Fixed Aids to Navigation

Replacement Class Screening Report

Canadian Coast Guard
Maritimes Region

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Acronyms

BMP – Best Management Practices

CCG – Canadian Coast Guard – Maritimes Region

CEAA – *Canadian Environmental Assessment Act*

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

DFO – Department of Fisheries & Oceans Canada - Maritimes or Gulf Region

FA – Federal Authority

Fixed Aids – Fixed Short-Range Aids to Navigation

RA – Responsible Authority

RCSR – Replacement Class Screening Report

SARA – *Species at Risk Act*

the Agency – *Canadian Environmental Assessment Agency*

the Registry – *Canadian Environmental Assessment Registry*

VEC – Valued Ecosystem Component

1. Introduction

The Maritimes Region of the Canadian Coast Guard (CCG) includes Nova Scotia, New Brunswick and Prince Edward Island. This region consists of over 9,300km of coastline and numerous inland rivers and lakes. As a special operating agency within the Department of Fisheries & Oceans Canada (DFO), one role of the CCG is to install and operate over 7,000 Short-Range Aids to Navigation. These aids provide guidance to mariners through some combination of light, signage, or radar characteristics and can be either floating or fixed. Approximately 2000 of the Short-Range Aids to Navigation are classified as *Fixed* Short-Range Aids to Navigation, or Fixed Aids.

As CCG is the proponent for these projects, DFO is a responsible authority (RA) under the *Canadian Environmental Assessment Act* (CEAA) and must complete an environmental assessment before it can exercise any duty, power or function in relation to a project. Each year, approximately 25 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 will also be an RA for fixed aid projects that require an approval under the *Navigable Waters Protection Act* and which trigger the CEAA. Although this has rarely happened to date, Transport Canada has agreed to use the process outlined in this RCSR to fulfill its EA requirements.

1.1 Class Screening and the Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* (CEAA) 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. CEAA 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 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 the likely adverse environmental effects. The *Canadian Environmental Assessment Agency* (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 conclusion regarding significance of environmental effects for all projects assessed by the replacement class screening. Once the Agency declares a replacement class screening report (RCSR), no further environmental assessment regarding the significance of the environmental effects is required for projects within the class, provided 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 are constructed according to standard techniques. The class has been created with certain Fixed Aid structure elements; projects that do not conform to listed structure designs will not be applicable to the RCSR.

2. *Well-understood Environmental Setting:* The CCG has been performing environmental assessments on the subject class of projects since the inception of the CEAA and has developed a strong understanding of the environmental setting of these projects within the Maritimes Region. The environmental screening reports have evolved a common environmental setting, a common set of valued ecosystem components and a common understanding of project-environment interactions. These have been verified in recent years by a program of environmental monitoring and follow-up.

3. *Unlikely to Cause Significant Adverse Environmental Effects, Taking into Account Mitigation Measures:* Recent monitoring and follow-up programs have allowed the CCG to develop an inventory of low-impact and easily mitigated activities related to Fixed Aids. Activity-specific mitigation has been shown to effectively prevent adverse environmental effects. No significant residual or cumulative effects have been identified within the life of Fixed Aids.

4. *No Project-specific Follow-up Program Required:* Previous monitoring and follow-up programs have provided knowledge that has contributed to the current design criteria and construction methods. Experience has shown that project-specific follow-up programs are unnecessary.

5. *Effective and Efficient Planning and Decision-making Process:* Implementation and alteration of Fixed Aid works is predictable and methodical. Projects are often identified at least six months in advance and require internal review before aid structures can be changed. Past experience ensures that planning and decision making processes for projects covered by this class are effective and efficient.

6. *Public Concerns Unlikely:* Negative public comments regarding construction, operation, or decommissioning activities of Fixed Aids have not been encountered in the past. Fixed Aids are placed to increase the navigability of waterways, thereby increasing the public safety, and their implementation produces minimal environmental impacts that are easily mitigated; therefore, the public is unlikely to raise concerns about Fixed Aid works.

1.3 Consultation

The process for developing this RCSR included consultation with DFO, Environment Canada, and Transport Canada. A draft of the RCSR has been reviewed and comments have been incorporated before submission of the final draft to the Agency. Following its submission, the Agency conducted a 30-day public consultation on the RCSR. No comments were received during this time.

Internal consultation within DFO and the Coast Guard has been 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.

1.4 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 of assessments. The Registry consists of two components - an Internet site and a project file.

The 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 a RCSR.

Upon declaration of the class screening report, the Agency requires RAs to post on the Internet site of the Registry, at least every three months, a statement of projects for which

a RCSR was used. The statement should be in the form of a list of projects, and will include:

- the title of each project for which the replacement class screening report was used;
- the location of each project;
- contact information (name or number); 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 a statement is:

- July 15 - (for projects assessed from April 1 to June 30)
- October 15 - (for projects assessed from July 1 to September 30)
- January 15 - (for projects assessed from October 1 to December 31)
- April 15 - (for projects assessed from January 1 to March 31)

The RA must also provide annual confirmation of cumulative effects assessment conditions.

The project file must include a copy of the RCSR. The RA must maintain the file, ensure convenient public access, and respond to information requests in a timely manner.

Further information regarding the Registry can be found in "*The Guide to the Canadian Environmental Assessment Registry*", prepared by the Agency.

2. Projects Subject to Class Screening

2.1 Projects Subject to CEAA

Fixed Aid activities are projects under CEAA because they are undertakings in relation to a physical work. As the CCG is the proponent and triggers CEAA 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 CEAA.

Section 7 of CEAA 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 CEAA; however, modifications of a structure will be subject to CEAA. 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 CEAA. 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.

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 paragraph 5(1)(a) 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. For example, this may include the construction of "…any structure, device or thing… similar in character… that may interfere with navigation".

It is not likely that a fixed aid to navigation would ever be subject to the NWPA (TC, pers. comm.). However, on occasion, fixed aids are powered by cables, either submarine, or overhead, that if in, or over a navigable water, could be subject to the NWPA. If an approval is required under paragraph 5(1)(a) of the NWPA, which is a trigger under the *Law List Regulations* of CEAA, both CCG and Transport Canada are RAs.

2.2 Projects Subject to the Replacement Class Screening Report

The class of projects for this RCSR involves the construction, operation, and demolition/ decommissioning of concrete-based structures and the modification of power supplies to terrestrial towers and lighthouses. Projects subject to the RCSR are those undertaken within the three Maritime Provinces of Canada and Canada's territorial waters (out to 12 nautical miles) in the Atlantic Ocean that match the criteria below.

Characteristics of Concrete-Based Structures subject to the RCSR:

- built above Lowest Low Water
- a base of less than 3 m x 3 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 daymark (aluminum or other suitable material), and
- may support electronic equipment (light, solar panels, batteries, etc)

Characteristics of Terrestrial Towers subject to the RCSR:

- 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)

Characteristics of Electrical Services subject to the RCSR (cable trenching, solar panels):

- installed above Highest High Water
- solar panels with a concrete base of less than 3m x 12m (height not restricted).

Figures 1a to 1e show examples of Fixed Aids that meet the above criteria.

Figure 1a: Aluminum swing pole

Figure 1b: Steel tower.

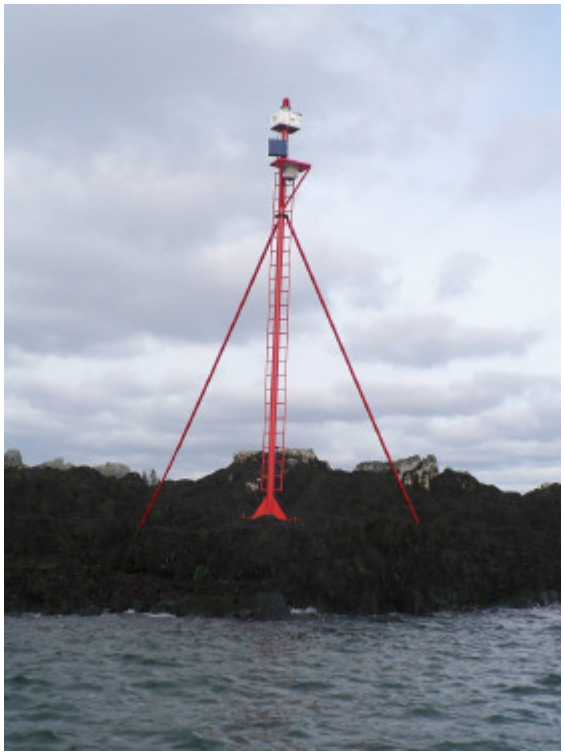


Figure 1c: Spindle structure with braces.

Figure 1d: Millard tower.

Figure 1e: Solar panels mounted on a concrete slab.

Figure 1: Typical concrete-based 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:

- A new structure at a new location
- 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”, 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)
- Species at risk likely to be adversely effected (see below)
- 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).

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 description using the RCSR and consult with DFO-RPSS resource personnel who will run a species at risk search on the 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.

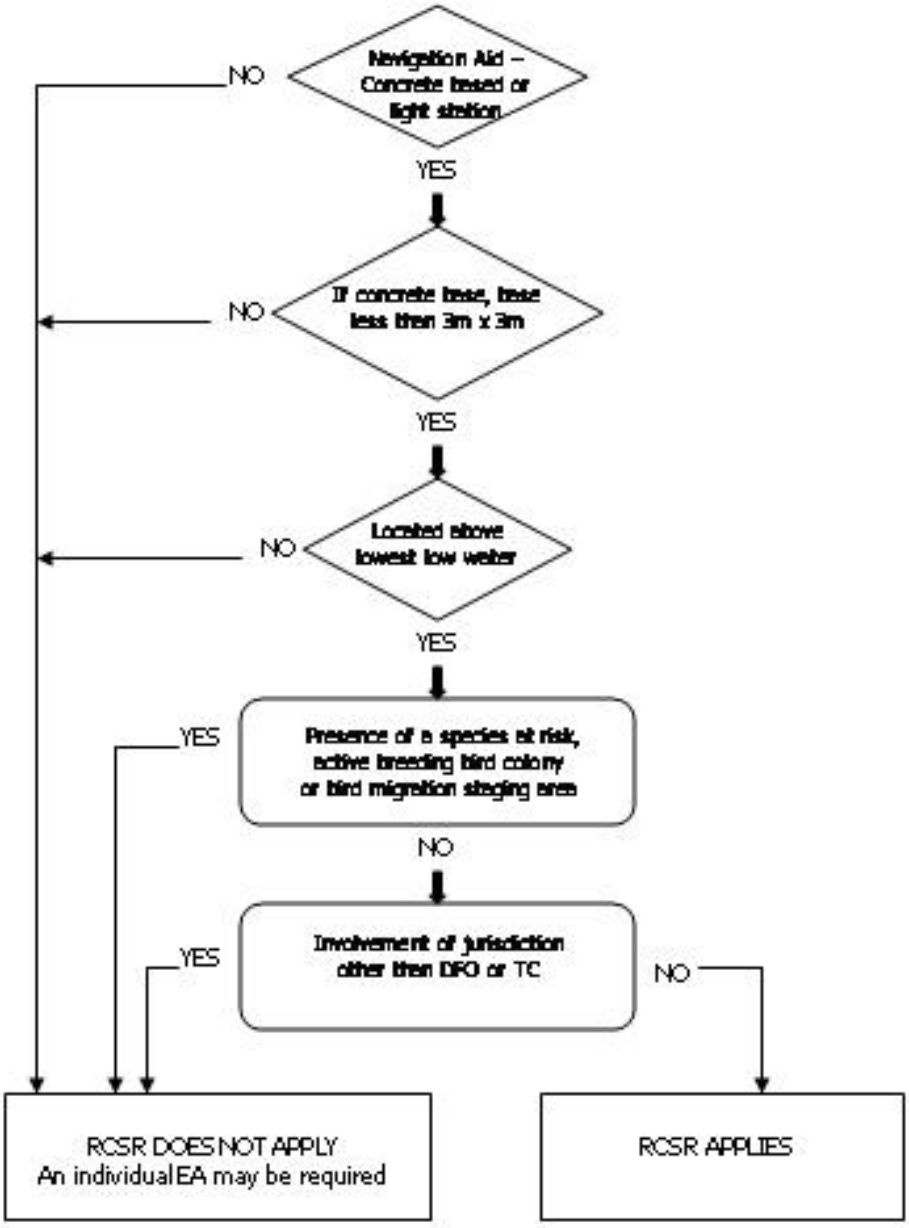
Some navigation aids are located within or adjacent to properties owned by the Parks Canada Agency. Parks Canada properties are often in sensitive areas. Parks Canada has a mandate to preserve ecological integrity in its parks and is a stakeholder in the “greater park ecosystem” surrounding parks. Any work to be done on navigation aids within parks or in adjacent areas will (if deemed necessary after consultation with park authorities) undergo a CEAA screening 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.

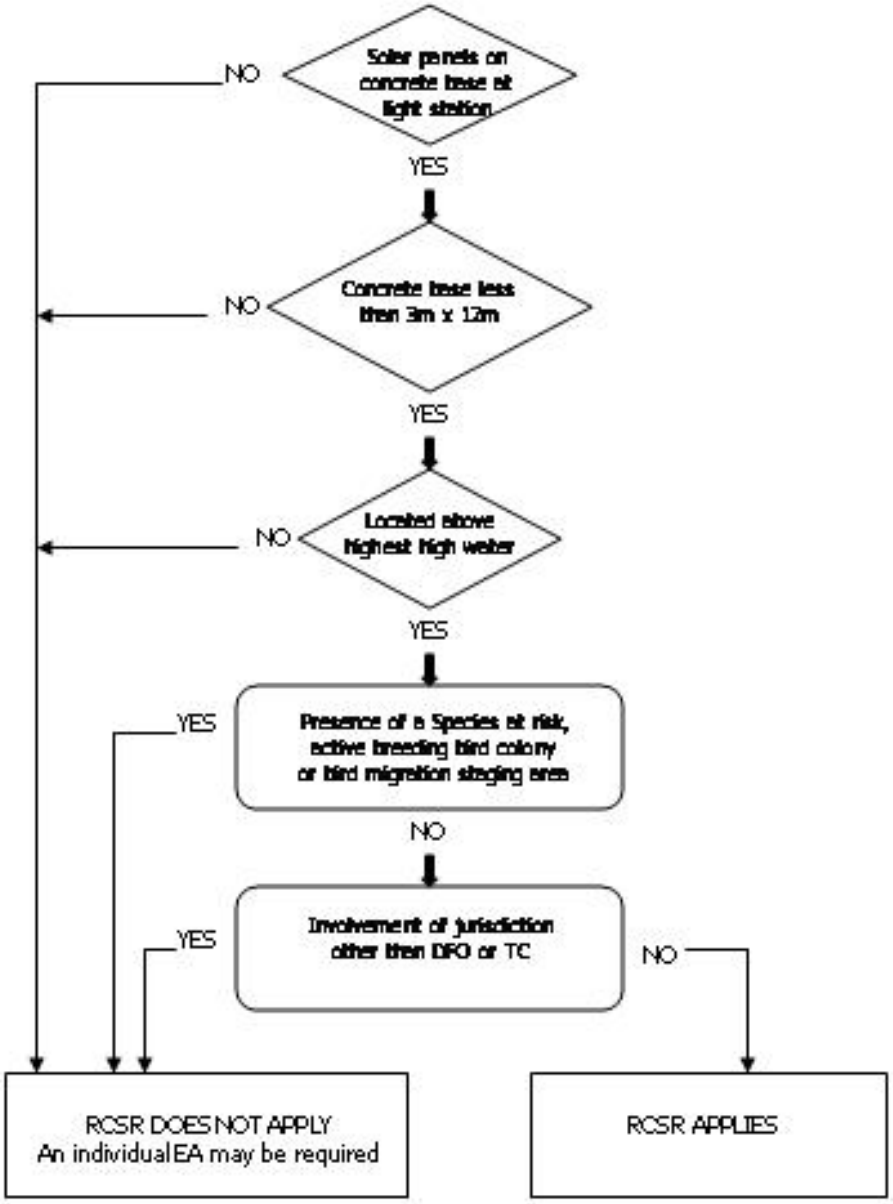
All projects that are found to be not included in the RCSR will likely require an individual environmental assessment under CEAA. Contents of this RCSR may be used to assist in the preparation of the individual environmental assessment.

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

Navigation Aid RCSR Decision Flow Chart



Solarization
Decision Flow Chart



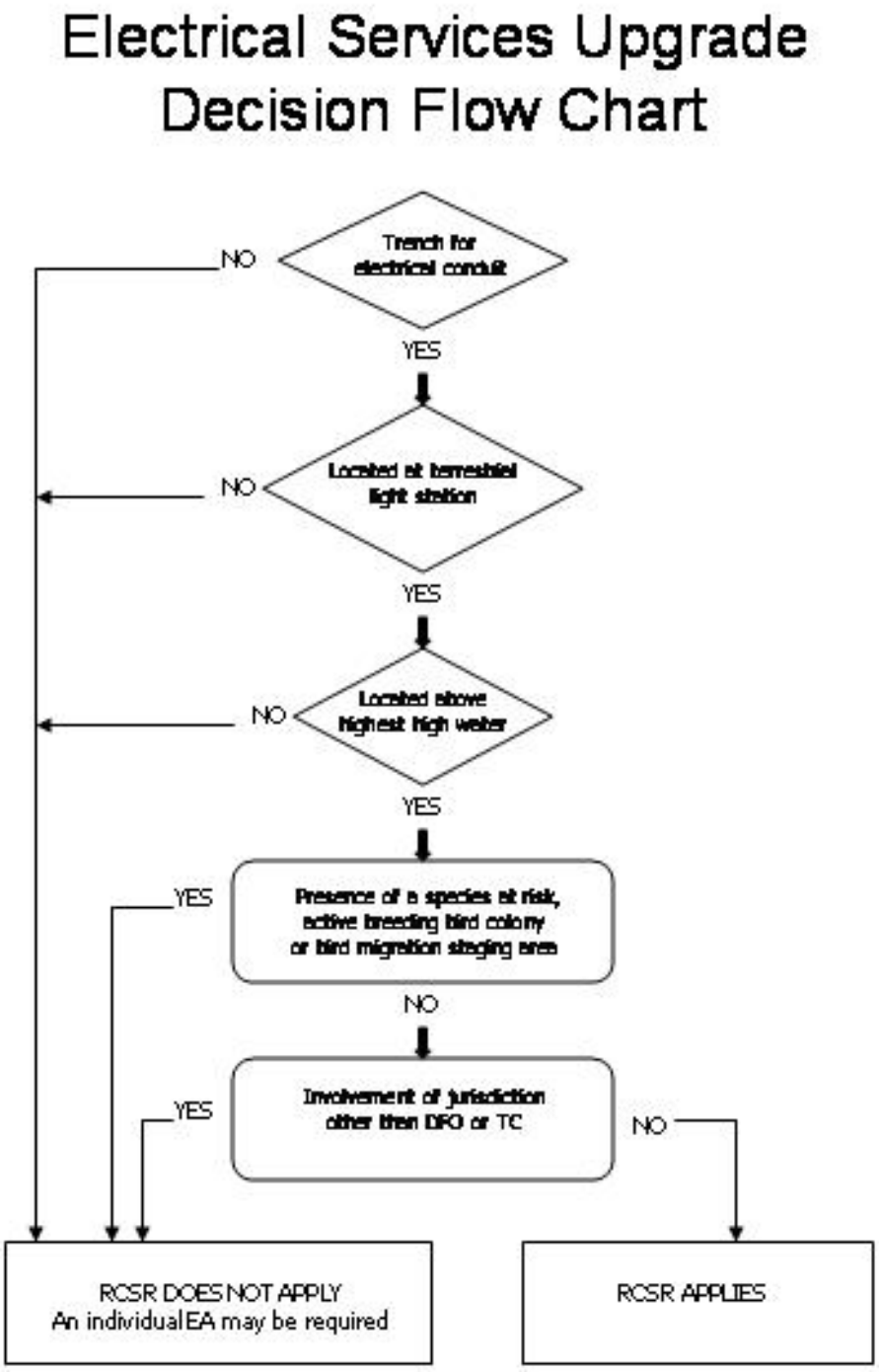


Figure 2a, b, c: RCSR Decision Flow Charts

3. Project Class Description

The Fixed Aid project class is characterized by a large boundary. All regions within the Maritime Provinces and the adjacent Canadian territorial waters are included in the project class. The Magdelene Islands and Newfoundland and Labrador are not included. Fixed Aids may be built in all aquatic and terrestrial environments given that they meet the conditions identified in Section 2 of this report. Currently, the majority of Fixed Aids that have been constructed are in the Atlantic coastal region with additional aids located on some major inland lakes. Figure 3 shows the class boundary and the existing locations of marine and freshwater Fixed Aids, which are essentially the coastlines of the three Maritime Provinces, the Bras d'Or Lakes in Nova Scotia and the lower Saint John River in New Brunswick.

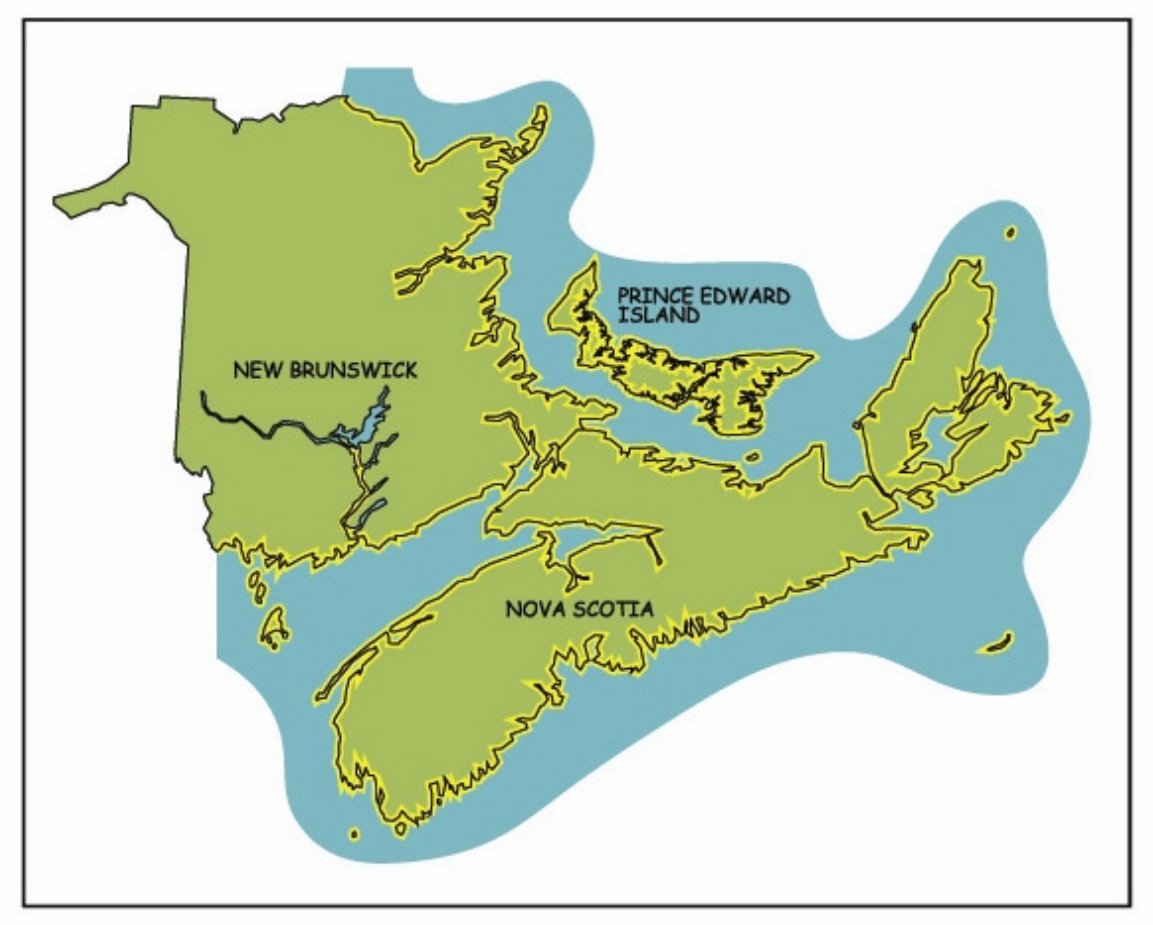


Figure 3: RCSR Boundaries – the yellow highlight along the coastlines illustrates the general locations of navigational fixed aids.

Within the 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 construction, 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 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 construction, operation, and decommissioning activities occur.

3.1 Seasonal Scheduling and Duration of Projects

Fixed Aid construction, operation, and decommissioning may occur during any season with the exception of 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 construction, operation, and 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. 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 CEAA, 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 abandonment.
- 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 wear 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 4 and Appendix 2 of this RCSR.

3.3 Construction

Construction of Concrete-based Fixed Aids

Construction of concrete-based Fixed Aids occurs above the lowest low tide or on land. 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, 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 on land.

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

Installation of Dry Mounted Fixed Aids:

Fixed Aids are not necessarily installed at pristine or undeveloped locations. Many are located on wharves or breakwaters, or other anthropogenic structures. Installation requires 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.

Construction of Terrestrial Towers and Lighthouses:

Construction of new towers or lighthouses is unlikely in the Maritimes 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 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 fog horn and remove the requirement to run generators and store hydrocarbon fuels on 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, then the solar panels can be mounted on concrete piles or dry mounted as described above.

3.4 Operation

Once constructed, aids operate self sufficiently. Lit aids operate by solar and battery power. Daybeacons are signs with navigational symbols, which are painted or marked with a sticker. Maintenance activities, conducted on a four year cycle, account for the operation of Fixed Aids. Maintenance visits take approximately one hour and involve electronics changeouts, 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. Abandonment of the concrete base occurs if the base creates no significant effect to navigability or aesthetics when left in place.

4. Environmental Review

Since 2000, an internal monitoring and follow up program run by CCG has been completed for Fixed Aid projects to assist in the development of standard structure design and project mitigation. Environmental review methods used in the creation of this report include desktop literature review, internal consultation, and review of monitoring and follow up programs.

4.1 Environmental Assessment Boundaries

The environmental assessment boundaries for the RCSR have been defined by the terrestrial boundaries Nova Scotia, New Brunswick, and Prince Edward Island and the outer limits of Canada's territorial waters in the Atlantic Ocean. Within the RCSR boundary, the CCG manages over 11,000 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 aircraft.

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.

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 not 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 found within the Maritime Provinces is included below.

Environmental Settings of Fixed Aids

Fixed Aids may be constructed on any of the substrates that occur across the Maritimes 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.

Ecozones

Most Fixed Aids are located within the Atlantic Maritime Ecozone of Canada, which includes the three Maritime Provinces of Canada (Wiken, 1986).

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.

Over 9,000 kilometres of coastline are deeply indented by tidal inlets and impressive sand dunes. Almost 4,000 offshore islands dotted with lagoons and extensive marshes ring Nova Scotia. Red sandstone cliffs and hard volcanic rocks in the Bay of Fundy tower over intertidal beaches up to 5 kilometres wide.

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.

During late spring and early summer, the mixing of the cold Labrador Current and the warm Gulf Stream produces frequent banks of sea fog over coastal areas. Average precipitation varies from 1,000 mm inland to 1,425 mm along the coast. The average annual growing season ranges from 1,500 to over 1,750 growing degree days above 5°C. Frost-free days, on average, fluctuate from 80 in the New Brunswick highlands to 180

along the coast. With a storm frequency higher than anywhere else in Canada, sunshine can be a rare commodity (Environment Canada 2005).

Heritage Resources

The Maritime Provinces are rich with heritage resources from historic and pre-historic times, dating back 500 and 1,200 years respectively. The most frequently recorded archaeological sites include shell middens, lithic scatters, pictographs and petroglyphs, and rock formation sites including fish weirs and traps, canoes runs and cairns.

Species at Risk

There are numerous species at risk within the RCSR boundary due to the large area that it encompasses. Species include marine and terrestrial mammals, birds, amphibians, fishes, arthropods, mollusks, insects, vascular plants, mosses, and lichens.

A 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 Atlantic Canada Conservation Data Centre (ACCDC) which can be accessed through DFO-RPSS personnel.

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 contain several ecosystem components. Table 1 provides a summary of the VEC categories.

Table 1: Valued Ecosystem Components

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

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 activities interactions is included in Table 2. For further identification of VEC-project interactions, refer to the VEC-Project Interaction Matrix in Table 3.

Table 2: 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 anthropogenic uses such as 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. - anthropogenic values include recreation, archaeological, and industrial	- 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 - anthropogenic values include health, recreation, and aesthetic	- construction	- chemical/physical interactions from site access, machinery operation
		-operation	- chemical/physical interactions from site access, aid maintenance
		-decommissioning	- chemical/physical interactions from site access, machinery operation

Valued Ecosystem Components	VEC Justification	Project Phase	VEC – Project Activities Interaction
Ecological			
Species and Population Health	- indicator for ecosystem health and resiliency - anthropogenic values include recreation, industry, education, and health	- 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 - anthropogenic values include recreation, industry, education, and health	- 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
Anthropogenic			
Health and Safety	- contributes directly to enhancing quality of life - components for the building of strong families and communities	- all phases	- potential accidents and health repercussions from physical dangers including machinery operation and contact with chemicals - Fixed Aids have a positive effect on navigation and the safety of mariners
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. This discussion is separated into physical-chemical, ecological, and anthropogenic effects. The potential environmental effects associated with VEC/Project interaction and a summary of the mitigation that addresses these effects are provided in Table 3.

Physical-Chemical Effects

Water: Shoreline and bottom alteration and changes in surface water quality could result from 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 effects are 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 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 effects (if not mitigated) could persist for years, while structural changes to rock and soil will 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 effects is equal to project activity duration: approximately one day to a week.

Ecological Effects

Aquatic and terrestrial species and populations will experience short term disturbance from project activities. Significant disturbance effects on bird nesting colonies are possible. Small scale habitat alteration will result from construction and decommissioning activities. At the community and habitat level, the environmental effects resulting from project activities are (apart from effects on bird colonies) negligible. Project activities, and the environmental effects associated with them, are minor and short term and therefore too small to impact the community and habitat level.

Anthropogenic Effects

Project crews are 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. Project activities positively affect economic stability by creating employment at the individual and community level, and enhance the safety and viability of the fishing industry and recreational activities. Further effects 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 4 and Appendix 2 of this RCSR. For example, vehicles will be regularly serviced to avoid malfunctions, all hydrocarbon spills, regardless of size, will be reported in accordance with local legislation and contingency plans will be in place.

Table 3: VEC – Project Interaction Matrix

Valued Ecosystem Components

		PHYSICAL – CHEMICAL EFFECTS																	ECOLOGICAL EFFECTS												ANTHROPOGENIC EFFECTS												
		WATER QUALITY						LAND RESOURCES					ATMOSPHERIC QUALITY						SPECIES AND POPULATIONS – TERRESTRIAL				SPECIES AND POPULATIONS – AQUATIC				COMMUNITIES AND HABITATS				HEALTH AND SAFETY		SOCIAL AND ECONOMIC STABILITY										
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 QUALITY	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)	DEMOGRAPHY	LOCAL ECONOMY	REGIONAL TRANSPORTATION	COMMUNITY INFRASTRUCTURE	HEALTH EDUCATION AND SOCIAL SERVICES	HERITAGE RESOURCES	LIFESTYLE AND QUALITY OF LIFE	LABOUR	REGIONAL ECONOMY	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 CEAA. 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 4, 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*, 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*
- *BMP for Concrete Pouring Programs at DFO-CCG Sites*
- *BMP for Undertaking Maintenance Cleaning/Painting of CCG Lightstations*
- *BMP for Brushing Activities at CCG Sites*
- *Proceedings: Archaeological Training Workshop – CCG Lightstation Project*
- *Standards and Best Practices for Instream Works (Province of BC)*

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 4: 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 excavation, back filling, rock drilling, and installation/removal of concrete bases.	SITE ACCESS 1. Site access practices 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. 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. 2.

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. 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 anchors instead of spuds). 2. All debris deposited throughout the life of the aid should be removed from the site.
WATER RESOURCES continued	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. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. 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 practices 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. 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. REPLACEMENT OF ELECTRICAL SERVICE 1. If, during project activities, weather is deteriorating, 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 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.
	Paint applied during the operation phase will 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.	EXCAVATION/ROCK DRILLING Rock drilling and excavation activities must not occur near active bird breeding colonies, nest sites or migration staging areas.

VEC	Potential Environmental Effects	Mitigative Measures
	Short term disturbance from project activities to both terrestrial and aquatic species.	AID INSTALLATION/MAINTENANCE 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 spuds).
	Short term disturbance from project activities to both terrestrial and aquatic species.	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.
ANTHROPOGENIC	Project crews are 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 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.
		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.

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 spuds). 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 CEAA, 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 5). 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 5: 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, etc. 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 week 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 VECs 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 insignificant. Table 6, below, includes a summary of the criteria and significance of the residual environmental effects associated with Fixed Aid projects.

Summary of Significance of Residual Environmental Effects

All residual environmental effects remaining after the application of recommended mitigation measures were found to be negligible, insignificant, 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 insignificant impacts. CCG and Transport Canada conclude that projects under this RCSR will not likely contribute to significant adverse environmental effects.

Table 6: Significance of Residual Environmental Effects

VEC	Project Phase/Elements	Residual Environmental Effects	Criteria Ratings					Significance
			Magnitude	Geographic Extent	Duration of Effect	Frequency of Effect	Reversibility	
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

CEAA 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 CEAA, 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 of 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 VECS

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 of project boundaries which could have potential to act in a cumulative manner on affected VECs. 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)

Fisheries & Oceans Canada (DFO), as the proponent, can be considered the lead RA for all components of the RCSR. As the CCG is a special operating agency within the department, CCG will represent DFO in the application and management of this report. Structures and activities included in the report have been selected to minimize the potential for additional permitting and, therefore, the inclusion of other responsible authorities.

It will be the responsibility of the CCG to ensure that projects are properly identified as class-applicable, as well as to ensure that applicable mitigation is implemented. CCG will also be responsible for monitoring the use of the RCSR and reporting to the Agency.

Note: This RCSR does not exempt CCG from the requirement to obtain approval in accordance with federal laws such as the *Navigable Waters Protection Act* (NWPA). The NWPA still requires that the proponent apply for approval of any work located in, on, over, under, through or across any navigable water.

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 CEAA. 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. This could happen if a power cable to a fixed aid must be run over, under or through a navigable water.

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 CEAA will be required.

Potential responsible authorities of note include DFO Habitat Management or Parks Canada.

If an additional approval is required from within DFO in the form of a *Fisheries Act* Authorization; the RCSR will not apply.

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 a CEAA screening independent of this replacement class screening.

5.3. Federal Authorities

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

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

Any project that requires further assessment by or referral to another FA will not be included in the 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 Amending the Replacement Class Screening Report

The purpose of an amending procedure is to allow for modification of the RCSR after experience has been gained with its operation. The reasons for such modification may include:

- clarification of the document and procedures;
- streamlining or modifying the planning process in areas where problems may have arisen;
- minor modifications and revisions to the factors to be considered in the assessment to reflect new or changed regulatory requirements, policies or standards;
- extension of the application of the RCSR to RA(s) who were not previously declared users of the report; and/or
- new procedures and environmental mitigation practices that have been developed over time.

The RA will notify the Agency in writing of its interest to amend the RCSR. It will discuss the proposed amendments with the Agency and affected federal government departments and may invite comment from stakeholders and the public on the proposed changes. The RA will then submit the proposed amendments to the Agency, along with a statement providing a rationale for each amendment proposed.

The Agency may amend the RCSR without changing the declaration period if the changes:

- are minor;
- represent editorial changes intended to clarify or improve the screening process;
- do not materially alter either the scope of the projects subject to the RCSR or the factors to be considered in the assessment for these projects; and
- do not reflect new or changed regulatory requirements, policies or standards.

The Agency may initiate a new declaration for the RCSR for the remaining balance of the original declaration period or for a new declaration period if the changes:

- are considered to be substantial; or
- 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.

6.1 Term of Application

This report will be in effect for 10 years from its date of declaration. Near the end of the RCSR application period, the CCG will review content and usage to allow for report update and 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/) • Atlantic Region Operational Statements (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/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 Nova Scotia	• Home page (http://www.gov.ns.ca) • Natural Resources • Heritage/Archaeology • Species at Risk
Province of New Brunswick	• Home page (http://www.gov.nb.ca/) • Natural Resources • Heritage/Archaeology • Species at Risk
Province of Prince Edward Island	• Home page (http://www.gov.pe.ca/) • Natural Resources • Heritage/Archaeology • Species at Risk
Species at Risk data	• Atlantic Canada Conservation Data Centre home page (http://www.accdc.com) • Species at Risk (www.speciesatrisk.gc.ca) • Species at Risk Registry (http://www.sararegistry.gc.ca/) • Species at Risk, Search by Map English: (http://www.speciesatrisk.gc.ca/map/default_e.cfm) French: (http://www.speciesatrisk.gc.ca/map/default_f.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.
SITE ACCESS	1. Site access practices 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 kilometre buffer zone is recommended around such sites.
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. 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.

PROJECT ACTIVITY	MITIGATION
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.*
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 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.

PROJECT ACTIVITY	MITIGATION
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 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 which 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.
AID MAINTENANCE	1. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. 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.
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). 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.