department of Fisheries & Oceans Canada (DFO), one role of the CCG is to install and operate over 800 Fixed Aids to navigation. These aids provide guidance to mariners through some combination of light, signage, or radar characteristics.

As CCG is the proponent for these projects, DFO is a responsible authority (RA) under the *Canadian Environmental Assessment Act* (the Act) and must complete an environmental assessment before it can exercise any duty, power or function in relation to a project. Each year, approximately 15-20 individual screening reports are conducted for the construction and replacement of the most common Fixed Aid designs in the region. These designs have been incorporated into this replacement class screening report (RCSR) for the purpose of achieving a more cost effective schedule that honors environmental integrity.

The RCSR has evolved from previous Fixed Aid projects and follow-up programs that include proven design standards, best management practices, and effective mitigation that are supported by regulations and industry. The creation and implementation of this RCSR is a timely addition to the environmental initiatives at the CCG.

Transport Canada (TC) will also be an RA for fixed aid projects that require an approval under the *Navigable Waters Protection Act* and which trigger the Act. Although this has rarely happened to date, Transport Canada has agreed to use the process outlined in this RCSR to fulfill its environmental assessment (EA) requirements.

1.1 Class Screening and the Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* (the Act) and its regulations set out the legislative basis for federal environmental assessments. The legislation ensures that the environmental effects of projects involving the federal government are carefully considered early in project planning. The Act applies to projects, which require a federal authority (FA) to make a decision or take an action, whether as a proponent, land administrator, source of funding or regulator (issuance of a permit or license). The FA then becomes a responsible authority (RA) and is required to ensure that an environmental assessment of the project is carried out prior to making its decision or taking action.

Most projects are assessed under a screening type of assessment. A screening systematically documents the anticipated environmental effects of a proposed project, and determines the need to modify the project plan or recommend further mitigation to eliminate adverse environmental effects or minimize the significance of these effects.

The screening of some repetitive projects may be streamlined through the use of a class screening report. This kind of report presents the accumulated knowledge of the environmental effects of a given type of project and identifies measures that are known to reduce or eliminate any significant adverse environmental effects. The Agency may declare such a report appropriate for use as a class screening after taking into account comments received during a period of public consultation.

A replacement class screening consists of a single report that defines the class of projects and describes the associated environmental effects, design standards and mitigation measures for projects assessed within the report. It includes a determination regarding significance of environmental effects for all projects assessed by the replacement class screening. Once the Agency declares an RSCR and where an RA is satisfied that a project falls within the class described in the RCSR, no further action is required under sections 18 or 20 with respect to the project as long as the RA ensures that design standards and mitigation measures described in the RCSR are implemented.

1.2 Rationale for Replacement Class Screening

The applicability of the RCSR to Fixed Aid projects is based on the following six criteria:

1. *Well-defined Class of Projects:* The fixed aid project class includes common designs that have been used by DFO-CCG in the coastal environment for a long period of time. They are constructed and installed according to standard and proven construction techniques. The proposed class for this RCSR is defined in Section 2.

2. *Well-understood Environmental Setting:* The environmental setting for the Fixed Aids to navigation proposed under this RCS is the coastal environment of the Newfoundland and Labrador Region, ranging from the intertidal zone to the terrestrial environment. Previous environmental assessments conducted by DFO-CCG for Fixed Aids projects have led to a strong understanding of this environmental setting and the potential impacts that this class of projects may have upon it. The project sites are well known and understood by DFO-CCG and are monitored and inspected regularly by DFO-CCG.

3. *Unlikely to Cause Significant Adverse Environmental Effects, Taking into Account Mitigation Measures:* The potential environmental effects associated with fixed aid projects are common and predictable and can be mitigated through standard and proven measures. The proponent's previously conducted screenings on the installation/replacement or modification of fixed navigation aids concluded that

the projects were unlikely to result in significant adverse environmental effects with the implementation of prescribed mitigation measures. Construction Phase and post-project inspections have confirmed this.

4. *No Project-specific Follow-up Program Required:* Follow-up programs as defined under the Act, were not required under the DFO-CCG's previously conducted screenings for fixed aid projects, and project-specific follow-up programs will not be required as part of this RCSR. However, the project sites will be monitored/inspected on a regular basis as part of routine DFO-CCG programs, such as the yearly inspection program.

5. *Effective and Efficient Planning and Decision-making Process:* A RCSR for Fixed Aids to Navigation would streamline and make the environmental assessment process more efficient for the DFO-CCG. Projects in relation to Fixed Aids to navigation are often identified at least 6 months in advance as part of program planning. The projects are well planned in a methodical manner as a result of site inspections, routine maintenance and upgrading of structures, and demand for increased navigational aids. In the case of multiple RA's, coordination may be a concern. Multiple RAs or jurisdictions are not, by themselves, factors that automatically exclude a project from consideration for the class screening process. Rather, the federal authority or proponent initiating the class screening will demonstrate this has addressed and do not pose a concern.

6. *Public Concerns Unlikely:* In previous regional projects involving undertakings in relation to fixed navigation aids, no public comments were received. Given that Fixed Aids are placed to promote safe navigability of waterways, thereby increasing public safety, and their implementation and operation does not result in significant adverse environmental effects, public concern over these projects continues to be unlikely.

1.3 Consultation

Development of a RCSR includes consultation with DFO, Environment Canada, and Transport Canada. A draft of the RCSR has been reviewed and the comments were incorporated before submission of the final draft to the Agency. Following its submission, the Agency will conduct a 30-day public consultation on the RCSR. Any comments received will be addressed and incorporated into the screening document.

Internal consultation within DFO and the Coast Guard will also be completed to ensure the validity of project activity descriptions. The practicality of mitigation has also been reviewed to provide the highest potential for successful implementation.

1.3.1 Aboriginal Consultation

In the context of the Crown's legal duty to consult with Aboriginal groups, where it contemplates conduct that might adversely impact any potential or established Aboriginal and Treaty rights:
The RA confirms that a preliminary assessment has been undertaken to determine if a legal duty to consult arises in respect of the declaration of the report as a class screening report. The RA also confirms that based on its assessment, it is of the view that the declaration of this class of project does not give rise to a duty to consult.

The RA undertakes to ensure that, as appropriate, an analysis consistent with the approach proposed in the Government of Canada's Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (March 2011) is carried out when a project is assigned to the class within the proposed RCSR to determine if, in the particular circumstance, the Crown conduct related to that project gives rise to the legal duty to consult.

1.4 Canadian Environmental Assessment Registry

The purpose of the Canadian Environmental Assessment Registry (the Registry) is to facilitate public access to records relating to environmental assessments and to provide notice in a timely manner. The Registry consists of two components – an Internet site and a project file.

The Registry project file must include a copy of the RCSR. The RA maintains the file, ensures convenient public access, and responds to information requests in a timely manner.

The Registry Internet site is administered by the Agency. The RA and the Agency are required to post specific records to the Internet site in relation to the RCSR.

Upon declaration of the RCSR, the Act requires RAs to post on the Internet site of the Registry, at least every three months, statements of projects for which an RCSR was used. Each statement should be in the form of a list of projects, and should include:

- the title of each project for which the RCSR was used;
- the location of each project;
- RA contact information (name, phone number, address, email); and
- the date when it was determined that the project falls within the class of projects covered by the report.

Note: The schedule for posting statements is:

- no later than July 15 (for projects assessed from April 1 to June 30)

- no later than October 15 (for projects assessed from July 1 to September 30)
- no later than January 15 (for projects assessed from October 1 to December 31)
- no later than April 15 (for projects assessed from January 1 to March 31).

Further sources of information regarding the Registry can be found in the Canadian Environmental Assessment Agency (CEAA-RA) - Policy & Guidance - Reference Guide: The Public Registry, 2010, http://www.ceaa.gc.ca/default.asp?lang=En&n=E29C1273-1&offset=1&toc=show.

2. Projects Subject to Class Screening

2.1 Projects Subject to the Act

Fixed Aid activities are projects under the Act because they are undertakings in relation to a physical work. As the CCG is the proponent and triggers the Act as an RA, the completion of an environmental assessment is necessary before it can exercise any duty, power or function in relation to a project, as defined by paragraph 5(1)(a) of the Act.

Section 7 of the Act states that projects will be excluded if: (a) the project is described in the *Exclusion List Regulations*; (*b*) the project is to be carried out in response to a national emergency for which special temporary measures are being taken under the *Emergencies Act*; or (*c*) the project is to be carried out in response to an emergency and carrying out the project forthwith is in the interest of preventing damage to property or the environment or is in the interest of public health or safety.

In accordance with the *Exclusion List Regulations*, projects comprised solely of the proposed maintenance or repair of an existing structure will be excluded from the Act; however, modifications of a structure will be subject to the Act. In some instances, Fixed Aid projects may have several components. If all components of the project are described on the *Exclusion List Regulations*, the project is exempt from the Act. If any component of the project is not described on the *Exclusion List Regulations*, an environmental assessment of the project, including all components, is required. In addition, most Nav Aids are located within 30m of a water body and therefore any new installations / modifications / decommissioning cannot be excluded.

Transport Canada may also declare itself an RA for some of the Fixed Aid projects outlined in the RCSR. Transport Canada has the responsibility to protect the right of public navigation under the federal *Navigable Waters Protection Act* (NWPA). The NWPA defines a navigable water as a "canal or any other body of water created or altered as a result of the construction of any works", but in practice includes "any body of water capable of being navigated by a floating vessel of any description, for the purposes of transportation, recreation or commerce". Construction or placement of a work in, on, over, under, through or across any navigable water may require approval from Transport Canada under Part I, Section 5(1) of the NWPA. Any other works that may cause changes to flow, water level or clearances in a navigable water body may also be of regulatory interest.

It is not likely that a fixed aid to navigation would routinely be subject to the NWPA (TC, pers. comm.). However, on occasion, Fixed Aids are powered by cables, either submarine, or overhead, that if in, on, over, under, through or across a navigable body of water, may be subject to a NWPA approval pursuant to Part I, Section 5(1) of the NWPA and potentially trigger an environmental assessment under the Act, given that Sections 5(2) and 6(4) of the NWPA are triggers under the *Law List Regulations*. If this is the case, then both CCG and TC would be RAs. However, proponents are encouraged to

review the NWPA Minor Works and Waters Order http://canadagazette.gc.ca/rp-pr/pl/2009/2009-05-09/html/notice-avis-eng.html#d103 and self-assess to determine if they meet the established criteria for aerial and submarine cables. If the proposed project falls within the Minor Works and Waters Order then no formal approval is required and there is no need to apply to NWP Program.

2.2 Projects Subject to the Replacement Class Screening Report

The proposed class of projects to be addressed under this RCSR includes the installation, operation, expansion, modification, and demolition/ decommissioning of concrete-based structures and terrestrial towers constructed above the low water mark, as well as, the modification of power supplies to land-based towers and lighthouses within the DFO-CCG Newfoundland and Labrador Region.

Characteristics of Concrete-Based Structures subject to the RCSR:

- built above Lowest Low Water
- a base of less than 2.5 m x 2.5 m (height not restricted)
- may be a platform and ladder (aluminum or other suitable material)
- may be a mast/tower (aluminum, fiberglass-reinforced plastic, or other suitable material)
- may be a day mark (aluminum or other suitable material), and
- may support electronic equipment (light, solar panels, batteries, etc)

Characteristics of Terrestrial Towers and Lighthouses subject to the RCSR for power-supply modification:

- built on land
- one to four legged structures with navigation aids mounted on top
- may have ladder and platform (aluminum or other suitable material) on top
- electronic equipment (items may include: light, solar panels, batteries, etc)

Figures 1a and 1b show examples of Fixed Aids that meet the above criteria and Table 1 presents a count of all existing Fixed Aids in Newfoundland and Labrador subject to this RCSR.

Table 1: Count of Fixed Aids in Newfoundland and Labrador

Type	Number
Fixed Light Aids	813
Fog Horns	64
Total	877

Figure 1a: Typical RCSR structures

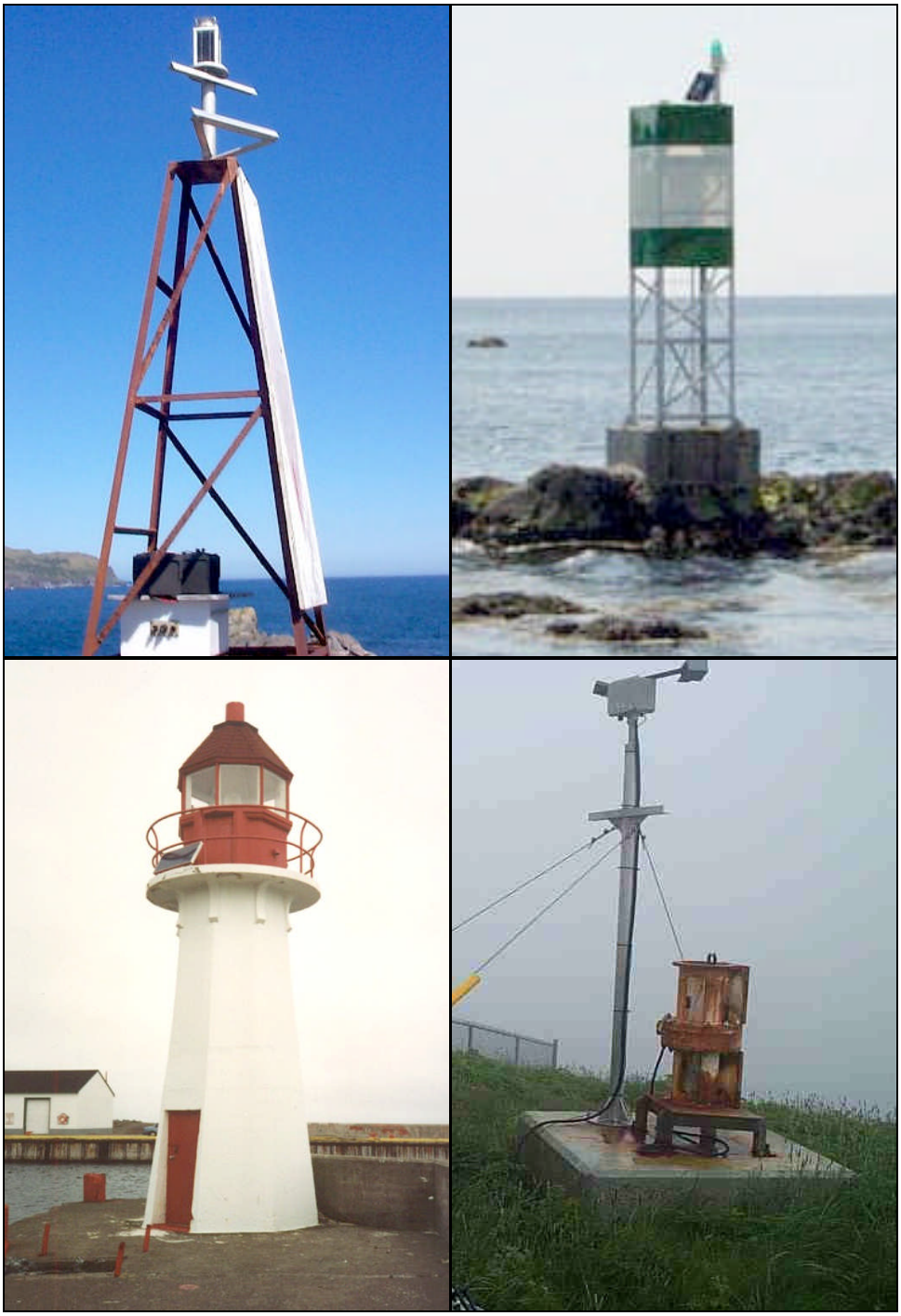

Figure 1b: Typical RCSR structures

2.3 Projects Not Subject to the Replacement Class Screening Report

Fixed Aid projects that include any of the following are not subject to the RCSR:

- Floating aids, RACONS, or LORAN-C;
- A new lay down area;
- A new access road or cross country access;
- Any phase of a project places personnel or equipment in a wetland;
- Pile-based structures (piles driven into seabed);
- Concrete-based structures located below Lowest Low Water;
- Concrete-based navigation aids with a base of more than 2.5m x 2.5m;
- Concrete-based solar panels with a base of more than 3m x 12m;
- Requirements for a provincial environmental assessment;
- Fixed Aids located in a National Park or adjacent in the "greater park ecosystem" immediately outside the Park, or in or adjacent to a National Wildlife Area or Migratory Bird Sanctuary;
- Requirements for a permit, approval or authorization from any federal authority other than CCG and Transport Canada (e.g., if an additional approval is required from within DFO in the form of a *Fisheries Act* authorization);
- Site or access route within 2 km of an active bird nesting colony during breeding season (April to September) or a migration staging area (August and September);
- In the context of the Crown's legal duty to consult with Aboriginal groups, where it contemplates conduct that might adversely impact any potential or established Aboriginal and Treaty rights: those projects for which issues raised during Aboriginal consultation remain to be adequately addressed or are addressed in such a way that the project no longer fits in the class as defined in the RCSR;
- Species at risk likely to be adversely effected (see below).

Projects are not suitable for application of the replacement class screening if they are likely to have an adverse effect on a species at risk, either directly or indirectly, such as by adversely affecting their habitat, and/or that would require a permit under the *Species at Risk Act* (SARA). For the purposes of this RCSR, species at risk include:

- Species identified on the List of Wildlife Species at Risk set out in Schedule 1 of SARA, and including the critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of SARA.
- Species that have been recognized as "at risk" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or by provincial or territorial authorities.

Project officers must review the Project Class Description using the RCSR and consult with DFO-Real Property Safety and Security Branch (RPSS) resource personnel who will run a species at risk search on the Atlantic Canada Conservation Data Centre (ACCDC)

database to ascertain if it is known or reasonably suspected that species at risk could be adversely affect by the proposed project. If so, project officers must not proceed using the RCSR.

Similarly, project officers must consult with DFO-RPSS personnel with regard to the location and seasonality of any nearby bird nesting colonies.

Some navigation aids are located within or adjacent to properties owned by the Parks Canada Agency. Parks Canada properties are often in sensitive areas. Parks Canada has a mandate to preserve ecological integrity in its parks and is a stakeholder in the "greater park ecosystem" surrounding parks. Any work to be done on navigation aids within parks or in adjacent areas will (if deemed necessary after consultation with park authorities) undergo an individual screening subject to the Act, independent of this replacement class screening.

Similarly, project officers or DFO-RPSS officers must consult with Environment Canada personnel with regard to projects located in or adjacent to National Wildlife Areas or Migratory Bird Sanctuaries.

All projects that are found to be not included in the RCSR will likely require an individual environmental assessment under the Act. Contents of this RCSR may be used to assist in the preparation of the individual environmental assessment.

Figures 2a and 2b provide flow charts that describe RCSR inclusion/exclusion for each of navigation aid work, and upgrading of electrical services to light stations.

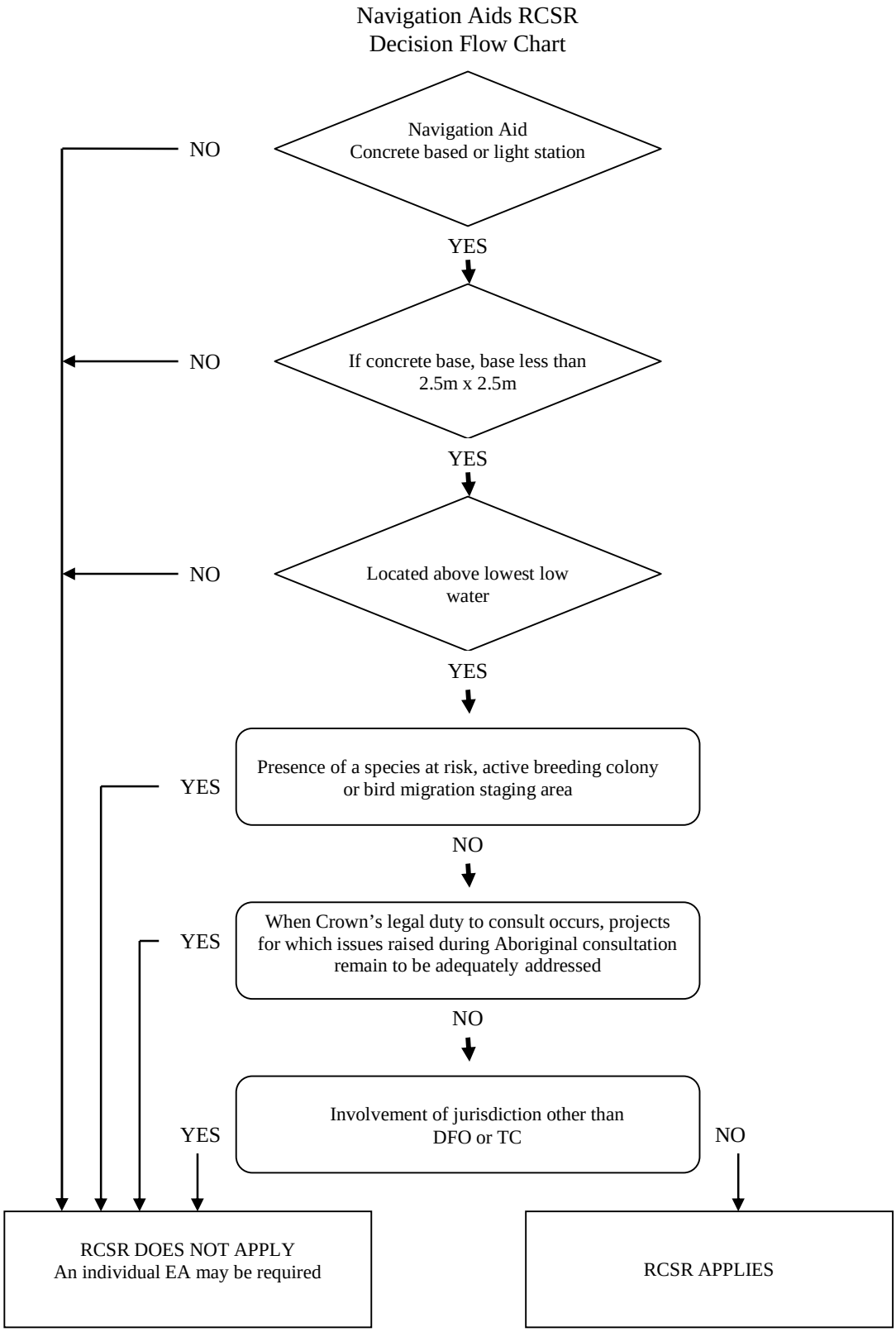

Figure 2a: RCSR Decision Flow Charts

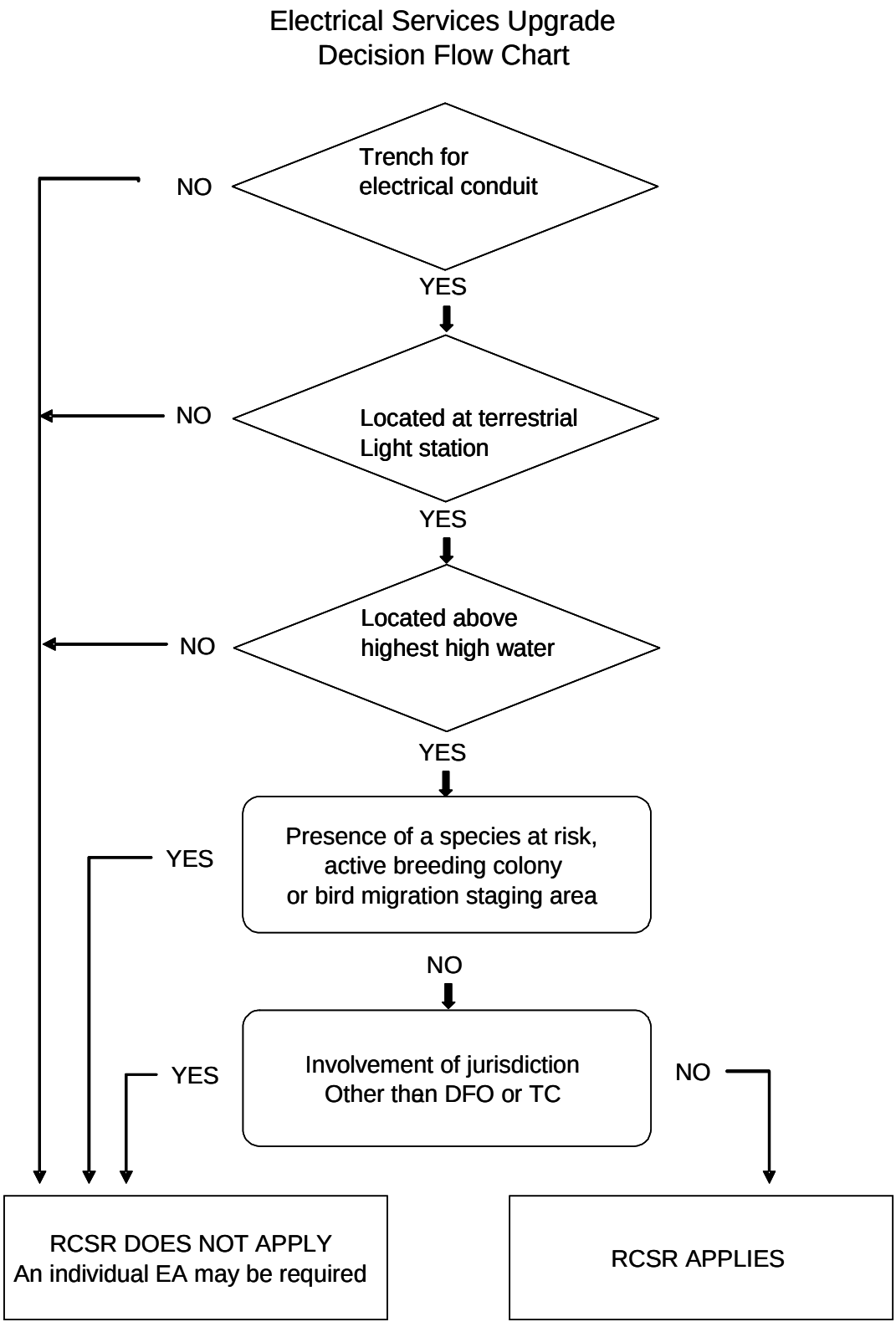

Figure 2b: RCSR Decision Flow Charts

3. Project Class Description

Figure 3 shows the existing locations of all Navigational Aids (including Fixed Aids, floating aids, and Racons) in the Newfoundland and Labrador Region, although this RCSR only covers Fixed Aids as identified in section 2.2 of this report. The Fixed Aid project class is characterized by a large geographic boundary and includes all regions within the Newfoundland and Labrador, which are within the identified project class. The GIS coordinates of Fixed Aids to navigation in the Newfoundland and Labrador region are available at http://www.notmar.gc.ca/privacy.php.

Within the identified RCSR project class, the project scope is separated into two areas: the material staging location and the Fixed Aid site. Material staging areas are often located as close as possible to the Fixed Aid site and are used when all supplies needed for the modification, operation, and decommissioning of the aid cannot be stored at the project site. These areas are often located in previously disturbed areas that allow easy road, water, and/or helicopter access: examples include logging roads, industrial yards, and outdoor recreation areas. Materials and equipment are prepared at the staging area before they are transported to the Fixed Aid site by boat, barge or helicopter. The Fixed Aid site is where the direct modification, operation, and decommissioning activities occur.

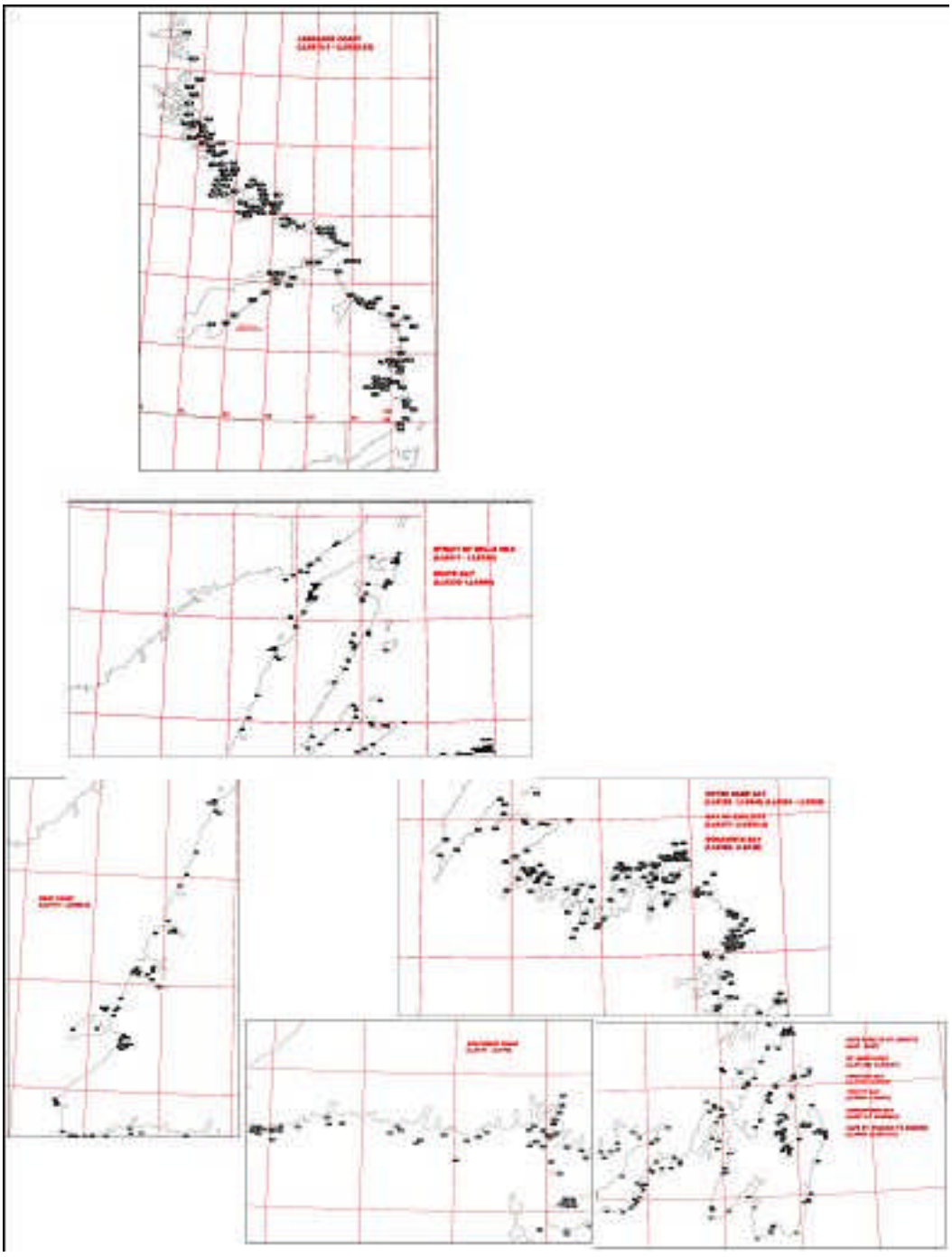

Figure 3: Navigational Aids Locations – The points along the coastlines identify the locations of all the navigational aids (including fixed, floating, and Racon) for Newfoundland and Labrador Region.

3.1 Seasonal Scheduling and Duration of Projects

Fixed Aid modification, operation, and decommissioning may occur during any season with the exception of nearby seabird nesting season, which is specific to each individual site. Apart from seasonality, the most important consideration for scheduling Fixed Aid activities is tide cycles.

Low tides are required when scheduling concrete-based Fixed Aid modification, operation, and/or decommissioning in the intertidal zone. Low tides ensure time for project activities to be conducted and concrete to be cured before the tide rises again. Usually, two consecutive low tide cycles allow enough time for project completion.

The Fixed Aids works under consideration in this RCSR each take approximately one week to complete. However, typical operation phase activities most often require only one or two hours every four years for the life span of an aid. Fixed Aids are inspected and serviced on a four-year maintenance schedule unless a malfunction or damage is reported to the CCG.

3.2 Effects of the Environment on the Project

Under the Act, an environmental assessment must consider potential effects the environment may have on projects. Increased weather extremes and a number of adverse events may affect permanent structures. Following standards and ensuring protection against these effects are increasingly important. Fixed Aid projects are vulnerable to a variety of effects from the environment such as:

- Extreme and adverse weather-related effects (i.e. temperature and precipitation) can delay project activities and can damage the physical integrity of projects, and/or cause unpredictable run-off, erosion or sedimentation during the construction phase and/or cause problems for machinery operation during construction or decommissioning.
- Sinking or settling of soils, ground subsidence and ground surface movement could also damage physical integrity of projects, potentially leading to structural failures and/or a reduced quality of end products.
- Landscape and physical characteristics of project location (e.g. soil structure) could alter materials used in construction or cause for project re-location or impede the installation of underwater or underground structures.
- Normal wears on project components by weather-related effects and forces (i.e. wind, ice, freeze/thaw cycles, water, sun exposure).

The effects that have been identified are considered mitigable and avoidable through design, the site chosen, and the use of stringent standards under which Fixed Aids are designed, constructed, operated and decommissioned. For example, requirements for

concrete base size will vary depending on the environment where the aids are being constructed. As well, chains are routinely used in the construction of Fixed Aids to lash the concrete forms in place to prevent movement caused by wind and waves.

Specific mitigations to avoid effects of the environment on Fixed Aid projects are covered in Section 4.6, Table 6 and Appendix 2 of this RCSR.

3.3 Construction/ Installation/Modification/Expansion

Modification of Concrete-based Fixed Aids

Modifications of concrete-based Fixed Aids occurs above the lowest low tide. Depending on the location, materials can be transported by helicopter, motor vehicle, or boat.

Site preparation methods can vary depending on site-specific requirements. Aquatic areas near low tide, including exposed rock, often involve power washing the site to remove marine growth. Reinforcing steel is then grouted into the rock to anchor the concrete. In upland areas, vegetation removal and excavation may be required to access acceptable supporting material. To reduce the amount of excavation in deep organic soils, stakes may be driven into the ground to provide extra support.

Once site preparation is complete, wood or metal forms are built, reinforcing steel is installed, and concrete is poured. The method used for concrete pouring depends on the transportation method used to access the site: helicopters utilizing hoppers; vessels with hoppers or pouring by hand. Concrete trucks are used at terrestrial sites.

Once the base is completed, a platform, tower, and other equipment are installed using vessel, helicopter, or truck support.

Reinstallation of Dry Mounted Fixed Aids:

Fixed Aids are not necessarily located at pristine or undeveloped locations. Many are located on wharves or breakwaters, or other anthropogenic structures. Servicing of existing dry mounted Fixed Aids typically involves the replacement of one or all of the existing facilities. Reinstallation may require drilling of holes into wood or rock or concrete. Bolts are screwed or grouted (using an epoxy material) into the holes and then the Fixed Aid is mounted on the bolts, using shims where necessary to have it standing plumb. Materials and personnel are transported to the site by truck, boat or helicopter depending on accessibility.

Modification of Terrestrial Towers and Lighthouses:

Construction of new towers or lighthouses is unlikely in this Region. Most work is renovation, repair and modernization of existing facilities. Two procedures are included here.

Power services: One procedure included in this Replacement Class Screening is the modernization of power service to the existing facilities. This consists of removing suspended aerial wires and replacing them with underground wires, which are far less vulnerable to environmental or anthropogenic impacts.

The work consists of digging a trench, up to 24 inches depth, from the power source to the facility. "Tech cable", made for underground use, is laid in the trench and covered with a layer of clay. Caution tape is laid on top of the clay and a layer of backfill is put in the trench. A second layer of caution tape is placed 6 inches below the soil horizon and then backfilling is completed. The surface is tamped down and stabilized by replacing sods lifted during the excavation. The original power service is then removed from the facility.

Solarization: Solar panels are often installed as part of the modernization of terrestrial towers and lighthouses. Solar panels can provide enough energy to run a light and a foghorn and remove the requirement to run generators and store hydrocarbon fuels on remote sites. Installation of solar panels often requires the construction of a concrete base upon which the panels are mounted. The methods are the same as those described above for concrete based fixed-aids. If a concrete base is not required, solar panels can be mounted on concrete piles or dry mounted as described above.

3.4 Operation

Once constructed, aids operate self sufficiently. Light aids operate by solar and battery power. Day beacons are signs with navigational symbols, which are painted or marked with a sticker. Maintenance activities, conducted on a four-year cycle, account for the activities associated with the operation of Fixed Aids. Maintenance visits take approximately one hour and typically involve electronics change outs, brushing activities, and painting/mark replacement. Servicing may occur outside of the maintenance schedule in the event that a repair is required to maintain the efficacy of the aid.

3.5 Decommissioning

Concrete-based Fixed Aids are decommissioned by first removing aid marks and supporting structures. The concrete base can be removed in one piece or broken apart with a jackhammer or a small explosive charge. Areas affected by structure removal are left in a state, which will support natural restoration. In rare cases, where more trauma would be caused to the environment by removal of the concrete base, it will be abandoned if it creates no significant effect to navigability or aesthetics when left in place.

4. Environmental Review

The fixed aid project class includes common designs that have been used by DFO-CCG in the coastal environment for a long period of time. The potential environmental effects associated with fixed aid projects are common and predictable and can be mitigated through standard and proven measures. Environmental review methods used in the creation of this report include desktop literature review, internal consultation, and discussion with fixed aid experts at CCG.

4.1 Environmental Assessment Boundaries

The environmental assessment boundaries for the RCSR have been defined by the terrestrial boundaries of Newfoundland and Labrador and the outer limits of Canada's territorial waters in the Atlantic Ocean. Within the RCSR boundary, the CCG manages approximately 29,000 km of coastline (Natural Resources Canada 2005).

Smaller boundaries have been defined for the assessment scope to identify project-specific environmental effects. The project scope boundaries, including the staging and construction areas, will be used as a basis for the assessment. A radius of 200m around project areas has been found effective in capturing potential environmental effects resulting from project activities. The scope of assessment also includes areas between the staging and project sites that may be affected by low-flying aircrafts.

Regarding the temporal scope of the project, according to design standards the life span of a Fixed Aid is 25 years; however, the actual life span depends on the environmental and anthropogenic conditions an aid experiences. Fixed Aids operate self-sufficiently with real potential for environmental effects possible only when project activities are engaged. Construction and decommissioning phases usually require one week for completion. Activities during the operation phase often require only one to two hours every four years during the life span of an aid with the exception of unplanned servicing which could take up to one week.

4.2 Environmental Setting

The primary purpose of Fixed Aids is to "facilitate the safe and expeditious movement of maritime traffic" (CCG-ANP 2005), and the locations selected for Fixed Aid placement reflect this purpose. Some environmental setting similarities may exist among Fixed Aid locations, such as rocky outcroppings or shallow aquatic environments, but specific environmental setting characteristics are not pertinent to the placement of an aid. Rather, Fixed Aid designs and construction methods are tailored to meet each individual environmental setting in which an aid is required.

As there are no specific environmental criteria that determine the location of Fixed Aids, a general description of the environmental settings in which Fixed Aids are constructed is provided. In addition, a general description of the ecozones (marine and terrestrial) found within the Province of Newfoundland and Labrador is included below.

Environmental Settings of Fixed Aids

Fixed Aids may be constructed on any of the substrates that occur across Newfoundland and Labrador in terrestrial and aquatic environments. Typical substrates within project boundaries include rock, cobblestone, sand, or mudflats. Strictly terrestrial areas may also be characterized by the presence of soils or organic overburden.

Generally, concrete-based Fixed Aids may be built anywhere in the intertidal zone or on land. Rocky substrates in the intertidal zone and on land are the favored locations for concrete-based structures. In intertidal zones with soft substrates, stakes will be combined with the concrete structure to provide extra anchorage.

Modernization of power services to towers or lighthouses take place in a terrestrial setting. These structures are situated on headlands or islands, often in exposed locations on bedrock or thin soil substrate with grass or stunted forest vegetation.

As some of the Fixed Aids are located above the low water line and some above the high water line, descriptions of both the marine and terrestrial ecozones are included.

Marine Ecozones

The Fixed Aids for this RCSR are located within the Atlantic and Northwest Atlantic Marine Ecozone of Canada.

The Atlantic Maritime Ecozone constitutes a cluster of peninsulas and islands, which form the northeastern end of the Appalachian mountain chain that runs from Alabama to Newfoundland (Environment Canada 2005).

The proximity of the Atlantic Ocean creates a moderate, cool, and moist maritime climate. Most of the ecozone experiences long, mild winters (averaging about -4°C in January) and cool summers (the mean daily July temperature is 18°C). Coastal communities are generally several degrees warmer in winter and slightly cooler in summer. Sea surface temperatures in August can vary between 10 and 23° C (Environment Canada 2005).

The Northwest Atlantic Ecozone encompasses all of the Labrador Coast and Newfoundland's Avalon Peninsula. There are numerous islands along the coasts and water depths on the continental shelf range from 200 to 300m. In this area, cold arctic waters are carried by the Labrador Currents and merge with the Gulf Stream near the Grand Banks. Sea ice is common in this area forming off the coast of Labrador in November or December and reaching the Northeast corner of Newfoundland by February or March. The ice usually begins to thaw in May or June and the coasts are ice free in

July (Environment Canada 2008). Sea surface temperatures in August can vary between 3 and 8° C (Environment Canada 2005).

Terrestrial Ecozones

All of the sites under consideration are located within both the Eastern Taiga Shield and the Boreal Shield ecozones of Canada (Environment Canada 2005), which include both Newfoundland and Labrador.

The Eastern Taiga Shield ecozone covers central Quebec and the majority of Labrador. This ecozone is comprised of two large biophysical features, the Taiga Forest and the Canadian Shield. Numerous lakes and wetlands formed by glacially-carved depressions span the landscape as well as an abundance of long, winding eskers, characteristic of the Eastern Taiga Forest. The barren grounds of Precambrian bedrock outcrops and waterlogged lowlands covered with peatlands are habitat for approximately fifty species of mammals including caribou, moose, fox and beavers (Environment Canada 2005).

The Eastern Taiga Shield is similar to that of the arctic tundra bordering the northern edge of the latitudinal limits of tree growth. Forest stands contain lichen, stunted black spruce, jack pine and tamarack trees mixed with shrublands of alder and willow. Open forests of mixed tree stands are found upland along rivers and steams, supporting trembling aspen, balsam poplar and white birch (Environment Canada 2005).

The climate conditions of this ecozone are subarctic rather than Atlantic with short summers and cool temperatures (averaging temperature about 11^{o}C), and long, cold winters (temperature averaging between -11^{o}C and -24.5^{o}C). The incursion of the easterly Labrador Current brings the cool, moist air off the Atlantic, a result of the pack ice and icebergs cooling the sea temperatures (Environment Canada 2004). This current creates snow flurries in the winter and fog in the summer over coastal areas. Mean annual temperatures of the Eastern Taiga Shield range between -5^{o}C and 0^{o}C. Mean annual precipitation ranges from 500 to 800 mm and 1000 mm along the coast of Labrador (Environment Canada 2005).

The Boreal Shield ecozone is one of the largest ecozones that reaches from northern Saskatchewan, northeast of Lake Winnipeg, the Great Lakes and the St. Lawrence River and stretches eastward to Newfoundland. Within the project area the Boreal Shield encompasses southern Labrador and all of Newfoundland. More than half of this ecozone is forested and much of it accessible, but for some portions that remain as wilderness condition (Environment Canada 2005).

Similar to the Taiga Shield, the Boreal Shield's landscape consists of Precambrian bedrock outcrops, glacial moraine deposits and numerous eskers. Similar mammals also utilize the dense forests of this ecozone but are greater in diversity. The Boreal Shield forests are conifer dominant to the north and comprised of white and black spruce, balsam fir and tamarack. The southern portion of this ecozone is mixed stands with deciduous trees more pronounced. These include white birch, trembling aspen and balsam poplar mixed in with conifers such as white, red pine and jack pine. Various

lichens and shrubs can be found with more open areas with exposed bedrock (Environment Canada 2005).

Typical climate conditions for this ecozone are cold winters and warm summers with influence to coastal locations from the Atlantic. Throughout the Island of Newfoundland and southern portions of Labrador weather conditions are generalized as cooler, wetter, windier and foggier than the rest of the country. The sea influences the weather greatly throughout the Island and southern Labrador, with less variability inland than along the coast (Environment Canada 2005). The mean annual temperature is approximately 5.5°C, the mean a summer temperature of approximately 15°C and winter temperatures average between -2°C and -10°C (Environment Canada 2005). The average growing season lengths are between 100 and 150 days, with frost-free periods being the shortest inland (Environment Canada 2005). Annual precipitation amounts are approximately 1000 mm or greater inland and along the south coast (Environment Canada 2005).

Heritage Resources

Newfoundland and Labrador are rich with geologic history and archaeological evidence of exploration to the New World. The landscape of the province contains geologic significance such as the components of Central Newfoundland being the remains of old ocean floor that originated between North America and Africa 500 million year years ago (Bell and Liverman 1997). Some of the oldest rock known on Earth was found in the Canadian Shield of eastern Labrador derived from plutonic and metamorphic rocks that date 4 billion years (Bell and Liverman 1997).

Historical evidence resides throughout the province in the fossils and archaeological record. The province is world renowned for fossil discovery in such locations as Fortune Head (for marine strata), Mistaken Point (deep water marine and soft tissue fossils), and Bell Island (trace fossils; tracks, trails and burrows produced by trilobites and soft bodied animals) (Boyce 2006). Archaeological artifacts discovered include dwellings, tools, pottery, organic artifacts of leather, wood, bone, ivory, antler or fabrics, and ornate objects such as jewellery. Archaeological evidence throughout the province have established the first humans to reach the province (in southern Labrador), descendants of Palaeo-Indians about 10,500 years BP (Before Present), explorers of Norse voyagers in Newfoundland and Labrador around 1000 A.D. and European discovery to harvest cod off the coast of Newfoundland in the early sixteenth century (Pastore 1998 and Newfoundland and Labrador Heritage Web Site Project, 1997).

Light stations occupy a prominent position in the heritage consciousness of Atlantic Canadians. They are among the oldest structures built by Europeans in Eastern Canada and have been the subject of picture books, historical references and art works. Tourists visit many sites and decommissioned light stations are often acquired by local community groups to be used as tourist destinations (Fisheries and Oceans Canada, 2009, http://www.ceaa-acee.gc.ca/050/documents/40420/40420E.pdf).

Species at Risk

There are numerous species at risk within the RCSR boundary due to the large area that it encompasses. Species can include marine and terrestrial mammals, birds, amphibians, fishes, arthropods, mollusks, insects, vascular plants, mosses, and lichens. With new sites not included in the RCSR, the largest potential interaction with the SARA listed species would be coastal bird species that could use the intertidal or nearshore areas.

The SARA registry website provides a mapping database that allows the user to determine the presence of SARA Schedule 1 Species within a general area. This tool was used in determining the potential of Schedule 1 Coastal Bird Species within the project area (Table 2). A complete list of species at risk has not been included in this report as the list is very dynamic and information regarding species at risk within project boundaries will be obtained from the Federal and Provincial listings for an area on a project-by-project basis. The resource for location information on species at risk in Atlantic Canada is the ACCDC, which can be accessed through DFO-RPSS personnel.

Table 2: List of Coastal Bird Species at Risk in the Area

Common Name	Species Name	Status
Barrow's Goldeneye (Eastern population)	Bucephala islandica	Special Concern
Harlequin Duck (Eastern population)	Histrionicus histrionicus	Special Concern
Ivory Gull	Pagophila eburnean	Endangered
Piping Plover melodus subspecies	Charadrius melodus melodus	Endangered

Although species at risk is discussed here, any project that is likely to have an adverse effect on a species at risk, either directly or indirectly, will not be subject to this RCSR. See Appendix 1 for a list of environmental information resources that guides to more species at risk information.

4.3 Issues Scoping and Valued Ecosystem Components

Issue scoping included analysis of previous project activities with respect to locations and identified ecosystem receptors. The scoping exercise was internal and focused on existing information and corporate knowledge.

Valued Ecosystem Components (VEC) have been identified by assessing parts of the ecosystem that may be affected as a result of project activities. VEC are summarized into three categories: physical-chemical, ecological, and anthropogenic that each contain several ecosystem components. Table 3 provides a summary of the VEC categories.

VEC were determined based on the benefits they provide ecologically and anthropologically. VEC-Project interactions were then identified by reviewing project activities and their relationship to physical-chemical, ecological, and anthropogenic

elements. A summary of VEC justifications and project activity interactions is included in Table 4. For further identification of VEC-project interactions, refer to the VEC-Project Interaction Matrix in Table 5.

Table 3: Valued Ecosystem Components

VEC Category	Ecosystem Components
Physical – Chemical	• Water Quality • Land Resources • Atmospheric Quality
Ecological	• Species and Populations • Habitat and Communities
Socioeconomic	• Health and Safety • Social and Economic Stability

Table 4: VEC Justification and Project Activities Interaction

Valued Ecosystem Components	VEC Justification	Project Phase	VEC – Project Activities Interaction
Physical-Chemical			
Water Quality	- direct relationship to terrestrial and aquatic habitat quality and abundance. - supports fishing, recreation, and transportation.	- construction	- chemical/physical interactions from machinery operation, power-washing, excavation, rock or wood drilling, concrete works
		- operation	- chemical/physical interactions from site access
		- decommissioning	- chemical/physical interactions from site access, machinery operation and concrete base removal
Land Resources	- support habitat for terrestrial as well as near-shore aquatic species.	- construction	- chemical/physical interactions from site access, machinery operation, concrete works, excavation, rock drilling, power service installation
		- operation	- chemical/physical interactions from site access, brushing activities
		- decommissioning	- chemical/physical interactions from site access, machinery operation, power service and concrete base removal
Atmospheric Quality	- important indicator of habitat health	- construction	- chemical/physical interactions from site access, machinery operation
		- operation	- chemical/physical interactions from site access, aid maintenance

Valued Ecosystem Components	VEC Justification	Project Phase	VEC – Project Activities Interaction
		- decommissioning	- chemical/physical interactions from site access, machinery operation
Ecological			
Species and Population Health	- indicator for ecosystem health and resiliency	- construction	- interactions from site access, machinery operation, power-washing, excavation, rock or wood drilling, power service installation, concrete works
		- operation	- interactions from site access, aid maintenance
		- decommissioning	- interactions from site access, machinery operation, power service removal, concrete base removal
Community and Habitat Health	- contribute to species survival and biodiversity	- construction	- interactions from site access, machinery operation, power-washing, excavation, rock drilling, power service installation, concrete works
		- operation	- interactions from site access, aid maintenance
		- decommissioning	- interactions from site access, machinery operation, power service installation, concrete base removal
Socioeconomic			
Health and Safety	- contributes directly to enhancing quality of life	- all phases	- potential accidents and health repercussions from physical dangers including machinery operation and contact with chemicals

Valued Ecosystem Components	VEC Justification	Project Phase	VEC – Project Activities Interaction
Economic Stability	- contributes directly to enhancing quality of life - contributes to development of individuals, communities, and sustainable practices	- all phases	- employment created at the individual and community level

4.4 Potential Environmental Effects

The discussion below provides a brief overview of the environmental effects associated with project activities. Similar to Table 5, this discussion is separated into physical-chemical, ecological, and socio-economics effects. The potential environmental effects associated with VEC/Project interaction and a summary of the mitigation that addresses these effects are provided in Table 6.

Physical-Chemical Effects

Water: Shoreline and bottom alteration and changes in surface water quality could result from maintenance, construction and decommissioning activities; these include excavation, rock or wood drilling, and installation/removal of concrete bases and power service installation. Fines, foreign materials and organic debris may also enter the aquatic environment due to project activities. Water quality impacts could be expected to last only as long as construction, operation, and decommissioning phases are engaged: from approximately one day to one week, while fines or debris in the substrate could persist for years.

Land: Lay-down areas, site access, site maintenance and machinery operation could contribute to soil erosion, compaction and settling, and changes in stability. Rock drilling and excavation physically change rock structure in a small, localized manner and fines, foreign materials, and organic debris may enter the terrestrial environment. Environmental impacts (if not mitigated) could persist for years, while structural changes to rock and soil could be permanent.

Atmosphere: The primary atmospheric effects are localized noise, dust, and fumes that result from machinery operation and activities. The application of paint during the operation phase will also result in the small-scale release of fumes. The duration of these impacts would be equal to project activity duration: approximately one day to a week.

Ecological Effects

Aquatic and terrestrial species and populations could experience short-term disturbance from project activities. It is possible that nesting bird colonies could be disturbed by activities under this RCSR. Small-scale habitat alteration could result from construction and decommissioning activities. Impacts on other populations at the community and habitat level are minor and short term.

Socio-economic Effects

Project crews could be vulnerable to health risks from exposure to fumes from machinery, dust from concrete works, and contaminated soils. Safety risks may result from machinery operation, accidental falls, and site access. Further impacts may include potential disruption of heritage resources such as archaeological sites.

4.5 Accidents and Malfunctions

The likelihood of accidents or malfunctions occurring and causing negative environmental impacts due to project activities and physical works is minimal. Potential accidents and malfunctions may occur at the staging location and during the construction, operation and decommissioning phases. These may include:

- vehicle collisions
- spills from equipment operated on site
- structural failures
- spills or leaks (from paint, chemicals, and concrete) into the marine and terrestrial environment

Project activities that could result in accidents and malfunctions largely relate to the operation and maintenance of heavy machinery, vehicles, and hand machinery. Structural failures, vehicle collisions, spills and leaks would likely be attributed to human error. Spills resulting from improperly stored materials are also possible. During the operation phase, the most likely accident to occur is damage to Fixed Aids by passing vessels resulting in the loss of equipment and structures into the surrounding environment.

Accidents and malfunctions will be avoided through compliance with mitigation measures listed in Section 4.6, Table 6 and Appendix 2 of this RCSR. For example, vehicles will be regularly serviced to avoid malfunctions, and all hydrocarbon spills, regardless of size, will be reported in accordance with local legislation and contingency plans will be in place.

Table 5: VEC – Project Interaction Matrix

		Valued Ecosystem Components																																	
		PHYSICAL – CHEMICAL EFFECTS																ECOLOGICAL EFFECTS												SOCIOECONOMIC EFFECTS					
		WATER QUALITY						LAND RESOURCES					ATMOSPHERIC QUALITY						SPECIES AND POPULATIONS						COMMUNITIES AND HABITATS				HEALTH AND SAFETY		SOCIAL AND ECONOMIC STABILITY			
																			TERRESTRIAL				AQUATIC												
PROJECT PHASE	**PROJECT ACTIVITIES**	WATER TABLE ALTERATION	GROUND WATER FLOW	GROUND WATER QUALITY CHANGES	SHORELINE AND BOTTOM ALTERATION	SURFACE FLOW VARIATION	SURFACE WATER QUALITY CHANGES	SOIL EROSION	UNIQUE PHYSICAL FEATURES	COMPACTION AND SETTLING	STABILITY (SLIDES AND SLUMP)	GEOLOGY	AIR QUAILITY	WIND	INVERSION/ FOGGING	TEMPERATURE	NOISE	DUST	TERRESTRIAL VEGETATION	BIRDS AND MAMMALS	AMPHIBIANS AND REPTILES	INVERTEBRATES	AQUATIC VEGETATION	BIRDS AND MAMMALS	AMPHIBIANS AND REPTILES	FISH AND INVERTEBRATES	TERRESTRIAL COMMUNITIES	TERRESTRIAL HABITATS	AQUATIC COMMUNITIES	AQUATIC HABITATS	HEALTH RISKS (Chemical)	SAFETY RISKS (Physical)	HERITAGE RESOURCES	LAND/ RESOURCE USE	AESTHETIC
CONSTRUCTION	**SITE ACCESS** (incl. transportation methods)																•	•	•	•	•	•	•	•	•	•						•			
	MACHINERY OPERATION (incl. operation of all equipment required for construction operations below)							•		•	•		•				•	•	•	•	•	•	•	•	•	•					•	•	•		•
	POWER-WASHING (physical alteration/impact)						•																•			•									
	EXCAVATION (physical alteration/impact)				•		•	•			•	•					•	•	•	•	•	•		•	•	•		•			•	•	•		•
	STORAGE of FILL/BACKFILL MATERIAL (physical alteration/impact)					•	•				•							•	•	•	•	•						•			•		•		•
	ROCK DRILLING (physical alteration/impact)				•		•					•					•	•		•			•	•		•									
	PILE INSTALLATION (physical alteration/impact)				•		•					•					•			•			•	•		•				•					
	CONCRETE WORKS (physical alteration/impact)				•		•											•			•		•		•	•				•	•				
OPERATION	**SITE ACCESS** (incl. transportation methods)																•	•	•	•	•	•	•	•	•	•						•			
	AID MAINTENANCE (incl. power washing, painting, equipment replacement)						•						•						•												•	•		•	
DECOMMISSIONING	**MACHINERY OPERATION** (incl. operation of all equipment required for operations below)							•		•	•		•				•	•	•	•	•	•	•	•	•	•					•	•	•		•
	PILE REMOVAL (physical alteration/impact)				•		•										•						•	•	•	•				•					
	CONCRETE BASE REMOVAL (physical alteration/impact)				•		•											•		•			•	•		•				•					
	CONCRETE BASE ABANDONMENT (physical alteration/impact)																		•	•	•	•	•	•	•	•		•		•					•

4.6 Mitigation

Mitigation measures that address the environmental effects associated with Fixed Aid activities are based on existing Best Management Practices (BMP) and procedures. These documents are from various levels of government, industry BMP and internal CCG protocols. The mitigation measures have been previously applied and proven to be successful for projects that have undergone individual screenings pursuant to the Act. The mitigation measures have been synthesized, modified, and enhanced for the purposes of this report.

A full copy of the RCSR mitigation measures is included in Table 6, which includes a summary of the potential environmental effects and mitigation measures that address these effects organized by VEC. Standard mitigation organized by project activity is included in Appendix 2 with the intention of providing a convenient reference for crews to access the mitigation to be implemented.

The primary source for the mitigation included in this report is the *BMP for Pile Driving and Related Operations (2003)*, which was developed by the BC Marine Pile Driving Contractors Association. This document provided a suitable starting point for mitigation as it includes standard mitigation for RCSR- applicable project activities. The mitigations from the *BMP for Pile Driving and Related Operations* were enhanced to better protect VECs with use of the following documents:

- *CCG Protocol for On-site Visits to Navigation Aids in Sensitive Bird Nesting Sites (2004)*
- *BMP for Concrete Pouring Programs at DFO-CCG Sites (2000)*
- *BMP for Undertaking Maintenance Cleaning/Painting of CCG Lightstations (1998)*
- *BMP for Brushing Activities at CCG Sites (2005)*
- *Proceedings: Archaeological Training Workshop – CCG Lightstation Project (2000)*
- *Standards and Best Practices for Instream Works (Province of BC, 2004)*
- *Environmental Guidelines for General Construction Practices (Water Resource Management Division, Government of NL, 2002)*
- *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (1998)*
- *Navigable Waters Protection Act* Minor Works and Waters Order *(2009)*

CCG will ensure that mitigation measures will be implemented by requiring compliance with the RCSR and related BMP by all CCG staff and crews. Staff and crews will be introduced to the RCSR and required to implement it properly as part of standard operating procedures.

Table 6: Potential Environmental Effects and Mitigation Summary

VEC	Potential Environmental Effects	Mitigative Measures
WATER RESOURCES	Shoreline and bottom alteration, siltation, and other changes in water quality could result from access excavation, back filling, rock drilling, and installation/removal of concrete bases.	SITE ACCESS 1. Site access must be undertaken with regard to protecting water resources from hydrocarbons, silt and run-off. Access must be by roads or designated pathways. Dirt or gravel roads must be stable and not produce silt. 2. Air and water access must avoid passing near active breeding bird colonies and migration staging areas. A 2-kilometer buffer zone is recommended around such sites. EXCAVATION/ ROCK DRILLING 1. Dust and fines entering the water must be avoided. 2. Loose material at excavation sites should be managed (using silt fences, take off ditches, settling ponds etc) to avoid migration of silt and debris to nearby waters, especially during heavy rainfall events. 3. All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone. 4. Any blasting must follow the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*. REPLACEMENT OF ELECTRICAL SERVICE 1. Trenching must not extend further than installation and backfill can be completed in a day. All trench works, spoil piles and backfilled sections must be covered or stabilized (tarpaulins, mulch or sod, etc) to prevent erosion by rain or wind. Sods or vegetation on the trench alignment are to be removed and saved for replacement as the top layer of backfill.

VEC	Potential Environmental Effects	Mitigative Measures
WATER RESOURCES Continued	Shoreline and bottom alteration, siltation, and other changes in water quality could result from excavation, rock drilling, and installation/removal of concrete bases.	CONCRETE WORKS 1. When pouring concrete, spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the form work or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews must ensure that concrete forms are not filled to overflowing. 2. All concrete forms must be constructed and sealed in a manner that will prevent fresh concrete or cement laden water from leaking into the surrounding water. 3. All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the marine environment. The wash water must be contained and disposed of upland in an environmentally acceptable manner, likely directed to a settling pond for control and treatment, as appropriate. CONCRETE BASE REMOVAL 1. Crews where possible must position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Ideally, equipment should not be grounded on the substrate. Where possible, alternative methods must be employed (e.g. use of temporary anchors instead of spud anchorages). 2. All debris deposited throughout the life of the aid should be removed from the site.

VEC	Potential Environmental Effects	Mitigative Measures
	Fines, foreign materials and organic debris may enter the aquatic environment due to project activities	AID MAINTENANCE 1. Activities should be completed in such a way (groundsheets, etc) as to minimize the amount of fines and organic debris that may enter nearby aquatic environments. 2. Fixed Aid maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. All operational wastes must be recycled where possible or otherwise disposed of appropriately. Solar panel batteries will be replaced as scheduled, collected, and returned to CCG base for recycling. 3. An approach of "contain and recover" should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of appropriately.

VEC	Potential Environmental Effects	Mitigative Measures
LAND RESOURCES	Soil erosion, compaction, and settling, and changes in stability may result from machinery operation.	SITE ACCESS 1. Site access must be undertaken with regard to not damaging resident plants and animals. MACHINERY OPERATION 1. All equipment must be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Vehicles must remain on stable hardened surfaces and not be operated below the line of Highest High Water (never in the intertidal zone). 3. Machine operation should only occur where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. REPLACEMENT OF ELECTRICAL SERVICE 1. Trenching must not extend further than installation and backfill can be completed in a day. All trench works, spoil piles and backfilled sections must be covered or stabilized to prevent erosion by rain or wind.
	Rock drilling and excavation may physically change rock/soil structure	EXCAVATION/ROCK DRILLING 1. Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock/soils remain small and localized.
ATMOSPHERIC QUALITY	Noise, dust, and fumes result from project activities.	MACHINERY OPERATION 1. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.

VEC	Potential Environmental Effects	Mitigative Measures
	Paint applied during the operation phase may result in the small scale release of fumes.	AID MAINTENANCE 1. Painting activities should be completed in such a way as to minimize the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.
SPECIES AND POPULATIONS/ COMMUNITIES AND HABITATS	Short term disturbance from project activities to both terrestrial and aquatic species may occur.	EXCAVATION/ROCK DRILLING 1. Rock drilling and excavation activities must not occur near active bird breeding colonies, nest sites or migration staging areas.
		AID INSTALLATION/MAINTENANCE 1. Crews where possible must position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Ideally, equipment should not be grounded on the substrate. Where possible, alternative methods must be employed (e.g. use of anchors instead of spud anchorages).
		REPLACEMENT OF ELECTRICAL SERVICE 1. Trenching must not extend further than installation and backfill can be completed in a day. All trench works, spoil piles and backfilled sections must be covered or stabilized to prevent erosion by rain or wind.

VEC	Potential Environmental Effects	Mitigative Measures
ANTHROPOGENIC	Project crews may be vulnerable to health risks from exposure to fumes from machinery, dust from concrete works, and contaminated soils. Safety risks may result from machinery operation, accidental falls, and site access. In addition, the public may be affected by temporary disruptions to site use or navigability during works.	GENERAL 1. Activities should be completed in such a way as to minimize the amount of fines and organic debris. 2. Ensure all personnel involved with activities are adequately trained and utilize appropriate personal protective equipment. 3. Storage of fuels and petroleum products must comply with safe operating procedures, including containment facilities in case of spill. 4. Onsite crews must have emergency spill equipment available. 5. Any disruption to navigability will require issuance of a Notice to Mariners to advise. MACHINERY OPERATION 1. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local. AID INSTALLATION/MAINTENANCE 1. Proper notice should be given to transportation authorities to warn of potential disruptions to navigability during works, (e.g./ Notice to Mariners).

VEC	Potential Environmental Effects	Mitigative Measures
ANTHROPOGENIC continued	The aesthetic of construction, operation, and decommissioning could be perceived to be negative.	GENERAL 1. Aesthetic effects created by activities will be short-term and localized. Sites should be kept in a tidy manner during activities and left in a good condition at the end of the project. CONCRETE BASE ABANDONMENT 1. Care should be taken to remove all components of the Fixed Aid that are not incorporated into the concrete base. 2. All debris deposited throughout the life of the aid should be removed from the site. 3. Areas near the concrete base should be protected from excessive disturbance. Crews where possible must position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods must be employed (e.g. use of anchors instead of spud anchorages). 4. Concrete base abandonment will be conducted only in remote sites, where aesthetic effects are not a concern.
	Archaeological sites could be inadvertently disturbed or damaged by project activities	GENERAL 1. Archaeological sites in remote locations may not have been previously identified. Care should be taken to observe for archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.

4.7 Analysis and Prediction of Significance of Residual Environmental Effects

Residual effects are "those environmental effects that remain after the application of design standards and the implementation of mitigation measures" (Virtue 2005). Under the Act, the significance of residual environmental effects must be considered. This section provides criteria for evaluating the significance of potentially adverse residual environmental effects. Analysis of the significance of residual environmental effects is based on several criteria including magnitude, geographic extent, duration, frequency and reversibility (see Table 7). This table was developed in accordance with the November 1994 Agency Reference Guide, *Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects*, and the *Responsible Authorities Guide to the Environmental Assessment Act* (CEAA-RA 2003). The criteria were assessed using past experience and professional judgment and are combined to determine whether or not an activity's effect is significant.

Table 7: Rating System Used to Determine the Significance or Residual Environmental Effects

Criteria	Negligible	Minor	Major
Magnitude	Minute levels of disturbance and/or damage (i.e. within natural variation)	Low levels of disturbance and/or damage (i.e. temporarily outside range of natural variation)	High levels or disturbance and/or damage (i.e. outside the range of natural variation)
Geographic Extent	Limited to direct project site	Extends beyond direct project site but remains within the project boundaries	Extends beyond the project boundaries
Duration of Effects	Less than one day	Days to weeks	A month or longer
Frequency of Effects	Occurs on a monthly basis or less frequently	Occurs on a weekly basis	Occurs on a daily basis or more frequently
Reversibility	Effects reversible over short term without active management	Effects reversible over short term with active management	Effects reversible over extended term with active management or effects are not reversible

The above rating system was used to determine whether or not a residual environmental effect was significant based on the following definitions:

Significant

A residual environmental effect is considered *significant* when it introduces frequent, major levels of disturbance and/or damage and when the effects last longer than a month and extend beyond the project boundary following the application of mitigation measures. It is either reversible with active management, or over an extended term, or irreversible. A *significant* effect would not be consistent with well-defined environmental protection outcomes such as no degradation of shorelines, no loss of fish or aquatic habitat, and as defined would not be tolerated under the *Canadian Environmental Protection Act*.

Not Significant

A residual environmental effect is considered *not significant* when it has minor or negligible levels of disturbance and/or damage and when the effects last less than a month and are contained within the project boundaries following the application of mitigation measures. An effect that is *not significant* is reversible with or without short-term active management.

Residual Effects and Significance

Identified VEC including water, land, atmosphere, species and populations/communities and habitats, and anthropogenic factors are affected by residual effects from project activities. Each of these residual effects has been identified and examined according to the above criteria ratings and all of the residual effects were found to be not significant. Table 8, below, includes a summary of the criteria and significance of the residual environmental effects associated with Fixed Aid projects under this RCSR.

Summary of Significance of Residual Environmental Effects

All residual environmental effects remaining after the application of recommended mitigation measures were found to be negligible, not significant, and limited to the immediate project area. Although the potential exists for short term environmental effects during construction and decommissioning, the implementation of recommended mitigation measures will result in impacts that are not significant. CCG and Transport Canada conclude that projects under this RCSR will not contribute to significant adverse environmental effects.

Table 8: Significance of Residual Environmental Effects

VEC+	Project Phase/Elements	Residual Environmental Effects	Criteria Ratings: Magnitude	Geographic Extent	Duration of Effect	Frequency of Effect	Reversibility	Significance
WATER QUALITY	Construction, excavation	Potential inputs to receiving waters.	1	1	1	1	1	**Not Significant**
LAND RESOURCES	Construction phase: pile installation, excavation	Physical change to rock structure in a small, localized manner	1	1	1	1	2	**Not Significant**
ATMOSPHERIC QUALITY	All phases: machinery operation, site access by helicopter, boat, or vehicle	Chemical release of fumes and dust	1	1	1	1	1	**Not Significant**
	All phases: site access by helicopter, boat or vehicle	Noise	1	2	1	1	1	**Not Significant**
	Operation phase: maintenance activities such as painting and power-washing	Small scale release of fumes, fines, foreign materials (e.g. paint chips) and organic debris	1	1	1	1	1	**Not Significant**
SPECIES AND POPULATIONS/ COMMUNITIES AND HABITATS	All phases: site access, machinery operation, construction and decommissioning activities	Short term disturbance to terrestrial and aquatic species	2	2	1	1	1	**Not Significant**
ANTHROPOGENIC FACTORS	Decommissioning phase: concrete base abandonment	Aesthetic effect	1	1	3	1	1	**Not Significant**

Legend: 1=Negligible, 2=Minor, 3 = Major

4.8 Cumulative Environmental Effects

The Act requires that the assessment of potential environmental effects also consider the potential of cumulative environmental effects. Cumulative environmental effects are defined as "changes to the environment that are caused by an action in combination with other past, present and future human activities" (CEAA, 1999). The concept of cumulative environmental effects recognizes that the environmental effects of individual human activities can combine and interact with each other to cause aggregate effects that may be different in nature or extent from the effects of the individual activities (CEAA, 1994).

Under the Act, the identification of likely future projects takes into consideration projects that are certain (i.e. approved, under regulatory review, or officially announced to regulatory agencies) and reasonably foreseeable (i.e. identified in a development plan that is approved or under review, or conditional upon approval of a development plan that is under review). Hypothetical actions (i.e. conjectural or discussed on a conceptual basis) are not considered. (CEAA 1999)

Many of the potential environmental effects associated with Fixed Aid projects are short-lived, localized and reversible; their capacity to act in a cumulative manner is minimal. For the purposes of this RCSR, the cumulative effects assessment must consider the potential cumulative effects resulting from: (1) other projects addressed by this RCSR, (2) other project/activities within the site boundaries, and (3) projects and activities occurring outside the site boundaries.

Interactions between Fixed Aid projects

The environmental effects associated with Fixed Aid projects, as defined by this RCSR, have been found to be negligible and limited to each individual project area. Considering these factors, the environmental effects of individual Fixed Aid projects are not likely to interact with each other and contribute to cumulative effects.

Interactions between Fixed Aid projects and other projects/activities inside the site boundaries

The environmental effects of interactions between Fixed Aid projects and other projects/activities inside the site boundaries must be factored into the consideration of cumulative effects.

Due to the small size of each individual project's boundaries, it is highly unlikely that other projects will occur within the same boundaries as Fixed Aid projects. Activities that could occur within project boundaries while Fixed Aid projects are occurring in aquatic environments include vessel traffic such as fishing, shipping, and recreation. In terrestrial environments there is potential that industrial, recreational, or residential

activities may occur within project boundaries. These are routine activities that typically have minimal or negligible environmental effects.

Given that the potential environmental effects resulting from the construction, operation, and decommissioning of Fixed Aids are expected to be negligible and limited to the immediate area of each individual project, it is unlikely that the environmental effects of Fixed Aid projects will interact with the environmental effects of other project/activities and contribute to cumulative effects.

Interactions between Fixed Aid projects and projects/activities outside site boundaries

The environmental effects of interactions between Fixed Aid projects and projects/activities outside site boundaries must be considered during the assessment of cumulative effects.

There is potential for a wide range of activities/projects to occur outside of Fixed Aid project boundaries. Similar to those activities that could occur inside project boundaries, fishing, shipping, recreation, and residential are expected activities outside project boundaries. These are routine activities that typically have minimal or negligible environmental effects.

In addition, the remote nature of most Fixed Aid sites makes it unlikely that the environmental effects of outside projects will combine with Fixed Aid projects to produce cumulative effects.

Summary of Cumulative Effects on VEC

Taking the mitigation measures from section 4.6 of this RCSR into account, potential adverse environmental effects would be limited to each individual project site. Consequently, potential adverse cumulative environmental effects are unlikely to occur either inside our outside the project boundaries.

Proper project planning and design will take into account surrounding infrastructure, and other projects or activities inside and outside project boundaries, which could have potential to act in a cumulative manner on affected VEC. Consequently, the potential for any cumulative effects to occur as a result of project interactions with other Fixed Aid projects, other projects or activities inside or outside the sites' boundaries are unlikely.

Assumptions made regarding cumulative environmental effects will be confirmed on a yearly basis.

5. Roles and Responsibilities

5.1 Responsible Authorities

5.1.1 Canadian Coast Guard (CCG)

DFO, as the proponent, is the lead RA for all components of the RCSR. It should be noted that since the RA is DFO, the RCSR can be applied, where appropriate, by all members of the department until such time as the Agency declares the RCSR not to be a class screening report or the declaration period expires. Structures and activities included in the report have been selected to minimize the potential for additional permitting and, therefore, the inclusion of other RAs.

It will be the responsibility of DFO to:

- ensure that projects are properly identified as class-applicable;
- ensure that applicable mitigation is implemented;
- place a regular statement on the Registry Internet site noting the extent to which the RCSR has been used, as identified in section 1.4;
- maintain the Registry project file, ensure convenient public access, and respond to information requests in a timely manner; and
- provide annual confirmation of the continuing validity of cumulative effects assessment conditions to the Agency.

5.1.2 Transport Canada

Transport Canada has agreed to use this replacement class screening with CCG to fulfill its EA requirements in instances where it is also an RA for Fixed-Aid projects.

If Transport Canada considers issuing a specific approval associated with a project under the NWPA, they become an RA in accordance with the *Law List Regulations* of the Act. In such cases, it will be the responsibility of Transport Canada to ensure that projects are subject to this replacement class screening, as well as to ensure that applicable mitigation is implemented. However, the majority of these projects will be subject to the Minor Works and Waters Order of the NWPA.

Where CCG and Transport Canada are both RAs for a project, CCG will be the lead RA and be responsible for co-ordination of the EA and the Registry requirements.

5.2 Other Responsible Authorities

If permitting or approval is required from an additional RA, other than CCG and Transport Canada, this RCSR will not apply and an individual environmental assessment under the Act will be required.

5.3. Federal Authorities

If permitting or approval is required from an FA other than DFO this RCSR will not apply and an individual assessment under the Act may be required. Potential FAs of note include other entities that have been delegated with land management: Parks Canada, Port Authorities, Transport Canada, and Indian & Northern Affairs, for example. Also, if an additional approval is required from DFO Habitat Management in the form of a *Fisheries Act* authorization, this RCSR will not apply.

The following list includes FAs that have provided comments regarding this report's identification of potential environmental effects, suggested mitigation, and procedures. Comments have been incorporated as appropriate such that further referrals to these FAs will not be required except as outlined in this report:

- Environment Canada
- Fisheries & Oceans Canada – Habitat Management Program

Any project that requires further assessment by, or referral to, another FA will not be included in this RCSR.

5.4 Provincial Coordination

This RCSR is not designed to compensate for provincial requirements nor does it eliminate the need for provincial project specific approvals where required. The RCSR does not exempt CCG from obeying relevant provincial legislation.

6. Procedures for Revising the Replacement Class Screening Report

The RA will notify the Agency in writing of its interest to revise the RCSR as per the terms and conditions of the declaration. It will discuss the proposed revisions with the Agency and affected federal government departments and may invite comment from stakeholders on the proposed changes. For a re-declaration of the RCSR, a public consultation period will be required. The RA will then submit the proposed revisions to the Agency, along with a statement providing a rationale for each revision proposed as well as a request that the Agency amend or re-declare the RCSR.

6.1 Amendments

The purpose of an amendment is to allow for minor modifications to the RCSR after experience has been gained with its operation. Amendments do not require public consultation and do not allow for changes to the term of application. In general, amendments to the RCSR can be made if the Agency is satisfied that changes:

1. represent editorial changes intended to clarify or improve the document and procedures screening process;
2. streamline or modify the planning process and/or
3. do not materially alter either the scope of the projects subject to the RCSR or the factors to be considered in the assessment required for these projects.

6.2 Re-declaration

The purpose of a re-declaration is to allow substantial changes to the RCSR after experience has been gained with its operation. Re-declarations require a public consultation period. A re-declaration of an RCSR may be undertaken for the remaining balance of the original declaration period or for a new declaration period if the changes:

- extend the application of the RCSR to projects or environmental settings that were not previously included, but are similar or related to projects included in the class definition;
- represent modifications to the scope of the projects subject to the RCSR or the factors to be considered in the assessment required for these projects;
- reflect new or changed regulatory requirements, policies or standards;
- introduce new design standards and mitigation measures;
- modify the federal coordination notification procedures;
- extend the application of the RCSR to RA(s) who were not previously declared users of the report;
- remove projects that are no longer suitable for the class; and/or

- extend the term of application of the RCSR.

6.3 Term of Application

This report will be in effect for 5 years from its date of declaration. Near the end of the RCSR declaration period, and at other times as necessary, the CCG will review content and usage to allow for report updates and the preparation for potential re-declaration.

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8. Appendices

1. Environmental Information Resources
2. Standard Mitigation Organized by Project Activity

Appendix 1
Environmental Information Resources

Environmental Information Resources

Department of Fisheries and Oceans Canada	• Home page (http://www.dfo-mpo.gc.ca/) • Newfoundland and Labrador Operational Statements (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/nl/index_e.asp)
Environment Canada	• Atlantic Region (http://www.atl.ec.gc.ca/index_e.html)
Canadian Environmental Assessment Agency	• Canadian Environmental Assessment Agency (http://www.ceaa-acee.gc.ca) • Canadian Environmental Assessment Registry (http://www.ceaa-acee.gc.ca/050/index_e.cfm)
Transport Canada	• Navigable Waters Protection Program (http://www.tc.gc.ca/marinesafety/oep/nwpp)
Province of Newfoundland and Labrador	• Home page (http://www.gov.nl.ca) • Natural Resources • Heritage/Archaeology • Species at Risk • NL Department of Environment and Conservation
Species at Risk data	• Atlantic Canada Conservation Data Centre home page (http://www.accdc.com) • Species at Risk (http://www.sararegistry.gc.ca/default_e.cfm) • Species at Risk, Search by Map English: (http://www.sararegistry.gc.ca/sar/index/map_e.cfm) French: (http://www.sararegistry.gc.ca/sar/index/map_e.cfm) • Committee on the Status of Endangered Wildlife in Canada (http://www.cosewic.gc.ca)

Appendix 2
Standard Mitigation by Project Activity

PROJECT ACTIVITY	MITIGATION
GENERAL (to be incorporated into all activities below)	1. Ensure all personnel involved with activities are adequately trained and utilize appropriate personal protective equipment. 2. Storage of fuels and petroleum products must comply with safe operating procedures, including containment facilities in case of a spill. Onsite crews must have emergency spill equipment available. 3. Waste or any miscellaneous unused materials must be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the marine or terrestrial environment. 4. All activities should be completed in such a way as to minimize stress and disturbance to resident flora and fauna. 5. Operations should only occur where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. 6. Aesthetic effects created by activities will be short-term and localized. Sites should be kept in a tidy manner during activities and left in a good condition at the end of the project. 7. Archaeological sites in remote locations may not have been previously identified. Care should be taken to observe for archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.
Working in Shorewater Zone (land located between high water mark and low water mark)	1. Contact the Minister of the Environment to obtain written permission for working in the shore water zone.
SITE ACCESS	1. Site access must be undertaken with regard to protecting water resources, and resident plants and animals from hydrocarbons, silt, run-off and physical disturbance. 2. Land access must be by roads or designated pathways. Dirt or gravel roads must be stable and not produce silt. 3. Air and water access must avoid passing near active breeding bird colonies and migration staging areas. A 2-kilometer buffer zone is recommended around such sites.

PROJECT ACTIVITY	MITIGATION
MACHINERY OPERATION	4. All equipment must be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 5. Vehicles must remain on stable hardened surfaces and not be operated below the line of Highest High Water (never in the intertidal zone). 6. Machine operations should only occur where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. 7. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.
POWER-WASHING	1. Activities should be completed in such a way as to minimize the amount of fines and organic debris that may enter nearby aquatic environments.
EXCAVATION/ROCK DRILLING	1. Rock drilling and excavation activities must not occur near active bird breeding colonies, nest sites, or migration staging areas. 2. Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized. 3. Dust and fines must be prevented from entering the water by use of groundsheets or other suitable means. 4. Archeological sites in remote locations are not likely to have been previously identified. Care must be taken to observe for archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit. 5. Loose material at excavation sites must be managed to avoid migration of silt and debris to nearby waters, especially during heavy rainfall events. 6. All excavation below Highest High Water should be completed by hand, as no vehicles may be operated in the intertidal zone. 7. Any blasting must follow the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (1998).*
EXCAVATION FOR ELECTRICAL SERVICE	1. All equipment must be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Proper notice should be given to transportation authorities to warn of potential disruptions during

PROJECT ACTIVITY	MITIGATION
	works. 3. Trenching must not extend further than installation and backfill can be completed in a day. 4. All trench works, spoil piles and backfilled sections must be covered or stabilized (tarpaulins, mulch, sod, etc) daily to prevent erosion by rain or wind. 5. Sods or vegetation on the trench alignment must be removed and saved for replacement as the top layer of backfill. 6. Silt, fines or dust must not be allowed to wash or blow from the site into adjacent habitats.
CONCRETE WORKS	1. When pouring concrete all spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the formwork or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews must ensure that concrete forms are not filled to overflowing. 2. All concrete forms must be constructed and sealed in a manner that will prevent fresh concrete or cement laden water from leaking into the surrounding water. 3. All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the marine environment. The wash water must be contained and disposed of upland in an environmentally acceptable manner, likely directed to a settling pond for control and treatment, as appropriate.
AID MAINTENANCE	1. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. All operational wastes must be recycled where possible or otherwise disposed of appropriately. Solar panel batteries will be replaced as scheduled, collected, and returned to CCG base for recycling. 2. Power washing activities must follow mitigation provided under “POWER-WASHING” 3. An approach of “contain and recover” should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly. 4. Painting activities should be completed in such a way as to minimize the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered. 5. Any disruption to navigability will require issuance of a Notice to Mariners to advise.
CONCRETE BASE REMOVAL	1. Crews where possible must position their water borne equipment in a manner that will minimize

PROJECT ACTIVITY	MITIGATION
	damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods must be employed (e.g. use of anchors instead of spuds). 2. All debris deposited throughout the life of the aid should be removed from the site.
CONCRETE BASE ABANDONMENT	1. Care should be taken to remove all components of the Fixed Aid that are not incorporated into the concrete base. 2. All debris deposited throughout the life of the aid should be removed from the site. 3. Areas near the concrete base should be protected from excessive disturbance. 4. Concrete base abandonment will be conducted only in remote sites, where aesthetic effects are not a concern.