Figure 4.49 Generalized Migration Route of American Eels

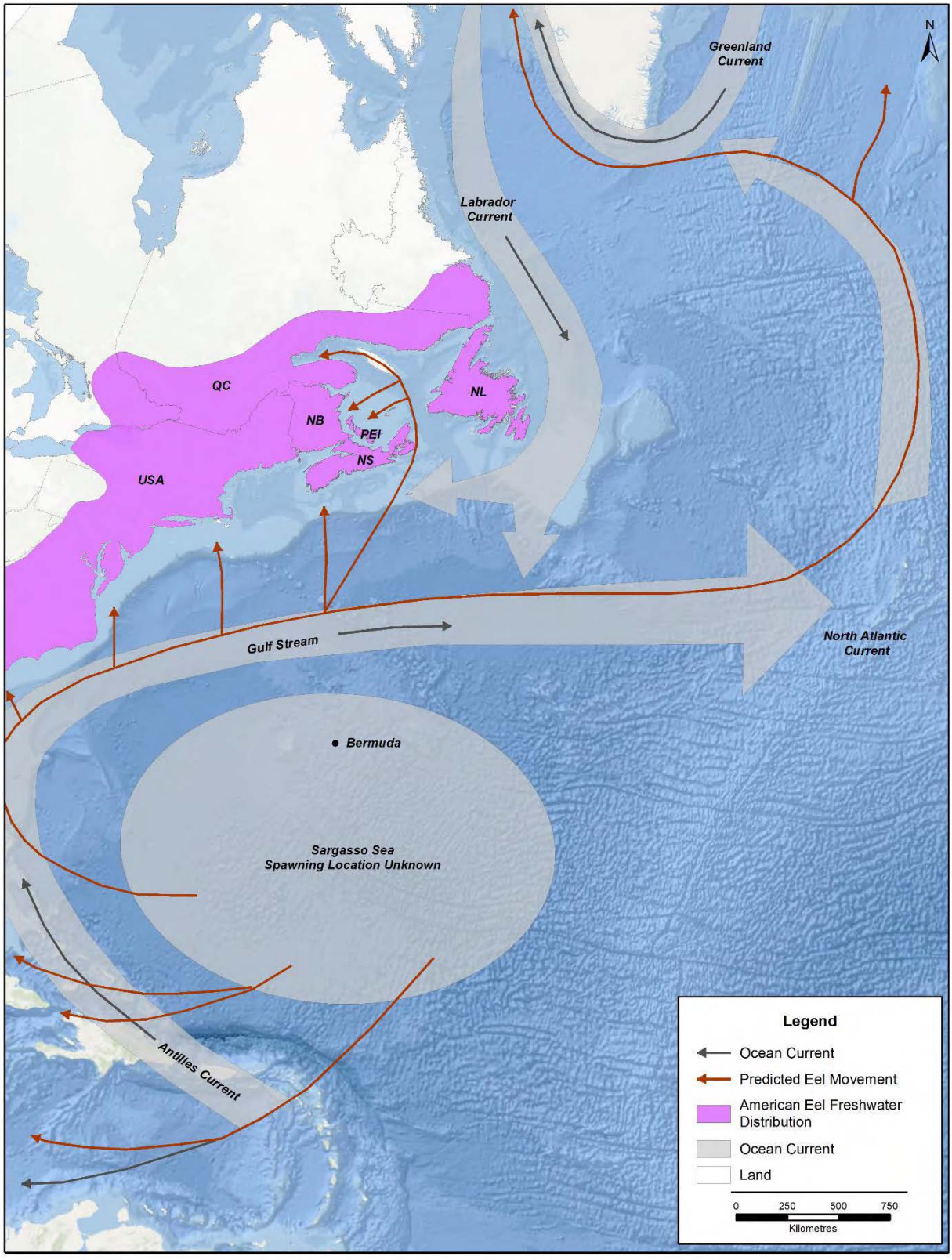
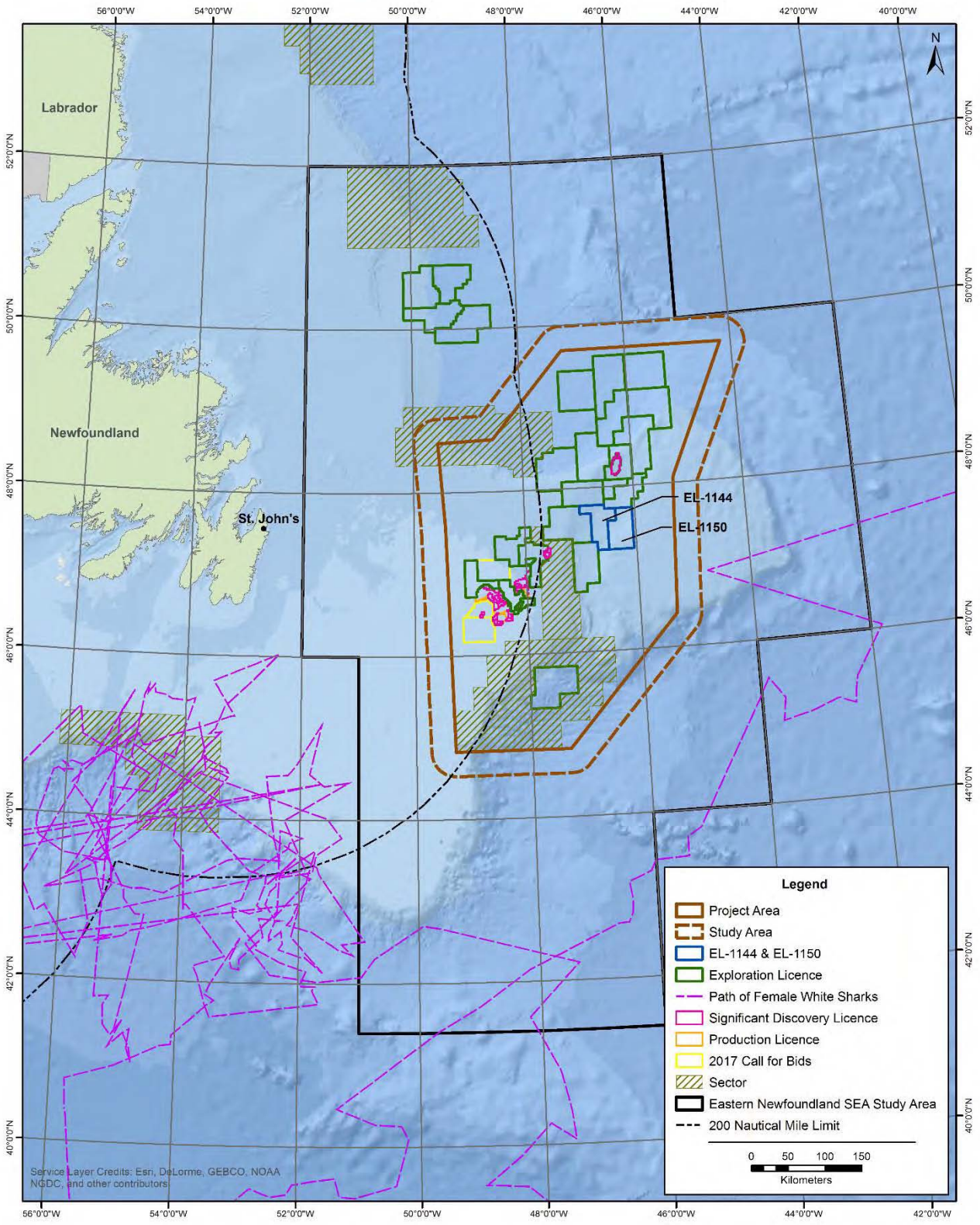


Figure 4.50 Migration Tracks of Female White Sharks



Source: Ocearch (2017)

4.2.1.10 Identified Important and Sensitive Ecological Environments

A number of terrestrial, marine and coastal areas within and east of Newfoundland have been designated as protected under provincial, federal and/or other legislation and processes, or have been formally identified through relevant forums and processes as being otherwise special or sensitive due to their ecological, historical and/or socio-cultural characteristics and importance. Special areas within and adjacent to the Study Area are discussed and mapped in some detail in Section 4.2.4 of this EA Report. This includes any such areas located within the Study Area but also those within the larger Eastern Newfoundland Offshore Area as background and regional context. Those that overlap with the Study Area that have particular relevance for marine fish and fish habitat are also identified and summarized below.

DFO, though Canada's *Oceans Act*, has identified the *Placentia Bay/Grand Bank Large Ocean Management Area* as an area that is home to important living and non-living marine resources, areas of high biological diversity and productivity and increasing development pressures and competition for ocean space and resources (PB/GBLOMA 2013). While this designation provides no formal protection, it is a framework that promotes collaborative planning and resource management of the area. Within this region and elsewhere off Newfoundland and Labrador, a number of Ecologically and Biologically Significant Areas (EBSAs) have been defined by DFO (Templeman 2007; DFO 2013a) through a ranking system of candidate areas using criteria of fitness consequences, aggregations, uniqueness, naturalness and resilience. Several of these EBSAs overlap with the Study Area. Those whose designations have been at least partially based on their importance and relevance for fish and fish habitat are summarized in Table 4.14. In addition, although no National Marine Conservation Areas (NMCAs) have been designated in Newfoundland and Labrador (Parks Canada 2013), several preliminary Representative Marine Areas (RMAs) have been identified for study and may be established at NMCAs at a later date. One such RMA also overlaps with the Study Area (Table 4.14).

A number of Vulnerable Marine Ecosystems (VMEs) containing VME indicator species and features have been identified within the NAFO Regulatory Area off Eastern Newfoundland (WG-EAFM 2008; WWF 2012; FAO 2016a). In addition, approximately 15 percent of the NAFO Regulatory Area (see Section 4.3.1 of this EA Report and associated figures) is closed to bottom fishing in order to help protect sensitive marine habitats, particularly corals and sponges (NAFO 2016a; WG-EAFFM 2016; NAFO 2017a) (Table 4.14).

Table 4.14 Identified Special Areas that Overlap with the Study Area and their Relationship to Marine Fish and Fish Habitat

Area Type	Area Name	Description as it Relates to Benthic Invertebrates and Finfish
Ecologically and Biologically Significant Areas	Southeast Shoal and Tail of the Banks	• Spawning and/or rearing habitat for capelin, yellowtail flounder, Atlantic cod, and American plaice. High concentration of “special concern” striped wolffish.
	Lilly Canyon-Carson Canyon	• Invertebrates: Highly productive area and area of high abundance for Icelandic scallop.
	Northeast Shelf and Slope	• Greenland halibut and “threatened” spotted wolffish aggregate in this area in the spring.
Preliminary Representative Marine Area	South Grand Bank Area	• Relatively high coral species richness. High fish species richness. Significant groundfish biomass. Unique species biodiversity.

Area Type	Area Name	Description as it Relates to Benthic Invertebrates and Finfish
Vulnerable Marine Ecosystems	Northern Flemish Cap	• High density of sea pens that form key structural components for fish habitat. Black corals, feather stars and tube anemones, and sponges are also associated with these areas.
	Sackville Spur	• Extensive demosponge (Order *Astrophorida*) grounds mainly comprised of Geodiid species, *Stelletta normani* and *Stryphnus ponderosus* that form key structural components for fish habitat. The sponge grounds support high abundance and diversity of epibenthic megafauna.
	Southern Flemish Pass to Eastern Canyons	• Extensive demosponge (Order *Astrophorida*) grounds mainly comprised of Geodiid species, *Stelletta normani* and *Stryphnus ponderosus*, and high density of large gorgonian corals that form key structural components for fish habitat. The sponge and coral grounds support high abundance and diversity of epibenthic megafauna.
	Beothuk Knoll	• High density of large gorgonian corals, sea pens and sponges that form key structural components for fish habitat.
	Northeast Shelf and Slope	• High abundance of gorgonian and antipatharian corals.
	Deepwater Coral Area	• An area where deep water corals are thought likely to occur.
NAFO Fisheries Closure Areas	NAFO Coral Closures	• Northern Flemish Cap (Area 7), Northern Flemish Cap (Area 8), Northern Flemish Cap (Area 9), Northwest Flemish Cap (Area 10), Northwest Flemish Cap (Area 11), Northwest Flemish Cap (Area 12) • Closed to protect high coral and sponge concentrations
	Beothuk Knoll (Area 3)	• Closed to protect high coral and sponge concentrations
	Beothuk Knoll (Area 13)	
	Sackville Spur (Area 6)	
	Flemish Pass/Eastern Canyon (Area 2)	• Closed to protect extensive sponge grounds
Source: DFO (2016); NAFO (2014); Templeman (2007), WGEAFM (2008); CPAWS (2009); AFW (2014); NAFO (2015, 2016a, 2016b); FAO (2016b)		

Other Ecologically Important Habitats in the Study Area

Aggregate examinations of the fish communities from Canadian RV surveys also provide indication of ecologically important areas within the Study Area (Figures 4.51 to 4.53). For example, trawlable fish species richness was highest in the Flemish Pass and (surveyed areas of the) Cap as well as on the northern slope of the Grand Banks. Similarly, overall fish abundance and biomass was high in the Flemish Pass and the northern slope of the Grand Banks but the eastern Grand Bank slope was also important for measures of biomass. These areas are often coincident with other formally designated

areas such as several EBSAs and fisheries closure/coral protection zones. In contrast, the shallow areas of the Grand Banks were relatively poor for all fish community measures, while the eastern slope of the Grand Banks was poor for richness and abundance.

Other important areas, identified in previous SEAs (LGL 2003; Amec 2014) include the “Bonavista Corridor” and the Frontal Extrusion Zone. The former is an important spawning area and migration route for Atlantic cod, American plaice and redfish. The latter is a high productivity zone located on the continental slope in the northern portions of the Study Area.

Figure 4.51 Areas of Relatively High Faunal Abundance (Canadian RV Surveys, 2008-2012)

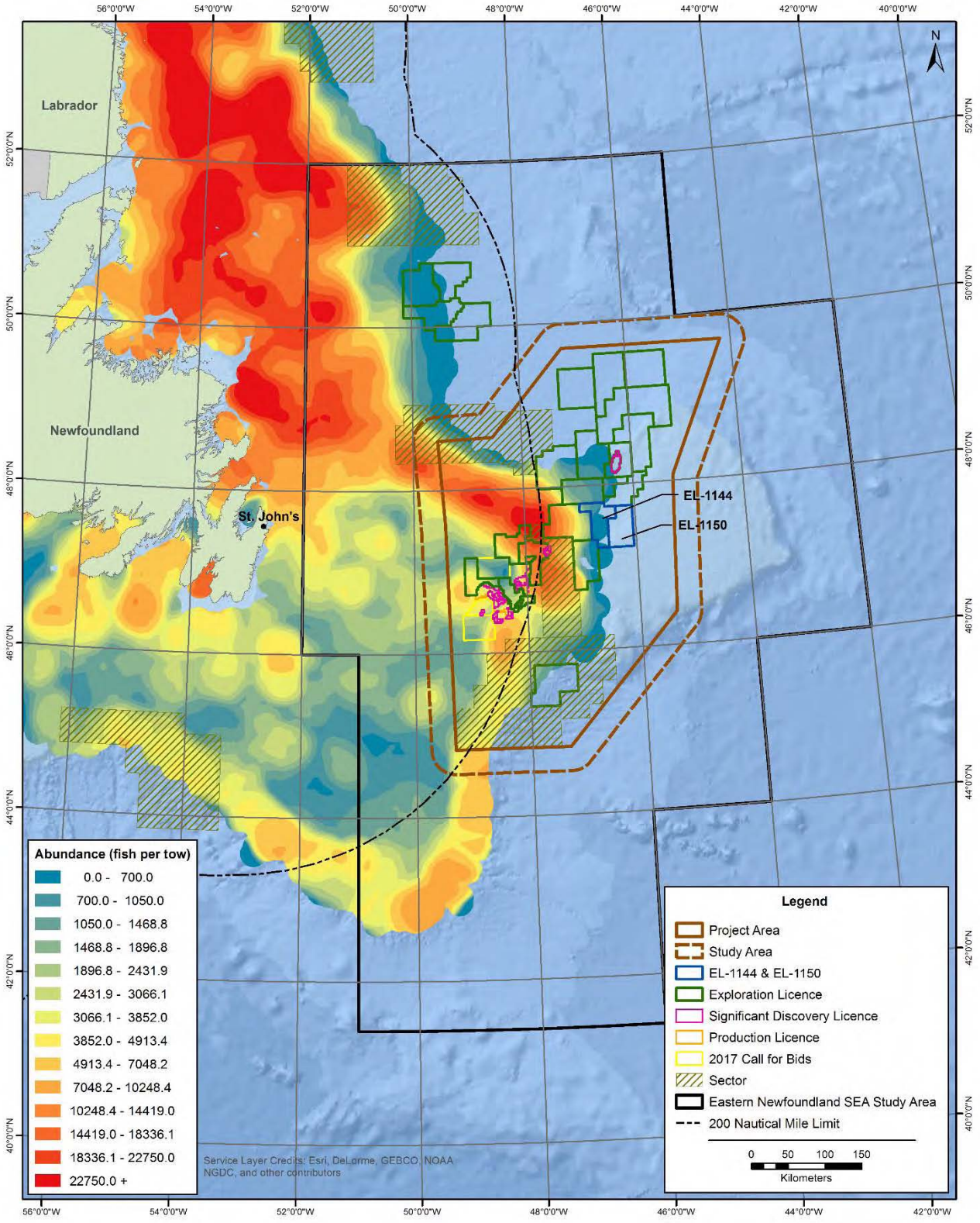


Figure 4.52 Areas of Relatively High Faunal Biomass (Canadian RV Surveys, 2008-2012)

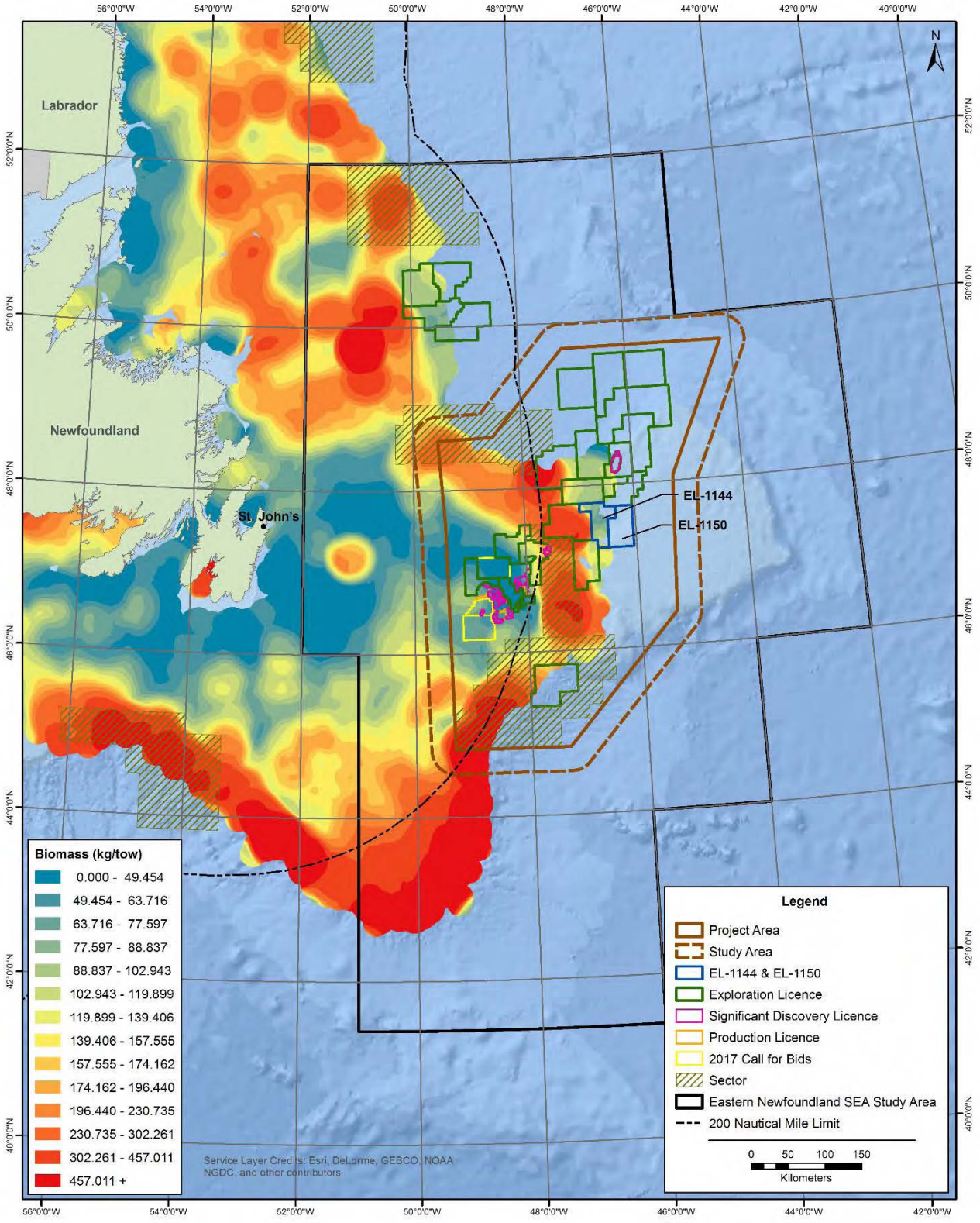
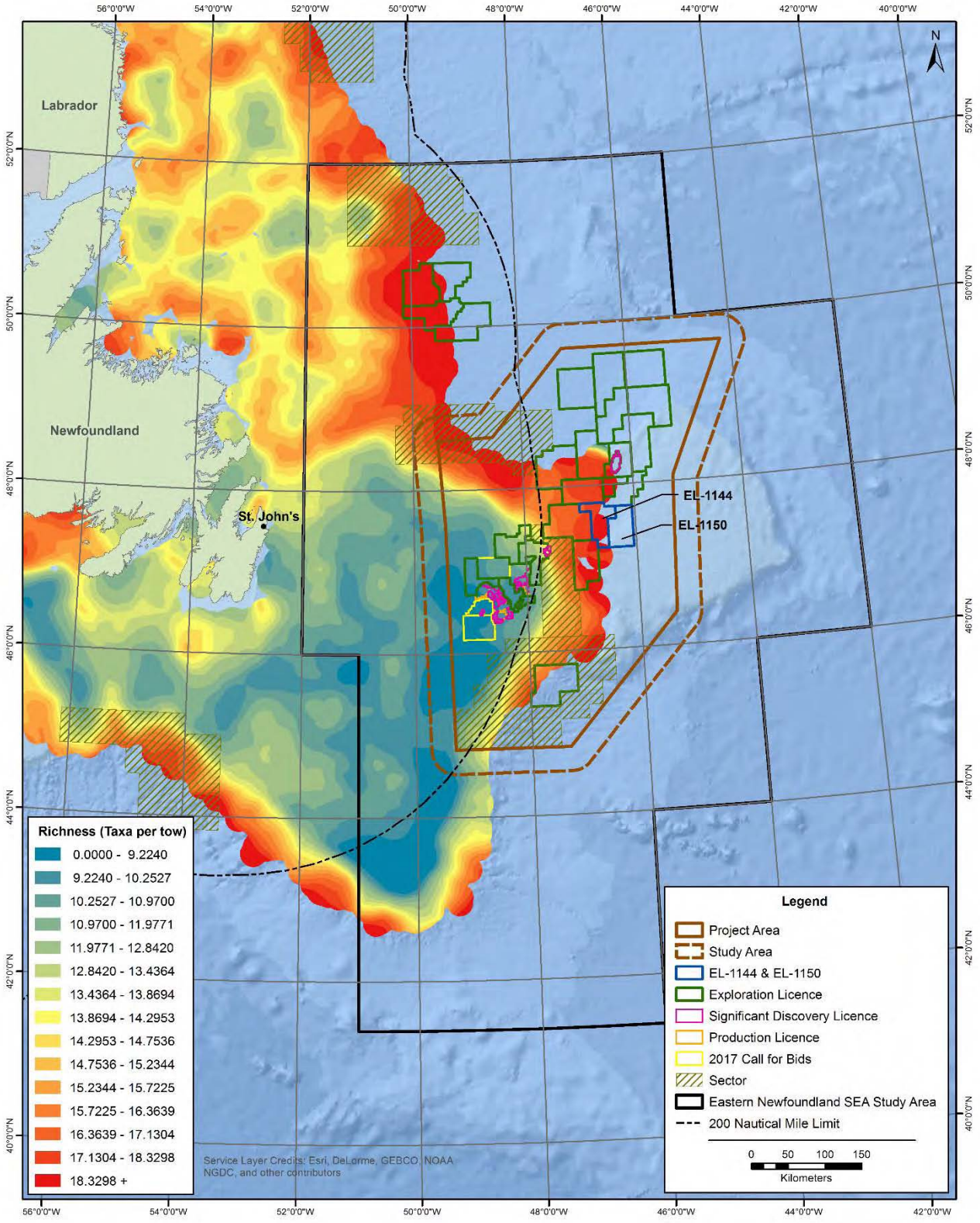


Figure 4.53 Areas of Relatively High Taxonomic Richness (Canadian RV Surveys, 2008-2012)



4.2.2 Marine/Migratory Birds

As key components and indicators of ecosystem health, birds are often considered to be of high intrinsic ecological importance. Further, they are of socioeconomic importance in Newfoundland and Labrador both in terms of tourism (e.g. the Witless Bay and Cape St. Mary's Ecological Reserves), and as a food source (murres, known locally as "turrs", are hunted locally). The coastline of Eastern Newfoundland and the waters offshore provide important habitat for various species of marine-associated birds. The nutrient-rich Grand Banks and Flemish Cap regions are important feeding areas for dozens of marine bird species, and are of particular importance to planktivorous seabirds (such as storm-petrels, shearwaters and dovekies) due to the abundance of food in this area (Barrett et al 2006; Fort et al 2012, 2013). Offshore islands and mainland cliffs provide nesting grounds for tens of millions of seabirds representing some 20 species, including some of the largest seabird colonies in eastern North America south of the Hudson Strait (Lock et al 1994). Several Important Bird Areas (IBAs) have also been identified in Eastern Newfoundland, which have been designated as such because they provide important habitat for nationally and/or globally significant numbers of birds, and/or because they support avian species of conservation concern. In addition to the IBAs, there are several other sites of regional significance to migratory birds in proximity to the Study Area.

Marine-associated birds that may occur within the Study Area can be roughly divided into several categories, as follows: 1) seabirds, 2) waterfowl and divers, and 3) shorebirds. As well, there are a number of landbird species that are associated with coastal habitats and/or migrate nocturnally over marine waters.

Information on marine and migratory bird presence and abundance within the Study Area was obtained from the Canadian Wildlife Service (CWS) of ECCC. This and other sources were also consulted for information on seabird colonies in Eastern Newfoundland, as well as for recent data on seasonal and spatial trends in seabird abundance from the Eastern Canadian Seabirds at Sea (ECSAS) program. Records from the Atlantic Canada Shorebird Survey (ACSS) and the IBA of Canada programs were also used to provide further information on species presence and to identify areas of importance to avifauna in and around the Study Area. In addition to the summary text below, more detailed information (tables and figures) derived from these sources is provided in Appendix C.

4.2.2.1 Seabirds

Seabirds are relatively long-lived species with low fecundity, delayed recruitment and relatively low rates of population growth. A diverse assemblage of seabirds are found in the marine waters off Eastern Newfoundland (Table 4.15), including cormorants, gannets, phalaropes, gulls, terns, alcids (auks), jaegers and skuas, and tubenoses (fulmars, petrels and shearwaters). Many of these taxa nest along the coastline of Eastern Newfoundland. These avian taxa are discussed in turn below, and detailed accounts of each (including general life history information) can be found in Section 4.2.2.1 of the Eastern Newfoundland SEA (Amec 2014).

Table 4.15 Overview of Seabirds that are Known or Likely to Occur in the Study Area

Family	Species
Phalacrocoracidae – Cormorants	Great Cormorant (*Phalacrocorax carbo*)
	Double-crested Cormorant (*Phalacrocorax auritus*)
Suliidae – Gannets	Northern Gannet (*Morus bassanus*)
Scolopacidae – Phalaropes	Red Phalarope (*Phalaropus fulicarius*)
	Red-necked Phalarope (*Phalaropus lobatus*)
Laridae – Gulls	Herring Gull (*Larus argentatus*)
	Iceland Gull (*Larus glaucoides*)
	Glaucous Gull (*Larus hyperboreus*)
	Great Black-backed Gull (*Larus marinus*)
	Ring-billed Gull (*Larus delawarensis*)
	Black-headed Gull (*Chroicocephalus ridibundus*)
	Sabine‘s Gull (*Xema sabini*)
	Ivory Gull (*Pagophila eburnea*)
	Black-legged Kittiwake (*Rissa tridactyla*)
Sternidae – Terns	Common Tern (*Sterna hirundo*)
	Arctic Tern (*Sterna paradisaea*)
	Caspian Tern (*Hydroprogne caspia*)
Alcidae – Alcids	Dovekie (*Alle alle*)
	Razorbill (*Alca torda*)
	Common Murre (*Uria aalge*)
	Thick-billed Murre (*Uria lomvia*)
	Atlantic Puffin (*Fratercula arctica*)
	Black Guillemot (*Cepphus grylle*)
Stercorariidae – Jaegers and Skuas	Pomarine Jaeger (*Stercorarius pomarinus*)
	Parasitic Jaeger (*Stercorarius parasiticus*)
	Long-tailed Jaeger (*Stercorarius longicaudus*)
	Great Skua (*Stercorarius skua*)
	South Polar Skua (*Stercorarius maccormicki*)
Procellariidae – Fulmars and Shearwaters	Northern Fulmar (*Fulmarus glacialis*)
	Great Shearwater (*Ardenna gravis*)
	Sooty Shearwater (*Ardenna grisea*)
	Manx Shearwater (*Puffinus puffinus*)
	Cory’s Shearwater (*Calonectris borealis*)
Hydrobatidae – Storm-petrels	Leach’s Storm-petrel (*Oceanodroma leucorhoa*)

Fifield et al (2009) explored seasonal trends in abundance of seabirds off eastern Canada and found that the largest concentration of seabirds in the offshore waters of Eastern Newfoundland was from March to August, while seabirds were least abundant in the area in the fall (September - October). Within the Study Area, data are relatively sparse for the fall months due to lack of survey coverage, but seabird abundance was consistent throughout the rest of the year with an average of approximately 18 to 25 birds/km^2 (Fifield et al 2009). The seasonal trends observed largely correspond with earlier PIROP (Programme Intégré des Recherches sur les Oiseaux Pélagiques) seabird survey data summarized in Lock et al (1994). In both of these data sets, the geographical survey coverage was considerably greater in the spring and summer months as compared to the fall and winter, as the survey program relies heavily on the use of vessels of opportunity rather than dedicated survey vessels.

ECSAS data within the Study Area from 2006 to 2017 were obtained from CWS, and while these survey data cannot be used to calculate densities as they have not been corrected for detectability (unlike the

data in Fifield et al 2009), they provide valuable information on seasonal and spatial trends in abundance for the different seabird groups. Figures C.1 to C.13 in Appendix C were developed for taxa that were commonly observed in the ECSAS surveys to illustrate these survey data for the spring (March to April), summer (May to August), fall (September to October) and winter (November to February) seasons. The seasons as defined here are consistent with those used by Fifield et al (2009) and correspond to seabirds' migratory (spring and fall), breeding (summer for northern hemisphere breeders; winter for southern hemisphere breeders) and non-breeding (winter for northern hemisphere breeders; summer for southern hemisphere breeders) seasons.

Cormorants

Cormorants nest in Eastern Newfoundland and often form mixed colonies (Hatch et al 2000). They generally feed within a few kilometers of their colony or roost location and rarely venture far from the coast at any time of year, and so their abundance in the Study Area is low. ECSAS sightings for cormorants off eastern Newfoundland, including the Study Area, are presented in Figure C.1 (Appendix C). Few of the cormorant sightings were far from shore and all of those were in the winter months, with none within the Study Area. Two sightings were identified as Great Cormorants, and the rest were not identified to species level. CWS records indicate that there are eight known cormorant colonies in eastern Newfoundland (Table C.1 in Appendix C), although species composition was not determined.

Gannets

Northern Gannets nest in Eastern Newfoundland, and are most likely to be present in the Study Area from March to November, as the majority of the population overwinters in the Gulf of Maine and further south (Mowbray 2002; Montevecchi et al 2012). However, they have been observed in the waters off of Newfoundland at all times of year. ECSAS sightings for Northern Gannets within and near the Study Area are presented in Figure C.2 (Appendix C). CWS survey data for the two colonies of Northern Gannet in eastern Newfoundland are presented in Table C.2 (Appendix C).

Phalaropes

Phalaropes breed in Arctic tundra during the summer months and typically overwinter south of Canada, occurring most frequently in the Study Area during migration. The Red-necked Phalarope has been assessed by COSEWIC as a species of Special Concern. ECSAS sightings for Phalaropes within the Study Area are presented in Figure C.3 (Appendix C), which show that phalarope sightings were infrequent in summer and fall and even rarer in winter, and no sightings were reported in the region during the spring surveys. Although most of the sightings were not identified to species level, of those that were identified most were Red Phalarope which is known to be the more pelagic of the two species (Tracy et al 2002).

Gulls

Herring, Great Black-backed and Ring-billed Gulls and Black-legged Kittiwakes occur in temperate areas year-round, while Sabine's, Ivory, Iceland and Glaucous Gulls nest in the Arctic and are found in the Study Area only outside the breeding season. Laughing, Black-headed and Lesser Black-backed Gulls may occur infrequently in the Study Area. The Ivory Gull is listed as Endangered under both *NLESA* and *SARA*. Gulls breeding in the region have suffered population declines due to reduced food availability associated with the collapse of fisheries and the closure of municipal landfills, although

recent census data indicates that populations are showing some signs of recovery (Cotter et al 2012). Outside of the breeding season, most gull species are associated with coastal areas, while Sabine's Gull, Ivory Gull and Black-legged Kittiwake are more pelagic. A recent tracking study of Black-legged Kittiwakes has shown that the northwest Atlantic, particularly the shelf edge off Newfoundland, is a particularly important wintering area for kittiwakes, with most of the Atlantic population overwintering in this region (Frederiksen et al 2012).

ECSAS sightings for Black-legged Kittiwakes and Large Gulls (all other gull species) within the Study Area are presented in Figures C.4 and C.5, respectively, in Appendix C. As illustrated, gulls and kittiwakes were both commonly observed in the area year-round. Most of the large gulls identified to species level were Great Black-backed Gull, Herring Gull, and in the winter months, Iceland Gull and Glaucous Gull. No endangered Ivory Gulls were identified in the ECSAS surveys within the Study Area.

Newfoundland supports more than two-thirds of Atlantic Canada's breeding gull population, with Black-legged Kittiwakes accounting for almost half of this number (Cotter et al 2012). CWS records of gull colonies in Eastern Newfoundland are shown in Table C.3 (Appendix C), and the colony locations are shown later. Herring Gull, Great Black-backed Gull and Black-legged Kittiwake colonies are abundant and widespread along the coast, while Ring-billed Gull colonies are fewer in number.

Terns

All three tern species found in the Study Area are migratory, and are present only during the breeding season. Terns are typically found in coastal environments, seldom seen far from shore except for Arctic Terns which tend to be highly pelagic during migration (Cuthbert and Wires 1999; Hatch 2002; Nisbet 2002). ECSAS sightings for terns within and near the Study Area are presented in Figure C.6 (Appendix C). They were infrequently observed in the spring and summer, and essentially absent in the fall and winter. While most tern sightings could not be identified to species level, both Common and Arctic Terns have been observed in the waters of eastern Newfoundland. CWS records for tern colonies in eastern Newfoundland are provided in Table C.4 in Appendix C; species composition of the colonies was not reported.

Alcids

Five of the six alcid species found in the Study Area breed in Eastern Newfoundland, while the Dovekie is a largely arctic-nesting species. During breeding, they are most abundant in the waters near the colonies. Among seabirds, murres and Dovekies spend a particularly large proportion of their time on the water relative to more aerial species (Wiese and Ryan 2003; Wilhelm et al 2007; Fifield et al 2009) and congregate over relatively small, productive areas such as around the Grand Banks (Gaston et al 2011; Hedd et al 2011; Montevecchi et al 2012). The core winter distribution of the world's Dovekie population lies within the waters off Eastern Newfoundland (Fort et al 2013). Most of the Eastern Canadian population of Common Murres and over a third of the region's Thick-billed Murres also congregate in this region in the winter months (McFarlane Tranquilla et al 2013). Alcids are rendered flightless for several weeks each year during the fall moulting period (Gaston and Hipfner 2000; Ainley et al 2002; Montevecchi and Stenhouse 2002; Lavers et al 2009). Atlantic Puffins tend to disperse widely and well offshore in the winter months (Fifield et al 2009), while Razorbills are believed to concentrate in the Bay of Fundy in winter (Huettman et al 2005), and Black Guillemots tend to be associated with coastal environments year-round (Butler and Buckley 2002).

ECSAS sightings for alcids within and near the Study Area are presented in Appendix C, Figure C.7 (Dovekies), Figure C.8 (Murres) and Figure C.9 (Other alcids, including Razorbills, Black Guillemots and Atlantic Puffins). All six species have been reported in ECSAS surveys year-round, although Black Guillemots are relatively infrequently observed. The eastern coast of Newfoundland supports numerous alcid colonies, the largest at Funk Island, Baccalieu Island, the Witless Bay islands and Cape St. Mary's. CWS records for alcid colonies in eastern Newfoundland are provided in Table C.5 (Appendix C).

Jaegers and Skuas

Jaegers and skuas do not breed in Newfoundland and Labrador; however, non-breeding individuals are found offshore year-round. In the winter months, the waters off eastern Canada support a large proportion of the Icelandic population of Great Skuas (Magnusdottir et al 2012). ECSAS sightings for jaegers and skuas within and near the Study Area are presented in Figure C.10 (Appendix C). While most sightings could not be identified to species level, all five have been observed in the waters of Eastern Newfoundland. Great Skuas were much more numerous than South Polar Skuas, and Pomarine Jaegers were identified more often than Parasitic or Long-tailed Jaegers.

Fulmars and Shearwaters

Northern Fulmar and Manx Shearwater nest in Newfoundland (Lee and Haney 1996; Mallory et al 2012), while the other three species of shearwater (Great, Sooty and Cory's) do not. Outside the breeding season, fulmars and shearwaters are highly pelagic and spend most of their time in the air, at or near the water's surface. The Northern Fulmar is common year round in the offshore waters of Eastern Newfoundland. Shearwaters are most common overall in offshore Newfoundland in the summer and fall months, particularly on the east and northeast Grand Banks (Fifield et al 2009). Most of the world's population of Great Shearwaters is found in the northwest Atlantic in the summer months, outside of their austral breeding season (Brown 1986).

ECSAS sightings for fulmars and shearwaters within and near the Study Area are presented in Figures C.11 and C.12, respectively, in Appendix C. Of the shearwaters that could be identified in the surveys, Great Shearwater was the most commonly identified species in the Study Area, followed by Sooty, Manx and Cory's. CWS records for Northern Fulmar colonies in eastern Newfoundland are provided in Table C.6 in Appendix C. The Manx Shearwater is known to nest in one small colony, at Middle Lawn Island off the Burin Peninsula, which is the only known regular nesting site in North America (Lee and Haney 1996).

Storm-petrels

The Leach's Storm-petrel is the most abundant breeding seabird in Newfoundland, while the Wilson's Storm-petrel is an Antarctic breeder and uncommon visitor in the northwest Atlantic. Storm-petrels are highly pelagic, often following ships and fishing boats, and are attracted to artificial light sources (Huntington et al 1996). Leach's Storm-petrel is the species most frequently found stranded on platforms and vessels in and near the Study Area (Ellis et al 2013; Environment Canada 2015), with the vast majority of strandings occurring in September and October, corresponding with the departure of fledglings from the breeding colonies (Huntington et al 1996). The largest Leach's Storm-petrel colony in the world, Baccalieu Island, supports approximately one third of the species' population (Huntington et al 1996; Barrett et al 2006; CWS 2017). ECSAS sightings for storm-petrels within the Study Area are presented in Figure C.13 (Appendix C). They are commonly observed in the summer months and

regularly seen in the spring and fall, but are uncommon in winter. CWS records for Leach's Storm-petrel colonies in eastern Newfoundland are provided in Table C.7 (Appendix C).

4.2.2.2 Waterfowl

Waterfowl and divers (loons and grebes) spend much of their time on the water's surface. Although loons and grebes are not waterfowl, they are behaviourally and functionally similar, and have therefore been combined in this section. Waterfowl occur in large numbers in marine habitats off Eastern Newfoundland, especially during the winter months, although they tend to prefer more coastal habitats and are unlikely to occur frequently in the Study Area. Several species of waterfowl and divers occur in the province during at least part of the year (Table 4.16) including two species of conservation concern, the Barrow's Goldeneye (*NLESA*: Vulnerable; *SARA*: Special Concern) and Harlequin Duck (*NLESA*: Vulnerable; *SARA*: Special Concern). Of these species, the sea ducks (Merginae) and loons (Gaviidae) have the highest potential to occur in the Study Area; geese, dabbling ducks, diving ducks and grebes are less likely to be found offshore.

Table 4.16 Overview of Waterfowl that have Potential to Occur in the Study Area

Family	Species
Anserinae – Geese	Canada Goose (*Branta canadensis*)
Anatinae – Dabbling Ducks	Wood Duck (*Aix sponsa*)
	Gadwall (*Anas strepera*)
	Eurasian Wigeon (*Anas penelope*)
	American Wigeon (*Anas americana*)
	American Black Duck (*Anas rubripes*)
	Mallard (*Anas platyrhynchos*)
	Blue-winged Teal (*Anas discors*)
	Northern Shoveler (*Anas clypeata*)
	Northern Pintail (*Anas acuta*)
	Green-winged Teal (*Anas crecca*)
Aythyinae – Diving Ducks	Ring-necked Duck (*Aythya collaris*)
	Tufted Duck (*Aythya fuligula*)
	Greater Scaup (*Aythya marila*)
	Lesser Scaup (*Aythya affinis*)
Merginae – Sea Ducks	King Eider (*Somateria spectabilis*)
	Common Eider (*Somateria mollissima*)
	Harlequin Duck (Eastern pop.) (*Histrionicus histrionicus*)
	Surf Scoter (*Melanitta perspicillata*)
	White-winged Scoter (*Melanitta fusca*)
	Black Scoter (*Melanitta americana*)
	Long-tailed Duck (*Clangula hyemalis*)
	Bufflehead (*Bucephala albeola*)
	Common Goldeneye (*Bucephala clangula*)
	Barrow's Goldeneye (Eastern pop.) (*Bucephala islandica*)
	Hooded Merganser (*Lophodytes cucullatus*)
	Common Merganser (*Mergus merganser*)

Family	Species
	Red-breasted Merganser (*Mergus serrator*)
Gaviidae – Loons	Red-throated Loon (*Gavia stellata*)
	Common Loon (*Gavia immer*)
Podicipedidae – Grebes	Pied-billed Grebe (*Podilymbus podiceps*)
	Red-necked Grebe (*Podiceps grisegena*)

Broadly, waterfowl may be categorized as geese and ducks; the latter includes dabbling ducks (primarily inland breeders), diving ducks, and sea ducks. Most species of sea ducks spend much of the year at sea (generally close to shore). The most abundant species of waterfowl in coastal Newfoundland waters at all times of year is the Common Eider, which breeds in several small colonies along the coast (Locke et al 1994).

Common Eiders and other sea ducks such as scoters and Long-tailed Ducks occur in large flocks ("rafts") off the coast from autumn to spring. Large wintering congregations occur at Witless Bay IBA, between the Cape Freels coastline and nearby Wadham Islands, Grates Point, Cape St. Francis, Mistaken Point, Cape St. Mary's and Placentia Bay (Bird Studies Canada 2017). Small numbers of Barrow's Goldeneye have been reported wintering in Eastern Newfoundland at Port Blandford and Newman Sound in Terra Nova National Park, as well as Traytown Bay, St. Mary's Bay, and Spaniard's Bay (Schmelzer 2006).

ECSAS sightings for waterfowl and divers within and near the Study Area are presented in Figure C.14 (Appendix C). Waterfowl observations were scarce in the waters off Eastern Newfoundland, but the most frequently observed species was Common Eider, followed by Long-tailed Duck; loons (Common and Red-throated), scoters (White-winged, Surf and Black) and a handful of other waterfowl species were infrequently observed.

4.2.2.3 Shorebirds

Marine shoreline habitats such as sandy mudflats and coastal barrens are utilized by foraging shorebirds during migration, but shorebirds are not typically found offshore. Due to the great distance of the Study Area from the coastline, it is unlikely that shorebirds will occur in the Study Area with any regularity, other than phalaropes (which are taxonomically shorebirds but due to their pelagic habitat preferences are discussed along with the seabirds in this EA report) nor would migrating landbirds. Due to their preference for coastal habitats, shorebirds are very infrequent visitors in the Study Area, primarily in the fall months during migration. More than 25 species of shorebirds occur in the province for at least part of the year and may pass through the Study Area (Table 4.17). Least Sandpiper, Spotted Sandpiper, Greater Yellowlegs, Piping Plover, Semipalmated Plover and Killdeer nest in Newfoundland, while others are present only during migration (Warkentin and Newton 2009).

Table 4.17 Overview of Shorebirds that have Potential to Occur in the Study Area

Family	Species
Charadriidae – Plovers	Black-bellied Plover (*Pluvialis squatarola*)
	American Golden-Plover (*Pluvialis dominica*)
	Semipalmated Plover (*Charadrius semipalmatus*)
	Piping Plover (melodus ssp.) (*Charadrius melodus*)
	Killdeer (*Charadrius vociferus*)
Scolopacidae – Sandpipers	Spotted Sandpiper (*Actitis macularius*)
	Solitary Sandpiper (*Tringa solitaria*)
	Greater Yellowlegs (*Tringa melanoleuca*)
	Willet (*Tringa semipalmata*)
	Lesser Yellowlegs (*Tringa flavipes*)
	Whimbrel (*Numenius phaeopus*)
	Hudsonian Godwit (*Limosa haemastica*)
	Ruddy Turnstone (*Arenaria interpres*)
	Red Knot (rufa ssp.) (*Calidris canutus*)
	Sanderling (*Calidris alba*)
	Semipalmated Sandpiper (*Calidris pusilla*)
	Least Sandpiper (*Calidris minutilla*)
	White-rumped Sandpiper (*Calidris fuscicollis*)
	Baird's Sandpiper (*Calidris bairdii*)
	Pectoral Sandpiper (*Calidris melanotos*)
	Purple Sandpiper (*Calidris maritima*)
	Dunlin (*Calidris alpina*)
	Stilt Sandpiper (*Calidris himantopus*)
	Buff-breasted Sandpiper (*Calidris subruficollis*)
	Short-billed Dowitcher (*Limnodromus griseus*)
	Wilson's Snipe (*Gallinago delicata*)
	American Woodcock (*Scolopax minor*)

On the southern and eastern coasts of Newfoundland, shorebirds are most abundant during their fall migration, when many species move southward from their Arctic breeding grounds. Atlantic Canada Shorebird Survey data show that the eastern coast of the Avalon Peninsula has several important migration stopovers (e.g., Witless Bay, Renews, Long Beach, St. Shotts, Spaniard's Bay, Bellevue Beach, etc.); other major stopovers in southern and eastern Newfoundland include Big Barasway, Grand Bay West to Cheeseman Provincial Park, Codroy Valley Estuary, Cape Freels and Cape Bonavista (Environment Canada 2009; Bird Studies Canada 2017). In the winter months, generally from November to April, Purple Sandpipers are present along rocky shorelines and offshore ledges and islands of Southern and Eastern Newfoundland, including at Cape Spear, Witless Bay, Ferryland, Cape St. Francis and Mistaken Point in Eastern Newfoundland (Environment Canada 2009; Bird Studies Canada 2017). At Mistaken Point, far north of the rest of the species' usual wintering range, a small number of Ruddy Turnstones regularly overwinter (Bird Studies Canada 2017).

4.2.2.4 Other Marine-Associated Avifauna

Many passerines, raptors and other landbirds breed in Newfoundland. Although most do not regularly occur in the marine environment, some species of landbirds are associated with coastal habitats including the Bank Swallow, Savannah Sparrow and Short-eared Owl, which typically nest along the coast, as well as some raptor species such as the Peregrine Falcon that prey upon concentrations of

shorebirds during migration. Further, many landbirds fly long distances over water during migration, and although they tend to remain fairly close to shore, nocturnal migrants (including most passerines) are attracted to artificial light sources at sea, particularly in foggy conditions during the late summer to fall months (July to early November). Landbirds are therefore considered to be infrequent visitors in the Study Area, particularly outside the fall migration period.

4.2.2.5 Species at Risk and of Conservation Concern

Very few avian species at risk or species of conservation concern are likely to occur in the Study Area. The Ivory Gull is found almost exclusively in marine environments, and although its breeding distribution (and critical habitat) is in the Arctic, it regularly occurs in small numbers in the waters off Eastern Newfoundland. However, Ivory Gulls are highly associated with pack ice, so interactions with Project activities are unlikely. Two waterfowl species at risk, the Barrow's Goldeneye and Harlequin Duck, both occur in the marine environment, particularly outside of the breeding season. Like other waterfowl species, they prefer coastal areas and so are considered unlikely to be present in the Study Area. Red-necked Phalaropes, assessed by COSEWIC as a species of conservation concern, were seen in small numbers during ECSAS surveys in offshore waters from April to December. Other avian species at risk that occur in Newfoundland are shorebirds and landbirds, and are unlikely to be found in the Study Area except on a transient basis during the fall months.

Bird species that are otherwise of conservation concern in Newfoundland and Labrador that do not inhabit coastal or offshore environments, or that only migrate over the ocean in the daytime, are not assessed further in this section. These include the Red Crossbill, which is a non-migratory forest dweller (EC 2006); and three diurnally migrating landbirds, the Rusty Blackbird (Avery 2013), Chimney Swift (Steeves et al 2014) and Barn Swallow (Brown and Brown 1999).

A summary of avian species at risk that occur in the province, including information on their habitat preferences and potential to occur in the Study Area, is provided in Table 4.18

Table 4.18 Avian Species at Risk and their Likelihood of Occurrence in the Study Area

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
Barrow's Goldeneye (Eastern pop.)	Vulnerable	Special Concern	Special Concern	• Does not breed in Newfoundland. Moults and winters in small numbers off the coast of Eastern Canada, often in groups with Common Goldeneye. Small numbers have been reported wintering at Port Blandford and Newman Sound in Terra Nova National Park, as well as Traytown Bay, St. Mary's Bay, and Spaniard's Bay (Schmelzer 2006).	Unlikely, due to their affinity for coastal habitats.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
				• Known to congregate in relatively small geographic areas in important shipping corridors, therefore considered to be particularly vulnerable to being affected by accidental spills (Schmelzer 2006).	
Harlequin Duck (Eastern pop.)	Vulnerable	Special Concern	Special Concern	• Breed in fast-flowing streams, and congregate in moulting sites in the late summer to fall. May breed in Bay du Nord River in southeastern Newfoundland (Bird Studies Canada 2017). • Found in coastal marine environments throughout fall and winter along rocky coastlines, subtidal ledges, and exposed headlands. Non-breeding individuals may be found year round at Cape St. Mary's, one of few known moulting sites in the province (Bird Studies Canada 2017; NLDEC 2017a).	Unlikely, due to their affinity for coastal habitats.
Ivory Gull	Endangered	Endangered	Endangered	• Breeds in the far north and winters offshore. • Spend almost all of their time in the marine environment, including within the Study Area. • Present in small numbers in the waters off Eastern Newfoundland, usually among pack ice. • Rarely seen on the coast of the Northern Peninsula and ashore (Stenhouse 2004; NLDEC 2017a).	Potentially present. Because they are typically found among pack ice, interactions with Project activities are unlikely.
Piping Plover (*Melodus* ssp.)	Endangered	Endangered	Endangered	• During the nesting season, found on sandy beaches along the coast. • In Newfoundland, breeding population is concentrated in	Unlikely, due to their affinity for coastal habitats.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
				the southwest and western portions of the Island (NLDEC 2017a); major breeding areas include Grand Bay West to Cheeseman Provincial Park and Big Barasway, and nesting has also been observed in Codroy Valley Estuary (Bird Studies Canada 2017). However, in 2013, breeding was reported at Deadman's Bay near the Cape Freels Coastline IBA in northeastern Newfoundland. • Unlikely to be affected by typical project activities, although accidental spills near breeding habitat could potentially be harmful.	
Red Knot (*Rufa* ssp.)	Endangered	Endangered	Endangered	• Found on open sandy inlets, coastal mudflats, sand flats, salt marshes, sandy estuaries and areas with rotting kelp deposits during fall migration, from August 1st to October 30th (Garland and Thomas 2009; NLDEC 2017a). • Sightings have been reported around almost the entire coast of Newfoundland, mostly on the west coast (Baker et al 2013). • In Atlantic Canada Shorebird Survey, they are considered regular or occasional species during fall migration at Bellevue Beach, Cape Freels, and around the Codroy Valley Estuary, and they are rare visitors at other survey sites (Environment Canada 2009).	Unlikely, due to their affinity for coastal habitats.
Buff-breasted Sandpiper	none	none	Special Concern	• Arctic breeders; during fall migration, considered to be a rare migrant in the province (COSEWIC 2012e).	Unlikely, due to their affinity for coastal habitats.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
				• Occasionally observed in Atlantic Canada Shorebird Surveys at St. Shott's Sod Farm near the southern shore of the Avalon Peninsula and at Cape Bonavista. Reported in small numbers at other survey sites (Environment Canada 2009).	
Red-necked Phalarope	none	none	Special Concern	• Outside the breeding season, found in coastal marine environment (Rubega et al 2000). • Surface feeders, often congregating in areas such as upwellings with higher prey densities. • In the Atlantic Canada Shorebird Survey, considered rare visitors at Cape Spear and at Bonavista/ Cape Bonavista (Environment Canada 2009).	Potentially present. Seen in small numbers during ECSAS surveys within the Study Area, although scarce in the winter and spring (CWS 2017).
Peregrine Falcon	Vulnerable	Special Concern	Special Concern	• Migrates along the coast of Newfoundland during the fall (particularly the west coast), preying on concentrations of migrating shorebirds. • Peregrine Falcon sightings have been reported in the fall near Port-aux-Basques, St. Pierre et Miquelon, and on the Bonavista Peninsula, and year-round (most frequently during the fall) on the Avalon Peninsula (White et al 2002).	Unlikely to occur regularly in the Study Area. May be an occasional vagrant during fall migration.
Common Nighthawk	Threatened	Threatened	Threatened	• Nests in open areas (e.g. coastal sand dunes and beaches, logged or slashburned areas of forest sites, woodland clearings, grassland habitat, farm fields, open forests, rock outcrops, and flat gravel rooftops). • Does not breed in insular Newfoundland (Brigham et al	Unlikely to occur regularly in the Study Area. May be an occasional vagrant during fall migration.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
				2011), but migrates through province.	
Bank Swallow	none	none	Threatened	• Bank Swallows are colonial, often nesting in sandy banks created through coastal erosion; therefore, potentially in close proximity to the marine environment during the breeding season. • Diurnal migrants (Garrison 1999). • Within the province, breeds primarily in southwestern Newfoundland (Warkentin and Newton 2009); however, sightings have also been reported in eastern Newfoundland (Garrison 1999).	Unlikely, due to their affinity for coastal habitats. As diurnal migrants, they are less susceptible to disorientation from offshore artificial light sources.
Gray-cheeked Thrush (*minimus* ssp.)	Threatened	none	Candidate Species (low priority)	• Nests in dense coniferous forest habitat throughout insular Newfoundland and overwinters in South America, migrating nocturnally (Lowther et al 2001). • Most common on the Northern Peninsula and along the northeast coast, as well as the northern Avalon Peninsula (Endangered Species and Biodiversity Section 2010). • Has also been reported in Placentia Bay (Endangered Species and Biodiversity Section 2010) and breeds in Terra Nova National Park (Bird Studies Canada 2017). • An inland species, therefore unlikely to be affected by offshore activities at most times of year.	Unlikely to occur regularly in the Study Area. May be an occasional vagrant during fall migration.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
Olive-sided Flycatcher	Threatened	Threatened	Threatened	• Found in boreal forest habitat, particularly open areas such as wetlands with tall trees and snags. • Migrates to south and central America to overwinter (Altman and Sallabanks 2012). • Breeds throughout insular Newfoundland and Southern Labrador (COSEWIC 2007), and in Eastern Newfoundland it has been reported at several locations on the Avalon Peninsula as well as at Terra Nova National Park (Altman and Sallabanks 2012).	Unlikely to occur regularly in the Study Area. May be an occasional vagrant during fall migration.
Bobolink	Vulnerable	none	Threatened	• Nests in agricultural and natural grasslands, and migrates to South America in the fall (Renfrew et al 2015). • Breeding has been reported at Codroy Valley (Bird Studies Canada 2017), and there have been sightings on the Avalon Peninsula and Terra Nova National Park (Renfrew et al 2015).	Unlikely to occur regularly in the Study Area. May be an occasional vagrant during fall migration.
Short-eared Owl	Vulnerable	Special Concern	Special Concern	• Typically nests in coastal barrens and grasslands (Wiggins et al 2006), and suitable habitat occurs in much of coastal Newfoundland. • Sightings have been reported throughout the eastern portion of insular Newfoundland from Wadham Islands to the Avalon and Burin Peninsulas, and near Port-aux-Basques and Codroy Valley in southwestern Newfoundland, mostly in the summer months	Unlikely, due to their affinity for coastal habitats.

Species	Provincial Status	Federal Status		Habitat and Distribution in Newfoundland	Potential Presence in Study Area
		SARA Schedule 1 Listing	COSEWIC Assessment		
				(Schmelzer 2005; Wiggins et al 2006).	

4.2.2.6 Key Areas and Times for Marine/Migratory Birds

Although seabirds utilize the Study Area throughout the year, the abundance, distribution and species composition vary considerably. Some taxa (e.g. large gulls and kittiwakes, many alcid species, fulmars and shearwaters) are abundant year-round. Other groups are absent or scarce in the winter months, such as gannets, terns, cormorants and phalaropes. In the marine environment off Eastern Newfoundland, Ivory Gulls and waterfowl (including Harlequin Duck and Barrow's Goldeneye) are most abundant outside of the breeding season, and so the greatest potential for presence in the Study Area is in the winter months. IBAs and breeding colonies are found in coastal areas and inland, far from the Study Area. At several hundred kilometers offshore, the Flemish Pass is outside of the reported foraging range of most species breeding at the major seabird colonies in coastal Newfoundland, although Northern Gannets and Leach's Storm-petrels will travel hundreds of kilometres from their colonies over multi-day foraging trips (Garthe et al 2007; Pollet et al. 2014).

Areas of particular importance to the survival of bird species may be given the designation of IBA. The IBA program is coordinated by BirdLife International, and administered in Canada by the Canadian Nature Federation and Bird Studies Canada. The criteria used to identify important habitat are internationally standardized, and are based on the presence of species at risk, species with restricted range, habitats holding representative species assemblages, or a congregation of a significant proportion of a species' population during one or more season. These criteria are used to identify sites of national and international importance. There are a total of 21 IBA sites in Eastern Newfoundland (Bird Studies Canada 2017). These are summarized in Table 4.19, and are illustrated and described later in Section 4.2.4 (Special Areas).

Table 4.19 IBAs in Eastern Newfoundland and Labrador

IBA Name	Area (km^2)	Location	Importance
St. Peter Bay (LB023)	170.59	30 km south of Mary's Harbour on the southeast coast of Labrador. Includes the bay and several small islands within.	• Major moulting area for Common Eiders • Thought to be an important congregating area for Harlequin Ducks in the non-breeding season.
Point Amour (LB022)	107.23	On the Labrador side of the narrowest point of the Strait of Belle Isle.	• Important migratory corridor for waterbirds in the spring and fall, including large numbers of Dovekie, Common Eider, Black Guillemot and large alcids (Razorbills and possibly Common and/or Thick-billed Murres).

IBA Name	Area (km^2)	Location	Importance
Fischot Islands (NF008)	56.78	A group of small islands, isolated rocks, and shoals at the southeast head of Hare Bay, on the northeast side of the Northern Peninsula.	• Globally significant wintering congregation of Common Eiders.
Northern Groais Island (NF009)	173.42	Off the eastern side of the Northern Peninsula.	• Breeding colony of Black-legged Kittiwakes. • Wintering congregation of Common Eiders.
Bell Island South Coast (NF010)	282.47	Off the eastern side of the Northern Peninsula, just south of Northern Groais Island.	• Largest colony of nesting Common Eiders on insular Newfoundland (over 1,000 pairs). • During winter, thousands of Common Eiders congregate. • Reports of Harlequin Ducks in the non-breeding season. • The Shepherd Island and Île aux Canes Migratory Bird Sanctuaries are part of this IBA.
Funk Island (NF004)	135.18	Island off northeastern Newfoundland, approximately 60 km from shore.	• Major concentration of nesting seabirds. • Globally significant Common Murre population. • Large numbers of Northern Gannets. • Provincially protected Seabird Ecological Reserve; as such, access to the island is restricted to scientific researchers.
Wadham Islands and adjacent Marine Area (NF013)	159.23	Near Fogo Island, approximately 40 km offshore; includes 7 main islands and several smaller rocks and shoals.	• Globally significant number of wintering Common Eider (approximately 25,000 counted in a 1995 survey). • Large numbers of nesting Atlantic Puffin, Leach's Storm-Petrel and Razorbill.
Cape Freels Coastline and Cabot Island (NF025)	334.48	At the head of Bonavista Bay; includes several small islands and shoals.	• Up to 25,000 wintering Common Eiders have been reported between the Cape Freels coastline and Wadham Islands. • Large numbers of nesting Common Murres, as well as some pairs of Razorbills. • Historic records of breeding Atlantic Puffins, although none were recorded in recent EC-CWS surveys.
Terra Nova National Park (NF017)	655.56	On the inner reaches of Bonavista Bay. Much of the area is forested, but there are numerous lakes and wetlands, as well as a significant coastal component.	• Numerous forest species nest here, including two subspecies with restricted ranges: the federally-listed Red Crossbill (*percna* ssp.) and Ovenbird (*furvoir* ssp.). • Shorebirds, gulls and waterfowl can be seen on the flats at the outlet of Big Brook, as well as Newman Sound. • At least six tern colonies (Common and Arctic Tern), totalling between 1000 and 1500 pairs. • Also a federally designated Migratory Bird Sanctuary.

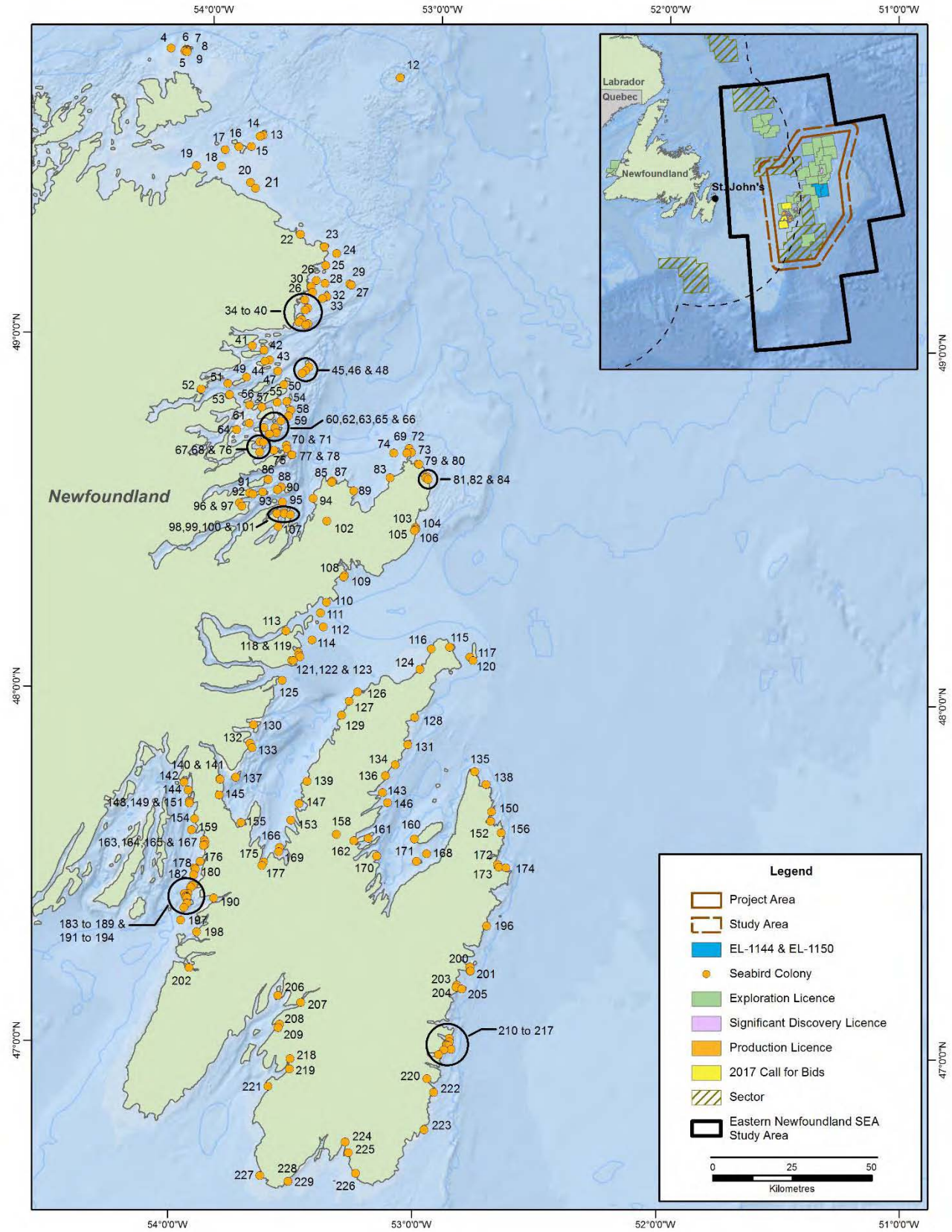
IBA Name	Area (km^2)	Location	Importance
Grates Point (NF019)	66.55	The northern tip of the Bay de Verde Peninsula, which separates Trinity Bay from Conception Bay.	• Large number of wintering Common Eiders (up to 12,000 individuals, but typically around 2,800). • Other wintering species include Black-legged Kittiwake, Thick-billed Murre and Dovekie. • Atlantic Puffin and Northern Gannet are present in the summer months.
Baccalieu Island (NF003)	45.22	5.5 km from the northern tip of the Avalon Peninsula.	• Greatest seabird abundance and diversity in Eastern North America. • World's largest colony of Leach's Storm-petrels, including 70 percent of the North American population. • Significant numbers of breeding Atlantic Puffin, Black-legged Kittiwake and Northern Gannet. • Smaller numbers of nesting Common Murre, Thick-billed Murre, Razorbill, Black Guillemot, Northern Fulmar, Herring Gull and Great Black-backed Gull. • Like Funk Island, a provincially designated Seabird Ecological Reserve.
Cape St. Francis (NF021)	70.21	At the northern tip of the Avalon Peninsula.	• Winter congregating area for Common Eiders; up to 5000 individuals recorded. • Purple Sandpipers regularly observed along the rocky shoreline in the winter.
Quidi Vidi Lake (NF022)	7.0	Within St. John's city limits, and fed by the Virginia River and Rennies River.	• Important daytime resting site for gulls from late fall to early spring, including significant numbers of Herring, Great Black-backed, Iceland, Glaucous and Common Black-headed Gulls. • Locally rare Ring-billed Gull, Mew Gull and Lesser Black-backed Gull occasionally reported. • Waterfowl including American Black Ducks, Mallards and Northern Pintails are common in the winter, subsisting on food handouts from people.
Witless Bay Islands (NF002)	62.08	Composed of four small islands off the east coast of the Avalon Peninsula.	• Provincially designated Seabird Ecological Reserve. • Globally significant numbers of breeding seabirds, including more than half of the eastern North American population of Atlantic Puffins and almost 10% of the global Leach's Storm-petrel population. • Large numbers of nesting Common Murres, Black-legged Kittiwakes and Herring Gulls. • Great Black-back Gulls, Northern Fulmars, Thick-billed Murres, Razorbills and Black Guillemots nest in smaller numbers.

IBA Name	Area (km^2)	Location	Importance
			• During the fall migration, surrounding marine area is important to sea ducks including White-winged Scoter, Surf Scoter, Long-tailed Duck and Common Eider.
Mistaken Point (NF024)	102.77	Near the southeastern corner of the Avalon Peninsula.	• Important wintering area for up to 12,000 Common Eiders. • Continentally significant numbers of wintering Purple Sandpiper (> 1% of North American population). • Small numbers of overwintering Ruddy Turnstone, far north of its usual wintering range. • Nesting Black-legged Kittiwake, Common Murre and Razorbill. • Provincially designated Ecological Reserve because of its rich fossil deposits.
Cape St. Mary's (NF001)	329.39	Located at the entrance to Placentia Bay on the southwestern Avalon Peninsula.	• Significant numbers of nesting Northern Gannet (> 2% of global population). • Large numbers of Common Murre and Black-legged Kittiwake, and smaller numbers of nesting Thick-billed Murre, Razorbill, Great Cormorant and Double-crested Cormorant. • Herring Gull, Great Black-backed Gull and Black Guillemot historically reported nesting. • In the winter, large numbers of migrating sea ducks including scoters, Common Eider, Long-tailed Duck and the endangered Harlequin Duck. • Small numbers of Harlequin Duck during summer, moulting season in some years. • Designated as a provincial Seabird Ecological Reserve.
Placentia Bay (NF028)	1398.05	Includes the eastern half of Placentia Bay in southeastern Newfoundland (between the Avalon and Burin peninsulas), and extends out 25 km from shore	• Exceptional feeding area for seabirds during the summer capelin spawning season. • More than 100,000 shearwaters recorded in a single survey (mostly Greater and Sooty Shearwater, some Manx Shearwater). • Large numbers of other species breeding at Cape St. Mary's feed here, including Northern Gannet, Black-legged Kittiwake, Atlantic Puffin, Thick-billed Murre and Common Murre. • Large numbers of feeding Pomarine and Parasitic Jaegers. • More than 1,000 wintering Common Eiders.
Cape Pine and St. Shotts Barren (NF015)	57.4	Southern tip of the Avalon Peninsula.	• Large, possibly globally significant numbers of American Golden-Plover during their fall migration (August to mid-October). • Dozens of Whimbrel during fall migration.

IBA Name	Area (km^2)	Location	Importance
Corbin Island (NF030)	5.25	Southeast corner of the Burin Peninsula.	• An estimated 100,000 pairs of nesting Leach's Storm-petrels (2% of western Atlantic population). • Historic records of Herring Gull, Great Black-backed Gull, Black Guillemot and Black-legged Kittiwake colonies.
Middle Lawn Island (NF031)	4.17	A small, rugged island off the southern tip of the Burin Peninsula.	• One of the few known colonies of Manx Shearwaters in North America, as well as the largest with up to 100 pairs reported; another 300 non-breeding individuals are estimated to be present. • Globally significant numbers of Leach's Storm-petrels breed on the island. • Black Guillemot, Herring Gull and Great Black-backed Gull have been reported breeding. • Part of the Lawn Islands Archipelago, a provisional Seabird Ecological Reserve.
Green Island (NF032)	5.61	Midway between the Burin Peninsula and St. Pierre and Miquelon.	• Globally significant colony of Leach's Storm-petrels. • Common Tern, Arctic Tern and small numbers of Herring Gull have been reported breeding. • Spotted Sandpipers observed in the summer. • Manx Shearwater and Black Guillemot may breed on the island.
Source: Important Bird Areas of Canada (Bird Studies Canada 2017); Atlantic Canada Colonial Waterbird database (CWS 2017)			

ECCC has designated several Migratory Bird Sanctuaries in Canada, which are protected by the *Migratory Bird Sanctuary Regulations* (federal) which prescribe rules and prohibitions regarding the taking, injuring, destruction or molestation of migratory birds or their nests or eggs in the sanctuaries. Hunting of migratory species is not permitted in any Migratory Bird Sanctuary (MBS). There are three MBSs in the Eastern Newfoundland region: Terra Nova MBS, which is also an IBA, and the Shepherd Island and Île aux Canes Migratory Bird Sanctuaries which are part of the Bell Island South Coast IBA. Provincially, there are also several protected Wilderness and Ecological Reserves, including seven designated Seabird Ecological Reserves, five of which are in Eastern Newfoundland (NLDEC 2017b). Many these sites, including Witless Bay, Lawn Bay (which includes Middle Lawn Island), Baccalieu Island, Cape St. Mary's and Funk Island, are also IBAs and have been discussed in Table 4.19. The *Seabird Ecological Reserve Regulations, 2015* prohibit or limit industrial development as well as certain activities that can cause disturbance to breeding seabirds, including limitations on hiking, boat traffic and low-flying aircraft near the colonies during the breeding season, and prohibition of ATVs at all times. As well, Mistaken Point is a designated Ecological Reserve because of its rich assemblage of fossils, and as such is afforded similar protection from development and off-road vehicles. In addition to designated IBAs and MBSs, breeding sites for colonial species also constitute particularly important areas and habitats for marine birds. Figure 4.54 shows the locations of known seabird colonies off Eastern Newfoundland (see Appendix C for details).

Figure 4.54 Seabird Colony Locations in Eastern Newfoundland



A number of EBSAs have also been identified within the Placentia Bay Grand Banks Large Ocean Management Area (PBGB LOMA). Among the criteria for selection and ranking of these important areas was their importance to seabirds in terms of biodiversity, density and importance to reproduction and survival. Table 4.20 provides a summary of key relevant characteristics of the three EBSAs that overlap the Study Area, including important attributes pertaining to seabirds. These and other special areas are illustrated and described later in Section 4.2.4 (Special Areas).

Table 4.20 EBSAs that Overlap with the Study Area and their Importance to Seabirds

EBSA Name	Location	Importance to Seabirds
Southeast Shoal and Tail of the Banks	Defined as the area east of 51°W and south of 45°N, extending to the edge of the Grand Banks.	• An important offshore spawning area for key prey species (e.g. capelin and sand lance). This high concentration of forage species draws large and diverse aggregations of seabirds. • In terms of fitness consequences, this EBSA is an important seasonal foraging area for seabirds.
Northeast Shelf and Slope	The northeastern Grand Bank, starting at the nose of the Bank, from 48°W to 50°W, and from the edge of the shelf to the 1,000 m isobath.	n/a
Lilly Canyon-Carson Canyon	From 44.8°N to 45.6°N along the 200 m isobaths of the southeast slope of the Grand Bank.	• This EBSA is important as a seasonal refuge and feeding area for overwintering marine animals.

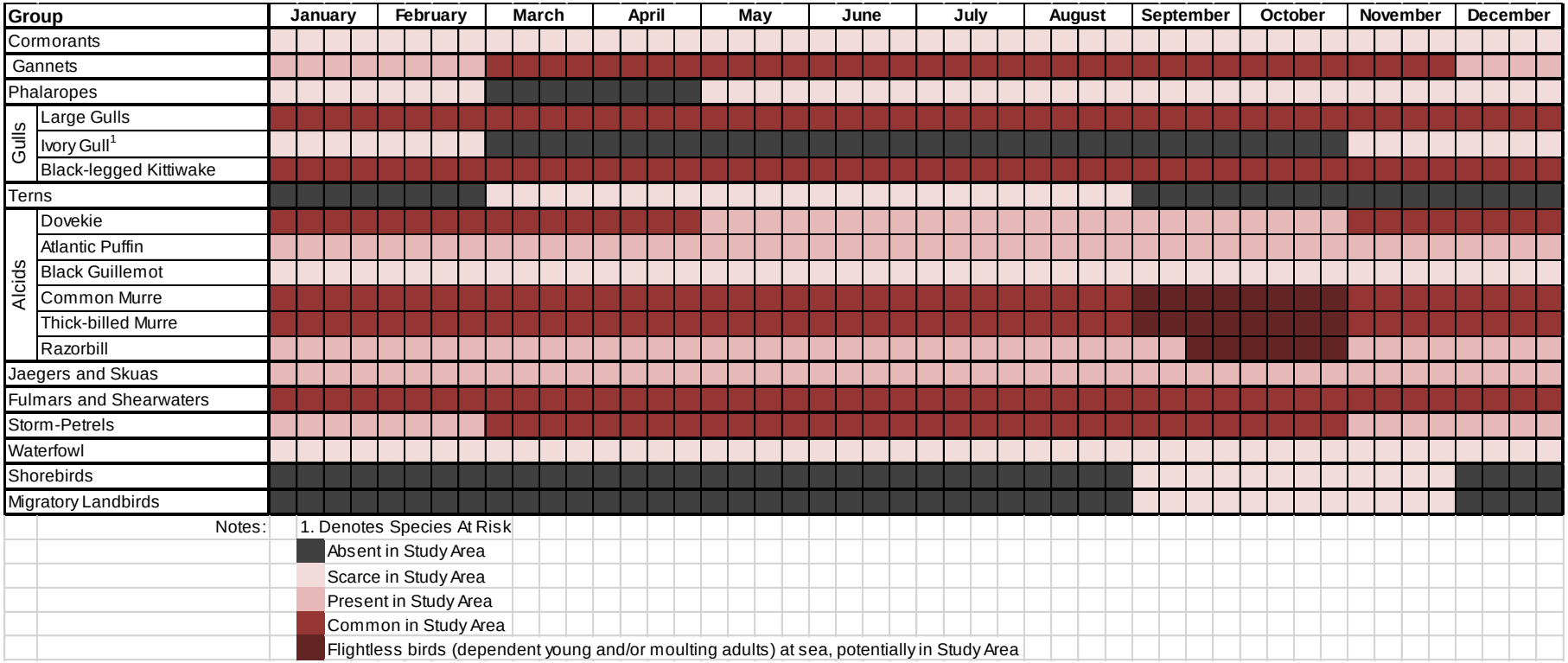
Figure 4.55 summarizes the seasonal presence of marine-associated bird species in the Study Area. In the summer months, the greatest abundance of seabird species breeding in Newfoundland is concentrated around nesting colonies (Fifield et al 2009). However, seabirds are relatively long-lived and in many species, individuals do not breed until four or five years of age. Therefore, even during the breeding season large numbers of non-breeding birds may be found far offshore. Some Southern Hemisphere-breeding species spend the summer months (austral non-breeding season) in the northwest Atlantic, including most of the world's Great Shearwaters (Brown 1986).

The fall months are an important time for Leach's Storm-petrels and migrating landbirds (particularly passerines, which tend to be nocturnal migrants), as these species are vulnerable to disorientation from artificial light sources. The Leach's Storm-petrel is the species most frequently found stranded on platforms and vessels in and near the Study Area (Ellis et al 2013; Environment Canada 2015), with the vast majority of strandings occurring in September and October, following the departure of fledglings from nearby breeding colonies (Huntington et al 1996). At all times of year, but especially outside the breeding season, alcids are considered particularly vulnerable to the potential effects of oil pollution because they spend a large proportion of their time on the water relative to more aerial species (Fifield et al 2009) and congregate over relatively small, productive areas such as around the Grand Banks (Gaston et al 2011; Hedd et al 2011; Montevecchi et al 2012; Fort et al 2013; McFarlane Tranquilla et al 2013). Alcid vulnerability in the region is at its highest during the post-breeding season moulting period (Gaston and Hipfner 2000; Ainley et al 2002; Montevecchi and Stenhouse 2002; Lavers et al 2009).

During the winter months, tens of millions of Dovekies travel several thousand kilometers from their breeding grounds to their core winter distribution within the highly productive waters off eastern

Newfoundland (Fort et al 2012, 2013). In the winter months, the waters off Eastern Canada support a large proportion of the Icelandic population of Great Skuas (Magnusdottir et al 2012). A recent tracking study of Black-legged Kittiwakes has shown that the northwest Atlantic, particularly the shelf edge off Newfoundland, is a particularly important wintering area for kittiwakes, with most of the Atlantic population overwintering in this region (Frederiksen et al 2012). Most of Eastern Canada's population of Common Murres and approximately a third of the region's Thick-billed Murres overwinter in the waters off eastern Newfoundland (McFarlane Tranquilla et al 2013).

Figure 4.55 Summary of Seasonal Presence of Marine-Associated Birds in the Study Area



4.2.3 Marine Mammals and Sea Turtles

The waters off Eastern Newfoundland support a diverse assemblage of marine fauna throughout the year. Marine mammals and reptiles are considered ecologically, economically, culturally, and recreationally important to various stakeholder groups, including government agencies, Aboriginal groups and other interested parties. Over 20 marine mammals and five sea turtle species have been reported in and near the Study Area, including several that are considered to be at risk or otherwise of special conservation concern.

This section provides an overview of marine mammal and sea turtles, including species at risk, that have potential to occur in the Study Area. Detailed life history and habitat information for these species, as well as information about key areas and times of year, can be found in the Eastern Newfoundland SEA (Amec 2014, see Section 4.2.3). New data, as well as key information specific to the Study Area for this assessment, is summarized in the following subsections.

Sightings data for marine mammals and sea turtles within the Study Area were obtained from the Ocean Biogeographic Information System (OBIS), which include the following sources:

- Bureau of Land Management (BLM) Cetacean and Turtle Assessment Program (CETAP);
- CWS-ECCC Eastern Canada Seabirds at Sea (ECSAS) (opportunistic sightings);
- PIROP Northwest Atlantic 1965–1992 (opportunistic sightings);
- DFO Maritimes Region Cetacean Sightings;
- National Oceanic and Atmospheric Administration records;
- NOAA Northeast and Southeast Fisheries Science Center surveys;
- Visual sightings from Song of the Whale 1993-2013;
- Lamont-Doherty/LGL/NSF cruises;
- UK Royal Navy Marine Mammal Observations; and
- HMAP Dataset 04: World Whaling

In addition to the compiled OBIS data, cetacean observations from the DFO Marine Mammals Sightings Database, which includes sightings from the late 1940s to 2013, were obtained from Dr. Jack Lawson of DFO. Although useful and informative at a regional scale, there are several caveats associated with these datasets which must be noted. Because the data collection is not standardized across surveys, and the sightings effort is not quantified, the data cannot be used to estimate species abundance or density. A lack of sightings may reflect a deficiency of survey effort in a given area and cannot be interpreted as absence of a particular species; similarly, a cluster of sightings may reflect high survey effort rather than a large number of individuals in a particular area. As well, observers may have varying degrees of experience and expertise in marine mammal identification, and the data have not been completely error-checked and the quality of some of the information is therefore unknown. Most sightings are collected on an opportunistic basis and observations may come from individuals with varying degrees of experience and expertise in marine mammal identification. Most data have been gathered from platforms of opportunity that were vessel-based, and the possible negative or positive reactions by cetaceans to such vessels have not yet been factored into the data. Numbers sighted have not been verified, especially in light of the significant differences in detectability between species. For completeness, these data represent an amalgamation of sightings from a variety of years and seasons; the effort is not necessarily consistent among seasons, years, and areas, and there are gaps between years. Finally, many sightings could not be identified to the species level, and these have been assigned to the smallest taxonomic group possible.

4.2.3.1 Mysticetes

Six species of the cetacean suborder Mysticetes (the baleen whales) regularly occur in the waters off Eastern Newfoundland (Table 4.21). The bowhead whale, an Arctic species, has been observed off the coast of Newfoundland. Sightings of odontocete species obtained from OBIS and the DFO Marine Mammals Sightings database are shown in Figure 4.56.

Table 4.21 Overview of Mysticetes that are Known or Likely to Occur in the Study Area

Family	Species
Balaenidae – Right Whales	North Atlantic Right Whale (*Eubalaena glacialis*)
Balaenopteridae – Rorquals	Common Minke Whale (*Balaenoptera acutorostrata*)
	Sei Whale (*Balaenoptera borealis*)
	Blue Whale (*Balaenoptera musculus*)
	Fin Whale (*Balaenoptera physalus*)
	Humpback Whale (*Megaptera novaengliae*)

These large whales are characterized by having plates of baleen, which filter food items from seawater, in place of teeth. Baleen whales are typically solitary or clustered in small groups, and within groups, baleen whales are social, and acoustic communication (vocalizations and other underwater sounds) is critical to maintaining complex social structures. Baleen whales may be found in coastal as well as offshore areas, typically foraging at depths of 100 m to 150 m. Blue whales and common minke whales may be found in the area throughout the year, while the other four species are absent in the winter months.

4.2.3.2 Odontocetes

The suborder Odontoceti includes toothed whales, dolphins and porpoises. In the waters off Eastern Newfoundland, 14 species of odontocetes have been regularly observed (Table 4.22). An additional species has been reported in the area, the Atlantic spotted dolphin (OBIS 2017), a species that is generally found in tropical and subtropical waters and is therefore considered very unlikely to occur in the Study Area. Sightings of odontocete species obtained from OBIS and the DFO Marine Mammals Sightings database are shown in Figures 4.57 (dolphins and porpoises) and Figure 4.58 (other odontocetes).

Table 4.22 Overview of Odontocetes that are Known or Likely to Occur in the Study Area

Family	Species
Delphinidae – Dolphins	Short-beaked Common Dolphin (*Delphinus delphis*)
	Long-finned Pilot Whale (*Globicephala melas*)
	Risso's Dolphin (*Grampus griseus*)
	Atlantic White-sided Dolphin (*Lagenorhynchus acutus*)
	White-beaked Dolphin (*Lagenorhynchus albirostris*)
	Killer Whale (*Orcinus orca*)
	Striped Dolphin (*Stenella coeruleoalba*)
	Common Bottlenose Dolphin (*Tursiops truncatus*)
Phocoenidae – Porpoises	Harbour Porpoise (*Phocoena phocoena*)
Monodontidae – Belugas and Narwhals	Beluga Whale (*Delphinaptera leucas*)
Ziphiidae – Beaked Whales	Cuvier's Beaked Whale (*Ziphius cavirostris*)
	Sowerby's Beaked Whale (*Mesoplodon bidens*)
	Northern Bottlenose Whale (*Hyperoodon ampullatus*)
Physeteridae – Sperm Whales	Sperm Whale (*Physester macrocephalus*)

Like baleen whales, toothed whales rely heavily on acoustic means of communication. Their auditory range is much greater than that of baleen whales, ranging from 200 Hz to as high as 200 kHz (NRC 2003). In addition to using sound for communication, many species of toothed whales use echolocation to navigate and to locate prey (Richardson et al 1995). Toothed whales vary in habitat preferences, with belugas and harbour porpoises favouring coastal/estuarine habitats. Some dolphins may be found in both coastal areas and open ocean, and other dolphins as well as beaked whales and sperm whales are seldom observed close to shore. Typical foraging depths range from 20 m for belugas to 1,000 m for Sowerby's beaked whale and Risso's dolphin (Perrin et al 2002). Most species are thought to be present in offshore Northwest Atlantic waters year-round, but belugas are a rare winter visitor to the area, and common bottlenose dolphin and Risso's dolphin are only seen in the summer months (Amec 2014).

4.2.3.3 Pinnipeds

Four seal species are known to occur regularly in the Study Area (Table 4.23). Two additional seal species, the bearded seal and ringed seal, are typically Arctic dwellers but are known to occasionally occur in the area in the winter months. A single extralimital sighting of walrus has also been reported off Eastern Canada (OBIS 2017). Sightings of pinniped species obtained from OBIS are shown in Figure 4.59.

Table 4.23 Overview of Pinnipeds that are Known or Likely to Occur in the Study Area

Family	Species
Phocidae – Earless Seals	Harp Seal (*Pagophilus groenlandicus*)
	Harbour Seal (*Phoca vitulina*)
	Hooded Seal (*Cystophora cristata*)
	Grey Seal (*Halichoerus grypus*)

Some pinniped species may be found in coastal environments (harbour seal and occasionally grey seal), but most prefer open ocean habitats. Typical foraging depths range from less than four meters for harbour seals (Perrin et al 2002), up to as deep as 600 m for hooded seals (Kovacs 2008). Harp and hooded seals are most common in the winter months (December to April), while harbour and grey seals may be present year-round. The populations of all four species are secure or increasing (Hammill et al 2012).

4.2.3.4 Sea Turtles

Five species of sea turtles have been reported in the waters of the Northwest Atlantic, as described in Table 4.24. Of these, only the Leatherback Turtle and the Loggerhead Sea Turtle are regularly found in the Study Area. Green Sea Turtle, Hawksbill Sea Turtle, and Kemp's Ridley Sea Turtle frequent tropical and subtropical waters, but have occasionally been found in the waters off Eastern Canada in the summer months. Sightings of sea turtle species obtained from OBIS are shown in Figure 4.60.

Table 4.24 Overview of Sea Turtles that are Known or Likely to Occur in the Study Area

Family	Species
Dermochelyidae – Leatherback Turtle	Leatherback (*Dermochelys coriacea*)
Cheloniidae – Sea Turtles	Loggerhead Sea Turtle (*Caretta caretta*)

Leatherback and loggerhead sea turtles may be found in the Study Area from April to December, but are absent in the winter months. They are rarely seen in coastal areas, preferring offshore habitats (COSEWIC 2010d, 2012e). Sea turtles spend much time on the ocean surface, and foraging depths are typically less than 100 m (Wyneken et al 2013).

Figure 4.56 Baleen Whale Sightings off Eastern Newfoundland

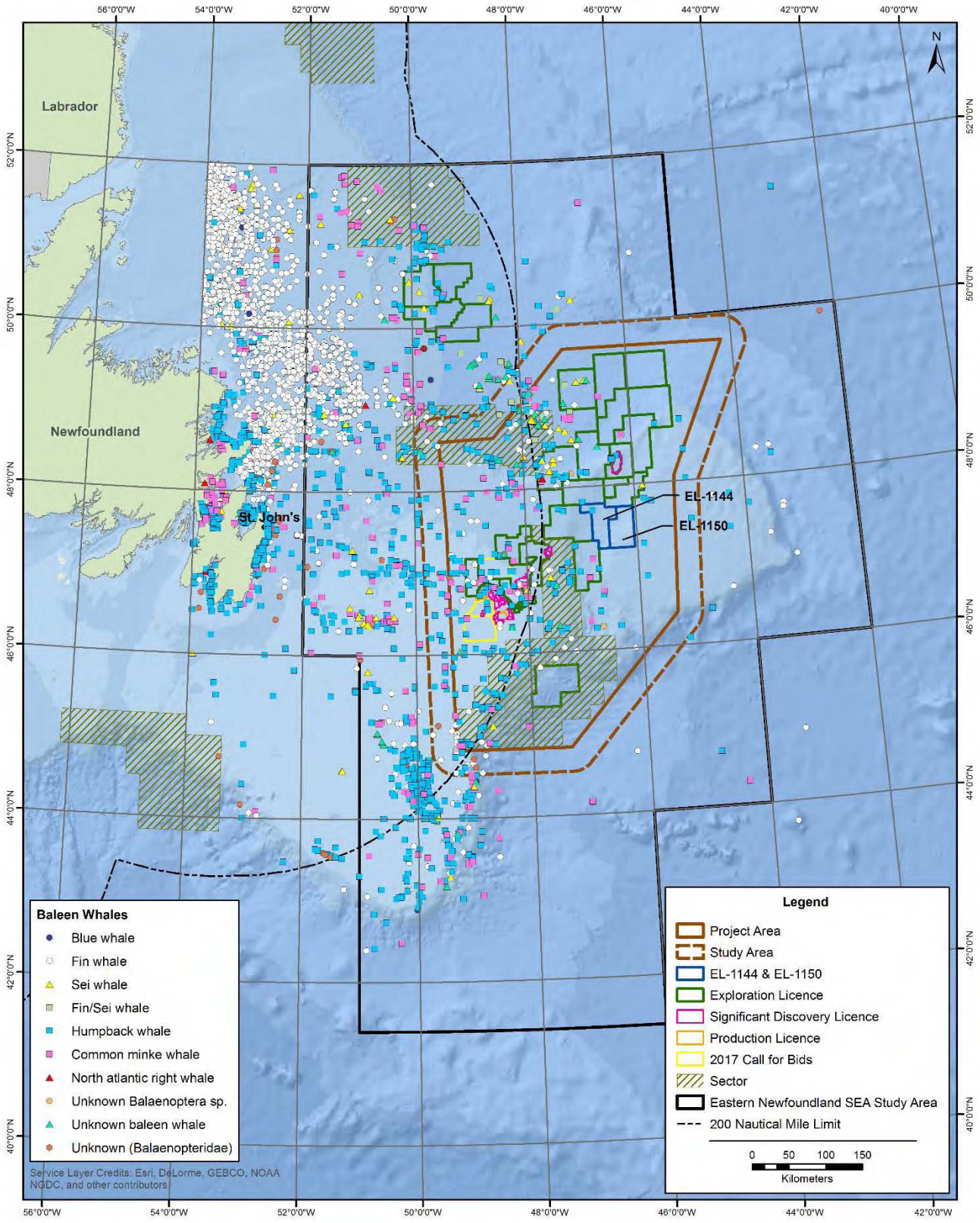


Figure 4.57 Dolphin and Porpoise Sightings off Eastern Newfoundland

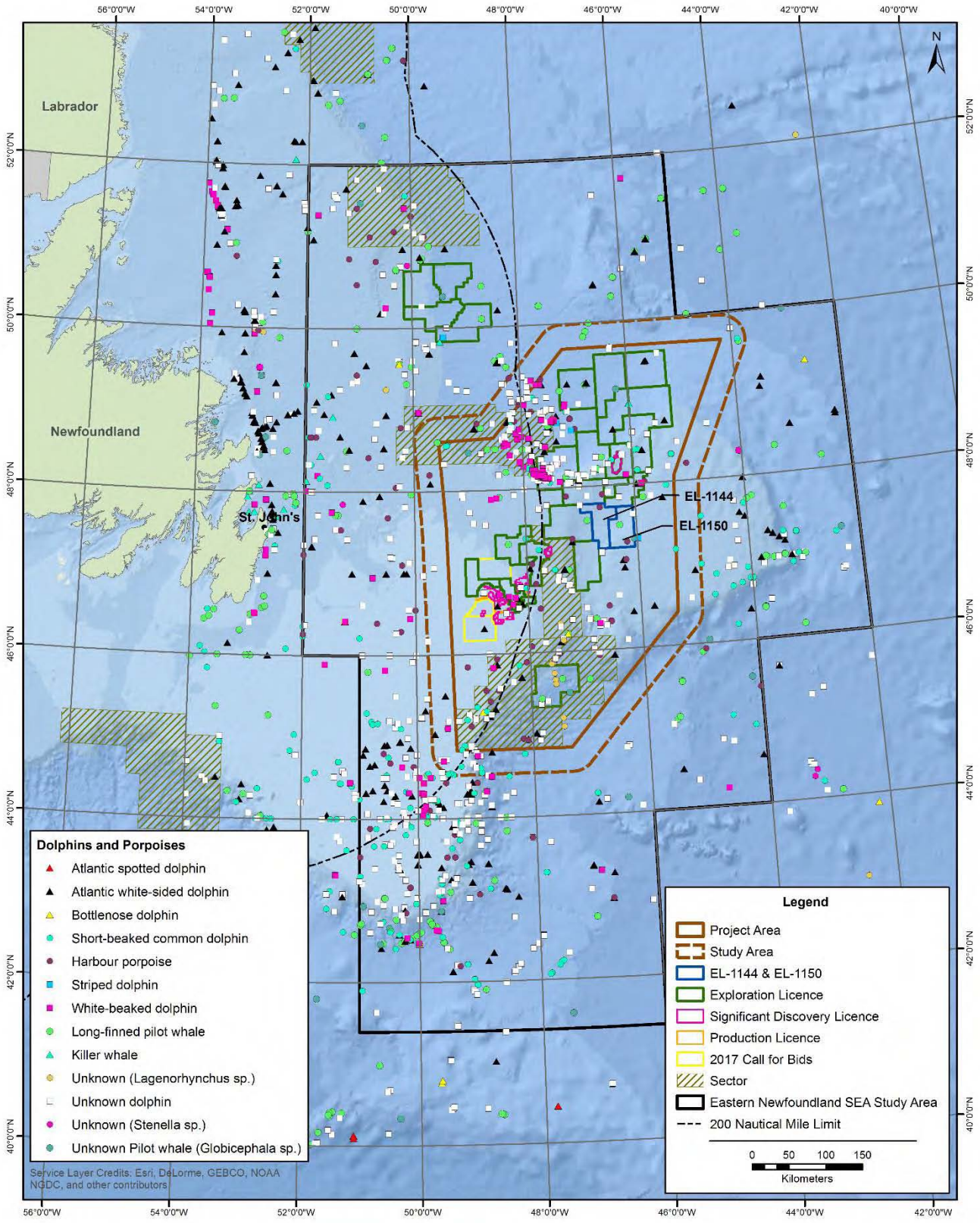


Figure 4.58 Large Toothed Whale Sightings off Eastern Newfoundland

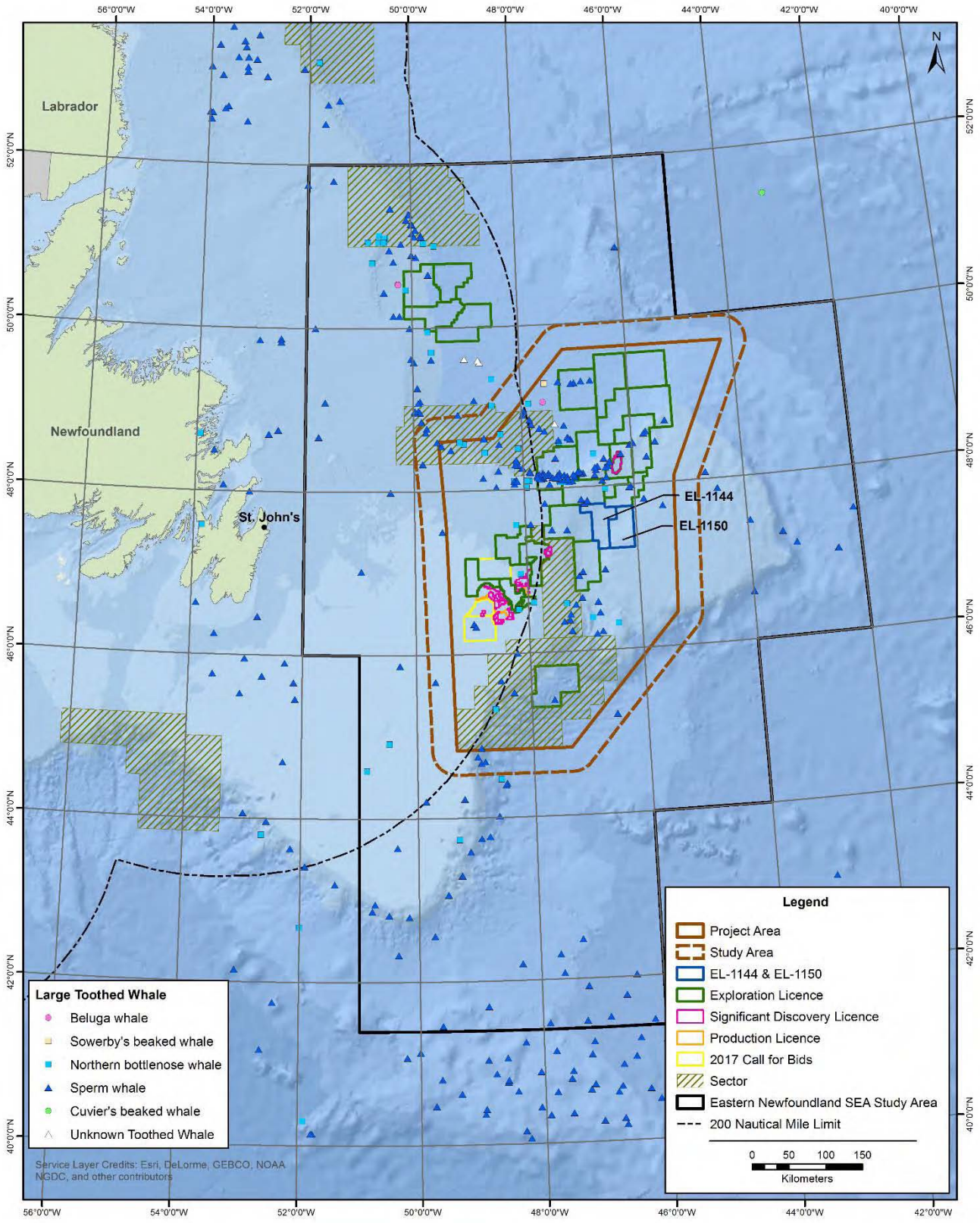


Figure 4.59 Pinniped Sightings off Eastern Newfoundland

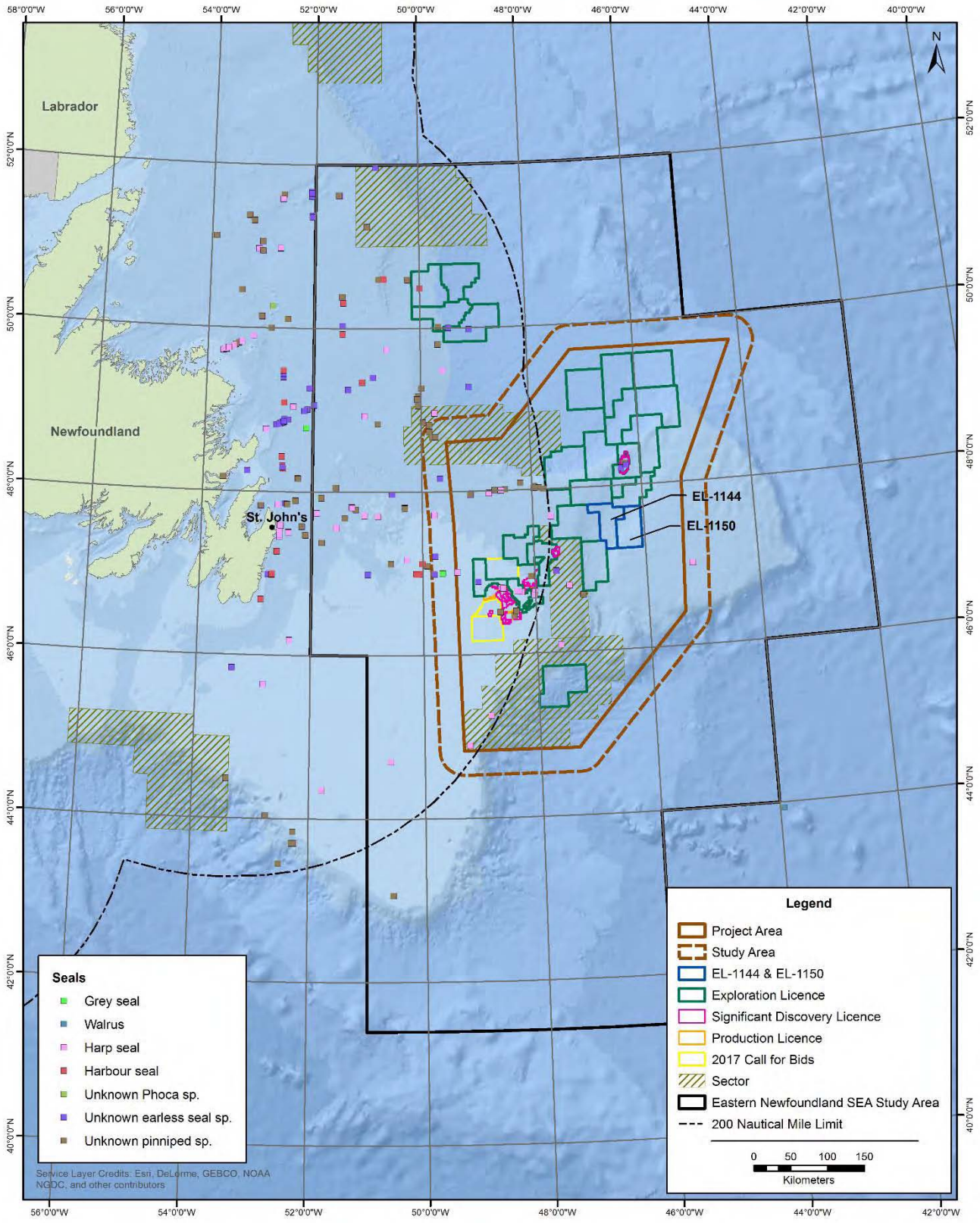
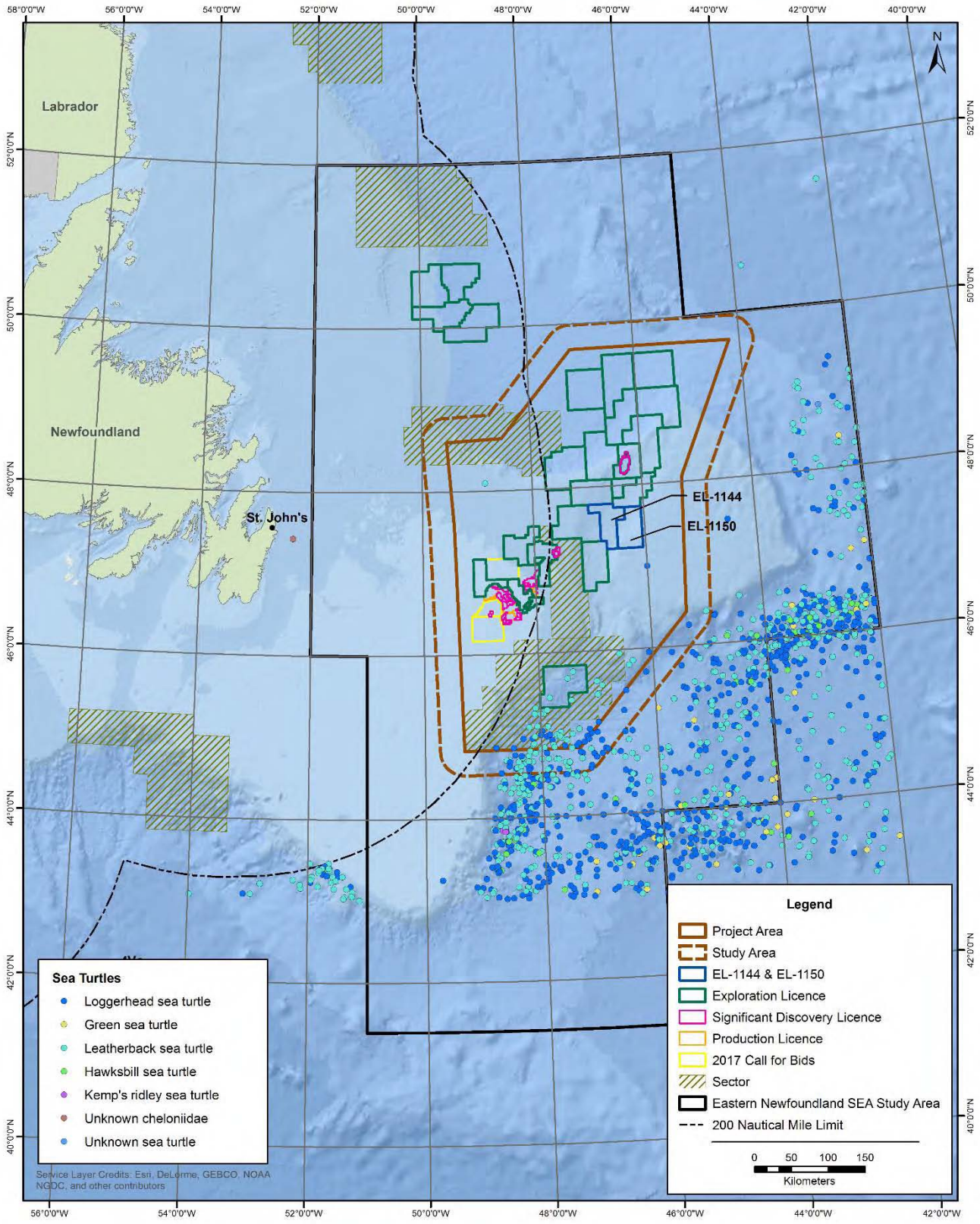


Figure 4.60 Sea Turtle Sightings off Eastern Newfoundland



4.2.3.5 Species at Risk and Otherwise of Conservation Concern

A number of marine mammal and sea turtle species at risk protected under the *SARA*, occur in the waters offshore Eastern Newfoundland, as well as other species that have been identified as being of conservation concern by COSEWIC (Table 4.25). While not assessed by COSEWIC, the Kemp's Ridley, Green and Hawksbill sea turtle are all considered to be of conservation concern by the IUCN (IUCN 2017). All three of these sea turtle species are unlikely to be present in the Study Area, as they are associated with tropical and sub-tropical areas; however, vagrants may occur in the summer months.

Table 4.25 Marine Mammal and Sea Turtle Species at Risk and their Likelihood of Occurrence in the Study Area

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	***SARA* Schedule 1 Listing**	**COSEWIC Assessment**		
Blue Whale - Atlantic Population	Endangered	Endangered	• Found in coastal and pelagic waters, frequently at shelf edge where food production is high (Schoenherr 1991). • Present in all oceans except the Arctic (Reilly et al 2008). • Critical habitat in the estuary and Gulf of St. Lawrence is currently being identified for the species (DFO 2016a).	Present in small numbers throughout the year; most common in the winter and early spring.
Fin Whale - Atlantic Population	Special Concern	Special Concern	• Coastal shelf edge and offshore (COSEWIC 2005). • World-wide distribution; most abundant at temperate and polar latitudes (Reeves et al 2002). • Typically found in areas with high prey concentration (e.g., the Grand Banks) in the summer months.	Present year-round, most common in the summer months.
North Atlantic Right Whale	Endangered	Endangered	• Prefers waters 100 – 200 m deep with surface temperatures between 8 and 15°C (Kenney 2001). • Distribution related to presence and abundance of prey species. • Aggregate in five seasonal habitat areas along the east coast of North America, including two designated critical habitat areas in Canada: the lower Bay of Fundy and Roseway Basin on the Scotian Shelf (Brown et al 2009).	Uncommon in Study Area; may be present in the summer months.
Northern Bottlenose Whale - Davis Strait population;	Endangered (Scotian Shelf population)	Special Concern (Davis Strait population)	• Deep-diving species found in waters 800 - 1500 m deep. • In western North Atlantic, occur from Baffin Island to New England (Taylor et al 2008a).	Potentially present in small numbers in the area year round; most sightings have been in the spring and

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	***SARA* Schedule 1 Listing**	**COSEWIC Assessment**		
Scotian Shelf population		Endangered (Scotian Shelf population)	• It is unclear to which population individuals observed in the Study Area belong; however, a recent observation of 50 individuals in the Sackville Spur area suggest there may be a previously unknown population (CBC 2016). • Davis Strait population seemingly tends to migrate north to south, although patterns are not consistent (Reeves et al 1993), whereas Scotian Shelf population is apparently non-migratory. • Three marine canyons, all along the Scotian Shelf, have been identified as critical habitat for the Scotian Shelf population (DFO 2010a).	summer.
Sowerby's Beaked Whale	Special Concern	Special Concern	• Deep-diving species found at continental edges and slopes in depths of 550 - 1500 m or more. • Seasonal movements unknown. • Found in cold North Atlantic waters, from Massachusetts to Labrador (Taylor et al 2008b).	May be present year round in deep water habitats.
Beluga Whale (St. Lawrence Estuary population)	Threatened	Endangered	• Coastal species (ACS 2006). • Concentrated near the outlet of the Saguenay River in summer; in the winter months, they disperse from estuarine habitats, regularly occurring as far downstream as the western end of Anticosti Island (COSEWIC 2014). • Critical habitat has been identified in the St. Lawrence Estuary and lower reaches of the Saguenay River (DFO 2012a).	Very rare in the Study Area; seldom range far from the St. Lawrence estuary.
Killer Whale (Northwest Atlantic/Eastern Arctic population)	none	Special Concern	• Nearshore and pelagic environments. • Cosmopolitan distribution, concentrated in areas of high productivity (Forney and Wade 2006).	Likely present; small numbers have been observed in the area at all times of year.
Harbour Porpoise	none	Special Concern	• Coastal shelf, bays and estuaries, but occasionally offshore (Hammond et al 2008).	Fairly common in the Study Area, possibly present year round.

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	***SARA* Schedule 1 Listing**	**COSEWIC Assessment**		
			• Found in cold waters throughout the northern hemisphere (Hammond et al 2008a). • Seasonal movements poorly known.	
Walrus	none	Special Concern	• Require shallow open areas with substrate supporting a productive bivalve community, and suitable ice or land nearby upon which to haul out (COSEWIC 2006b). • Once common in the Atlantic Provinces, but now restricted to Arctic to sub-Arctic regions.	Extremely unlikely. Single extralimital report in Study Area (OBIS 2017).
Leatherback Sea Turtle (Atlantic population)	Endangered	Endangered	• Typically found in coastal shelf waters with depths of less than 200 m. • Range from tropical to sub-polar regions (COSEWIC 2012f), and undertake extensive migrations between feeding areas and to tropical nesting areas (Wallace et al 2013). • To date, critical habitat has not been identified; however, DFO (2012d) observed three high-use feeding areas in Canadian waters: 1) waters east and southeast of Georges Bank, including the Northeast Channel near the southwestern boundary of the Canadian Exclusive Economic Zone; 2) the southeastern Gulf of St. Lawrence and waters off eastern Cape Breton Island, including Sydney Bight, the Cabot Strait, portions of the Magdalen Shallows and adjacent portions of the Laurentian Channel; and 3) waters south and east of the Burin Peninsula, Newfoundland, including parts of Placentia Bay. Information from the DFO study is being used to inform the identification of critical habitat in a forthcoming amendment to the species' Recovery Strategy (DFO 2013a).	Occur with some regularity in the Study Area, mainly from April to December.

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	SARA Schedule 1 Listing	COSEWIC Assessment		
Loggerhead Sea Turtle	None	Endangered	• Found in oceanic and near-shore zones of temperate and tropical Atlantic, Pacific and Indian Oceans, and nest on beaches in subtropical and tropical climates (COSEWIC 2010d). • In Atlantic Canada, most abundant in spring to fall, and generally associated with the Gulf Stream.	Uncommon; most frequently observed in the spring and summer months.

4.2.3.6 Key Areas and Times for Marine Mammals and Sea Turtles

Baleen whales are present in the area throughout the year, but are most abundant in the summer months. Most species are migratory and absent from the Study Area in winter, but common minke whale and blue whale may occur in the area year-round. Most toothed whales are thought to be year-round residents of the Study Area, with the exception of Risso's and common bottlenose dolphins, which are found only in the summer months, and beluga, which are only observed in the winter months. Pinnipeds are most abundant in the winter months, although grey and harbour seals may be present year-round. Sea turtles are most abundant in the area during the summer months, when the Grand Banks and surrounding waters provide important feeding habitat, and they are absent from the area between December and April.

From the preceding Figures, it is evident that the greatest concentration of marine mammal sightings reported in DFO and OBIS datasets within the Study Area was in the Southern Grand Banks area and within the 200 nautical mile limit, while most sea turtle sightings were south of the Grand Banks and off the continental shelf edge. However, as noted above, the level of search effort was not consistent over the entire region and so this does not necessarily reflect the specific distribution of the species. Despite these caveats, however, some species seemed to favour certain areas; for example, a relatively large proportion of fin whale sightings were clustered off the northeast coast of Newfoundland, while humpback whale sightings were somewhat widespread in coastal and continental shelf waters, but were particularly abundant on the Tail of the Grand Banks.

As described earlier, a number of EBSAs have been identified by DFO within the Placentia Bay Grand Banks Large Ocean Management Area (Templeman 2007). Among the criteria for the identification, evaluation and selection of these important areas was their importance to marine mammals and seabirds in terms of biodiversity, density and importance for reproduction and survival. As shown previously, a number of EBSAs are wholly or partly within the Study Area and several more are situated nearby.

Table 4.26 provides an overview of the key relevant characteristics of EBSAs located within or near the Study Area as they relate to marine mammals and/or sea turtles; the location of these and other EBSAs are depicted in Section 4.2.4 (Special Areas).

Table 4.26 EBSAs That Overlap with the Study Area and their Importance to Marine Mammals and Sea Turtles

EBSA Name	Location	Importance to Marine Mammals and Sea Turtles
Southeast Shoal and Tail of the Banks	Defined as the area east of 51°W and south of 45°N, extending to the edge of the Grand Banks	• Offshore spawning area for capelin and sandlance, key prey species for marine mammals and birds. • High concentration of forage species draws large and diverse aggregations of seabirds and marine mammals, especially humpback whale and northern bottlenose whale. • In terms of fitness consequences, an important seasonal foraging area for seabirds and cetaceans.
Lilly Canyon-Carson Canyon	From 44.8°N to 45.6°N along the 200 m isobaths of the southeast slope of the Grand Bank	• Important seasonal refuge and feeding area for overwintering marine mammals, particularly along the edge of the shelf.
Northeast Shelf and Slope	Northeastern Grand Bank, starting at the nose of the Bank, from 48°W to 50°W, and from the edge of the shelf to the 1000 m isobath	• Moderate fitness consequences as a potentially important marine mammal feeding area. • Important areas for marine mammals, including harp seals around the Sackville Spur west, hooded seals around Sackville Spur east, and long-finned pilot whales throughout the EBSA.
Sources: Templeman (2007), DFO (2013b), Amec (2014), DFO (2016b)		

Critical habitat has been identified in the federal recovery strategies for the beluga (St. Lawrence Estuary population), northern bottlenose whale (Scotian Shelf population) and the North Atlantic right whale. The North Atlantic right whale's critical habitat is located in the Grand Manan Basin within the Bay of Fundy, and off southern Nova Scotia at Roseway Basin (DFO 2014a). Critical habitat for the beluga (St. Lawrence Estuary population) is restricted to the St. Lawrence estuary (DFO 2012a), and critical habitat for the northern bottlenose whale (Scotian Shelf population) is located in three deep underwater canyons off the southern coast of Nova Scotia, along the Scotian Shelf (DFO 2010a). Researchers have recently discovered at least 50 northern bottlenose whales in the Sackville Spur area; this significant find (in size, numbering 30 percent or more of the entire Scotian Shelf population) is thought to potentially represent a previously undiscovered population of the species (CBC 2016).

Recovery strategies identifying critical habitat are not currently available for the other species at risk reported in the Study Area. A study intended to aid in the identification and delineation of critical habitat for the blue whale is underway; recent studies have identified important feeding grounds in the estuary and Gulf of St. Lawrence, and these will be used to inform the identification of critical habitat areas (Beauchamp et al 2009; DFO 2016a).

DFO (2012b) observed three high-use feeding areas of the leatherback turtle: 1) waters east and southeast of Georges Bank, including the Northeast Channel near the southwestern boundary of the Canadian Exclusive Economic Zone; 2) the southeastern Gulf of St. Lawrence and waters off eastern Cape Breton Island, including Sydney Bight, the Cabot Strait, portions of the Magdalen Shallows and adjacent portions of the Laurentian Channel; and 3) waters south and east of the Burin Peninsula, Newfoundland, including parts of Placentia Bay. Information from the DFO tracking study is being used to inform the identification of critical habitat in a forthcoming amendment to the species' Recovery Strategy (DFO 2013b).

4.2.4 Special Areas

A number of marine and coastal areas in Newfoundland and Labrador have been designated as protected under provincial, federal and/or other legislation or agreements due to their ecological, historical or socio-cultural characteristics and importance. Other areas have been formally identified as being special or sensitive through other relevant processes and initiatives.

This section describes special areas in and around the Project Area and Study Area, as well as in other adjacent marine (offshore and coastal) areas of Eastern Newfoundland, in order to provide overall context and to illustrate the general proximity of the Project to these areas in the larger surrounding environment. The descriptions that follow are intended to be both general and concise, providing specific information on the relationship of these areas to the Project/Study Area that is the focus of this EA Report, as well as updating the information and mapping included in the Eastern Newfoundland SEA (Amec 2014, see Section 4.2.4). Overall information of the nature and definition of each type of special area and the processes for their identification and designation is also provided in the SEA, and is therefore not repeated here.

4.2.4.1 Canadian (Federally) Identified and Designated Areas

Various processes are used to identify and potentially protect marine and coastal ecosystems in Canada, as illustrated in the sections that follow.

Ecologically and Biologically Significant Areas

A number of EBSAs have been identified in marine areas of Eastern Newfoundland (Table 4.27; Figure 4.61). This identification and designation process and the specific rationales for identification of each of these EBSAs is discussed throughout Section 4.2 of the Eastern Newfoundland SEA (Amec 2014).

Table 4.27 EBSAs off Eastern Newfoundland

EBSA	Area
Northeast Shelf and Slope	13,885 km^2
Lilly Canyon-Carson Canyon	1,145 km^2
Southeast Shoal and Tail of the Banks	30,935 km^2
Virgin Rocks	6,843 km^2
Orphan Spur	21,569 km^2
Eastern Avalon Coast	1,683 km^2
Southwest Shelf Edge and Slope	16,644 km^2
Notre Dame Channel	6,222 km^2
Fogo Shelf	9,403 km^2
Smith Sound	148 km^2
Placentia Bay Extension	7,693 km^2
Gilbert Bay	359 km^2
Grey Islands	11,301 km^2
Labrador Slope	29,746 km^2
Labrador Marginal Trough	16,952 km^2
St. Pierre Bank	5,482 km^2
Laurentian Channel and Slope	17,140 km^2

EBSA	Area
Hamilton Inlet	11,038 km^2
Southern Pack Ice	n/a
Source: Templeman (2007); DFO (2013a); Amec (2014); DFO (2016b)	

Marine Protected Areas and Areas of Interest

Two Marine Protected Areas (MPAs) are located in Bonavista Bay and one is in Gilbert Bay, Labrador (Table 4.28; Figure 4.61), well outside of the proposed Project Area. Detailed information on the Eastport – Duck Islands and Round Island MPAs is provided in Section 4.2 of the Eastern Newfoundland SEA (Amec 2014). The Gilbert Bay MPA was established in 2005 to conserve one of the few coastal concentrations of northern cod in the Newfoundland region (DFO 2016c).

Table 4.28 MPAs in Newfoundland and Labrador

MPA	Area
Eastport – Duck Islands MPA	2.1 km^2 in total
Eastport-Round Island MPA	
Gilbert Bay MPA	60 km^2
Source: EMPAAC (2013); DFO (2016c)	

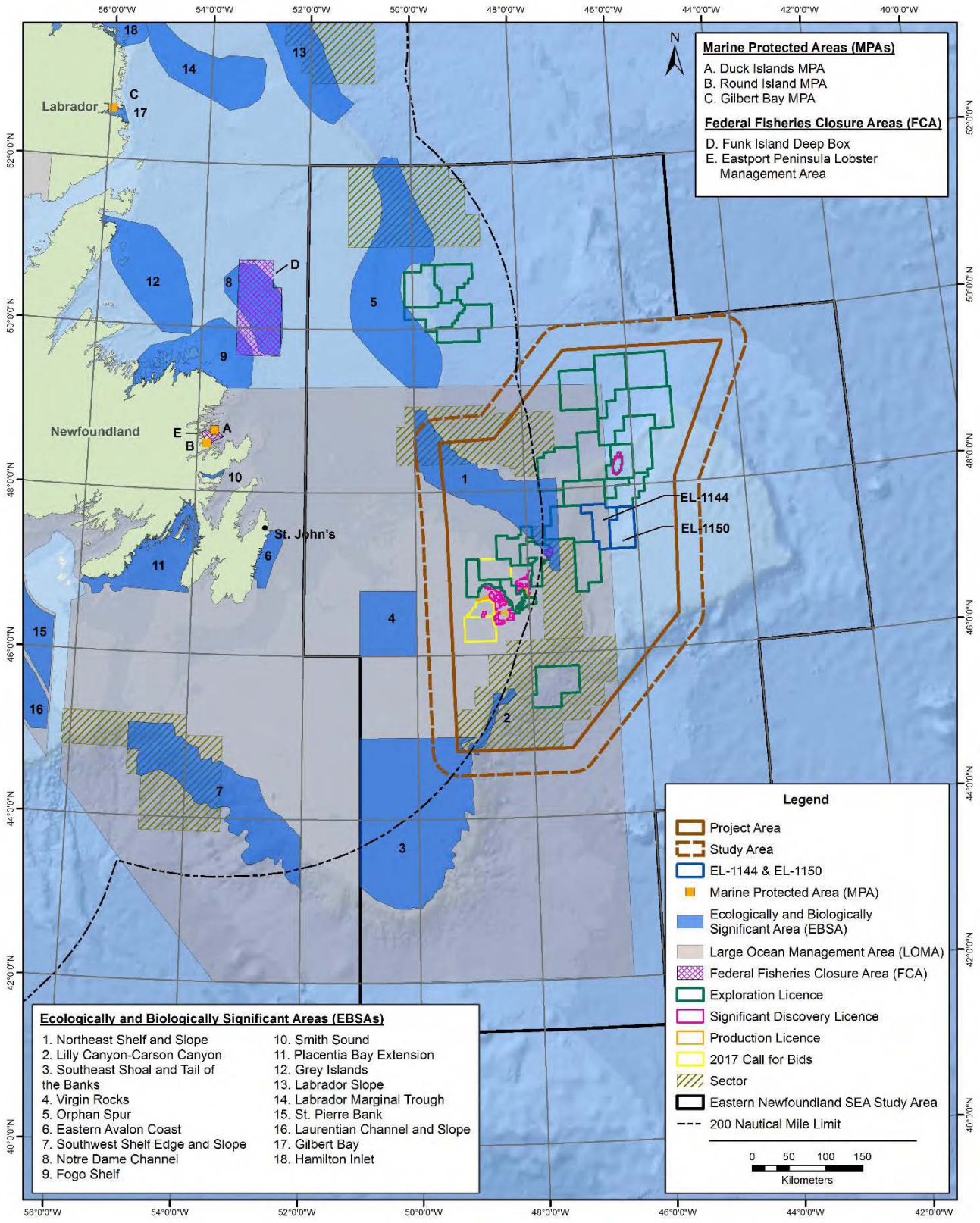
Fisheries Closure Areas within Canada's Exclusive Economic Zone

A number of marine areas off Eastern Newfoundland have been closed to particular types of fishing activities to protect and conserve productive fish and shellfish habitat for commercially important species (Table 4.29; Figure 4.61). Two of these fishing closure areas are located in coastal and nearshore areas of Eastern Newfoundland (EMPACC 2013; DFO 2017b).

Table 4.29 Federal Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Area
Eastport Peninsula Lobster Management Area	In 1995, Eastport Peninsula lobster fishers voluntarily limited lobster fishing in an area of Bonavista Bay to protect prime lobster habitat. In 1997, DFO provided protection through the *Fisheries Act* and designated two portions of the area as MPAs under the *Oceans Act*.	400 km^2
Funk Island Deep Box	In 2002, DFO closed (through the *Fisheries Act*) an area of the Funk Island Deep to gillnetting to protect bottom habitat. DFO also closed the area to small vessel bottom trawling in 2005. The fishing industry has voluntarily closed the area to the large vessel shrimp fleet.	7,272 km^2
Source: DFO (2007, 2014b); EMPAAC (2013)		

Figure 4.61 EBSAs, MPAs and Federal Fisheries Closure Areas off Eastern Newfoundland



National Marine Conservation Areas and Preliminary Representative Marine Areas

No National Marine Conservation Areas (NMCAs) have been designated in Newfoundland and Labrador (Parks Canada 2013). Preliminary Representative Marine Areas (RMAs) have been identified for study and may be established at NMCAs at a later date (Table 4.30; Figure 4.62). Please see Section 4.2.4 of the Eastern Newfoundland SEA for additional information on these areas and processes (Amec 2014).

Table 4.30 Preliminary RMAs off Eastern Newfoundland

Preliminary RMA	Rationale for Identification/Designation	Area
Virgin Rocks	Unique geological features and habitat. Important spawning habitat for Atlantic cod, American plaice and yellowtail flounder. Congregation area for capelin. Congregation and feeding area for seabirds. Large winter colonies of common eiders.	6,740 km^2
South Grand Bank Area	Relatively high coral species richness. High fish species richness. Significant groundfish biomass. Unique species biodiversity including seabirds, Fea's petrel and other rare birds. Feeding area for aggregations of seabirds, cetaceans and leatherback turtles.	18,201 km^2
Northwestern Conception Bay	Capelin spawn in high concentrations. Greatest abundance and diversity of seabird species in eastern North America. Largest seabird island and greatest diversity of breeding seabirds in the province. Largest Leach's storm petrel breeding colony in the world. One of six known breeding colonies of Northern Gannets in North America. One of four islands in Eastern Canada where northern fulmars breed.	608 km^2
Southern Coast of Burin Peninsula and Southeastern Placentia Bay	Globally significant concentrations of seabirds such as Leach's storm petrel. Largest concentration of nesting Manx shearwaters in North America and the only North American location where the species nests regularly. Other seabirds and gulls nest in the area.	1,357 km^2
Source: CPAWS (2009); Amec (2014)		

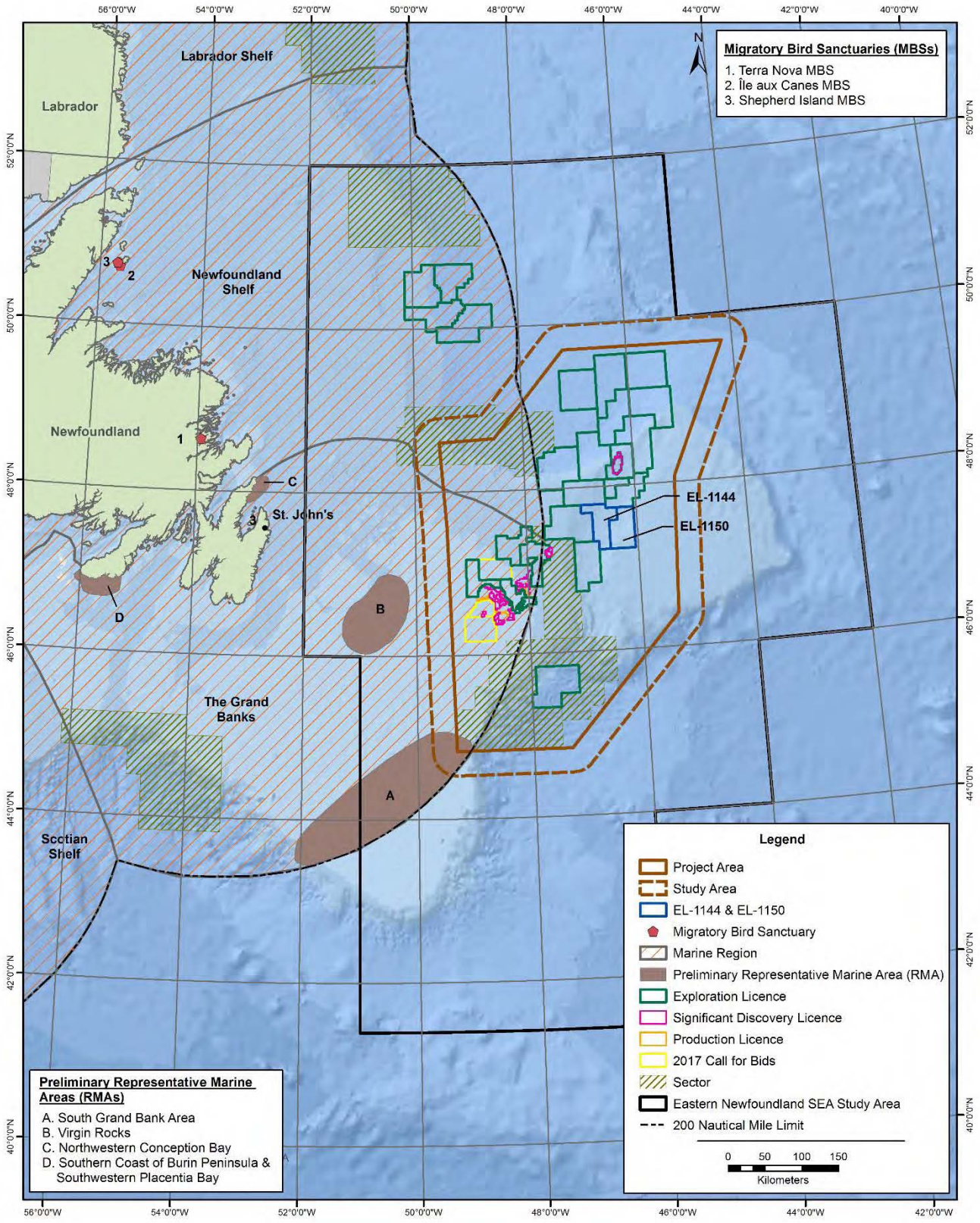
National Wildlife Areas, Marine Wildlife Areas and MBSs

No National Wildlife Areas (NWA) or Marine National Wildlife Areas (MWAs) have been established in Newfoundland and Labrador (Environment Canada 2016). Three MBSs are located in the province (GOC 2010) (Figure 4.62 and Table 4.31). The Terra Nova MBS is presented in Section 4.2.4 of the Eastern Newfoundland SEA (Amec 2014). The Île aux Canes and Shepherd Island MBSs, located off the east coast of the Northern Peninsula, together protect one of the largest breeding sites for the common eider in insular Newfoundland.

Table 4.31 MBSs in Newfoundland and Labrador

MBS	Area
Terra Nova	12 km^2
Île aux Canes	1.62 km^2
Shepherd Island	0.18 km^2
Source: Environment Canada (2016)	

Figure 4.62 Preliminary RMAs and MBSs in Eastern Newfoundland



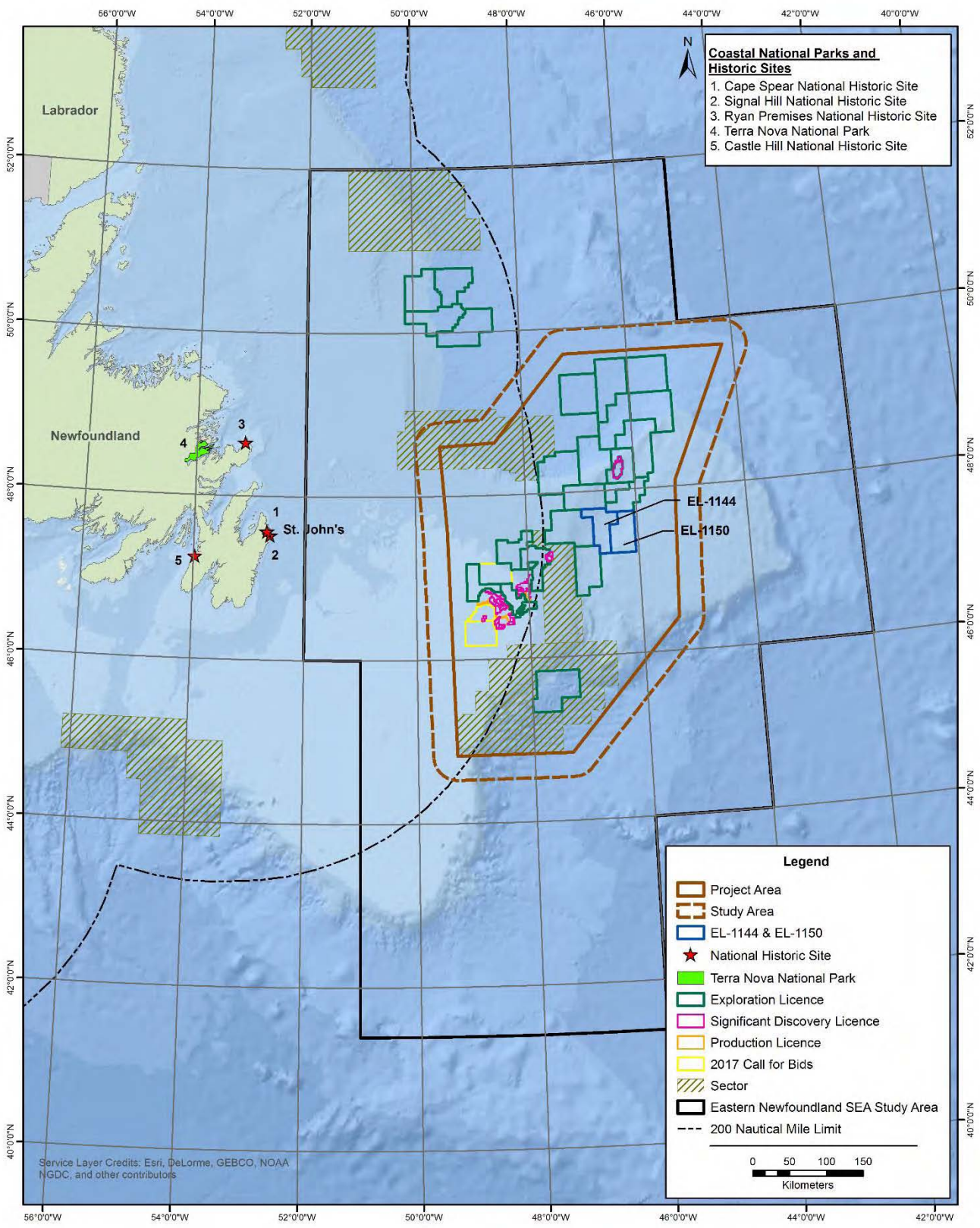
National Parks and Historic Sites

Gros Morne and Terra Nova National Parks are located on the Island of Newfoundland, while the Torngat Mountains National Park and Mealy Mountains National Park Reserve are located in Labrador (Parks Canada 2009). Terra Nova National Park, along with various National Historic Sites (NHSs), are located in coastal areas of Eastern Newfoundland (Parks Canada 2016), each of which is far removed from the proposed Project Area (Table 4.32 and Figure 4.63). The key characteristics and ecological/socio-cultural importance of these sites are discussed in Section 4.2.4 of the Eastern Newfoundland SEA (Amec 2014).

Table 4.32 Coastal National Parks and Historic Sites in Eastern Newfoundland

Park/National Historic Site
Cape Spear National Historic Site
Signal Hill National Historic Site
Ryan Premises National Historic Site
Terra Nova National Park
Castle Hill National Historic Site
Source: Amec (2014); Parks Canada (2008, 2016)

Figure 4.63 Coastal National Parks and National Historic Sites in Eastern Newfoundland



4.2.4.2 Provincially Identified Areas

The Government of Newfoundland and Labrador establishes a number of types of protected areas, including wilderness and ecological reserves, wildlife reserves, provincial parks and nature parks (DOEC 2016a). Please see Section 4.2.4 of the Eastern Newfoundland SEA for a description of the legislation and processes that apply to the identification and designation of these special areas in Newfoundland and Labrador (Amec 2014).

Provincial Wilderness and Ecological Reserves

No Provincial wilderness reserves are located in coastal areas of Eastern Newfoundland. Coastal ecological reserves found in this region include five seabird ecological reserves and two fossil ecological reserves (Table 4.33 and Figure 4.64). In 2015 the Lawn Islands Archipelago Provisional Seabird Ecological Reserve received full status and became the Lawn Bay Seabird Ecological Reserve (DOEC 2016b). The United Nations Educational, Scientific and Cultural Organization (UNESCO) has designated Mistaken Point as a World Heritage Site (UNESCO 2016).

Table 4.33 Coastal Provincial Ecological Reserves in Eastern Newfoundland

Reserve	Area
Baccalieu Island Seabird Ecological Reserve	22.9 km^2
Witless Bay Seabird Ecological Reserve	30.5 km^2 on four islands
Mistaken Point Fossil Ecological Reserve	5.7 km^2
Funk Island Seabird Ecological Reserve	5.4 km^2
Cape St. Mary's Seabird Ecological Reserve	66.8 km^2
Lawn Bay Seabird Ecological Reserve	3.8 km^2 on three islands
Fortune Head Fossil Ecological Reserve	2.4 km^2
Sources: Amec (2014); DOEC (2016b); UNESCO (2016)	

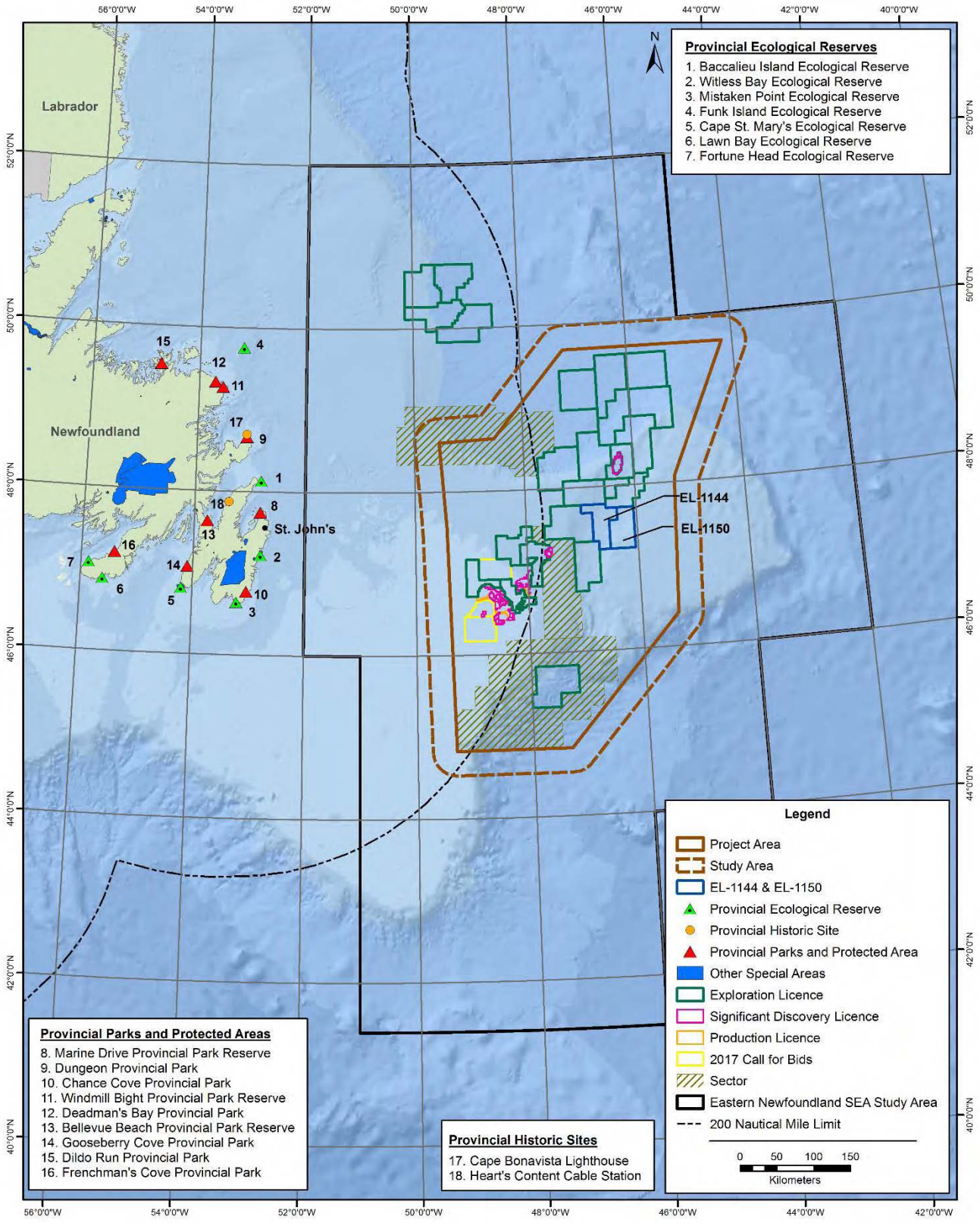
Provincial Parks and Protected Areas

Provincial parks and protected areas located in coastal areas of Eastern Newfoundland are listed and described in Table 4.34 and illustrated in Figure 4.64 (DOEC 2016c). These parks and protected areas are described in detail in in Section 4.2.4 of the Eastern Newfoundland SEA.

Table 4.34 Coastal Provincial Parks and Protected Areas in Eastern Newfoundland

Park/Protected Area	Area
Marine Drive Provincial Park Reserve	6.17 km^2
Dungeon Provincial Park	0.02 km^2
Chance Cove Provincial Park	20.68 km^2
Windmill Bight Provincial Park Reserve	2.86 km^2
Bellevue Beach Provincial Park Reserve	1.16 km^2
Deadman's Bay Provincial Park	0.70 km^2
Gooseberry Cove Provincial Park	0.05 km^2
Dildo Run Provincial Park	3.28 km^2
Frenchman's Cove Provincial Park	0.51 km^2
Source: DOEC (2016b)	

Figure 4.64 Coastal Provincial Protected and Special Areas in Eastern Newfoundland



Provincial Historic Sites

Provincial Historic Sites are designated as such because of their historical or architectural significance. A number of these sites are found in coastal areas of Eastern Newfoundland (Table 4.35; Figure 4.64).

Table 4.35 Coastal Provincial Historic Sites in Eastern Newfoundland

Historic Site	Rationale for Identification/Designation
Cape Bonavista Lighthouse	Historic lighthouse, built in 1843, includes traditional seal oil fueled catoptric light apparatus used in the 1800s. Also demonstrates the work of light keepers of the period.
Heart's Content Cable Station	The first permanent telegraph cable between Europe and North America was connected at this site in 1866. Displays communications technology used until the 1960s.
Source: DBTCRD (2016)	

4.2.4.3 Internationally Identified Areas

In addition to special areas identified and designated under applicable Canadian (federal and/or provincial) legislation and processes, a number of areas have also been identified under international jurisdictions. In addition, some coastal and inland areas of Eastern Newfoundland have been identified as globally, continentally or nationally significant wildlife habitats.

Vulnerable Marine Ecosystems

Nine VMEs containing VME indicator species and features have been identified within NAFO regulatory footprint off Eastern Newfoundland (WG-EAFM 2008; WWF 2012; FAO 2016a). These are summarized in Table 4.36 and illustrated in Figure 4.65. Please see Section 4.2.4 of the Eastern Newfoundland SEA for a description of the processes that apply to the identification and designation of these VMEs (Amec 2014).

Table 4.36 VMEs off Eastern Newfoundland

VME	Rationale for Identification/Designation	Approximate Area
Southern Flemish Pass to Eastern Canyons	Large gorgonians and high density of sponges. Vulnerable fish species: striped wolffish, redfish, spiny tailed skate, northern wolffish, some black dogfish, deep sea cat shark.	7,928 km^2
Northern Flemish Cap	High density of sea pens, soft corals and black corals and, to a lesser extent, solitary stony corals and small gorgonians. Vulnerable fish species: northern wolffish and spiny dogfish.	6,650 km^2
Sackville Spur	High density of sponges.	3,961 km^2
Northeast Shelf and Slope (within Canadian EEZ)	Abundance of gorgonian and black corals.	4,150 km^2
Beothuk Knoll	Abundant gorgonian corals and high density of sponges. Vulnerable fish species: northern wolffish, spiny tailed skate, roundnose grenadier, deep sea cat shark, black dogfish.	6,685 km^2
Deep Water Coral Area	An area where VMEs for deep-water corals are thought to be likely.	1,502 km^2

VME	Rationale for Identification/Designation	Approximate Area
Flemish Cap East	Large gorgonians and high density of sponges. Vulnerable fish species: black dogfish and smooth skate.	2,098 km^2
South East Shoal and Adjacent Shelf Edge/Canyons	Unique spawning grounds on South East Shoal, marine mammal feeding grounds, long-lived and relict bivalve populations in sandy shoal habitat. Vulnerable fish species: spawning capelin, northern wolffish, redfish, striped and spotted wolffish, roundnose grenadier, black dogfish.	11,930 km^2
Division 3O Coral Closure Area	Existing closure based on coral concentrations, high density of sea pens and solitary stony corals. Vulnerable fish species: white hake, redfish, black dogfish, smooth skate and deep-sea cat shark.	16,877 km^2
Source: WG-EAFM (2008)		

NAFO Fisheries Closure Areas

Approximately 380,511 km^2 (15 percent) of the NAFO Regulatory Area (see Section 4.3.1 of this EA Report) is closed to bottom fishing (NAFO 2016a; WG-EAFFM 2016; NAFO 2017b) (Table 4.37 and Figure 4.66). NAFO FCAs are discussed throughout Section 4.2 of the Eastern Newfoundland SEA (Amec 2014).

Table 4.37 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Area
NAFO Coral Closures	• Northern Flemish Cap (7), Northern Flemish Cap (8), Northern Flemish Cap (9), Northwest Flemish Cap (10), Northwest Flemish Cap (11), Northwest Flemish Cap (12) • Closed to protect high coral and sponge concentrations	Total of 898 km^2
Beothuk Knoll (3)	• Closed to protect high coral and sponge concentrations	309 km^2
Beothuk Knoll (13)		340 km^2
Northeast Flemish Cap (5)		2,892 km^2
Eastern Flemish Cap (14)		239 km^2
Eastern Flemish Cap (4)		1,563 km^2
Tail of the Bank (1)		144 km^2
Sackville Spur (6)		992 km^2
3O Coral Area Closure	• Closed to protect corals	13,995 km^2
Flemish Pass/Eastern Canyon (2)	• Closed to protect extensive sponge grounds	5,418 km^2
Orphan Knoll Seamount	• Closed to protect seamounts	15,815 km^2
Newfoundland Seamounts		15,494 km^2
Fogo Seamounts (1)		4,522 km^2
Fogo Seamounts (2)		4,616 km^2
Source: NAFO (2015, 2016a, 2016b); FAO (2016b)		

Figure 4.65 VMEs off Eastern Newfoundland

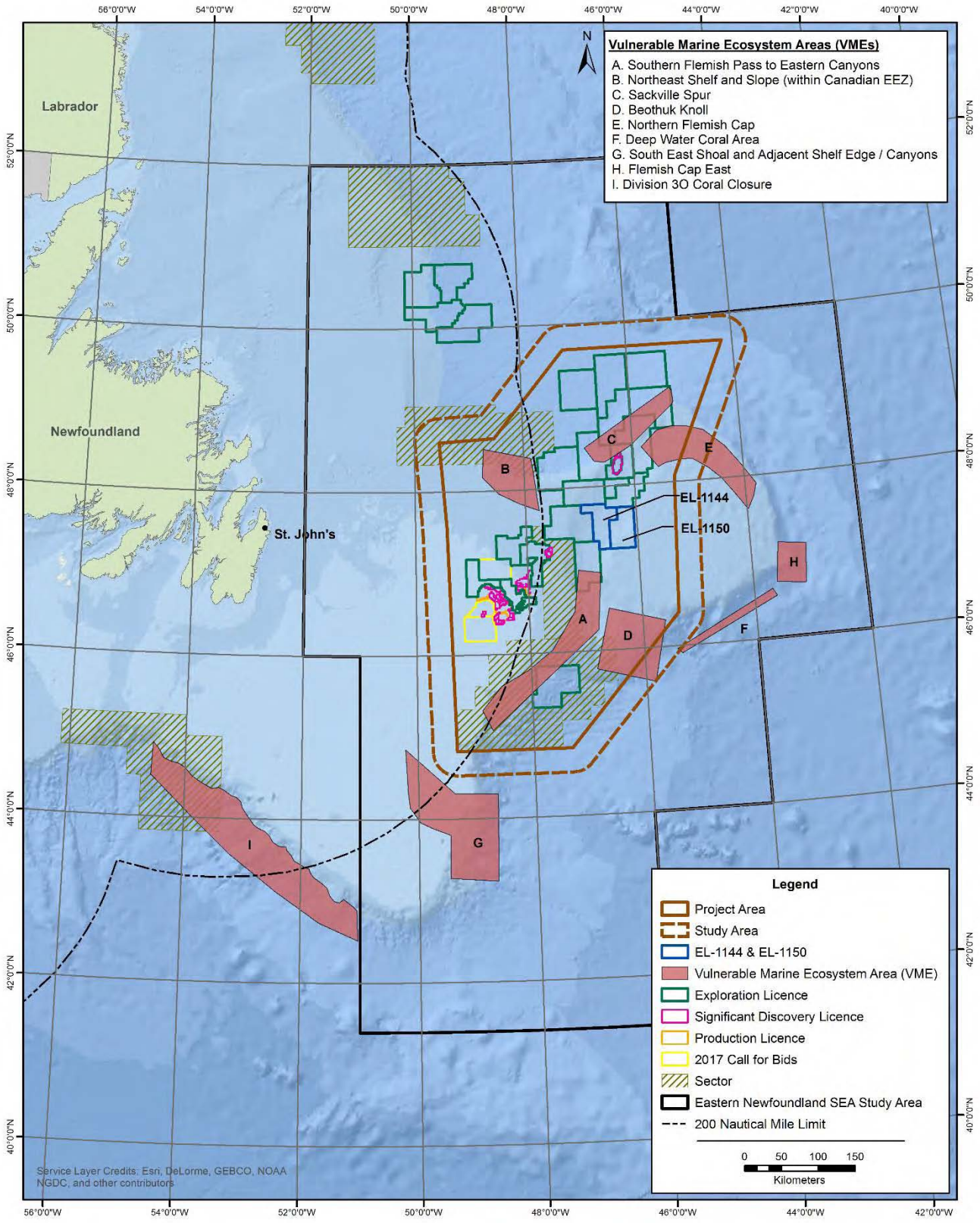
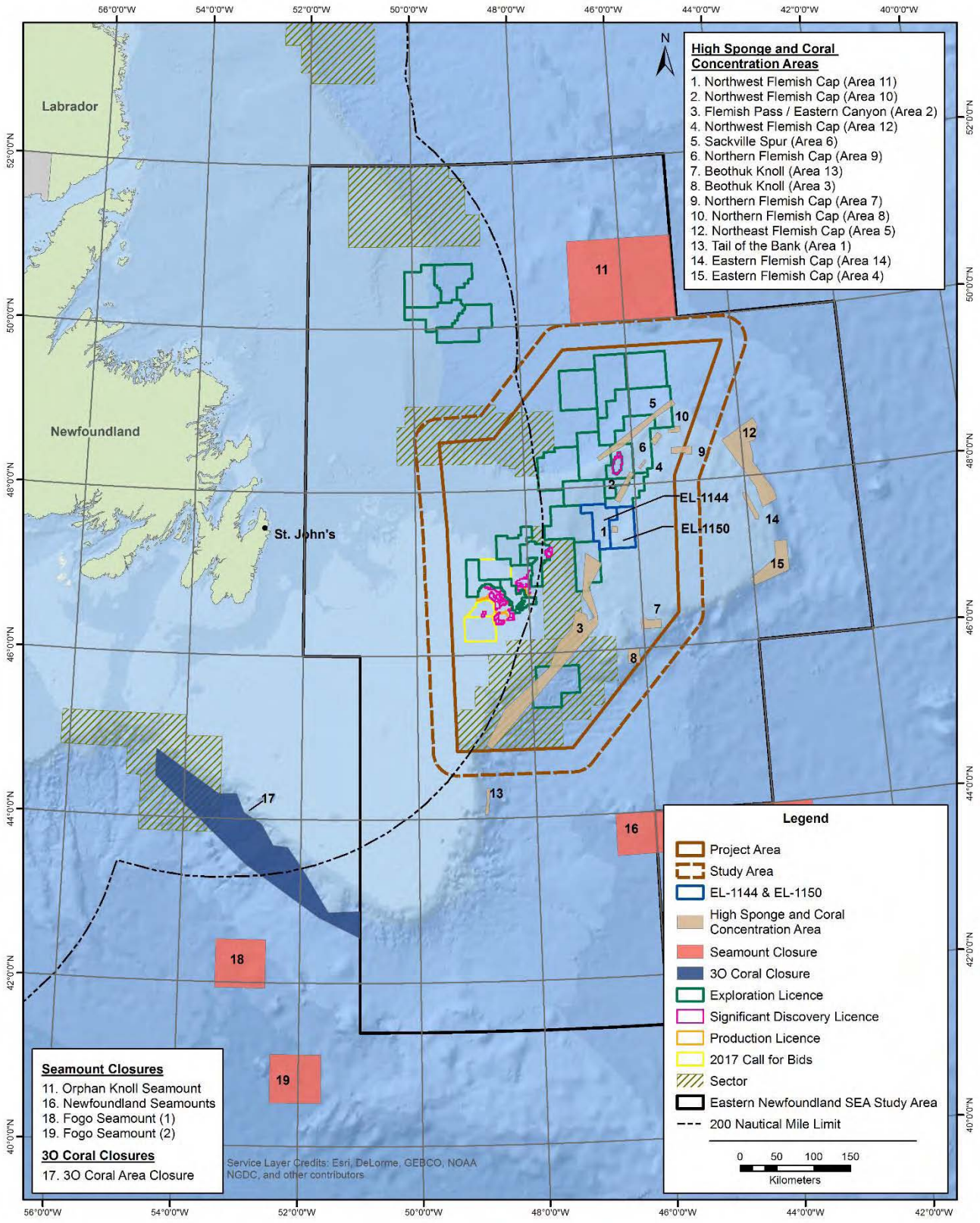


Figure 4.66 NAFO Fisheries Closure Areas off Eastern Newfoundland



4.2.4.4 Other Identified Special Areas

Canada is signatory to various international conventions, some of which identify important wildlife habitats in coastal and marine areas. A number of these have been designated as important bird habitats and may be protected in whole or in part through applicable provincial and national legislation.

Important Bird Areas

A number of IBAs have been identified in coastal areas of Eastern Newfoundland (IBA 2016; Environment Canada 2010). These areas are listed in Table 4.38 and illustrated in Figure 4.67. The IBAs outlined in this section are described in detail in Section 4.2 of the Eastern Newfoundland SEA (Amec 2014).

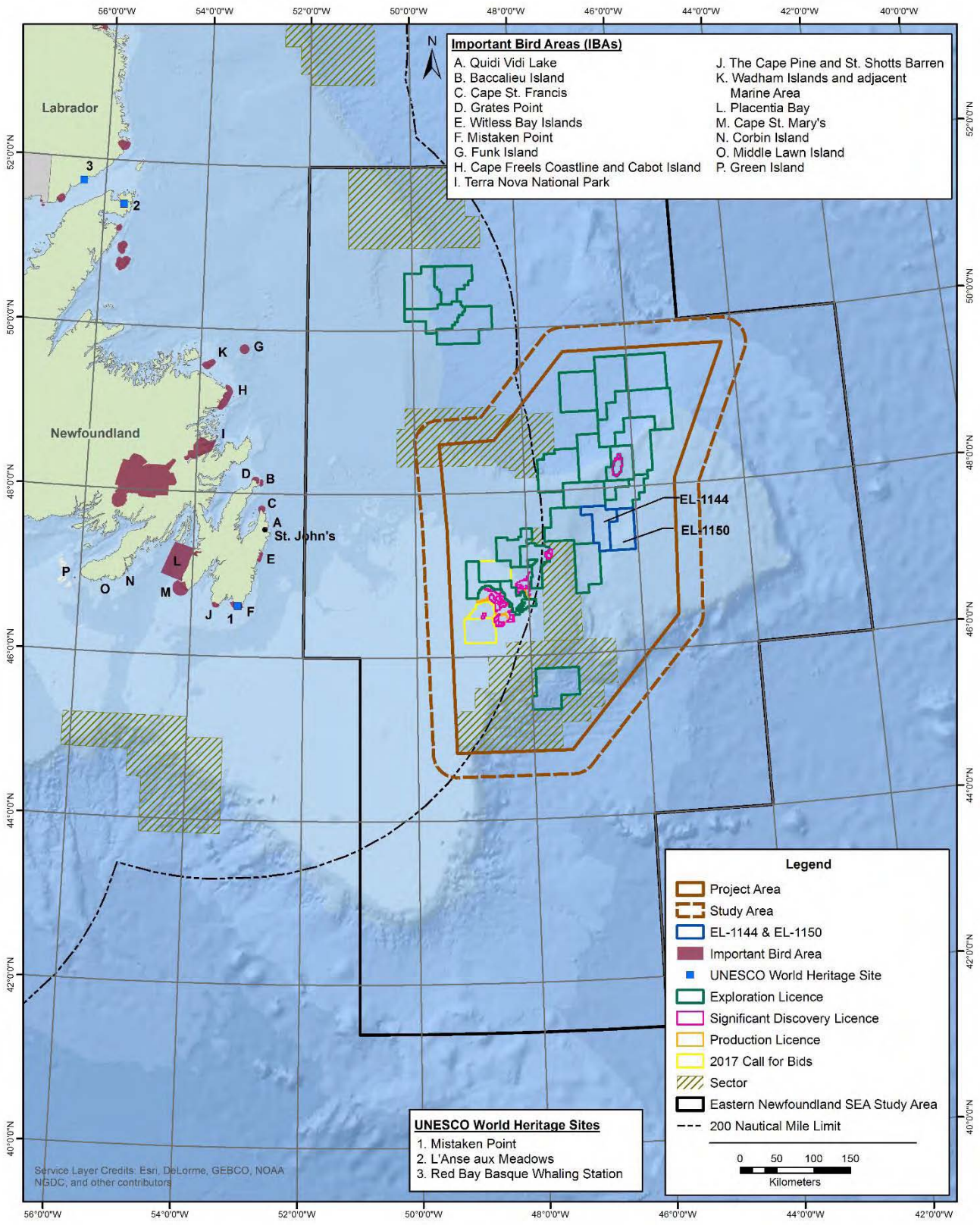
Table 4.38 Coastal IBAs in Eastern Newfoundland

IBA	Area
Quidi Vidi Lake	7 km^2
Cape St. Francis	70.2 km^2
Baccalieu Island	45.2 km^2
Witless Bay Islands	62 km^2
Grates Point	66.5 km^2
Mistaken Point	102.8 km^2
Funk Island	135.2 km^2
Cape Freels Coastline and Cabot Island	334.5 km^2
Terra Nova National Park	655.8 km^2
Cape Pine and St. Shotts Barren	57.4 km^2
Placentia Bay	1398.9 km^2
Wadham Islands and adjacent Marine Area	159.3 km^2
Cape St. Mary's	329.6 km^2
Corbin Island	5.3 km^2
Middle Lawn Island	4.2 km^2
Green Island	5.6 km^2
Source: Amec (2014); IBA (2016)	

UNESCO World Heritage Sites

Newfoundland and Labrador has four United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites, which are managed by the Federal or Provincial Governments. These include Red Bay Basque Whaling Station National Historic Site (3.13 km^2) in Labrador, L'Anse aux Meadows National Historic Site (80.56 km^2) on the Northern Peninsula, Gros Morne National Park (1,805 km^2) also on the Northern Peninsula and Mistaken Point Provincial Ecological Reserve (1.46 km^2) on the southeastern tip of the Avalon Peninsula (UNESCO WHC 2017) (Figure 4.67).

Figure 4.67 Coastal IBAs in Eastern Newfoundland



4.3 Socioeconomic Environment

The following sections provide an overview of the existing socioeconomic environment of the Study Area, including anthropogenic components and activities that occur in the region and which may potentially interact with the proposed Project.

4.3.1 Marine Fisheries

This section describes the existing and historical commercial fisheries within the EA Study Area. These include various Canadian domestic fisheries, primarily on or adjacent to the continental shelf and slope, and foreign (non-Canadian) fisheries outside Canada's 200-nautical-mile EEZ. In addition to these wild/capture fisheries, the section identifies commercial aquaculture operations which occur in coastal settings to the west, outside the Study Area, as well as any Aboriginal fisheries in the region and discusses the potential for recreational fishing activity in or near the Study Area.

Marine fisheries operating within the Study Area and elsewhere off Newfoundland and Labrador are important in terms of levels of activity, employment and overall economic value. These offshore fisheries are also important socially, and are integrally linked to the region's industrial and cultural history dating back more than 500 years. While specific numbers are not available for the fishing enterprises or fishers who are dependent in some way on Study Area resources, province-wide in Newfoundland and Labrador the sector employed some 9,300 fishers and an additional 7,700 workers in the on-shore processing sector in 2015 (GNL 2016). In addition, commercial harvesters from other Atlantic Provinces may be operating in the Study Area at some time during the year.

Beyond the EEZ, fishing enterprises from several other nations currently – and historically – share the waters with Canadian vessels on and near the margins and slopes of the Grand Banks (particularly the "Nose" and "Tail") and the Flemish Cap. While international shipping also navigates the area (see Section 4.3.2), these activities are transient and do not depend on the area's natural resources.

4.3.1.1 Management Regimes and Administrative Boundaries

The EA Study Area overlaps with two principal fisheries management zones. Canada (through the DFO) has management and regulatory responsibility for fish stocks and fishing activity within most of its EEZ and for certain "sedentary species" - mainly snow crab (also known as queen crab), lobster and clams - over the entire Canadian continental shelf. By international Convention, the NAFO participates in the management of some species in part of the Canadian EEZ which is within its designated Convention Area and regulates most fisheries in a subarea defined as the NAFO Regulatory Area (NRA). The NRA is specifically "that part of the Convention Area which lies beyond the areas in which Coastal States exercise fisheries jurisdiction" (i.e. outside of any state's EEZ, see Figure 4.68) (NAFO 2004). These multinational fisheries are described in Section 4.3.1.8, below.

As Figures 4.68 and 4.69 indicate, the Convention Area is further subdivided, for administrative and management purposes, into various Divisions/Subdivisions and Unit Areas. DFO also utilizes these areas in its management and regulatory regimes, and most of the fisheries descriptions that follow reference them. They are also used in the fisheries data analysis for this EA. Specifically, the Study Area overlaps

with parts of NAFO Divisions 3K, 3L, 3M and 3N, and with all or parts of Unit Areas 3Kk, 3Ld, 3Le, 3Lh, 3Li, 3Lr, 3Lt, 3Ma, 3Mb, 3Mc, 3Md, 3Na, 3Nb and 3Nd (the Study Area Unit Areas) [2], as shown.

4.3.1.2 Key Information Sources

This Marine Fisheries section utilizes information from several different sources, most published by DFO, NAFO and related agencies (such as the Canadian Science Advisory Secretariat), including fisheries management plans, science advisory reports, quota reports and other documents, as referenced in the text, as well as personal communications from key informants. Information about aquaculture is based on Newfoundland and Labrador Department of Fisheries and Land Resources sources. Other important sources are various sets of statistical data which report catch quantities, values and location (at varying degrees of geographical resolution), by species and month and/or year.

For the commercial harvesting data presented in the following sections, four discrete sets are used, each with a different degree of resolution and statistical completeness. The historical (1985-2009) harvesting graphs and tables in Section 4.3.1.3 utilize datasets provided by DFO before 2010. These are complete and allow a precise reporting of the harvesting quantity for each species harvested in any area of interest in the region and landed in a Canadian port, year by year and month by month (DFO 1985-2009). These datasets record both domestic and foreign fish harvests landed in Canada. The most recently available quantity and value data provided by DFO (for 2010-2015), used for the description of recent/current fisheries (Section 4.3.1.4) and the basis for the associated graphs and tables, contain similar information but are less complete owing to redaction of quantity and value data to meet more recent confidentiality requirements, particularly in the most recent years reported. Overall, these latest data provided by DFO (in January 2017) are estimated to suppress approximately 15 to 20 percent of the actual total quantity and value of the harvest (DFO 2010-2015a). [3] A further DFO dataset is used for the maps depicting harvesting locations. This was provided by DFO as an aggregated set which gives a general indication of locations (by year, month, species, gear types and other categories) but with no specific quantities or values attached, for a series of “cells” that are approximately 6 x 4 nautical miles in size (DFO 2010-2015b).

Multinational fisheries data are derived from NAFO statistical datasets but these are only accessible at the much larger NAFO Division level, so that the information is much less geographically resolved than the Unit-Area-level analysis for domestic landings in this EA. These Divisional data (quantities only) are based on NAFO’s STATLANT 21 database which allow organization and/or aggregation by Division, signatory nation, species and year (NAFO 2017a). Mapping of areas of multinational fishing effort is also derived from NAFO-provided data, as cited in the descriptions. For the analysis in that section all NAFO data for Divisions 3L and 3M are utilized.[4] All quantities in these sections are in metric tonnes. All values are in current (unadjusted) Canadian dollars.

2 Two Unit Areas (3Kg and 3Ne) which have minor intersections with the Study Area, but not the Project Area, have been excluded from the Study Area Unit Areas used for the following analysis. This is because nearly all the recorded harvesting in these UAs typically occurs outside the Study Area limits, and therefore would unduly skew the data presented to characterise the Study Area fisheries.

3 This estimate is based on a comparison of the totals from the 2015 database provided by DFO to the aggregated totals for the relevant areas provided separately by DFO. Note that these redactions do not necessarily apply equally across all species or harvesting areas.

4 Although Divisions 3K and 3N have overlap with the Study Area they are not used in the foreign fisheries analysis because little of the foreign fisheries occur within them (see NAFO “Footprint”, described in later section). Including all fisheries in these Divisions would inaccurately skew the data and the analysis presented.

Figure 4.68 NAFO Convention Area, NRA and Divisions

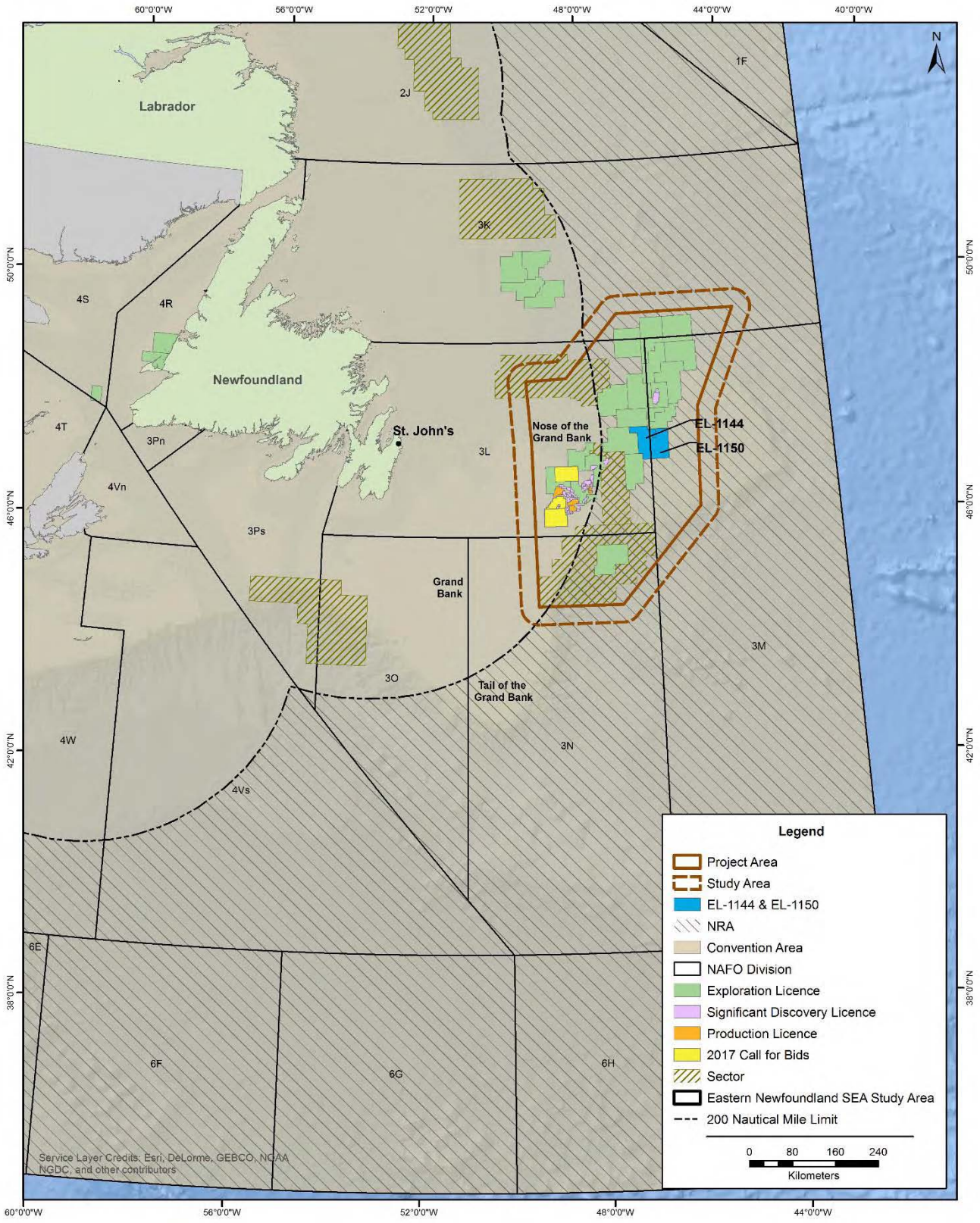
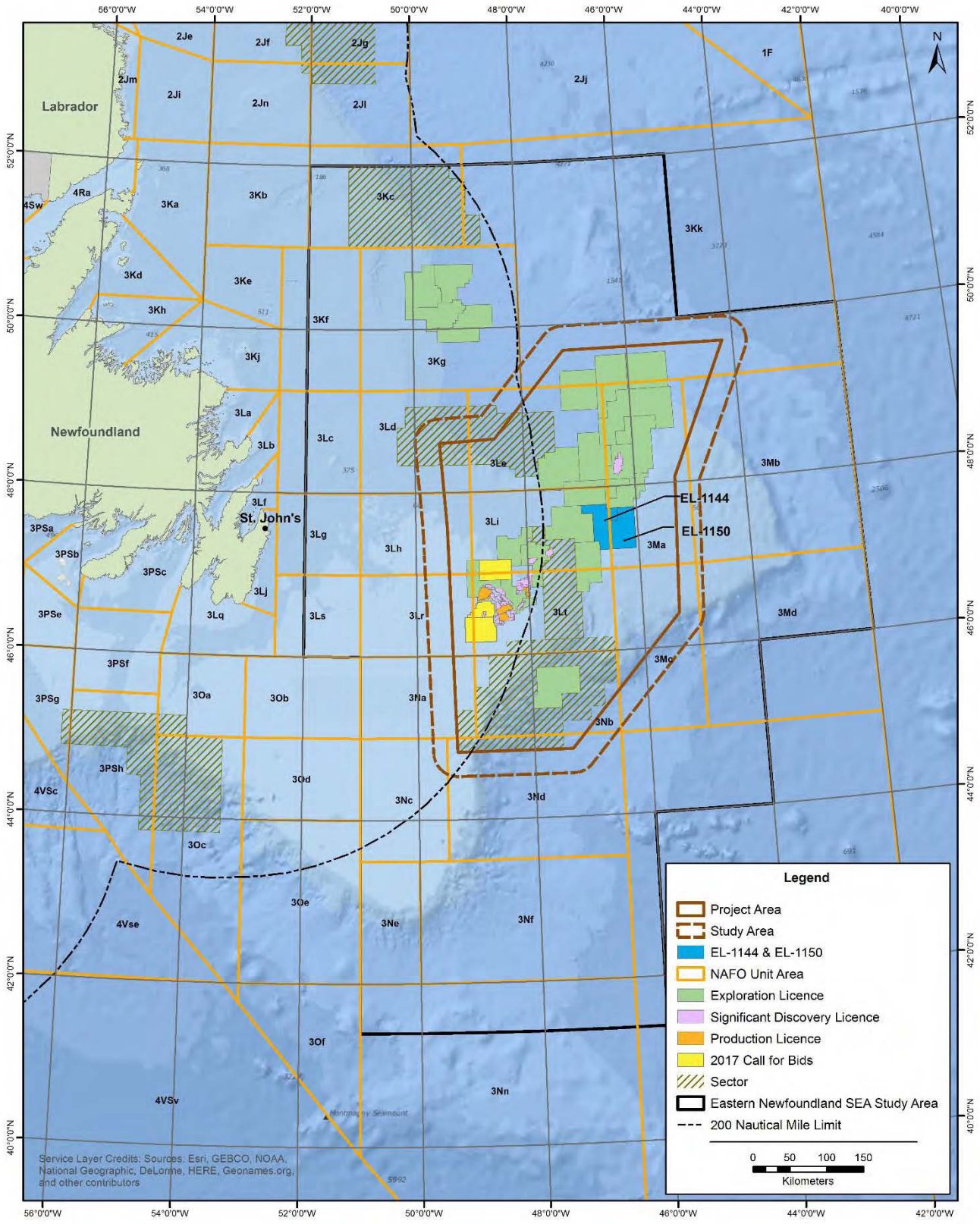


Figure 4.69 NAFO Unit Areas



4.3.1.3 Overview of Past Commercial (Domestic) Fisheries

The following provides a summary of historical fisheries within the Study Area Unit Areas for the 25-year period 1985 to 2009. This is important in order to understand the substantial changes in harvesting that occurred in the Atlantic Canadian fisheries – the Study Area included – during this period. The history is relevant to the present EA since, if groundfish (demersal) stocks improve sufficiently, fisheries more like the historic species mix and levels of effort might occur within the temporal scope of this EA.

Figure 4.70 indicates the overall decline in harvesting that began in the early 1990s owing to declining stocks and, in 1992, the imposition by DFO of a moratorium on the harvesting of Atlantic cod and several other groundfish species. As the data show, the fisheries in most of the Study Area Unit Areas were dominated by groundfish harvesting until the early 1990s. This was primarily Atlantic cod but included American plaice and a few other species. In 1992, with increasing evidence that several stocks had reached an unsustainably low level, a fishing moratorium was declared and directed fisheries for cod were halted. After that, with increased fishing effort, new markets and increasing shellfish populations – mainly northern shrimp and snow crab – came to replace traditional groundfish species in the Study Area, as they have in many other parts of Atlantic Canada (Figure 4.71). Consequently, the fisheries “mix” in the area changed from almost exclusively groundfish to predominantly shellfish after 1992. This is reflected in the catch composition presented in Figures 4.72 and 4.73, for 1985 compared to 2009. With the exception of the area’s Northern Shrimp fishery, which has been recently placed under closure (discussed below), Figure 4.73 represents harvesting that is more typical of the current situation.

Although overall harvest quantities declined, as did the number of fish harvesters in the province, the landed value of the overall catch in Newfoundland and Labrador has remained relatively steady, or increased in some cases, owing to the higher-value species pursued after 1992. For instance, the landed value of snow crab in Newfoundland and Labrador increased from under $13 million in 1992 to nearly $180 million in 2008 (DFO 2010b). Similarly, the landed value of northern shrimp increased from approximately $230 million in 1997 to $350 million in 2005 (DFO 2010c). These trends are described in the overview of historic fisheries and associated catch statistics presented in recent SEAs and EAs that cover the Study Area (eg, Amec 2014).

Note that in the following historic fisheries graphs, only quantities of catch are presented as these are more directly comparable than economic values (particularly over many years) since the latter data reflect several factors other than resource availability or fishing effort. Value differences often occur from year to year simply because of price fluctuations determined by a variety of external market factors, including international exchange rates, demand and market competition.

Figure 4.70 All Species: Study Area Unit Areas Quantity of Harvest by Year, 1985-2009

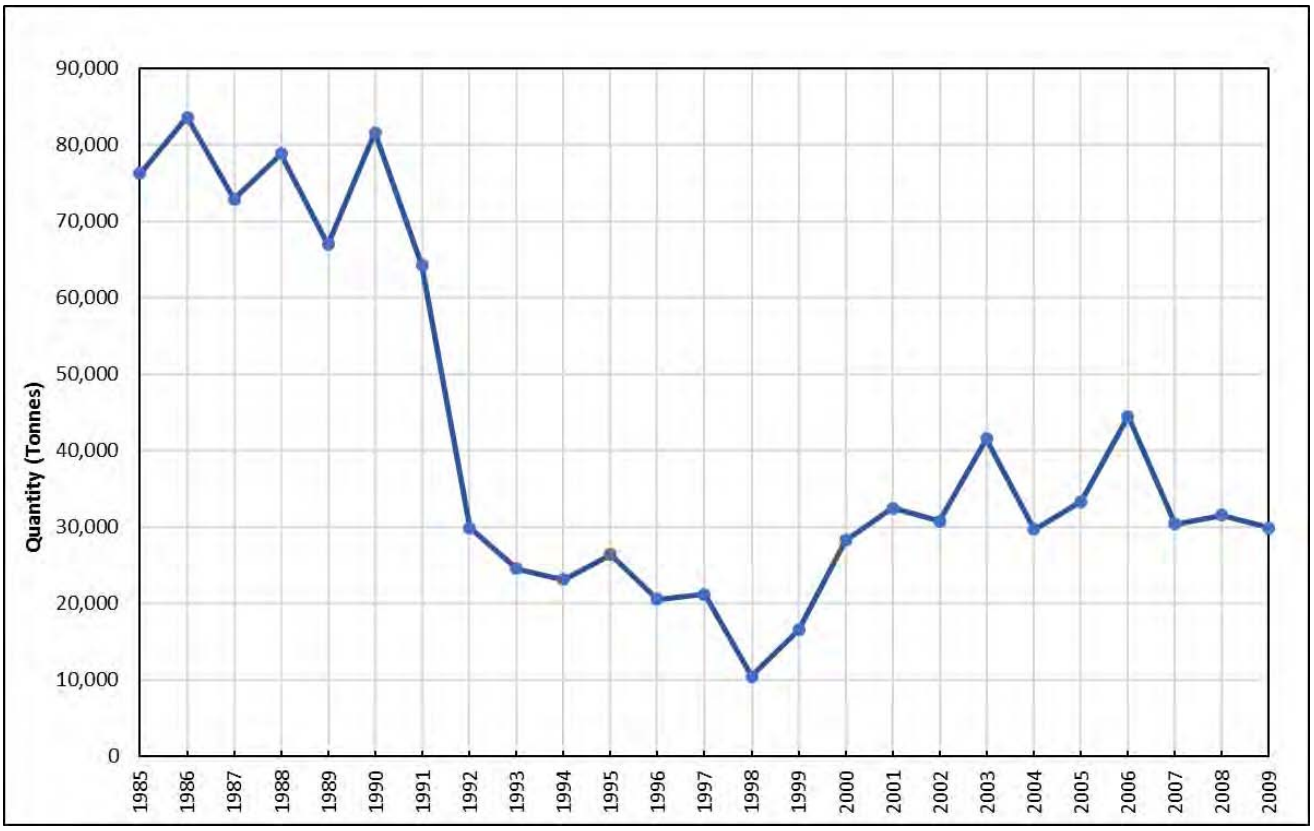


Figure 4.71 Groundfish vs Other Species, Study Area Unit Areas Quantity of Harvest by Year, 1985-2009

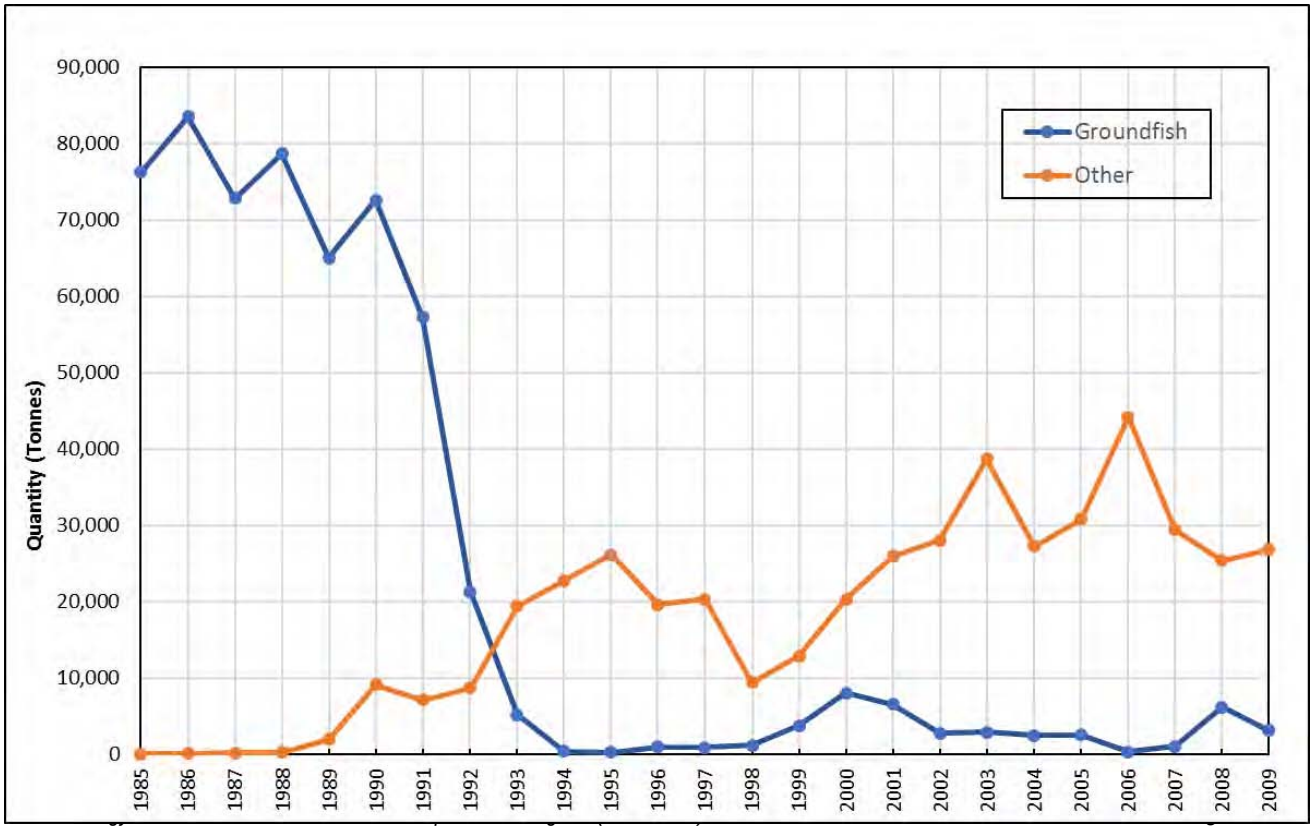


Figure 4.72 Species Composition of Harvest by Quantity, Study Area Unit Areas 1985

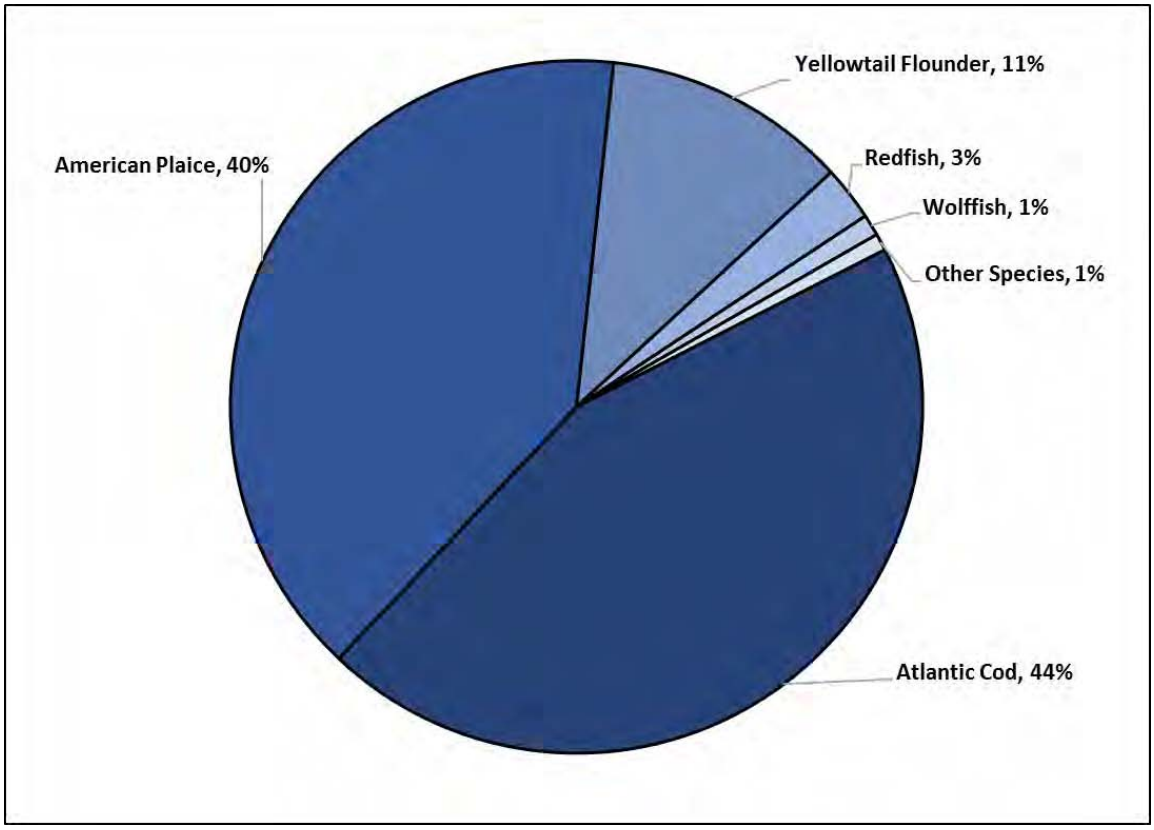


Figure 4.73 Species Composition of Harvest by Quantity, Study Area Unit Areas 2009