Ecologically and Biologically Significant Areas in the Atlantic Coastal Region of Nova Scotia

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ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS IN THE ATLANTIC COASTAL REGION OF NOVA SCOTIA

by

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ABSTRACT

Hastings, K., King, M., and Allard, K. 2014. Ecologically and biologically significant areas in the Atlantic coastal region of Nova Scotia. Can. Tech. Rep. Fish. Aquat. Sci. 3107: xii + 174 p.

With the passage of the *Oceans Act* (1996), the Government of Canada has committed to an integrated, ecosystem-based approach to oceans and coastal management. One important element of this approach is the identification of Ecologically and Biologically Significant Areas (EBSAs), which are areas of especially high ecological or biological significance where greater risk aversion is required in the management of activities. EBSAs are considered in a broad range of management processes, including the development of marine protected area networks. This report describes a refined set of EBSAs for the Atlantic coast of Nova Scotia, which falls within the DFO Maritimes Region. It builds on past studies and outlines the ecological or biological rationale for how each area satisfies the DFO EBSA criteria. Two types of EBSAs are described, including: (i) broadly-distributed, single-feature EBSAs, which are discrete significant features or processes that occur throughout the Atlantic coast sub-region (e.g. Piping Plover critical habitat) and (ii) site-specific, multiple-feature EBSAs, which are areas identified for their unique combination of exceptional features. Thirty-eight site-specific, multiple-feature EBSAs are described.

RÉSUMÉ

Hastings, K., King, M., et Allard, K. 2014. Zones d'importance écologique et biologique dans la région côtière de l'Atlantique de la Nouvelle-Écosse. Can. Tech. Rep. Fish. Aquat. Sci. 3107, xii + 174 p.

En adoptant la *Loi sur les océans* (1996), le gouvernement du Canada s'est engagé à mettre en œuvre une approche écosystémique intégrée pour la gestion côtière et des océans. Un élément important de cette approche est la désignation de zones d'importance écologique et biologique (ZIEB), qui correspondent à des zones particulièrement importantes sur le plan écologique ou biologique, pour lesquelles un niveau d'aversion au risque plus élevé est requis dans le cadre de la gestion des activités. Les zones d'importance écologique et biologique sont prises en compte dans un large éventail de processus de gestion, y compris le développement des réseaux d'aires marines protégées. Le présent rapport décrit un ensemble précis de zones d'importance écologique et biologique pour la côte atlantique de la Nouvelle-Écosse (région des Maritimes de Pêches et Océans Canada). Il s'appuie sur des études antérieures et décrit la justification écologique ou biologique de la façon dont chaque zone répond aux critères liés aux zones d'importance écologique et biologique de Pêches et Océans Canada. Deux types de zones d'importance écologique et biologique sont décrits, notamment : (i) les zones d'importance écologique et biologique très répandues qui ne comptent qu'une seule caractéristique, soit une caractéristique ou un processus distinct et important dans l'ensemble de la sous-région de la côte de l'Atlantique (p. ex. habitat essentiel du pluvier siffleur) et (ii) les zones d'importance écologique et biologique propres à un site et qui comptent plusieurs caractéristiques, soit des zones reconnues en raison de leur

composition unique de caractéristiques exceptionnelles. Un total de 38 zones d'importance écologique et biologique propres à un site et qui comptent plusieurs caractéristiques sont décrites.

LIST OF ACRONYMS

CBD	Convention on Biological Diversity
CHS	Canadian Hydrographic Service
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPANS	Coastal Protected Areas of Nova Scotia
CSAS	Canadian Science Advisory Secretariat
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
EBSA	Ecologically and Biologically Significant Area
EC	Environment Canada
EHJV	Eastern Habitat Joint Venture
ENGO	Environmental Non-Government Organization
EOAR	Ecosystem Overview and Assessment Report
ESSCP	Ecologically Significant Species and Community Properties
FSRS	Fishermen and Scientists Research Society
GIS	Geographic Information System
IBA	Important Bird Area
IEP	Inshore Ecosystem Project
LEK	Local Ecological Knowledge
MPA	Marine Protected Area
NACS	National Areas of Canadian Significance
NCC	Nature Conservancy of Canada
NSDFA	Nova Scotia Department of Fisheries and Aquaculture
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Environment
NSNT	Nova Scotia Nature Trust
PC	Parks Canada
RAP	Regional Advisory Process
RPA	Recovery Potential Assessment
SARA	Species at Risk Act
SEO	Scientific Expert Opinion
SHACI	Significant Habitats: Atlantic Coast Initiative
TEK	Traditional Ecological Knowledge

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The Coastal Protected Areas of Nova Scotia (CPANS) inter-departmental working group has been involved in evaluating the sites presented in this report for several years. The contributions made by working group members past and present are gratefully acknowledged.

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1. INTRODUCTION

With the passage of the *Oceans Act* (S.C. 1996, c. 31), followed by the release of Canada's Oceans Strategy (DFO 2002a), the Government of Canada committed to adopting an integrated, ecosystem-based approach to managing the marine environment and its resources. One important element of this approach is the identification of ecologically and biologically significant areas (EBSAs), which are special natural places where a greater-than-usual degree of risk aversion is required in the management of human activities (DFO 2004, 2007a). The identification of an area as an EBSA does not automatically trigger a management response. However, EBSAs are considered in a broad range of coastal management activities, such as environmental assessments, environmental emergency response, spatial risk assessments, and marine spatial planning. EBSAs are also recognized as a key consideration in the development of networks of marine protected areas (MPAs) (CBD 2008; DFO 2011a, 2012a).

Identification of EBSAs in the Fisheries and Oceans Canada (DFO) Maritimes Region is proceeding within three sub-regions: the Bay of Fundy, the Atlantic coast of Nova Scotia, and the offshore Scotian Shelf (Figure 1). The DFO Maritimes Region generally corresponds to the Scotian Shelf bioregion[2]. This report focuses on the Atlantic coast of Nova Scotia, defined here as encompassing the approximate area inshore of 12 nautical miles to 500 metres inland, between Cape St. Mary's and Cape North. A 2012 Regional Advisory Process (RAP) of the Canadian Science Advisory Secretariat (CSAS) recommended that Atlantic coast EBSAs be re-evaluated to inform the development of a bioregional network of MPAs (DFO 2012a). In response to this recommendation, a suite of previously identified EBSAs were systematically reviewed, validated, and refined using the best available information. The results of this re-evaluation are presented in this report and will inform coastal management in the future.

This report has been organized into seven chapters, including the current introduction. Chapter 2 explains what is meant by the term "EBSA", and outlines the national and international criteria used to identify these special areas. This chapter also introduces the concepts of ecologically significant species and depleted species, and how they are identified in the Canadian context. The presence of ecologically significant species or depleted species can help support the identification and prioritization of EBSAs for future management measures. Chapter 2 also highlights prior regional work done to identify and validate Atlantic coast EBSAs. In Chapter 3, the purpose, content, and overall organization of this report is discussed in some detail, including how each EBSA was evaluated and what information was used to conduct these evaluations. For organizational purposes only, Atlantic coast EBSAs

[2] DFO (2009a) classified Canadian waters into twelve broad biogeographic units based on oceanographic and bathymetric similarities. The Great Lakes have since been added as a thirteenth unit (DFO 2011a). These biogeographic units are now termed bioregions and are intended to serve as the general spatial planning framework for Canada's national network of marine protected areas (MPAs) (DFO 2011a). However, since the Scotian Shelf bioregion roughly corresponds to the DFO Maritimes Region administrative boundaries, for pragmatic reasons, the Maritimes Region administrative boundary will be used during EBSA identification and MPA network development. For the purposes of this report, the term "DFO Maritimes Region" will be used in all cases unless reference is being made to a specific report that uses the term "Scotian Shelf bioregion".

were grouped into two "types": i) broadly-distributed, single-feature EBSAs and ii) site-specific, multiple-feature EBSAs. These EBSA groups are evaluated in Chapters 4 and 5, respectively. Chapter 6 highlights sites where unsubstantiated or outdated evidence exists to suggest their potential significance. These particular sites were not included in the final suite of EBSAs, but have been flagged for further research so that a more rigorous assessment of their significance can be conducted as time and resources allow. Finally, Chapter 7 provides insight into how the EBSAs identified in this report will influence future integrated oceans and coastal management in the DFO Maritimes Region.

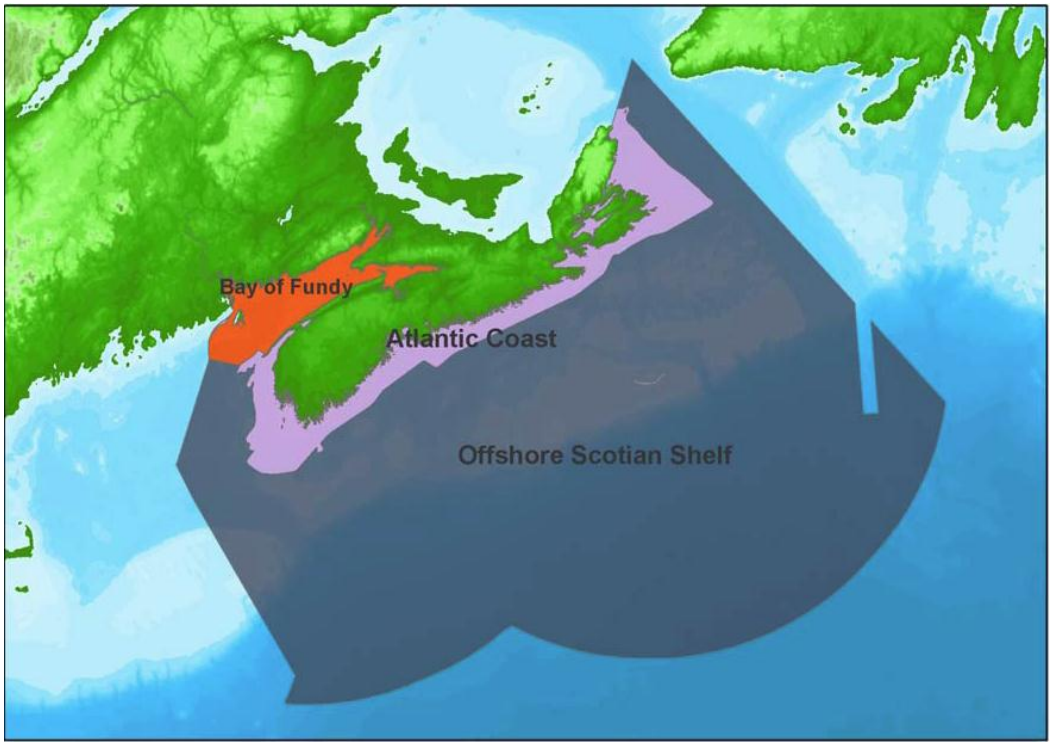

Figure 1. The three sub-regions within which EBSAs are being identified in the DFO Maritimes Region: the Bay of Fundy, the Atlantic coast of Nova Scotia, and the offshore Scotian Shelf. This report describes EBSAs in the Atlantic coast of Nova Scotia sub-region. Note that this report does not cover St. Mary's Bay, in spite of its inclusion in the Atlantic coast sub-region delineated above. Information on St. Mary's Bay, including the ecologically significant Brier Island area, can be found in Buzeta (2014).

2. BACKGROUND

This chapter introduces the EBSA concept and explains how these areas are identified (Sections 2.1 and 2.2). The presence of depleted species or habitats in an area is one factor that can lead to the identification of an EBSA. As such, the national Species at Risk program is highlighted in this chapter as well (Section 2.3). The presence of ecologically significant species can help identify and prioritize EBSAs for potential management action so this category of species is also introduced (Section 2.4). Finally, an overview of prior EBSA identification and evaluation efforts in the Atlantic coast sub-region is provided for further context (Section 2.5).

2.1. DEFINING AN EBSA

DFO (2004) defined an EBSA as an area of especially high ecological or biological significance where greater risk aversion is required in the management of activities. Furthermore, it is expected that if such an area were severely perturbed, it would sustain greater ecological consequences than would most other areas given an equal perturbation. Similarly, CBD (2008) defined an EBSA as a discrete area that, when compared to other areas, provides important services to one or more species/populations, or to the ecosystem as a whole. In short, EBSAs may be considered "special" for one or more of the reasons discussed in Section 2.2. Identifying an area as an EBSA does not confer any regulatory status upon that area.

2.2. EBSA IDENTIFICATION CRITERIA

Scientific criteria for EBSA identification have been defined at both the national (DFO 2004) and international (CBD 2008) levels. These criteria are summarized in Boxes 1 and 2. As noted by Westhead et al. (2013), there are obvious areas of overlap between the DFO and CBD EBSA criteria (Table 1). Indeed, the use of either set of criteria is very likely to lead to similar areas being identified (DFO 2012a). The initial EBSA identification process for the Atlantic coast region used the DFO criteria so, to be consistent, the same criteria is used in the current exercise. However, the CBD criteria will also be considered because coastal conservation and management is the shared responsibility of several federal and provincial agencies in addition to DFO. Considering the CBD criteria will also foster international consistency, which is particularly pertinent where ecosystems straddle a border, such as in the Gulf of Maine (Westhead et al. 2013).

Box 1. Summary of the DFO (2004) EBSA criteria.

1. **Uniqueness.** This criterion is met if the area contains unique, rare, or distinct features.
2. **Aggregation.** This criterion is met if:
    a. Significant numbers of a species are found in the area during some period of the year.
    b. Significant numbers of a species use the area for a life history function.
    c. A structural feature or ecological process is observed in high density in the area.
3. **Fitness Consequences**. This criterion is met if the life history activities of a species or population in the area strongly affect its fitness.
4. **Resilience.** This criterion is met if the habitat structures or species present in the area are highly sensitive, easily perturbed, and/or slow to recover.
5. **Naturalness**. This criterion is met if the area is relatively pristine, with little to no evidence of human influence.

Box 2. Summary of the CBD (2008) EBSA criteria.

1. **Uniqueness or rarity**. This criterion is met if:
    a. A unique, rare, or endemic species, population, or community is present.
    b. A unique, rare, or distinct habitat or ecosystem is present.
    c. A unique or unusual geomorphological or oceanographic feature is present.
2. **Special importance for life-history stages of species.** This criterion is met if the area is required for a population to survive and thrive (e.g. breeding or nursery grounds, spawning areas, migratory species habitat).
3. **Importance for threatened, endangered or declining species and/or habitats.** This criterion is met if:
    a. The area contains habitat that is critical for the survival and recovery of endangered, threatened, or declining species.
    b. Significant assemblages of endangered, threatened, or declining species are found in the area.
4. **Vulnerability, fragility, sensitivity, or slow recovery.** This criterion is met if the area contains a high proportion of sensitive habitats, biotopes, or species that are especially susceptible to degradation or depletion, and/or are slow to recover.
5. **Biological productivity.** This criterion is met if the area contains species, populations, or communities with comparatively higher natural biological productivity.
6. **Biological diversity.** This criterion is met if:
    a. The area contains comparatively higher diversity of ecosystems, habitats, communities, or species.
    b. Comparatively higher genetic diversity is observed in the area.
7. **Naturalness.** This criterion is met if the area exhibits a comparatively higher degree of naturalness resulting from little to no anthropogenic pressure.

Table 1. Overlap between CBD (2008) and DFO (2004) EBSA criteria (after Westhead et al. 2013). Shading indicates overlap.

CBD (2008)	DFO (2004)				
	Uniqueness	Aggregation	Fitness consequences	Resilience	Naturalness
Uniqueness or rarity					
Special importance for life-history stages of species					
Importance for threatened, endangered or declining species and/or habitats					
Vulnerability, fragility, sensitivity, or slow recovery					
Biological productivity					
Biological diversity					
Naturalness					

2.3. DEPLETED SPECIES

Depleted species are those that are "both currently at a very low abundance, and usually were much more abundant at some time in the past" (DFO 2007a, p.3). There are two key mechanisms through which depleted marine species are identified nationally. These include the Committee on the Status of Endangered Wildlife in Canada (e.g. COSEWIC 2013) and the precautionary approach framework for fisheries management (DFO 2006a). The known presence of depleted species (assessed as Endangered or Threatened), or species that are seen as vulnerable to depletion if not appropriately managed (assessed as Special Concern), will be highlighted in the Atlantic coast EBSA descriptions.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent body that identifies and assesses at-risk species, and provides advice to the competent minister under the federal *Species at Risk Act* (SARA) (S.C. 2002, c. 29). Species assessed as at-risk by COSEWIC may be considered for legal protective status under SARA. The current assessment and/or legal status of Canadian wildlife species can be found on the Species at Risk Public Registry (Government of Canada 2013) or in the most recent COSEWIC annual assessment report (e.g. COSEWIC 2013).

2.4. ECOLOGICALLY SIGNIFICANT SPECIES AND COMMUNITY PROPERTIES

The identification of Ecologically Significant Species and Community Properties (ESSCPs) is another tool used to facilitate ecosystem-based management. Unlike EBSAs, ESSCPs are not discrete areas, but rather individual species or community properties "that are particularly significant to maintaining ecosystem structure and function" (DFO 2006b, p.1). Again, the term "significant" must be contextualized. ESSCPs may be significant "because of the functions they serve in the ecosystem and/or because of features that they provide for other parts of the ecosystem to use" (DFO 2006b, p.1). Specific criteria for evaluating these functions and features were established by DFO (2006b), and are summarized in Box 3.

Box 3. Summary of DFO (2006b) ESSCP criteria.

Type 1 – Species with a crucial trophodynamic role:
- Forage species
- Highly influential predators
- Nutrient importing/exporting species

Type 2 – Structure-providing species

Type 3 – Aggregate ecosystem (community) properties:
- Size-based properties
- Frequency distribution of abundance and/or biomass across species

Type 4 – Species posing a threat to ecosystem structure:
- Invasive species
- Harmful or toxic species

A working paper developed by Sinclair (unpublished report[3]) provides a preliminary evaluation of ESSCPs (excluding Type 3) for the Scotian Shelf bioregion; however, the list of ESSCPs that resulted from this evaluation has not yet been vetted through a science advisory process. Nonetheless, these tentatively identified ESSCPs helped to guide EBSA identification and evaluation where relevant species distribution data were available.

[3] Sinclair, M. Unpublished report. Ecosystem Structure and Function, and Role of Species, in the Scotian Shelf Bioregion. Unpublished working paper developed for a Fisheries and Oceans Canada Science Peer Review meeting on Marine Protected Area Network Planning in the Scotian Shelf Bioregion from March 5-7, 2012.

2.5. PREVIOUS EBSA IDENTIFICATION AND EVALUATION EFFORTS

Over the past decade, numerous efforts have been made to identify and evaluate ecologically significant coastal and offshore areas in the Maritimes Region (e.g. Buzeta et al. 2003; Breeze 2004; Doherty and Horsman 2007; Buzeta and Singh 2008; MacLean et al. 2009; Buzeta 2014). Of particular interest for this report are those studies that have focused on the Atlantic coast of Nova Scotia. These include the Significant Habitats: Atlantic Coast Initiative (Schaefer et al. 2004; McCullough et al. 2005), the Inshore Ecosystem Project (e.g. DFO 2006c; Doherty and Horsman 2007; DFO 2007b; Bundy et al. 2014), and the work of Gromack et al. (2010). A brief overview of these key initiatives is provided below:

- The **Significant Habitats: Atlantic Coast Initiative (SHACI)** was undertaken to support integrated coastal management and conservation programs being developed under the *Oceans Act* (Schaefer et al. 2004). The Atlantic coast was subdivided into 12 study units, with the intention of a) compiling available scientific information for each unit, and b) identifying "Significant Habitats" in each unit using SHACI criteria. The work on this project pre-dated the release of current national and international EBSA guidance (i.e. DFO 2004, CBD 2008); however, the SHACI criteria are broadly similar to these criteria. Unit reviews were completed for two major coastal sub-regions, including Sydney Bight (Schaefer et al. 2004) and the Halifax Regional Municipality (McCullough et al. 2005), with ten significant habitat areas being identified in the former, and eight in the latter. The remaining coastal units were not assessed within the SHACI framework, as the project was later discontinued in light of emerging approaches.
- The **Inshore Ecosystem Project (IEP)** was a joint initiative between DFO and the Fishermen and Scientists Research Society (FSRS), funded by Phase 1 of Canada's Ocean Action Plan (DFO 2007b; 2007c). The overarching objective of this project was to produce a comprehensive Ecosystem Overview and Assessment Report (EOAR) that would facilitate future ecosystem-based management of the region and support the identification of EBSAs (DFO 2007b). This was to be achieved through synthesis of existing inshore data and collection of additional baseline information. Eight research initiatives were identified as part of the project, including a *Workshop on Inshore Ecosystems and Significant Areas of the Scotian Shelf*, which was held in January 2006. As part of this workshop, regional scientists with different fields of expertise identified 47 areas of importance along the Atlantic coast[4] using DFO EBSA criteria (Doherty and Horsman 2007; Figure 2). The identification of these areas represented the first concerted effort to systematically define EBSAs along the entire Atlantic coast, and this work has formed the foundation for subsequent site evaluation and refinement to date. A caveat associated with the collection of scientific expert opinion is that further substantiation is required to ensure the rigour of the identifications. This may be achieved through corroboration with published data, peer-reviewed literature, and local ecological knowledge (e.g. DFO 2006c). The results of the IEP research initiatives serve as one source of data for this purpose. The proceedings from a preliminary IEP data synthesis workshop can be found in DFO (2007b), and an inshore EOAR has been compiled by Bundy et al. (2014). Additional

[4] Forty-two offshore EBSAs were also identified during the same workshop.

IEP results have been reported in Bundy and King (2009), and den Heyer et al. (2010).

- **Gromack et al. (2010)** applied a simple filtering mechanism to narrow the original list of 47 EBSAs in Doherty and Horsman (2007) to 20 coastal sites for further consideration in the context of conservation planning. These 20 sites were selected based primarily on their adherence to *Oceans Act* MPA criteria; the number of times they were identified as significant by scientific experts; and whether they met the three primary DFO EBSA criteria. The physical, oceanographic, and ecological attributes of each site were profiled and an overview of human uses provided. Information was collected according to a regime broadly mirroring EBSA criteria (see Table 3.3 in Gromack et al. 2010).

The work of the last decade was preceded by the seminal study of P. Lane and Associates Limited (1992), in which a thorough appraisal of the natural and cultural features of the Scotian Shelf area was conducted to support the selection of candidate "National Areas of Canadian Significance" (NACS). Seventeen potential NACS (mostly along the Atlantic coast) were identified through a subjective evaluation process based on the occurrence and significance of distinguishing geological, oceanographic, biological, and cultural features. Although the policy and management context has since changed, this study remains an important compilation of coastal information that supports the identification of modern EBSAs.

In addition to the studies highlighted above, there are several other regional datasets that may be utilized for EBSA validation and identification. Many of these are discussed in Gromack and Allard (2013).

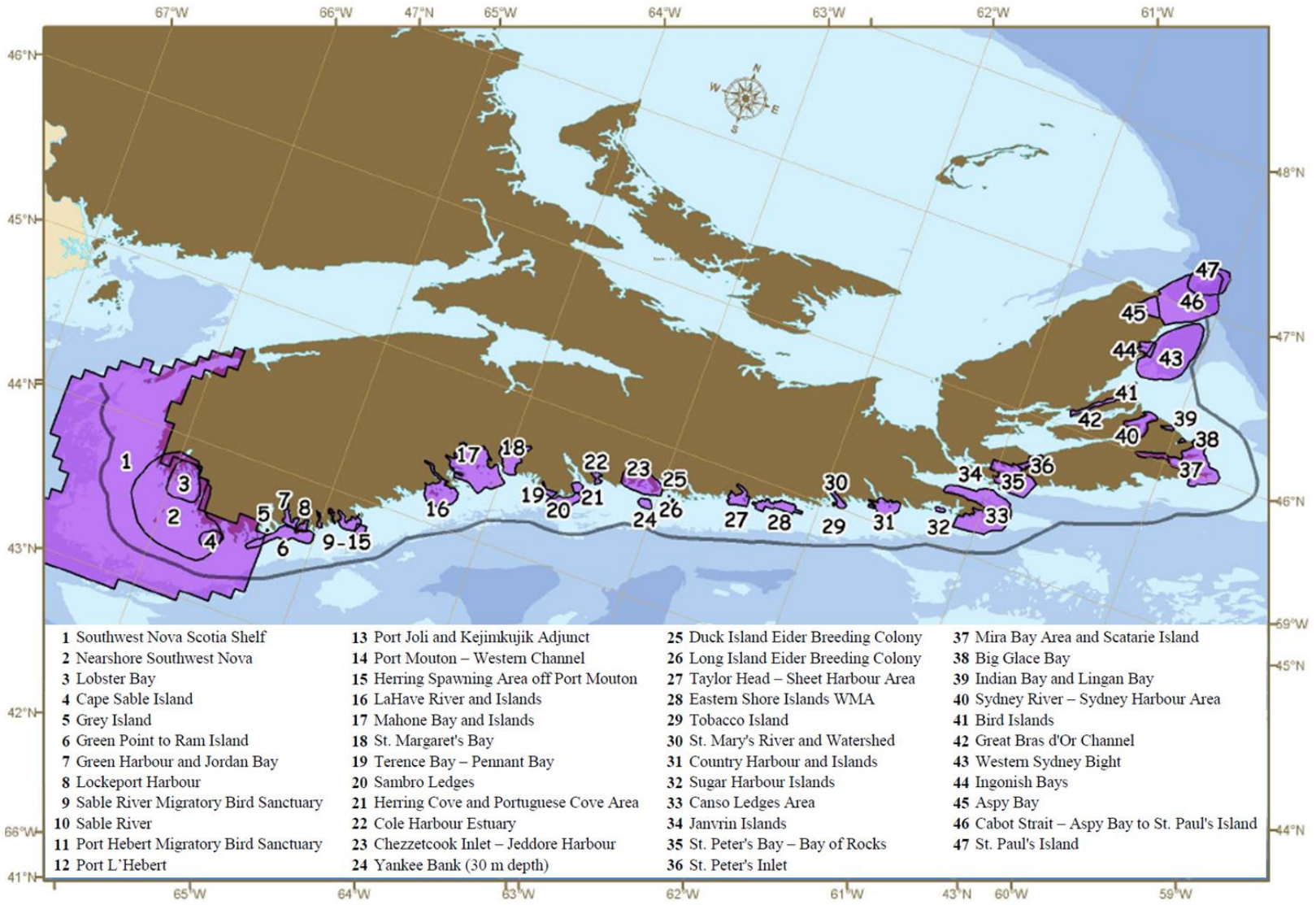

Figure 2. Atlantic coast inshore EBSAs as identified by scientific experts at a 2006 workshop (adapted from Doherty and Horsman 2007).

3. STRUCTURE AND METHODOLOGY

This chapter provides an overview of basic report structure and methodology. Section 3.1 describes the underlying motivation for this work. The organization of the remaining chapters is outlined in Section 3.2. The compendium of supporting map products is introduced in Section 3.3. Caveats regarding data availability and scope are discussed in Section 3.4. Section 3.5 details some of the key information sources consulted.

3.1. HISTORY AND MOTIVATION

In March 2012, a Canadian Science Advisory Secretariat (CSAS) Regional Advisory Process (RAP) Meeting was held to develop initial guidance on the objectives and information to be considered in the development of an MPA network in the Scotian Shelf bioregion. The outcomes of this meeting included the recognition of the 20 sites profiled in Gromack et al. (2010) as EBSAs (DFO 2012a). In addition, a recommendation was made that the remaining 27 sites from the 47 previously identified EBSAs in Doherty and Horsman (2007) be re-evaluated using more recent information. DFO has taken the lead on addressing this recommendation, with input from the Coastal Protected Areas of Nova Scotia (CPANS) Working Group. Formed in 2008, CPANS is a federal-provincial group whose membership includes representatives from the following agencies:

- Fisheries and Oceans Canada (DFO)
  - Oceans and Coastal Management Division (Maritimes Region)
  - Oceans and Habitat Division (Gulf Region)
- Parks Canada (PC)
- Environment Canada (EC)
  - Canadian Wildlife Service (CWS)
- Nova Scotia Department of Natural Resources (NSDNR)
  - Wildlife Division
  - Parks and Recreation Division
- Nova Scotia Environment (NSE)
- Nova Scotia Fisheries and Aquaculture (NSDFA)

This report is the culmination of work done to address the recommendation of the CSAS RAP discussed above, and builds upon previous work on EBSA identification along the Atlantic coast of Nova Scotia (Section 2.5). Note that all 47 sites originally identified as EBSAs in Doherty and Horsman (2007) have been re-evaluated using the DFO EBSA criteria (Chapters 4 and 5). As part of this process, the original suite of EBSAs has undergone refinement: certain areas have been merged, new areas have been added, data deficient areas have been removed, and, where applicable, the area represented within pre-existing EBSA polygons has been adjusted. The up-to-date overview of Atlantic coast EBSAs provided in this report will serve as an important resource for regional oceans and coastal management moving forward. However, it is important to note that not all EBSAs will require new management measures and even fewer will become MPAs.

3.2. REPORT ORGANIZATION

Strictly for report organization purposes, two "types" of EBSAs are evaluated in Chapters 4 and 5. The first type includes the **broadly-distributed single-feature EBSAs**. For this type, the occurrence of a specific habitat or process of significance led to the identification of a series of discrete areas across the region (i.e. spawning areas, salt marsh, eelgrass, and critical habitat areas). There was limited geographical uncertainty with respect to where these particular habitats or processes occur. In most cases, these areas overlap with the second EBSA type: **site-specific multiple-feature EBSAs**. Each of these areas, generally identified at the inlet-scale, has a unique combination of special features that led to its identification as an EBSA. These areas could also be described as "EBSA complexes", since they usually contain an aggregation of smaller EBSAs.

The broadly-distributed single-feature EBSA evaluations (Chapter 4) consist of three main pieces of information: 1) the DFO EBSA criteria met by the areas, 2) a written justification for the selection of these areas as EBSAs, and 3) the approximate locations of the suite of EBSAs associated with the identified habitat or process of significance.

The site-specific multiple-feature EBSA evaluations (Chapter 5) consist of the following pieces of information:

a. **Geography**: A brief written description of the geography of the EBSA, with a reference to the corresponding map in the appendices.
b. **Inlet classification**: The inlet classes with which the EBSA overlaps (if available/applicable). Greenlaw et al. (2011) classified Atlantic coast inlets from St. Mary's Bay to Chedabucto Bay according to their geophysical and hydrographic features. The classification scheme was designed to predict species richness and overall productivity at the inlet-scale based on well-established species-environment relationships. The classification framework consists of three components: a) hydrographic inlet type (bays, estuaries, coves); b) dominant productivity regime type (benthic, intermediate, pelagic); and c) inlet complexity type (simple, intermediate, complex). These components were defined using the following variables (by inlet type, as above): a) freshwater input, exposure; b) intertidal area, depth; and c) shoreline sinuosity, topographic complexity. In general, estuaries are expected to be more productive than bays and coves; predominantly benthic productivity regimes are expected to be more productive than pelagic regimes; and complex inlets are expected to support greater species diversity than simple inlets. Of the 11 inlet types identified, complex intermediate estuaries and complex pelagic bays were seen to have the highest conservation value, since these types ranked the highest when productivity and diversity were considered together (M. Greenlaw pers. comm. 2012).
c. **Coastline classification**: The coastline classes with which the EBSA overlaps (if applicable). Greenlaw et al. (2013) used a Delphic approach to identify regional-scale coastline segments that share similar physiographic features. Environmental variables associated with the coastline were examined for emergent patterns. These variables included geological character, substrate, shoreline orientation, topography, tidal range, turbidity, and geomorphic features, among others. The classification was applied to the coast of Nova Scotia and the Bay of Fundy shore of New Brunswick.

d. **Notable physical and/or oceanographic attributes**: A brief accounting of physical and/or oceanographic features with known or potential significance. Oceanographic features, in particular, are not often resolved at the inlet-scale, so there are relatively few sites where information was available to complete this section.
e. **Notable ecological attributes**: A description of the site's ecological characteristics that have known or potential significance.
f. **EBSA criteria**: A table summarizing if and how the site meets each of the DFO EBSA criteria. If the EBSA clearly meets a criterion, it is marked "Y". It is important to note that a specific feature or characteristic of an EBSA may satisfy multiple EBSA criteria. For example, spawning aggregations represent evidence of both the aggregation and fitness consequences criteria. In such cases, the feature or characteristic is noted under the criterion that is deemed most relevant. If the EBSA meets a criterion solely on the basis of proxy information (e.g. inlet classifications) or unverified scientific expert opinion/local ecological knowledge, it is marked "(Y)". Similarly, any accompanying justification without a verified source is also listed in brackets. In the generally data-poor environment associated with the inshore, it can be difficult to make a definitive assessment regarding whether a site does not meet a given criterion. As such, if there is no evidence to support the assignment of either a "Y" or "(Y)", the cell is left blank. A supplemental table entry indicating whether the EBSA is known to be important for any tentatively identified ESSCPs (Section 2.4) is included below the main table. *Note*: The naturalness criterion is not assessed in this report. Naturalness is a highly relative measure, and can be difficult to assess objectively, particularly given detailed guidance on coastal application is not yet available (e.g. Ardron et al. 2009; DFO 2011b). Furthermore, the amount of additional data and analysis that would be required to even crudely evaluate the cumulative effect of human activity across the sub-region is significant. As such, it was decided that this criterion would not be assessed in this report. Factors such as contaminant levels, the presence of invasive species, the type and intensity of human activities, and the degree of coastline development could be considered in a future analysis of naturalness.
g. **Current area-based management measures and special designations**: An overview of current spatial management measures in the EBSA. These primarily include coastal lands that are federally or provincially managed for the purposes of conservation. Also included in this overview are designations that may not inherently have specific legal or management implications, but connote international recognition of significance (e.g. Important Bird Areas, Ramsar wetland sites). Finally, conservation easement lands, as well as those lands purchased by environmental non-government organizations (ENGOs; e.g. Nature Conservancy, Nova Scotia Nature Trust), are highlighted.

In Chapter 6, other potentially significant areas are highlighted. These are areas that have either: a) been previously identified as EBSAs but were removed due to unsubstantiated or weak evidence, or b) are new areas flagged as potentially important, but for which conclusive evidence has not yet been obtained.

3.3. MAPS AND SPATIAL DATA

Maps of the broadly-distributed single-feature EBSAs (evaluated in Chapter 4) can be found in Appendix A, while more detailed maps of the site-specific multiple-feature EBSAs (evaluated in Chapter 5) can be found in Appendix B. A supplementary reference map of inshore bathymetry is provided in Appendix C. Further information on the thematic layers included in these maps is given in Sections 3.3.1through 3.3.3.

3.3.1. Broadly-Distributed Single-Feature EBSA Maps

Each broadly-distributed single-feature EBSA map (Appendix A) has one thematic layer, which corresponds to the specific feature (e.g. SARA critical habitat, spawning areas, significant habitats) being highlighted. Data sources are cited in the individual map captions.

3.3.2. Site-Specific Multiple-Feature EBSA Maps

The site-specific multiple-feature EBSA maps (Appendix B) include the following thematic layers:

- **EBSA polygons:** These polygons loosely approximate the area of an ecosystem or features with known significance. The boundaries are fuzzy and dynamic: they are not fixed in time or space. On their own, EBSAs do not impose any legal restrictions on resource extraction or other human activities. They can, however, help to prioritize areas where such restrictions may be required to protect the integrity of a significant ecosystem or feature.
- **Salt marshes:** Using Landsat imagery acquired between 2000 and 2002, NSDNR (2009) inventoried the salt marshes present along the Nova Scotia coastline. The resulting spatial data is represented in the EBSA maps; however, the accuracy of the data cannot be guaranteed. Similarly comprehensive and Geographic Information System (GIS)-ready data layers for other coastal wetland types were not available for inclusion in these maps.
- **Restricted and limited use lands for conservation purposes:**
    a. Federally managed: National Historic Sites and Parks (PC); National Parks and Adjuncts (PC); National Wildlife Areas (EC-CWS); Migratory Bird Sanctuaries (EC-CWS).
    b. Provincially managed[5]: Protected Beaches (NSDNR); Designated Provincial Parks and Park Reserves (NSDNR); Operational Non-Designated Parks and

[5] On August 1, 2013, the Province of Nova Scotia released *Our Parks and Protected Areas – A Plan for Nova Scotia*, which commits to protecting 13% of Nova Scotia's landmass by 2015, and as much as 14% by 2020, including a doubling of coastline protection (Province of Nova Scotia 2013). In accordance with the *Green Economy Act* (2012), this percentage includes terrestrial protected areas "dedicated, in a legally recognized manner, primarily to the protection of biodiversity and natural processes", and include wilderness areas, nature reserves, certain provincial parks, and other contributing properties (i.e. national parks, national wildlife areas, land trust lands, and conservation easement lands). The plan includes many new sites and expands many existing protected areas. The areas put forth in this plan have not been incorporated into the maps presented in this report.

Reserves (NSDNR); Wildlife Management Areas (NSDNR); Game Sanctuaries (NSDNR); Wilderness Areas (NSE); Nature Reserves (NSE); Sites of Ecological Significance/IBP Sites on Crown Land Under Moratorium (NSE); Ramsar wetland sites (NSDNR); Peggy's Cove Preservation Area (NSDNR).

c. Privately or jointly managed: Nature Conservancy of Canada (NCC) lands; Nova Scotia Nature Trust (NSNT) lands; other conservation easements where the intent is "forever wild"; and Eastern Habitat Joint Venture (EHJV) lands (government/private partnership).

These data sets were retrieved from the Restricted and Limited Use Lands Database (Province of Nova Scotia 2012a). Where appropriate, updated data layers were provided by the relevant management authority. Most of the data is current to the year 2012.

- **Critical habitat:** Critical habitat that has been identified in the Recovery Strategy or Action Plan for a SARA-listed species must be legally protected from destruction. Details regarding the location of critical habitat can be found within these recovery documents. The spatial critical habitat data presented in this report were derived from the recovery strategies for the Roseate Tern and the Piping Plover (i.e. Environment Canada 2010; 2012).

3.3.3. Coastal Bathymetry Map

Inshore bathymetry (Appendix C, Figure C-1) was derived using a combination of contour, sounding, and multibeam data obtained from the Canadian Hydrographic Service (Greenlaw 2013). These data were transferred to mean water level, interpolated using a triangulated irregular network (TIN), and converted to raster at 50 m resolution. The resulting digital elevation model (DEM) is superimposed on a hillshade layer to illustrate bottom topography.

3.4. LIMITATIONS

3.4.1. Data

While the evidence supporting the significance of the EBSAs described in Chapters 4 and 5 is rigorous, it should be noted that many spatial and temporal data gaps exist throughout the Atlantic coast sub-region, especially in the sub-littoral zone (as noted in Gromack et al. 2010; Gromack and Allard 2013). Consequently, an overall bias toward relatively data-rich areas in this analysis is unavoidable. Furthermore, some of the areas identified have more comprehensive and/or more current information available than others. The existence of large knowledge gaps in the Atlantic coast sub-region makes it necessary to keep in mind the following:

- It is very likely that there are other EBSAs in the sub-region for which supporting evidence is not yet available. Further scientific research is required to help provide a more complete picture of the marine ecology and biology of the Atlantic coast.
- For those EBSAs already identified, the supporting data may or may not represent an exhaustive accounting of exceptional features. It is acknowledged that additional data

would lead to changes in the size and/or configuration of many of the EBSAs described in this report.

3.4.2. Scope

For the reasons outlined in Section 3.4.1, this report is not intended to be definitive, but rather a reflection of the best available information. The Atlantic coast EBSAs identified herein may require further refinement as more data becomes available.

Although the Atlantic coast area of study extends into the terrestrial domain, the analysis in this report focuses primarily on the supratidal, intertidal, subtidal, and marine elements of the coastal system. With the exception of beaches and islands, terrestrial landforms and ecology are not accounted for comprehensively. Information on terrestrial coastal features can be found in Davis and Browne (1996a and b), NSDEL (2002), and Neily et al. (2003), for example.

EBSAs are characterised as exceptional relative to other areas based on the DFO identification criteria; however, areas that do not meet these criteria are not without ecological value. All species and habitats must be carefully managed to preserve natural biodiversity and ensure the long-term sustainability of marine resources.

This report considers biological, ecological, and oceanographic data only. Any management decisions informed by the results of this analysis will also take into account social, economic, and other human use information.

3.5. KEY INFORMATION SOURCES

3.5.1. General

The lack of large-scale, systematic inshore scientific surveys in the Atlantic coast sub-region makes unbiased EBSA identification and validation a challenge[6]. A Delphic approach is often adopted in data sparse environments, as was done in the first iteration of EBSA identification in 2006 (Section 2.5). While this approach can be very useful, it has some inherent drawbacks, including the level of subjectivity and a lack of peer-review (Allard et al. 2014). Recognizing these drawbacks, it is reasonable to strive toward a data-driven validation process. Gromack et al. (2010) began this process, and this report builds upon that work. Consequently, to the extent possible, the evidence supporting the identification of Atlantic coast EBSAs (Chapters 4 and 5) is rooted in published literature, broadly including scientific journal articles, books, technical reports, stock assessments, and COSEWIC species

[6]The incomplete geographic coverage of inshore data makes it difficult to a) ensure all EBSAs have been accounted for, and b) conclude whether an EBSA is especially important for a given species in relation to the rest of the Atlantic coast sub-region. In the absence of more regionally comprehensive data, areas where a species is known to aggregate are considered to be of special importance for one or more of its life history stages, regardless of how the size of that aggregation may compare to other data-deficient areas along the coast. In select cases, species distribution patterns are known for the sub-region as a whole, allowing for a more definitive evaluation of relative importance (e.g. herring spawning areas).

assessments. Scientific trawl survey data is available for some of the deepest areas of the inshore region (e.g. Western Sydney Bight). Unpublished sources were also consulted as appropriate. A well informed, directed literature review was facilitated by the prior work of Doherty and Horsman (2007) and Gromack et al. (2010), as well as Gromack and Allard (2013).

Marine bird data constitute an exception to the generally data deficient state of data for other taxa within the inshore region of Nova Scotia. Periodic and geographically extensive surveys of several marine bird species have been conducted in the region. These data sources are considered in more detail in Section 3.5.2.

3.5.2. Marine Birds

Any area where a large proportion of a particular marine bird species or population aggregates may be considered an EBSA, as such areas are evidently important for one or more life cycle stages. These locations may include, singly or in combination: nesting, chick-rearing, foraging, migratory staging, wintering, and moulting areas. Two key sources of marine bird data, discussed in more detail below, helped provide evidence of the location of such areas in the Atlantic coast region. The reader is encouraged to refer to the original sources for additional data, important information regarding the limitations of particular datasets, and potential biases that can be introduced by certain survey methods and data analysis techniques. It should be noted that, though important to consider, mean maximum foraging ranges typically associated with colonies of marine birds are not necessarily reflected in the EBSA polygons presented. Instead, EBSA polygons associated with marine bird colonies are meant primarily to emphasize the island, island group, or general area, based on available data. Management measures taken in these areas would require a more thorough consideration of the actual breeding season foraging range. Also, it bears repeating that colonies not identified as EBSAs may still be of importance to a species. In particular, remote small island habitat, though lacking data, may have high potential value to colonial marine waterbirds due to lack of mammalian predator populations. Furthermore, some offshore islands, recently unoccupied after generations of human presence and activities, may represent rare and valuable opportunities for eventual restoration and re-colonization.

Important Bird Area Program

In 1996, BirdLife International partnered with Bird Studies Canada and Nature Canada to deliver the global Important Bird Area (IBA) program at the national level (IBA Canada 2014). The purpose of this program is to identify and monitor areas that have particular significance for birds, with a view to long-term species and habitat conservation. Thirty-two IBAs were identified in Nova Scotia to recognize the presence of significant numbers of congregatory and/or threatened bird species (IBA Canada 2014; Figure 3). The significance thresholds used to make these identifications are outlined in Chaundy and Wilcox (2001). Threshold criteria are subject to modification and recently have been revised (BirdLife International 2014).

Important Marine Habitat Areas for Migratory Birds in Eastern Canada

Using a systematic, data-driven approach, Allard et al. (2014) identified important marine habitat areas for migratory birds in Eastern Canada, including maritime Québec, Newfoundland and Labrador, Nova Scotia, New Brunswick and Prince Edward Island. This work was driven by four main objectives:

1. Document existing large-scale marine bird data sets for the region.
2. Compile and analyze these data, using a GIS to map bird abundance and distribution.
3. Identify and assess data gaps.
4. Inform conservation planning efforts in the marine environment.

A suite of relative abundance maps were produced based on the available landscape-scale marine habitat (e.g. salt marsh, eelgrass) and population monitoring data. Although species or habitat "hotspots" are highlighted in this approach, individual sites were not required to meet or exceed any thresholds to be included in the final maps. Annual and seasonal variations were not accounted for in the spatial analyses. The work of Allard et al. (2014) should be consulted directly for information on known or potential biases in the data collection and analysis methods used. The list below briefly describes the data represented in their relative abundance maps, particularly as it relates to the Atlantic coast of Nova Scotia sub-region and the EBSA evaluations in Chapters 4 and 5 of this report:

1. **Habitat data, including salt marsh and eelgrass coverage.** For Nova Scotia, these data were obtained from the Maritimes Wetland Inventory (MWI) Atlas Series, in which the locations of coastal and freshwater wetlands were delineated based on visual interpretation of aerial photographs. There are no major gaps in the geographic coverage of these data; however, the method by which they were collected carries certain interpretative limitations. For example, eelgrass beds that are in deep and/or turbid waters are not visible on aerial photographs, nor are small beds (A. Hanson[7] pers. comm. 2013). The polygons derived from aerial photographs are available on paper maps. The location and areal extent of each salt marsh and eelgrass polygon recorded in the MWI were summarized as points in a digital file. All of the point values across the Maritimes were then subjected to a kernel point density analysis within a fixed search radius of 2.5 km, resulting in a smoothed relative abundance surface. For the purpose of this report, kernels exhibiting high density values are deemed significant. High density values can correspond to a single large expanse of salt marsh/eelgrass, or a large aggregation of smaller patches.
2. **Coastal waterfowl data.** For Nova Scotia, these data were derived from the Atlantic Coastal Waterfowl Survey, which counts waterfowl in defined "blocks" across the Maritimes. These survey blocks are not uniform in size or shape, but generally represent distinct areas that can be visually delineated from the air or water. To best reflect the potential for a given block to host large aggregations of waterfowl, count maxima in all survey blocks across eastern Canada were assigned to 20% quintiles (excluding zero counts). For the purpose of this report, counts falling within the top two quintiles (top 40% of values) are considered significant.

[7] Head, Landscape Conservation, Canadian Wildlife Service, Atlantic Region, Environment Canada.

3. **Shorebird data.** For Nova Scotia, these data were derived from the Atlantic Canada Shorebird Survey and the Atlantic Canada Purple Sandpiper Survey. The geographic coverage of these surveys is less comprehensive than the habitat and waterfowl data discussed above, with many known aggregation and suitable staging sites within the region yet unsurveyed. In contrast, the Atlantic Canada Piping Plover Breeding Season Survey offers essentially complete coverage of breeding habitat of this species at risk (refer to Section 4.1.1.). Count maxima from all survey locations across eastern Canada were subjected to kernel point density analysis within a fixed 10 km radius. For the purpose of this report, kernels exhibiting high density values are deemed significant. High density values correspond to a high count at a single survey site, or a comparably large number of birds occurring at multiple neighbouring survey sites.
4. **Colonial marine bird data.** For Nova Scotia, these data were derived from the Atlantic Region Colonial Waterbird Database. Geographic coverage is fairly complete along the Atlantic coast of the province. Count maxima from all survey locations across eastern Canada were subjected to kernel point density analysis within a fixed 10 km radius. For the purpose of this report, kernels exhibiting high density values are deemed significant. High density values correspond to a high count at a single colony, or a comparably large number of birds occurring at multiple neighbouring colonies.
5. **Offshore pelagic marine bird data.** These data were obtained by ship along linear transects as part of three monitoring programs (in chronological order): PIROP (Programme intégré des recherches sur les oiseaux pélagiques; Pelagic Bird Integrated Research Program), Manomet Bird Observatory Cetacean and Seabird Assessment Program, and Eastern Canada Seabirds at Sea. To create relative distribution maps based on these data, a kernel density analysis (using a fixed search radius of 25 km) was applied to the centroid of each cell in a 5 km x 5 km grid created for the analysis. A smoothed probability density surface resulted, with a relative linear density value for each grid cell. Correction for observer effort was made by dividing the probability density associated with each cell by the number of days it was visited. To best reflect the potential for a given cell to host large aggregations of marine birds, cell values across eastern Canada were assigned to 20% quintiles (excluding zero counts). The top quintile was partitioned to highlight the top 5% of values. For the purpose of this report, values falling within the top two quintiles (top 40%) are considered significant.

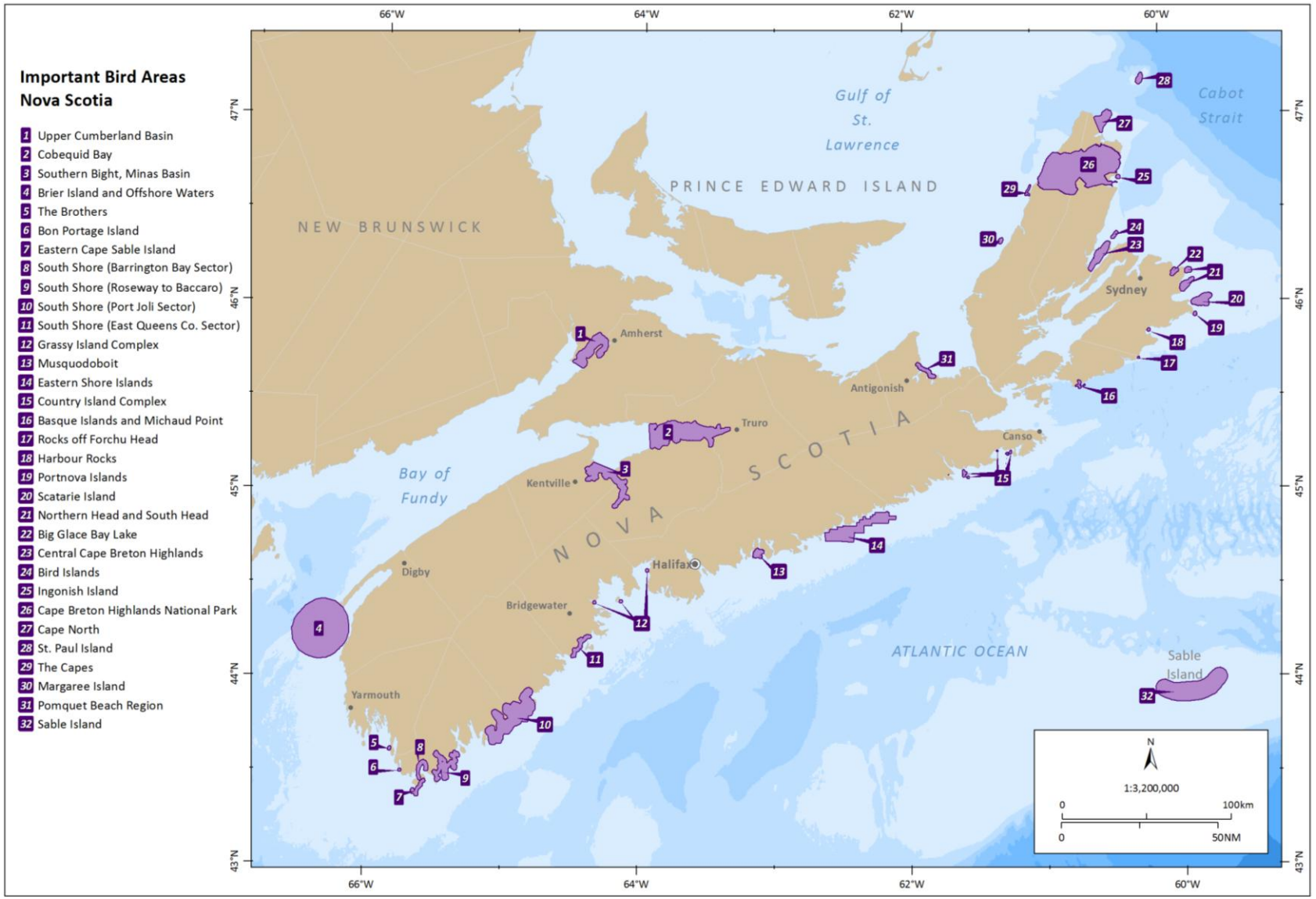

Figure 3. Important Bird Areas (IBAs) identified for Nova Scotia. Data used with permission from Bird Studies Canada and Nature Canada (2004-2010).

4. BROADLY-DISTRIBUTED SINGLE-FEATURE EBSAS

The first organizational category of EBSAs is profiled in this chapter. These are the broadly-distributed single-feature EBSAs (Appendix A), which include legally designated critical habitat for at-risk species (Section 4.1), known fish spawning areas (Section 4.2), and high concentration areas of significant habitat types (Section 4.3). These EBSAs are characterized by a single significant feature or process that is repeated multiple times throughout the Atlantic coast sub-region. The specific features and processes considered in this chapter were chosen based on the availability of relatively comprehensive regional-scale data. A full accounting of critical habitat and inshore spawning areas, for example, cannot be achieved until these areas have been defined for all inshore marine species.

4.1. CRITICAL HABITAT

In subsection 2(1) of SARA "critical habitat" is defined as "[…] the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species." For the purpose of this report, any area that has been identified as critical habitat for a species at risk is considered an EBSA since these areas will, by definition, satisfy the *fitness consequences* EBSA criterion and, in most cases, will also meet the *aggregation* criterion (Box 1; Table 1). Certain critical habitat areas may also meet the *uniqueness* criterion. Under section 58 of SARA, once critical habitat is identified in a recovery strategy or action plan, it must be legally protected from destruction within 180 days of publication in the SARA Public Registry. To date, critical habitat has been identified within the Atlantic coast sub-region for two marine bird species, detailed below. In addition to critical habitat protection, species listed as threatened, endangered, or extirpated are protected under section 32 of SARA, which contains a prohibition against killing, harming, harassing, capturing, or taking such species.

4.1.1. Piping Plover Critical Habitat

EBSA criteria met:

- Fitness consequences
- Resilience

The Piping Plover (*Charadrius melodus melodus*) is a small shorebird that relies on beach environments for nesting (Environment Canada 2012). The *melodus* subspecies, listed as Endangered under SARA, occurs in Atlantic Canada during the spring and summer (generally late March to early September). This population is small (~460 adults), and is at risk of further decline due to predation, human disturbance, impacts of adverse weather conditions, and poorly understood mortality factors, both during and outside of the breeding season. Because of their preferred nesting habitat, the Piping Plover is especially vulnerable to disturbance such as recreational beach use, off-road vehicles, and coastline development.

Piping Plover critical habitat has been identified as: "[…] any site with suitable habitat [i.e. gently sloping foredune; wide beach; sand, gravel, and/or cobble substrate; sparse vegetation] occupied by at least one nesting pair of Piping Plovers (*melodus* subspecies) in at least one year since 1991 […]" (Environment Canada 2012, p. 17).

Beaches identified as critical habitat in the Atlantic coast sub-region are listed in Table 2 and mapped in Appendix A, Figure A-1. Within this sub-region, Piping Plover beaches are most densely concentrated along the south shore.

Table 2. Beaches within the Atlantic coast sub-region that have been identified as critical habitat for the Piping Plover. Numbers refer to locations indicated in Appendix A, Figure A-1. Numerical ordering starts in southwest and proceeds northward. Beaches highlighted in bold font are those not also encompassed within a site-specific, multiple-feature EBSA (Chapter 5).

CRITICAL HABITAT BEACHES	
1) The Cape	21) St. Catherines River
2) Hawk Point	22) Little Port Joli Bay
3) The Hawk	23) Port Joli (Goose Haven)
4) Daniels Head (Southside)	**24) Cranberry Pond**
5) Stoney Island	**25) Carters & Wobamkek**
6) Bulls Head	**26) Summerville**
7) Clam Point	**27) Beach Meadows**
8) Northeast Point	28) Ragged Harbour
9) Sand Hills Provincial Park (Sebim)	29) Cherry Hill (Conrad)
10) Goose (Indian) Point	30) Cape Bay (Cape LaHave Island)
11) Burks Point	31) Rainbow Haven Park (Cole Harbour)
12) Crow Neck (Baccaro)	32) Conrads (East and West)
13) Red Head	33) Stoney (Lawrencetown Head)
14) Round Bay & Roseway	34) Martinique
15) Fox Bar	35) Clam Harbour
16) Crescent	36) Glace Bay Bar
17) Black Point	37) Dominion (Lingan)
18) Louis Head	38) South Harbour
19) Johnston's Pond	39) North Harbour
20) Sandy Bay	

4.1.2. Roseate Tern Critical Habitat

EBSA criteria met:

- Fitness consequences
- Resilience

The Roseate Tern (*Sterna dougallii*), listed as Endangered under SARA, has a limited distribution in Canada, occurring mainly in Nova Scotia, with smaller colonies in Quebec and New Brunswick (Environment Canada 2010). The total Canadian population is estimated to number less than 250 individuals. The species may have specific habitat requirements, which restrict breeding colonies to a select few coastal islands. The presence of breeding

Common Tern (*Sterna hirundo*) pairs and a predator-free environment are both known to be important nesting habitat features. The presence of suitable foraging habitat nearby is also necessary.

The Roseate Tern has a low reproductive rate due to a number of factors, including delayed maturity to age of first breeding, small clutch size, low annual adult survival, and relatively low survival to first breeding (Environment Canada 2010). This low reproductive success, coupled with a highly restricted distribution, makes the Canadian population vulnerable.

Roseate Tern critical habitat has been identified based on the following criteria as outlined in the Recovery Strategy for the species (Environment Canada 2010):

1. Those sites that currently support more than 15 pairs of Roseate Terns (>10% of the Canadian population).
2. Those sites that have supported small but persistent numbers of Roseate Terns for over 30 years.

All of the sites satisfying the first criterion fall within the Atlantic coast sub-region, and together account for over 95% of the total Canadian population. These critical habitat sites are listed in Table 3 and mapped in Appendix A, Figure A-1.

Table 3. Sites within the Atlantic coast sub-region that have been identified as critical habitat for the Roseate Tern. Numerical ordering starts in southwest and proceeds northward. Each of these sites is also encompassed within a site-specific, multiple-feature EBSA (Chapter 5).

CRITICAL HABITAT ISLANDS	
1) North Brother	3) Country Island
2) South Brother	

4.2. SPATIALLY DISCRETE FISH SPAWNING AREAS

4.2.1. Atlantic Herring Spawning Areas

EBSA criteria met:

- Fitness consequences
- Aggregation

The Atlantic Herring (*Clupea harengus*) is a pelagic fish species occurring in the northwest and northeast Atlantic (DFO 2011c). It has been described as the "archetypal forage species", meaning it is prey for a wide array of species, including other fish, marine birds, and marine mammals (Diamond and Devlin 2003; Cury et al. 2011; Bundy et al. 2014). The accessibility and high energy content of herring makes it the preferred species for many seabirds. In its role as an important forage species, herring strongly influences marine ecosystem trophodynamics. For this reason, it is considered a Type 1 ESSCP (Sinclair unpublished report).

Herring exhibits strong fidelity to its spawning grounds, returning year after year to the same discrete areas (Stephenson et al. 2009). In the waters off of Nova Scotia, herring typically spawn during the fall, with comparatively fewer spring spawning areas. At one time, herring spawning areas were profuse along the Atlantic coast, particularly between Cape Sable Island and Chedabucto Bay. Currently, however, active herring spawning areas are relatively scarce. Those areas with known spawning activity within the past decade and a half have been subject to systematic acoustic surveys to determine and monitor the abundances of spawning herring (e.g. Melvin and Power 1999; Melvin et al. 2004; Power et al. 2010; DFO 2011c; Power et al. 2012). Little is known about the historical performance of spawning groups outside of these surveyed areas.

Known herring spawning grounds are considered EBSAs, and include all of the areas listed in Table 4 (see also Appendix A, Figure A-2). Of these areas, German Bank, by far, presently supports the highest and most stable spawning biomass (DFO 2011c). Herring subpopulations that have suffered collapse (such as Trinity Ledge and the Bras d'Or Lakes) or severe declines (such as Glace Bay) are known to recover very slowly (Stephenson et al. 2009) so a case could be made that these areas also satisfy the resilience EBSA criterion.

Table 4. Current Atlantic Herring spawning areas known to occur within the Atlantic coast sub-region. With the exception of Red Ground, Glace Bay, and The Big Shoal (in bold font), each of these spawning areas overlap wholly or partially with one or more site-specific, multiple-feature EBSA (Chapter 5).

HERRING SPAWNING AREAS	
Trinity Ledge	Halifax/Eastern Shore
Spectacle Buoy	**Glace Bay**
German Bank	**Red Ground**
Seal Island	**The Big Shoal**
Little Hope Island/Port Mouton	Bras d'Or Lakes

4.2.2. Atlantic Salmon Spawning Rivers

EBSA criteria met:

- Fitness consequences
- Aggregation
- Resilience

The Atlantic Salmon (*Salmo salar*) is an anadromous fish species, returning to freshwater streams to spawn. There are over 118 Atlantic Salmon rivers within the Atlantic coast sub-region, the majority of which are thought to support their own population (Bowlby et al. 2014; Gibson et al. 2014). These populations can be grouped into two larger assemblages: the Southern Upland populations and the Eastern Cape Breton populations (Figure 4). Both of these assemblages have been assessed as Endangered by COSEWIC due to marked declines in numbers and persisting threats to recovery. Although less is known about the at-sea behaviour and distribution of these populations, extensive research has been conducted to assess their freshwater habitat and abundance (e.g. DFO 2000; Gibson and Bowlby 2009; Gibson et al. 2010; DFO 2011d). Those rivers supporting Atlantic Salmon, along with their seaward approaches, are considered EBSAs. These areas are discussed in more detail below.

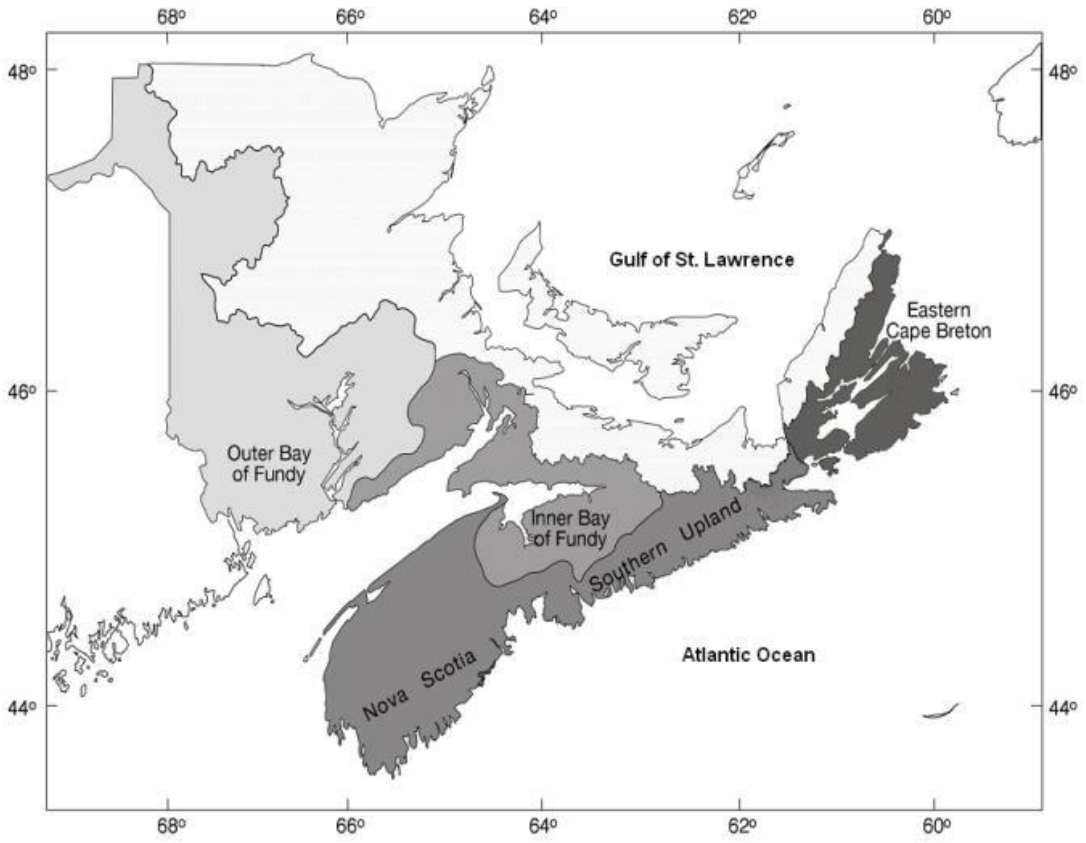

Figure 4. The major Atlantic Salmon population assemblages in the Maritimes (DFO 2013a).

Southern Upland Salmon Rivers

The Southern Upland region of Nova Scotia encompasses much of mainland Nova Scotia, and the entirety of the Atlantic coast sub-region outside of Cape Breton. Although the exact number of salmon rivers in the Southern Upland is not known, there are 72 rivers that are thought to either contain or to have historically contained Atlantic Salmon populations (Bowlby et al. 2014) (Appendix A, Figure A-3). Over the past several decades, the majority of rivers in this region have undergone some degree of acidification, caused by a combination of acid precipitation and acid leaching from the underlying bedrock (DFO 2000). By 1986, salmon production had dropped by 50% from historical levels; a decline attributed largely to acid toxicity in the spawning rivers. Based on mean pH measurements from the 1980s, DFO (2000) reported on the acidity level of rivers in the region known to have historically supported Atlantic Salmon. Fourteen of these rivers were acidified to the point where salmon was effectively extirpated from their waters (category 1 rivers). A further 20 rivers had pH levels low enough to severely compromise salmon production (category 2 rivers). The remaining rivers (categories 3 and 4) had pH levels conducive to natural salmon reproduction (Appendix A, Figure A-4). There has been negligible improvement in the condition of Southern Upland rivers since the 1980s, despite the fact that pollution-based acid deposition has been significantly reduced. One of the reasons for this slow recovery is that the soils and bedrock of the region tend to lack buffering minerals. It has been estimated

that acidified rivers will not likely recover for 50-100 years (DFO 2008). The effect of river acidification on the Southern Upland salmon population has been further compounded by low rates of marine survival, and other threats such as habitat fragmentation and invasive fish species (DFO 2013a). The combined influence of these variables makes this population especially vulnerable to environmental variability and stochastic events. Indeed, the population and distribution of Atlantic Salmon in the Southern Upland region continues to decline. Despite similar electrofishing survey efforts in 2000 and 2008/09, the total number of juvenile Atlantic Salmon sampled in Southern Upland rivers was one-quarter of the number sampled in 2000 (Gibson et al. 2011). Furthermore, in 2008/09, juvenile salmon was absent from four rivers where it had been present in 2000. These trends have raised concern over the status of the Southern Upland populations, and the potential for proliferation of river-specific extirpations.

DFO (2000) sorted Atlantic Salmon spawning rivers into four categories according to the mean annual pH of the main river as measured in the 1980s. As previously mentioned, only rivers in categories 3 and 4 are expected to support naturally reproducing salmon. The recent Recovery Potential Assessment (RPA) prepared by DFO Science for the Southern Upland populations identified all category 3 and 4 rivers accessible to Atlantic Salmon, regardless of whether juveniles were observed in the 2008/09 electrofishing survey, as important freshwater habitat for the recovery of the species (DFO 2013a). The RPA also advised that the estuaries associated with these rivers be considered important habitat. Habitat features, functions, and attributes of importance in the marine environment have been identified for Atlantic Salmon in the inner Bay of Fundy (DFO 2013b), and these criteria would apply to estuaries elsewhere. Although watersheds in categories 1 and 2 are thought to be generally inhospitable to Atlantic Salmon, certain tributaries may maintain higher pH levels than the rest of the watershed (DFO 2000). In addition, the liming program applied to the West River in Sheet Harbour has demonstrated that river acidification can be mitigated such that salmon populations begin to recover (e.g. Halfyard 2007). Therefore, category 1 and 2 watersheds should not necessarily be considered insignificant for Atlantic Salmon.

None of the salmon populations in Southern Upland rivers are currently meeting their conservation requirements[8] (Gibson et al. 2010). The LaHave River and St. Mary's River are thought to support two of the largest salmon populations in the region at present; however, population models suggest that these two populations face a high probability (87% and 73%, respectively) of extirpation within 50 years if there is no change in survival rates (Gibson and Bowlby 2013). However, if implemented, recovery actions have the potential to reduce this risk significantly.

Eastern Cape Breton Salmon Rivers

Overall, Atlantic Salmon populations in Eastern Cape Breton are thought to be generally healthier than the Southern Upland populations (DFO 2014). There are 46 rivers that are thought to either contain or to have historically contained Eastern Cape Breton Atlantic

[8] In the DFO Maritimes Region, the river-specific conservation requirements for Atlantic Salmon are limit reference points used when assessing population status. An egg deposition value of 2.4 eggs per square metre of fluvial rearing habitat is used (Gibson and Claytor 2013).

Salmon populations (Appendix A, Figure A-5). Currently, there are four index rivers in which abundance is monitored to gauge the health of these populations: North, Baddeck, Clyburn, and Middle. The Grand River was also used as an index river during the last decade, but regular monitoring recently ceased for this river as abundance is thought to be quite low. The status of salmon populations in Eastern Cape Breton is quite variable (DFO 2014). Adult abundance trends during the last three generations (15 years) indicate abundance declines of 97% (to 2009) and 89% (to 2011) in Grand River and Clyburn River respectively, whereas the abundance trend in North River indicates an increase of 159% (to 2011). Of these index rivers, only the population in North River is thought to be meeting its conservation requirement. There is little information about the status of other salmon populations in Eastern Cape Breton, but based on recreational fishing statistics and sparse electrofishing data, salmon abundance is thought to be low throughout most of this area. The probability of extinction for the Middle River and Baddeck River populations is low if conditions in the future are similar to those in the recent past (Gibson and Levy 2014). However, neither population is expected to reach and remain above their recovery targets unless overall productivity (including reproduction and survival) is improved. Acid toxicity does not threaten Eastern Cape Breton salmon populations, meaning other threats are responsible for their declines in abundance (Gibson et al. 2014). These threats are poorly understood; however, low marine survival is a systemic problem. Other threats include: infrastructure (e.g. roads, power lines); culverts; genetic effects of small population size; forestry; illegal targeting of Atlantic Salmon while fishing under general licence; stocking of Rainbow, Brown, and Brook Trout; salmon stocking for fisheries enhancement; changes in predator or prey abundance; non-native fish; silt and sediment; altered hydrology; salmonid aquaculture; marine ecosystem changes; diseases and parasites; and bycatch in other fisheries.

4.3. IMPORTANT HABITATS AND HABITAT FEATURES

4.3.1. Significant Salt Marsh Areas

EBSA criteria met:

- Aggregation
- Resilience

Salt marshes are among the most highly productive ecosystems on Earth (e.g. Davis and Browne 1996a; Stewart et al. 2003). They form in sheltered intertidal areas, often in estuaries, protected bays, or behind barrier beaches, and require a steady supply of sediment. Salt marshes may be divided into “low marsh” and “high marsh” areas, depending on the frequency of tidal inundation experienced. In Nova Scotia, low marsh areas are typically dominated by the perennial cord grass *Spartina alterniflora*, while high marsh areas are dominated by another grass species: *Spartina patens* (Hanson 2004). Salt marshes represent a rich source of nutrients in the coastal ecosystem, and the habitat they create is highly valued by many marine species. Salt marshes also provide many ecosystem services to humans, including storm surge protection and water filtration. More recently, the role of salt marshes as highly effective carbon sinks has become better understood (Chmura 2013). In fact, it has

been suggested that the rate of carbon sequestration in salt marshes could be an order of magnitude higher than it is in terrestrial forests.

Salt marshes are sensitive to both natural and artificial disturbances, such as those resulting from coastal erosion, sea level change, and disrupted sediment transport (e.g. Stewart et al. 2003; CBCL Limited 2009). Over 60% of Nova Scotia's pre-settlement salt marshes have been lost to dyking, infilling, and/or dredging.

Because of its importance to several marine bird species, Allard et al. (2014) mapped the relative abundance of salt marsh habitats across eastern Canada (Section 3.5.2; Appendix A, Figure A-6). High density areas of salt marsh are considered EBSAs, and are found within or near the locations listed in Table 5.

Table 5. Locations within the Atlantic coast sub-region where salt marsh habitat is observed in relatively high abundance(s) according to the analysis by Allard et al. (2014). Bold font indicates those areas not also encompassed within a site-specific, multiple feature EBSA (Chapter 5).

SALT MARSH AREAS	
Cape St. Mary's	Medway Harbour
Salmon River	Cape LaHave Island
Bartletts River Pond	Crescent Beach
Yarmouth Harbour	**Ritcey Cove**
Chebogue Harbour	Mahone Bay
Lobster Bay	Cole Harbour
Pubnico Harbour	Lawrencetown
Shag Harbour	Chezzetcook Inlet
Barrington Passage	Petpeswick Inlet
Barrington Bay	Musquodoboit
Cape Sable Island	Clam Bay
Port La Tour	Clam Harbour
Negro Harbour	**Owls Head**
Round Bay	**Kirby River**
Roseway	**Quoddy Harbour**
Jordan Bay	**Marie Joseph Harbour**
Green Harbour	**Port Felix**
Lockeport Harbour	**Gows Gap**
Matthews Lake	**Fourchu**
Little Harbour	Morien Bay
Sable River	Glace Bay
Johnstons Pond	Lingan Bay
Port L'Hebert	**Big Pond**
Port Joli	Aspy Bay
St. Catherine's River Bay	Whycocomagh Bay (Bras d'Or)
Little Port Joli	Nyanza Bay (Bras d'Or)
Ragged Harbour	Denys Basin (Bras d'Or)

4.3.2. Significant Eelgrass Areas

EBSA criteria met:

- Fitness consequences
- Aggregation
- Resilience

Like salt marshes, eelgrass (*Zostera marina*) is another of the Earth's most productive ecosystems (DFO 2009b). Eelgrass occupies a relatively narrow niche within sheltered intertidal and subtidal environments, requiring specific salinity, light, oxygen, current, and water clarity conditions to thrive. In addition to its high level of primary production, eelgrass is a structure-providing species (DFO 2009b). It stabilizes sediment, adds habitat complexity, provides refuge from predation, and creates a settlement substrate for planktonic larva. Many species preferentially use eelgrass beds for all or parts of their life cycles. Indeed, comparatively greater species abundance and diversity is characteristic of eelgrass habitats (DFO 2009b). Following a CSAS RAP, eelgrass was designated an Ecologically Significant Species in accordance with the ESSCP criteria discussed in Section 2.4 (DFO 2009b).

Eelgrass is sensitive to eutrophication, shoreline development, invasive green crab activity, and environmental changes (Davis et al. 1998; DFO 2009b). The species is also susceptible to so-called "wasting disease". In recent decades, significant declines, ranging between 45 and 95% loss in coverage, have been observed in several eelgrass beds in Nova Scotia (Chapman and Smith 2006; Sharp et al. 2007). The specific reasons why these episodes of rapid decline have occurred in these areas are inconclusive.

The importance of eelgrass to waterfowl cannot be overstated. In fact, the Atlantic Brant (*Branta bernicla hrota*) was once known to feed almost exclusively on eelgrass in eastern North America (Hanson 2004). Historical declines in eelgrass abundance have had demonstrated effects on the feeding behaviour, migratory patterns, and winter survival of this and other waterfowl species. In the case of Atlantic Brant, widespread die-off of eelgrass along the coast of North America between 1930 and 1932 resulted in an estimated population loss of 90% by the winter of 1933-34 (Hanson 2004). Remaining individuals were compelled to alter their diets as well as their migration routes to survive. In Nova Scotia, inlets with relatively high abundances of eelgrass tend to correlate closely with areas of known significance to waterfowl, as is demonstrated in this report.

Because of its importance to several marine bird species, Allard et al. (2014) mapped the relative abundance of eelgrass habitat across Eastern Canada (Section 3.5.2; Appendix A, Figure A-7). High density areas of eelgrass are considered EBSAs, and are found within or near the locations listed in Table 6.

Table 6. Locations within the Atlantic coast sub-region where eelgrass habitat is observed in relatively high abundance(s) according to the analysis by Allard et al. (2014). Bold font indicates those areas not also encompassed within a site-specific, multiple feature EBSA (Chapter 5).

EELGRASS AREAS	
Lobster Bay	Musquodoboit Harbour
Negro Harbour	**Jeddore Harbour**
Round Bay	Clam Harbour
Matthews Lake	**Gegogan Harbour**
Port L'Hebert	**Wine Harbour**
Port Joli	**Country Harbour**
Ragged Harbour	**Guysborough Harbour**
Mahone Bay	**Isle Madame (NE corner)**
Cole Harbour	**Grand River**
Lawrencetown	Morien Bay
Chezzetcook Inlet	Aspy Bay
Petpeswick Inlet	

5. SITE-SPECIFIC MULTIPLE-FEATURE EBSAS

The second organizational category of EBSAs is profiled in this chapter. These are the site-specific multiple-feature EBSAs (Figure 5; Appendix B), which include those areas identified for their unique combination of exceptional features. Although many of these areas share similar features, no two areas were identified for the same set of reasons. In most cases, the site-specific multiple-feature EBSAs, which are generally considered at the inlet scale, encompass one or more of the broadly-distributed single-feature EBSAs profiled in Chapter 4.

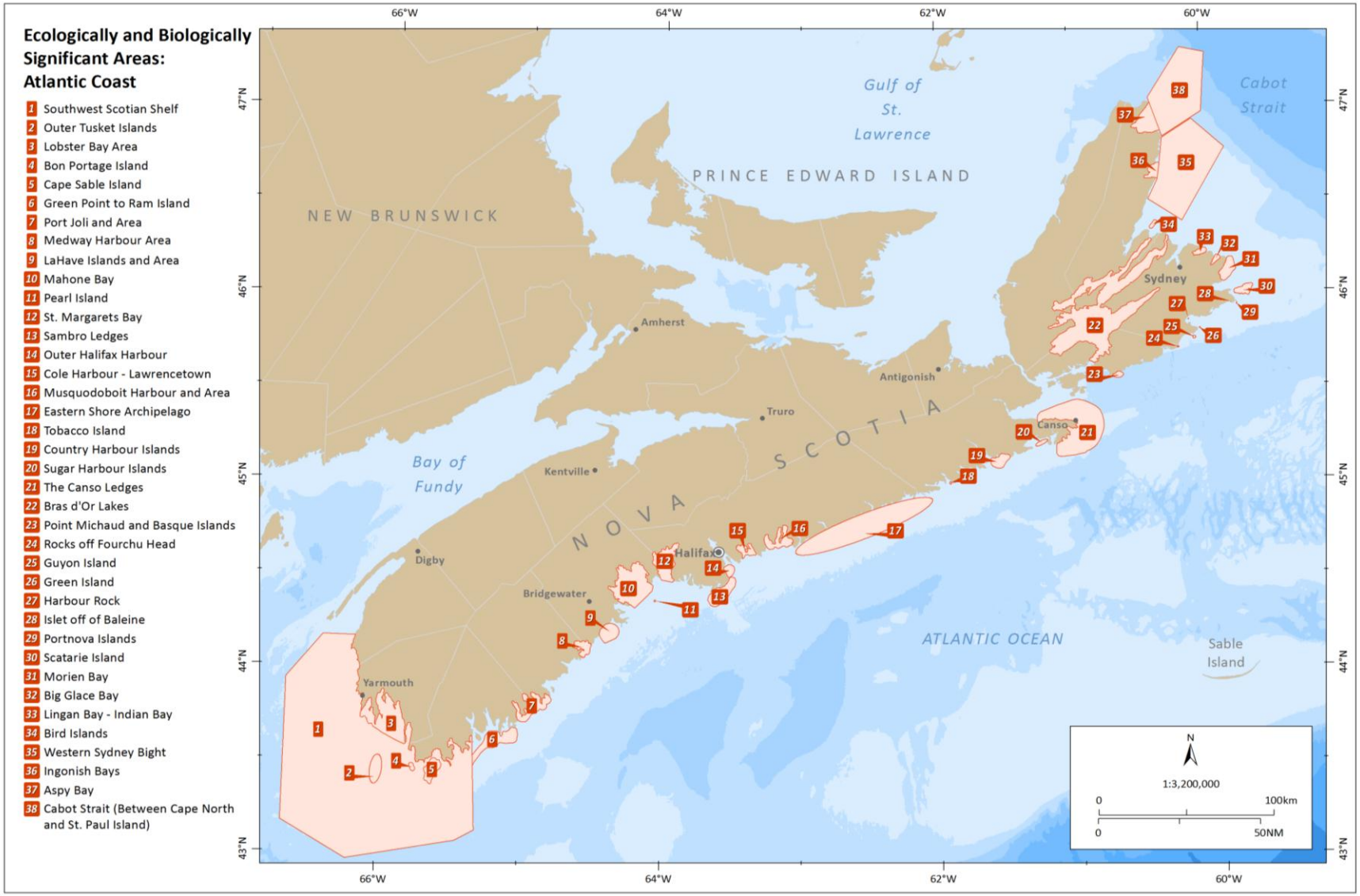

Figure 5. Site-specific EBSAs in the Atlantic coast sub-region (Cape St. Mary's to Cape North).

5.1. SOUTHWEST SCOTIAN SHELF

a. Geography:

This EBSA includes the shelf area between Cape St. Mary's and Shelburne Harbour, extending offshore to approximately the 100m isobath. The Southwest Scotian Shelf is the largest EBSA considered in this report, and encompasses several smaller EBSAs profiled separately in other sections. Among these are the Outer Tusket Islands, the Lobster Bay Area, Bon Portage Island, and Cape Sable Island. See Appendix B, Figure B-1.

b. Inlet classification(s):

There are numerous inlets along the vast coastline captured in this EBSA. Because of their number, they are not profiled individually here (see Greenlaw et al. 2011 for detail). However, it bears noting that there is a high concentration of highly productive and/or diverse inlets in this area. Between Yarmouth and Negro Harbours, inclusive, there are four complex intermediate estuaries (medium-high diversity and productivity) and four complex intermediate bays (high diversity and medium productivity). Both of these classification types were ranked the highest with respect to conservation value by Greenlaw et al. (2011). There are relatively few examples of these inlet types outside of southwest Nova Scotia.

c. Coastline classification:

Because this EBSA is so large, three coastline classes are captured within it. From west to east these include:

- Meteghan Cliffs and Beaches (9b):
  - Straight, highly exposed shoreline with small intermittent coves.
  - Cliffs are a dominant coastal feature.
  - Mixed substrate: sand/gravel, pebble/cobble, bedrock.

- Lobster Bay Salt Marshes and Islands (10):
  - Complex shoreline with numerous islands.
  - Substrate predominantly mud with sand and gravel.
  - Transition zone from the relatively low tidal ranges of Atlantic coast to the very high tidal ranges of the Bay of Fundy.
  - Persistent upwelling characterizes the area.

- South Shore Sandy Beaches (11):
  - Predominantly sand and gravel substrate.
  - Several long and narrow inlets.
  - Low shoreline complexity.
  - Highest concentration of sandy beaches in coastal Nova Scotia.

d. Notable physical and/or oceanographic attributes:

The waters off southwest Nova Scotia are among the most productive on the eastern coast of North America (Tee et al. 1993). This productivity is largely attributable to the dynamic and complex physical oceanography of the area, which is strongly influenced by upwelling and tidal mixing (e.g. Fournier et al. 1984a; Fournier et al. 1984b; P. Lane and Associates 1992; Tee et al. 1993). A persistent area of upwelling off Cape Sable Island is sustained by the interaction of strong tidal currents with complex bottom topography (Tee et al. 1993). This upwelling supplies the southwest Scotian Shelf with nutrient-rich surface waters. Intense tidal mixing on the shelf further enhances production at all trophic levels (P. Lane and Associates 1992).

e. Notable ecological attributes:

Southwest Nova Scotia supports the highest abundances of American Lobster (*Homarus americanus*), over the largest area, on the Atlantic coast – a spatial trend that has been attributed largely to regional oceanography (Hudon 1994; Tremblay et al. 2009). Hudon (1994) found a positive relationship between lobster productivity and cumulative number of degree-days in the surface layer. Within the Atlantic coast region, the waters off southwest Nova Scotia have the greatest cumulative number of degree-days >0°C in both shallow (0-40 m) and deep (>100 m) waters. In fact, the added degree-days at depth greatly enhance the yearly thermal gains acquired by seasonally migrating adult lobsters in this region (Hudon 1994). Enhanced local larval retention and/or accumulation of larvae from outside the immediate area are other factors likely contributing to the health of lobster populations in southwest Nova Scotia. In addition to having demonstrable benefits for lobster, the warmer inshore waters characteristic of this area allow for a diverse array of invertebrate species, many of which would typically be found at more southerly latitudes, to thrive (Davis and Browne 1996b).

There are several Atlantic Herring spawning areas within the Southwest Nova Scotia EBSA. Specifically, Trinity Ledge, Spectacle Buoy (southwest of Yarmouth), Seal Island, and German Bank are four areas with known autumn spawning activity in the past decade (DFO 2011c; Section 4.2.1).

The anadromous Striped Bass (*Morone saxatilis*) from the Endangered (COSEWIC) Bay of Fundy population have been observed in the Yarmouth County area (COSEWIC 2004). When in the marine environment, Striped Bass prefer estuarine and coastal waters. This species is nationally rare, with just five known spawning areas in Canada, of which only two are presently active, namely, the Shubenacadie River in Nova Scotia and Miramichi River in New Brunswick.

There are two watersheds in southwest Nova Scotia with spawning habitat known to be suitable for Atlantic Salmon (Endangered – COSEWIC): Salmon River (Digby) and Annis River (DFO 2000; Section 4.2.2). During electrofishing surveys in 2000 and 2008/09, juveniles were recorded in the Salmon River watershed, but not in the Annis River watershed (Gibson et al. 2011). Although considered partially acidified, juveniles were also found in the

Tusket River watershed during both surveys. This watershed is known to contain tributaries that have a higher pH than the main river (DFO 2000).

Simon and Campana (1987) conducted a series of exploratory bottom trawl surveys in the inshore region of southern Nova Scotia, recording the overall species composition of the fish caught at each station. They conducted their surveys in three sectors, loosely corresponding to the areas around St. Mary's Bay, Lobster Bay (sample sites were outside of the bay), and Barrington Bay/Lockeport (the latter two areas being of relevance to this EBSA). A combined total of 21 finfish species were observed within the Lobster Bay and Barrington Bay sectors. Spiny Dogfish (*Squalus acanthias*) (Special Concern – COSEWIC) was the most commonly caught species in the Lobster Bay area (presence among sets: 100%), followed by Winter Flounder (*Pseudopleuronectes americanus*) (50%), miscellaneous skates[9] (33%), Atlantic Cod (*Gadus morhua*) (Endangered – COSEWIC) (25%), and Butterfish (*Poronotus triacanthus*) (25%). Between Barrington Bay and Lockeport Harbour, Atlantic Cod was the most commonly occurring species (presence among sets: 79%), followed by Winter Flounder (75%), Haddock (*Melanogrammus aeglefinus*) (58%), and miscellaneous skates (50%). Other species present in a relatively large proportion of the sets within the Barrington Bay sector included Sea Raven (*Hemitripterus americanus*) (42%), Pollock (*Pollachius virens*) (29%), and Yellowtail Flounder (*Limanda ferruginea*) (29%). Observations of Atlantic Wolffish (*Anarhichas lupus*) (Special Concern – SARA) were made at stations east and southeast of Cape Sable Island, as well as off Negro Harbour. The presence of this species among sets was 12.5%. The Atlantic Wolffish possesses life history characteristics (i.e. low fecundity, long generation time) that makes it especially vulnerable to exploitation, incidental mortality, and environmental perturbations (COSEWIC 2000). The species has experienced a steep decline over the past four decades and may be considered depleted. Like Atlantic Wolffish, skates and Spiny Dogfish are also characterized by low fecundity and long generation times (COSEWIC 2005; 2010a; 2012a; 2012b). However, while skates have generally declined in abundance and range over the past several decades, Spiny Dogfish remains relatively abundant in Scotian Shelf waters. Another at-risk species, Cusk (*Brosme brosme*) (Endangered – COSEWIC), has been observed inshore off Cape Sable Island despite its being a deep-water fish (Harris 2006). Cusk is the only species in the *Brosme* genus, and has a very restricted spatial distribution in the western Atlantic (COSEWIC 2003). It is concentrated in the Gulf of Maine, the entrance to the Bay of Fundy, and the southwestern Scotian Shelf extending from the Fundian Channel and Browns Bank to Emerald, Western, and Sable Island Banks. Consequently, in both a regional and national context, the southwestern Scotian Shelf (primarily outside the bounds of this EBSA) is unique in its importance for Cusk. Inshore concentrations of Atlantic Halibut (*Hippoglossus hippoglossus*) have also been noted off of Cape Sable Island (Davis and Browne 1996b). Although presently considered not at risk, this species has a long generation time, making it vulnerable to depletion and slow to recover.

[9] Little Skate (*Leucoraja erinacea*), Winter Skate (*Leucoraja ocellata*), and Smooth Skate (*Malacoraja senta*) were grouped together as miscellaneous skates. The Winter Skate and Smooth Skate populations occurring in this EBSA have each been assessed by COSEWIC as Special Concern. At the time of writing, Little Skate had not yet undergone assessment.

Horne and Campana (1989) used an otter trawl to survey juvenile groundfish at eight sites across southern Nova Scotia, five of which fall within the Southwest Nova Scotia EBSA. These include, from west to east, Trinity Ledge, Lobster Bay, Barrington Bay, Negro Harbour, and Shelburne Harbour. A total of 13 juvenile groundfish species were recorded. Winter Flounder was the only species observed in relatively high numbers across all eight sample sites. The rest of the species were generally caught in comparatively lower numbers and with less geographic consistency. By a large margin, the highest numbers of juvenile White Hake (*Urophycis tenuis*) (Threatened – COSEWIC) were caught at Shelburne and Negro Harbours, respectively. By a lesser margin, Rock Gunnel (*Pholis gunnellus*) was most abundant at Negro Harbour and Barrington Bay. Within the Southwest Scotian Shelf EBSA, Lobster Bay and Barrington Bay were the only sites where juvenile Cunner (*Tautogolabrus adsperus*) was recorded. One hundred juvenile Pollock were caught at Trinity Ledge, with only one other survey site (in the Bay of Fundy) recording more than three individuals of this species. This suggests that Trinity Ledge may be a preferred coastal nursery area for Pollock, at least at a sub-regional scale. Trinity Ledge also yielded the highest catch of juvenile Atlantic Cod in the study by Horne and Campana (1989); however, the margin of difference between the catch at this site and those at Barrington Bay, Negro Harbour, and Shelburne Harbour, where Atlantic Cod was caught in roughly equal numbers, is narrow. Using a different set of trawl survey data, Clark (2006) noted the area off Cape Sable Island as having the highest inshore catches of juvenile Atlantic Cod between the Bay of Fundy and Shelburne.

O'Connor (2008) collected samples of juvenile fish at 25 coastal sites between Kings County and Guysborough County. Six of these sample sites are within the Southwest Scotian Shelf EBSA: Cape St. Mary's, Pembroke Beach (west of Yarmouth Harbour), Pinkney's Point (Chebogue Harbour) (discussed in Section 5.3), North East Point (Cape Sable Island), Hawk Beach (Cape Sable Island), and Port LaTour. A combined total of 22 different juvenile species were recorded at these locations. The highest number of sand lance spp. (*Ammodytes* spp.) across all 25 sample sites was caught at Hawk Beach. North East Point also yielded one of the highest catches of this species. Like herring, sand lance is an important forage fish, especially for marine birds (Robards et al. 1999). The Laridae (i.e. gulls and terns) and Alcidae (i.e. puffins, murres, auklets) families tend to show a particularly strong preference for this prey species (Willson et al. 1999). Indeed, Rock et al. (2007) found that sand lance was the most common prey item fed to Roseate Tern (Endangered – SARA) chicks on Country Island, Nova Scotia (Section 5.19). Atlantic Herring was the second most abundant juvenile fish species observed at North East Point (Cape Sable Island), and was among the highest catches of this species across all of the sites sampled by O'Connor (2008). Similarly, Lumpfish (*Cyclopterus lumpus*), rare among the 25 sample sites, was more abundant at North East Point (Cape Sable Island) than any other site. Outside of the Cape Sable Island area, Alewife (*Alosa pseudoharengus*) was the most abundant juvenile species caught at Cape St. Mary's, and also represented the highest catch of this species across all sample sites (O'Connor 2008). At Port La Tour, Three-spined Stickleback (*Gasterosteus aculeatus*) was the most abundant species caught, followed by herring and Ninespine Stickleback (*Pungitius pungitius*). The former two species were not caught in especially high numbers when compared to the other sample sites in the study; however, Ninespine Stickleback, which was

relatively uncommon among the sample sites, was caught in higher numbers at Port La Tour than at any of the other sites in the study.

In 2009, 93 stations across the Scotian Shelf and the south coast of Newfoundland were surveyed for Atlantic Mackerel (*Scomber scombrus*) eggs (DFO 2012b). Eggs were recorded at 28 of these stations, including three on the southwestern Scotian Shelf, of which one represented the highest egg abundance across all sites. At least one of these sites falls within the Southwest Scotian Shelf EBSA.

Southwest Nova Scotia is within the primary range of the Endangered (SARA) North Atlantic Right Whale (*Eubalaena glacialis*), which includes the coastal waters off the eastern United States and Canada (Brown et al. 2009). The long generation time and low reproductive rates associated with this species have resulted in a slow population recovery in the post-whaling era. Recovery is further compromised by a high modern-day mortality rate. The leading cause of death and major injury is vessel strikes, to which right whales are especially vulnerable given their immense size, slow movement, tendency to socialize in groups near the surface, and their mainly coastal habitat. Entanglement in fishing gear is another threat to this species (Brown et al. 2009). The North Atlantic Right Whale comes to Canadian waters during the summer and early fall to nurse, feed, and socialize. While here, the species is most commonly observed between the lower Bay of Fundy and Roseway Bank, which includes most of the Southwest Scotia Shelf EBSA (P. Lane and Associates 1992). Within this range, Grand Manan Basin and Roseway Basin, both outside of the Atlantic coast sub-region, have been identified as critical habitat under SARA (Brown et al. 2009). The situation of the southwest Nova Scotia EBSA between these two critical habitat areas suggests its potential importance as a migratory corridor for whales moving to and from these areas. Southwest Nova Scotia also has special importance for other marine mammals. Together with the northern Gulf of Maine, this region hosts inshore summer concentrations of Humpback Whale (*Megaptera novaeangliae*) and Fin Whale (*Balaenoptera physalus*) (Special Concern – SARA) on the Scotian Shelf (P. Lane and Associates 1992).

Many large salt marsh areas are distributed along the coastline of southwest Nova Scotia (Allard et al. 2014). In fact, nowhere else within the Atlantic coast sub-region is salt marsh coverage as abundant over such a large area. In contrast, significant eelgrass areas are less widespread and confined to discrete locations within Lobster Bay, Negro Harbour, and Round Bay. Southwest Nova Scotia has the highest concentrations of rockweed (*Ascophyllum nodosum*) biomass within the mainland portion of the Atlantic coast sub-region, with the highest concentrations occurring within Lobster Bay (Ugarte et al. 2010).

This EBSA has general importance for birds, including waterfowl, shorebirds, and colonial marine birds (Nocera 2000). Significant aggregations of American Black Duck, Canada Goose (*Branta canadensis*), scaup spp., merganser spp., goldeneye spp., and Common Eider can be found throughout much of the inshore area, especially east of Yarmouth Harbour (Allard et al. 2014). Several significant bird colonies are also found within this EBSA, including a Roseate Tern (Endangered – SARA) colony. These are discussed in more detail in Sections 5.2 through 5.5. Similarly, there are several important shorebird areas along the southeastern coastline of the EBSA. Between Cape Sable Island and Round Bay there are 15

beaches identified as critical habitat for the Endangered (SARA) Piping Plover, representing nearly 40% of the total number of critical habitat beaches identified within Nova Scotia. This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivores/generalists (e.g. tern spp., skua and jaeger spp., large gull spp.), surface-seizing planktivores (e.g. phalarope spp., Wilson's Storm-petrel), shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), pursuit-diving piscivores (e.g. Thick-billed Murre, Atlantic Puffin, Razorbill), shallow pursuit generalists (e.g. Great Shearwater), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014). With few exceptions (e.g. cormorant spp., large gull spp., loon and grebe spp.), these marine bird species are more northern, arctic, and trans-equatorial migrants drawn to this area outside of their respective breeding seasons.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• The waters off of southwest Nova Scotia are among the most productive in eastern North America. Unique oceanographic processes contribute to the high productivity of the area. • Extent and concentration of salt marsh coverage unparalleled elsewhere in the Atlantic coast sub-region.
Aggregation	Y	• Highest abundances of American Lobster in the Atlantic coast sub-region. • Relatively large aggregations of Spiny Dogfish (Special Concern – COSEWIC), Atlantic Cod (Endangered – COSEWIC), skates (Special Concern – COSEWIC), and Atlantic Wolffish (Special Concern – SARA). • Cusk (Endangered – COSEWIC), a predominantly offshore fish, has been observed inshore off Cape Sable Island. • Relatively large aggregations of Winter Flounder, Butterfish, Haddock, Sea Raven, Pollock, Yellowtail Flounder, and Atlantic Halibut. • Striped Bass (Endangered – COSEWIC), a nationally rare anadromous species, has been recorded in the Yarmouth County area. • Within the primary range of the North Atlantic Right Whale (Endangered – SARA). • Inshore Fin Whale (Special Concern – SARA) concentrations in the summer. • Inshore Humpback Whale concentrations in the summer. • Significant coastal aggregations of several waterfowl, shorebird, and colonial seabird species. • Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. tern spp., skua and jaeger spp., large gull spp.), surface-seizing planktivores (e.g. phalarope spp., Wilson's Storm-petrel), shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), pursuit-diving piscivores (e.g. Thick-billed Murre, Atlantic Puffin, Razorbill), shallow pursuit generalists (e.g. Great Shearwater), and plunge-diving piscivores (e.g. Northern Gannet). • Highest concentrations of rockweed biomass within the

EBSA criteria	Criteria met?	Rationale
		mainland portion of the Atlantic coast sub-region. • Significant areas of salt marsh (extensive). • Significant areas of eelgrass (localized). • (Medium-high to high diversity predicted for most of the inlets in the area based on their geophysical characteristics).
Fitness Consequences	Y	• Contains four Atlantic Herring spawning areas with known activity in the past decade. • Contains potentially important juvenile areas for Atlantic Cod, Winter Flounder, Pollock, sand lance spp., Atlantic Herring, Lumpfish, Alewife, and Ninespine Stickleback. • Mackerel eggs recorded in the area. • Atlantic Salmon (Endangered – COSEWIC) recently recorded in the Salmon River and Tusket River watersheds. Viable spawning habitat is also found in the Annis River watershed. • The Brothers are critical habitat for the Roseate Tern (Endangered – SARA). • 15 beaches identified as critical habitat for the Piping Plover (Endangered – SARA).
Resilience	Y	• Area contains important or potentially important habitat for several species whose life history characteristics make them vulnerable to depletion and slow recovery (e.g. skates).
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring. Atlantic Cod, Haddock, Atlantic Wolffish, Spiny Dogfish, American Lobster. • Type 2: Rockweed, Eelgrass.

g. Current area-based management measures and special designations:

There are several coastal protected areas within the Southwest Scotian Shelf EBSA, including a number of islands. An exhaustive list of these areas is not provided here; however, some of them are detailed in Sections 5.2-5.5 in conjunction with other site profiles.

5.2. OUTER TUSKET ISLANDS

a. Geography:

This EBSA includes a small archipelago often referred to as the Outer Tusket Islands, located approximately 25 km south of Wedgeport. Mud Island and Seal Island are the two largest islands in the group. Flat Island, Round Island, and Noddy Island surround Mud Island, and are much smaller in size. See Appendix B, Figure B-1.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Lobster Bay Salt Marshes and Islands (10):
  - Complex shoreline with numerous islands.
  - Substrate predominantly mud with sand and gravel.
  - Transition zone from the relatively low tidal ranges of Atlantic coast to the very high tidal ranges of the Bay of Fundy.
  - Persistent upwelling characterizes the area.

d. Notable physical and/or oceanographic attributes:

See Section 5.1 for discussion of regional oceanography.

e. Notable ecological attributes:

The Outer Tusket Islands host significant colonies of Common Eider (*Somateria mollissima*), Great Black-backed Gull (*Larus marinus*), and Herring Gull (*Larus argentatus*) (Allard et al. 2014). In addition, these islands represent one of the few locations where the Atlantic Puffin (*Fratercula arctica*) breeds in Nova Scotia. This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp.), shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

Noddy Island and Flat Island accounted for two of five inshore Grey Seal (*Halichoerus grypus*) breeding colonies identified by aerial survey in the Atlantic coast sub-region of Nova Scotia (Lidgard 2007). Of these five colonies, Noddy Island was the second largest, following Hay Island, situated off of Scatarie Island in Cape Breton.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• One of the few areas where the Atlantic Puffin is known to nest in the province.
Aggregation	Y	• Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp.), shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), and plunge-diving piscivores (e.g. Northern Gannet).
Fitness Consequences	Y	• Significant Common Eider, Great Black-backed Gull, and Herring Gull colonies. • Grey Seal breeding colony.
Resilience		
Special importance for ESSCPs	Y	• Type 4: Grey Seal.

g. Current area-based management measures and special designations:

None.

5.3. LOBSTER BAY AREA

a. Geography:

This EBSA includes, from west to east, Chebogue Harbour, Little River Harbour, Goose Bay, and Lobster Bay, located on the southern coast of Nova Scotia. See Appendix B, Figure B-2.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Chebogue Harbour	Complex Intermediate Estuary	Medium-**High**	Medium-**High**
Lobster Bay	Complex Intermediate Bay	**High**	Medium

c. Coastline classification:

- Lobster Bay Salt Marshes and Islands (10):
  - Complex shoreline with numerous islands.
  - Substrate predominantly mud with sand and gravel.
  - Transition zone from the relatively low tidal ranges of Atlantic coast to the very high tidal ranges of the Bay of Fundy.
  - Persistent upwelling characterizes the area.

d. Notable physical and/or oceanographic attributes:

Despite being fully exposed to incoming waves generated by predominantly south-westerly winds, the shores of Lobster Bay and the adjacent harbours are quite sheltered (Hudon 1994). This is due in part to local slope and shelf characteristics, as well as the presence of numerous islands and shoals. When combined with a meso-tidal range (2-4 m) and an abundant sediment supply, this low-energy environment creates ideal conditions for the formation and maintenance of salt marshes (Hudon 1994; Davis and Browne 1996a). Indeed, the Lobster Bay area stands out as having exceptionally extensive salt marsh coverage, even within greater southwest Nova Scotia, which is generally characterized by its abundance of salt marshes.

Within the Atlantic coast sub-region, Lobster Bay is among the four largest inlets by surface area (Gregory et al. 1993). When compared to other inlets of similar size along the Atlantic coast, it is not very deep, with a maximum depth of just 15.4 metres.

e. Notable ecological attributes:

Lobster Bay is aptly named given its importance as a highly productive area for American Lobster. Tremblay et al. (2009) assessed the abundance and spatial distribution of lobsters along the Atlantic coast of Nova Scotia using standardized trap catch rates (catch per unit effort, or CPUE) over a period of eight years. They found that the relative abundance of lobsters with a carapace length of 61-70 mm was high in Lobster Bay and in southwest Nova Scotia generally. In fact, all of the 10-minute grid cells within Lobster Bay fell within the highest CPUE ranking.

Two studies have surveyed juvenile fish species at sites within the Lobster Bay area. Horne and Campana (1989) used an otter trawl to survey juvenile groundfish at eight sites across southwest Nova Scotia. Cunner and Windowpane Flounder (*Scophthalmus aquosus*) were recorded in their highest abundances at Lobster Bay, while the catch of Winter Flounder was third highest across sample sites. O'Connor (2008) used a beach seine to sample juvenile fish species at 25 sites along the Nova Scotia coastline between Kings County and Guysborough County. At Pinkney's Point (Chebogue Harbour), sand lance spp. and Three-spined Stickleback were the most abundant species recorded. The abundance of sand lance at this site was not exceptionally high when compared to the other sample sites in the study; however, Three-spined Stickleback was more abundant at Pinkney's Point than at ~90% of the sample sites.

The Annis River watershed, as well as portions of the Tusket River watershed (see Section 5.1), has pH levels conducive to Atlantic Salmon (Endangered – COSEWIC) reproduction (DFO 2000; Bowlby et al. 2014; Section 4.2.2). The Tusket River watershed has a salmon rearing area of over 150,000 m^2, making it one of the most expansive spawning areas in the province, and an area of particular historical importance for this species. The Tusket-Annis watershed once also supported an anadromous population of the rare Atlantic Whitefish (*Coregonus huntsmani*) (Endangered – SARA), now considered extirpated from the watershed due in part to acidification and habitat alteration (DFO 2013c; see also Section 5.9). Re-introduction of Atlantic Whitefish into the Tusket-Annis watershed is being considered as part of the recovery effort for the species. Other notable occurrences of anadromous species in the area include a large spring run of Alewife in the Tusket River (Davis and Browne 1996b).

Significant areas of salt marsh are distributed throughout the intertidal zone of this EBSA (Allard et al. 2014). The extent of the salt marsh coverage in this area is unparalleled in the Atlantic coast sub-region. There are two localized areas of significant eelgrass in Lobster Bay. Rockweed (*Ascophyllum nodosum*) is more dense and widespread in the Lobster Bay area than elsewhere along the Atlantic coast of mainland Nova Scotia (DFO 1998; Ugarte et al. 2010). It has been suggested that kelp is a permanent feature of the bay, and grows twice as quickly as in other areas of the Atlantic coast sub-region (Doherty and Horsman 2007). The permanency of the kelp beds could be the result of a lack of sea urchins in the area (Gromack et al. 2010). The significant freshwater inputs into the bay likely prevent sea urchins from thriving (Doherty and Horsman 2007).

The Lobster Bay area, which remains relatively ice-free during the winter, is an important area for coastal waterfowl. Significant aggregations of American Black Duck, Atlantic Brant, Canada Goose, scaup spp., merganser spp., and goldeneye spp. can be found in the area[10] (Allard et al. 2014). There are significant overwintering aggregations of Common Eider in the area as well. There are a number of significant Great Blue Heron (*Ardea herodias*), Great Black-backed Gull, and Herring Gull colonies in the area (Allard et al. 2014). There are *globally significant* numbers of Roseate Tern (Endangered – SARA) on The Brothers islands, situated along the eastern shore of Lobster Bay during spring and summer (IBA Canada 2014). These islands are designated critical habitat for this species (Environment Canada 2010; Section 4.1.2). The Chebogue Harbour area is significant for occurrences of less abundant migratory shorebird species, including American Golden Plover and Buff-breasted Sandpiper (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Densest rockweed stands along the Atlantic coast of mainland Nova Scotia.
Aggregation	Y	• High concentrations of American Lobster. • Tusket-Annis watershed of historical importance for Atlantic Salmon (Endangered – COSEWIC) and Atlantic Whitefish (Endangered – SARA). • Large spring run of Alewife (Tusket River). • Significant aggregations of American Black Duck, Atlantic Brant, Canada Goose, scaup spp., merganser spp., and goldeneye spp. • Significant overwintering aggregations of Common Eider. • Significant areas of salt marsh coverage (extensive). • Significant areas of eelgrass (localized). • (Permanent kelp beds with especially high productivity). • (Medium-high productivity predicted for Chebogue Harbour based on its geophysical characteristics). • (Medium-high and high diversity predicted for Chebogue Harbour and Lobster Bay, respectively, based on their geophysical characteristics).
Fitness Consequences	Y	• Potentially important juvenile areas for Cunner, Windowpane Flounder, Witch Flounder, and Three-spined Stickleback. • Significant Great Blue Heron, Great Black-backed Gull, and Herring Gull colonies. • *Globally significant* numbers of Roseate Tern (Endangered – SARA) on The Brothers, which are designated critical habitat. • The Annis River watershed currently has viable Atlantic Salmon spawning habitat, although it has not been used recently. Portions of the Tusket River watershed have also recently supported salmon.

[10] There are multiple waterfowl survey blocks within this EBSA. Refer to Allard et al. (2014) for more detail on the distribution of these species within the area.

Resilience		

Special importance for ESSCPs	Y	• Type 1: American Lobster. • Type 2: Kelp, Rockweed, Eelgrass (localized).

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Melbourne Lake Game Sanctuary	*Wildlife Act* R.S., c. 504, s.2.	-
Glenwood Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
The Brothers Islands Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes the water within a 250 m radius around the centre of each island.
The Brothers Roseate Tern Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	Includes entire terrestrial habitat of both islands plus aquatic habitat extending 200 m from the mean high tide line of each island.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
Site of Ecological Significance (Chebogue/Melbourne Lake)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
IBA NS003 The Brothers	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Rabbit Island	Eastern Habitat Joint Venture	-
Melbourne	Eastern Habitat Joint Venture	Multiple parcels in the vicinity of Melbourne.
Melford Island	Eastern Habitat Joint Venture	-
Wedgeport	Eastern Habitat Joint Venture	Parcel on northern shore of Goose Bay near Wedgeport.
Amirault's Hill	Eastern Habitat Joint Venture	Multiple parcels in the vicinity of Amirault's Hill.
Morris Island	Eastern Habitat Joint Venture	-
Glenwood (Robert's Island)	Eastern Habitat Joint Venture	-
Upper Brother Island	Eastern Habitat Joint Venture	-

Lower Brother Island	Eastern Habitat Joint Venture	-

5.4. BON PORTAGE ISLAND

a. Geography:

This EBSA includes Bon Portage Island (also known as Outer Island) and the immediately surrounding waters. Bon Portage Island is relatively large at ~300 ha. It is located south of Woods Harbour and west of Cape Sable Island, and is approximately 3 km from the mainland. See Appendix B, Figure B-3.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- South Shore Sandy Beaches (11):
  - Predominantly sand and gravel substrate.
  - Several long and narrow inlets.
  - Low shoreline complexity.
  - Highest concentration of sandy beaches in coastal Nova Scotia.

d. Notable physical and/or oceanographic attributes:

See Section 5.1 for discussion of regional oceanography.

e. Notable ecological attributes:

The Leach's Storm-petrel (*Oceanodroma leucorhoa*) is found in *globally significant* numbers on Bon Portage Island, representing the largest known colony (50,000 pairs) of this species in the Maritimes (IBA Canada 2014). Also present are significant colonies of Great Black-backed Gull, Herring Gull, and Great Blue Heron (Allard et al. 2014). The island hosts the only Black-crowned Night Heron (*Nycticorax nycticorax*) colony in the province (P. Lane and Associates 1992; BSC 2013). A Snowy Egret (*Egretta thula*) pair has been recorded on the island during nesting season, which is a nationally rare occurrence (IBA Canada 2014).

Due to its location along the Atlantic coast, Bon Portage Island is a migratory stopover site for several waterfowl, shorebird, songbird, and raptor species (Green 2011; BSC 2013). The island lies within a waterfowl survey block that has been known to host significant aggregations of American Black Duck (*Anas rubripes*), Canada Goose, scaup spp., merganser spp., goldeneye spp., and Common Eider (Allard et al. 2014). In addition, the island lies in the path of northward tracking storms which can bring stray birds to the region prior to moving offshore (Green 2011). These strays often take refuge on Bon Portage Island before returning to their home territory or migratory course.

Bon Portage Island is surrounded by some of the richest marine algae beds in the province, which contribute significantly to the productivity of the island and its surrounding waters (Shutler 2011). The island is also host to several different habitat types, including barrier beaches, salt marshes, lagoons, fens, barrens, coastal forest, and swamps (NSNT 2012).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Only Black-crowned Night Heron colony in Nova Scotia. • Only probable nesting Snowy Egret pair observed in Nova Scotia.
Aggregation	Y	• Rich marine algae beds. • Staging area for numerous migratory birds, including significant aggregations of American Black Duck, Canada Goose, scaup spp., merganser spp., goldeneye spp., and Common Eider. • High diversity of coastal habitat types concentrated within a relatively small area.
Fitness Consequences	Y	• *Globally significant* numbers of nesting Leach's Storm-petrel pairs. • Significant Great Blue Heron, Great Black-Backed Gull, and Herring Gull colonies.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
-	-	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS015 Bon Portage Island	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
Site of Ecological Significance (Bon Portage Island)	Nova Scotia Museum	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Bon Portage Island	Nova Scotia Nature Trust/Acadia University	-

5.5. CAPE SABLE ISLAND

a. Geography:

This EBSA includes Cape Sable Island, a large coastal island located off of the most southeasterly shore of the province, south of Barrington. See Appendix B, Figure B-3.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Shag Harbour	Complex Intermediate Bay	**High**	Medium
Barrington Bay	Simple Pelagic Bay	Medium	Medium-Low

c. Coastline classification:

- South Shore Sandy Beaches (11):
  - Predominantly sand and gravel substrate.
  - Several long and narrow inlets.
  - Low shoreline complexity.
  - Highest concentration of sandy beaches in coastal Nova Scotia.

d. Notable physical and/or oceanographic attributes:

See Section 5.1 for discussion of regional oceanography.

e. Notable ecological attributes:

During migration, the eastern and southern shores of Cape Sable Island host *globally significant* numbers of Semipalmated Sandpiper (*Calidris pusilla*), Short-billed Dowitcher (*Limnodromus griseus*), and Atlantic Brant during migration (IBA Canada 2014). The latter species is especially abundant during spring migration and in winter (A. Hanson pers. comm. 2014). *Nationally significant* numbers of Willet (*Catoptrophorus semipalmatus*) and Piping Plover (Endangered – SARA) are also found here during the migratory and nesting seasons, respectively. In fact, there are eight Piping Plover critical habitat beaches on the island, six of which are concentrated along the eastern shore (Environment Canada 2012; Section 4.1.1). Eastern Cape Sable Island has broad importance for shorebirds in general, both in terms of abundance and diversity (IBA Canada 2014). In addition to those already mentioned, some of the most commonly occurring shorebird species include White-rumped Sandpiper (*Calidris fuscicollis*), Least Sandpiper (*Calidris minutilla*), Sanderling (*Calidris alba*), Black-bellied Plover (*Pluvialis squatarola*), Ruddy Turnstone (*Arenaria interpres*), and Dunlin (*Calidris alpina*). Wintering numbers of the latter four species are higher here than anywhere else in Atlantic Canada. In addition, Cape Sable Island is one of just two areas in Nova Scotia identified as important for the Endangered (SARA) *rufa* subspecies of Red Knot (*Calidris canutus*) (COSEWIC 2007). An American Oystercatcher (*Haematopus palliatus*) pair was recorded nesting on the island for the first time in 1997, representing the first known breeding occurrence of this species in Canada. At least one pair has nested there consistently

since that time. In addition to shorebirds, there is a high diversity of waterfowl, cormorants, herons, alcids, and terrestrial birds present on or near the island (IBA Canada 2014). Like Bon Portage Island to the west, Cape Sable Island is often a temporary host to rare species thrown off course due to northward tracking storm systems.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• First known breeding occurrence of American Oystercatcher in Canada. The species has since occurred on the island consistently. • Highest wintering concentrations of Sanderling, Black-bellied Plover, Ruddy Turnstone, and Dunlin in Atlantic Canada.
Aggregation	Y	• Important area for Red Knot *rufa* ssp. (Endangered – SARA). • Diverse shorebird population. • *Globally significant* numbers of Semipalmated Sandpiper, Short-billed Dowitcher, and Atlantic Brant during migration. • *Nationally significant* numbers of Willet during migration. • (High diversity predicted for Shag Harbour based on its geophysical characteristics).
Fitness Consequences	Y	• *Nationally significant* numbers of Piping Plover (Endangered – SARA) during the breeding season. • Eight beaches designated as critical habitat for Piping Plover (Endangered – SARA).
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Hawk Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Cape Sable Island Wildlife Management Area **(PROPOSED)**	*Wildlife Act* R.S., c. 504, s.2.	Not yet legally designated.
The Cape Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Hawk Point Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
The Hawk Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Daniels Head (Southside) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Stoney Island Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-

LEGISLATED AREAS		
Bulls Head Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Clam Point Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Northeast Point Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS016 Eastern Cape Sable Island	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
IBA NS018 South Shore (Barrington Bay Sector)	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Cape Sable Island	Eastern Habitat Joint Venture	One large parcel in the interior of the island.
Bakers Flats	Eastern Habitat Joint Venture	Two parcels on the eastern side of Bakers Flats.
The Hawk	Eastern Habitat Joint Venture	Coastal parcel on southernmost peninsula.
Hawk Point	Eastern Habitat Joint Venture	Coastal parcel on southernmost peninsula.

5.6. GREEN POINT TO RAM ISLAND

a. Geography:

This EBSA includes the inshore waters immediately off the coast between Green Point (Port LaTour area) and Ram Island (east of Lockeport Harbour). See Appendix B, Figure B-4.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

Not applicable.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

This area has hosted up to 40,000 moulting Common Eider during the summer months (Doherty and Horsman 2007). The Common Eider undergoes a single moult migration each year, during which time feathers are shed and new ones are grown (SDJV 2004). For three to four weeks of this period the eiders are flightless. Also, moulting birds are apt to lose some of their body mass due to the energy requirements of feather growth (Kavanagh 2005). Consequently, this is one of their most vulnerable life stages, made even more so by the fact that they are aggregated during this time (Allard et al. 2014). Moulting birds seek out areas where food is available, but that are away from predators. Noise and other sources of disturbance may cause individuals to use up valuable energy to react, compromising feather growth (e.g. Diéval et al. 2011). This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving coastal piscivores (e.g. cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), surface-seizing planktivores (e.g. phalarope spp. Wilson's Storm-petrel), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin) and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• There are no other known areas that host such large numbers of moulting Common Eider in the Atlantic coast region.
Aggregation	Y	• Significant at sea aggregations of shallow-diving coastal piscivores (e.g. cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), surface-seizing planktivores (e.g. phalarope spp. Wilson's Storm-petrel), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin) and plunge-diving piscivores (e.g. Northern Gannet).
Fitness consequences	Y	• Important moulting area for Common Eider.
Resilience	Y	• Moulting birds are especially vulnerable to predation and other disturbances while they are flightless (lasts 3-4 weeks).

Special importance for ESSCPs		

g. Current area-based management measures and special designations:

None.

5.7. PORT JOLI AND SURROUNDING AREAS

a. Geography:

This EBSA includes several inlets, the largest of which are (from west to east): Sable River, Port L'Hebert, and Port Joli. See Appendix B, Figure B-5.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Sable River	Simple Intermediate Estuary	Low	Medium-**High**
Jones Harbour	Intermediate Benthic Cove	Medium-Low	Medium
Johnston's Pond	Complex Intermediate Cove	Medium-**High**	Medium-Low
Port L'Hebert	Complex Intermediate Estuary	Medium-**High**	Medium-**High**
Port Joli	Complex Intermediate Bay	**High**	Medium
St. Catherine's River Bay	Intermediate Pelagic Cove	Medium-**High**	Low
Little Port Joli	Complex Intermediate Cove	Medium-**High**	Medium-Low

c. Coastline classification:

- South Shore Sandy Beaches (11):
  - Predominantly sand and gravel substrate.
  - Several long and narrow inlets.
  - Low shoreline complexity.
  - Highest concentration of sandy beaches in coastal Nova Scotia.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

This EBSA includes several closely spaced inlets that form an ecological complex of special significance for birds, particularly migratory waterfowl (Nocera 2000). The area remains relatively ice-free during the winter. Significant numbers of Canada Goose have been observed in this area during migration, as well as in the winter (MacKinnon et al. 1994; CWS unpubl. data; IBA Canada 2014). The Harlequin Duck (*Histrionicus histrionicus*) (Special Concern – SARA) also overwinters in the area in significant numbers (IBA Canada 2014). Other species for which significant numbers have been recorded include American Black Duck, scaup spp., scoter spp., merganser spp., goldeneye spp., and Common Eider (Allard et al. 2014).

There are six Piping Plover (Endangered – SARA) critical habitat beaches within this EBSA (Environment Canada 2012; Section 4.1.1). Together with critical habitat beaches identified in Lockeport Harbour and Port Mouton, these beaches host *continentally significant* numbers of this species (IBA Canada 2014). The lagoon areas behind the barrier beaches in St. Catherine's River Bay and Little Port Joli are known to be important feeding areas for fledging Piping Plovers (Parks Canada 2010).

There are significant areas of salt marsh habitat throughout Sable River, in Johnston's Pond, in the upper reaches of Port L'Hebert and Port Joli, and in the lagoon areas of St. Catherine's

River Bay and Little Port Joli (Allard et al. 2014). Significant areas of eelgrass can be found at the heads of Port L'Hebert and Port Joli.

There is an active herring spawning area off of Port Joli/Port Mouton (Power et al. 2012; Section 4.2.1). Within this area, at Devastation Shoal, evidence of the "spawning wave" phenomenon has been recorded (McPherson et al. 2003). This is where genetically and morphometrically distinct herring subpopulations spawn sympatrically, but at different times of the year. Of the four coastal spawning areas studied by McPherson et al. (2003), Devastation Shoal was the only one where such sympatry was apparent. O'Connor (2008) observed comparatively high abundances of juvenile herring at Carters Beach relative to the remaining 24 sample sites across mainland Nova Scotia, suggesting its importance as a nursery area for newly spawned fish.

In 2009, 93 stations across the Scotian Shelf and the south coast of Newfoundland were surveyed for mackerel eggs (DFO 2012b). Eggs were recorded at 28 of these stations, including one off of Port Joli.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant numbers of Harlequin Duck (Special Concern – SARA) during the winter. • *Continentally significant* numbers of Piping Plover (Endangered – SARA). • Significant aggregations of American Black Duck, scaup spp., scoter spp., merganser spp., goldeneye, and Common Eider. • Significant numbers of Canada Goose during migration, as well as during the winter. • Significant areas of eelgrass (localized). • Significant areas of salt marsh (extensive). • (Medium-high productivity predicted for Sable River and Port L'Hebert based on their geophysical characteristics). • (Medium-high to high diversity predicted for Johnston's Pond, Port L'Hebert, Port Joli, St. Catherine's River, and Little Port Joli based on their geophysical characteristics).
Fitness Consequences	Y	• Herring spawning area. • Mackerel eggs. • Six Piping Plover critical habitat beaches.
Resilience		

Special importance for ESSCPs	Y	• Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Louis Head Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Sable River Migratory Bird Sanctuary	*Migratory Birds Convention Act* S.C. 1994, c. 22	Marine/intertidal portion accounts for 2.6 km^2 of the total area (Wood 2007).
Johnstons Pond Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Johnstons Pond Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Port Hebert Migratory Bird Sanctuary	*Migratory Birds Convention Act* S.C. 1994, c. 22	Marine/intertidal portion accounts for 3.5 km^2 of the total area (Wood 2007).
Sandy Bay Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Sandy Bay Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Thomas Raddall Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Port Joli Migratory Bird Sanctuary	*Migratory Birds Convention Act* S.C. 1994, c. 22	Marine/intertidal portion accounts for 2.5 km^2 of the total area (Wood 2007).
Port Joli (Goose Haven) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
St. Catherines River Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
St. Catherines River Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Little Port Joli Bay Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Kejimkujik Seaside Adjunct National Park	*Canada National Parks Act* S.C. 2000, c. 32	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS004 South Shore (Port Joli Sector)	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Johnston's Pond	Nature Conservancy of Canada	Parcel adjacent to Johnston's Pond Beach.
Port Joli	Nature Conservancy of Canada	Multiple parcels on western shore of Port Joli.

5.8. MEDWAY HARBOUR AREA

a. Geography:

This EBSA includes Medway Harbour and the comparatively smaller Ragged Harbour just to the south of it. See Appendix B, Figure B-6.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Ragged Harbour	Intermediate Benthic Cove	Medium-Low	Medium
Medway Harbour	Complex Intermediate Estuary	Medium-**High**	Medium-**High**

c. Coastline classification:

- South Shore Sandy Beaches (11):
  - Predominantly sand and gravel substrate.
  - Several long and narrow inlets.
  - Low shoreline complexity.
  - Highest concentration of sandy beaches in coastal Nova Scotia.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Salt marsh habitat is both significant and widespread in Medway Harbour (Allard et al. 2014). There is also a significant area of eelgrass habitat in Ragged Harbour.

Medway Harbour is an important area for waterfowl. American Black Duck, Canada Goose, scaup spp., merganser spp., goldeneye spp., and Common Eider form significant aggregations in this area, and it is also one of the most important shorebird areas in the province (Allard et al. 2014). Both Ragged Harbour Beach and Cherry Hill (Conrad) Beach are critical habitat for Piping Plover (Endangered – SARA) (Environment Canada 2012; Section 4.1.1). Cherry Hill (Conrad) Beach and Crescent Beach (outside of this EBSA) together have hosted *globally significant* numbers of Semipalmated Plover (*Charadrius semipalmatus*) during migration (IBA Canada 2014). Significant numbers of Purple Sandpiper (*Calidris maritima*) are also found in this area (Allard et al. 2014.).

The Medway River watershed drains into Medway Harbour, and is a low-acidified river known to contain approximately 9,900,000 m^2 of suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) (DFO 2000). Juveniles were recorded in this watershed during electrofishing surveys in both 2000 and 2008/09 (Gibson et al. 2011).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of American Black Duck, Canada Goose, scaup spp., merganser spp., goldeneye spp., and Common Eider. • One of the most important shorebird areas in the province. • Significant numbers of Purple Sandpiper. • *Globally significant* numbers of Semipalmated Plover during migration. • Significant areas of eelgrass (localized). • Significant areas of salt marsh (widespread). • (Medium-high productivity predicted for Medway Harbour based on its geophysical characteristics). • (Medium-high diversity predicted for Medway Harbour based on its geophysical characteristics).
Fitness Consequences	Y	• Suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) in the Medway River watershed. • Two Piping Plover (Endangered – SARA) critical habitat beaches.
Resilience		

Special importance for ESSCPs	Y	• Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Ragged Harbour Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Ragged Harbour Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Cherry Hill (Conrad) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Cherry Hill Beach	*Beaches Act* R.S., c. 32, s. 1.	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS024 South Shore (East Queens Co. Sector)	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	Minor overlap with Cherry Hill Beach.
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**

Long Cove	Nova Scotia Nature Trust	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Vogler's Cove	Nova Scotia Nature Trust	-
Toby Island	Nature Conservancy of Canada	-

5.9. LAHAVE ISLANDS

a. Geography:

This EBSA includes a cluster of relatively large nearshore islands, collectively referred to as the LaHave Islands, located just south of LaHave River estuary. The largest of these islands is Cape LaHave Island. Among the other islands are Mosher Island, Hirtle Island, Bell Island, and the Spectacle Islands. Indian Island, approximately 2 km southwest of Cape LaHave Island, is also included in this EBSA. The waters surrounding the islands, including Green Bay, are also considered part of this EBSA. See Appendix B, Figure B-6.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Green Bay	Complex Intermediate Cove	Medium-**High**	Medium-Low

c. Coastline classification:

- Mahone Bay Islands (12a):
  - Highly complex shoreline.
  - Numerous islands.
  - Coarse and rocky substrate.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

There are two significant areas of salt marsh in the LaHave Islands area, one at Crescent Beach and the other at Cape Bay Beach (Allard et al. 2014).

The LaHave Islands area is important for several bird species. Scaup spp., goldeneye spp., Common Eider, American Black Duck, merganser spp., and scoter spp. each form significant aggregations in the area (Allard et al. 2014). Evidence suggests that this area hosts significant numbers of less abundant shorebird species, including Hudsonian Godwit and Willet (IBA Canada 2014; Allard et al. 2014). Cape Bay Beach on Cape LaHave Island is critical habitat for Piping Plover (Endangered – SARA) (Environment Canada 2012; Section 4.1.1). Prior to

1997, Piping Plover was also recorded on several other beaches within or near this EBSA (e.g. Crescent, Green Bay, Broad Cove), which, together with beaches in the Medway Harbour area, hosted *nationally significant* numbers of this species (IBA Canada 2014). Crescent Beach and Cherry Hill (Conrad) Beach (outside of this EBSA) together have hosted *globally significant* Semipalmated Plover numbers during migration. Significant numbers of Purple Sandpiper occur in the area (Allard et al. 2014.). The area has lesser importance for colonial seabirds; however, there are significant colonies of Herring Gull and Great Black-backed Gull present (Allard et al. 2014). In addition, Indian Island has served as a nesting location for Roseate Tern (Endangered – SARA). This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.) and plunge-diving piscivores (Northern Gannet); however, at-sea surveys within this EBSA are limited to the area seaward of the easternmost islands (Allard et al. 2014).

The LaHave River watershed is a low-acidified watershed (i.e. category 3) containing approximately 7,500,000 m^2 of suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) (DFO 2000). It drains into the coastal waters at the northern end of this EBSA. The LaHave River is one of two index rivers for the Southern Upland region, and is believed to support among the highest numbers of salmon in this region at present (Gibson et al. 2010). Consequently, its approaches may be considered important for migrating salmon. The Petite Rivière watershed, which drains into Green Bay, is a non-acidified watershed (i.e. category 4) with a viable salmon rearing area of approximately 7,000 m^2 (DFO 2000). Juveniles were recorded in this river during electrofishing surveys in both 2000 and 2008/09, albeit in considerably lesser densities in 2008/09 (the mean density of age-0 salmon in 2008/09 was ~3% of what it was in 2000) (Gibson et al. 2011).

The Petite Rivière watershed, draining into Green Bay, hosts the only known population of Atlantic Whitefish (Endangered – SARA) in the world. This species has been described as a "globally significant component of Canada's biodiversity" (COSEWIC 2010b, p. vi). At one time, Atlantic Whitefish were also found in the Tusket-Annis watershed; however, this population is considered extirpated. While morphologically similar to Lake Whitefish (*Coregonus clupeaformis*), Atlantic Whitefish exhibit strong genetic differentiation, with a lineage predating the Pleistocene. Although anadromy appears to be a dominant life history characteristic of the species, as was demonstrated by the Tusket-Annis population, the Petite Rivière population has been largely restricted to three freshwater lakes for over a century due to damming. In spite of this, stray Atlantic Whitefish have been caught as far afield as the LaHave River estuary. Indeed, the lakes-bound population have retained their physiological capacity for anadromy. It has been suggested that the installation of fish passage facilities could boost the range of this population to once again include coastal waters, while also promoting enhanced productivity (COSEWIC 2010b). The SARA distribution objective for the species, as outlined in the Recovery Strategy (DFO 2013c), is to re-establish self-sustaining anadromous Atlantic Whitefish populations in the Southern Uplands ecoregion, including the Petite Rivière.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• The Petite Rivière watershed hosts the only known population of Atlantic Whitefish (Endangered – SARA) in the world. While this population is currently largely restricted to three inland lakes, anadromy appears to be a dominant life history characteristic of the species. If permitted passage into the rest of the watershed, it is likely this population would expand its range into coastal waters.
Aggregation	Y	• Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.) and plunge-diving piscivores (Northern Gannet). • *Globally significant* numbers of Semipalmated Plover during migration. • Significant areas of salt marsh (localized). • (Medium-high diversity predicted for Green Bay based on its geophysical characteristics).
Fitness Consequences	Y	• Suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) in the LaHave River and Petite Rivière watersheds. • Formerly *nationally significant* numbers of Piping Plover (Endangered – SARA) in the area. • One Piping Plover critical habitat beach.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Green Bay Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Cape Bay, Cape LaHave Island Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Rissers Beach Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS024 South Shore (East Queens Co. Sector)	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Indian Island	Nova Scotia Bird Society	The island is managed as a sanctuary.

5.10. MAHONE BAY

a. Geography:

This EBSA includes Mahone Bay and the many islands within it. Among some of the larger islands in the bay are Big Tancook Island, Little Tancook Island, and East Ironbound Island. See Appendix B, Figure B-7.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Mahone Bay	Complex Pelagic Bay	**Highest**	Medium-Low

c. Coastline classification:

- Mahone Bay Islands (12a):
  - Highly complex shoreline.
  - Numerous islands.
  - Coarse and rocky substrate.

d. Notable physical and/or oceanographic attributes:

Within the Atlantic coast sub-region, Mahone Bay is among the four largest inlets by surface area (Gregory et al. 1993). It is also one of the deepest, with a maximum depth of 62.2 metres. The bay is bathymetrically complex, with over 365 islands, shoals, and bedrock sills (Bennett 2004).

e. Notable ecological attributes:

Doherty and Horsman (2007) noted the apparent importance of shoals as areas of relatively high productivity in Mahone Bay. It was suggested that small fish might show preference for these particular areas, making them popular feeding areas for higher predators, including marine birds.

The high habitat heterogeneity characteristic of Mahone Bay allows a diverse range of species to find their niche, while also creating numerous sheltered areas where refuge from predators can be found (Greenlaw 2009). Consequently, such areas can act as important fish nurseries. Using a beach seine, O'Connor (2008) collected samples of juvenile fish at three sites within Mahone Bay, specifically: Westhaver Beach, Western Shore, and East River

Point. A combined total of 19 different juvenile species were recorded at these sites. Sand lance spp. was the most abundant species at both Westhaver Beach and East River Point, with higher catch numbers than ~70% of the total sites sampled (25) between Kings County and Guysborough County. At Western Shore, Atlantic Tomcod (*Microgadus tomcod*) was most abundant, with a catch ranking third among all 25 sample sites. The second highest catch of Northern Pipefish (*Syngnathus fuscus*) across sample sites was also recorded here.

Northern Shrimp (*Pandalus borealis*) are found in Mahone Bay, representing one of three known coastal occurrences of this predominantly offshore species in Nova Scotia (Koeller et al. 2007). Its coastal presence appears to be limited by certain requisite conditions, including soft mud habitat and bottom temperatures less than 6ºC. Large, relatively deep embayments are preferred. Mahone Bay and St. Margaret's Bay appear to host a population of Northern Shrimp that is more localized than that of Chedabucto Bay, which derives from the same population as the offshore Eastern Scotian Shelf. In contrast, the shrimp in Mahone and St. Margaret's Bays have significantly different growth characteristics, suggesting that they originate from a different, more localized population.

The Mushamush and Gold watersheds, are non-acidified and low-acidified, respectively. The Mushamush River watershed contains approximately 270,000 m^2 of suitable Atlantic Salmon (Endangered – COSEWIC) spawning habitat, while the Gold River watershed contains approximately 2,200,000 m^2. Juvenile salmon were recorded in both watersheds during electrofishing surveys in 2000 and 2008/09 (Gibson et al. 2011). Although classified as partially acidified (category 2), juvenile salmon were also recorded in the Middle River and East (Chester) River watersheds during the 2000 and 2008/09 electrofishing surveys. In all of these watersheds, fewer fish were caught in 2008/09 than in 2000.

Neither eelgrass beds nor salt marshes are especially widespread in Mahone Bay, but there are localized significant areas of both habitat types. These are found in the vicinity of Marriotts Cove (salt marsh, eelgrass), between Martins Point and Western Shore (salt marsh), and near Second Peninsula (eelgrass) (Allard et al. 2014.).

Grassy Island and Westhaver Island have been known to host *globally significant* numbers of Roseate Tern (Endangered – SARA) (IBA Canada 2014). The presence and abundance of this species on these islands tends to vary from year to year depending on local conditions; however, until recently Grassy Island has been colonized the most consistently since the 1990s. The Roseate Tern is generally found in association with other tern colonies. Arctic and Common Tern are known to form large colonies on both Westhaver and Grassy Islands (~300-500 individuals each). The Mahone Bay islands host multiple significant colonies of Great Blue Heron (Allard et al. 2014). The greater bay area also hosts significant aggregations of American Black Duck, scaup spp., scoter spp., goldeneye spp., Common Eider, and merganser spp.[11].

[11] There are multiple waterfowl survey blocks within Mahone Bay. Refer to Allard et al. (2014) for more detail on the distribution of these species within the bay.

f. EBSA criteria:

CBD (2008) criteria	Criteria met?	Rationale
Uniqueness	Y	• Mahone Bay is unique in its size and depth. • Rare coastal habitat for Northern Shrimp.
Aggregation	Y	• Significant aggregations of American Black Duck, scaup spp., scoter spp., goldeneye spp., Common Eider, and merganser spp. • Significant areas of salt marsh (localized). • Significant areas of eelgrass (localized). • Very high habitat heterogeneity suggests high species diversity. • (High diversity predicted for Mahone Bay based on its geophysical characteristics).
Fitness Consequences	Y	• Suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) in Mushamush River and Gold River. Portions of the Middle River and East (Chester) River watersheds have also recently supported salmon. • Juvenile area for sand lance spp., Atlantic Tomcod, and Northern Pipefish. • *Globally significant* numbers of Roseate Tern (Endangered – SARA) during breeding season, variably on Grassy Island and Westhaver Island. • Significant Great Blue Heron colonies.
Resilience		
Special importance for ESSCPs	Y	• Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Second Peninsula Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Westhaver Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Graves Island Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
East River Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Grassy Island Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes waters within a 250 m radius around the centre of the island.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS026 Grassy Island Complex	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	Includes three islands, two of which are in Mahone Bay: Grassy Island and Westhaver Island.

CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Sheep Island	Nature Conservancy of Canada	-
Little Gooseberry Island	Nova Scotia Nature Trust	-

5.11. PEARL ISLAND

a. Geography:

This EBSA includes Pearl Island and the immediately surrounding waters. The island is situated just outside of Mahone Bay, approximately 10 km from the nearest mainland (P. Lane and Associates 1992). The island is 12.4 ha in size (Province of Nova Scotia 2012b). See Appendix B, Figure B-7.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Mahone Bay Islands (12a):
  - Highly complex shoreline.
  - Numerous islands.
  - Coarse and rocky substrate.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Pearl Island hosts colonies of Atlantic Puffin, Razorbill (*Alca torda*), and Black-legged Kittiwake (*Rissa tridactyla*) (Allard et al. 2014). Relative to the rest of eastern Canada, these species do not form significant colonies at this location; however, their presence is important because of their provincial rarity. Roseate Tern (Endangered – SARA) has been known to nest on the island in relatively moderate numbers among nesting Arctic and Common Terns; however, in recent years they have been generally absent, or have been found in small numbers only (BCAF 2012). BCAF (2003) determined that, within the Mahone Bay area, Pearl Island has the highest biological suitability for establishing a tern colony restoration site. However, logistical considerations (e.g. distance offshore, accessibility, etc.) have inhibited the restoration of a colony on this island. The Great Black-backed Gull is observed in significant colonies on Pearl Island (Allard et al. 2014). In addition, Pearl Island is within a waterfowl survey block that hosts significant aggregations of scoter spp. and Common Eider.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Atlantic Puffin, Razorbill, and Black-legged Kittiwake are provincially rare species.
Aggregation	Y	• Significant aggregations of scoter spp. and Common Eider.
Fitness Consequences	Y	• Roseate Tern (Endangered – SARA) has nested on the island in moderate numbers. • Within the Mahone Bay area, Pearl Island has the highest biological suitability for Roseate Tern colony establishment. • Significant colonies of Great Black-backed Gulls.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Pearl Island Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes surrounding waters within one-half of a statute mile from the mean high water mark.

5.12. ST. MARGARET'S BAY

a. Geography:

This EBSA includes St. Margaret's Bay and its islands. See Appendix B, Figure B-8.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
St. Margaret's Bay	Complex Pelagic Bay	**Highest**	Medium-Low

c. Coastline classification:

- Chebucto Bedrock Shore and Islands (12b):
  - Predominantly boulder and bedrock substrate.
  - Tidal range of less than two metres.

d. Notable physical and/or oceanographic attributes:

Within the Atlantic coast sub-region, St. Margaret's Bay is among the four largest inlets by surface area (Gregory et al. 1993). It is also one of the deepest, with a maximum depth of 91.4 m.

e. Notable ecological attributes:

Macroalgae has been noted to be especially productive in St. Margaret's Bay and may be considered significant for this reason (McCullough et al. 2005).

Northern Shrimp are found in St. Margaret's Bay, representing one of three known coastal occurrences of this predominantly offshore species in Nova Scotia (Koeller et al. 2007) (see discussion in Section 5.10). The Ocean Quahog (*Arctica islandica*) is also uncommon in coastal inlets, and more generally inshore, largely due to its preference for cooler waters (Cargnelli et al. 1999). This species is most often found in waters in excess of 25 m. With a maximum depth of ~90 m, St. Margaret's Bay provides viable habitat. In addition to Northern Shrimp and Ocean Quahog, several exotic warm-water species have been recorded in the bay during the summer months, likely due to Gulf Stream incursions (Davis and Browne 1996a).

The results of mackerel egg surveys conducted in St. Margaret's Bay by Bernier and Lévesque (2000) clearly demonstrated that Atlantic Mackerel spawns in the bay. Eggs were observed at all 27 stations sampled. The highest egg densities were recorded at the most northerly stations. Egg densities were described as being "not negligible", even when compared to those observed in the Gulf of St. Lawrence, which is the primary spawning area for the species in Atlantic Canadian waters.

With respect to invertebrates, sea urchins are especially abundant in St. Margaret's Bay (McCullough et al. 2005; DFO 2007b). In addition, Miller (1997) found that within the coastal area spanning ~190 km between Shelburne and Ketch Harbour (the south shore of Nova Scotia), ovigerous female American Lobster were most abundant in St. Margaret's Bay and surrounding areas by a factor of two. However, post-larval survival in these areas was lower than in the rest of the study region, likely due to differences in environmental conditions.

The large size and relatively deep waters of St. Margaret's Bay creates an environment more similar to the open ocean, which draws marine mammals and other large pelagic species to its waters (Davis and Browne 1996a; Bundy et al. 2014). The Common Minke Whale (*Balaenoptera acutorostrata*) and the Fin Whale (Special Concern – SARA) are sighted regularly, as are White-beaked and Atlantic White-sided Dolphins (*Lagenorhynchus albirostris* and *Lagenorhynchus acutus*, respectively) (McCullough et al. 2005). In fact, the White-beaked Dolphin is known to calve at the mouth of the bay between April and June. The Harbour Porpoise (*Phocoena phocoena*) (Special Concern – COSEWIC) is also observed frequently in the area. In a satellite tagging study, St. Margaret's Bay and its approaches ranked among the most highly used areas by the Leatherback Turtle

(*Dermochelys coriacea*) (Endangered – SARA) in Canadian waters (James et al. 2005; DFO 2012c). Bluefin Tuna (*Thunnus thynnus*) (Endangered – COSEWIC) is also known to occur in St. Margaret's Bay (Maguire and Lester 2012).

There were formerly three watersheds draining into St. Margaret's Bay that supported spawning Atlantic Salmon (Endangered – COSEWIC). All of these watersheds are categorized as partially acidified (DFO 2000), and consequently do not presently constitute viable spawning habitat for this species. Atlantic Salmon were not detected in these watersheds during electrofishing surveys in 2000 and 2008/09 (Gibson et al. 2011).

There are several marine birds for which St. Margaret's Bay is important. There are significant colonies of Herring Gull and Great Black-backed Gull (Allard et al. 2014). Wedge Island has been known to host *globally significant* numbers of nesting Roseate Tern (Endangered – SARA) (IBA Canada 2014). Colonization of Wedge Island by this species has been variable since the 1990s; however, during the 1970s and 80s, it was used consistently in relatively high numbers. The Roseate Tern nests among Arctic and Common Terns on the island. St. Margaret's Bay also hosts significant aggregations of merganser spp., Common Eider, goldeneye spp., and Harlequin Duck (Special Concern – SARA)[12] (Allard et al. 2014). This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• St. Margaret's Bay is unique in its size and depth. • Rare coastal habitat for Northern Shrimp • Contains Ocean Quahog, which is uncommon in coastal inlets. • Exotic warm-water species are often recorded.

[12]There are multiple waterfowl survey blocks within St. Margaret's Bay. Refer to Allard et al. (2014) for more detail on the distribution of these species within the bay.

EBSA criteria	Criteria met?	Rationale
Aggregation	Y	• Abundant sea urchin population. • Bluefin Tuna (Endangered – COSEWIC) is known to be present. • The Fin Whale (Special Concern – SARA) and Harbour Porpoise (Special Concern – COSEWIC) are regularly sighted. • Regular marine mammal sightings. • The Leatherback Turtle (Endangered – SARA) has been known to forage in the area. • Significant aggregations of merganser spp., Common Eider, goldeneye spp., and Harlequin Duck (Special Concern – SARA). • Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), and plunge-diving piscivores (e.g. Northern Gannet). • Highly productive macroalgae. • (High diversity predicted for St. Margaret's Bay based on its geophysical characteristics).
Fitness Consequences	Y	• Highest abundance of ovigerous American Lobster between Shelburne and Ketch Harbour. • Spawning area for Atlantic Mackerel. • White-beaked Dolphin calving area at mouth of the bay. • Wedge Island has historically hosted *globally significant* numbers of Roseate Tern (Endangered – SARA) during breeding season. • Significant Herring Gull and Great Black-backed Gull colonies.
Resilience		
Special importance for ESSCPs	Y	• Type 1: Sea urchins.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Queensland Beach Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Cleveland Beach Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Black Point Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Peggy's Cove Preservation Area	*Peggy's Cove Commission Act* R.S., c. 339, s. 1.	-

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS026 Grassy Island Complex	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	Includes three islands, one of which is in St. Margaret's Bay: Wedge Island.
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Troop Island	St. Margaret's Bay Stewardship Association and Nova Scotia Nature Trust	-

5.13. SAMBRO LEDGES

a. Geography:

This EBSA includes the inshore waters roughly between Pennant Point and Chebucto Head. See Appendix B, Figure B-9.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Chebucto Bedrock Shore and Islands (12b):
  - Predominantly boulder and bedrock substrate.
  - Tidal range of less than two metres.

d. Notable physical and/or oceanographic attributes:

There are numerous underwater rocks and shoals immediately off of Sambro Head.

e. Notable ecological attributes:

The Sambro Ledges area was initially identified as an EBSA for its importance to whales and dolphins as a feeding area (Doherty and Horsman 2007). The Fin Whale (Special Concern – SARA) aggregates off of Chebucto Head during the winter and spring to feed on schools of herring (P. Lane and Associates 1992). Indeed, this area is one of the major overwintering grounds for herring in Nova Scotia (e.g. DFO 2002b; Waters and Clark 2005). The approaches to Halifax Harbour represent one of three areas around Nova Scotia where the Fin Whale has been known to concentrate inshore (P. Lane and Associates 1992). However, limited published data on the relative inshore abundance and distribution of marine mammals makes it difficult to assert that this area has special importance for multiple species.

The approaches to Halifax Harbour were once purported to host one of the richest inshore Atlantic Cod (Endangered – COSEWIC) stocks along the Eastern Shore of Nova Scotia (Bundy et al. 2014). However, by the 1970s, heavy fishing effort had resulted in a substantial reduction in the size of this population.

Tagging studies of Bluefin Tuna (Endangered – COSEWIC) show the approaches to Halifax Harbour as one of the most heavily used inshore areas by this species (DFO 2011e).

Video transects carried out along the rocky shoals of this EBSA revealed dense beds or fields of the stalked tunicate *Boltenia ovifera* (Francis et al. 2014). These biogenic habitats appear to enhance species richness in this EBSA. However, it should be noted that the relative densities of *B. ovifera* along the entire Atlantic coast of Nova Scotia are not known. Kenchington (2014) identified stalked tunicate fields as a benthic biogenic habitat that is known to occur in the DFO Maritimes Region and could be used to identify EBSAs.

Common Eider, scoter spp., and merganser spp. each form significant aggregations off Sambro (Allard et al. 2014). On the nearshore islands, there are significant colonies of Great Black-backed Gull. Roseate Tern (Endangered – SARA) has been known to nest in relatively small numbers on Sambro Island. Furthermore, this EBSA supports significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), pursuit-diving piscivores (e.g. murre spp., Razorbill, Atlantic Puffin), shallow pursuit generalists (e.g. shearwater spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), pursuit-diving planktivores (e.g. Dovekie), surface-seizing planktivores (e.g. Wilson's Storm-petrel), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Historical importance for Atlantic Cod (Endangered – COSEWIC). • Relatively high-use inshore area for Bluefin Tuna (Endangered – COSEWIC). • Significant aggregations of Common Eider, scoter spp., and merganser spp. • Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), pursuit-diving piscivores (e.g. murre spp., Razorbill, Atlantic Puffin), shallow pursuit generalists (e.g. shearwater spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), pursuit-diving planktivores (e.g. Dovekie), surface-seizing planktivores (e.g. Wilson's Storm-petrel), and plunge-diving piscivores (e.g. Northern Gannet).
Fitness Consequences	Y	• Herring overwintering area. • Fin Whale (Special Concern – SARA) feeding area. • Nesting area for Roseate Tern (Endangered – SARA). • Significant colonies of Great Black-backed Gull.

Resilience		

Special importance for ESSCPs		

g. Current area-based management measures and special designations

None.

5.14. OUTER HALIFAX HARBOUR

a. Geography:

This EBSA includes the waters of Halifax Harbour, roughly between Herring Cove and Portuguese Cove, and southwest of McNabs Island. See Appendix B, Figure B-9.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Halifax Harbour	Complex Pelagic Bay	**Highest**	Medium-Low

c. Coastline classification:

- Chebucto Bedrock Shore and Islands (12b):
  - Predominantly boulder and bedrock substrate.
  - Tidal range of less than two metres.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

The Outer Halifax Harbour is an important wintering and staging area for migrating waterfowl (Doherty and Horsman 2007). Indeed, the area is known to host significant aggregations of Common Eider, American Black Duck, goldeneye spp., scoter spp., and merganser spp. (Allard et al. 2014). There are also significant Herring Gull and Great Black-backed Gull colonies in the area. This EBSA also supports significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

Tagging studies of Bluefin Tuna (Endangered – COSEWIC) show the mouth of Halifax Harbour and its approaches as one of the most heavily used inshore areas by this species (DFO 2011e).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Relatively high-use inshore area for Bluefin Tuna (Endangered – COSEWIC). • Significant aggregations of Common Eider, American Black Duck, goldeneye spp., scoter spp., and merganser spp. • Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), and plunge-diving piscivores (e.g. Northern Gannet). • (High diversity predicted for Halifax Harbour based on its geophysical characteristics).
Fitness Consequences	Y	• Significant colonies of Herring Gull and Great Black-backed Gull.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

None.

5.15. COLE HARBOUR - LAWRENCETOWN

a. Geography:

This EBSA includes the Cole Harbour estuary and Lawrencetown Lake, which is directly to the east of Cole Harbour. See Appendix B, Figure B-10.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Cole Harbour	Complex Intermediate Estuary	Medium-**High**	Medium-**High**
Lawrencetown Lake	Intermediate Benthic Estuary	Low	**High**

c. Coastline classification:

- Eastern Shore Beaches and Drumlins (13):
  - Very extensive estuarine flats.
  - Highly complex, sheltered coastline.
  - Diverse coastal landforms.

d. Notable physical and/or oceanographic attributes:

The Cole Harbour estuary is largely intertidal, forming a complex system of wetlands (McCullough et al. 2005). A beach-dune spit (Rainbow Haven) shields the estuary from wave action, and limits the influence of the open ocean (Davis and Browne 1996a).

e. Notable ecological attributes:

Eelgrass is abundant and widely distributed in the Cole Harbour estuary, at one time covering over 60% of the estuary, or approximately 600 ha (McCullough et al. 2005). There was a steep and unexplained decline of 49% in eelgrass coverage between 1992 and 2002 (Chapman and Smith 2006); however, it remains an abundant component of the intertidal habitat. Lawrencetown Lake also has significant areas of eelgrass. Both inlets contain significant areas of salt marsh.

In addition to its extensive wetlands, Cole Harbour is often recognized for its significance to marine birds. The area has been described as one of the most important overwintering areas for waterfowl in Nova Scotia (Nocera 2000; Province of Nova Scotia 2012b). There are significant aggregations of Canada Goose in each of Cole Harbour and Lawrencetown Lake (Allard et al. 2014). There are also significant aggregations of American Black Duck and scaup spp. in Cole Harbour. Evidence suggests that the Cole Harbour-Lawrencetown area is significant for less-abundant shorebird species, including Short-billed Dowitcher (IBA Canada 2014; Allard et al. 2014). Over 25 shorebird species have been recorded in this area, including two that are endangered (McCullough et al. 2005). Specifically, three beaches in the area are designated critical habitat for the Piping Plover (Endangered – SARA), and the Red Knot *rufa* ssp. (Endangered – SARA) is generally more abundant here than in most other locations within the Atlantic coast sub-region, outside of Cape Sable Island (Environment Canada 2012; Allard et al. 2014). Significant numbers of Purple Sandpiper can be found in the Lawrencetown area (Allard et al. 2014). This EBSA is of lesser importance for colonial seabirds, with just one species known to form significant colonies in the area, specifically, the Great Black-backed Gull.

This EBSA overlaps with the Halifax/Eastern Shore herring spawning area (Power et al. 2012; Section 4.2.1).

Tagging studies of Bluefin Tuna (Endangered – COSEWIC) show the waters off of Cole Harbour as one of the most heavily used inshore areas by this species (DFO 2011e).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		

EBSA criteria	Criteria met?	Rationale
Aggregation	Y	• Relatively high-use inshore area for Bluefin Tuna (Endangered – COSEWIC). • Significant aggregations of Canada Goose, American Black Duck, and scaup spp. • Among the highest concentrations of Red Knot *rufa* ssp. (Endangered – SARA) in the Atlantic coast sub-region. • Significant numbers of Purple Sandpiper. • Significant areas of salt marsh (widespread). • Significant areas of eelgrass (widespread). • Highly diverse shorebird area (over 25 species recorded). • (Medium-high to high productivity predicted for Cole Harbour and Lawrencetown Lake based on their geophysical characteristics). • (Medium-high diversity predicted for Cole Harbour based on its geophysical characteristics).
Fitness Consequences	Y	• Overlaps with the Halifax/Eastern Shore herring spawning area. • Three critical habitat beaches for Piping Plover (Endangered – SARA). • Significant colonies of Great Black-backed Gull.
Resilience		
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring. • Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Peter McNab Kuhn Wildlife Management Area **(PROPOSED)**	*Wildlife Act* R.S., c. 504, s.2.	This designation would apply to 970 hectares of the estuary, including island, estuarine flat, salt marsh, and saltwater habitats.
Cole Harbour-Lawrencetown Coastal Heritage Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Rainbow Haven Park (Cole Harbour) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Conrads (East and West) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Stoney (Lawrencetown Head) Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Conrod's Beach and Lawrencetown Beach	*Beaches Act* R.S., c. 32, s. 1.	-

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
Site of Ecological Significance (Conrad Beach)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Cow Bay	Eastern Habitat Joint Venture	-
Cole Harbour	Eastern Habitat Joint Venture	Includes most of the estuary.

5.16. MUSQUODOBOIT HARBOUR AND SURROUNDING AREAS

a. Geography:

This EBSA includes, from west to east, Chezzetcook Inlet, Petpeswick Inlet, and Musquodoboit Harbour. See Appendix B, Figure B-11.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Chezzetcook Inlet	Intermediate Benthic Estuary	Low	**High**
Petpeswick Inlet	Intermediate Benthic Estuary	Low	**High**
Musquodoboit Harbour	Intermediate Benthic Estuary	Low	**High**

c. Coastline classification:

- Eastern Shore Beaches and Drumlins (13):
  - Very extensive estuarine flats.
  - Highly complex, sheltered coastline.
  - Diverse coastal landforms.

d. Notable physical and/or oceanographic attributes:

All three of these inlets have extensive intertidal zones.

e. Notable ecological attributes:

Like the Port Joli EBSA (Section 5.7), this EBSA includes three closely spaced inlets that form an ecological complex with special significance for birds.

Each inlet within this EBSA has significant areas of both salt marsh and eelgrass habitat (Allard et al. 2014). However, a study by Chapman and Smith (2006) revealed a decline of

more than 49% in eelgrass coverage between 1992 and 2002 in each of the inlets, with the most extreme loss in Petpeswick Inlet, where a 96% decline was recorded.

Chezzetcook Inlet hosts significant aggregations of Canada Goose, American Black Duck, Common Eider and goldeneye spp. (Allard et al. 2014). Chezzetcook Inlet (outer reaches) also hosts significant numbers of Purple Sandpiper.

Petpeswick Inlet hosts significant aggregations of American Black Duck, Canada Goose, merganser spp., goldeneye spp., and Common Eider (Nocera 2000).

The Canada Goose and American Black Duck are both found in significant numbers in Musquodoboit Harbour during the winter (IBA Canada 2014). In fact, this inlet hosts the largest overwintering populations of these two species in eastern Canada (RSIS 2012). The popularity of this site during the winter is in large part due to the rapid tidal flow into the estuary, which keeps it ice-free. The Canada Goose uses this area in significant numbers during spring and fall migrations as well (IBA Canada 2014). Goldeneye spp. also forms significant aggregations in Musquodoboit Harbour (Allard et al. 2014). Up to 3000 Green-winged Teal (*Anas crecca*) have been known to visit the area during the fall migration (RSIS 2012). Martinique Beach is critical habitat for the Piping Plover (Endangered – SARA) (Environment Canada 2012; Section 4.1.1).

The Chezzetcook River and Musquodoboit River watersheds are classified as low-acidified and non-acidified, respectively, meaning that they are currently able to support spawning Atlantic Salmon (Endangered – COSEWIC) (DFO 2000; Section 4.2.2). The Chezzetcook River watershed contains approximately 176,000 m^2 of suitable spawning habitat, while the Musquodoboit River watershed contains approximately 2,310,000 m^2. In spite of its low-acidified status, no salmon were detected in the Chezzetcook River watershed during an electrofishing survey in 2000 (Gibson et al. 2011). In this same survey, which included watersheds from across the Southern Upland region, the Musquodoboit River watershed boasted the highest parr density recorded across sample sites. This watershed also had the highest density of salmon age-1 and older. In 2008/09, the mean salmon densities in the Musquodoboit River watershed, as estimated by electrofishing, were still the highest in the region; however, mean parr density was only ~25% of what it had been in 2000 (Gibson et al. 2011).

This EBSA overlaps with the Halifax/Eastern Shore herring spawning area (Power et al. 2012; Section 4.2.1).

Tagging studies of Bluefin Tuna (Endangered – COSEWIC) show the waters off of this portion of the Eastern Shore as one of the most heavily used inshore areas by this species (DFO 2011e).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Relatively high-use inshore area for Bluefin Tuna (Endangered – COSEWIC). • Significant numbers of Canada Goose during the fall, winter, and spring in Musquodoboit Harbour. • Significant numbers of American Black Duck during the winter in Musquodoboit Harbour. • Significant aggregations of goldeneye spp. in each of Chezzetcook Inlet, Petpeswick Inlet, and Musquodoboit Harbour. • Significant numbers of Purple Sandpiper in Chezzetcook Inlet. • Significant aggregations of Canada Goose, American Black Duck, and Common Eider in Chezzetcook Inlet and Petpeswick Inlet. • Significant aggregations of merganser spp. in Petpeswick Inlet. • Significant areas of salt marsh (widespread). • Significant areas of eelgrass (widespread). • (High productivity predicted for Chezzetcook Inlet, Petpeswick Inlet, and Musquodoboit Harbour based on their geophysical characteristics).
Fitness Consequences	Y	• Overlaps with the Halifax/Eastern Shore herring spawning area. • Martinique Beach is critical habitat for Piping Plover (Endangered – SARA). • Suitable spawning habitat for Atlantic Salmon (Endangered – COSEWIC) in the Chezzetcook River and Musquodoboit River watersheds. • The highest Atlantic Salmon parr densities in the Southern Upland eco-region were recorded in the Musquodoboit River watershed during electrofishing surveys in 2000 and 2008/09. • Up to 3000 Green-winged Teal during fall migration in Musquodoboit Harbour.
Resilience		

Special importance for ESSCPs	Y	• Type 1: Atlantic Herring. • Type 2: Eelgrass.

f. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Lower East Chezzetcook Beach	*Beaches Act* R.S., c. 32, s. 1.	-

LEGISLATED AREAS		
Martinique Beach Game Sanctuary	*Wildlife Act* R.S., c. 504, s.2.	-
Martinique Beach Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Martinique Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
Ramsar wetland site #369 Musquodoboit Harbour	[International convention] *The Convention on Wetlands of International Importance especially as Waterfowl Habitat*	Marine/intertidal portion accounts for 9.65 km^2 of the total area (Wood 2007).
IBA NS014 Musquodoboit Harbour	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Lower East Chezzetcook	Eastern Habitat Joint Venture	-
Cheticumchec Island	Eastern Habitat Joint Venture	-
Musquodoboit Harbour	Nature Conservancy of Canada	Parcel on the western side of the harbour near Martinique Beach.
Bayers Island	Nature Conservancy of Canada	-
Francis Nose Island	Eastern Habitat Joint Venture	-
Martinique	Eastern Habitat Joint Venture	Several island parcels north of Martinique Beach.
Goose Point Island	Eastern Habitat Joint Venture	-
Musquodoboit Harbour	Nova Scotia Nature Trust	Parcel on the eastern side of the harbour, just south of The Narrows.

5.17. EASTERN SHORE ARCHIPELAGO

a. Geography:

This EBSA includes the Eastern Shore Archipelago, which extends along nearly 100 km of coastline between Clam Bay and Liscomb Point. The islands are generally within 15 km of the shore. See Appendix B, Figure B-12.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Sheet Harbour Islands (14):
  - Very complex shoreline.
  - Extensive, undeveloped archipelago.
  - Substrate predominantly rocky.

d. Notable physical and/or oceanographic attributes:

The Eastern Shore Archipelago is composed of more than 100 islands, ranging from minute rocky ledges to islands in excess of 350 hectares (Hill et al. 2012). An archipelago of the size and extent of the Eastern Shore Islands is provincially rare, with the closest rival being the Tusket Islands on the southwestern Scotian Shelf. However, the density of the islands in the Eastern Shore Archipelago is unparalleled between Yarmouth and Canso (Hill et al. 2012). In fact, island density can be as much as three times greater along the Eastern Shore than elsewhere along mainland Nova Scotia.

e. Notable ecological attributes:

The high number and concentration of islands in the Eastern Shore Archipelago provides relatively large amounts of the habitat that is favoured by colonial marine birds. Indeed, the isolated and relatively mammal-free environment offered by at least some of these islands is ideal for nesting birds. Based on a combination of local ecological knowledge (LEK) and survey data, McCullough et al. (2005) identified over 85 marine bird colonies in this area. Generally more is known about the colonies east of Taylor Head. This portion of the archipelago hosts *globally significant* numbers of breeding Common Eider during the summer months, and is one of the most important nesting areas for the *dresseri* subspecies (Atlantic subspecies) in eastern Canada, outside of the Gulf of St. Lawrence and the Labrador coast (IBA Canada 2014; Allard et al. 2014). During the migratory seasons, Common Eider can be found in the waters of the Eastern Shore Archipelago in *globally significant* numbers (IBA Canada 2014). The Eastern Shore Archipelago is also of importance to other waterfowl species. This is especially true of scoter spp., which form significant aggregations in all nine of the waterfowl survey blocks represented within this EBSA (Allard et al. 2014). Similarly, merganser spp. and goldeneye spp. form several significant aggregations within the archipelago area[13]. The Canada Goose forms significant aggregations in the Necum Teuch Bay and offshore area (Halibut Islands). In all, waterfowl are observed in significant numbers within the Eastern Shore Archipelago during migration periods (IBA Canada 2014). In addition, significant numbers of the eastern population of Harlequin Duck (Special Concern – SARA) overwinter in the area, with the largest aggregations occurring around the islands between Beaver Harbour and Liscomb Point (IBA Canada 2014; Allard et al. 2014). The Purple Sandpiper also occurs in significant numbers in the area (Allard et al. 2014), especially along the exposed shorelines of the archipelago, as revealed in recent dedicated surveys of the species undertaken in 2011 (Julie Paquet[14] pers. comm. 2013).

[13] Refer to Allard et al. (2014) for more detail on the distribution of these aggregations within the EBSA.
[14] Coastal Birds Biologist, Canadian Wildlife Service, Atlantic Region, Environment Canada.

The Eastern Shore Archipelago supports significant colonies of Great Blue Heron (off Quoddy Head) and Great Black-backed Gull (throughout the archipelago, except for Clam Bay) (Allard et al. 2014). The Roseate Tern (Endangered – SARA) has also been known to form significant colonies on nearshore islands between Beaver Harbour and Liscomb Point. The current status of these colonies is not known; however, at one time they nested here in significant numbers (Gromack et al. 2010). Colonial species that do not necessarily form significant colonies, but have been observed nesting throughout the archipelago, include Common and Arctic Terns, Herring Gull, Leach's Storm-petrel, and cormorant spp. (McCullough et al. 2005). In fact, the tight clustering of multiple individual Leach's Storm-petrel colonies, such as exists within the archipelago and of this magnitude, has not been recorded elsewhere in the Maritime Provinces (Allard et al. 2014).

Bowen's Ledge and White Island, both situated off of Ecum Secum, accounted for two of five inshore grey seal breeding colonies identified by aerial survey in the Atlantic coast sub-region of Nova Scotia (Lidgard 2007).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Size and island density of archipelago is provincially unique. • Clustering of Leach's Storm-petrel colonies not observed elsewhere in the Maritime Provinces.
Aggregation	Y	• Significant aggregations of scoter spp., merganser spp., goldeneye spp., and Canada Goose. • Significant numbers of overwintering Harlequin Duck (Special Concern – SARA). • *Globally significant* numbers of Common Eider during migrations. • Significant aggregations of Purple Sandpiper in winter.
Fitness Consequences	Y	• *Globally significant* numbers of breeding Common Eider. • Roseate Tern (Endangered – SARA) colonies in the area were once considered significant. • Significant Great Blue Heron and Great Black-backed Gull colonies. • Two Grey Seal breeding colonies.
Resilience		
Special importance for ESSCPs	Y	• Type 4: Grey Seal.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Additions to Eastern Shore Islands Wildlife Management Area **(PROPOSED)**	*Wildlife Act* R.S., c. 504, s.2.	Not yet legally designated.

LEGISLATED AREAS		
Clam Harbour Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Taylor Head Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Eastern Shore Islands Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes 50 vegetated islands and islets, plus 10 non-vegetated islets and ledges (Payne 1977). Also includes the surrounding marine area amounting to 11,610 hectares (Province of Nova Scotia 2012b). Total protected area under this designation: 12,535 ha.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS027 Eastern Shore Islands	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
Site of Ecological Significance (Pumpkin Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
Site of Ecological Significance (Horse Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
Site of Ecological Significance (Long Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
Site of Ecological Significance (Brokenback Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
Site of Ecological Significance (Little White Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Ship Rock Island	Nova Scotia Nature Trust	Nova Scotia Nature Trust has initiated a dedicated campaign, the "100 Wild Islands Legacy Campaign", to secure more islands within the Eastern Shore Archipelago.
Upper Tickle Island	Nova Scotia Nature Trust	See above.
Lower Tickle Island	Nova Scotia Nature Trust	See above.

CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Moose Island	Nova Scotia Nature Trust	See above.
Gerard Island	Nova Scotia Nature Trust	See above.
Shelter Cove	Nova Scotia Nature Trust	-

5.18. TOBACCO ISLAND

a. Geography:

This EBSA includes Tobacco Island and the immediately surrounding waters. The island is located at the mouth of Gegogan Harbour. See Appendix B, Figure B-13.

b. Inlet classification(s):

Inlet	Class	Predicted Diversity	Predicted Productivity
Gegogan Harbour	Simple Pelagic Bay	Medium	Medium-Low

c. Coastline classification:

- Country Harbour Headlands (15a):
  - Moderately complex shoreline with elongated inlets.
  - Predominantly mixed coarse and sand substrate.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Tobacco Island supports significant colonies of Common Eider and Great Blue Heron (Allard et al. 2014). Furthermore, the island falls within a waterfowl survey block known to host significant aggregations of merganser spp., goldeneye spp., scoter spp., and Common Eider.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of merganser spp., goldeneye spp., scoter spp., and Common Eider.
Fitness Consequences	Y	• Significant Common Eider and Great Blue Heron colonies.
Resilience		

Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Additions to Eastern Shore Islands Wildlife Management Area **(PROPOSED)**	*Wildlife Act* R.S., c. 504, s.2.	Not yet legally designated.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
Site of Ecological Significance (Tobacco Island)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-

5.19. COUNTRY HARBOUR ISLANDS

a. Geography:

This EBSA includes three islands just outside of Country Harbour, as well as the immediately surrounding waters and Coddles Harbour (east of Country Harbour). Goose Island is the largest of the islands, followed by Harbour Island and Country Island. Country Island is located approximately 5 km offshore and is the furthest from the mainland. See Appendix B, Figure B-13.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Coddles Harbour	Complex Intermediate Cove	Medium-**High**	Medium-Low

c. Coastline classification:

- Country Harbour Headlands (15a):
  - Moderately complex shoreline with elongated inlets.
  - Predominantly mixed coarse and sand substrate.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Country Island is known to host *globally significant* numbers of nesting Roseate Tern (Endangered – SARA) (IBA Canada 2014). It is also one of just three colonies in Canada to have exceeded 20 pairs within the past 13 years (maximum count: 53 pairs in 2000; Environment Canada 2010). The island has been deemed critical habitat for the Roseate Tern, and is actively managed to promote their recovery (Section 4.1.2). Rock et al. (2007) affixed radio tags to a total of ten roseate terns from the Country Island colony during the summers of 2003 and 2004. They discovered that these terns foraged primarily in waters less than 5 metres in depth around Goose and Harbour Islands and in Coddle Harbour, with fewer instances west of Country Harbour. Sand lance and hake spp. accounted for the majority (>70%) of the prey captured during the period of observation. The specialized foraging behaviour exhibited by these birds makes them especially vulnerable to disturbances originating from human activities along the coast and on the shoreline. Other vulnerabilities of this species include low reproductive success and a highly restricted distribution (Section 4.1.2). The Roseate Tern prefers to nest among large Arctic and Common Tern colonies. Combined, these three tern species form significant colonies on Country Island (Allard et al. 2014).

Country Island is also host to *globally significant* numbers of Leach's Storm-petrel (IBA Canada 2014). More than 50,000 pairs were recorded on this island in 1998. Waterfowl species forming significant aggregations within the Country Harbour-Coddle Harbour area include scoter spp., goldeneye spp., Common Eider, merganser spp., and American Black Duck[15]. This EBSA also supports significant at-sea aggregations of several seabird functional guilds, including shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp.), surface-seizing planktivores (e.g. phalarope spp.), and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Roseate Tern colonies are nationally rare, and colonies of the size found on Country Island are even rarer.
Aggregation	Y	• Significant aggregations of scoter spp., goldeneye spp., Common Eider, merganser spp., and American Black Duck. • Significant at-sea aggregations of shallow-diving piscivore/generalists (e.g. large gull spp., tern spp.), shallow-diving coastal piscivores (e.g. cormorant spp.), surface-seizing planktivores (e.g. phalarope spp.), and plunge-diving piscivores (e.g. Northern Gannet). • (Medium-high diversity predicted for Coddles Harbour based on its geophysical characteristics).

[15] There are multiple waterfowl survey blocks represented within this EBSA. Refer to Allard et al. (2014) for more detail on the distribution of these species within the area.

EBSA criteria	Criteria met?	Rationale
Fitness Consequences	Y	• Country Island is considered critical habitat for the Roseate Tern. • *Globally significant* numbers of nesting Roseate Tern in the area. • *Globally significant* numbers of nesting Leach's Storm-petrel. • Significant numbers of nesting tern spp.
Resilience	Y	• The Roseate Tern is vulnerable due to its low reproductive success, restricted distribution, and specialized foraging behaviour and prey selection.

Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Country Island Roseate Tern Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	Includes entire terrestrial habitat of island plus aquatic habitat extending 200 m from the mean high tide line.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS028 Country Island Complex	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.20. SUGAR HARBOUR ISLANDS

a. Geography:

This EBSA includes the archipelago situated in the eastern half of Tor Bay, just south of Chedabucto Bay. The archipelago is referred to collectively as the Sugar Harbour Islands, and includes Western, Passage, Larrys, Dorts, Winter, Cooks, Bonds, Tanner, and Hog Islands, among other smaller islands. See Appendix B, Figure B-14.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Tor Bay	Simple Pelagic Bay	Medium	Medium-Low

c. Coastline classification:

- Country Harbour Headlands (15a):
  - Moderately complex shoreline with elongated inlets.
  - Predominantly mixed coarse and sand substrate.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

The Sugar Harbour Islands have been known to support significant colonies of Common Eider, Great Black-backed Gull, and Herring Gull (Allard et al. 2014). Relatively moderate Roseate Tern (Endangered – SARA) numbers have been recorded among the Sugar Harbour Islands, as well as on an island in Tor Bay off of Charlos Cove (IBA Canada 2014; Allard et al. 2014). How frequently and in what numbers this species currently uses these islands is unknown. As a whole, Tor Bay supports significant aggregations of merganser spp., goldeneye spp., scoter spp., and Common Eider (Allard et al. 2014). Significant numbers of Purple Sandpiper also occur on islands within Tor Bay in the winter (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of merganser spp., goldeneye spp., scoter spp., and Common Eider. • Significant aggregations of Purple Sandpiper during winter.
Fitness Consequences	Y	• Significant Common Eider, Great Black-backed Gull, and Herring Gull colonies. • Moderate numbers of Roseate Tern (Endangered – SARA) nest on islands within the archipelago, or have at some point in the recent past.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Additions to Eastern Shore Islands Wildlife Management Area **(PROPOSED)**	*Wildlife Act* R.S., c. 504, s.2.	Not yet legally designated.

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS028 Country Island Complex	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	While the primary focus of this IBA is the Country Harbour Islands (Section 5.19), it also includes an unnamed island off Charlos Cove in Tor Bay, as well as Cooks, Dorts, and Hog Islands within the Sugar Harbour archipelago. All of these islands have had known occurrences of Roseate Terns within the past 30 years.

5.21. THE CANSO LEDGES

a. Geography:

This EBSA includes the inshore waters around the prominent Canso peninsula on the eastern shore of Nova Scotia, near Cape Breton Island. It captures much of Chedabucto Bay, which is on the northern side of the peninsula. See Appendix B, Figure B-14.

b. Inlet classification(s):

Inlet Name	Class	Predicted Diversity	Predicted Productivity
Port Howe	Simple Pelagic Bay	Medium	Medium-Low
Louse Harbour	Simple Intermediate Estuary	Low	Medium-**High**
Dover Bay	Simple Pelagic Bay	Medium	Medium-Low
Chedabucto Bay	Simple Pelagic Bay	Medium	Medium-Low

c. Coastline classification:

- Canso Bedrock Shore and Islands (15b):
  - Predominantly boulder and bedrock substrate.
  - Large headlands with few inlets.

- Chedabucto Bedrock and Pocket Beaches (16a):
  - Predominantly rocky substrate.

d. Notable physical and/or oceanographic attributes:

Within the Atlantic coast sub-region, Chedabucto Bay is the largest inlet (Davis and Browne 1996b). It is also the deepest, with a maximum depth of 108 m (Gregory et al. 1993). The Chedabucto Fault, which transects central Nova Scotia into the Bay of Fundy, lies at the northern boundary of the Canso peninsula (P. Lane and Associates 1992; Davis and Browne 1996b). A narrow tongue of deep water (>90 metres depth) coincides with this boundary

between Fox Island and the seaward extent of the EBSA off Canso (Gregory et al. 1993; Gromack et al. 2010; Appendix C). Summer water temperatures around the Canso peninsula are typically warmer than the more exposed shorelines to the south (Davis and Browne 1996b; Breeze et al. 2002). There are numerous underwater rocks and shoals immediately off the Canso peninsula.

e. Notable ecological attributes:

The mouth of Chedabucto Bay has been described as having a high abundance and diversity of fishes (Clark 2006). There are a number of at-risk fish species that appear to form inshore aggregations off of Canso, including Atlantic Wolffish (Special Concern – SARA), Thorny Skate (Special Concern – COSEWIC), and Winter Skate (Threatened – COSEWIC) (Harris 2006). Chedabucto Bay has special historic importance for Atlantic Cod (Endangered – COSEWIC), at one time hosting the largest inshore stock along the Eastern Shore of Nova Scotia (Bundy et al. 2014). However, by the 1970s, heavy fishing effort had resulted in a substantial reduction in the size of this population. Nonetheless, P. Lane and Associates (1992) ranked cod as a commonly occurring species in the Canso area, and also suggested that it was an important cod spawning ground. The recent presence of cod in this area is supported by 2010 NAFO 4VsW Sentinel Program results, which show relatively high catches along the south shore of the Canso peninsula (Scott-Tibbetts 2012). Whether spawning still occurs in this area is not known.

Historically, Chedabucto Bay was one of just a few areas along the Atlantic coast where Atlantic Herring spawned both in the spring and the fall (Stephenson et al. 2009). In fact, a spawning area located along the south shore of the bay was once purported to be the largest in the region (Sameoto 1971); however, this area is not believed to be active currently (Stephenson et al. 2009). Chedabucto Bay is also one of the major overwintering grounds for herring in Nova Scotia (e.g. DFO 2002b; Waters and Clark 2005).

Using a beach seine, O'Connor (2008) collected samples of juvenile fish at two sites along the northern shore of the Canso peninsula, specifically, Fox Island and Queensport Beach. A combined total of 14 different juvenile species were recorded at these locations. Sand lance spp. was the most abundant species recorded at each sample site, and represented among the highest catches of this species across all 25 sites sampled by O'Connor (2008) between Kings County and Guysborough County. Juvenile hake spp. was more abundant at Queensport Beach than at any of the other 25 sample sites. Similarly, Fox Island Beach yielded the highest number of Grubby (*Myoxocephalus aenaeus*) across sites. This species was also caught at Queensport Beach, and was more abundant here than at ~85% of the other sites.

Because of its strong depth gradient, local scientists have described Chedabucto Bay as a "hotspot" for invertebrate diversity (DFO 2006c). Indeed, Chedabucto Bay is one of just a couple of inshore areas where the bottom reaches temperatures cold enough to support Snow Crab (*Chionoecetes opilio*) (Tremblay 2006). It is also one of just three known coastal areas in Nova Scotia where Northern Shrimp occurs (Koeller et al. 2007; see also Section 5.10).

Watanabe et al. (2010) recorded a concentration of abundance of the rockweed *Fucus* spp. around the Canso peninsula and into Chedabucto Bay. This genus of fucoid species is generally found in wave exposed or ice-scoured areas, which is true of the Canso area (DFO 1998; Ugarte et al. 2010).

Scoter spp., merganser spp., American Black Duck, and Common Eider each form significant aggregations around the Canso peninsula, as does Purple Sandpiper in the winter (Allard et al. 2014). Significant colonies of tern spp., Great Black-backed Gull, and Herring Gull have been observed on the nearshore islands. The relative at-sea abundances of Thick-billed Murre (*Uria lomvia*), Dovekie (*Alle alle*), and Northern Gannet in the Canso area are significant (Allard et al. 2014).

The Fin Whale (Special Concern – SARA) is sighted frequently in the Canso/Chedabucto Bay area during the winter and spring (e.g. P. Lane and Associates 1992; Davis and Browne 1996a; Jacques Whitford Environment Ltd. 2004). These whales are drawn to the area to forage on large schools of herring and mackerel, two of their preferred food sources. Chedabucto Bay is one of three areas around Nova Scotia where Fin Whales are known to concentrate inshore (P. Lane and Associates 1992). Other commonly observed marine mammals in the area include: the Common Minke Whale, the Atlantic White-sided Dolphin, the White-beaked Dolphin, the Harbour Porpoise (Special Concern – COSEWIC), and a variety of seal species (Jacques Whitford Environment Ltd. 2004).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Chedabucto Bay is unique in its size and depth. • Tongue of deep water on northern shore of peninsula. • Rare coastal habitat for Northern Shrimp.

EBSA criteria	Criteria met?	Rationale
Aggregation	Y	• The mouth of Chedabucto Bay has been noted for its abundance and diversity of fish. • Historic importance for Atlantic Cod (Endangered – COSEWIC). May still be important area for this species. • Aggregations of Atlantic Wolffish (Special Concern – SARA), Thorny Skate (Special Concern – COSEWIC), and Winter Skate (Threatened – COSEWIC). • Inshore concentration of Fin Whale (Special Concern – SARA). • Significant aggregations of scoter spp., merganser spp., American Black Duck, Common Eider, and Purple Sandpiper. • Significant at-sea aggregations of shallow-diving coastal piscivores (e.g. cormorant spp., loon and grebe spp.), pursuit-diving piscivores (e.g. murre spp.), shallow pursuit generalists (shearwater spp.), surface-seizing planktivores (e.g. Wilson's Storm-petrel), pursuit-diving planktivores (e.g. Dovekie), and plunge-diving piscivores (e.g. Northern Gannet). • High concentrations of the rockweed *Fucus* spp. • Because of its strong depth gradient, the area is a hotspot for invertebrate diversity. • (Medium-high productivity predicted for Louse Harbour based on its geophysical characteristics).
Fitness Consequences	Y	• Potentially important juvenile areas for sand lance spp., hake spp., and Grubby. • Formerly a significant spring and fall spawning area for Atlantic Herring. • Overwintering area for Atlantic Herring. • Significant tern spp., Great Black-backed Gull, and Herring Gull colonies.
Resilience		
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring, Atlantic Cod, Atlantic Wolffish. • Type 2: Rockweed.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Canso Coastal Barrens Wilderness Area	*Wilderness Areas Protection Act* 1998, c. 27, s. 1	-
Grassy Island National Historic Park	*Canada National Parks Act* S.C. 2000, c. 32	-
Fox Island Main Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Lower Half Island Cove Beach	*Beaches Act* R.S., c. 32, s. 1.	-

Half Island Cove Beach	*Beaches Act* R.S., c. 32, s. 1.	-
LEGISLATED AREAS		
Queensport Beach	*Beaches Act* R.S., c. 32, s. 1.	-

5.22. BRAS D'OR LAKES

Note: An Ecosystem Overview and Assessment Report for the Bras d'Or Lakes watershed was compiled by Parker et al. (2007). The information provided in this section was derived exclusively from this source, unless otherwise indicated.

a. Geography:

This EBSA includes the Bras d'Or Lakes, a large inland sea located in the middle of Cape Breton Island. See Appendix B, Figures B-15 and B-16.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Great Bras d'Or (22a):
  - Long, narrow inlets and channels.
  - More circulation and mixing than class 22b.
  - More ice cover than class 22b.

- Bras d'Or Lake (22b):
  - Topographically complex with numerous islands and large bays.
  - Greater wave and wind action than class 22a.
  - More extensive coastal landforms (e.g. marine/estuarine flats, saline ponds, beaches).

d. Notable physical and/or oceanographic attributes:

The Bras d'Or Lakes constitute a unique inland estuarine system, with a shoreline of 1234 km, and a marine area of 1086 km^2. The system is largely cut-off from the open ocean, with limited water exchange occurring via three outlets. Of these, only one, the Great Bras d'Or Channel (average width: 1.3 km), allows for any significant water exchange to occur. The other two outlets, Little Bras d'Or Channel and St. Peter's Canal, have a comparatively negligible influence due to their narrowness and locks system, respectively. Tidal amplitudes in the Lakes are greatly diminished by the friction and turbulence created by the constrictive Great Bras D'Or Channel. Further attenuation occurs with distance from the Channel, resulting in the Bras d'Or Lakes having the smallest tidal ranges observed in the province.

Indeed, with a typical tidal range on the order of 5-10 cm, there is a very limited intertidal zone throughout the Lakes.

The average depth of the Lakes is shallow at ~30 m. There are, however, discrete deepwater areas; namely, St. Andrew's Channel (maximum depth: 280 m) and the central portions of North Basin and Bras d'Or Lake (maximum depths: 229 m and 119 m, respectively). Numerous bathymetric sills characterize the Lakes as a whole, strongly influencing bay and within-bay scale chemical and biological properties by limiting circulation.

The Bras d'Or Lakes have a distinctly estuarine circulation, with a net inward flow of bottom water, and a net outward flow of comparatively fresher surface water. Spring surface salinity ranges from ~30 ppt at the entrance to the Great Bras d'Or Channel to ~20 ppt in the North Basin. The average salinity at depth in the Bras d'Or Lakes is approximately 25 ppt. These contrasting surface and bottom water salinities, coupled with a steep temperature gradient approaching 20°C, results in strong stratification throughout much of the Lakes in the spring and summer. Exceptions include narrow channels such as the Great Bras d'Or Channel and Barra Strait where strong tidal currents enhance mixing.

The primary source of nutrients to the Bras d'Or Lakes is the inflowing marine waters at depth. However, the cycling of these nutrients into the surface layer is severely inhibited by the general lack of mixing. Moreover, the influx of nutrient-rich marine water into the Lakes is diluted by the downwelling and subsequent recirculation of over half the outflowing surface water in the Great Bras d'Or Channel. The Lakes are generally nutrient-poor as a result.

The shoreline of the Bras d'Or Lakes is quite narrow, as steep relief closely abuts the coast in all but a few areas. Over 80% of the shoreline is composed of unconsolidated material, while the remainder is rock (Taylor and Shaw 2002). The shoreline is highly convoluted, with nearly one-third of it being sheltered in bays, coves, and inlets. Coastal barriers, which form small lagoons, are profuse, lining a total of ~150 km of the shoreline.

Metres-deep mud and silts cover the vast majority of the lake bottom. Rocky substrate is confined to the shore and the few areas where currents are fast enough to prevent the settling of fine sediments (e.g. Great Bras d'Or Channel). In spite of the extensive riverine input and predominantly muddy bottom, the amount of suspended particulate matter observed in the water column of the Bras d'Or Lakes is generally minimal, resulting in a deep photic zone.

e. Notable ecological attributes:

A complex suite of factors influences the overall biodiversity of the Lakes. Favourable conditions for enhanced marine biodiversity, such as water clarity, diverse physical habitats, and varied water chemistries, are diminished by the contrasting conditions of nutrient limitation, a negligible intertidal zone, low salinity, and restricted access to the more widely preferred coarse-grained substrate. In addition, migration between the Lakes and the open ocean is inhibited by the narrow, shallow, and high energy Great Bras d'Or Channel. The areas of highest biodiversity within the Lakes include:

- Great Bras d'Or Channel: This channel is well mixed, with extensive coarse-grained substrate. There is an approximate salinity range of 10 ppt from one end of the channel to the other, allowing for a wider variety of marine organisms to thrive. Nearly all migrations into and out of the Lakes occur via this channel.
- St. Andrews Channel: This channel is unique in the Bras d'Or Lakes for its depth and associated habitat characteristics.
- North Basin: This basin supports comparatively high levels of primary productivity relative to the rest of the Lakes. It has been hypothesized that this is in large part due to its situation between the Great Bras d'Or Channel, the source of nutrient-rich marine waters, and St. Patricks Channel, which conveys silicate-rich surface waters into the basin. In addition, the North Basin experiences the most significant upwelling in the Lakes, making deep-water nutrients more accessible in the photic zone.

The Bras d'Or Lakes are distinctive from the rest of coastal Nova Scotia in their ability to support several relict warm water (Virginian) and cold water (Arctic) species from a variety of taxonomic groups (Lambert 2002). These isolated population remnants have subsisted in the Lakes because of the unique temperature regime. Surface temperatures can reach in excess of 20°C, while bottom temperatures in the deepest areas are near freezing. This extreme contrast allows both groups of relict species to find their niche within the Lakes. Lambert (2002) observed that over 30° of latitude are represented within distances of less than 10 km in the Bras d'Or Lakes, which is an exceptional ecological feature. Examples of relict warm water species in the Lakes include American Oyster (*Crassotrea virginica*), Windowpane Flounder, and multiple species of polychaete worms (e.g. *Euchone elegans*, *Polydora quadrilobata*, and *Myriochele heeri*). Cold-water relicts include the copepod *Microcalanus pusillus*, the mysid shrimp *Mysis oculata*, multiple foram species (e.g. *Eggerella advena, Rheophax arctica*) and multiple polychaete worm species (e.g. *Clymenura polaris, Sabellides borealis, Lysippe labiata*).

Forty-six fish species have been recorded in the Bras d'Or Lakes, many of which spend their entire life cycle within the Lakes ecosystem, and can be considered resident populations (Lambert 2002). Consequently, spawning, rearing, and feeding activities are occurring within the Lakes nearly all year. Of the groundfish, Winter Flounder and Atlantic Cod (Endangered – COSEWIC) have historically been two of the most plentiful and widely distributed species in the Lakes. Less plentiful, but also widespread, are White Hake (Threatened – COSEWIC), Winter Skate (Threatened – COSEWIC), and Windowpane Flounder. American Plaice (*Hippoglossoides platessoides*) (Threatened – COSEWIC) was once among the most abundant and widespread fish species in the Lakes, but has declined significantly over the past 40 years. The most commonly observed pelagic species in the Bras d'Or Lakes are: Cunner, Fourbeard Rockling (*Enchelyopus cimbrius*), Alewife, Atlantic Mackerel, Rainbow Smelt (*Osmerus mordax*), and Three-Spined Stickleback (Lambert 2002). There is a spring spawning population of Atlantic Herring in the Bras d'Or Lakes, with some evidence to suggest that it may be genetically distinct from other populations on the Scotian Shelf. The current status of this spawning component is unknown, as there have been no systematic herring surveys of the Lakes since 2001 (DFO 2011c). The Bras d'Or Lakes herring fishery

was closed in the late 1990s in response to a near-collapse of the stock due to increased fishing effort (Lambert 2002).

Several watersheds known to support spawning Eastern Cape Breton Atlantic Salmon (Endangered – COSEWIC) drain into the Bras d'Or Lakes (Gibson et al. 2014; Section 4.2.2). Among these rivers are the Baddeck and Middle Rivers, which support two of the healthier Atlantic Salmon populations in the region, and both flow into Nyanza Bay. Consequently, this bay is likely an especially important area for these two salmon populations, and because of their status, potentially for the persistence of Atlantic Salmon in the Bras d'Or Lakes, and elsewhere in Nova Scotia.

The salinity and/or habitat requirements of several benthic invertebrate species (e.g. lobster, scallops, rock crab) severely limit their distribution and abundance in the Bras d'Or Lakes. However, sea urchins and starfish have been found to be abundant and widely distributed within the Lakes.

McLachlan and Edelstein (1971) conducted an intensive survey of marine algae at 45 stations within the Bras d'Or Lakes. Ninety-two species were identified in this effort. The authors noted that the algal flora of the Lakes was sparse and largely confined to a narrow band along the shoreline. As a result, it is unlikely that marine algae contribute significantly to the productivity of the Lakes. They also noted that the unique temperature, salinity, and circulation regime of the Lakes had an obvious influence on the composition and morphology of the species observed. The marine algae *Nemalion helminthoides*, a rare species within Atlantic Canada, was recorded at multiple sites, and was particularly dense just north of MacIver's Cove in St. Patricks Channel. Eelgrass was recorded at all 45 stations surveyed by McLachlan and Edelstein (1971). This was the most abundant plant observed, and it appeared to have a wider niche within the Lakes than the seaweeds. The more profuse occurrence of eelgrass is likely due in part to its ability to take root in the soft bottom sediments that dominate the lakebed. Little is known about the present abundance and distribution of eelgrass in the Bras d'Or Lakes (Parker et al. 2007); however, a traditional ecological knowledge study suggested that the coverage and health of some eelgrass beds has declined in recent decades (CEPI 2006). The most extensive eelgrass beds within the Lakes appear to be in Denys Basin (Parker et al. 2007). There are also a number of discrete areas of high salt marsh concentration within the Lakes; namely, Whycocomagh Bay, Nyanza Bay, and Denys Basin (Allard et al. 2014).

The Bras d'Or Lakes area is not generally noted for its birds; however, it is a popular habitat for select species. North Basin, St. Andrew's Channel, Great Bras d'Or Channel, East Bay, and West Bay each host significant aggregations of merganser spp. (Allard et al. 2014). Similarly, St. Patrick's Channel and Denys Basin each host significant aggregations of American Black Duck. Significant aggregations of goldeneye spp. can be found in St. Andrew's Channel and the lower Great Bras d'Or Channel. Overall, colonial birds are not observed to be exceptionally abundant or diverse within the Lakes. However, significant Great Blue Heron colonies have been recorded outside of Denys Basin and in St. Patrick's Channel (Allard et al. 2014). When present, colonial bird species are usually observed on the

few islands within the Lakes (Parker et al. 2007). Within the Bras d'Or watershed, the Bald Eagle (*Haliaeetus leucocephalus*) nests in provincially significant numbers.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• The Bras d'Or Lakes represent a unique ecosystem with distinct oceanographic characteristics (e.g. salinity, circulation, bathymetry). • Regionally rare Arctic and warm water relict species present. • A regionally rare species of marine algae, *Nemalion helminthoides*, has been observed at multiple sites within the Lakes.
Aggregation	Y	• A high proportion of the fish species observed in the Bras d'Or Lakes are part of resident populations, which complete all of their life stages within the Lakes. • Atlantic Cod (Endangered – COSEWIC) and Winter Flounder have historically been among the most abundant groundfish species in the Lakes. • Winter Skate (Threatened – COSEWIC) has historically been widely distributed throughout the Lakes. • Although it has declined significantly since 1952, American Plaice (Threatened – COSEWIC) is still among the more common groundfish species found in the Lakes. • The Bras d'Or Lakes watershed hosts provincially significant numbers of nesting Bald Eagle. • Significant areas of salt marsh (localized). • Historically widespread eelgrass coverage. • Ninety-two species of marine algae recorded. • Forty-six fish species recorded. • Several warm water and cold water relict species.
Fitness Consequences	Y	• Atlantic Herring spawning area. • Atlantic Salmon (Endangered – COSEWIC) transit through the Lakes on their way to and from spawning rivers in the Bras d'Or watershed.
Resilience	Y	• The many coastal barriers in the Bras d'Or Lakes are vulnerable to both natural and anthropogenic degradation. This is especially true given that nearly 45% of the existing barriers are either in the breakdown or collapsed phases of barrier evolution (Taylor and Shaw 2002). • Because of their relatively small size and lack of circulation, lagoons associated with the coastal barriers are especially prone to eutrophication.
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring, Atlantic Cod, Sea Urchins. • Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS			
Basin	**Protected Area**	**Governing Legislation**	**Notes**
Whycocomagh Bay	Whycocomagh Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
St. Patrick's Channel	Spectacle Island Game Sanctuary	*Wildlife Act* R.S., c. 504, s.2.	Includes the surrounding waters up to 100 m from ordinary high water mark of the island.
St. Patrick's Channel	Washabuck River Nature Reserve	*Special Places Protection Act* R.S., c. 438, s. 1	-
North Basin	Iona Beach	*Beaches Act* R.S., c. 32, s. 1.	-
North Basin	Shenacadie Beach	*Beaches Act* R.S., c. 32, s. 1.	-
St. Andrew's Channel	Mary Harper Nature Reserve	*Special Places Protection Act* R.S., c. 438, s. 1	-
St. Andrew's Channel	Groves Point Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
St. Andrew's Channel	Christies Beach	*Beaches Act* R.S., c. 32, s. 1.	-
St. Andrew's Channel	Barrachois Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
East Bay	Ben Eoin Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
West Bay	Malcolm Cove Beach	*Beaches Act* R.S., c. 32, s. 1.	-
St. Peter's Inlet	St. Peter's Canal National Historic Site	*Canada National Parks Act* S.C. 2000, c. 32	-
St. Peter's Inlet	Battery Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
SPECIAL DESIGNATIONS			
Basin	**Designation**	**Designating Body**	**Notes**
All basins	Bras d'Or Lake Biosphere Reserve	United Nations Educational, Scientific, and Cultural Organization (UNESCO).	-
St. Andrew's Channel	Island Point	The Beaton Institute, Cape Breton University	-

5.23. POINT MICHAUD AND BASQUE ISLANDS

a. Geography:

This EBSA includes Point Michaud and the adjacent Basque Islands. Point Michaud is a narrow promontory extending approximately 1.5 km into the Atlantic Ocean off the southeast coast of Cape Breton Island. To the east of Point Michaud (~2-4 km) are the Basque Islands, a group of four low-lying islets, each less than 1 ha in size (IBA Canada 2014). See Appendix B, Figure B-15.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Framboise Till Cliffs and Beaches (17a):
  - Topographically simple with long straight coastline.
  - Barrier beaches and coastal saline ponds are a common shoreline feature.
  - Substrate is resistant bedrock with sand beaches in the lower intertidal zone.

d. Notable physical and/or oceanographic attributes:

There are number of coastal ponds on the Point Michaud promontory and behind the beaches that connect it to the mainland (IBA Canada 2014). Some of these ponds are influenced by the tides.

e. Notable ecological attributes:

The Basque Islands are noted for hosting *globally significant* numbers of nesting Great Cormorant (*Phalacrocorax carbo*) (IBA Canada 2014). These islands also host significant colonies of Great Black-backed Gull (Allard et al. 2014). In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed. Although not a significant shorebird area relative to eastern Canada, Point Michaud is among the most important shorebird areas within Cape Breton, supporting a wide diversity of species (IBA Canada 2014; Allard et al. 2014). There is a significant aggregation of Purple Sandpiper in the area (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Among the most significant shorebird areas in Cape Breton due to the diversity of species present. • Significant aggregation of overwintering Purple Sandpiper. • Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• *Globally significant* numbers of nesting Great Cormorant. • Significant Great Black-backed Gull colonies.
Resilience		

Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Point Michaud Beach	*Beaches Act* R.S., c. 32, s. 1.	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS045 Basque Islands and Point Michaud	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
Site of Ecological Significance (Point Michaud)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT)	-

5.24. ROCKS OFF FOURCHU HEAD

a. Geography:

This EBSA consists of a cluster of rocks just off the end of Fourchu Head, a promontory approximately 1.5 km in length, located south of Fourchu Bay and directly east of the town of Fourchu. See Appendix B, Figure B-16.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Framboise Till Cliffs and Beaches (17a):
  - Topographically simple with long straight coastline.
  - Barrier beaches and coastal saline ponds are a common shoreline feature.
  - Substrate is resistant bedrock with sand beaches in the lower intertidal zone.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

The rocks off Fourchu Head have been known to host *globally significant* numbers of nesting Great Cormorant (IBA Canada 2014). In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• *Globally significant* numbers of nesting Great Cormorant.
Resilience		

g. Current area-based management measures and special designations:

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS047 Rocks off Fourchu Head	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.25. GUYON ISLANDS

a. Geography:

This EBSA encompasses the Guyon Islands, a small archipelago situated just outside of Fourchu Bay, approximately 1.6 km southeast of Winging Point Lake. Guyon Island is the largest of the islands. See Appendix B, Figure B-16.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Framboise Till Cliffs and Beaches (17a):
  - Topographically simple with long straight coastline.
  - Barrier beaches and coastal saline ponds are a common shoreline feature.
  - Substrate is resistant bedrock with sand beaches in the lower intertidal zone.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Significant colonies of Great Black-backed Gull and tern spp. are present in this area (Allard et al. 2014). In addition, this EBSA falls within the stretch of coastline between Isle Madame

and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• Significant colonies of Great Black-backed Gull and tern spp.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

None.

5.26. GREEN ISLAND

a. Geography:

This EBSA includes Green Island, located less than 1 km east of Cape Gabarus in Cape Breton. See Appendix B, Figure B-16.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Framboise Till Cliffs and Beaches (17a):
  - Topographically simple with long straight coastline.
  - Barrier beaches and coastal saline ponds are a common shoreline feature.
  - Substrate is resistant bedrock with sand beaches in the lower intertidal zone.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

This islet hosts the third largest of the five known colonies of Black-legged Kittiwake in Nova Scotia (Allard et al. 2014). Relative to the rest of eastern Canada, this species does not

form a significant colony at this location; however, its presence is noted because of its provincial rarity.

Significant colonies of Great Black-backed Gull and tern spp. are present (Allard et al. 2014). In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• One of five known Black-legged Kittiwake colonies in Nova Scotia. Black-legged Kittiwake is a provincially rare species.
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• Significant colonies of Great Black-backed Gull and tern spp.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

None.

5.27. HARBOUR ROCK

a. Geography:

This EBSA encompasses Harbour Rock and the surrounding high reefs, which are located at the head of Gabarus Bay, approximately 1 km from shore. The community of Gabarus is ~3 km southeast of Harbour Rock. See Appendix B, Figure B-16.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Framboise Till Cliffs and Beaches (17a):
  - Topographically simple with long straight coastline.
  - Barrier beaches and coastal saline ponds are a common shoreline feature.
  - Substrate is resistant bedrock with sand beaches in the lower intertidal zone.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Harbour Rock is known to host *globally significant* numbers of nesting Great Cormorant (IBA Canada 2014). It also hosts significant colonies of Great Black-backed Gull (Allard et al. 2014). In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• *Globally significant* numbers of nesting Great Cormorant. • Significant colonies of Great Black-backed Gull.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS049 Harbour Rocks	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.28. ISLET OFF OF BALEINE

a. Geography:

This EBSA includes a small, unnamed islet in Baleine Harbour, and the surrounding waters. See Appendix B, Figure B-17.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Scatarie Bedrock Cliffs (17b):
  - Primarily bedrock substrate, with mixed coarse material in the intertidal zone.
  - Cliffs are a dominant coastal landform.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

This islet hosts the second largest of the five known colonies of Black-legged Kittiwake in Nova Scotia (Allard et al. 2014). Relative to the rest of eastern Canada, this species does not form a significant colony at this location; however, its presence is noted because of its provincial rarity. In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• One of five known Black-legged Kittiwake colonies in Nova Scotia. Black-legged Kittiwake is a provincially rare species.
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences		
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

None.

5.29. PORTNOVA ISLANDS

a. Geography:

This EBSA includes a closely clustered group of islands and islets, collectively referred to as the Portnova Islands, located approximately 1 km from the nearest mainland. Chameau Rock, less than 1 km north of the Portnova Islands, is also included in the EBSA. See Appendix B, Figure B-17.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Scatarie Bedrock Cliffs (17b):
  - Primarily bedrock substrate, with mixed coarse material in the intertidal zone.
  - Cliffs are a dominant coastal landform.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

These islands have hosted *globally significant* numbers of nesting Great Cormorant (IBA Canada 2014). Significant Great Black-backed Gull colonies can also be found in the area. In addition, this EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of overwintering Common Eider in the general area.
Fitness Consequences	Y	• *Globally significant* numbers of nesting Great Cormorant. • Significant Great Black-backed Gull colonies.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS006 Portnova Islands	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.30. SCATARIE ISLAND

a. Geography:

This EBSA includes Scatarie Island and the immediately surrounding waters and islands, including Hay Island. See Appendix B, Figure B-17.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Scatarie Bedrock Cliffs (17b):
  - Primarily bedrock substrate, with mixed coarse material in the intertidal zone.
  - Cliffs are a dominant coastal landform.

d. Notable physical and/or oceanographic attributes:

At 1500 hectares, Scatarie Island is one of Nova Scotia's largest islands (Province of Nova Scotia 2012b).

e. Notable ecological attributes:

A variety of rare vegetation types are known to have adapted to the cool and highly exposed conditions characteristic of Scatarie Island (Province of Nova Scotia 2012b). The island is also noted for its diversity of fauna and habitats, including coastal wetland complexes and heath barrens.

Scatarie Island has been known to host *nationally significant* numbers of Bicknell's Thrush (*Catharus bicknelli*), a terrestrial songbird (IBA Canada 2014). This species is a habitat specialist, occupying one of the most restricted breeding ranges among North American forest birds (COSEWIC 2009). Coastal lowlands with cool sea breezes, high precipitation, and spruce-fir forests represent one of three breeding habitats identified for Bicknell's Thrush. This species is listed as Threatened (SARA) due to its limited range and recent decline in population and area of occupancy. Scatarie Island also hosts an unsurveyed colony of nesting Leach's Storm-petrel thought to number in the thousands of pairs (IBA Canada 2014). There is also a significant Great Black-backed Gull colony centred on Hay Island, just off the northeast coast of Scatarie (Allard et al. 2014). The waters around Scatarie Island host significant aggregations of scoter spp. This EBSA falls within the stretch of coastline between Isle Madame and Scatarie Island (i.e. eastern Cape Breton Island) where several significant aggregations of overwintering Common Eider have been observed. This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving coastal piscivores (cormorant spp.), shallow-diving piscivore/generalists (large gull spp., tern spp. Black-legged Kittiwake), pursuit-diving piscivores (e.g. murre spp., Razorbill), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel) and plunge-diving piscivores (e.g. Northern

Gannet). At-sea surveys within this EBSA are limited to the area east of Scatarie Island. (Allard et al. 2014).

Hay Island accounted for one of five inshore Grey Seal breeding colonies identified by aerial survey in the Atlantic coast sub-region of Nova Scotia (Lidgard 2007). It represents the largest surveyed colony in this sub-region, and is 19 times larger than the second largest colony on Noddy Island (Outer Tusket Islands).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of scoter spp. • Significant aggregations of overwintering Common Eider in the general area. • Significant at-sea aggregations of shallow-diving coastal piscivores (cormorant spp.), shallow-diving piscivore/generalists (large gull spp., tern spp. Black-legged Kittiwake), pursuit-diving piscivores (e.g. murre spp., Razorbill), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel) and plunge-diving piscivores (e.g. Northern Gannet). • Diverse coastal habitats.
Fitness Consequences	Y	• Largest breeding Grey Seal colony in the Atlantic coast sub-region. • Potentially significant Leach's Storm-petrel colony. • Significant Great Black-backed Gull colony. • *Nationally significant* numbers of nesting Bicknell's Thrush (Threatened – SARA).
Resilience		
Special importance for ESSCPs	Y	• Type 4: Grey Seal.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Scatarie Island Wilderness Area	*Wilderness Areas Protection Act* 1998, c. 27, s. 1	-
Scatarie Island Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes water, protruding rocks, and islands up to one statute mile distant seaward from the ordinary high water mark of Scatarie Island.

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS052 Scatarie Island	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.31. MORIEN BAY

a. Geography:

This EBSA includes the whole of Morien Bay, including the two headlands (Northern Head and South Head), Port Morien Beach (barrier beach), and the lagoon area behind the beach. See Appendix B, Figure B-17.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Sydney Cliffs and Beaches (18a):
  - Recurring shoreline features include bays, barrier beaches, and coastal saline ponds.
  - Predominantly bedrock substrate, with pockets of sand in the intertidal zone.

d. Notable physical and/or oceanographic attributes:

On either side of Morien Bay are Northern Head and South Head, both of which are steep, rocky headlands (IBA Canada 2014). Two barrier beaches mostly enclose the most southerly portion of the bay. Behind these beaches is a vast intertidal zone and coastal lagoon environment. As described below, lagoons can be ecologically and biologically significant ecosystems for several reasons.

Coastal lagoons are generally shallow, brackish water bodies almost entirely separated from the open ocean by some kind of barrier (Kennish and Paerl 2010). Exchange between the lagoon and the ocean occurs continuously or intermittently through a restricted tidal inlet or inlets. Water depths rarely exceed five metres (Kjerfve 1994). The low-energy environment characteristic of lagoons allows for the deposition of fine sediments, creating a muddy bottom (Barnes 1980).

Coastal lagoons are dynamic systems, with short geological lifespans (Kjerfve 1994). Much like estuaries, coastal lagoons are vulnerable to a number of natural and anthropogenic stressors (Kennish and Paerl 2010). However, lagoons are often even more sensitive than estuaries to these stressors because of their unique geomorphology. Their restricted circulation and extended water residence time make lagoons especially susceptible to eutrophication and contaminant accumulation (Barnes 1980). Furthermore, these ecosystems

are severely threatened by shifts in wind strength and hydrological balances, which can change fundamentally the physical characteristics of the lagoon with potentially irreparable consequences (Kennish and Paerl 2010).

e. Notable ecological attributes:

Coastal lagoons, such as the one present in Morien Bay, are renowned for their exceptional primary and secondary productivity, and are considered to be among the most productive ecosystems in the world (e.g. Barnes 1980; Kjerfve 1994; Kennish and Paerl 2010). Several features of the physical environment, which affect light and nutrient availability, contribute to this level of productivity. Biologically rich communities thrive in these environments, taking advantage of the abundance of food, diversity of habitats, and the sheltered waters. For these reasons, lagoons are often noted for their importance as juvenile fish nursery areas.

Because light is generally able to penetrate to the lagoon bottom, it is not uncommon for benthic primary productivity to exceed phytoplankton production (Kennish and Paerl 2010). Benthic algae and macrophytes are typically profuse in these environments. The characteristic muddy substrate and sheltered conditions also contribute importantly to making lagoons ideal habitats for these submerged plants (Barnes 1980). True to form, significant areas of eelgrass habitat can be found in the Morien Bay lagoon (Allard et al. 2014). Significant areas of salt marsh habitat are also found in this area. Again, it is common for extensive salt marsh wetlands to fringe coastal lagoons (Kennish and Paerl 2010).

Globally significant numbers of Great Cormorant nest on the cliffs of Northern Head and South Head (IBA Canada 2014). In addition, Northern Head hosts the fourth largest of the five known colonies of Black-legged Kittiwake in Nova Scotia (Allard et al. 2014). Relative to the rest of eastern Canada, this species does not form a significant colony at this location; however, its presence is noted because of its provincial rarity. There are, however, significant colonies of tern spp. in the area, and the bay hosts significant aggregations of Canada Goose and overwintering Common Eider (Allard et al. 2014). Harlequin Duck (Special Concern – SARA) aggregations occur during winter on the waters around the headlands (IBA Canada 2014). Port Morien Beach is the most important shorebird area in Cape Breton, and one of the most important within the Atlantic coast sub-region, both in terms of numbers and species diversity (Schaefer et al. 2004; Allard et al. 2014). In a 2001 survey, 23 shorebird species were recorded on this beach, including the Endangered (SARA) Red Knot *rufa* ssp. (Schaefer et al. 2004). The presence of Red Knot is generally greater here than in most other locations within the Atlantic coast sub-region, outside of Cape Sable Island (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• One of five known Black-legged Kittiwake colonies in Nova Scotia. Black-legged Kittiwake is a provincially rare species.

Aggregation	Y	• Port Morien Beach hosts one of the highest concentrations of Red Knot *rufa* ssp. (Endangered – SARA) in the Atlantic coast sub-region. • Port Morien Beach supports the highest numbers and diversity of shorebirds in Cape Breton. • Significant aggregations of Canada Goose and overwintering Common Eider. • Aggregations of Harlequin Duck (Special Concern – SARA) occur in the area during winter. • (Lagoons are known to be one of the most highly productive ecosystems on the planet). • Significant areas of salt marsh in the lagoon area. • Significant areas of eelgrass in the lagoon area.
Fitness Consequences	Y	• (Lagoon ecosystems are known to provide important juvenile fish habitat). • *Globally significant* numbers of nesting Great Cormorant on Northern Head and South Head. • Significant tern spp. colony.
Resilience	Y	• Lagoons are innately vulnerable to human disturbance and environmental variability.

Special importance for ESSCPs	Y	• Type 2: Eelgrass.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Port Morien Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Port Morien French Mine Site	*Special Places Protection Act* R.S., c. 438, s. 1	-
Nova Scotia Coal Fields (Sydney) National Historic Site	*Canada National Parks Act* S.C. 2000, c. 32	-
Schooner Pond Beach	*Beaches Act* R.S., c. 32, s. 1.	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS053 Northern Head and South Head	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Wadden's Cove	Eastern Habitat Joint Venture	Two parcels.
South Port Morien	Eastern Habitat Joint Venture	Two parcels.

5.32. BIG GLACE BAY

a. Geography:

This EBSA includes Big Glace Bay Lake and a portion of its seaward extension, Big Glace Bay, separated by Glace Bay Beach. See Appendix B, Figures B-17 and B-18.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Sydney Cliffs and Beaches (18a):
  - Recurring shoreline features include bays, barrier beaches, and coastal saline ponds.
  - Predominantly bedrock substrate, with pockets of sand in the intertidal zone.

d. Notable physical and/or oceanographic attributes:

Big Glace Bay Lake is a large coastal lagoon, almost entirely separated from Big Glace Bay by a sparsely vegetated barrier beach (Glace Bay Beach) composed of gravel and sand (IBA Canada 2014). At low tide, over half of the lagoon is exposed. See Section 5.31 for a detailed discussion of the significance of lagoon ecosystems.

e. Notable ecological attributes:

As a coastal lagoon, Big Glace Bay Lake is expected to be highly productive, and serve as a key nursery habitat for juvenile fish (see Section 5.31 for discussion).

Eelgrass beds are present in Big Glace Bay Lake, and are particularly extensive around the barrier beach (Schaefer et al. 2004). When compared to the rest of eastern Canada, these beds do not constitute a significant area for this habitat type (Allard et al. 2014). However, their apparent sizeable extent at the bay-scale suggests local, if not regional, significance, particularly given the general lack of eelgrass habitat in Cape Breton (Schaefer et al. 2004). Big Glace Bay also hosts one of the few significant areas of salt marsh in Cape Breton (Allard et al. 2014).

The Canada Goose is observed at Big Glace Bay Lake in significant numbers during migration (IBA Canada 2014). Also, Big Glace Bay/Lake (along with Lingan Bay-Indian Bay) is within a waterfowl survey block that hosts significant aggregations of American Black Duck, merganser spp., scaup spp., and goldeneye spp. (Allard et al. 2014). Regular use of the area by various shorebird species has also been noted, though not in especially high numbers (IBA Canada 2014). Glace Bay Bar is critical habitat for the Piping Plover (Endangered – SARA), and is one of just four critical habitat beaches in Cape Breton (Environment Canada 2012; Section 4.1.1). Willets are frequently observed in the salt marshes. Although at-sea aggregations of shallow-diving coastal piscivores, shallow-diving

piscivore/generalists, surface-seizing planktivores and plunge-diving piscivores (e.g. Northern Gannet) have been observed at adjacent Indian Bay, and might be expected in this EBSA, direct evidence stemming from at-sea surveys is lacking for Big Glace Bay.

Atlantic Herring is known to spawn in the waters outside of Big Glace Bay (Power et al. 2012; Section 4.2.1). In addition, acoustic surveys suggest that there is also an overwintering concentration of herring off of New Waterford/Glace Bay, representing one of two preferred overwintering areas within the 4Vn NAFO area (Claytor 1998).

The MacAskill's Brook watershed, which drains into Big Glace Bay Lake, supports spawning Atlantic Salmon (Endangered – COSEWIC) (Gibson and Bowlby 2009; Section 4.2.2). The health and size of the population using this particular stream is unknown.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of American Black Duck, merganser spp., scaup spp., and goldeneye spp. • (Lagoons are known to be one of the most highly productive ecosystems on the planet). • Significant areas of salt marsh in lagoon area. • Moderate eelgrass coverage.
Fitness Consequences	Y	• Significant numbers of Canada Goose use Big Glace Bay Lake as a staging area during migration. • (Lagoon ecosystems are known to provide important juvenile fish habitat). • There is an Atlantic Herring spawning and overwintering area just offshore of Big Glace Bay. • Glace Bay Bar is Piping Plover (Endangered – SARA) critical habitat. • The MacAskill's Brook watershed, draining into Big Glace Lake, has been known to support spawning Atlantic Salmon (Endangered – COSEWIC).
Resilience	Y	• Lagoons are innately vulnerable to human disturbance and environmental variability.
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring (known importance just outside of Big Glace Bay EBSA).

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Big Glace Bay Lake Migratory Bird Sanctuary	*Migratory Birds Convention Act* S.C. 1994, c. 22	Marine/intertidal portion accounts for 1.73 km^2 of the total area (Wood 2007).

LEGISLATED AREAS		
Glace Bay Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Glace Bay Bar Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS007 Big Glace Bay Lake	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.33. LINGAN BAY – INDIAN BAY

a. Geography:

This EBSA includes Lingan Bay and Indian Bay, separated by Dominion Beach. Indian Bay is on the seaward side of the barrier beach. See Appendix B, Figure B-18.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Sydney Cliffs and Beaches (18a):
  - Recurring shoreline features include bays, barrier beaches, and coastal saline ponds.
  - Predominantly bedrock substrate, with pockets of sand in the intertidal zone.

d. Notable physical and/or oceanographic attributes:

A sandy barrier beach (Dominion Beach) mostly separates Lingan Bay from Indian Bay, creating a lagoon environment in Lingan Bay. There is an extensive intertidal area in Lingan Bay. See Section 5.31 for a detailed discussion of the significance of lagoon ecosystems.

e. Notable ecological attributes:

It should be noted that many of the ecological attributes that define Big Glace Bay (Section 5.32) as an EBSA are also characteristic of Lingan Bay-Indian Bay. This can be largely attributed to their similar geomorphology, as well as their geographic proximity.

As a coastal lagoon, Lingan Bay is expected to be highly productive, and serve as a key nursery habitat for juvenile fish (see Section 5.31 for discussion).

Eelgrass beds are present in Lingan Bay, and are particularly extensive around the barrier beach (Schaefer et al. 2004). When compared to the rest of eastern Canada, these beds do not

constitute a significant area for this habitat type (Allard et al. 2014). However, their apparent sizeable extent at the bay-scale suggests local, if not regional, significance, particularly given the general lack of eelgrass habitat in Cape Breton (Schaefer et al. 2004). Lingan Bay also hosts one of the few significant areas of salt marsh in Cape Breton (Allard et al. 2014).

Lingan Bay-Indian Bay (along with Big Glace Bay) is within a waterfowl survey block hosting significant aggregations of American Black Duck, merganser spp., scaup spp., and goldeneye spp. (Allard et al. 2014). Dominion Beach is critical habitat for Piping Plover (Endangered – SARA), and is one of just four critical habitat beaches in Cape Breton (Environment Canada 2012; Section 4.1.1). This beach has general importance for shorebirds, with 15 species recorded (Schaefer et al. 2004). It appears to be the second most popular shorebird habitat in Cape Breton after Port Morien Beach (Allard et al. 2014). The Endangered (SARA) Red Knot *rufa* ssp. has been observed on Dominion Beach, but not in regionally significant numbers. This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving coastal piscivores (loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (large gull spp., tern spp.), surface-seizing planktivores (e.g. Wilson's Storm-petrel, Red Phalarope) and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

Atlantic Herring is known to spawn in the waters just outside of this area (i.e. Glace Bay spawning area) (Power et al. 2012; Section 4.2.1). Acoustic surveys suggest that there is an overwintering concentration of herring off New Waterford/Glace Bay, representing one of two preferred overwintering areas within the 4Vn NAFO area (Claytor 1998).

The Northwest Brook watershed, which drains into Lingan Bay, supports spawning Atlantic Salmon (Endangered – COSEWIC) (Gibson and Bowlby 2009; Section 4.2.2). The health and size of the population using this particular stream is unknown.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of American Black Duck, merganser spp., scaup spp., and goldeneye spp. • Significant at-sea aggregations of shallow-diving coastal piscivores (loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (large gull spp., tern spp.), surface-seizing planktivores (e.g. Wilson's Storm-petrel, Red Phalarope) and plunge-diving piscivores (e.g. Northern Gannet). • (Lagoons are known to be one of the most highly productive ecosystems on the planet). • Significant areas of salt marsh in lagoon area. • Moderate eelgrass coverage.

EBSA criteria	Criteria met?	Rationale
Fitness Consequences	Y	• There is an Atlantic Herring spawning and overwintering area just offshore of Indian Bay. • (Lagoon ecosystems are known to provide important juvenile fish habitat). • Dominion Beach is Piping Plover (Endangered – SARA) critical habitat. • The Northwest Brook watershed, draining into Lingan Bay, has been known to support spawning Atlantic Salmon (Endangered – COSEWIC).
Resilience	Y	• Lagoons are innately vulnerable to human disturbance and environmental variability.
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring (known importance just outside of Lingan Bay-Indian Bay EBSA).

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Dominion Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Dominion Beach Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-
Dominion Beach Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-

5.34. BIRD ISLANDS

a. Geography:

This EBSA includes the long and narrow Hertford and Ciboux Islands, which are together referred to as the Bird Islands. Also included are the immediately surrounding waters. See Appendix B, Figure B-19.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

- Ingonish High Cliffs (18b):
  - Substrate is mixed coarse with sand and occasional, but diverse, bedrock.
  - Topographically simple with generally long, straight coastline.
  - A few bays with barrier beaches and large coastal saline ponds.
  - Minimal riverine input.

d. Notable physical and/or oceanographic attributes:

The perimeter of each island is comprised of steep cliffs, while stunted trees and grasslands dominate the interior (Dietz and Chiasson 2000). Reefs and rock clusters are common between the islands (IBA Canada 2014).

e. Notable ecological attributes:

The aptly named Bird Islands are one of the most important habitats for colonial marine birds in Nova Scotia. They host the largest Great Cormorant colony known to North America, consisting of *globally significant* numbers (IBA Canada 2014). In addition, the islands support the highest concentrations in Nova Scotia of three provincially rare species, including Black-legged Kittiwake, Razorbill, and Atlantic Puffin. Of these species, the Razorbill forms significant colonies on these islands. Significant colonies of Herring Gull, Great Black-backed Gull, and tern spp. are also present (Allard et al. 2014). The Double-crested Cormorant (*Phalacrocorax auritus*) and Black Guillemot (*Cepphus grille*) have been known to number in the hundreds (Dietz and Chiasson 2000; IBA Canada 2014). A lesser number of Leach's Storm-petrel are also observed on the islands. The fact that so many species use this area in such high abundances, suggests that many, if not all, of these populations depend on the specific habitat provided by these islands (Schaefer et al. 2004). Also notable are the members of the Cape Breton Bald Eagle population frequently observed roosting and feeding on the islands in late summer (Dietz and Chiasson 2000).

The waters surrounding the Bird Islands appear to provide valued habitat for several fish and invertebrate species. For example, Common Starfish (*Asterias rubens*), Rock Crab (*Cancer irroratus*), scallop, Winter Flounder, Shorthorn Sculpin (*Myoxocephalus scorpius*), Longhorn Sculpin (*Myoxocephalus octodecemspinosus*), and Winter Skate (Threatened – COSEWIC) have all been observed in higher concentrations around the islands than in most other areas of western Sydney Bight[16] (Schaefer et al. 2004). The area around the Bird Islands is also an important nursery habitat for juvenile Atlantic Cod (Endangered – COSEWIC), White Hake (Threatened – COSEWIC), and likely other groundfish species as well (Zwanenburg et al. 2002; Schaefer et al. 2004). Herring from the unique, but depleted, Bras d'Or Lakes population have been known to overwinter in greater concentrations in the St. Ann's Bay/Bird Islands area than elsewhere in Sydney Bight (Claytor 1998). Similarly, an area off of the Bird Islands has been speculated to have importance for overwintering American Lobster following repeated observations of high local concentrations during the fall (Lambert and Wilson 2006).

The Bird Islands are understood to be one of the most frequented Grey Seal haul-out locations in Sydney Bight (Schaefer et al. 2004).

[16] Based on results from the DFO 4Vn inshore survey, 1991-1999 (see Zwanenburg et al. 2002 for more information on this survey program).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Highest concentrations of Black-legged Kittiwake, Razorbill, and Atlantic Puffin in Nova Scotia - all provincially rare species.
Aggregation	Y	• High concentration (relative to the rest of Sydney Bight) of Winter Skate (Threatened – COSEWIC). • High concentrations (relative to the rest of Sydney Bight) of Common Starfish, Rock Crab, scallop, Winter Flounder, Shorthorn Sculpin, Longhorn Sculpin. • High diversity of marine birds in high abundances.
Fitness Consequences	Y	• Nursery area for Atlantic Cod (Endangered – COSEWIC) and White Hake (Threatened – COSEWIC). • Overwintering area for the Bras d'Or Lakes population of Atlantic Herring. • Possible overwintering area for American Lobster. • Largest known colony of Great Cormorant in North America (*globally significant* numbers of nesting birds). • Significant colonies of Razorbill, Herring Gull, Great Black-backed Gull, and tern spp. • Roosting and feeding area for the Bald Eagle.
Resilience		
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring, Atlantic Cod, American Lobster. • Type 4: Grey Seal.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Bird Islands Wildlife Management Area	*Wildlife Act* R.S., c. 504, s.2.	Includes the marine area around the Bird Islands within approximately 500 m of the ordinary high water mark.
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS001 Bird Islands	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
Site of Ecological Significance (Bird Islands)	International Biological Program (IBP) (1964-74) - Conservation of Terrestrial Communities (CT) Subcommittee	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**

Hertford Island	Nova Scotia Bird Society	The island is managed as a sanctuary.

5.35. WESTERN SYDNEY BIGHT

a. Geography:

This EBSA includes a large expanse of waters in the western half of Sydney Bight, north of the Bird Islands. There is no intertidal component. See Appendix B, Figure B-20.

b. Inlet classification:

Not applicable.

c. Coastline classification:

Not applicable.

d. Notable physical and/or oceanographic attributes:

This EBSA encompasses "The Gutter", a unique inshore bathymetric trough with water depths in excess of 100 m.

e. Notable ecological attributes:

In their assessment of Scotian Shelf biodiversity, Shackell and Frank (2003) found that a large expanse of the northeast shelf, including western Sydney Bight and the Cabot Strait (Section 5.38), ranked among the most species-rich areas across the region[17]. They reasoned that proximity to the Gulf of St. Lawrence likely influences diversity in this area of the shelf. Indeed, species migrating into and out of the Gulf must pass through the Cabot Strait. In addition, mixing of the fresher Gulf waters with the more saline waters of the Scotian Shelf further enhances habitat heterogeneity in this region.

Western Sydney Bight falls within the sampling strata of the DFO Maritimes Research Vessel Trawl Survey, conducted each July since 1970. Horsman and Shackell (2009) analyzed the data collected by this survey to determine areas of important habitat for key Scotian Shelf finfish species. Based on their results, it is evident that, throughout the study period (1970-2006), Western Sydney Bight (or some portion of it) has remained an important[18] summer habitat for Atlantic Herring, Witch Flounder (*Glyptocephalus cynoglossus*), American Plaice (Threatened – COSEWIC), Smooth Skate (Special Concern – COSEWIC), Thorny Skate (Special Concern – COSEWIC), White Hake (Threatened – COSEWIC), and Atlantic Cod (Endangered – COSEWIC). The relative importance of this

[17]This was primarily an offshore analysis; however, data coverage extended into inshore areas off of northern Cape Breton.

[18]For the purpose of this report, "important" in this context will refer to a summed rank of 31 or higher. See Horsman and Shackell (2009) for details on this ranking scheme.

area has been maintained in spite of any changes in population status, management approach, and/or environmental conditions during that period. There are also other species for which this area has represented important summer habitat less consistently; for example, Capelin (*Mallotus villosus*) and Northern Shortfin Squid (*Illex illecebrosus*) (Horsman and Shackell 2009).

Aggregations of larval Atlantic Herring, Atlantic Mackerel, American Plaice, Atlantic Cod, Longhorn Sculpin, and redfish (Endangered/Threatened[19] – COSEWIC) have been recorded in the northern portion of Western Sydney Bight (in the vicinity of Neils Harbour) (Horsman and Shackell 2009).

Snow Crab is densely aggregated in the deep waters of western Sydney Bight, as are overwintering concentrations of Atlantic Cod (Davis and Browne 1996b; Biron et al. 2002).

Western Sydney Bight is within one of three important habitat areas that have been identified for the Leatherback Turtle (Endangered – SARA) in Atlantic Canadian waters (DFO 2012c). These areas, which include waters in the vicinity of Georges Bank, the Gulf of St. Lawrence, and Placentia Bay, were identified through a 2012 Science Advisory Process. Western Sydney Bight falls within the Gulf of St. Lawrence important habitat area. Leatherbacks are the largest marine turtle on Earth, and undergo extensive annual migrations between their tropical breeding grounds and their temperate foraging habitat. Peak use of Canadian foraging habitat occurs during the summer and fall. Within the Atlantic coast sub-region, the turtles appear to spend the most time in western Sydney Bight and the Cabot Strait (off Cape North; Section 5.38) (DFO 2012c).

This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., tern spp., skua and jaeger spp., Black-legged Kittiwake), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel) and plunge-diving piscivores (e.g. Northern Gannet) (Allard et al. 2014).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• Unique bathymetric feature (The Gutter).

[19]There are two species of redfish found in this area; however, because they are not readily distinguishable from one another they are often considered as a single complex. Each species has been assessed separately by COSEWIC. Acadian Redfish (*Sebastes fasciatus*) is assessed as Threatened, and Deepwater Redfish (*Sebastes mentella*) is assessed as Endangered.

EBSA criteria	Criteria met?	Rationale
Aggregation	Y	• Important summer habitat for Atlantic Cod (Endangered – COSEWIC), American Plaice (Threatened – COSEWIC), Smooth Skate (Special Concern – COSEWIC), Thorny Skate (Special Concern – COSEWIC), White Hake (Threatened – COSEWIC), Atlantic Herring, and Witch Flounder. • Area of high finfish species richness compared to the rest of the Scotian Shelf. • Significant at-sea aggregations of shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., tern spp., skua and jaeger spp., Black-legged Kittiwake), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel) and plunge-diving piscivores (e.g. Northern Gannet).
Fitness Consequences	Y	• Larval American Plaice (Threatened – COSEWIC), Atlantic Cod (Endangered – COSEWIC), redfish (Endangered/Threatened – COSEWIC), Atlantic Herring, Atlantic Mackerel, and Longhorn Sculpin observed in the area. • Part of the Gulf of St. Lawrence important habitat area for Leatherback Turtle (Endangered – SARA).
Resilience		
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring, Atlantic Cod.

g. Current area-based management measures and special designations:

None.

5.36. INGONISH BAYS

a. Geography:

This EBSA includes North Bay Ingonish and South Bay Ingonish, which are separated by a narrow, rocky peninsula. Also included is Ingonish Island, a steep-cliffed, partially wooded island located in North Bay Ingonish. See Appendix B, Figure B-20.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Ingonish High Cliffs (18b):

- Substrate is mixed coarse with sand and occasional, but diverse, bedrock.
- Topographically simple with generally long, straight coastline.
- A few bays with barrier beaches and large coastal saline ponds.
- Minimal riverine input.

d. Notable physical and/or oceanographic attributes:

None known.

e. Notable ecological attributes:

Globally significant numbers of Great Cormorant nest on Ingonish Island (IBA Canada 2014). Together, the bays host significant aggregations of merganser spp. There are also significant colonies of Great Black-backed Gull and Herring Gull in the area (Allard et al. 2014).

The Ingonish River and Clyburn Brook watersheds are known to support spawning Atlantic Salmon (Endangered – COSEWIC) (Gibson and Bowlby 2009; Section 4.2.2). Adult and juvenile salmon have been recorded in both rivers within the last decade; however, a marked decline in adult abundance over the past ~15 years has been noted in Clyburn River (Gibson and Bowlby 2009). Clyburn is one of four current index rivers in the Eastern Cape Breton region.

Regional scientific experts indicated that marine mammals aggregate in the Ingonish Bay area to breed and feed (Doherty and Horsman 2007). Indeed, Ingonish Bay is one of three main whale-watching areas in Sydney Bight, suggesting that mammal sightings are frequent enough to support such operations (Schaefer et al. 2004).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		
Aggregation	Y	• Significant aggregations of merganser spp.
Fitness Consequences	Y	• The Ingonish River and Clyburn Brook watersheds, both draining into the Ingonish Bays, support spawning Atlantic Salmon (Endangered – COSEWIC). • Breeding and feeding area for whales. • *Globally significant* numbers of nesting Great Cormorant on Ingonish Island. • Significant colonies of Great Black-backed Gull and Herring Gull.
Resilience		
Special importance for ESSCPs		

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Cape Breton Highlands National Park	*Canada National Parks Act* S.C. 2000, c. 32	-
North Bay Beach	*Beaches Act* R.S., c. 32, s. 1.	-
Ingonish Lighthouse National Historic Site	*Canada National Parks Act* S.C. 2000, c. 32	-
SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS055 Ingonish Island	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
IBA NS056 Cape Breton Highlands National Park	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

5.37. ASPY BAY

a. Geography:

This EBSA includes Aspy Bay, which is just south of Cape North. See Appendix B, Figure B-21.

b. Inlet classification(s):

Not available.

c. Coastline classification:

- Ingonish High Cliffs (18b):
  - Substrate is mixed coarse with sand and occasional, but diverse, bedrock.
  - Topographically simple with generally long, straight coastline.
  - A few bays with barrier beaches and large coastal saline ponds.
  - Minimal riverine input.

d. Notable physical and/or oceanographic attributes:

There are lagoon areas behind North Harbour Beach and South Harbour Beach.

e. Notable ecological attributes:

The lagoon areas are expected to be highly productive, and serve as key nursery habitats for juvenile fish (see Section 5.31 for discussion). There are significant areas of salt marsh and eelgrass habitats in these areas (Allard et al. 2014).

North Harbour Beach and South Harbour Beach, both sandy barrier beaches, are considered critical habitat for the Piping Plover (Endangered – SARA) (Environment Canada 2012; Section 4.1.1). These beaches constitute two of just four critical habitat areas identified within Cape Breton. There is also a significant Great Blue Heron colony in the area (Allard et al. 2014). The northern headland (Cape North) hosts *globally significant* numbers of the terrestrial songbird Bicknell's Thrush (Threatened – SARA) (IBA Canada 2014).

This EBSA is also known to support significant at-sea aggregations of several seabird functional guilds, including shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., skua and jaeger spp., Black-legged Kittiwake, tern spp.), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel), plunge-diving piscivores (e.g. Northern Gannet), and ship-following generalists (e.g. Northern Fulmar) (Allard et al. 2014).

Acoustic surveys suggest that there is an overwintering concentration of Atlantic Herring in Aspy Bay, representing one of two preferred overwintering areas within the 4Vn NAFO area (Claytor 1998).

The North Aspy River watershed is known to support spawning Atlantic Salmon (Endangered – COSEWIC) (Gibson and Bowlby 2009; Section 4.2.2). In fact, it is one of just two rivers in the Atlantic coast sub-region that has met its salmon conservation requirement in recent years (DFO 2011d).

Regional scientific experts indicated that marine mammals aggregate in the Aspy Bay area to breed and feed (Doherty and Horsman 2007). Indeed, Aspy Bay is one of three main whale-watching areas in Sydney Bight, suggesting that mammal sightings are frequent enough to support such operations (Schaefer et al. 2004).

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness		

EBSA criteria	Criteria met?	Rationale
Aggregation	Y	• Cape North hosts *globally significant* numbers of Bicknell's Thrush (Threatened – SARA). • Significant at-sea aggregations of shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., skua and jaeger spp., Black-legged Kittiwake, tern spp.), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel), plunge-diving piscivores (e.g. Northern Gannet), and ship-following generalists (e.g. Northern Fulmar). • Significant areas of salt marsh in lagoon areas. • Significant areas of eelgrass in lagoon areas. • (Lagoons are known to be one of the most highly productive ecosystems on the planet).
Fitness Consequences	Y	• Significant Great Blue Heron colony. • Overwintering aggregation of Atlantic Herring. • Breeding and feeding area for whales. • North Harbour Beach and South Harbour Beach are Piping Plover critical habitat (Endangered – SARA). • North Aspy River is an important spawning river for Atlantic Salmon (Endangered – COSEWIC). • (Lagoon ecosystems are known to provide important juvenile fish habitat).
Resilience	Y	• Lagoons are innately vulnerable to human disturbance and environmental variability.
Special importance for ESSCPs	Y	• Type 1: Atlantic Herring.

g. Current area-based management measures and special designations:

LEGISLATED AREAS		
Protected Area	**Governing Legislation**	**Notes**
Lily Pond Beach	*Beaches Act* R.S., c. 32, s. 1.	-
South Harbour Beach	*Beaches Act* R.S., c. 32, s. 1.	-
South Harbour Beach Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Middle Harbour Beach	*Beaches Act* R.S., c. 32, s. 1.	-
North Harbour Beach	*Beaches Act* R.S., c. 32, s. 1.	-
North Harbour Beach Piping Plover Critical Habitat	*Species at Risk Act* S.C. 2002, c. 29	-
Cabot's Landing Provincial Park	*Provincial Parks Act* R.S., c. 367, s.1.	-

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS030 Cape North	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-
CONSERVATION EASEMENTS/ENGO LANDS/JOINT VENTURE LANDS		
Area ID	**Program/Owner**	**Notes**
Yellow Head	Nova Scotia Nature Trust	-

5.38. CABOT STRAIT (BETWEEN CAPE NORTH AND ST. PAUL ISLAND)

a. Geography:

This EBSA includes the southern waters of the Cabot Strait between Cape North and St. Paul Island, as well as St. Paul Island. See Appendix B, Figure B-21.

b. Inlet classification(s):

Not applicable.

c. Coastline classification:

Not applicable.

d. Notable physical and/or oceanographic attributes:

The Cabot Strait is an area of current exchange between the Gulf of St. Lawrence and the Scotian Shelf. Outflow from the Gulf of St. Lawrence is one of three main current processes influencing ocean circulation on the Scotian Shelf (Breeze et al. 2002). The Gulf of St. Lawrence outflow is generally less saline than the inflowing Scotian Shelf waters.

St. Paul Island is located approximately 24 km offshore from Cape North. When compared to the rest of Nova Scotia, coastal islands are relatively rare in Cape Breton. St. Paul Island is also unique in its distance from shore. From a landscape perspective, the island resembles the Cape Breton Highlands, with rugged terrain and dense spruce-fir forests, generally stunted due to high exposure and extreme marine weather (Fenton 2010; IBA Canada 2014). The perimeter of the island is almost exclusively steep-sided cliffs. There are several upland areas on the island, the highest being Crogan Mountain at 147 m. In the interior, there are two freshwater lakes.

e. Notable ecological attributes:

In their assessment of Scotian Shelf finfish diversity, Shackell and Frank (2003) found that a large expanse of the northeast shelf, including Western Sydney Bight (Section 5.35) and the Cabot Strait, ranked among the most species-rich areas across the region[20].

As the sole conduit between the Scotian Shelf and the Gulf of St. Lawrence, the Cabot Strait is a major migratory route for fish, squid, turtles, whales, and other marine organisms (Schaefer et al. 2004). The sheer scale of the seasonal migrations that occur via this strait has been described as being unparalleled in the Canadian terrestrial realm.

Like the Western Sydney Bight EBSA, this EBSA falls within the sampling strata of the DFO Maritimes Research Vessel Trawl Survey. Consequently, the results of Horsman and Shackell (2009) are applicable here as well. Based on their results, it is evident that this area of the Cabot Strait has remained an important summer habitat for Witch Flounder, American Plaice (Threatened – COSEWIC), Atlantic Cod (Endangered – COSEWIC), redfish (Endangered/Threatened – COSEWIC), White Hake (Threatened – COSEWIC), and Atlantic Wolffish (Special Concern – SARA). There are also other species for which this area has represented important summer habitat less consistently; for example, Smooth Skate (Special Concern – COSEWIC) and Thorny Skate (Special Concern – COSEWIC) (Horsman and Shackell 2009).

Aggregations of larval Atlantic Mackerel, American Plaice, Atlantic Cod, and redfish have been recorded in the Cabot Strait EBSA (Horsman and Shackell 2009). In 2009, 93 stations across the Scotian Shelf and the south coast of Newfoundland were surveyed for mackerel eggs (DFO 2012b). Eggs were recorded at 28 of these stations, including one off of Aspy Bay in the Cabot Strait.

Nationally significant numbers of the terrestrial songbird Bicknell's Thrush (Threatened – SARA) nest on St. Paul Island (IBA Canada 2014). In addition, a very large Leach's Storm-petrel colony is suspected to be present on the island, but has not yet been confirmed by survey (Doherty and Horsman 2007).

Given the extreme isolation of St. Paul Island, it may be reasonable to assume it hosts a number of endemic terrestrial and/or freshwater sub-species (Fenton 2010). A comprehensive ecological assessment of St. Paul Island has not yet been completed; however, 30 provincially rare plant species have been recorded on the island. Such a profusion of rare plants in one location is not known to occur elsewhere in Nova Scotia.

Cabot Strait is an important area for pelagic seabirds. The EBSA supports significant at-sea aggregations of seabird foraging guilds, including shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., skua and jaeger spp., Black-legged Kittiwake, tern spp.), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow

[20] This was primarily an offshore analysis; however, data coverage extended into inshore areas off of northern Cape Breton.

pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel, phalarope spp.), plunge-diving piscivores (e.g. Northern Gannet), and ship-following generalists (e.g. Northern Fulmar) (Allard et al. 2014).

Like Western Sydney Bight, the Cabot Strait EBSA is within one of three important habitat areas that have been identified for Leatherback Turtle (Endangered – SARA) in Atlantic Canadian waters, specifically the Gulf of St. Lawrence important habitat area (DFO 2012c).

It has been suggested that the Cabot Strait be considered a significant cetacean migratory corridor (Schaefer et al. 2004). Blue Whale (*Balaenoptera musculus*) (Endangered – SARA), Fin Whale (Special Concern – SARA), Humpback Whale, Common Minke Whale, and pilot whales are all known to migrate through this channel.

f. EBSA criteria:

EBSA criteria	Criteria met?	Rationale
Uniqueness	Y	• The scale of the migrations through Cabot Strait is unparalleled in Canada. • The long distance between the mainland and St. Paul Island is rare in Nova Scotia. • St. Paul is a potentially unique island ecosystem.
Aggregation	Y	• Important summer habitat for Atlantic Cod (Endangered – COSEWIC), American Plaice (Threatened – COSEWIC), redfish (Endangered/Threatened – COSEWIC), Atlantic Wolffish (Special Concern – SARA), White Hake (Threatened – COSEWIC) and Witch Flounder. • Area of high finfish species richness compared to the rest of the Scotian Shelf. • Significant at-sea aggregations of shallow-diving coastal piscivores (e.g. loon and grebe spp., cormorant spp.), shallow-diving piscivore/generalists (e.g. large gull spp., skua and jaeger spp., Black-legged Kittiwake, tern spp.), pursuit-diving piscivores (e.g. Razorbill, Atlantic Puffin, murre spp.), pursuit-diving planktivores (e.g. Dovekie), shallow pursuit generalists (e.g. shearwaters), surface-seizing planktivores (e.g. Wilson's Storm-petrel, phalarope spp.), plunge-diving piscivores (e.g. Northern Gannet), and ship-following generalists (e.g. Northern Fulmar). • *Nationally significant* numbers of Bicknell's Thrush on St. Paul Island.

EBSA criteria	Criteria met?	Rationale
Fitness Consequences	Y	• Larval American Plaice (Threatened – COSEWIC), Atlantic Cod (Endangered – COSEWIC), redfish (Endangered/Threatened – COSEWIC), and Atlantic Mackerel observed in the area. • Mackerel eggs observed in the area. • Part of the Gulf of St. Lawrence important habitat area for Leatherback Turtle (Endangered – SARA). • Important cetacean migratory corridor. • Blue Whale (Endangered – SARA) and Fin Whale (Special Concern – SARA) migrate through Cabot Strait. • Potentially significant Leach's Storm-petrel colony on St. Paul Island.
Resilience		

Special importance for ESSCPs	Y	• Type 1: Atlantic Cod, Atlantic Wolffish.

g. Current area-based management measures and special designations:

SPECIAL DESIGNATIONS		
Designation	**Designating Body**	**Notes**
IBA NS032 St. Paul Island	Bird Studies Canada and Nature Canada in partnership with BirdLife International.	-

6. OTHER POTENTIALLY SIGNIFICANT AREAS

Table 7 highlights areas that were previously identified as EBSAs (see Doherty and Horsman 2007) but were removed from this analysis due to a lack of data. It is possible that, if such data were available, these areas would indeed meet the EBSA criteria. Other areas of potential significance have been flagged in the years since the original identification exercise in 2006, but still lack enough data to justify their inclusion in the analysis. Among these areas is Framboise Cove, located on the eastern shore of Cape Breton. This area has been described as a drumlin-fed estuary, with a wide diversity of coastal habitats, including lagoons and salt marshes (D. MacKinnon[21] pers. comm. 2013). It is a staging area for waterfowl and shorebirds, and may be of particular importance for Whimbrel *(Numenius phaeopus*) during migration. New Jersey Rush (*Juncus caesariensis*), a wetland plant species of Special Concern (SARA), is also found in the area. Framboise Cove has been compared to the ecologically rich drumlin-fed estuaries of the eastern (e.g. Cole Harbour to Musquodoboit Harbour) and southwestern shores of Nova Scotia, but at a smaller scale (D. MacKinnon pers. comm. 2013). Other areas of potential significance include those inlets predicted to have high diversity or productivity based on their geophysical characteristics (Greenlaw et al. 2011). Many of these inlets have already been identified as EBSAs; however, there are others that have not (e.g. Liscomb Harbour). Further field research in these areas may confirm their significance.

Table 7. EBSAs identified during the scientific expert opinion workshop in 2006 that were excluded from analysis in this report. Note that the original identification rationale is presented verbatim from Doherty and Horsman (2007).

Area	Identification rationale (Doherty and Horsman 2007)	Exclusion rationale (this report)
Grey Island	Common Eider colony location. Breeding season is April to mid-June.	Available data does not support this island being identified as exceptional (e.g. Allard et al. 2014).
Green Harbour and Jordan Bay	High concentration of lobsters that are potentially reproducing.	When compared to six other areas on the south shore of Nova Scotia, Miller (1997) found that the Green Harbour area had among the highest postlarval lobster abundances. The number of ovigerous females, however, was among the lowest. Given the limited spatial scope of the study, it is unclear whether the relatively high postlarval abundances recorded in this area are significant. Since there is no other published evidence to support the significance of this area, it is excluded for the time being.
Lockeport Harbour	High concentration of lobsters that are potentially reproducing.	See rationale for Green Harbour and Jordan Bay.

[21] System Planning Coordinator, Protected Areas and Ecosystems Branch, Nova Scotia Environment.

Port Mouton-Western Channel	Double-crested Cormorant colony.	No definitive evidence was found to support the identification of this area as an EBSA.
Terence Bay-Pennant Bay	The area is a coastal adjunct to a large expanse of crown land. The watershed is relatively unimpacted.	It is possible that this area could be considered an EBSA based on the "Naturalness" criterion alone; however, because naturalness was not assessed in this report, and little is known about the marine ecology of the area, it was not included in the analysis.
Yankee Bank (30 m depth)	Herring and cod spawning area in the fall. Whale and marine birds feed on herring as do many other marine species such as flounder.	No definitive evidence was found to support the identification of this area as an EBSA.
Taylor Head-Sheet Harbour area	The area encompasses an array of coastal islands and protected nearshore waters that provide habitat (breeding, feeding, rearing) to an array of seabirds. Taylor Head Provincial Park provides opportunities for a relatively unimpacted nearshore marine adjunct. Sheet Harbour/West River has an estuary of a reasonable size. This is a salmon area and is a potential recovery site for this species. There is also a lobster fishery in the area.	See rationale for Terence Bay-Pennant Bay. The significance of the salmon rivers in the area is acknowledged in Section 4.2.2 Atlantic Salmon Spawning Rivers.
Janvrin Islands	Presence of a very extensive rockweed (Ascophylum nodosum) bed that extends approximately 1 km along the south side of the island from low intertidal down to approx. 30 feet deep. Pure bed (100% cover). It is a highly productive, monospecific rockweed bed.	No definitive evidence was found to support the identification of this area as an EBSA.
St. Peter's Bay-Bay of Rocks	Area of high productivity and diverse benthic habitat. Mackerel, lobster and herring (and possibly white hake) are all available in the area.	No definitive evidence was found to support the identification of this area as an EBSA.
Sydney River-Sydney Harbour area.	Spawning/breeding/feeding area for multiple species. High diversity of fish species. Very big freshwater streams entering the area (smelt runs, gaspereau runs). This area is unique in Nova Scotia for yellow lampmussels, a species of special concern (upriver).	The presence of Yellow Lampmussel (Special Concern – SARA) in the Sydney River watershed meets the "Uniqueness", "Fitness Consequences" and "Aggregation" criteria; however, it is a freshwater species and falls outside the scope of this report. Beyond this species, there was no definitive evidence to support the identification of this area as an EBSA.

7. NEXT STEPS

Building on the work of Doherty and Horsman (2007) and Gromack et al. (2010), this report describes a refined set of EBSAs for the Atlantic coast of Nova Scotia. It represents a culmination of work completed to address one of the recommendations of the March 2012 CSAS RAP, which offered advice on the ecological data to be considered in MPA network development in the bioregion (DFO 2012a).

As previously stated, the identification of an area as an EBSA does not automatically require new management measures. However, EBSAs are considered special natural places where a greater-than-usual degree of risk aversion is required in the management of human activities (DFO 2004, 2007a). The need for, and nature of, any management action to conserve or protect an EBSA is determined by the ecological characteristics of the area and the type and extent of human activities occurring in or adjacent to it. The information that has been compiled on the ecological features of the Atlantic coast EBSAs will greatly inform management decisions related to human activities that could have negative impacts on these areas.

Moving forward under the Regional Oceans Plan, EBSAs will serve as a focal point for a broad range of integrated oceans and coastal management activities in the region. Those EBSAs most likely to be affected by current and future activities, or those that are highly vulnerable or at risk, will be considered priorities. A profile, which will include an assessment of the relevant risks and management recommendations, will be developed for each priority EBSA. This exercise may reveal that certain EBSAs do not require additional management actions while other areas that are sensitive to disturbance or are of particularly high conservation value may need specific protection measures. Other EBSAs may simply require operational guidance on how to conduct activities in a way that minimizes the risk of negative impacts on the ecosystem. The full range of management options will be considered for priority EBSAs.

The EBSAs identified in this report will also be considered in the regional MPA network development process. International and national guidance indicates that EBSAs are a key component of effective MPA networks. However, it is important to note that not all EBSAs will become MPAs. Looking ahead, EBSAs that are suitable for spatial approaches to conservation will be considered along with other ecological, social, economic, and cultural information in developing an MPA network plan for the DFO Maritimes Region. DFO will lead the MPA network development process in the region while working closely with its federal and provincial partners and through ongoing consultation with Aboriginal groups, stakeholders, and other interests.

While the evidence of the significance of the EBSAs described in this report is rigorous, it is acknowledged that many data gaps exist along the Atlantic coast of Nova Scotia. As a result, there is a clear bias toward better-studied components of the sub-region. These knowledge gaps make it important to recognize that: (a) there are likely other EBSAs that exist along the

Atlantic coast but have not been documented, and (b) for those EBSAs already identified, the supporting data may not represent an exhaustive accounting of exceptional features. Further research would be needed to provide a more complete picture of the marine ecology of the Atlantic coast. Consequently, the EBSAs described in this report may require additional refinement as more data becomes available.

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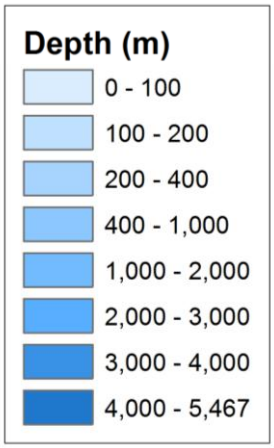
APPENDIX A

BROADLY-DISTRIBUTED SINGLE-FEATURE EBSAS

CONTENTS:

Box A-1. Bathymetry legend for Figures A-1, A-2, A-6, and A-7.



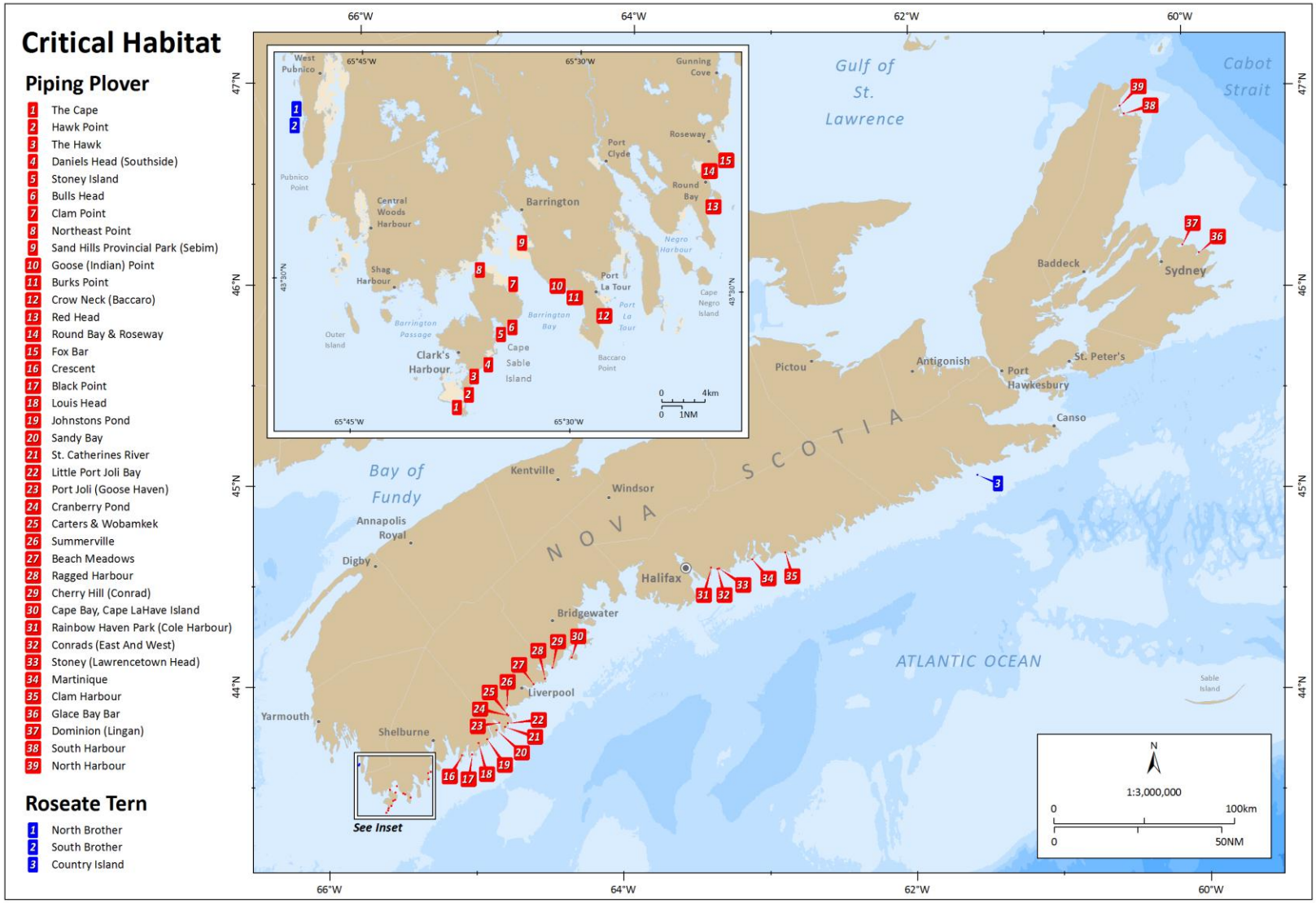


Figure A-1. Critical habitat for Piping Plover and Roseate Tern, as designated under the *Species at Risk Act*. Critical habitat coordinates can be found in the respective recovery strategies for these species (i.e. Environment Canada 2010; 2012).

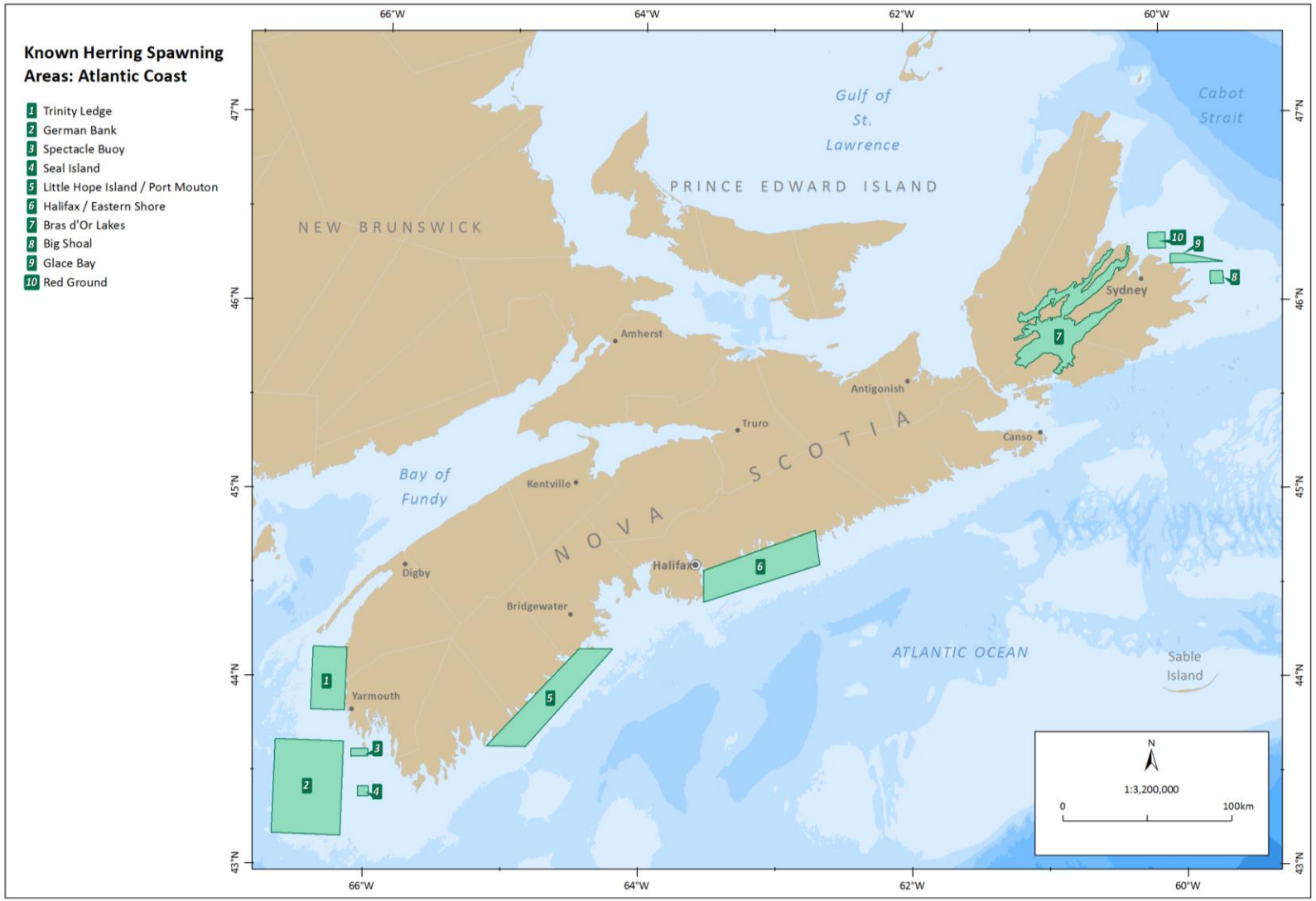


Figure A-2. Known Atlantic Herring spawning areas that fall within the Atlantic coast sub-region (derived from Melvin and Power 1999; Melvin et al. 2004; Power et al. 2010; DFO 2011c; Power et al. 2012).

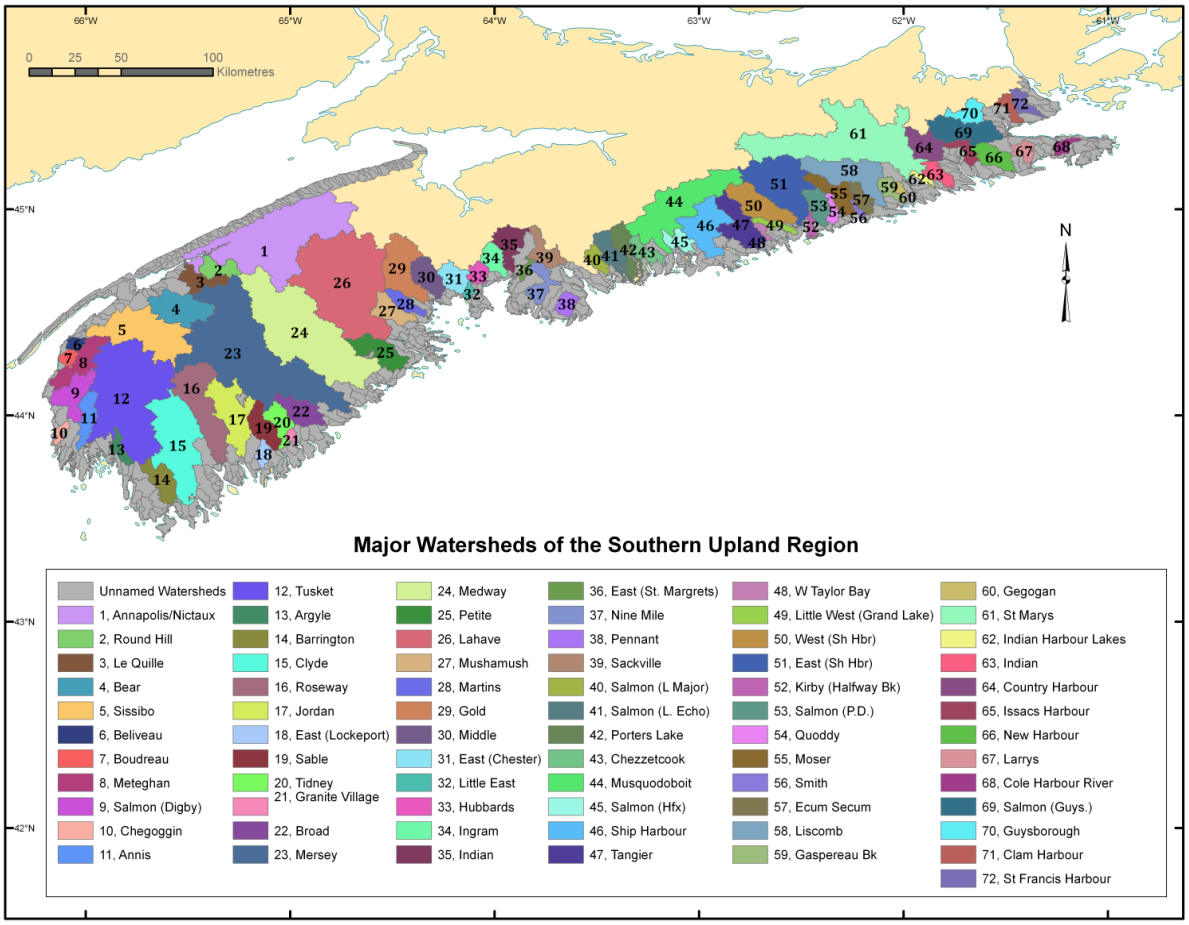


Figure A-3. Map of the watersheds contained in the Southern Upland region, labelled by number and colour. Watersheds that are not known to have been used by Atlantic Salmon, but that are contained within the Southern Upland region, are not labelled by number and are shaded grey. Reprinted with permission from Bowlby et al. (2014).

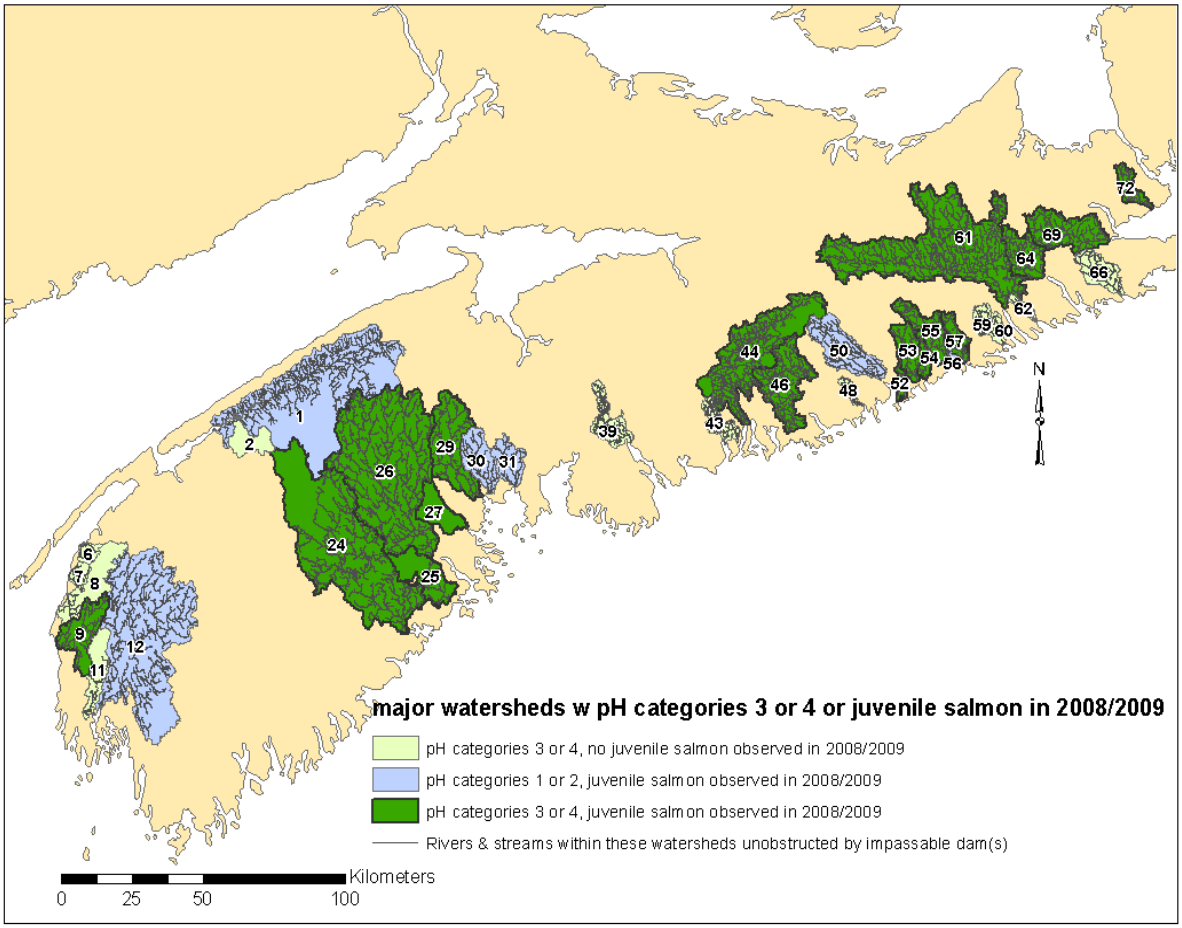


Figure A-4. Location of freshwater habitats that exhibit one or more of the following three characteristics: 1) have a pH greater than 5.0 (category 3 and 4 rivers), 2) have a high proportion of the watershed not impacted by barriers to fish passage, 3) contained Atlantic Salmon in the most recent (2008/09) electrofishing survey. Watershed numbers correspond to the legend in Figure A-3. Reprinted with permission from Bowlby et al. (2014).

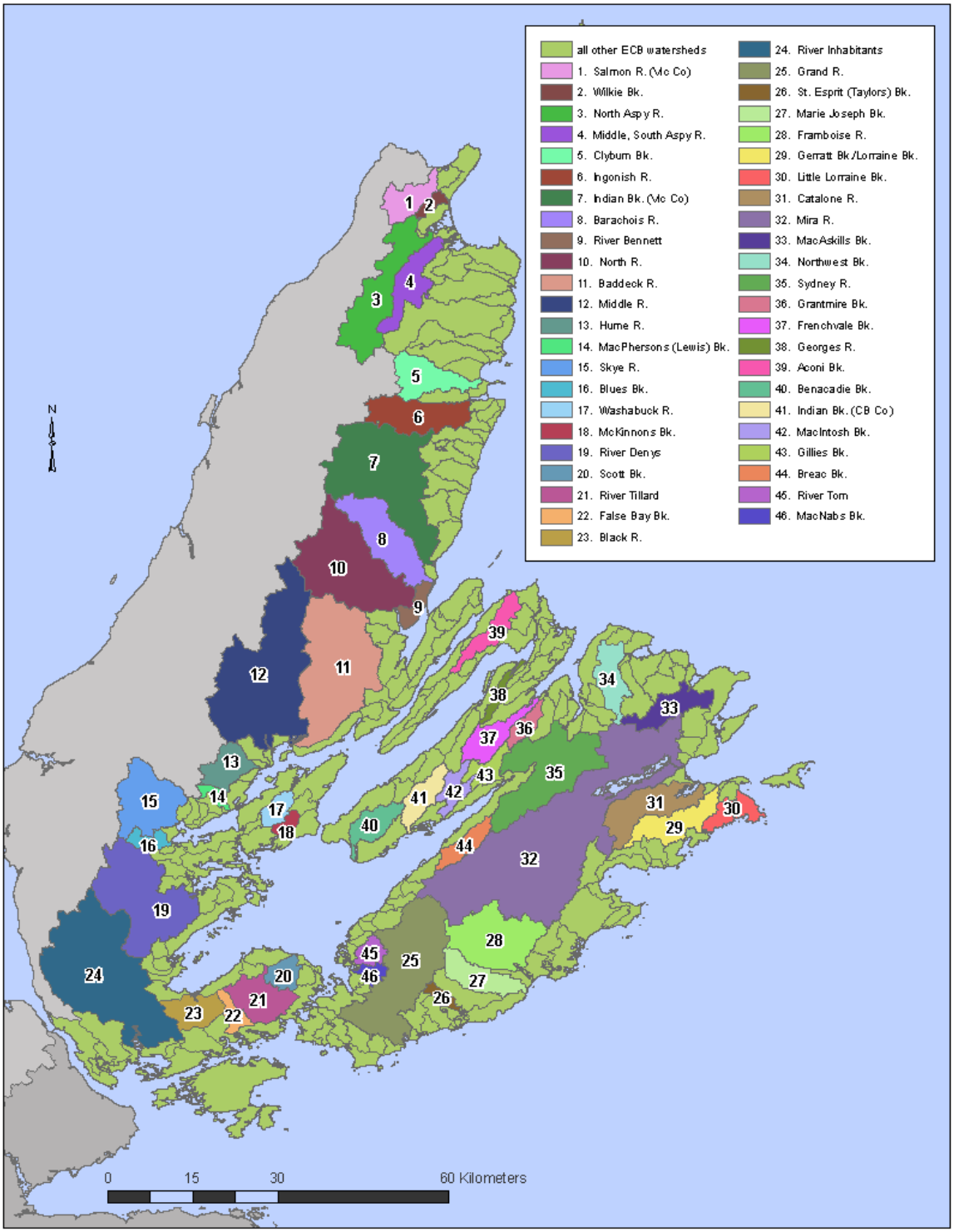


Figure A-5. Map of the watersheds contained in the Eastern Cape Breton region, labelled by number and colour. Watersheds that are not known to have been used by Atlantic Salmon, but that are contained within the Eastern Cape Breton region, are not labelled by number and are shaded light green. Reprinted with permission from Gibson et al. (2014).

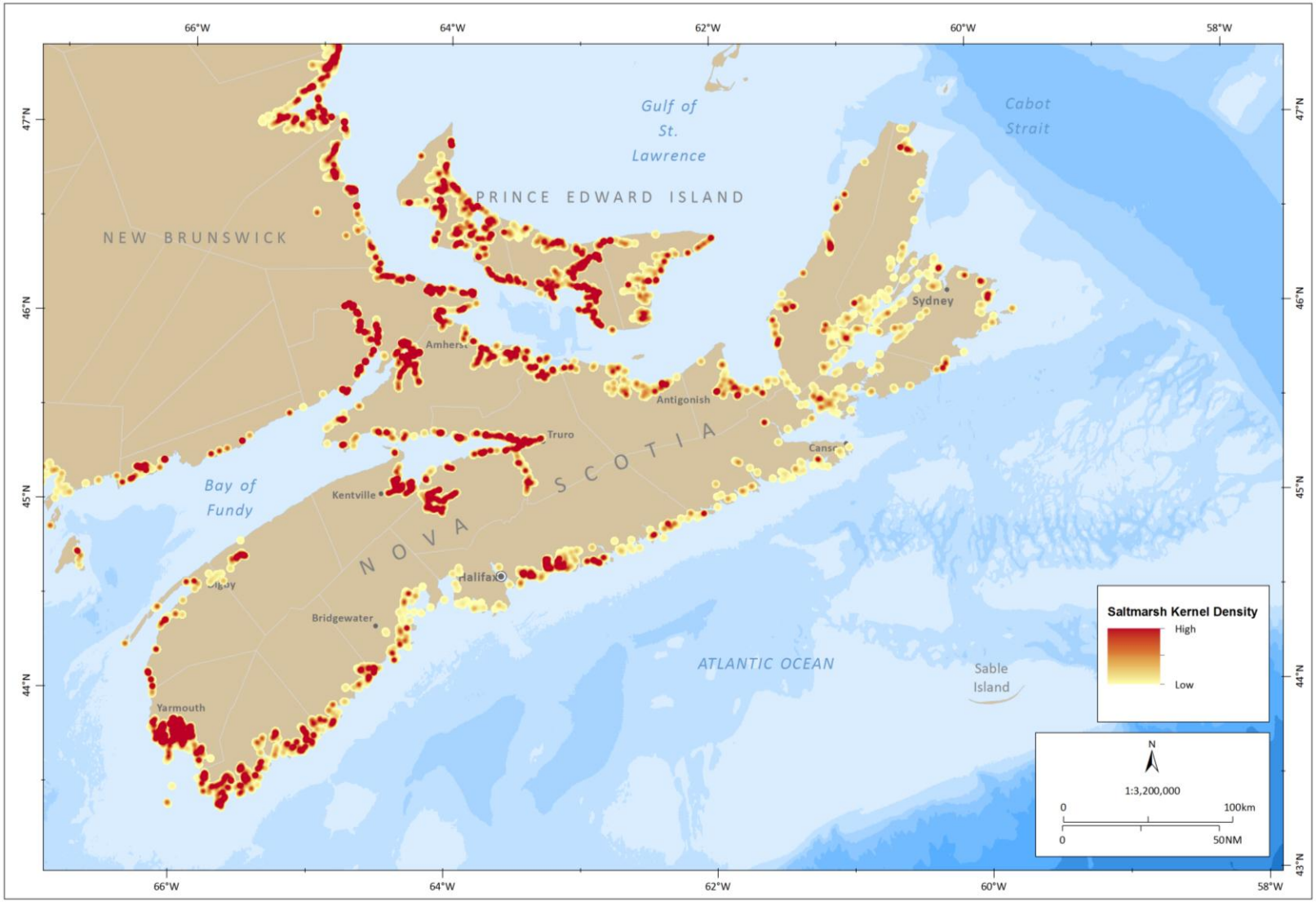


Figure A-6. Densities of salt marsh areal extent in the Maritimes, from Allard et al. (2014)

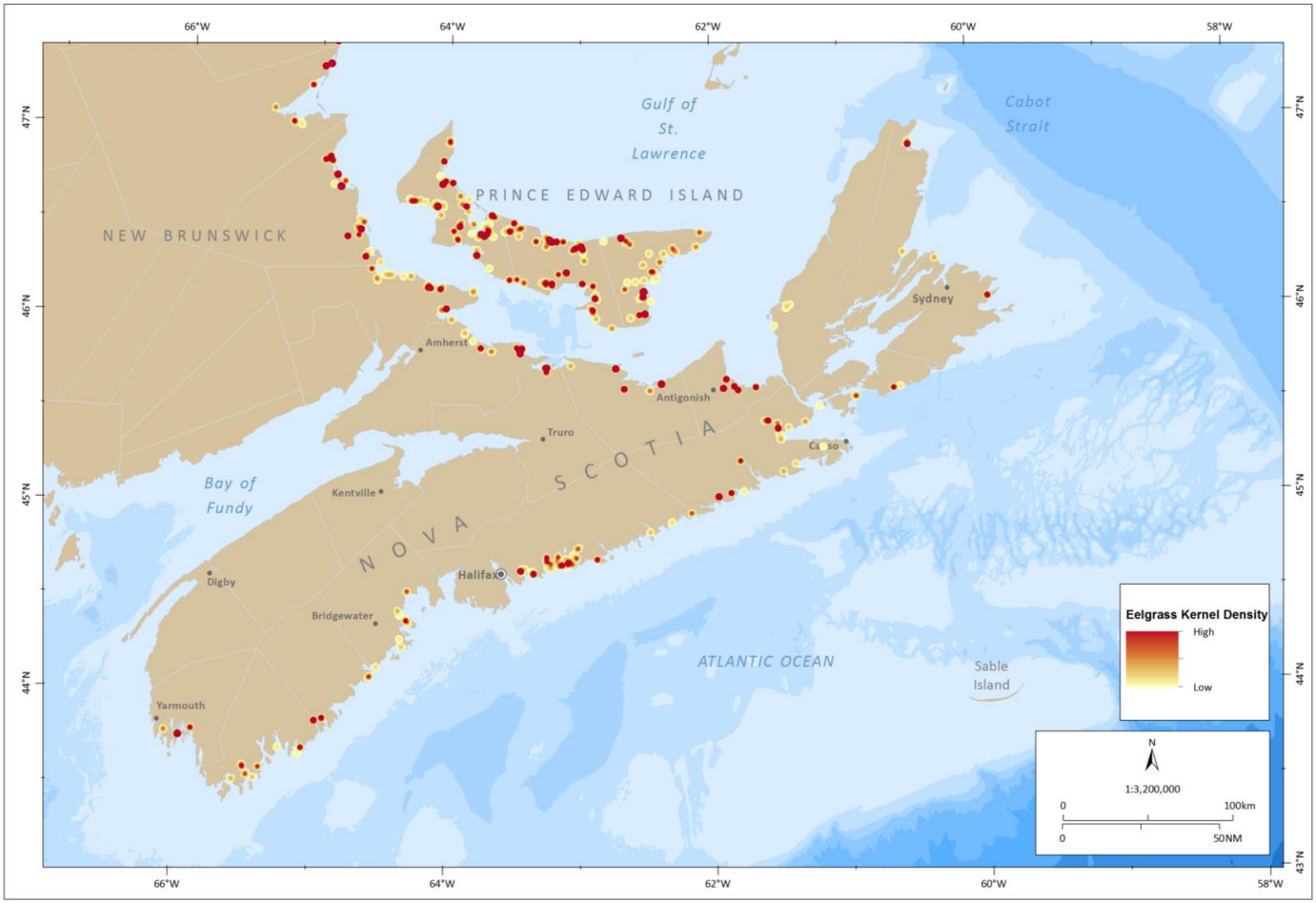


Figure A-7. Densities of eelgrass (*Zostera marina*) areal extent in the Maritimes, from Allard et al. (2014).

APPENDIX B

SITE-SPECIFIC MULTIPLE-FEATURE EBSAS

CONTENTS:

***A note on data sources:** Please refer to Section 3.3 of this report for a discussion of the thematic layers used in the maps.

Map Legend

Thematic Layers

Labelled Features

- Ecologically and Biologically Significant Area (EBSA)
- National Park or Adjunct
- National Wildlife Area
- Migratory Bird Sanctuary
- Game Sanctuary
- Wildlife Management Area
- Proposed Wildlife Management Area
- Designated Provincial Park or Park Reserve
- Peggys Cove Preservation Area
- Ramsar Wetland Site
- Wilderness Area
- Nature Reserve

Unlabelled Features

- Site of Ecological Significance (International Biological Program 1964-1974)
- Flight 111 Act
- Operational Non-Designated Provincial Park or Reserve
- National Historic Site or Park
- EHJV, ENGO, or Other Privately Protected Land
- Protected Beach
- Salt Marsh
- Roseate Tern Critical Habitat
- Piping Plover Critical Habitat

Topographic Layers

- Numbered Highway
- Local Paved Road
- Unpaved Road or Trail
- Railway
- County Boundary
- Watercourse
- Waterbody
- Beach, Foreshore Area, Shoal, etc
- Urban Area
- Vegetation

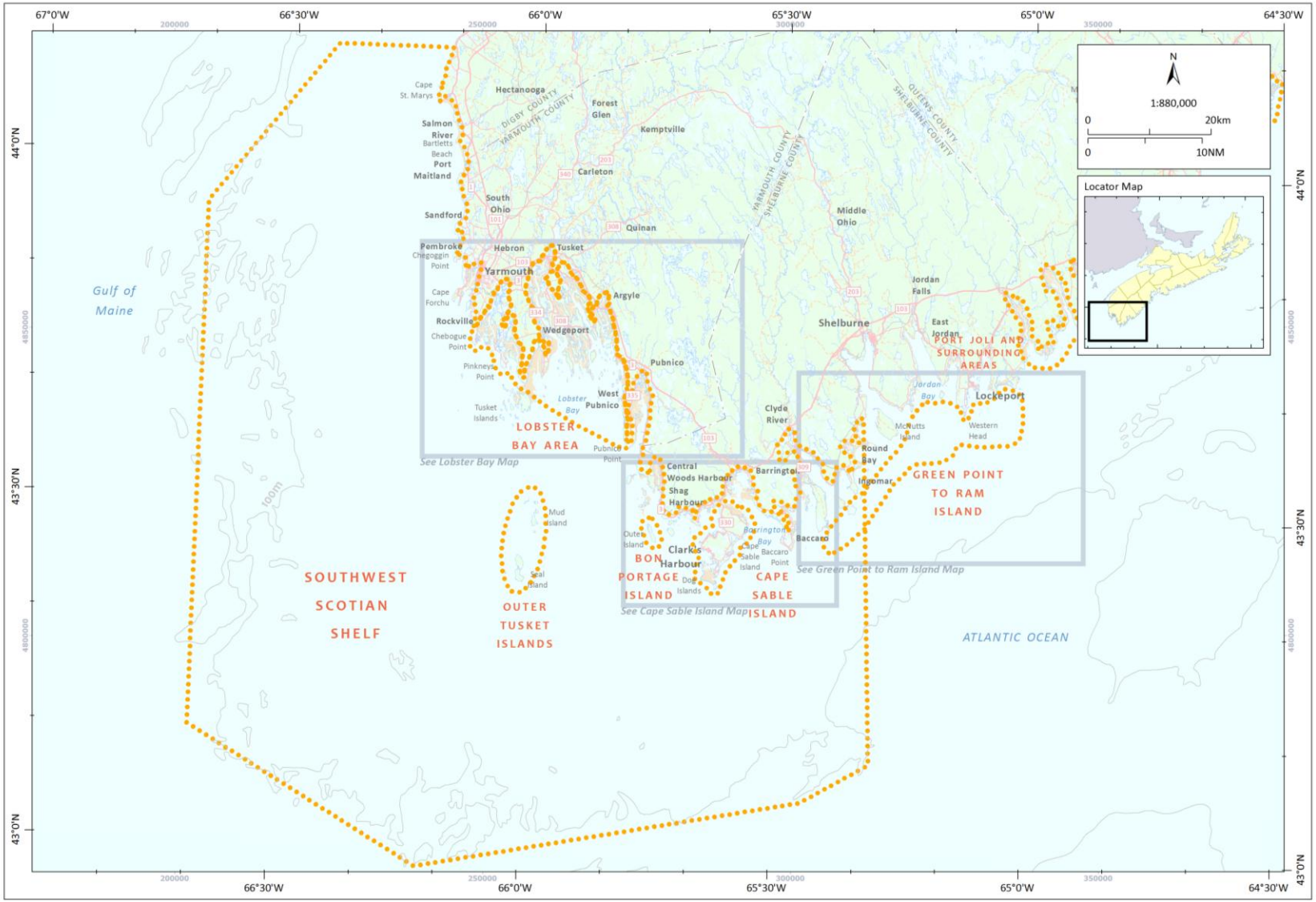


Figure B-1. The Southwest Scotian Shelf, Outer Tusket Islands, Lobster Bay Area, Bon Portage Island, Cape Sable Island, and Green Point to Ram Island EBSAs.

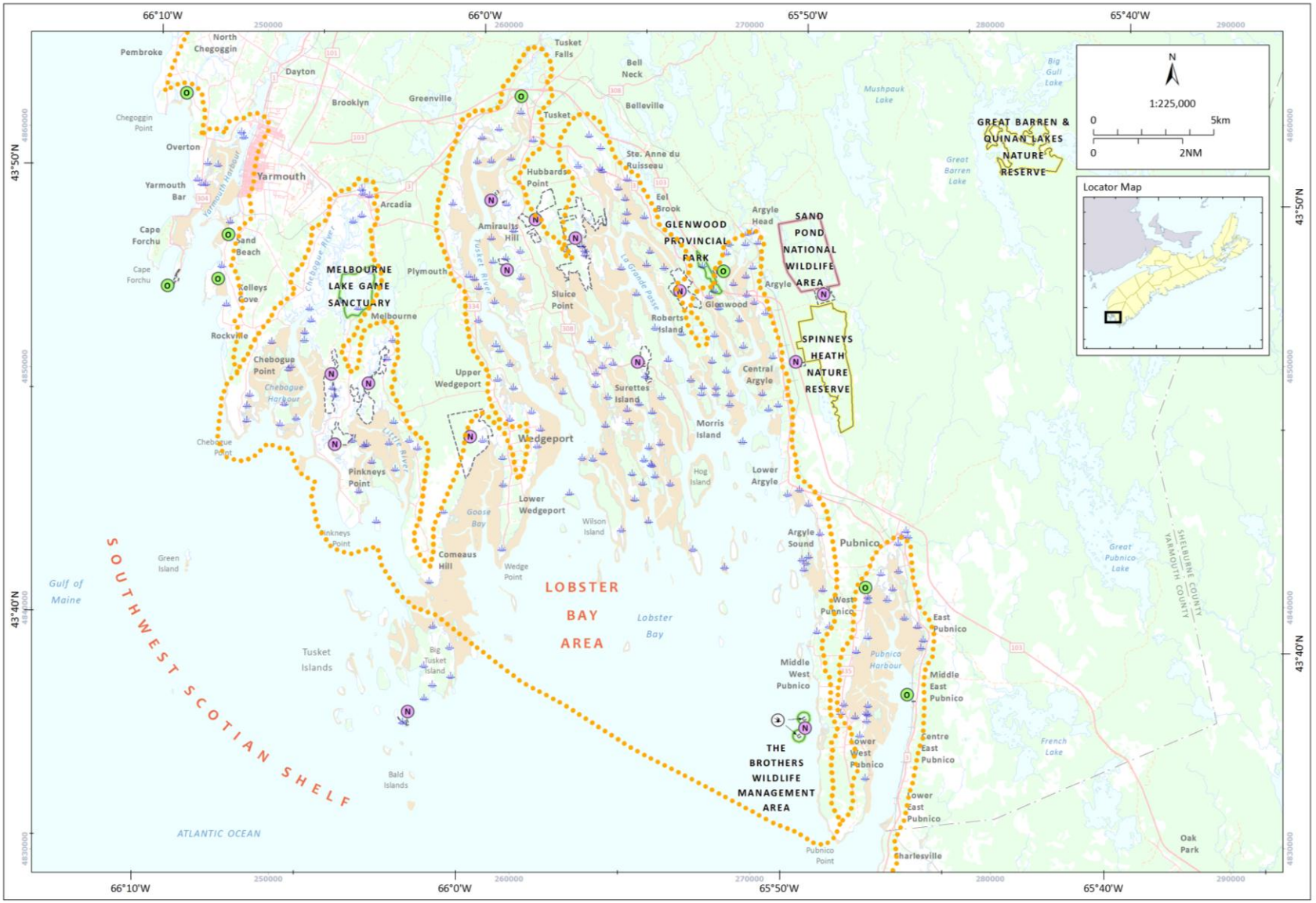


Figure B-2. The Lobster Bay Area EBSA.

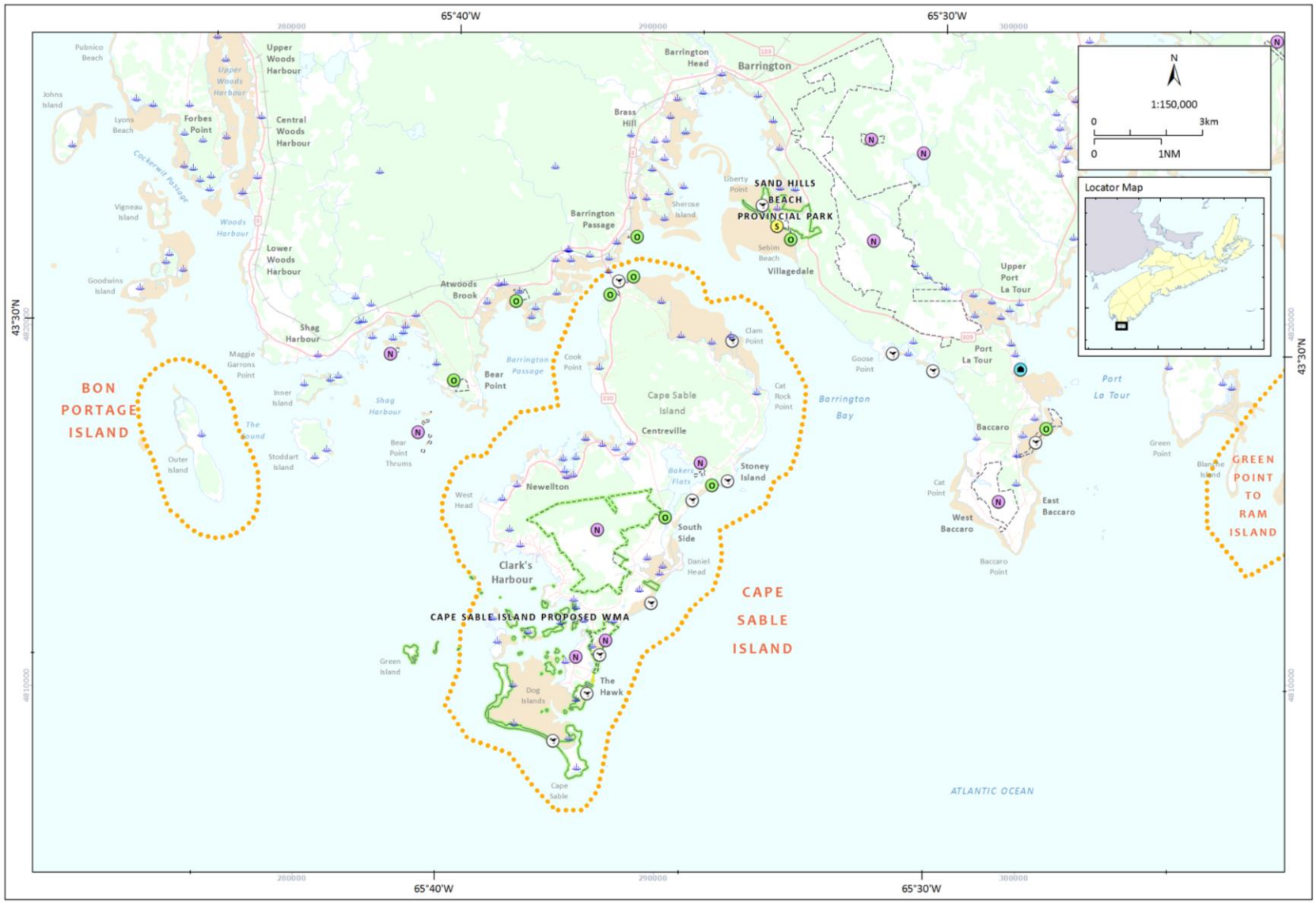


Figure B-3. The Bon Portage Island and Cape Sable Island EBSAs.

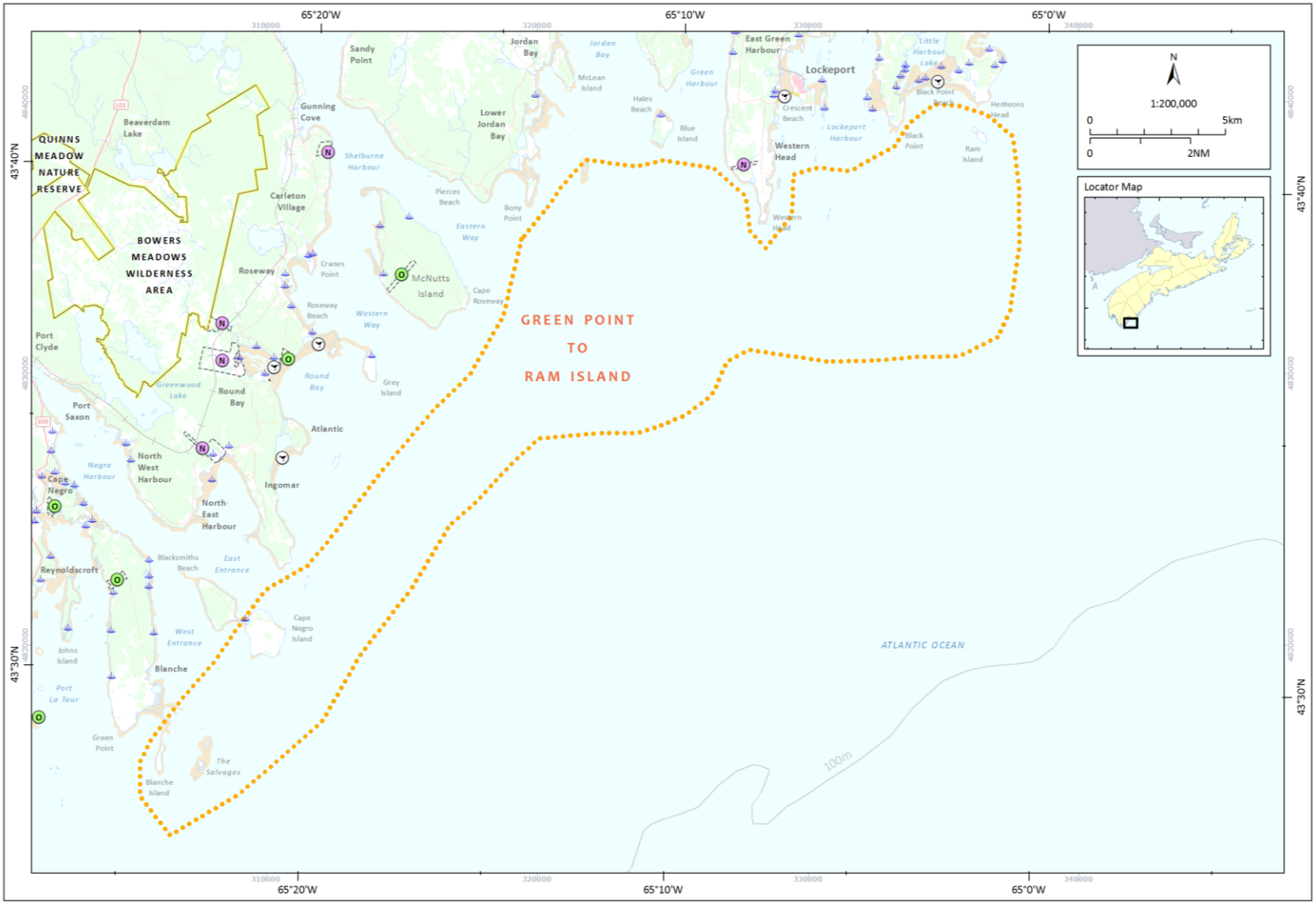


Figure B-4. The Green Point to Ram Island EBSA.

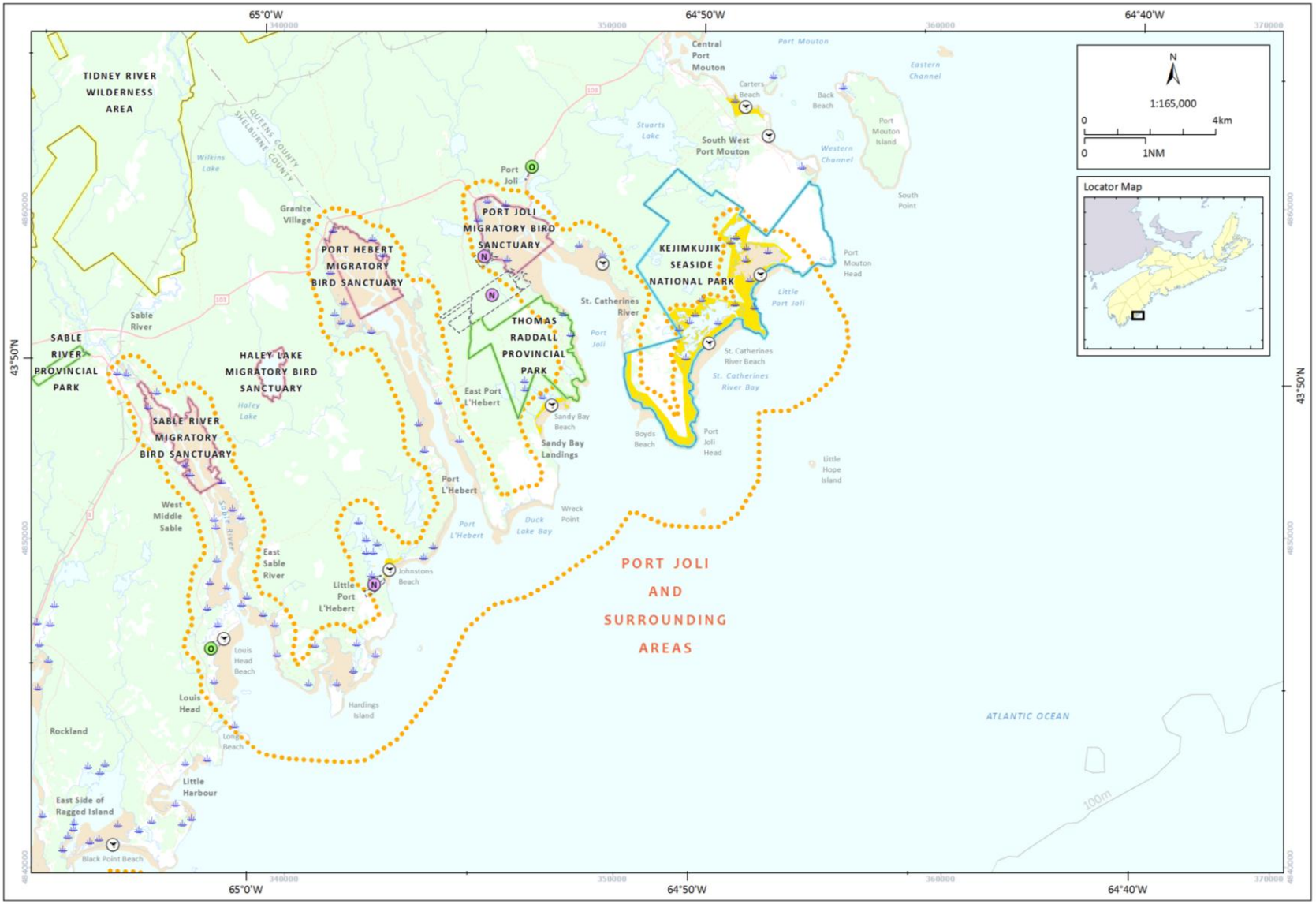


Figure B-5. The Port Joli and Surrounding Areas EBSA.

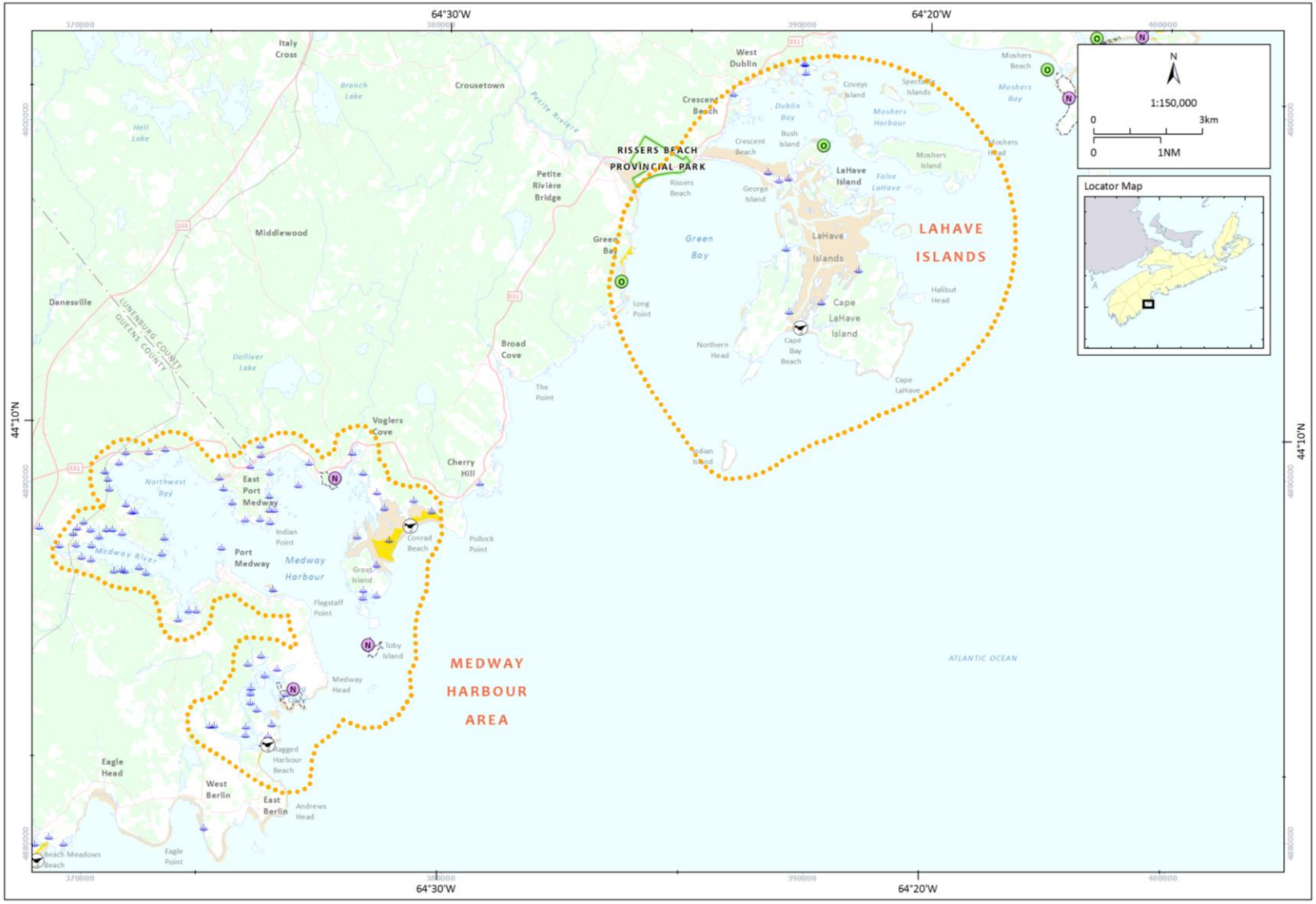


Figure B-6. The Medway Harbour Area and LaHave Islands EBSAs.

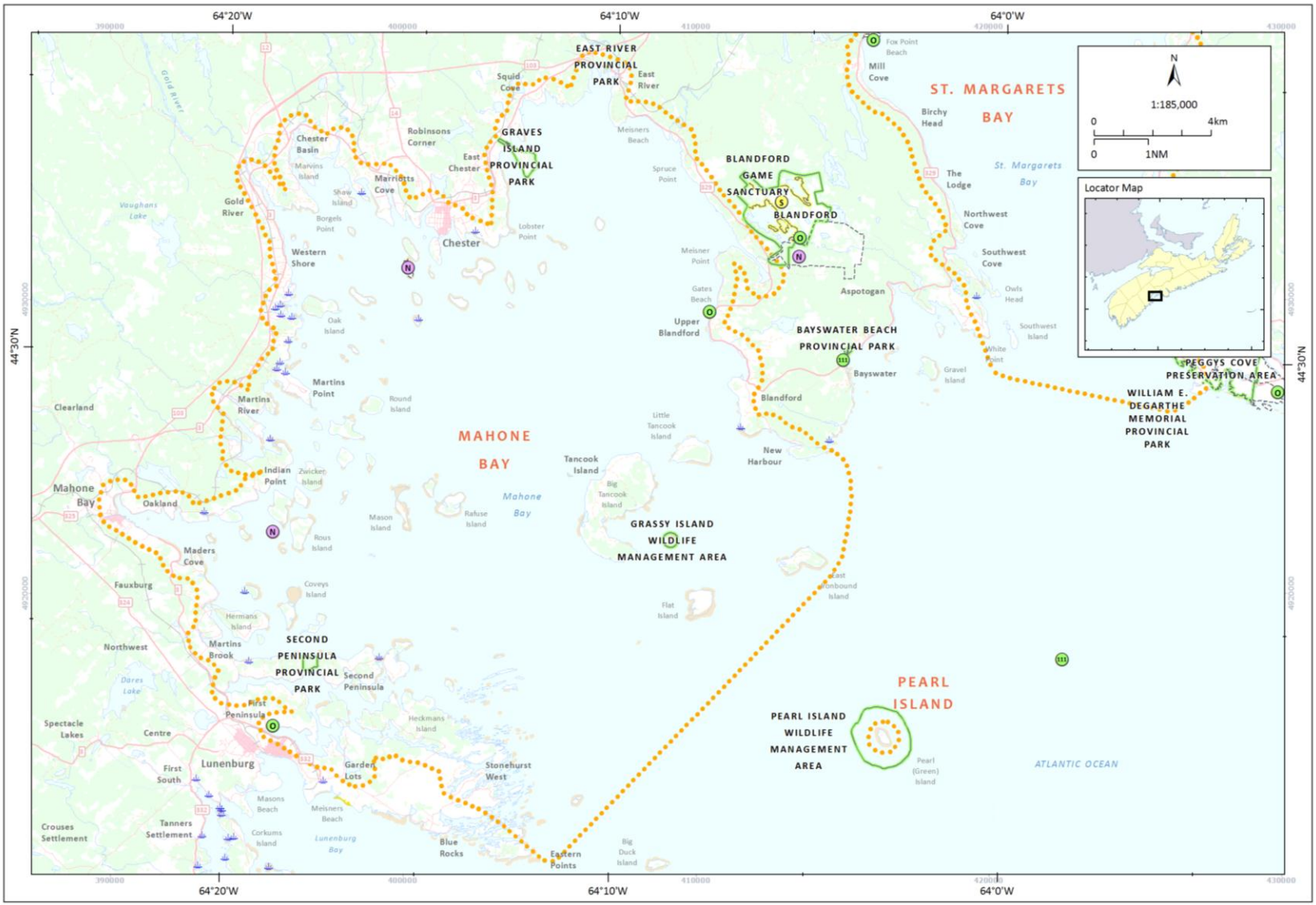


Figure B-7. The Mahone Bay and Pearl Island EBSAs.

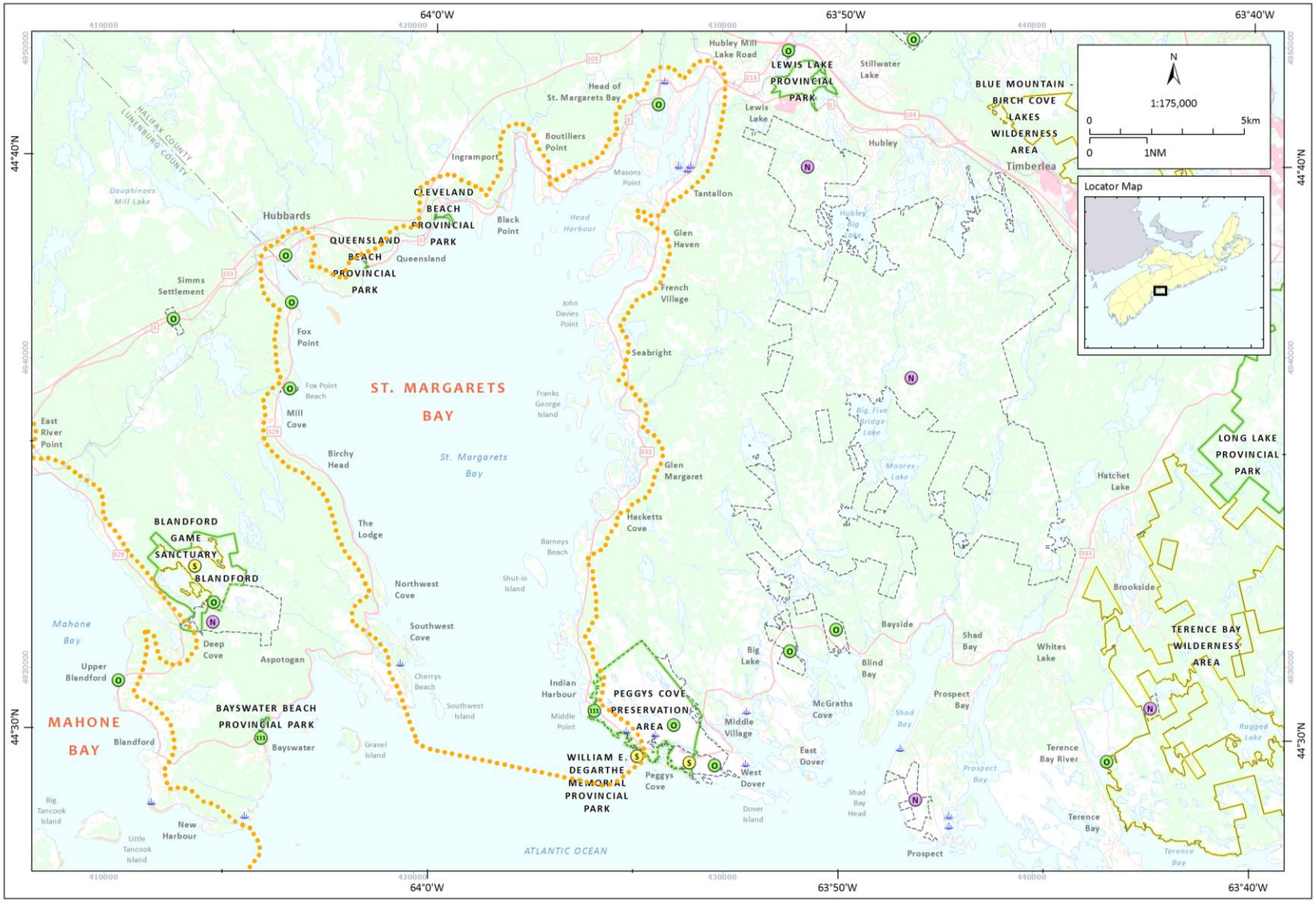


Figure B-8. The St. Margaret's Bay EBSA.

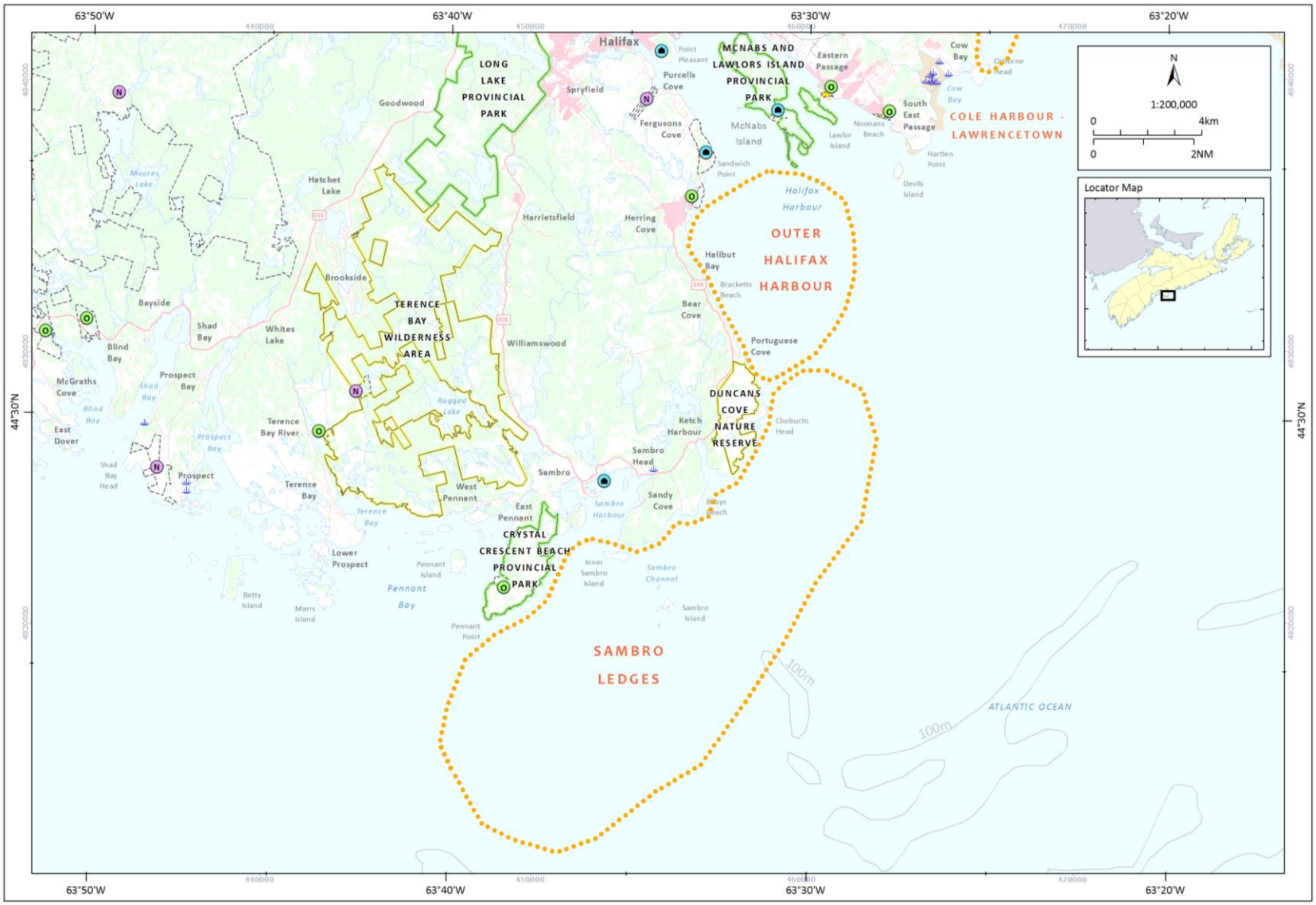


Figure B-9. The Sambro Ledges and Outer Halifax Harbour EBSAs.

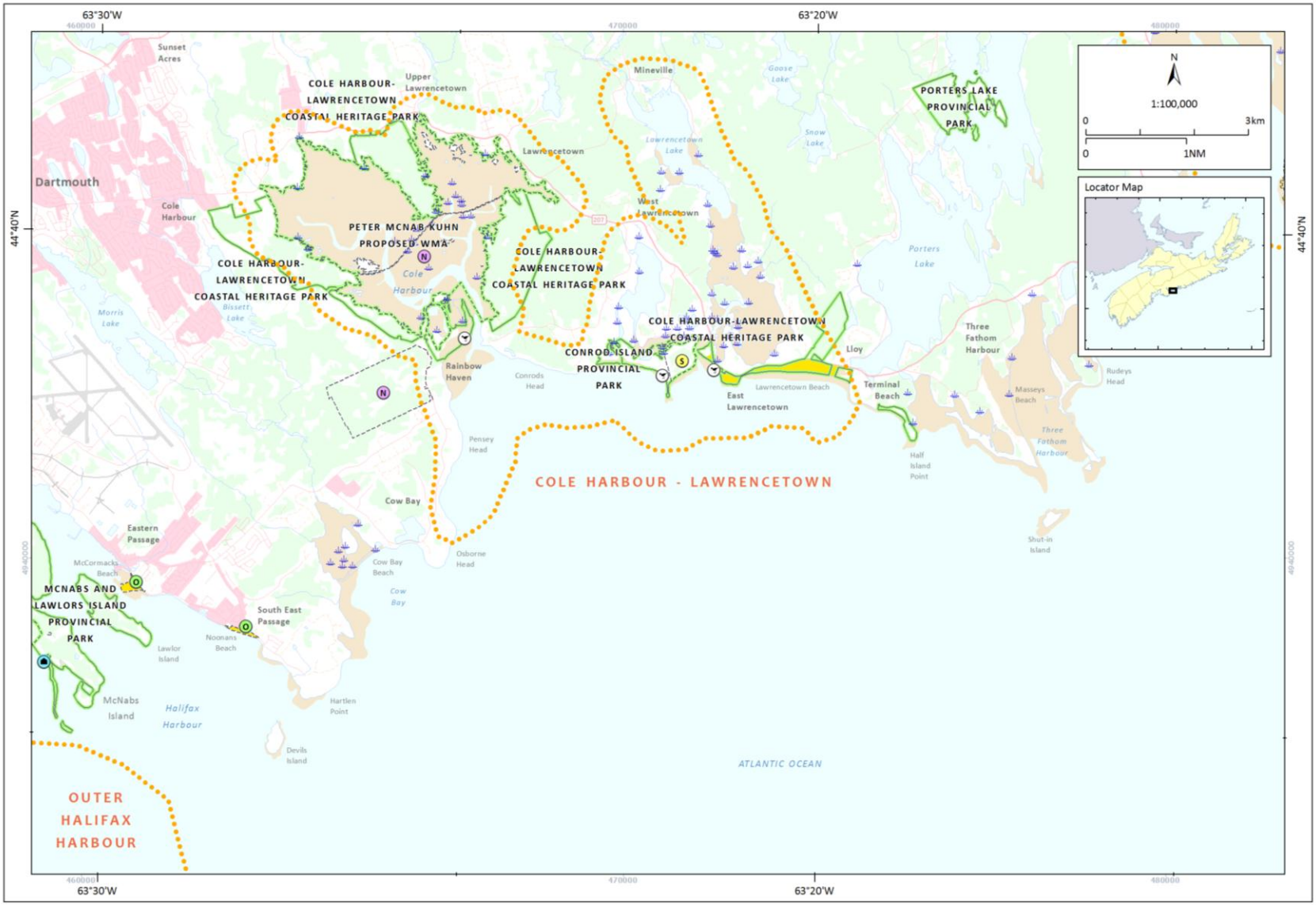


Figure B-10. The Cole Harbour – Lawrencetown EBSA.

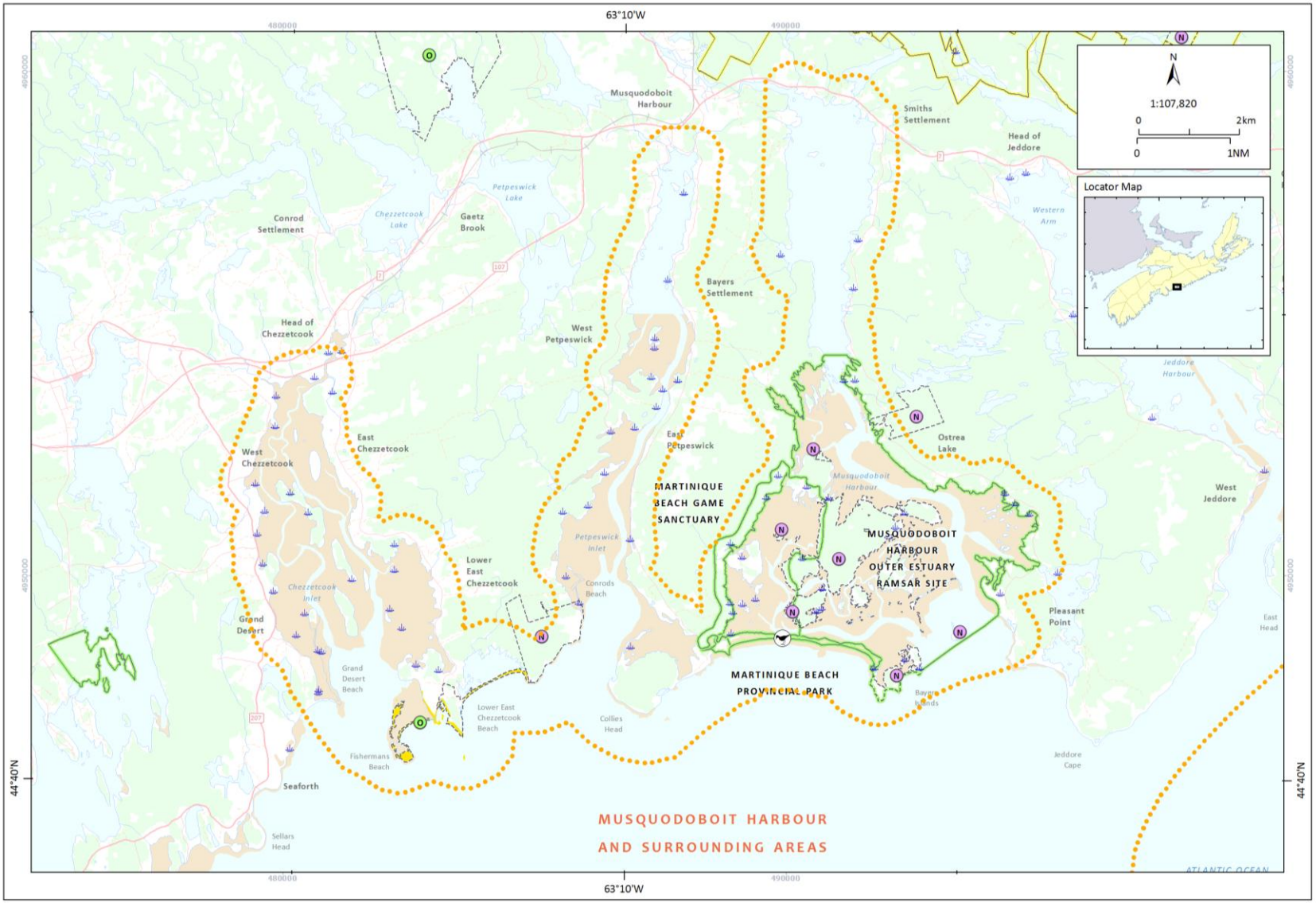


Figure B-11. The Musquodoboit Harbour and Surrounding Areas EBSA.

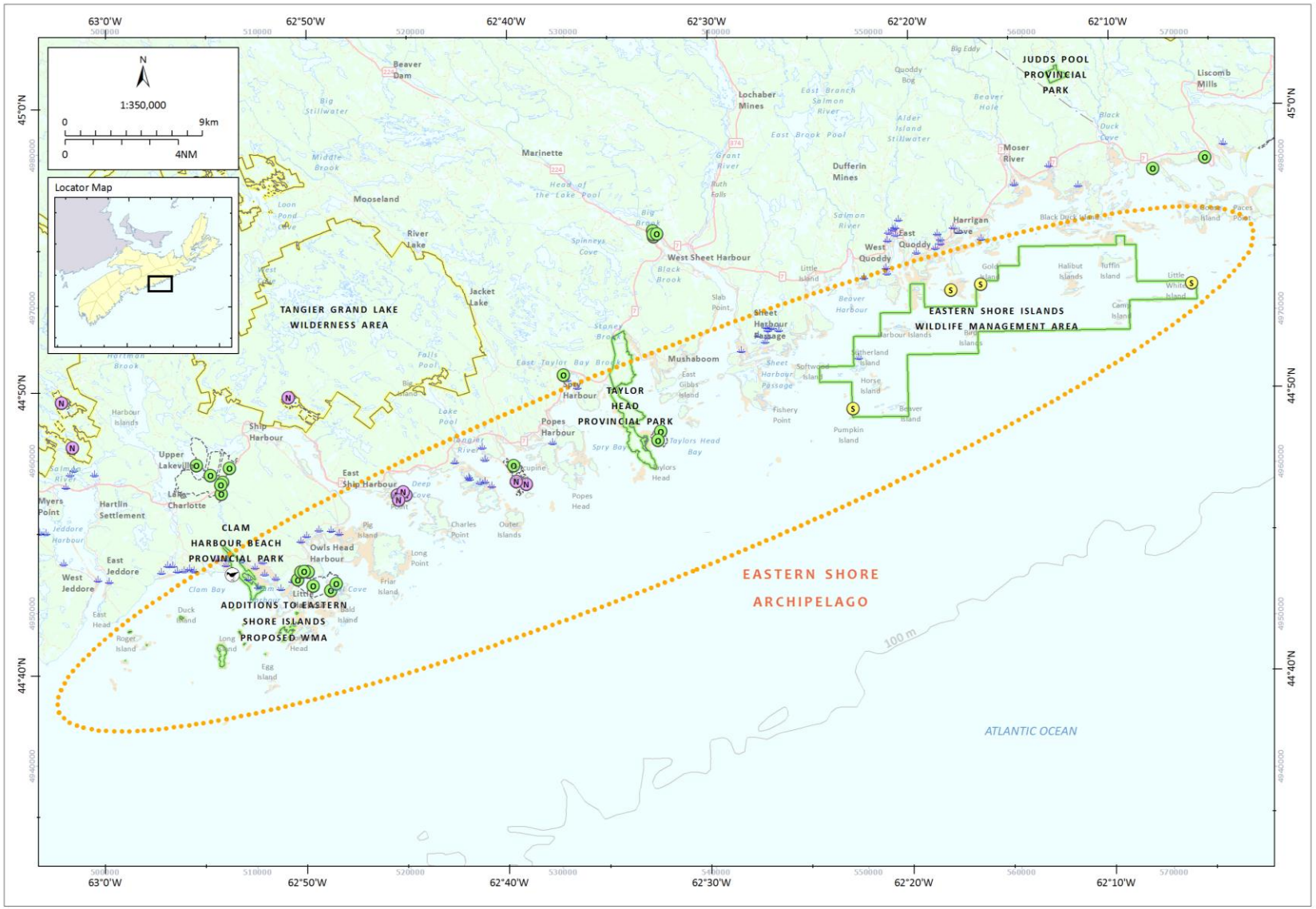


Figure B-12. The Eastern Shore Archipelago EBSA.

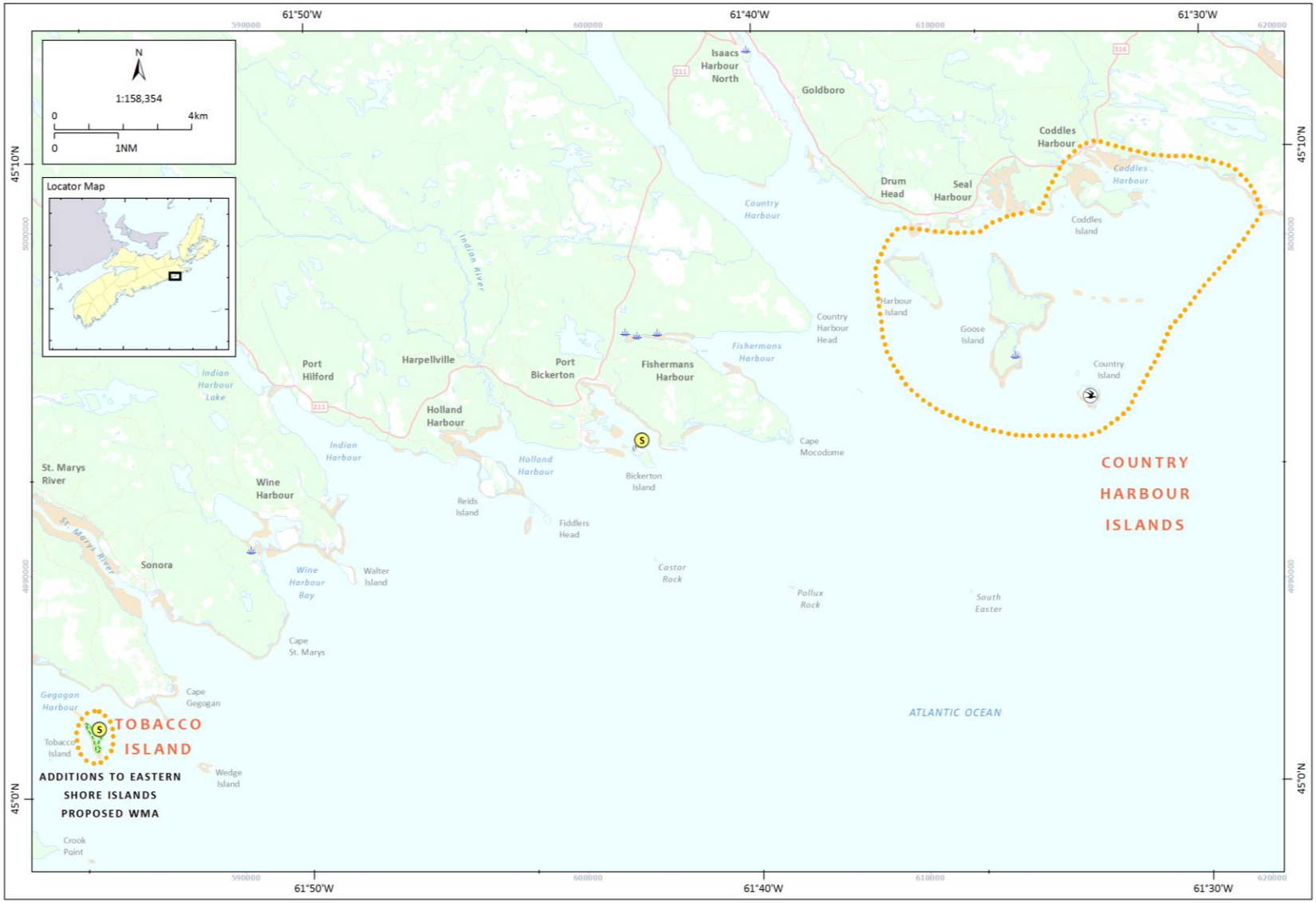


Figure B-13. The Tobacco Island and Country Harbour Islands EBSAs.

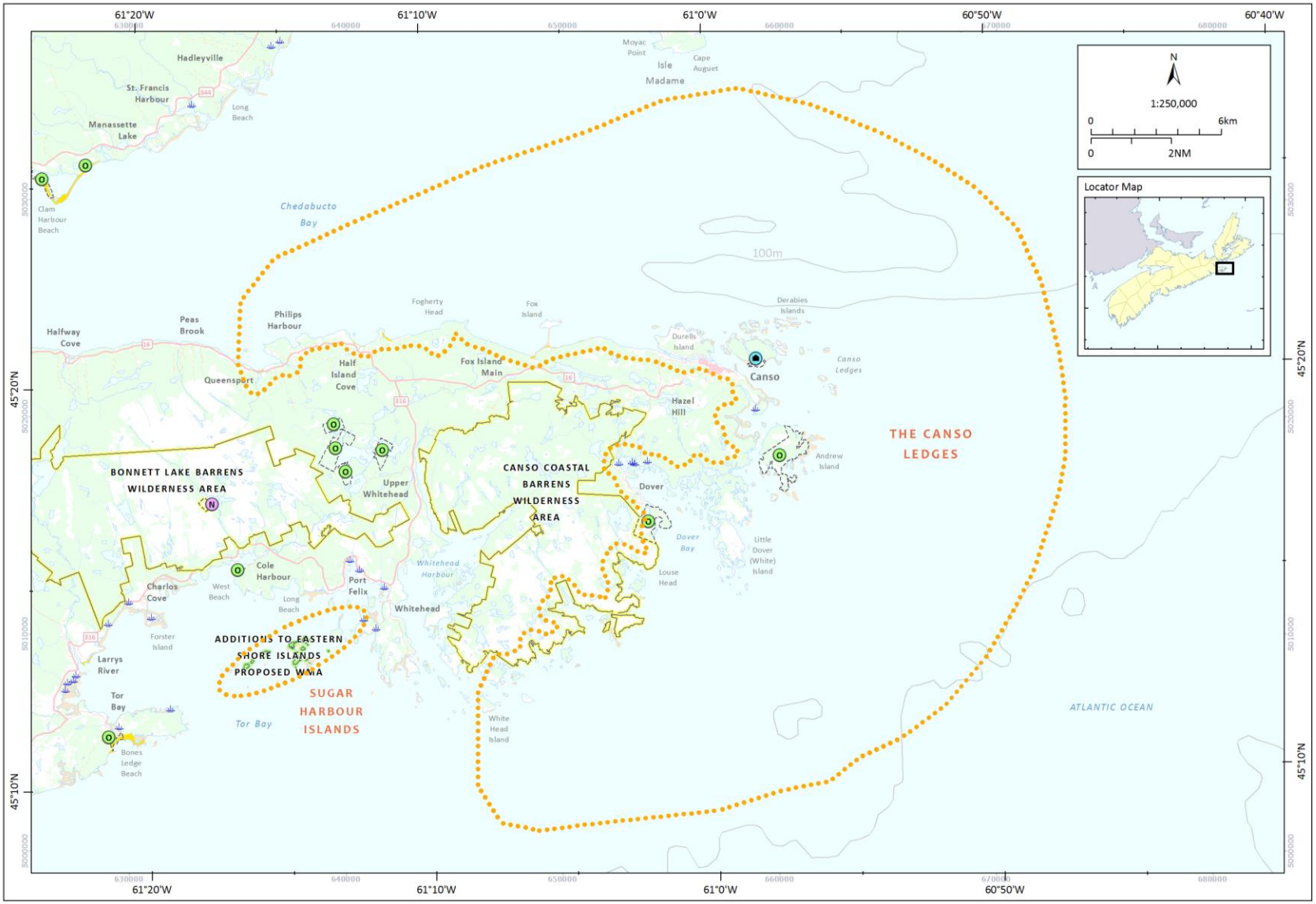


Figure B-14. The Sugar Harbour Islands and the Canso Ledges EBSAs.

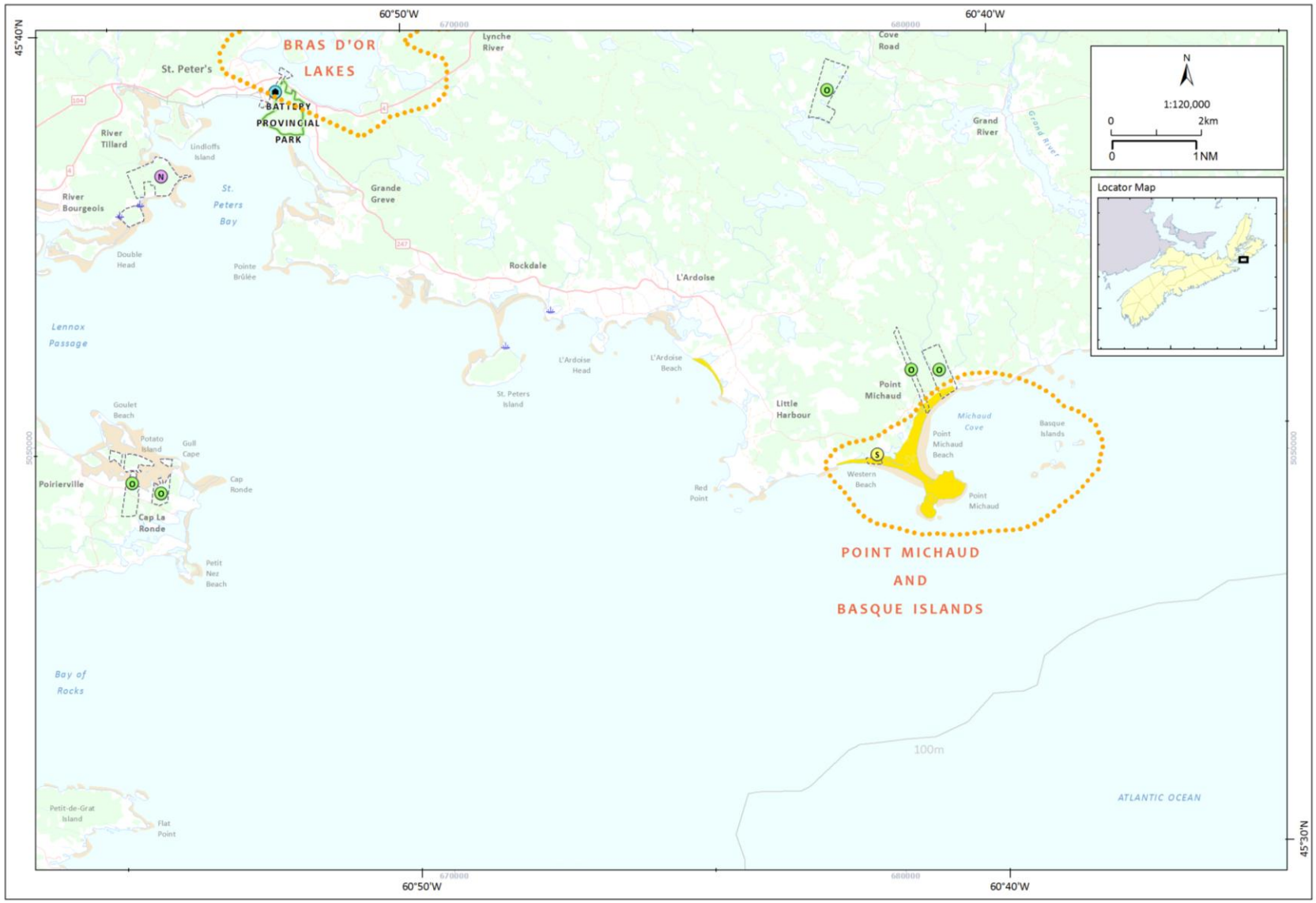


Figure B-15. The Point Michaud and Basque Islands EBSA.

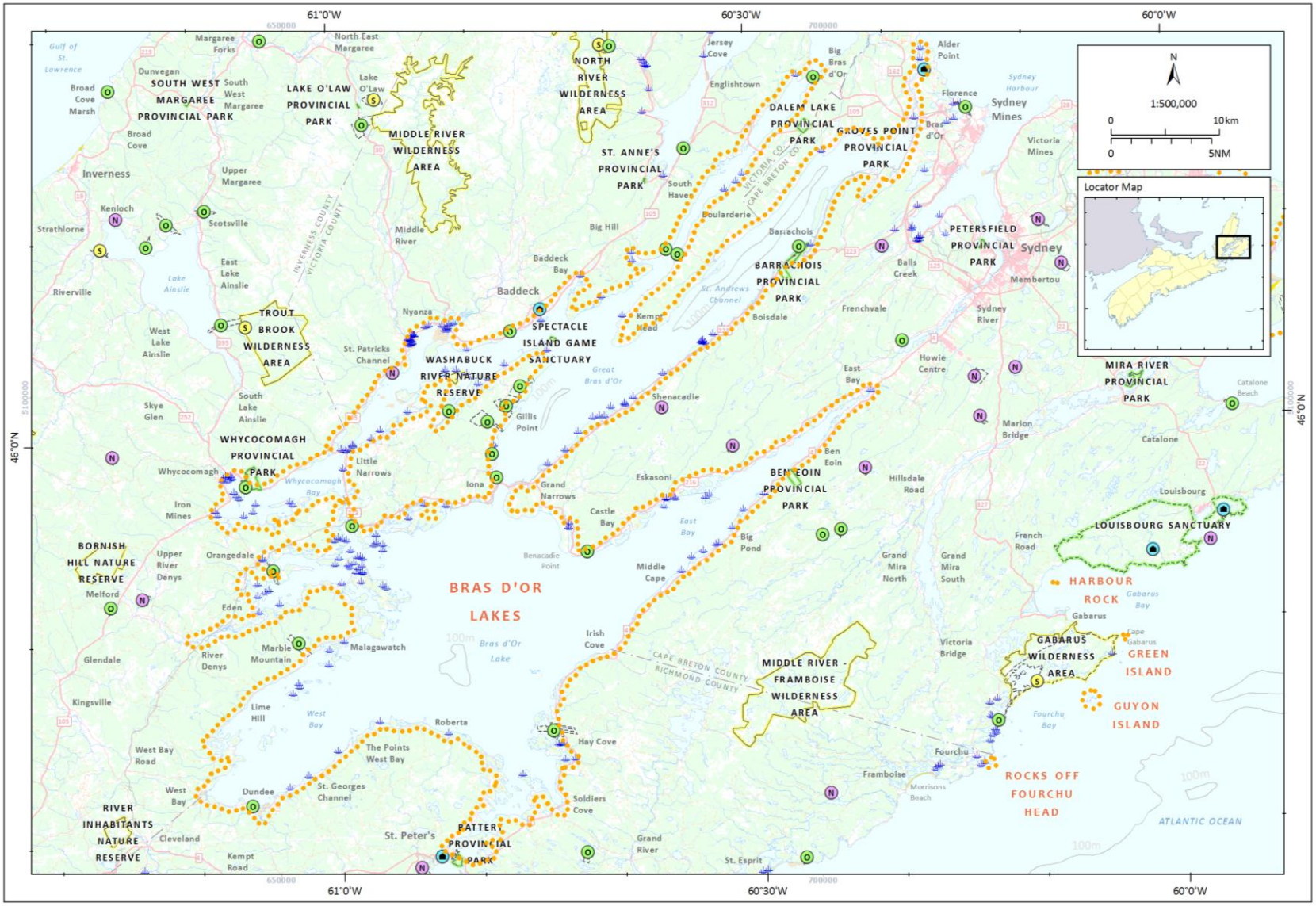


Figure B-16. The Bras d'Or Lakes, Rocks off Fourchu Head, Guyon Islands, Green Island, and Harbour Rock EBSAs.

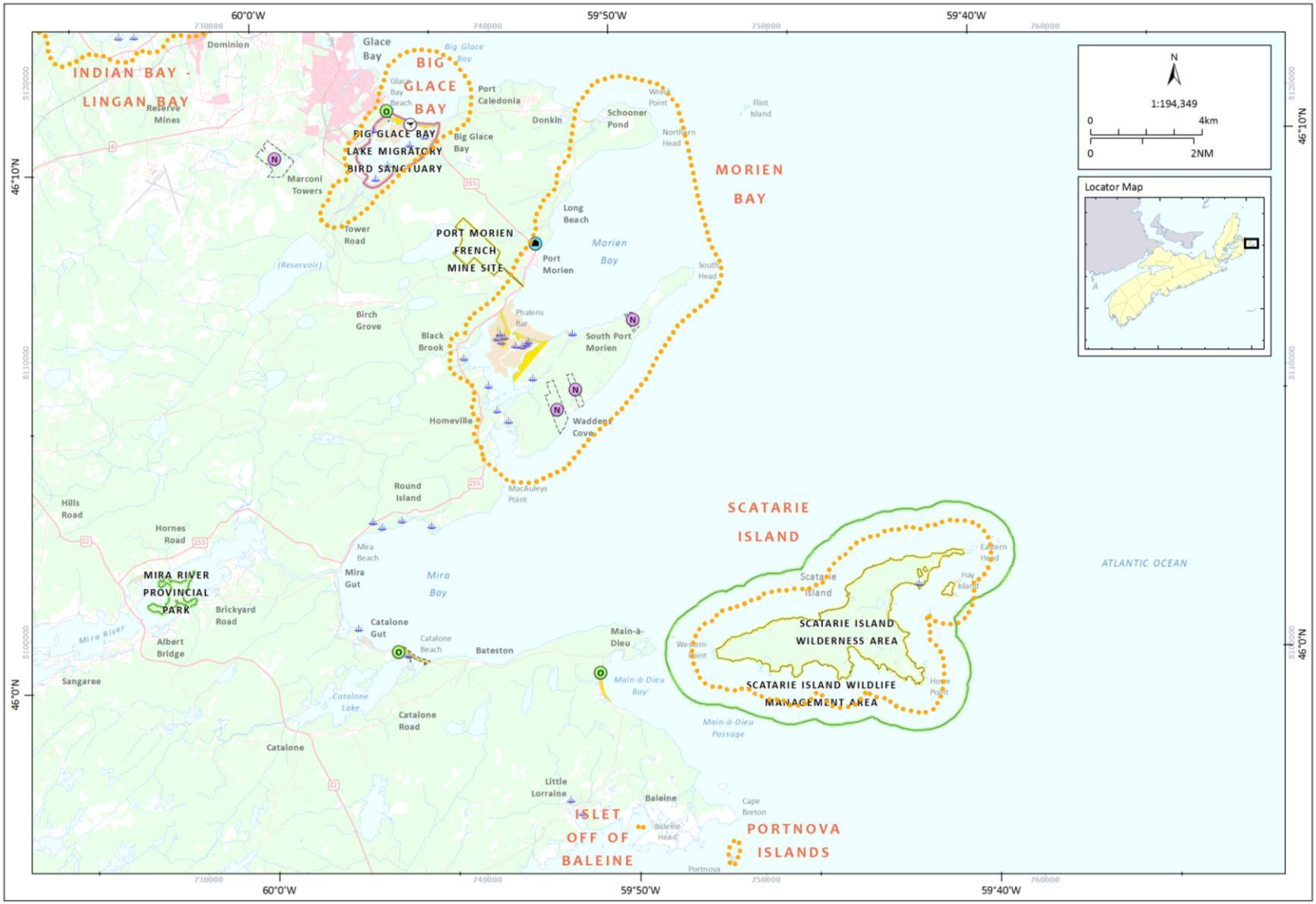


Figure B-17. The Islet off of Baleine, Portnova Islands, Scatarie Island, Morien Bay and Big Glace Bay EBSAs.

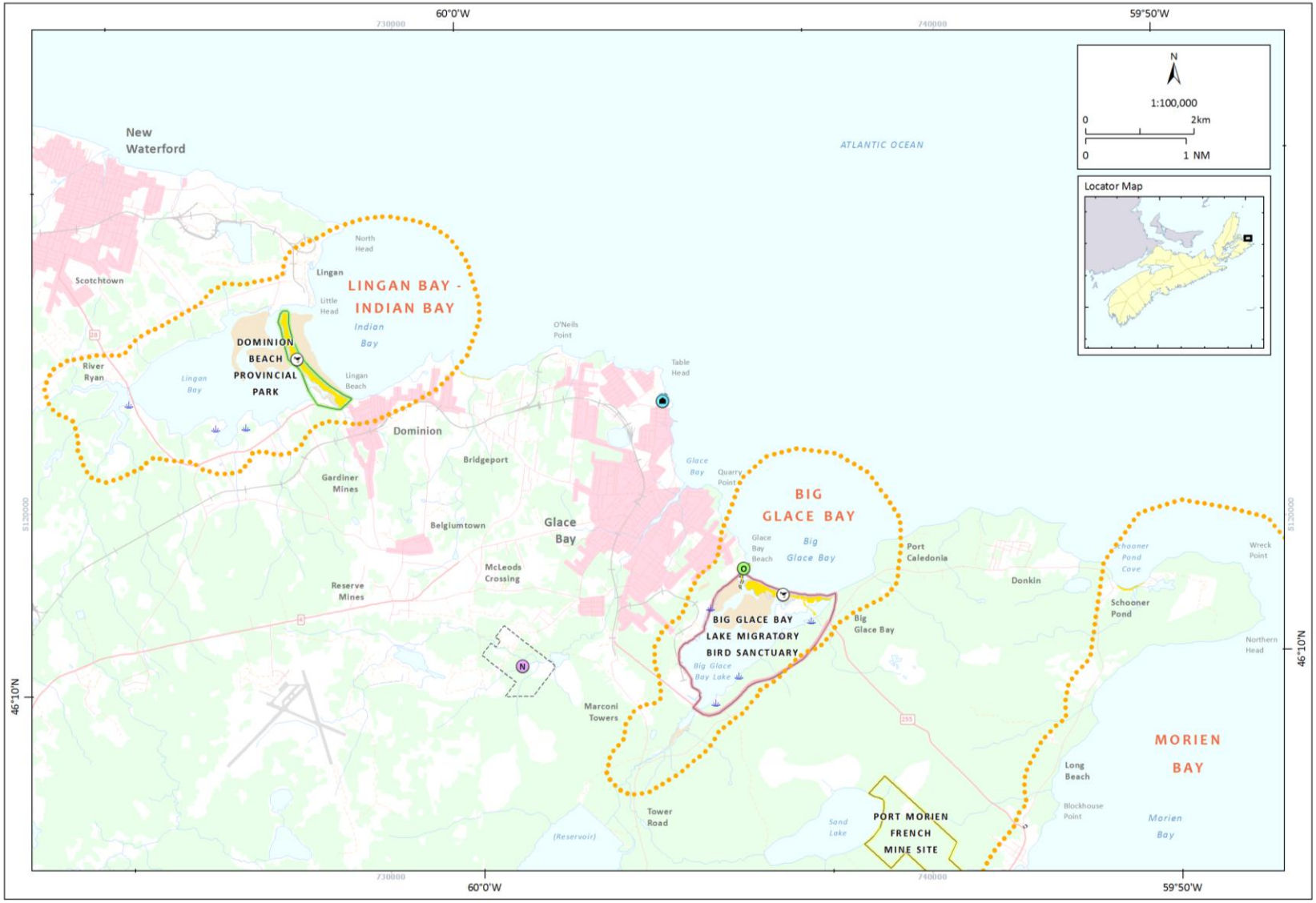


Figure B-18. The Big Glace Bay and Lingan Bay – Indian Bay EBSAs.

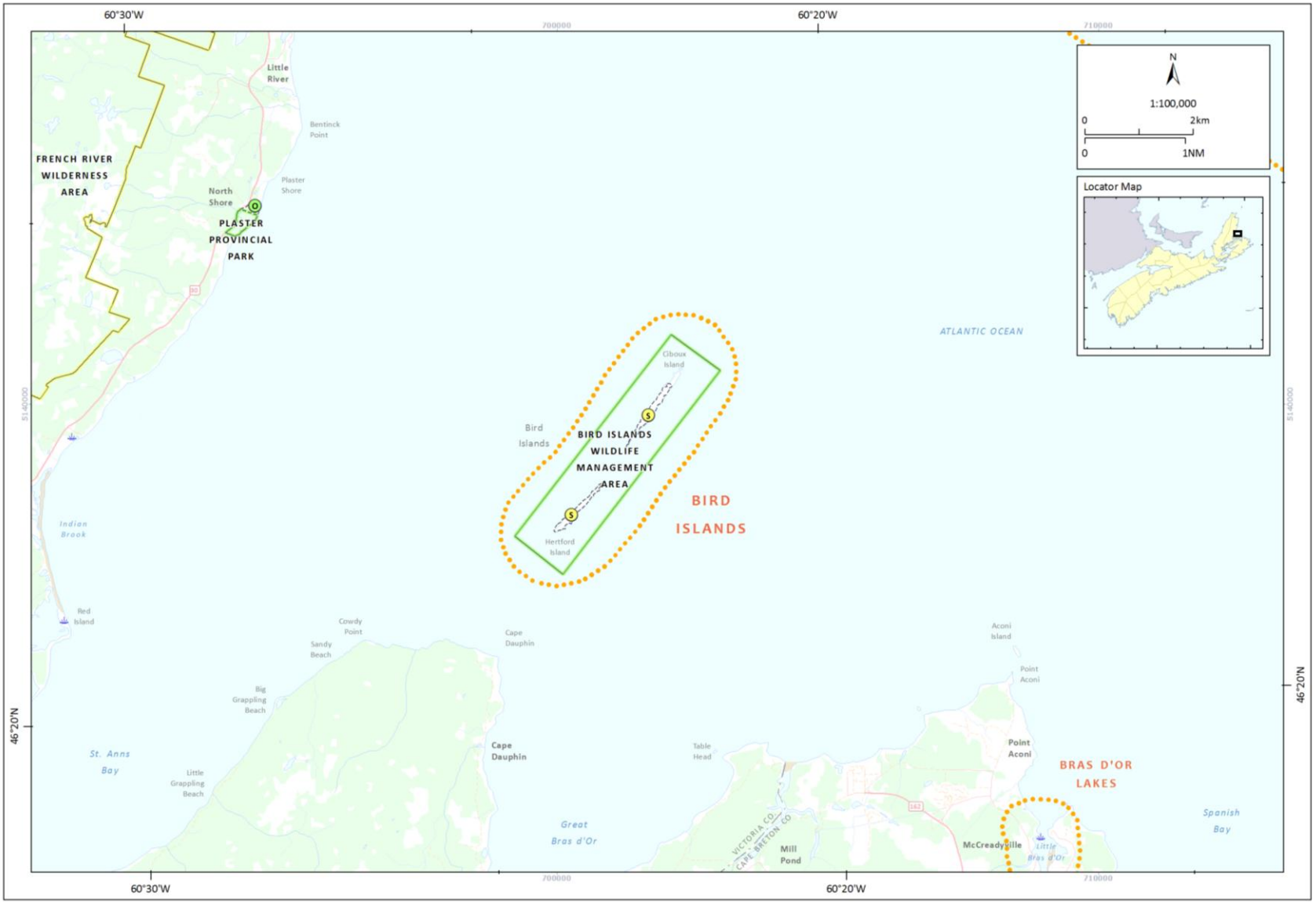


Figure B-19. The Bird Islands EBSA.

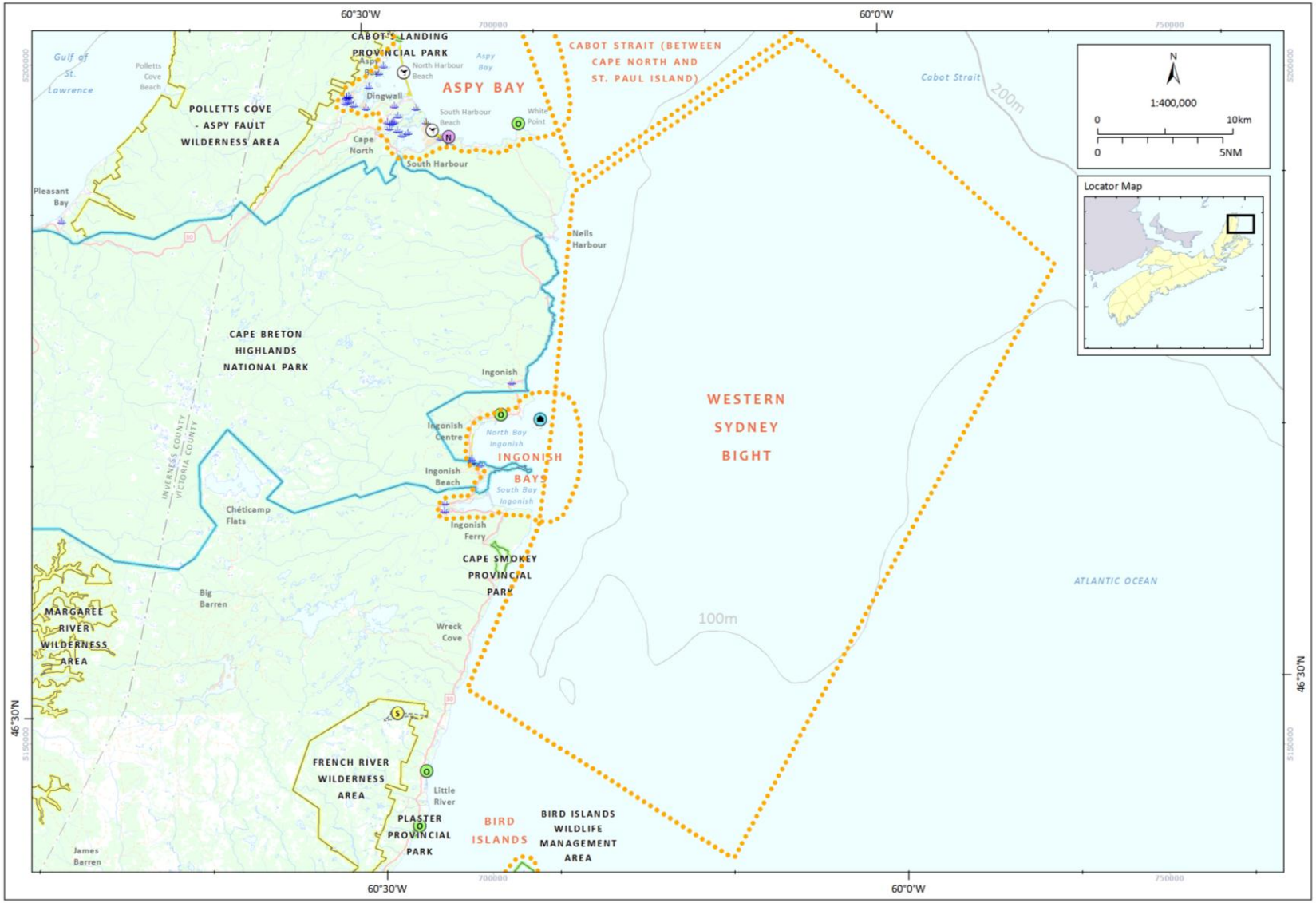


Figure B-20. The Ingonish Bay and Western Sydney Bight EBSAs.

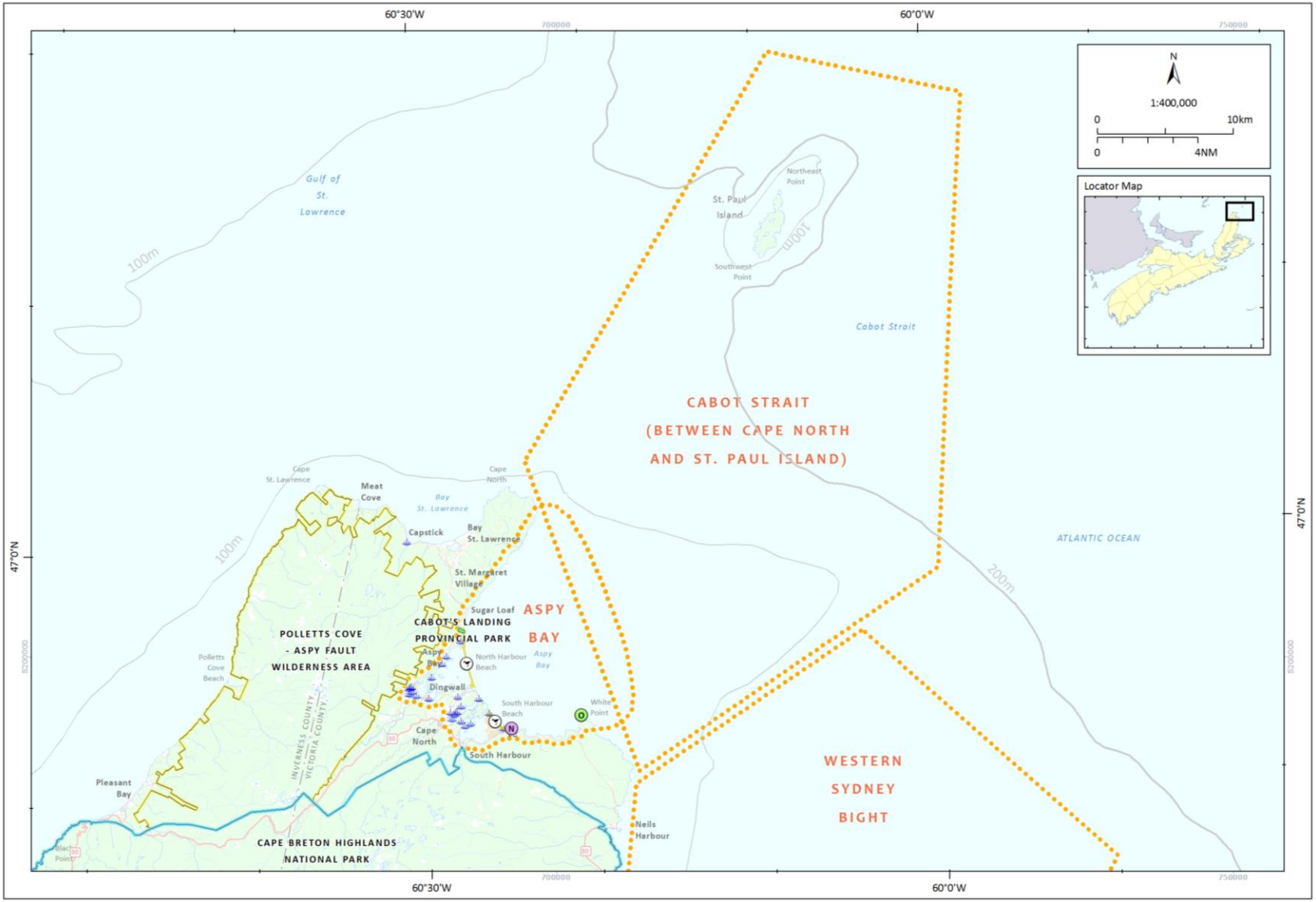


Figure B-21. The Aspy Bay and Cabot Strait EBSAs.

APPENDIX C

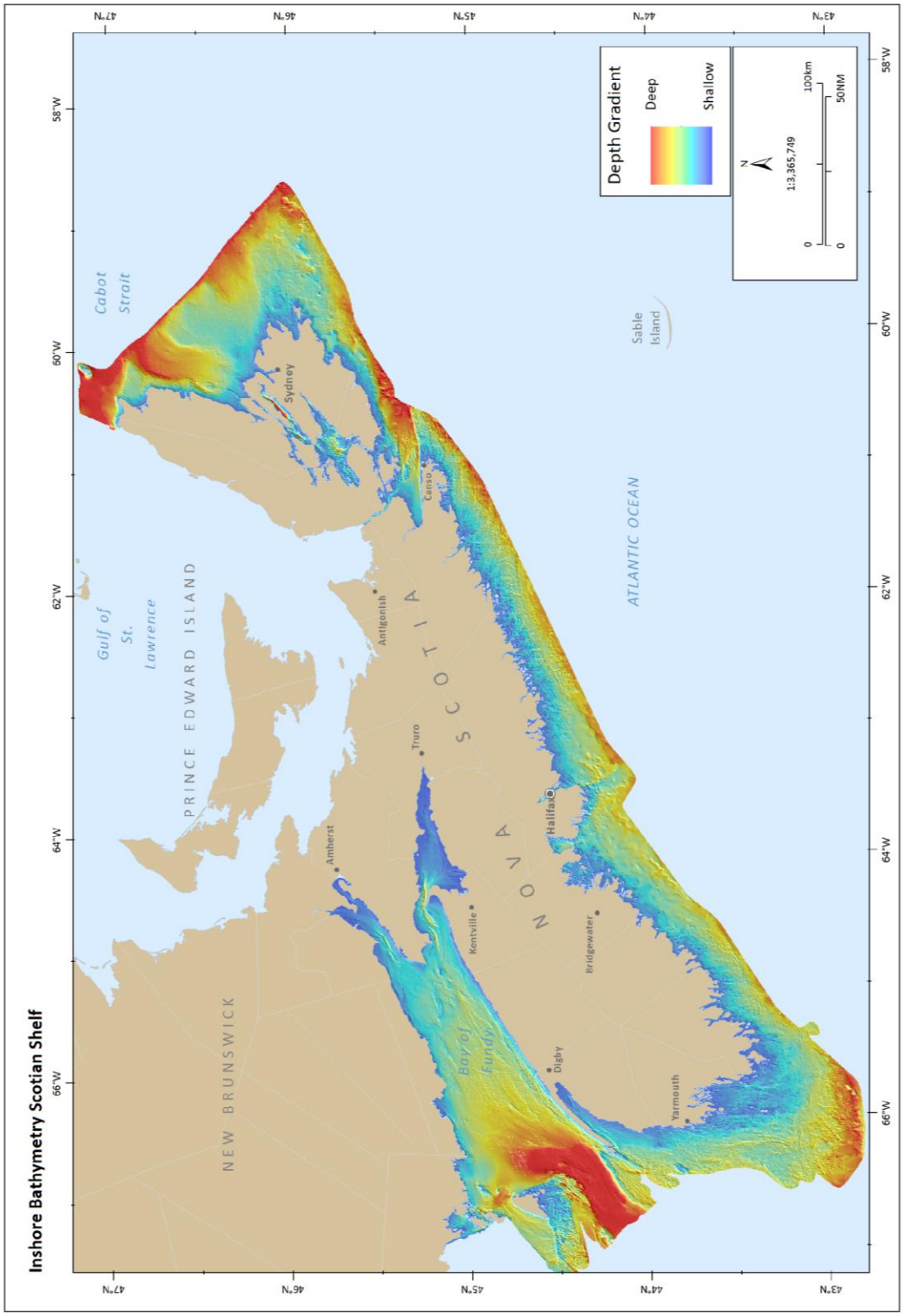


Figure C-1. Inshore bathymetry for the Scotian Shelf, including the Bay of Fundy (data from Greenlaw 2013).