4.2.2 Marine / Migratory Birds

This section summarizes the distribution and abundance of marine and other migratory birds in the Study Area, including avian species at risk.

The nutrient-rich Grand Banks and Flemish Cap regions of the Study Area serve as a major feeding area for dozens of marine bird species throughout the year, particularly during the summer months. The eastern coast of Newfoundland is home to several major colonies supporting tens of millions of seabirds, which travel long distances offshore from their nest sites to forage for themselves and their chicks. Eastern Newfoundland is home to many designated Important Bird Areas (IBAs) which provide important habitat for nationally and/or globally significant numbers of birds and/or for avian species at risk, and there are various other sites of provincial and regional significance to birds in proximity to the Project Area. Although none of these areas or sites occurs within the Project Area, many bird species that make use of these designated habitats spend some of their time in the Project Area.

Information on marine and migratory bird species that may occur in the Project Area was obtained from several sources, including the Eastern Canada Seabirds at Sea (ECSAS) ongoing monitoring program, eBird and the Atlantic Canada Shorebird Survey (ACSS).

4.2.2.1 Seabirds

Seabirds are relatively long-lived avifauna species with low fecundity, delayed recruitment and low rates of population growth. They are key indicators of ecosystem health, and are also important in terms of tourism, particularly in the Witless Bay and Cape St. Mary's Ecological Reserves, and as a food source (particularly murres, known locally as "turrs"). A variety of seabird species occur in the marine waters of the Study Area, including cormorants, gannets, phalaropes, gulls, terns, alcids, jaegers and skuas, fulmars, petrels and shearwaters, which are described in Table 4.9. Seabirds occur year-round in offshore waters, and are present at colonies on the eastern coast of Newfoundland throughout much of the year, with Black-legged Kittiwakes arriving as early as February and Northern Gannets remaining as late as November.

In 2006, the Canadian Wildlife Service (Environment Canada) initiated the Eastern Canada Seabirds at Sea (ECSAS) program (Gjerdrum et al 2008; Fifield et al 2009). According to the information presented by Fifield et al (2009), the survey data indicate that the highest concentration of seabirds in the Study Area is from March to August, while the lowest concentration is seen in the fall months (September - October).

This monitoring initiative is ongoing, and up-to-date information from the ECSAS program on the distribution and relative abundance of seabirds in the region was obtained and is summarized in Figures 4.51 to 4.63 (based on 2006 – 2014 data from ECSAS 2014). It should be noted that the data have not been corrected in differences in detectability, and represent underestimates of the actual abundance of seabirds (ECSAS 2014).

Table 4.9 Overview of Seabirds Known or Likely to Occur Within the Study Area

Species	Details[1]
Phalacrocoracidae – Cormorants	
Double-crested Cormorant (*Phalacrocorax auritus*)	**Status** Secure; populations have increased significantly since 1970 (Environment Canada 2011). **Biology and Ecology** • Coastal; typically found within 5 km of shore in waters < 10 m deep. • Nest on cliffs, artificial platforms, rocky ground, shrubs or trees. • Begins to breed at 2 or (typically) 3 years of age. Lays 1 to 7 eggs per clutch (mean = 4). Annual number of fledglings per breeding pair for populations in eastern Canada ranges from 0.98 - 2.35 (Dorr et al 2014). • Wide breeding distribution in Newfoundland (Cairns et al 1989). • Feed by pursuit diving typically to depths of 10 m or less, occasionally up to 35 m. • Diet includes a variety of small fish (typically less than 20 cm) and invertebrates, predominantly benthic species. • Migrate south in late fall. **Environmental Preferences** Common: Apr to Oct — 10 — Coastal *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Great Cormorant (*Phalacrocorax carbo*)	**Status** Secure in Canada **Biology and Ecology** • Coastal; typically found within 5 km of shore in waters < 10 m deep. • Nest on cliffs, artificial platforms, rocky ground, shrubs or trees. • Begins to breed at 2 or (typically) 3 years of age. Lays 1 to 7 eggs per clutch (mean = 4). Annual number of fledglings per breeding pair for populations in eastern Canada ranges from 1.2 - 1.97 (Hatch et al 2000). • Breeding distribution in Newfoundland is restricted to the south and southwest coast (Cairns et al 1989). • Feed by pursuit diving typically to depths of 10 m or less, occasionally up to 35 m. • Diet includes a variety of small fish (typically less than 20 cm) and invertebrates, predominantly benthic species. • Partial migrants, with some individuals remaining within the breeding range year round. **Environmental Preferences** Present: Year round — 10 — Coastal Common: Apr to Aug *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details[1]
Sulidae - Gannets	
Northern Gannet (*Morus bassanus*)	**Status** Secure in Canada. Steadily increasing population of 200,000 - 300,000 breeding adults (Environment Canada 2011). **Biology and Ecology** • Typically found in continental shelf waters year-round. • Nest in dense colonies on cliff ledges on islands or inaccessible mainland cliffs. • Northwest Atlantic breeding population is confined to six colonies in eastern Newfoundland and Québec; winter range extends from the Gulf of Maine to Mexico (Mowbray 2002). • Adults arrive at colony in mid-March, followed a few weeks later by subadults. Juveniles migrate southward in September; adults and older immatures may travel north from the colonies to feed along the Labrador Coast before southward migration. • Begins to breed between 4 and 7 years of age, and lays 1 egg per clutch. Mean annual number of fledglings per breeding pair for populations in Eastern Canada is 0.81 (Mowbray 2002). • Feeds by plunge diving from a height of 10 - 40 metres above the surface, descending to depths of 15 m. Travels up to 180 km from breeding colony to forage, but generally within 60 km. • Preys on shoaling fish (herring, mackerel and capelin), and invertebrates such as squid; flocks of up to 1000 gannets have been observed congregating over shoals of food fish. **Environmental Preferences** Common: Mar-Nov — 15 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Scolopacidae - Phalaropes	
Red Phalarope (*Phalaropus fulicaria*)	**Status** Red Phalarope population trends are unknown. Estimated to have a population of over 1,000,000 in Canada (Environment Canada 2011). **Biology and Ecology** • Taxonomically members of the shorebird family (*Scolopacidae*), phalaropes are pelagic outside of the breeding season and so are considered here as seabirds. • Nest on the ground in Arctic tundra, in short vegetation (sedges, mossy hummocks) typically close to fresh water. Winter offshore along ocean fronts, mostly in tropical and sub-tropical regions. • Begins to breed in first year. Lays 4 eggs per clutch. Annual number of fledglings per breeding pair for populations highly variable and dependent on predator populations; for Red Phalarope, the average fledging success is approximately 10 percent in Canada (Tracy et al 2002). • Phalaropes display reverse sexual dimorphism, females being larger and more brightly coloured than males; as well, female departs shortly after egg-laying, leaving male as sole provider to the offspring. • Surface feeders. Phalaropes swim on the water surface in tight circles, churning prey upwards to within reach. Congregate in areas such as upwellings which are associated with higher prey densities. • Diet includes zooplankton and small aquatic invertebrates.

Species	Details[1]
	Environmental Preferences Present: Apr-Dec — Surface — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Red-necked Phalarope (*Phalaropus lobatus*)	**Status** COSEWIC (Special Concern). Populations have decreased slightly, butestimated to have a population of over 1,000,000 in Canada (Environment Canada 2011). **Biology and Ecology** • Taxonomically members of the shorebird family (*Scolopacidae*), phalaropes are pelagic outside of the breeding season and so are considered here as seabirds. • Nest on the ground in Arctic tundra, in short vegetation (sedges, mossy hummocks) typically close to fresh water. Winter offshore along ocean fronts, mostly in tropical and sub-tropical regions. • Begins to breed in first year. Lays 4 eggs per clutch. Annual number of fledglings per breeding pair variable; no data on lifetime reproductive success (Rubega et al 2000). Phalaropes display reverse sexual dimorphism, females being larger and more brightly coloured than males; as well, female departs shortly after egg-laying, leaving male as sole provider to the offspring. • Surface feeders. Phalaropes swim on the water surface in tight circles, churning prey upwards to within reach. Congregate in areas such as upwellings which are associated with higher prey densities. • Diet includes zooplankton and small aquatic invertebrates. **Environmental Preferences** Present: Apr-Dec — Surface — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Laridae - Gulls	
Herring Gull (*Larus argentatus*)	**Status** Secure in Canada (Environment Canada 2011). **Biology and Ecology** • Occur in temperate areas year-round. • Outside of the breeding season, found in coastal and offshore areas. At sea, congregations of gulls may be found around upwellings and following foraging marine mammals, diving seabirds and predatory fishes, as well as fishing vessels, which concentrate food sources at the surface. • Ground nesters. • Begin to breed between 3 and 7 years of age, and lay 2 to 3 eggs per clutch. Mean annual fledging success varies depending on food availability and predation, averaging 70 percent for Herring (Pierrotti and Good 1994). • Nest in numerous coastal locations in eastern Newfoundland. • Surface feeders, preying on fish and invertebrates (cephalopods and crustaceans) as well as offal. Will also prey on eggs, young, and occasionally adults of other seabird species. **Environmental Preferences** Common: Year Round — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details[1]
Iceland Gull (*Larus glaucoides*)	**Status** Secure in Canada (Environment Canada 2011). **Biology and Ecology** • Nests in the Arctic, occurring in the Study Area only outside the breeding season. • Outside of the breeding season, found in coastal and offshore areas. At sea, congregations of gulls may be found around upwellings and following foraging marine mammals, diving seabirds and predatory fishes, as well as fishing vessels, which concentrate food sources at the surface. • Ground nesters. • Begin to breed at approximately 4 years of age, and lay 2 to 3 eggs per clutch. Mean annual fledging success varies depending on food availability and predation; estimated at up to 63% (Gaston et al. 1985). • Surface feeders, preying on fish and invertebrates (cephalopods and crustaceans) as well as offal. May also prey on eggs, young, and occasionally adults of other seabird species. **Environmental Preferences** Common: Oct-Apr — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Glaucous Gull (*Larus hyperboreus*)	**Status** Populations declining (Environment Canada 2011). **Biology and Ecology** • Nest in the Arctic, occurring in the Study Area only outside the breeding season. • Outside of the breeding season, found in coastal and offshore areas. At sea, congregations of gulls may be found around upwellings and following foraging marine mammals, diving seabirds and predatory fishes, as well as fishing vessels, which concentrate food sources at the surface. • Ground nesters. • Typically begin to breed at four years of age, and lay 3 eggs per clutch. Mean annual fledging success of 0.9 chicks per pair, depending on food availability and predation. • Surface feeders, preying on fish, invertebrates (cephalopods and crustaceans), eggs, young, and occasionally adults of other seabird species as well as offal. **Environmental Preferences** Present: Oct-Apr (uncommon) — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Great Black-backed Gull (*Larus marinus*)	**Status** Secure in Canada (Environment Canada 2011). **Biology and Ecology** • Occur in temperate areas year-round. • Outside of the breeding season, found in coastal and offshore areas. At sea, congregations may be found around upwellings and following foraging marine mammals, diving seabirds and predatory fishes, as well as fishing vessels, which concentrate food sources at the surface. • Ground nesters.

Species	Details[1]
	• Begin to breed between 4 and 5 years of age, and typically lay 3 eggs per clutch. Mean number of fledglings per pair ranges from 0.6 - 1.47, depending on food availability and other factors such as laying date and position in colony. • Nest in numerous coastal locations in eastern Newfoundland. • Surface feeders, preying on preying on fish, invertebrates (cephalopods and crustaceans), eggs, young, and occasionally adults of other seabird species as well as offal. **Environmental Preferences** Common: Year Round — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Lesser Black-backed Gull (*Larus fuscus*)	**Status** Uncommon visitor to eastern Canada. **Biology and Ecology** • Nests in Europe; regular but uncommon in winter in eastern Canada. • Outside of the breeding season, found in coastal and offshore areas. At sea, congregations of gulls may be found around upwellings and following foraging marine mammals, diving seabirds and predatory fishes, as well as fishing vessels, which concentrate food sources at the surface. • Ground nesters. • Lays 1 to 4 eggs per clutch (Cramp et al. 1998). • Surface feeders, preying on preying on fish, invertebrates (cephalopods and crustaceans), eggs, young, and occasionally adults of other seabird species as well as offal. **Environmental Preferences** Present: Oct-Apr (Uncommon) — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Ring-billed Gull (*Larus delawarensis*)	**Status** Secure in Canada (Environment Canada 2011). **Biology and Ecology** • Occur in the waters around eastern Newfoundland in the summer months, but are absent from the area in winter. • Found in coastal waters; also associated with garbage dumps and parking lots. • Ground nesters. • Begin to breed at 3 - 4 years of age, and lay 2 to 4 eggs per clutch. Mean annual fledging success varies depending on food availability and predation; estimates range from 51 to 65 percent. • A small number of colonies have been identified in eastern Newfoundland. • Surface feeders, preying on fish, invertebrates such as earthworms and crustaceans, and small mammals, as well as garbage. **Environmental Preferences** Common: Mar-Oct — Surface — Coastal *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details[1]
Black-headed Gull (*Chroicocephalus ridibundus*)	**Status** Uncommon visitor to eastern Canada. **Biology and Ecology** • Nests in Europe; regular but uncommon in winter in eastern Canada. • Outside of the breeding season, primarily found in coastal areas. • Ground nesters. • Lays 1 to 4 eggs per clutch (Cramp et al. 1998). • Surface feeders, preying on fish and invertebrates (earthworms and insects) as well as offal. **Environmental Preferences** Present: Oct-Apr (Uncommon) — Surface — Coastal *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Sabine's Gull (*Xema sabini*)	**Status** Data are insufficient to assess population trends (Environment Canada 2011). **Biology and Ecology** • Nest in the Arctic, occurring in the Study Area only outside the breeding season. • Outside of the breeding season, found in offshore areas. • Ground nesters. • Begin to breed at around 2 years of age, and lay 1 to 4 (usually 2 to 3) eggs per clutch. Mean annual fledging success varies depending on food availability and predation; average is 40 percent (Day et al 2001). • Surface feeders, preying on invertebrates (zooplankton and crustaceans), fish and offal. **Environmental Preferences** Present: Oct-Apr (Uncommon) — Surface — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Ivory Gull (*Pagophila eburnea*)	**Status** *NLESA* and *SARA*: Endangered; has suffered severe population declines since 1970 (Environment Canada 2011). **Biology and Ecology** • Nest in the Arctic, occurring in the Study Area only outside the breeding season. • Outside of the breeding season, found in offshore areas; generally associated with pack ice. • Ground nesters. • Begin to breed at around 2 years of age, and lay 1 to 3 eggs per clutch. Reproductive success is unknown, but believed to be lower than other gull species based on relatively low proportion of immatures observed (Brown and Mactavish 1988) • Herring and Great Black-backed Gull and Black-legged Kittiwake nest in numerous coastal locations in eastern Newfoundland, and a smaller number of Ring-billed Gull colonies have been identified in the area; the other species breed in the Arctic. • Surface feeders, preying on fish and invertebrates in surface waters or washed onto ice floes.

Species	Details[1]		
	Environmental Preferences		
	Present: Oct-Apr (Uncommon) *Seasonal Presence*	Surface *Foraging Depth (m)*	Open Ocean *Marine Habitat*
Black-legged Kittiwake (*Rissa tridactyla*)	**Status** Secure in Canada (Environment Canada 2011). **Biology and Ecology** • Occur in temperate areas year-round. • Outside of the breeding season, usually found in offshore areas. • Nest on cliffs. • Begin to breed between 3 and 5 years of age, and lay 1 to 3 eggs per clutch. Mean annual fledging success varies depending on food availability and predation; in eastern North America, success ranged from 0 to 1.1 chicks per pair annually (Hatch et al. 2009). • Nests in numerous coastal locations in eastern Newfoundland. • Surface feeders, preying on fish and zooplankton. **Environmental Preferences**		
	Common: Year Round *Seasonal Presence*	Surface *Foraging Depth (m)*	Coastal/Open Ocean *Marine Habitat*
Sternidae - Terns			
Common Tern (*Sterna hirundo*)	**Status** Populations are considered stable in Canada. Estimated population in Canada is between 100,000 and 200,000 individuals (Environment Canada 2011). **Biology and Ecology** • Typically breed on islands, in areas with sand or low vegetation. Found in coastal and offshore waters outside the breeding season. Winter in Central and South America. • Begin to breed between 2 and 3 years of age, and lay 2 to 3 eggs per clutch. Mean annual number of chicks fledged per pair varies between 1.0 and 2.0 (Nisbet 2002). • Widely distributed in North America. Locally, they nest in the Green Island, Wadham Islands and Cabot Island IBAs, as well as Terra Nova National Park. (Warkentin and Newton 2009; Thomas et al. 2011). • During the breeding season, typically forage within 20 km of the nest site, usually < 1 km from shore. • Feed by surface feeding and pursuit plunging, and prey on fish and small crustaceans. **Environmental Preferences**		
	Present: Mar-Dec Common: May-Aug *Seasonal Presence*	Surface *Foraging Depth (m)*	Coastal *Marine Habitat*
Arctic Tern (*Sterna paradisaea*)	**Status** Populations are considered stable in Canada. Estimated population in Canada is between 100,000 and 200,000 individuals (Environment Canada 2011).		

Species	Details[1]
	Biology and Ecology • Typically breed on islands, in areas with sand or low vegetation. Found in coastal and offshore waters outside the breeding season. Undertake long migrations to the waters off of Antarctica. • Begin to breed between 3 and 4 years of age, and lay 1 to 3 eggs per clutch. Mean annual number of chicks fledged per pair varies between 0 and 1.4 (Hatch 2002). • Widely distributed in North America. Locally, they nest in the Green Island, Wadham Islands and Cabot Island IBAs, as well as Terra Nova National Park. (Warkentin and Newton 2009; Thomas et al. 2011). • During the breeding season, typically forage within 20 km of the nest site, usually < 1 km from shore. • Feed by surface feeding and pursuit plunging, and prey on fish and small crustaceans. **Environmental Preferences** Present: Mar-Dec / Surface / Coastal Common: May-Aug *Seasonal Presence* / *Foraging Depth (m)* / *Marine Habitat*
Caspian Tern (*Hydroprogne caspia*)	**Status** Populations are considered stable in Canada (Environment Canada 2011). **Biology and Ecology** • Typically breed on islands, in areas with sand or low vegetation. Found in coastal and offshore waters outside the breeding season. Winter in Central and South America. • Begin to breed at 3 years of age, and lay 1 to 3 eggs per clutch. Mean annual number of chicks fledged per pair ranged from 0.6 to 1.6 (Cuthbert and Wires 1999). • Caspian Terns are uncommon in the Study Area, but nest in Wadham Islands and Cabot Island IBAs (Warkentin and Newton 2009). • During the breeding season, Caspian Terns may forage up to 62 km from the colony, typically remaining < 1 km from shore. • Feed by surface feeding and pursuit plunging, and prey on fish and small crustaceans. **Environmental Preferences** Present: Mar-Dec (Uncommon) / Surface / Coastal *Seasonal Presence* / *Foraging Depth (m)* / *Marine Habitat*

Species	Details[1]
Alcidae - Alcids	
Dovekie (*Alle alle*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. • A largely Arctic species, occurring in the offshore waters of eastern Newfoundland only in winter. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their post-breeding moult. • Begin to breed between 2 and 3 years of age, and lay 1 egg per clutch. No data on annual breeding success available, but as with other alcids, depends on factors such as food availability, weather and parental experience. • Feed by pursuit diving, and prey on invertebrates such as crustaceans and molluscs, and on small pelagic fish. **Environmental Preferences** Common: Oct-Apr — 20-30 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Razorbill (*Alca torda*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. • Found in the Study Area year round, arriving at the colony in May to early June, and typically departing by late August. During breeding, most abundant in the waters near the colonies; in the winter months, they are highly pelagic. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their winter moult. As well, the chick departs the colony with the male parent in late summer; the two remain together for several weeks before the chick reaches independence (Lavers et al 2009). • Begin to breed between 4 and 5 years of age, and lay 1 egg per clutch. Mean annual number of chicks fledged per pair depends on factors such as food availability, weather and parental experience. Successful nest departures per breeding pair ranges from 0.65 - 0.75. • The eastern coast of Newfoundland supports numerous alcid colonies, the largest being at Funk Island, Baccalieu Island, the Witless Bay islands and Cape St. Mary's (EC-CWS 2013). During the nesting season, foraging range is within 30 km of the colony. • Feed by pursuit diving, and prey on small fish (capelin and sand lance) and some invertebrates such as crustaceans and polychaetes. **Environmental Preferences** Common: Year round — 10-40 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details[1]
Common Murre (*Uria aalge*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. • Found in the Study Area year round, arriving at the colony in May to early June, and typically departing by late August. During breeding, they are most abundant in the waters near the colonies. In the winter months, tend to be highly pelagic. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their winter moult. As well, the chick departs the colony with the male parent in late summer; the two remain together for several weeks before the chick reaches independence (Ainley et al 2002). • Begin to breed between 2 and 7 years of age, and lay 1 egg per clutch. Mean annual number of chicks fledged per pair depends on factors such as food availability, weather and parental experience. Successful nest departures per breeding pair ranges from 0.35 - 0.85 for Common Murres (*aalge* subspecies). • The eastern coast of Newfoundland supports numerous alcid colonies, the largest being at Funk Island, Baccalieu Island, the Witless Bay islands and Cape St. Mary's (EC-CWS 2015). During the nesting season, foraging range for murres can be up to 170 km. • Feed by pursuit diving, and prey on small fish (capelin and sandlance) and some invertebrates such as copepods. **Environmental Preferences** Common: Year round — 20-50 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Thick-billed Murre (*Uria lomvia*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. Newfoundland is at the southern edge of the breeding range. • In the Study Area year round, arriving at the colony in May to early June, and typically departing by late August. During breeding, they are most abundant in the waters near the colonies. In the winter months, tend to be highly pelagic. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their winter moult. As well, the chick departs the colony with the male parent in late summer; the two remain together for several weeks before the chick reaches independence (Gaston and Hipfner 2000). • Begin to breed at around 5 - 6 years of age, and lay 1 egg per clutch. Mean annual number of chicks fledged per pair depends on factors such as food availability, weather and parental experience. Successful nest departures per breeding pair ranges from 0.48 - 0.79 for Thick-billed Murres in the Atlantic. • Colonies of Thick-billed Murre are found at Funk Island, Baccalieu Island, and Cape St. Mary's (Warkentin and Newton 2009). During the nesting season, foraging range for murres can be up to 170 km. • Feed by pursuit diving, and prey on small fish (capelin and sandlance) and some invertebrates such as copepods.

Species	Details[1]		
	Environmental Preferences		
	Common: Year round *Seasonal Presence*	20-70 *Foraging Depth (m)*	Coastal/Open Ocean *Marine Habitat*
Atlantic Puffin (*Fratercula arctica*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. • Found in the Study Area year round, arriving at the colony in May to early June, and typically departing by late August. During breeding, they are most abundant in the waters near the colonies. In the winter months, tend to be highly pelagic. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their winter moult. • Begin to breed between 4 and 5 years of age, and lay 1 egg per clutch. Mean annual number of chicks fledged per pair depends on factors such as food availability, weather and parental experience. Number of fledglings per breeding pair varies from around 0.40 - 0.60 for Atlantic Puffins in eastern Newfoundland studies. • The eastern coast of Newfoundland supports numerous alcid colonies, the largest being at Funk Island, Baccalieu Island, the Witless Bay islands and Cape St. Mary's (EC-CWS 2013). During the nesting season, Atlantic Puffins generally forage within 5 km of the colony. • Feed by pursuit diving, and prey on small fish (capelin and sandlance) and some invertebrates such as copepods. **Environmental Preferences**		
	Common: Year round *Seasonal Presence*	20-50 *Foraging Depth (m)*	Coastal/Open Ocean *Marine Habitat*
Black Guillemot (*Cepphus grylle*)	**Status** Populations are considered secure (Environment Canada 2011). **Biology and Ecology** • Breed on islands or mainland cliffs, in areas inaccessible to terrestrial predators. Occur in coastal to offshore waters outside the breeding season. • Found in the Study Area year round, arriving at the colony in May to early June, and typically departing by late August. During breeding, they are most abundant in the waters near the colonies. In the winter months, tend to be found close to shore, often near their breeding sites. • Alcids are most vulnerable at sea in the winter months, when they spend the greatest proportion of their time on the water and are rendered flightless for a period of several weeks during their winter moult. • Begin to breed between 2 and 4 years of age, and lay 2 eggs per clutch. Mean annual number of chicks fledged per pair depends on factors such as food availability, weather and parental experience. Number of fledglings per breeding pair varies from 0.26 - 0.72. • The eastern coast of Newfoundland supports numerous alcid colonies, the largest being at Funk Island, Baccalieu Island, the Witless Bay islands and Cape St. Mary's (EC-CWS 2013).		

Species	Details[1]
	• During the nesting season, foraging range is generally within 5 km of the nest site. • Feed by pursuit diving, and prey on small fish (capelin and sandlance) and some invertebrates such as copepods. **Environmental Preferences** Common: Year round / *Seasonal Presence* — 15-30 / *Foraging Depth (m)* — Coastal/Open Ocean / *Marine Habitat*
Stercorariidae - Jaegers and Skuas	
Pomarine Jaeger (*Stercorarius pomarinus*)	**Status** Estimated population of 100,000 to 200,000 adults in Canada; insufficient information to determine trends (Environment Canada 2011). **Biology and Ecology** • Occasional visitors to the Study Area during the spring, summer and fall months; absent in the winter. • Breed in high Arctic tundra. Outside the breeding season, found in offshore waters. Non-breeders remain offshore year-round. Breeding adults return to the colonies in late May to early June, and typically depart for offshore waters in September. • Age at first breeding unknown, but likely similar to Parasitic Jaeger (4 years of age), and typically lay 2 eggs per clutch. No data on annual number of fledglings per pair (Wiley and Lee 2000). • Typically feed by kleptoparasitizing prey items from other seabirds, particularly at sea outside of the breeding season. **Environmental Preferences** Present: Apr-Oct (uncommon) / *Seasonal Presence* — Surface / *Foraging Depth (m)* — Open Ocean / *Marine Habitat*
Parasitic Jaeger (*Stercorarius parasiticus*)	**Status** Estimated population of 100,000 to 200,000 adults in Canada; insufficient information to determine trends (Environment Canada 2011). **Biology and Ecology** • Occasional visitors to the Study Area during the spring, summer and fall months; absent in the winter. • Breed in high Arctic tundra. Outside the breeding season, found in offshore waters. • Non-breeders remain offshore year-round. Breeding adults return to the colonies in late May to early June, and typically depart for offshore waters in September. • Begin to breed at 4 years of age, and typically lay 2 eggs per clutch. • Mean annual number of fledglings per pair varies with factors such as parental experience and prey density; range is between approximately 0.5 - 1.5 (Wiley and Lee 1999). • Typically feed by kleptoparasitizing prey items from other seabirds, particularly at sea outside of the breeding season.

Species	Details[1]
	Environmental Preferences Present: Apr-Oct (uncommon) *Seasonal Presence* | Present: Apr-Oct (uncommon) *Foraging Depth (m)* | Present: Apr-Oct (uncommon) *Marine Habitat*
Long-tailed Jaeger (*Stercorarius longicaudus*)	**Status** Estimated population of 100,000 to 200,000 adults in Canada; insufficient information to determine trends (Environment Canada 2011). **Biology and Ecology** • Occasional visitors to the Study Area during the spring, summer and fall months; absent in the winter. • Breed in high Arctic tundra. Outside the breeding season, found in offshore waters. Non-breeders remain offshore year-round. Breeding adults return to the colonies in late May to early June, and typically depart for offshore waters in September. • Begin to breed at 3 - 5 years of age, and typically lay 1 - 2 eggs per clutch. Mean annual number of fledglings per pair varies with factors such as parental experience and prey density; range is between approximately 0.5 - 1.5 (Wiley and Lee 1998). • Typically feed by kleptoparasitizing prey items from other seabirds, particularly at sea outside of the breeding season. **Environmental Preferences** Present: Apr-Oct (uncommon) *Seasonal Presence* | Present: Apr-Oct (uncommon) *Foraging Depth (m)* | Present: Apr-Oct (uncommon) *Marine Habitat*
Great Skua (*Stercorarius skua*)	**Status** Occasional visitors to offshore waters of the northwest Atlantic. **Biology and Ecology** • Occasional year-round visitors to the Study Area. • Breed on coastal moors and rocky islands in Europe. With the exception of nesting adults during the breeding season, found in offshore waters. Non-breeders occur offshore year-round. Breeding adults return to the colonies in late May to early June, and typically depart for offshore waters in September. • Opportunistic feeder, often scavenging from fisheries (BirdLife International, 2015a). **Environmental Preferences** Present: Year round (uncommon) *Seasonal Presence* | Surface *Foraging Depth (m)* | Open Ocean *Marine Habitat*
South Polar Skua (*Stercorarius maccormicki*)	**Status** Occasional visitors to offshore waters of the northwest Atlantic. **Biology and Ecology** • Occasional visitors to the Study Area during the spring, summer and fall months; largely absent in the winter.

Species	Details[1]
	• Nest along the Antarctic coast. With the exception of nesting adults during the breeding season, found in offshore waters. Non-breeders are found offshore year-round. • Opportunistic feeder, often engaging in kleptoparisitism and scavenging from fisheries (BirdLife International, 2015b). **Environmental Preferences** Present: Apr-Oct (uncommon) — Surface — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Procellariidae - Fulmars and Shearwaters	
Northern Fulmar (*Fulmarus glacialis*)	**Status** Populations are considered stable, with 300,000 to 400,000 individuals in Canada (Environment Canada 2011) **Biology and Ecology** • Breed on cliffs on offshore islands. Colony attendance is from June to September (Lee and Haney 1996). Outside the breeding season, they occur primarily along the continental shelf in temperate to cold water environments. • Begins to breed between 5 and 8 years of age, and lays 1 egg per clutch. Mean annual number of chicks fledged per pair is approximately 0.55 (Dunnet and Ollason 1978). • The coast of Newfoundland supports a few colonies of, including the Witless Bay islands and Cape St. Mary's (EC-CWS 2015); however, they are primarily Arctic breeders. • Surface feeders. Nesting fulmars and shearwaters will forage hundreds of kilometres offshore from the colony. • Prey on small schooling fish, offal and squid. **Environmental Preferences** Common: Year round — Surface — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Great Shearwater (*Puffinus gravis*)	**Status** Common visitor to offshore waters of the northwest Atlantic. **Biology and Ecology** • Breed in burrows on offshore islands. Outside the breeding season, they occur primarily along the continental shelf in temperate to cold water environments. • Shearwaters are known to be strongly attracted to artificial light sources (Weise et al 2001). • Feed by pursuit plunging. Will forage hundreds of kilometres offshore from the colony during breeding. • Prey on small schooling fish, offal and squid. **Environmental Preferences** Common: Year round — 0-3 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details[1]
Sooty Shearwater (*Puffinus griseus*)	**Status** Common visitor to offshore waters of the northwest Atlantic **Biology and Ecology** • Breed in burrows on offshore islands. Outside the breeding season, they occur primarily along the continental shelf in temperate to cold water environments. • Shearwaters are known to be strongly attracted to artificial light sources (Weise et al 2001). • Feed by pursuit plunging. Will forage hundreds of kilometres offshore from the colony during breeding. • Prey on small schooling fish, offal and squid. **Environmental Preferences** Common: Year round — 0-3 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Manx Shearwater (*Puffinus puffinus*)	**Status** A small number of Manx Shearwaters (fewer than 100 pairs) nest in Canada (Mallory et al 2012). **Biology and Ecology** • Nest in burrows on offshore islands. Present at the colony from mid-April to October (Mallory et al 2012). Outside the breeding season, they occur primarily along the continental shelf in temperate to cold water environments. • Shearwaters are known to be strongly attracted to artificial light sources (Weise et al 2001). • Begins to breed between 5 and 8 years of age, and lays 1 egg per clutch. Mean annual number of chicks fledged per pair is approximately 0.69 (Perrins et al 1973). • Primarily a European breeder, Manx Shearwaters nest on Middle Lawn Island; this is the only confirmed nesting location for the species in North America. • Feed by pursuit plunging, and will forage hundreds of kilometres offshore from the colony. • Prey on small schooling fish, offal and squid. **Environmental Preferences** Common: Year round — 0-3 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Cory's Shearwater (*Calonectris diomedea*)	**Status** Occasional visitor to offshore waters of the northwest Atlantic. **Biology and Ecology** • Nest in burrows on offshore islands. Outside the breeding season, they occur primarily along the continental shelf in temperate to cold water environments. • Shearwaters are known to be strongly attracted to artificial light sources (Weise et al 2001). • Feed by pursuit plunging, and will forage hundreds of kilometres offshore from the colony. • Prey on small schooling fish, offal and squid.

Species	Details[1]		
	Environmental Preferences		
	Present: Year round (uncommon)	0-3	Coastal/Open Ocean
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Hydrobatidae - Storm-petrels			
Leach's Storm-petrel (*Oceanodroma leucorhoa*)	**Status** Population trends are unknown, but they are estimated to have a population of over 10,000,000 in Canada (Environment Canada 2011), mainly in Eastern Newfoundland. **Biology and Ecology** • Nest in burrows on offshore islands. Highly pelagic year-round; even breeding adults return to land only at night. Spend most of the year offshore, coming on land only to breed. Occur in higher numbers in areas such with higher prey densities. • Very rare in winter months in the Study Area, but otherwise common. • Storm-petrels often follow ships and fishing boats, and are strongly attracted to artificial light sources. They are therefore particularly susceptible to strandings, particularly in the fall during poor visibility due to fog / drizzle. • Begin to breed at 5 years of age, and lay 1 egg per clutch. Annual average fledging success is approximately 48 percent in Canada (Huntington et al 1996). • Surface feeders, hovering over the water's surface gleaning prey items. During breeding season, will forage hundreds of kilometres from the colony (Huntington et al 1996). • Diet includes zooplankton and small crustaceans. **Environmental Preferences**		
	Present: Year round Common: May-Dec	Surface	Open Ocean
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Wilson's Storm-petrel (*Oceanites oceanicus*)	**Status** Uncommon offshore visitor to Canada. **Biology and Ecology** • Nest in burrows on offshore islands. Highly pelagic year-round; even breeding adults return to land only at night. Spend most of the year offshore, coming on land only to breed. Occur in higher numbers in areas such with higher prey densities. • Uncommon visitors in spring and summer only. • Storm-petrels often follow ships and fishing boats, and are strongly attracted to artificial light sources. • Surface feeders, hovering over the water's surface gleaning prey items. During breeding season. • Diet includes zooplankton and small crustaceans. **Environmental Preferences**		
	Present: May - Sep (uncommon)	Surface	Open Ocean
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*

[1] Information is summarized from Poole (2005) unless otherwise noted

Figure 4.51 Seasonal Distribution of Cormorant Observations (2006 – 2014)

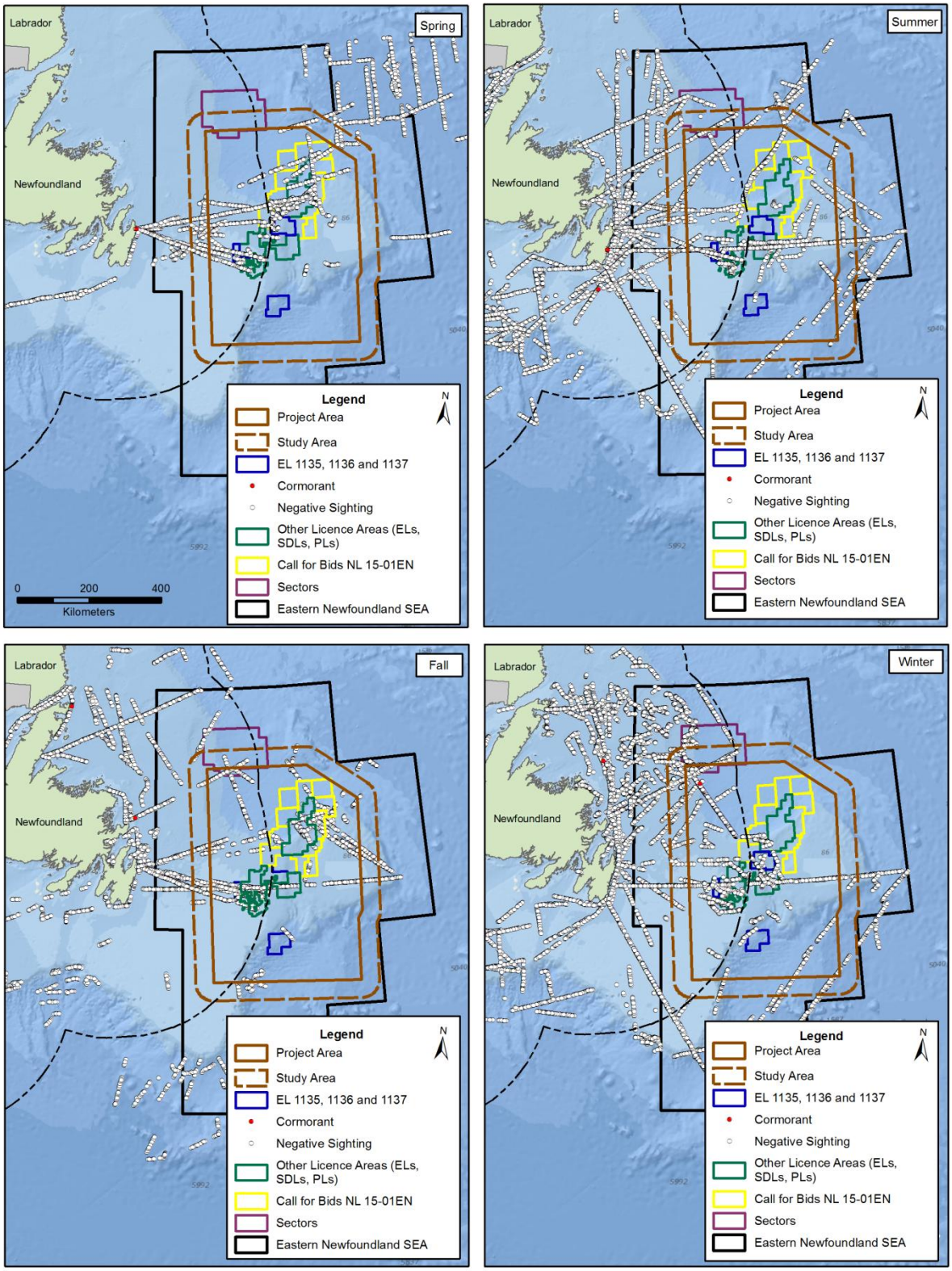


Figure 4.52 Seasonal Distribution of Gannet Observations (2006 – 2014)

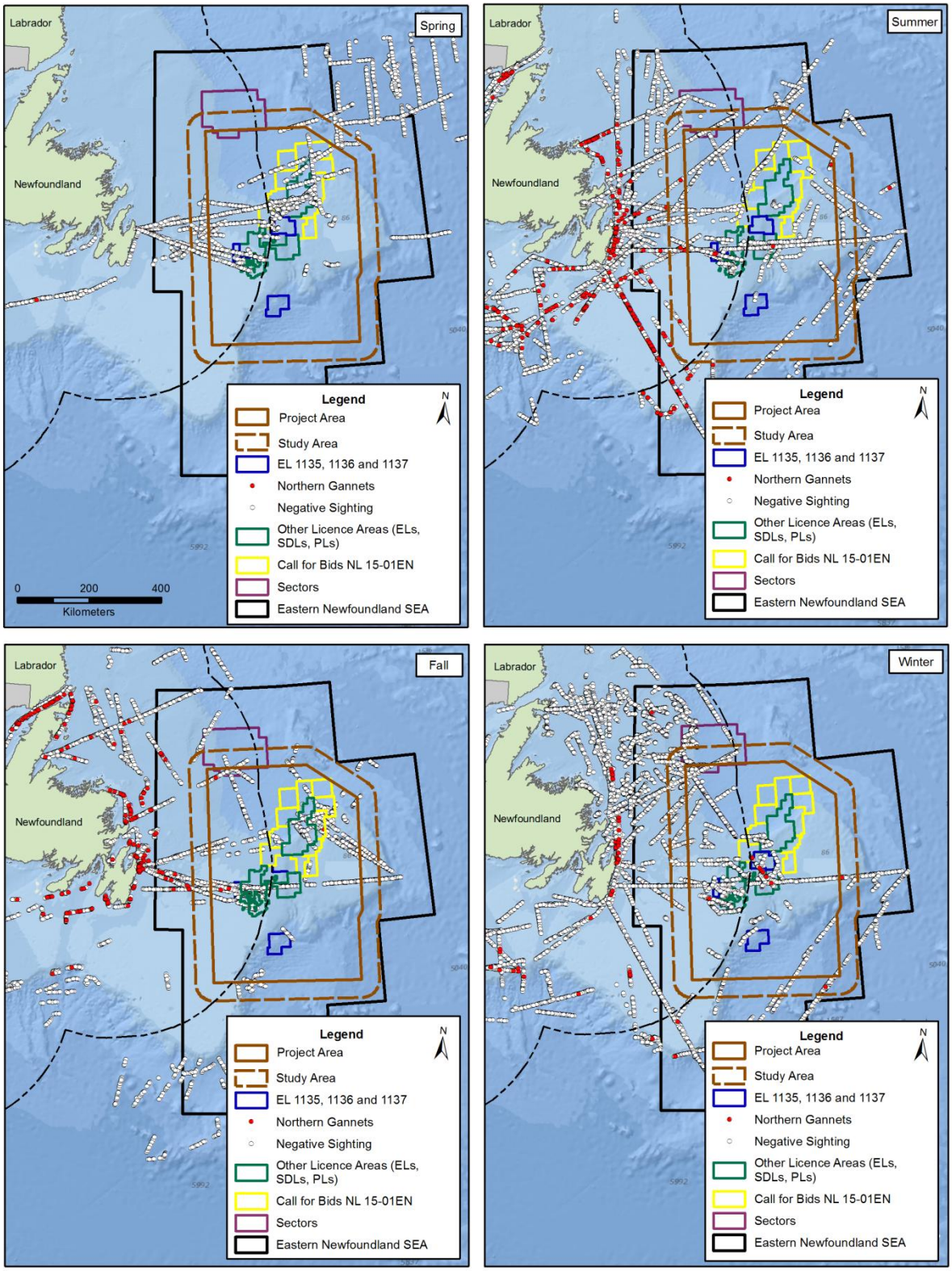


Figure 4.53 Seasonal Distribution of Phalarope Observations (2006 – 2014)

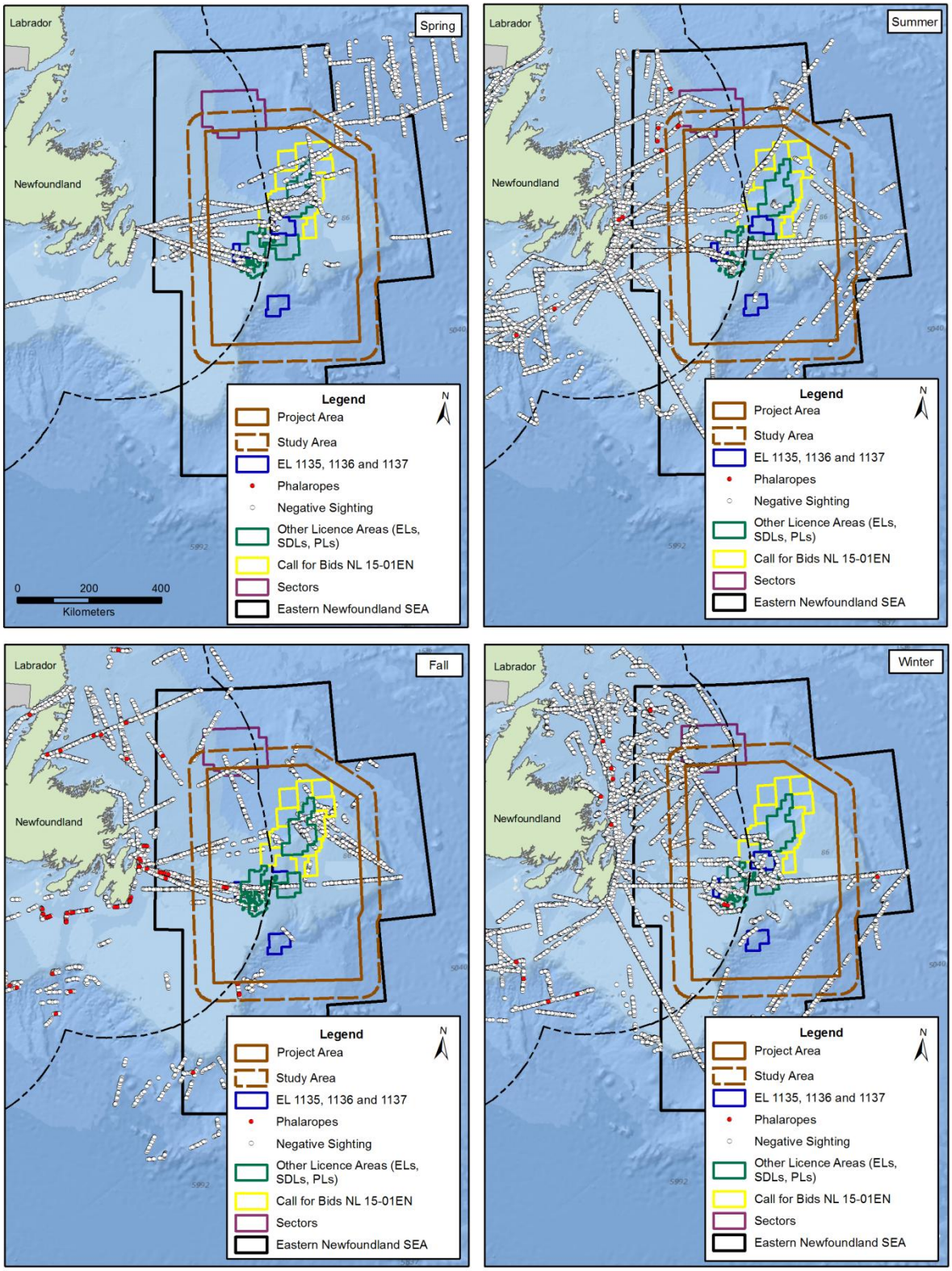


Figure 4.54 Seasonal Distribution of Large Gull Observations (2006 – 2014)

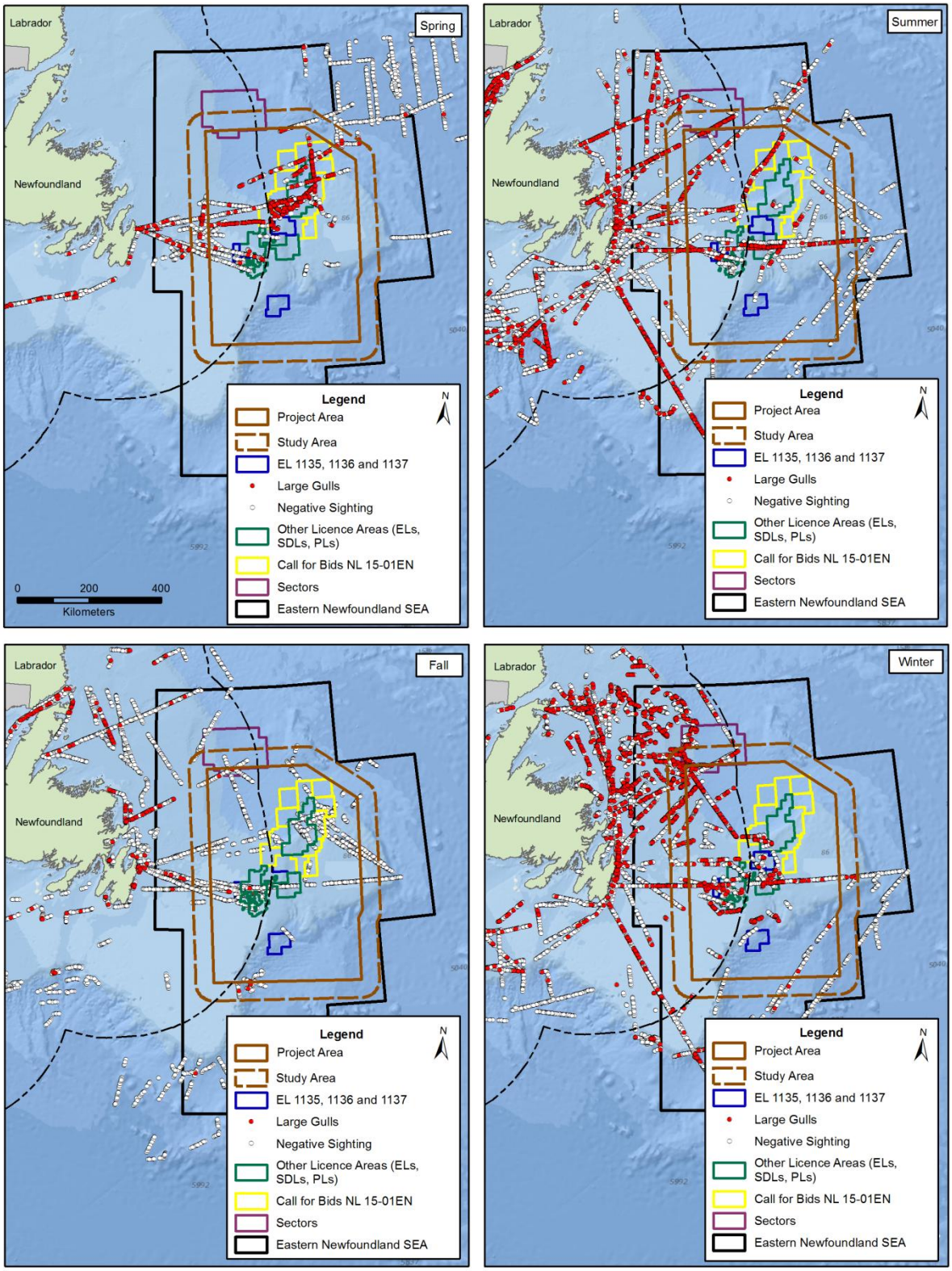


Figure 4.55 Seasonal Distribution of Kittiwake Observations (2006 – 2014)

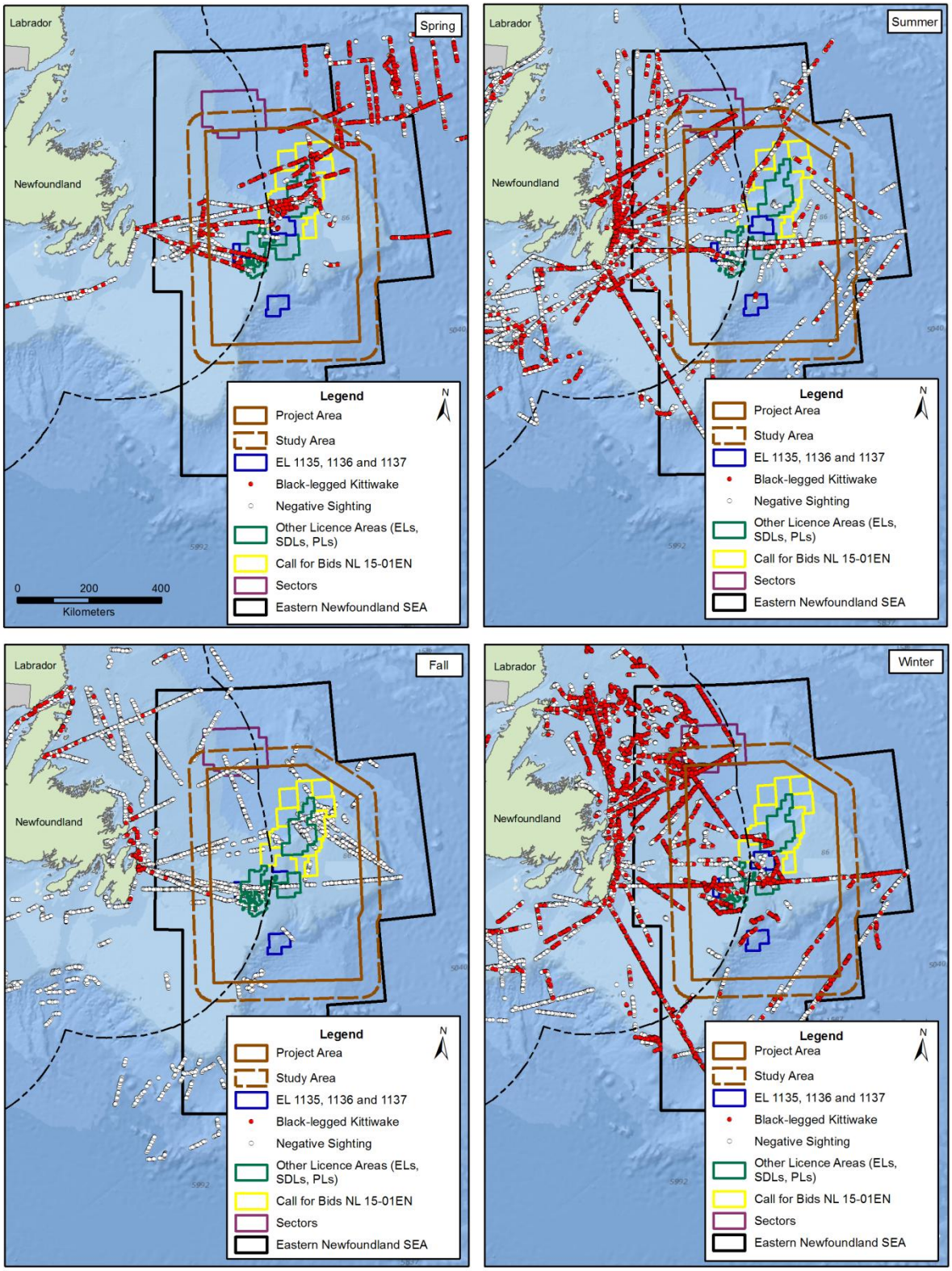


Figure 4.56 Seasonal Distribution of Tern Observations (2006 – 2014)

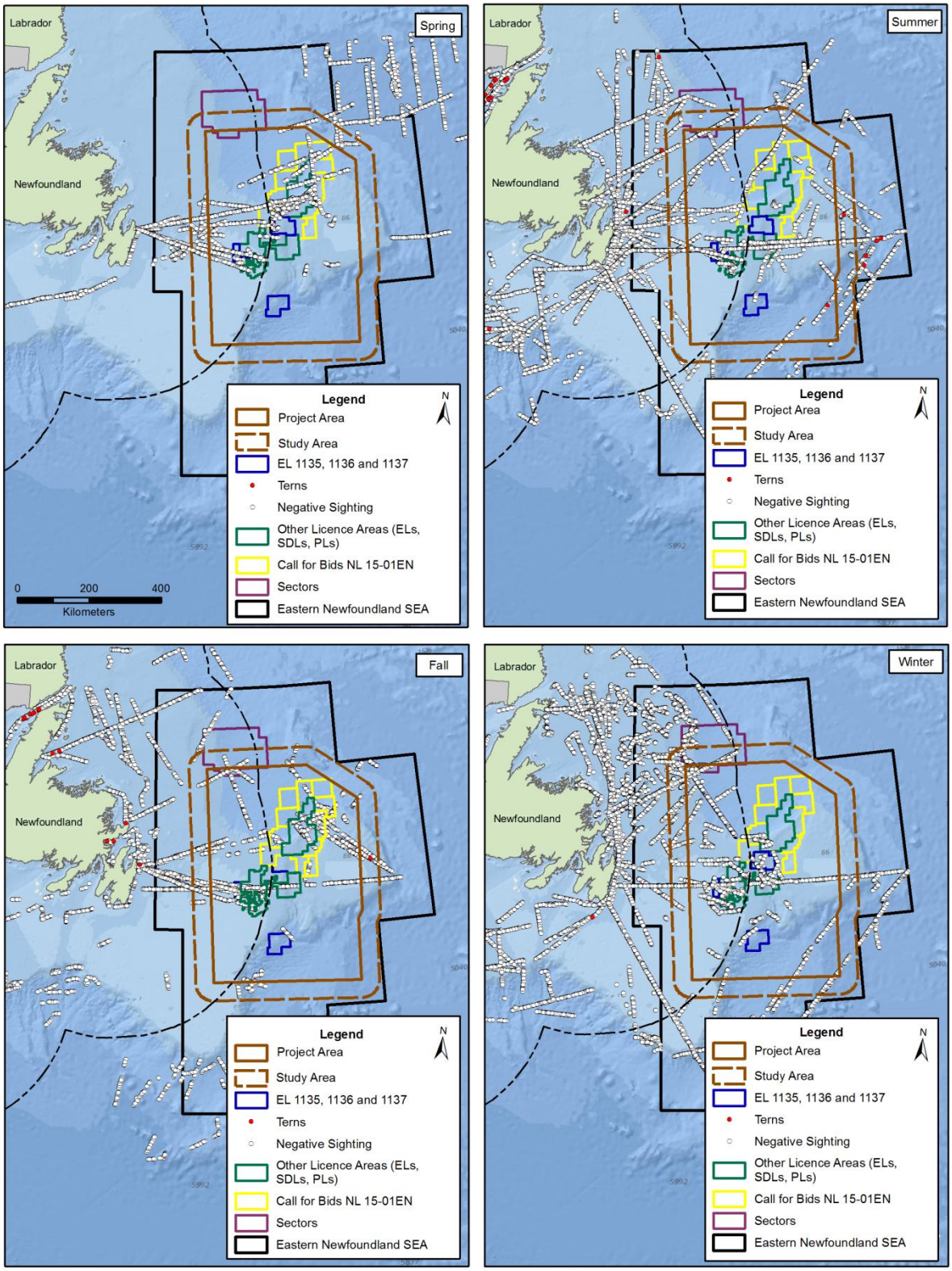


Figure 4.57 Seasonal Distribution of Dovekie Observations (2006 – 2014)

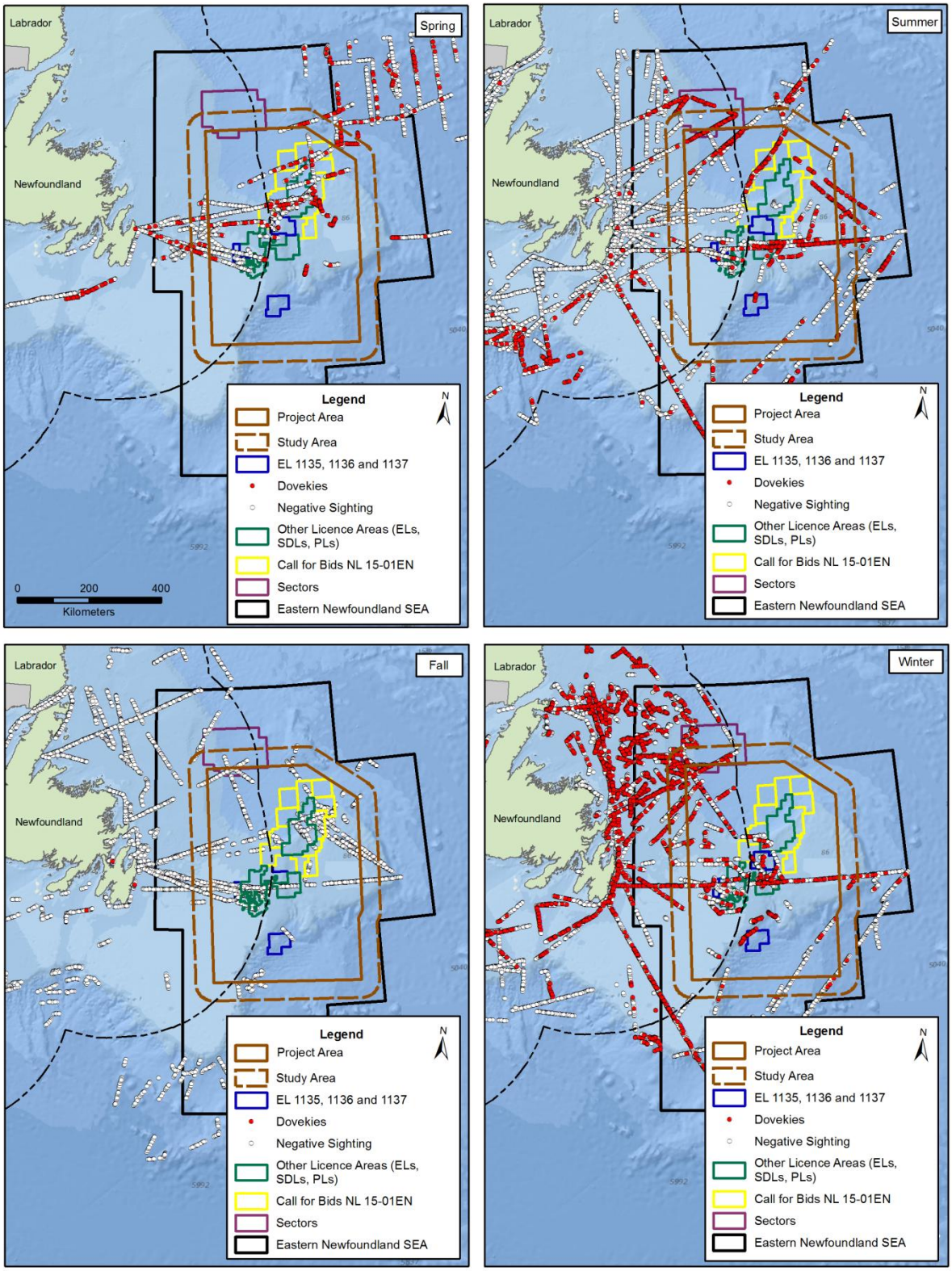


Figure 4.58 Seasonal Distribution of Murre Observations (2006 – 2014)

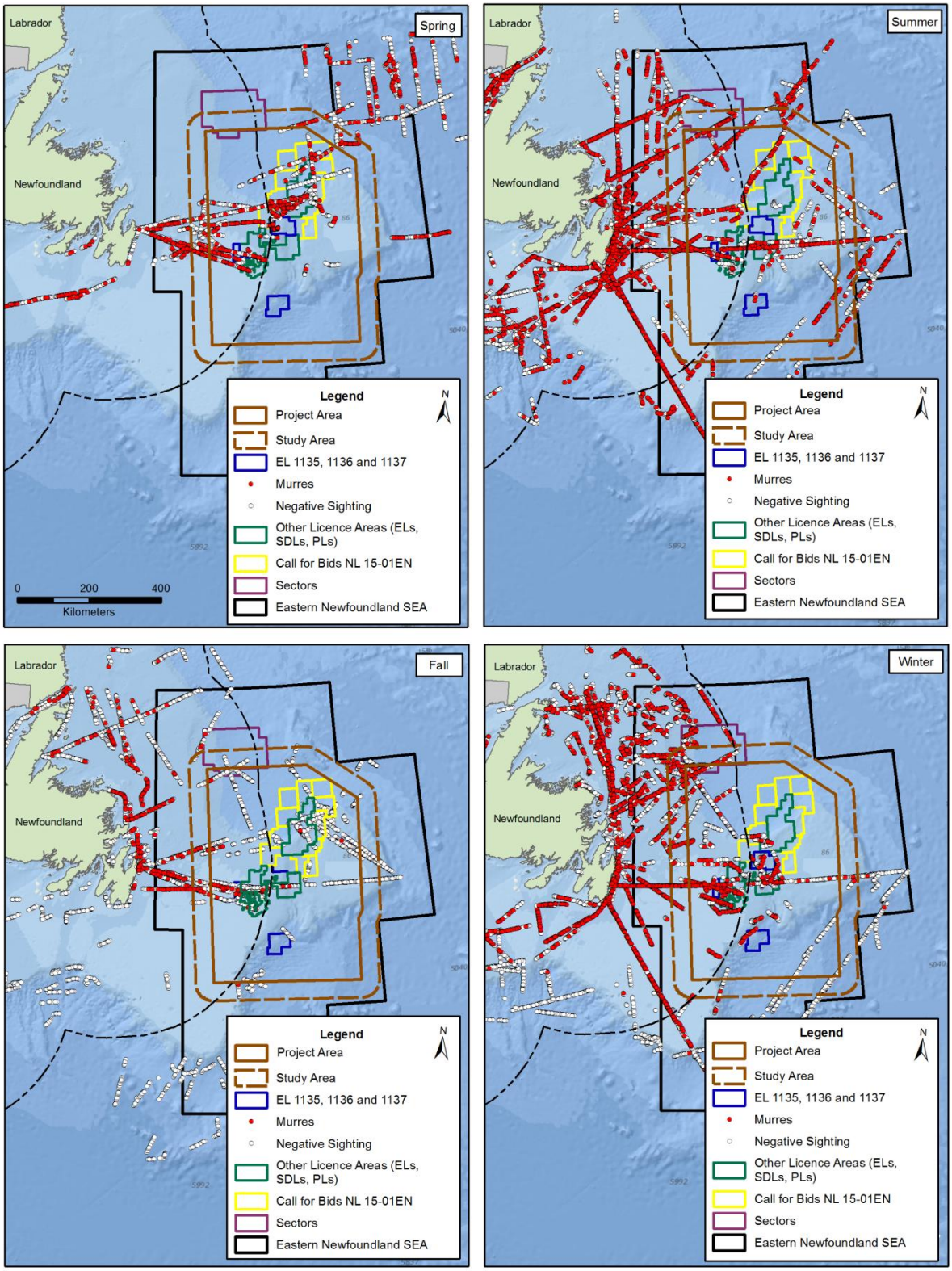


Figure 4.59 Seasonal Distribution of Other Alcids Observations (2006 – 2014)

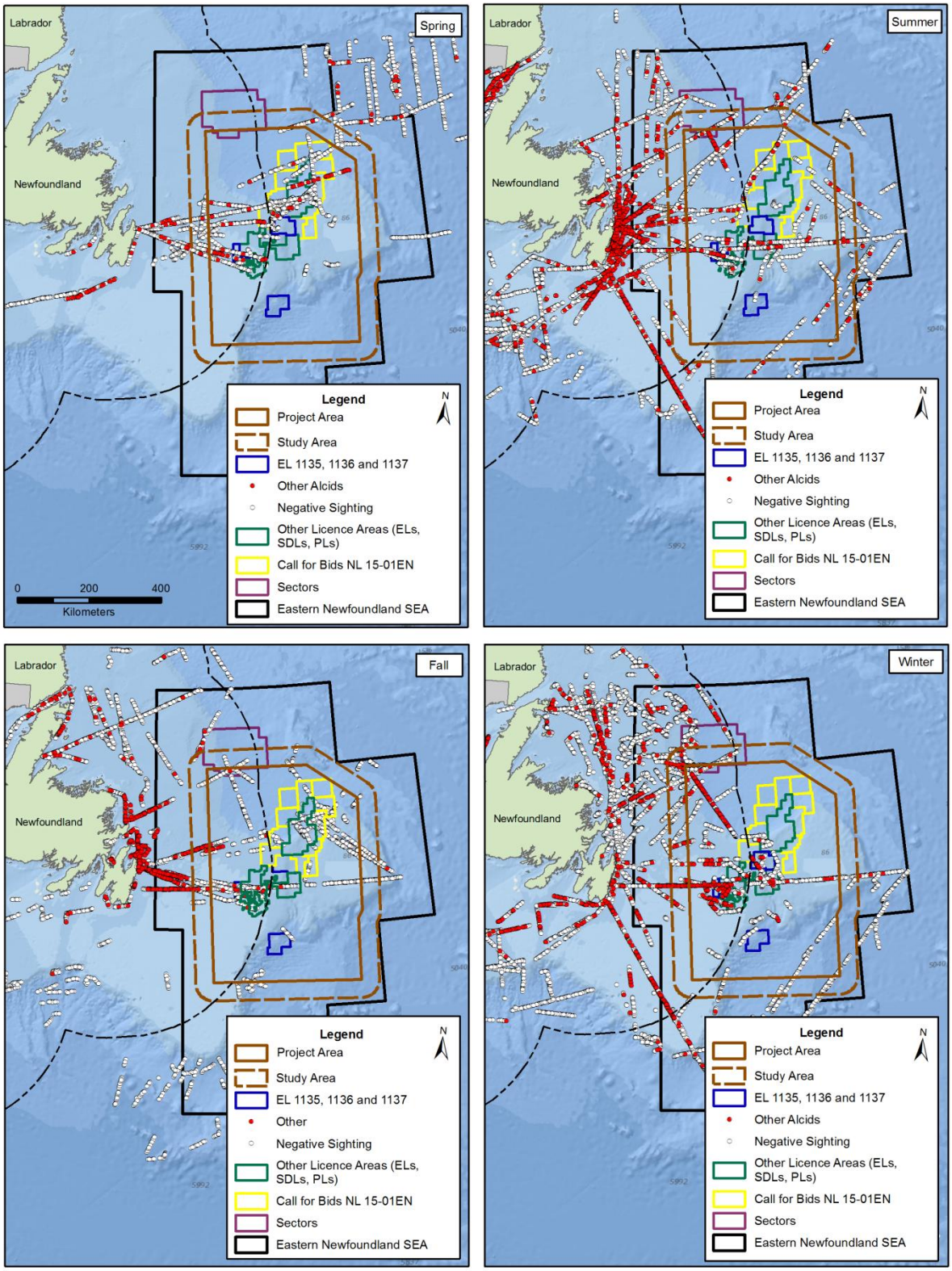


Figure 4.60 Seasonal Distribution of Jaegers and Skua Observations (2006 – 2014)

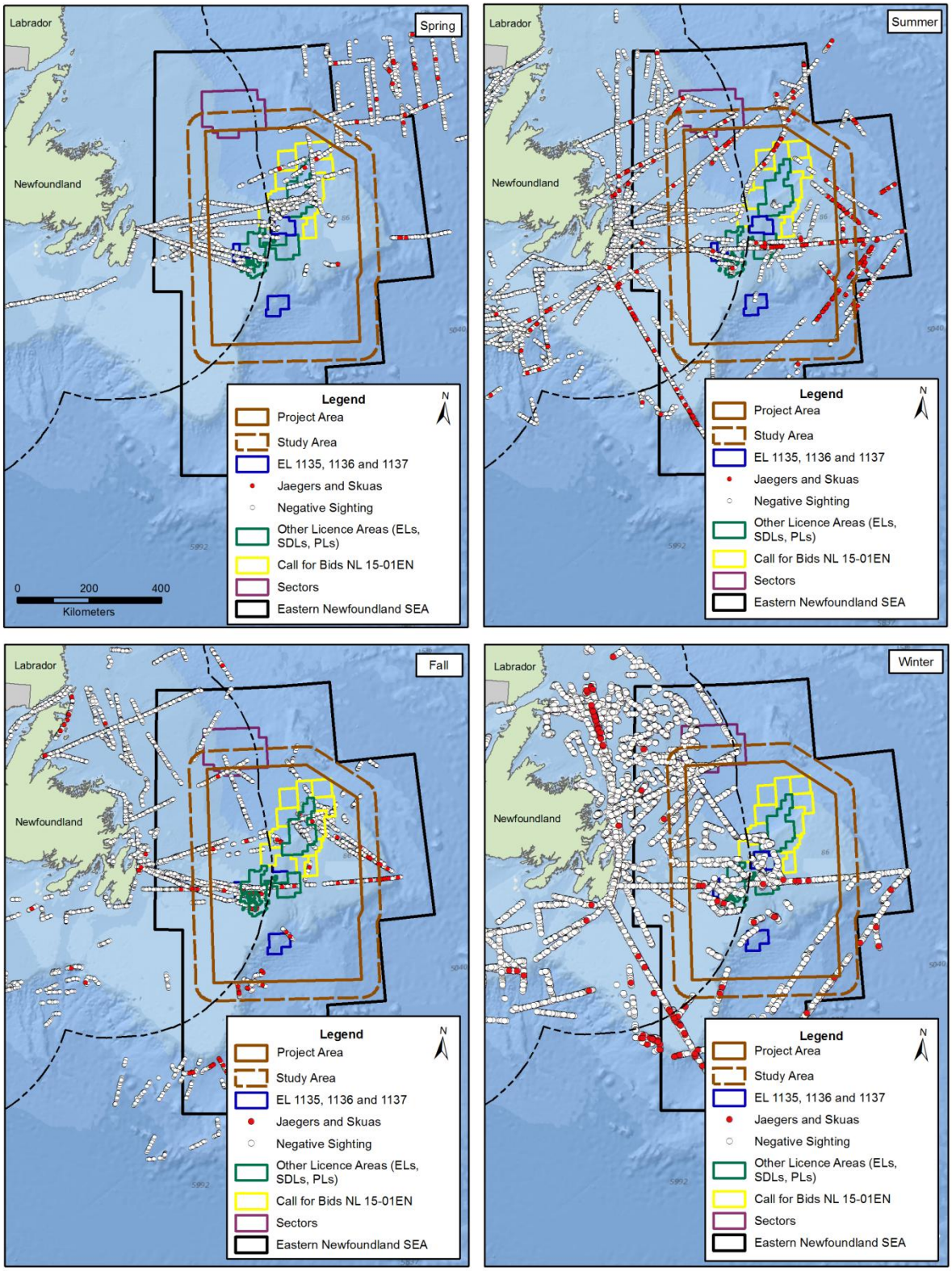


Figure 4.61 Seasonal Distribution of Fulmar Observations (2006 – 2014)

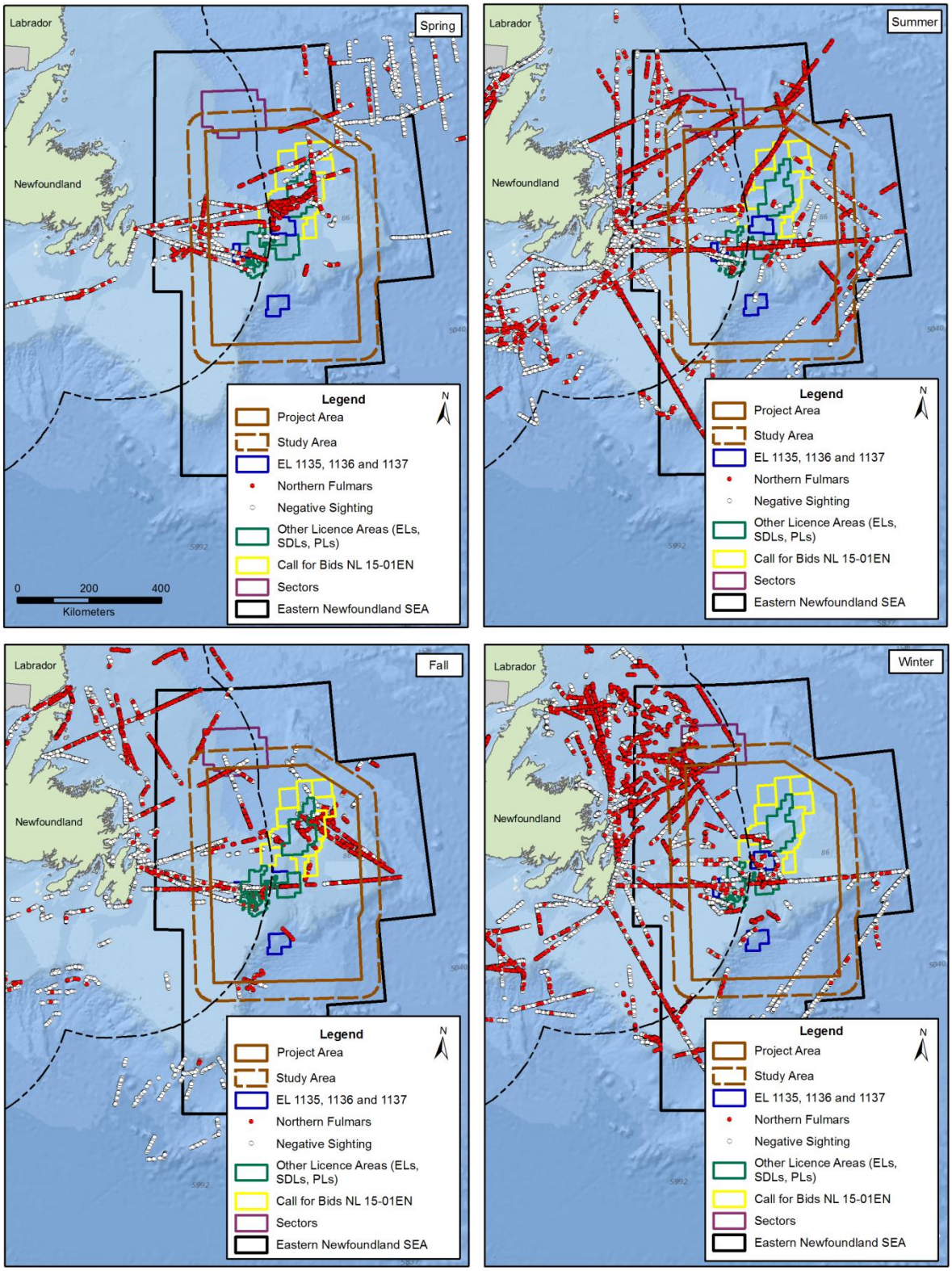


Figure 4.62 Seasonal Distribution of Shearwater Observations (2006 – 2014)

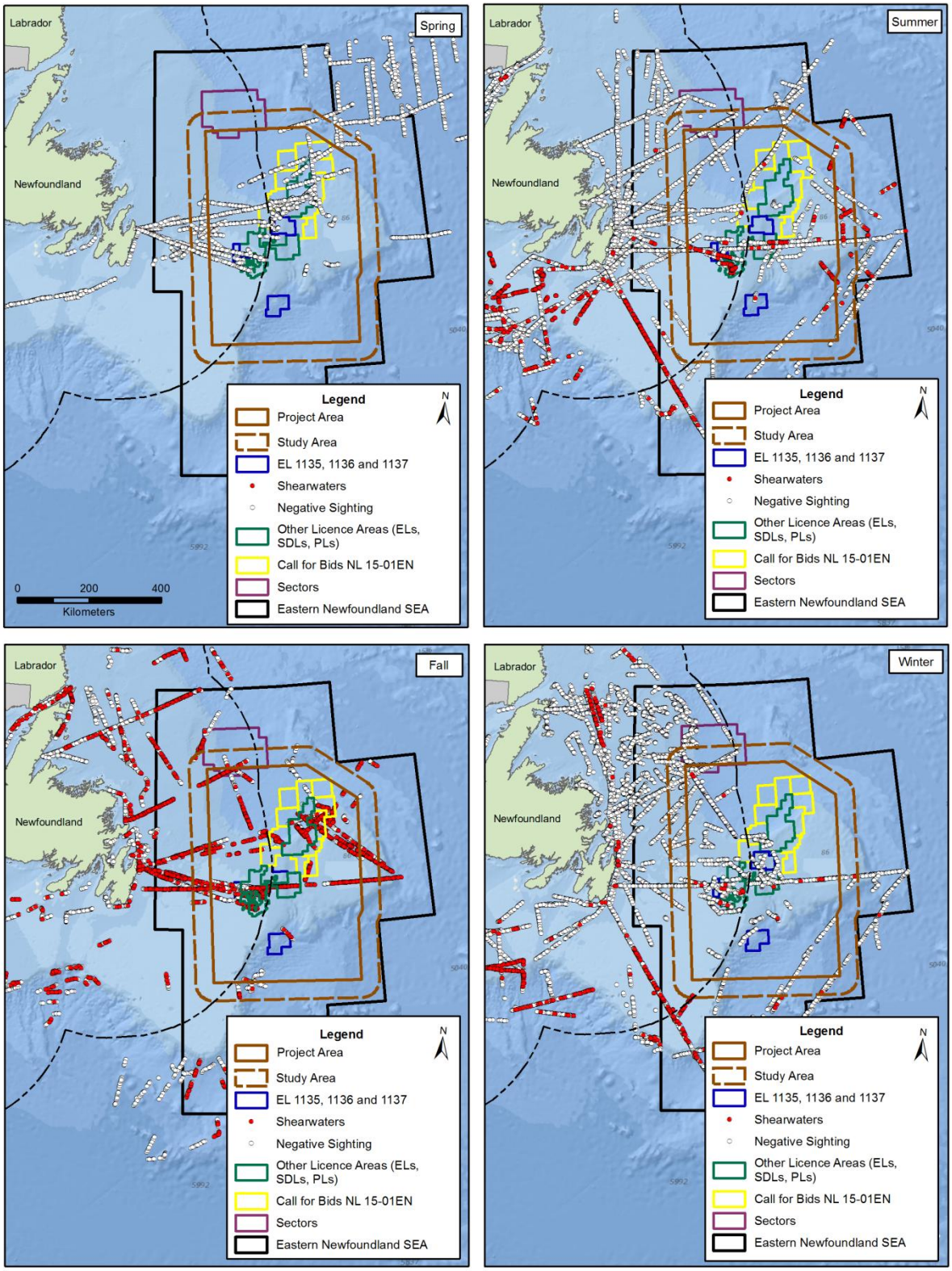
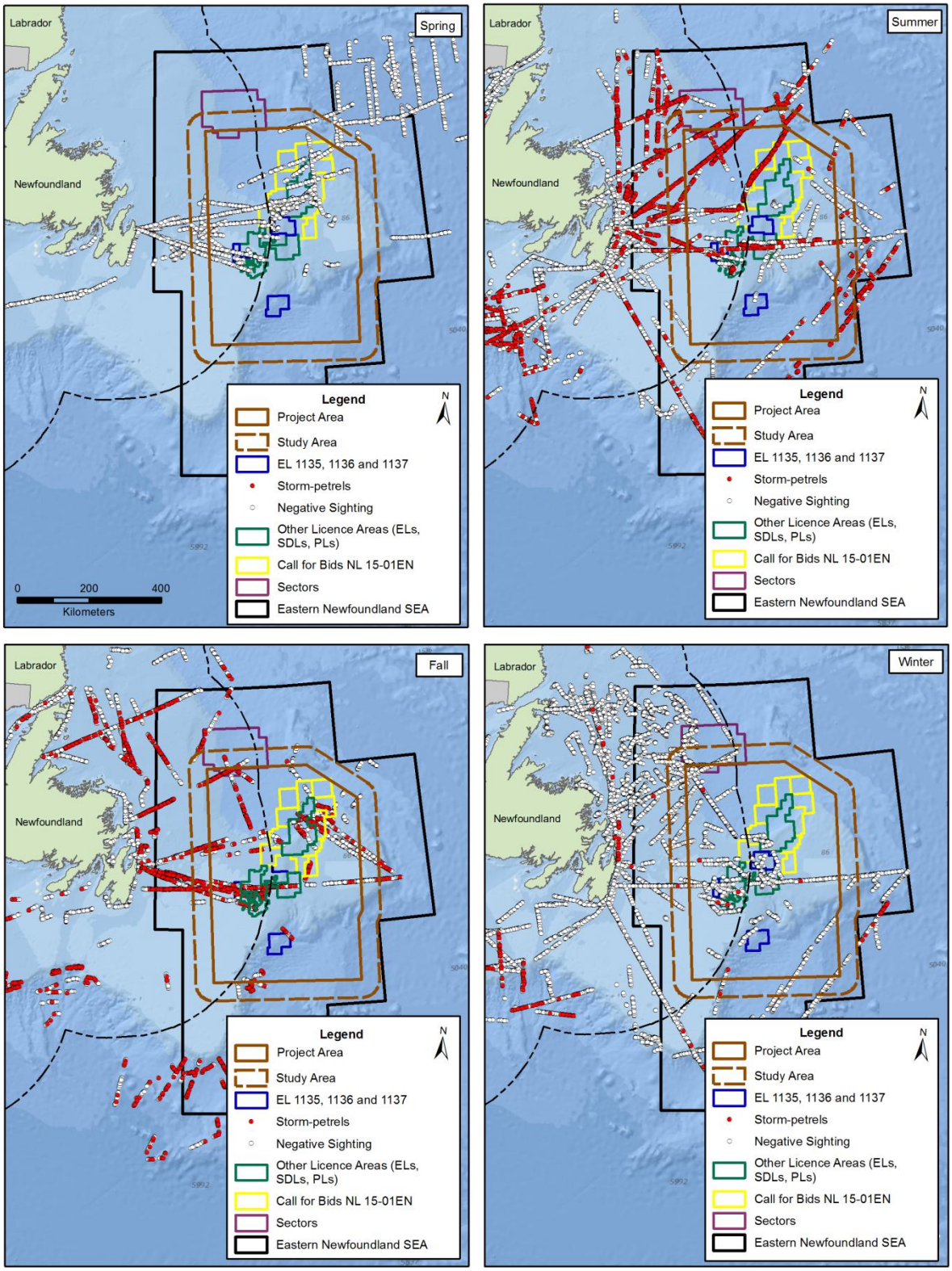


Figure 4.63 Seasonal Distribution of Storm-petrel Observations (2006 – 2014)



4.2.2.2 Waterfowl

Waterfowl, along with loons and grebes, spend much of their time on the water's surface. This group is generally found in inland and coastal waters, although some species may be found further offshore. Taxonomically, loons and grebes are not waterfowl; however, they have fairly similar life histories and are therefore considered together in this section.

Broadly, waterfowl may be categorized as dabbling ducks (primarily inland breeders) and diving ducks. Table 4.10 presents information on the habits, habitats and key life history characteristics of waterfowl (including loons and grebes) that do or may occur within the Study Area.

Table 4.10 Overview of Waterfowl (including Loons and Grebes) Known or Likely to Occur Within the Study Area

Group	Details[1]
Anatidae, Gaviidae and Podicipedidae - Waterfowl, Loons and Grebes	
20+ Species (see *Status*)	**Status** More than 20 species of waterfowl, loon and grebe occur in Newfoundland and surrounding waters during at least part of the year. At least 14 duck species breed in the province (Common Eider, *Somateria mollissima*, being the most abundant), along with Common Loon (*Gavia immer*) and Pied-billed Grebe (*Podilymbus podiceps*) (Warkentin and Newton 2009). Two protected waterfowl species have potential to occur in the Study Area, the Harlequin Duck (*Histrionicus histrionicus*) and Barrow's Goldeneye (*Bucephala islandica*) (both *NLESA*: Vulnerable and *SARA*: Special Concern). Populations of inland-breeding duck species surveyed by CWS (American Black Duck (*Anas rubipres*), Mallard (*Anas platyrhynchos*), Green-winged Teal (*Anas carolinensis*) and Ring-necked Duck (*Aythya collaris*) are considered stable in Eastern Canada (CWS Waterfowl Committee 2012). Population trends for sea ducks are relatively poorly known, as most breed in remote areas; however, available information suggests that populations are stable (CWS Waterfowl Committee 2012).

Group	Details[1]
Anatidae, Gaviidae and Podicipedidae - Waterfowl, Loons and Grebes	
	Biology and Ecology • Some species, such as White-winged Scoters (*Melanitta deglandi*), Surf Scoters (*Melanitta perspicillata*), Black Scoters (*Melanitta americana*), Long-tailed Ducks (*Clangula hyemalis*) and Common Eiders, occur offshore in the Study Area from autumn to spring, often in large flocks ("rafts"). In the waters off eastern Newfoundland, large wintering congregations occur at Witless Bay, between the Cape Freels coastline and nearby Wadham Islands, Grates Point, Cape St. Francis, Mistaken Point, Cape St. Mary's and Placentia Bay. Many other waterfowl species migrate south for the winter months, and in the fall, many species aggregate at inland and coastal staging and moulting areas. • The colonial Common Eider breeds on coastal islands, and some species (e.g. American Wigeon (*Anas americana*), Blue-winged Teal (*Anas discors*), Northern Shoveler (*Anas clypeata*), Pied-billed Grebe, etc.) nest in estuaries. Most nest inland on freshwater lakes and rivers. • Clutch size for ducks typically 3-14; loons, grebes and sea ducks typically have lower reproductive rates compared with inland ducks (CWS Waterfowl Committee 2012). Age at first breeding is 1-2 years for most species, 2-3 for sea ducks (Sibley 2001). • Precocial young typically remain with female parent until near fledging. • The main foraging strategies of this group are dabbling (surface-feeding) and diving. • Dabbling ducks eat animals as juveniles and during breeding and pre-breeding, and plant material at other times. Sea ducks, loons and grebes feed on invertebrates, shellfish and fish year-round. **Environmental Preferences** Present: Year round Common: Oct-Apr *Seasonal Presence* Surface-20 *Foraging Depth (m)* Coastal *Marine Habitat*
[1] Information is summarized from Poole (2005) unless otherwise noted	

4.2.2.3 Shorebirds

Shorebirds (families *Scolopacidae* and *Charadriidae*) are not typically found in offshore environments. However, coastal marine habitats such as sandy mudflats are utilized for foraging. Shorebirds nest close to inland freshwater bodies, estuaries and tidal flats. They feed on tidal flats, coastal barrens, and rocky shorelines, moving to inland areas during high tide. On the eastern coast of Newfoundland, shorebirds are most abundant during fall migration, when many species move southward from their Arctic breeding grounds.

4.2.2.4 Other Marine-Associated Avifauna

Many passerines (songbirds), raptors and other landbirds breed in Newfoundland. Landbirds do not regularly occur in the marine environment, although some species feed in coastal habitats (e.g. Bank Swallow (*Riparia riparia*), Savannah Sparrow (*Passerculus sandwichensis*), Short-eared Owl (*Asio flammeus*) and some raptor species) and many fly long distances over water during migration between points of land. Nocturnal migrants such as passerines may be attracted to artificial light sources at sea, particularly in foggy conditions (Chapter 5).

4.2.2.5 Species at Risk and of Special Conservation Concern

A number of bird species at risk or which are otherwise species of conservation concern have potential to occur in the waters off of Eastern Newfoundland (Table 4.11). Species that do not inhabit the offshore environment were considered unlikely to be affected by the proposed Project and so are not described herein; the Study Area is situated far off the coast, such that terrestrial bird species are unlikely to pass through even during migration. This includes the Red Crossbill (*percna* subspecies), a non-migratory forest dweller that does not occur in the offshore environment (Environment Canada 2006). The Rusty Blackbird (*Euphagus carolinus*) breeds throughout Newfoundland and may migrate over the offshore area, but as a diurnal migrant (Avery 2013). Other diurnal migrant species at risk or species of conservation concern that may occur in Newfoundland but are not considered here include the Chimney Swift (*Chaetura pelagica*) (Cink and Collins 2002) and Barn Swallow (*Hirundo rustica*) (Brown and Bomberger Brown 1999).

Two additional marine-associated avian species at risk in Eastern Canada, the Roseate Tern and Eskimo Curlew, are not considered likely to occur in the Study Area. The Roseate Tern breeds in Southern Nova Scotia and the Northeastern United States, and winters further south (Gochfeld et al 1998).The Eskimo Curlew once bred in large numbers in the Arctic and passed through Newfoundland and Labrador on its migration to the South American wintering grounds in the fall. However, the species' numbers have declined sharply, and there have been no confirmed sightings of the Eskimo Curlew since 1963. The species is therefore considered to possibly be extinct (COSEWIC 2009a).

Table 4.11 Avian Species at Risk or Otherwise of Special Conservation Concern

Species	Provincial Status	Federal Status		Habitat and Distribution in Eastern Newfoundland	Potential Presence in the Study Area
		SARA Listing	COSEWIC Assessment		
Barrow's Goldeneye (*Bucephala islandica*)	Vulnerable	Special Concern Schedule 1	Special Concern	• 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).	Barrow's Goldeneye are known to congregate in relatively small geographic areas in important shipping corridors, therefore considered to be particularly vulnerable to being affected by accidental spills (NLDEC 2013a).
Harlequin Duck (*Histrionicus histrionicus*)	Vulnerable	Special Concern Schedule 1	Special Concern	• Breeds in fast-flowing streams, and congregate in moulting sites in the late summer to fall. • Winter along rocky coastlines, subtidal ledges, and exposed headlands. • Bay du Nord River in southeastern Newfoundland may support nesting Harlequins (IBA 2014). • Cape St. Mary's is one of just three known moulting sites in Newfoundland (Thomas 2008). • Regularly winter in the waters off Cape St. Mary's (IBA 2014; NLDEC 2013a). • A small number of non-breeding individuals may be found at Cape St. Mary's year round (Environment Canada 2007).	Although they breed inland, Harlequin Ducks occur in the coastal marine environment throughout the fall and winter months. Some non-breeding individuals may be found year round at Cape St. Mary's.
Ivory Gull (*Pagophila eburnea*)	Endangered	Endangered Schedule 1	Endangered	• Breeds in the far north. • Winters offshore, occurring in small numbers in the waters off Eastern Newfoundland. • They are found most often among the pack ice. • Rarely seen on the coast of the Northern Peninsula and ashore (Stenhouse 2004; NLDEC 2013a).	Outside of the breeding season, Ivory Gulls spend almost all of their time in the marine environment, including within the Study Area. However, because they are typically found among pack ice, frequent interactions with project activities are unlikely.

Species	Provincial Status	Federal Status		Habitat and Distribution in Eastern Newfoundland	Potential Presence in the Study Area
		SARA Listing	COSEWIC Assessment		
Red-necked Phalarope (*Phalaropus lobatus*)	none	none	Special Concern	• Phalaropes come onshore only to breed, and occur in the coastal marine environment the rest of the year. • Surface feeders, often congregating in areas such as upwellings which are associated with higher prey densities. • Reported as rare visitors at Cape Spear and Bonavista/Cape Bonavista Atlantic Canada Shorebird Survey sites (Environment Canada 2009).	Red-necked Phalaropes are seen in small numbers during ECSAS surveys within the Study Area, although they are apparently absent in the winter months (ECSAS 2015).

4.2.2.6 Key Areas and Times for Marine / Migratory Birds

The Important Bird Area (IBA) program is coordinated by BirdLife International, and administered in Canada by the Canadian Nature Federation and Bird Studies Canada (IBA 2014). This program identifies areas of important habitat using internationally standardized criteria based on the presence of species at risk, species with restricted range, habitats holding representative species assemblages, or a congregation of a nationally and/or globally significant proportion of a species' population during one or more season.

In Eastern Newfoundland, in general proximity to the Study Area, there are a total of 17 designated IBAs (Figure 4.64; Sources: IBA 2014 and EC-CWS Atlantic Region Colonial Waterbird Database). These are described (in order of location along the coast, from north to southeast) in Table 4.12. Many of these IBAs are home to colonial seabirds that utilize the Study Area for feeding during the breeding season.

Table 4.12 Important Bird Areas within or Adjacent to the Study Area

IBA Name	Area (km^2)	Location	Characteristics and Importance
NF004: Funk Island	135.18	An island off northeastern Newfoundland, situated 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
NF013: Wadham Islands and adjacent Marine Area	159.23	Located near Fogo Island, approximately 40 km offshore, this IBA 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
NF025: Cape Freels Coastline and Cabot Island	334.48	Located at the head of Bonavista Bay, this IBA 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
NF017: Terra Nova National Park	655.56	Situated 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
NF019:	66.55	The northern tip of the Bay de Verde	• Large number of wintering Common Eiders (up to 12,000 individuals, but typically around 2,800)

IBA Name	Area (km^2)	Location	Characteristics and Importance
Grates Point		Peninsula, which separates Trinity Bay from Conception Bay.	• Other wintering species include Black-legged Kittiwake, Thick-billed Murre and Dovekie • Atlantic Puffin and Northern Gannet are present in the summer months
NF003: Baccalieu Island	45.22	Located 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
NF021: Cape St. Francis	70.21	Located 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
NF022: Quidi Vidi Lake	7.0	Situated 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 here in the winter, subsisting on food handouts from people
NF002: Witless Bay Islands	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 percent 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 • During the fall migration, surrounding marine area is important to sea ducks including White-winged Scoter, Surf Scoter, Long-tailed Duck and Common Eider
NF024: Mistaken Point	102.77	Located 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 (over 1 percent of North American population)

IBA Name	Area (km^2)	Location	Characteristics and Importance
			• 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
NF001: Cape St. Mary's	329.39	Located at the entrance to Placentia Bay on the southwestern Avalon Peninsula.	• Significant numbers of nesting Northern Gannet (over 2 percent 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
NF028: Placentia Bay	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
NF015: Cape Pine and St. Shotts Barren	57.4	Located on the 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
NF030: Corbin Island	5.25	Located at the southeast corner of the Burin Peninsula.	• An estimated 100,000 nesting Leach's Storm-petrels (2 percent of western Atlantic population) • Historic records of Herring Gull, Great Black-backed Gull, Black Guillemot and Black-legged Kittiwake colonies
NF031: Middle Lawn Island	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 occur

IBA Name	Area (km^2)	Location	Characteristics and Importance
			• 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
NF032: Green Island	5.61	Located midway between the Burin Peninsula and the French islands of 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 are believed to breed on the island
NF018: Bay du Nord Wilderness Reserve and Middle Ridge Wildlife Reserve	3804.04	An upland plateau with extensive barrens, heaths and wetlands, this IBA comprises two large inland reserves in southeastern Newfoundland.	• Several species of breeding waterfowl, including Canada Goose, American Black Duck, Green-winged Teal, Common Goldeneye and Common Merganser • The endangered Harlequin Duck may breed on Bay du Nord River • Rock Ptarmigan (*welchii* subspecies), a restricted-range species, is believed to breed in small numbers
Sources: IBA (2015); Atlantic Canada Colonial Waterbird Database (EC-CWS 2015); Amec (2014)			

Nesting sites for colonial seabirds and rare species also constitute particularly important areas and habitats. Most but not all of the major seabird colonies are designated IBAs (see above); locations of other major colonies are indicated in Figure 4.64. Table 4.13 shows the number of colony sites and approximate number of nesting pairs of seabirds in Eastern Newfoundland, although this is not an exhaustive list as there are a number of smaller colonies of Leach's Storm-Petrel, Atlantic Puffin, Herring Gull, Great Black-backed Gull and Black-Legged Kittiwake along the eastern coast of Newfoundland (S. Wilhelm, pers. comm. 2014).

Other designated sites that are important to migratory birds include federal Migratory Bird Sanctuaries (MBS), provincially-designated Wilderness and Ecological Reserves, and Ramsar sites which are designated wetlands of international importance. Migratory Bird Sanctuaries are designated by Environment Canada and are protected by the *Migratory Bird Sanctuary Regulations* regarding the taking, injuring or destruction of migratory birds or their nests or eggs in the sanctuaries. Hunting of migratory species not permitted in any Migratory Bird Sanctuary. There is one MBS in Eastern Newfoundland, the Terra Nova Bird Sanctuary, which is part of the Terra Nova National Park and is described in the preceding Table.

As described in a later section, there are a number of provincial Ecological Reserves within the Eastern Newfoundland region (NLDEC 2013b), although outside the Project Area. Four of these are Seabird Ecological Reserves (Witless Bay, Baccalieu Island, Cape St. Mary's and Funk Island) and these sites are also IBAs (see above). In 2009, the Lawn Islands Archipelago (which includes Middle Lawn Island) was named as a provisional Seabird Ecological Reserve, and as such has been afforded interim protection until the site assessment process has been completed (Government of NL 2009).

The provincial *Seabird Ecological Reserve Regulations* 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.

The 1998 *Convention on Wetlands of International Importance* (also referred to as the Ramsar Convention) established an objective of sustaining important wetland habitats. In 1981, Canada became a contracting party to the Ramsar Convention, and to date, Canada has designated 37 Ramsar Sites of which 17 are also National Wildlife Areas or Migratory Bird Sanctuaries (Environment Canada 2012). The only Ramsar site in Newfoundland is the Codroy Valley Estuary (Ramsar 2013) in southwestern Newfoundland, located far from the Study Area.

As also described in an earlier section, a number of EBSAs have also been identified within the Placentia Bay Grand Banks Large Ocean Management Area. Among the criteria for selection and ranking of these areas was their importance to marine birds and marine mammals in terms of biodiversity, density and importance to reproduction and survival. A discussion of key relevant characteristics of EBSAs that were identified as possessing important attributes to marine mammals and birds is provided later in this report (Section 4.2.3). For seabirds, these are primarily important offshore feeding areas.

The abundance and distribution of birds in the Study Area changes throughout the year. According to ECSAS information presented by Fifield et al (2009), the highest concentration of seabirds in the Study Area is from March to August, while the lowest concentration is seen in September and October. Waterfowl are most common in marine waters during the winter months. The temporal distribution of species presence in the Study Area is shown in the species' life history accounts, and information on key locations and times of year for Marine and Migratory Bird Species at Risk is found in the preceding section.

Figure 4.64 Important Bird Areas and Seabird Colony Sites

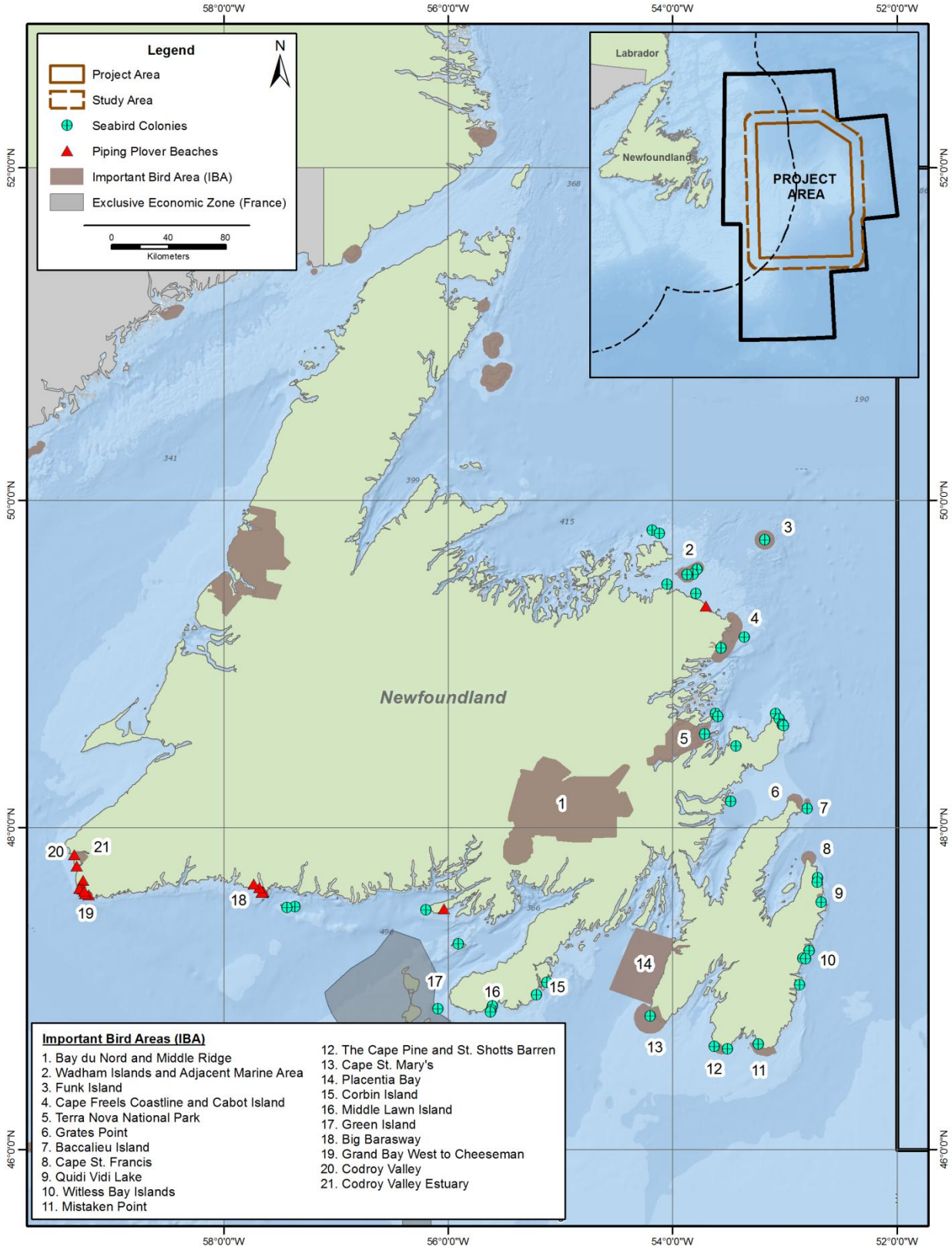


Table 4.13 Estimated Numbers of Pairs of Colonial Seabirds along Coastal Eastern Newfoundland

Family	Species	Number of Colonies	Number of Breeding Pairs
Gannets	Northern Gannet	3	27,000
Gulls	Herring Gull[1]	25+	6,300-10,400
	Great Black-blacked Gull[1]	23+	230-1,800
	Ring-billed Gull[1]	2	100-500
	Black-legged Kittiwake	17+	40,000
Terns	Common and Arctic Terns[2]	5	220
Alcids	Common Murre	11	766,000
	Thick-billed Murre	4	1,500
	Razorbill	14	3,200
	Black Guillemot[3]	4	440
	Atlantic Puffin	21+	410,000
Fulmars and Shearwaters	Northern Fulmar	5	114
	Manx Shearwater	1	13
Storm-Petrels	Leach's Storm-petrel	22+	4,000,000

Notes: Data obtained from the Atlantic Canada Colonial Waterbird Database maintained by Environment Canada - Canadian Wildlife Service, unless otherwise noted.

1. Combined data from Atlantic Canada Colonial Waterbird Database and Thomas et al (2011). Data from Thomas et al reported as ranges (e.g., “101 - 500 individuals”), so a minimum and maximum estimated number are provided.

2. Data obtained from Thomas et al (2011). Common and Arctic Terns are combined, as the two species cannot be reliably distinguished from aerial surveys.

3. Black Guillemot numbers are likely to be underestimates due to the loose colony distribution and solitary nature of the species.

4.2.3 Marine Mammals and Sea Turtles

The waters off Eastern Newfoundland support a diverse assemblage of marine fauna including more than 20 marine mammals and three sea turtle species, many of which are considered to be at risk or otherwise of special conservation concern. Key feeding grounds such as the Grand Banks are of particular importance to marine mammals and turtles, and several Ecologically and Biologically Significant Areas (EBSAs) have been identified in or near the Study Area due in part to their known importance to a number of marine mammal species (Templeman 2007).

4.2.3.1 Mysticetes

Six species of the cetacean suborder Mysticetes (the baleen whales) have been reported in the waters off Southern and Eastern Newfoundland. These large whales are characterized by having plates of baleen (instead of teeth), which filter food items from seawater. They are typically solitary or clustered in small groups.

Table 4.14 summarizes key life history and habitat information for each of the species of baleen whales that do or may occur in the Study Area.

Table 4.14 Overview of Baleen Whales Known or Likely to Occur within the Study Area

Species	Details
Balaenopteridae - The Rorquals	
Humpback Whale (*Megaptera novaengliae*)	**Population** Western North Atlantic **Status** Not At Risk (COSEWIC); Special Concern (*SARA* Schedule 3). Relatively common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 1,427 individuals (95 percent confidence limits: 952 - 2,140) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Usually found in coastal waters, but also may occur in offshore habitats (Baird 2003). Wide-ranging species found in all oceans (Reilly et al 2008a). Usually observed singly or in groups of 2-3; during breeding and feeding, groups of up to 15 individuals seen. • Highly migratory; individuals from the Newfoundland and Labrador feeding stock breed, calve in the West Indies (Katona and Beard 1990; IWC 2002). Calving occurs between January and April. • Sexual maturity at 9 years of age, on average. Gestation approximately 12 months, and inter-calving interval is 2 years (Baird 2003). • Feed on krill and small schooling fishes such as capelin (Reilly et al 2008a, Witteveen et al 2008). • Often feed cooperatively, using specialized feeding techniques such as bubble net feeding; will dive to a depth of approximately 100 m (Reilly et al 2008a, Witteveen et al 2008).

Species	Details
	Environmental Preferences Present: Apr-Dec — 100 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Blue Whale (*Balaenoptera musculus*)	**Population** Atlantic **Status** Endangered (*SARA* Schedule 1 and COSEWIC). The population size in Canadian waters is unknown, but based on data from a 2007 DFO survey in Atlantic Canadian waters, is believed to be fewer than 250 mature individuals (Lawson and Gosselin 2009; COSEWIC 2012c). **Biology and Ecology** • Found in both coastal and pelagic waters; frequently at continental shelf edge where food production is high (Schoenherr 1991). Wide-ranging species found in all oceans except the Arctic (Reilly et al 2008b). • In the summer, distribution in the western Atlantic extends in the west from the Scotian Shelf to the Davis Strait; they are found off the southwest and eastern coasts of Newfoundland during winter and early spring (Sears et al 1990; Lesage et al 2007). Migration patterns are poorly understood, but variable and apparently related to food availability (Reilly et al 2008b). Mating and calving occurs between late fall to mid-winter (Yochem and Leatherwood 1985). • Usually observed singly or in small groups. • Sexual maturity at 5 - 15 years of age. Gestation approximately 10 - 11 months, and inter-calving interval is 2 - 3 years (Yochem and Leatherwood 1985). • Feed almost exclusively on krill, typically diving to depths of greater than 100 m to forage (Reilly et al 2008b, Croll et al 2001). **Environmental Preferences** Present: Year round — 150 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Fin Whale (*Balaenoptera physalus*)	**Population** Atlantic **Status** Special Concern (*SARA* Schedule 1 and COSEWIC). Relatively common in the Study Area, particularly in summer; abundance estimate in Southern and Eastern Newfoundland is 890 individuals (95 percent confidence limits: 551 - 1,435) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009).

Species	Details
	Biology and Ecology • Generally found at the coastal shelf edge and further offshore (COSEWIC 2005). World-wide distribution, with higher abundance in temperate and polar latitudes compared with tropical waters (Reeves et al 2002). • Migration habits are not well understood; however, Newfoundland stocks appear to migrate southward in the winter (Allen 1971). Conception and calving takes place in the winter, and is thought to occur in low latitudes. Summer distribution is typically in areas with high prey concentration (e.g., the Grand Banks). • Usually observed singly or in pairs; groups of up to 20 individuals seen on feeding grounds. • Sexual maturity at 6 - 7 years of age for females, 7 – 8 for males. Gestation approximately 12 months, and inter-calving interval averages 2.7 years (COSEWIC 2005). • Feed on krill and small schooling fishes such as capelin, typically diving to depths of approximately 100 m (Kenney 2001, Croll et al 2001). **Environmental Preferences** Present: Apr-Dec — 100 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Sei Whale (*Balaenoptera borealis*)	**Population** Atlantic **Status** Data Deficient (COSEWIC). Uncommon in the Study Area (Lawson and Gosselin 2009). **Biology and Ecology** • Usually found in offshore waters, and associated with shelf edge in the northwest Atlantic (Hain et al 1985). • World-wide distribution, but generally found at temperate latitudes (Perry et al 1999). • In the Northwest Atlantic, migrate north along the continental slope in July-August, and return south in September to November for breeding and calving (Mitchell and Chapman 1977). • Typically solitary or in groups of two to three. • Sexual maturity at 5 - 15 years of age, on average. Gestation 10.5 - 12 months, and inter-calving interval is 2 - 3 years (COSEWIC 2003). • Feed on copepods, krill and small fish. Fast swimmers, but shallow divers (Reilly et al 2008c). **Environmental Preferences** Present: Jul-Nov — 100 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details
Common Minke Whale (*Balaenoptera acutorostrata*)	**Population** North Atlantic (*acutorostrata* subspecies) **Status** Not At Risk (COSEWIC). Relatively common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 1,315 individuals (95 percent confidence limits: 855 - 2,046) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Occurs in both coastal and offshore waters. Worldwide distribution, but uncommon in the tropics (ACS 2006). In the Northwest Atlantic, common in the waters off New Jersey to Baffin Island during spring and summer. Particularly common on the Grand Banks where prey is abundant (Piatt et al 1989). Very little information on winter distribution, but it is possible that some individuals remain within the summer range year-round (Reilly et al 2008d). • Usually observed singly, but may be seen in groups of 2 – 6. Where food is concentrated (generally in polar regions), larger aggregations occur. • Sexual maturity at 7 - 8 years of age. Gestation approximately 10 - 11 months, and inter-calving interval is 2 years (ACS 2006). • Feed on small schooling fishes such as capelin and sandlance, as well as copepods and krill (ACS 2006). **Environmental Preferences** Present: Year round Common: Apr-Aug — 100 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Balaenidae - The Right Whales	
North Atlantic Right Whale (*Eubalaena glacialis*)	**Population** Western North Atlantic **Status** Endangered (*SARA* Schedule 1 and COSEWIC). The western North Atlantic population in 2010 was estimated at about 468 animals (COSEWIC 2013). Only rarely sighted in the Study Area; none were observed during aerial surveys conducted in 2007 off of Eastern and Southern Newfoundland (Brown et al 2009; Lawson and Gosselin 2009).

Species	Details
	Biology and Ecology • Usually found in waters 100 – 200 m deep with surface temperatures between 8 and 15°C (Kenney 2001). The species was formerly distributed throughout the North Atlantic; however, it appears to be extinct in the eastern North Atlantic (Reilly et al 2012). • Known to aggregate in five seasonal habitat areas along the east coast of North America, all of which are south of Newfoundland. Within their range, distribution can shift dramatically with prey distribution and abundance. Calving takes place in the winter in the waters off of Georgia south to Florida; winter distribution of males and non-calving females is poorly known, but they are thought to be scattered along the waters off the eastern US as far north as Cape Cod Bay (Winn et al 1986). • Sexual maturity at approximately 10 years of age. Gestation approximately 12 months, and inter-calving interval is 3 - 5 years (COSEWIC 2013). • Feed on plankton, primarily copepods, with a typical dive depth of around 150 m (Kenney 2001, Baumgartner and Mate 2003). **Environmental Preferences** Present: Jun-Sep — 150 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

4.2.3.2 Odontoctes

The suborder Odontoceti includes toothed whales, dolphins and porpoises. In the waters off Eastern Newfoundland, six species of larger toothed whales have been reported, along with four dolphin species and one porpoise. Table 4.15 summarizes key life history and habitat information for toothed whales, dolphins and porpoises that do or may occur in the Study Area.

Table 4.15 Overview of Toothed Whales Known or Likely to Occur within the Study Area

Species	Details
Physeteridae - The Sperm Whales	
Sperm Whale (*Physester macrocephalus*)	**Status** Not At Risk (COSEWIC). Uncommon in the Study Area; just 2 groups totaling 11 individuals were observed in 2007 DFO surveys (Lawson and Gosselin 2009). However, the western North Atlantic population appears healthy, with reasonably high population density and reproduction (NMFS 2000). **Biology and Ecology** • Generally a deep-water species (over 1000 m), but has been sighted in coastal waters. Worldwide distribution, though most abundant in tropical and temperate waters over 15°C (Rice 1989). • Adult females and juveniles generally found in tropical and subtropical waters year-round; adult males often found in higher latitudes outside of the breeding season (Rice 1989). Males usually observed singly. • Sexual maturity at 7 - 13 years of age for females; somewhat later for males. Gestation approximately 14 - 16 months, and inter-calving interval is 3 - 6 years (Shirihai and Jarrett 2006). Feed primarily on deep-water squid (Shirihai and Jarrett 2006).

Species	Details
	Environmental Preferences Present: Year round — 800 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Ziphiidae - The Beaked Whales	
Northern Bottlenose Whale (*Hyperoodon ampullatus*)	**Population** Davis Strait; Scotian Shelf **Status** Davis Strait population: Special Concern (COSEWIC); Scotian Shelf population: Endangered (*SARA* Schedule 1). The Scotian Shelf population, though apparently stable, is estimated at only 164 individuals; numbers and population trends for the Davis Strait population are unknown (COSEWIC 2011). Small numbers have been observed in the Study Area (Lawson and Gosselin 2009), though it is not clear as to which population these individuals belong. **Biology and Ecology** • Found in deep waters, typically 800 m to 1500 m. Distribution is restricted to the North Atlantic; in western North Atlantic, they are found from Baffin Island to New England (Taylor et al 2008a). • May be found in groups of up to 20 individuals. • The Scotian Shelf population is believed to be non-migratory. While the Davis Strait population appears to move north to south seasonally, these patterns are not consistent, as there have been sightings in the winter (Benjaminsen and Christensen 1979; Reeves et al 1993). • Females reach reproductive age at 8 - 13 years, males at 7 – 9. Gestation approximately 12 months, and inter-calving interval is 2 years (Benjaminsen and Christensen 1979). • Feed on deep-water squid, some fish and invertebrates; usually feed at or near the sea bed at depths of 800 m or more (Hooker and Baird 1999). **Environmental Preferences** Present: Year round — 800 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Sowerby's Beaked Whale (*Mesoplodon bidens*)	**Population** Atlantic Ocean **Status** Special Concern (*SARA* Schedule 1 and COSEWIC). No population estimate exists (COSEWIC 2006c; Taylor et al 2008b).

Species	Details
	Biology and Ecology • Generally found in deep water environments (550 m to over 1500 m), including continental shelf edges and slopes. Distribution is limited to the colder waters of the North Atlantic; in North America, they occur from Massachusetts north to Labrador (Taylor et al 2008b). • Seasonal movements unknown; all confirmed sightings off Newfoundland have been in the summer months, but this may be due to the relatively higher search effort relative to other times of the year (COSEWIC 2006c), but a stranded female was reported in February 2015 at Point Lance, near Cape St. Mary's (CBC 2015). • Most sightings and strandings are of groups of 3 - 10 individuals. • Life history poorly understood; females attain sexual maturity upon reaching a length of between 4.6 and 4.8 m, while males are apparently sexually mature at 5.0 m (COSEWIC 2006c). • Feed on squid and fish, including cod (Ostrom et al 1993). **Environmental Preferences** Present: Year round — 1,000 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Monodontidae - The Belugas and Narwhals	
Beluga Whale (*Delphinaptera leucas*)	**Population** St. Lawrence Estuary **Status** Threatened (*SARA* Schedule 1), Endangered (COSEWIC). Abundance is estimated at 952 individuals, and the numbers are believed to be stable or increasing (Gosselin et al 2001). As they seldom range far from the St. Lawrence Estuary, belugas are likely to be extremely rare in the Study Area. **Biology and Ecology** • Typically found in coastal waters (ACS 2006). In the summer, St. Lawrence population is concentrated in comparatively warm and shallow waters near the outlet of the Saguenay River to calve; in the winter months, they disperse from estuarine habitats, regularly occurring as far downstream as the western end of Anticosti Island (COSEWIC 2004). • St. Lawrence population is considerably less migratory than some high-Arctic populations (Jefferson et al 2013). May aggregate in large numbers in spring (COSEWIC 2004). • Sexual maturity at 4 - 7 years of age for females, 6 - 7 for males (COSEWIC 2004). Gestation approximately 14 months, and inter-calving interval is 3 years (ACS 2006). • Feed on a variety of prey items including small squid, crabs, clams, shrimp, sandworms, and various kinds of fish, typically at depths to about 20 m, although they do occasionally dive deeper (ACS 2006). **Environmental Preferences** Present: Sep-Feb — 20 — Coastal/Estuarine *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details
Delphinidae - The Dolphin Family	
Killer Whale (*Orcinus orca*)	**Population** Northwest Atlantic/Eastern Arctic **Status** Special Concern (COSEWIC). The population size is estimated at less than 1000 individuals (COSEWIC 2008). **Biology and Ecology** • Occur in nearshore and pelagic environments, and tolerate a broad range of temperatures. Found in all oceans, although they tend to be concentrated in areas of high productivity (Forney and Wade 2006). • Not known to be reliably migratory (Higdon 2007); small numbers observed year-round in the Study Area (Lien et al 1988; Lawson and Gosselin 2009). • Usually observed in matrilineal groups of a few up to tens of individuals. • Sexual maturity at 14 - 15 years of age for females, and 13 years for males. Gestation approximately 16 - 17 months, and inter-calving interval is 5 years Calving peaks from fall to spring. (Olesiuk et al 2005). • Prey on a diverse variety of items including marine mammals, seabirds, fish and squid, and have been known to cooperate to herd prey (Taylor et al 2013). **Environmental Preferences** Present: Year round — 60 — Coastal/Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Long-finned Pilot Whale (*Globicephala melas*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Abundance in western North Atlantic is estimated at 31,000 individuals (Waring et al 2006) **Biology and Ecology** • Occur in high densities over the continental slope in winter and spring months in the western North Atlantic; in summer and autumn, they move off the shelf (Taylor et al 2008c). Considered to be abundant in the Grand Banks from July to December (LGL Limited 2003). • Typically found in deep water with steep bottom topography in temperate to subpolar latitudes (Kingsley and Reeves 1998). In the northern hemisphere they are found only in the North Atlantic; circum-Antarctic distribution south of the equator (Taylor et al 2008c). • Very social, occurring in pods of 20 to 90 individuals. Pods are known to strand en masse (ACS 2006). • Sexual maturity at 6 - 7 years of age. Gestation approximately 12 - 15 months, and inter-calving interval is 3 - 5 years (ACS 2006). • Feed on cephalopods and fish (Taylor et al 2008c). **Environmental Preferences** Present: Year round — 500 — Open Ocean

Species	Details		
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Common Bottlenose Dolphin (*Tursiops truncatus*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Likely uncommon in the Study Area, as they tend to frequent more tropical waters. None were observed in 2007 DFO aerial surveys (Lawson and Gosselin 2009). **Biology and Ecology** • Primarily coastal, but also found in inshore, shelf and offshore areas. Worldwide distribution in temperate and tropical waters; seldom found north of 45° latitude (Hammond et al 2012a). • Many populations non-migratory; however, near the extremes of the species' range, they do undertake migration (Hammond et al 2012a); unlikely to occur in the Study Area outside the summer months. • Usually seen in large groups, often mixed with other cetaceans, including large whales and other dolphin species (Hammond et al 2012a). • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed primarily on fish and squid (Hammond et al 2012a). **Environmental Preferences**		
	Present: Jun-Sep	50	Coastal/Open Ocean
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Short-beaked Common Dolphin (*Delphinus delphis*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Fairly common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 576 individuals (95 percent confidence limits: 314 - 1,056) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Occurs in nearshore and offshore waters in tropical to cool temperate latitudes in the Atlantic and Pacific (Hammond et al 2008a). In the northwest Atlantic, most abundant south of George's Bank (Reeves et al 1999). • In the waters off Newfoundland, usually observed in groups of 50 - 200 individuals (Reeves et al 1999). • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed on small schooling fishes and squid; will move to follow aggregations of prey (Hammond et al 2008a). **Environmental Preferences**		
	Present: Year round	200	Coastal/Open ocean

Species	Details		
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Atlantic White-sided Dolphin (*Lagenorhynchus acutus*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 1,507 individuals (95 percent confidence limits: 968 - 2,347) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Non-migratory. Occurs along the continental shelf and slope, as well as offshore, in cold temperate to subpolar latitudes in the North Atlantic (Hammond et al 2008b). • Often associate with other cetaceans, including baleen whales, pilot whales and other dolphin species (Hammond et al 2008b). • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed on small schooling fishes, shrimp and squid, typically in waters 40 - 270 m deep (Hammond et al 2008b). **Environmental Preferences**		
	Present: Year round	200	Open Ocean
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
White-beaked Dolphin (*Lagenorhynchus albirostris*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 1,842 individuals (95 percent confidence limits: 1,118 - 2,854) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Non-migratory; will move to follow aggregations of prey. Typically found in coastal and continental shelf areas in relatively shallow (less than 200 m) waters in cool temperate to subpolar regions of the North Atlantic (Reeves et al 1999; Hammond et al 2012b). • Associate with other cetaceans, including large whales and other dolphin species (Reeves et al 1999). • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed on small schooling fish, squid and crustaceans (Hammond et al 2012b). **Environmental Preferences**		
	Present: Year round	200	Coastal/Open ocean

Species	Details		
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Striped Dolphin (*Stenella coeruleoalba*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Unlikely to be common in the Study Area, as they are typically found in more southerly waters; none were observed in 2007 DFO surveys (Lawson and Gosselin 2009). **Biology and Ecology** • Occurs in tropical and warm-temperate latitudes in the Atlantic, Pacific and Indian Oceans (Hammond et al 2008c). In the northwest Atlantic, appear to prefer continental slope waters offshore of the Gulf Stream (Hammond et al 2008c). • Will move to follow aggregations of prey, but Atlantic populations are not known to be migratory. • Usually observed in large groups, often with other dolphin species. • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed on pelagic and benthopelagic fishes and squid (Hammond et al 2008c) in depths to 700 m. **Environmental Preferences**		
	Present: Year round	700	Open ocean
	Seasonal Presence	Foraging Depth (m)	Marine Habitat
Risso's Dolphin (*Grampus griseus*)	**Population** Atlantic Ocean **Status** Not At Risk (COSEWIC). Believed to be abundant throughout their range (ACS 2006); however, unlikely to be common in the Study Area as they are typically found in more southerly waters. None were observed in 2007 DFO surveys (Lawson and Gosselin 2009). **Biology and Ecology** • Occurs in deep (400 - 1000 m) oceanic and continental shelf and slope areas in tropical to temperate (mainly warm-temperate) latitudes in the Atlantic and Pacific (Taylor et al 2012; ACS 2006). • General migrations are not known; some individuals move to cooler waters (e.g. the Study Area) during the summer (ACS 2006). • Usually observed in groups of 3 - 30 individuals (ACS 2006). • Dolphins generally reach sexual maturity at 3 - 4 years, and gestation is from 10 - 14 months (ACS 2006). • Feed on cephalopods (mainly squid) and crustaceans occurring in deep waters (Taylor et al 2012). **Environmental Preferences**		
	Present: Jun-Sep	1,000	Open ocean

Species	Details		
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*
Phocoenidae - The Porpoises			
Harbour Porpoise (*Phocoena phocoena*)	**Population** Atlantic Ocean **Status** Special Concern (COSEWIC); Threatened (*SARA* Schedule 2). Fairly common in the Study Area; abundance estimate in Southern and Eastern Newfoundland is 1,195 individuals (95 percent confidence limits: 639 - 1,195) based on 2007 surveys. Estimate is considered by the authors to be preliminary, as it has not been corrected for perception biases (Lawson and Gosselin 2009). **Biology and Ecology** • Occurs in cold temperate to sub-polar waters in the northern hemisphere, usually in coastal shelf waters in shallow bays and estuaries less than 200 m in depth, although occasionally offshore (Hammond et al 2008d). • Movements of porpoises in the waters off Newfoundland are poorly known (COSEWIC 2006c). • Usually observed in groups of 1 - 3 individuals, often including at least one calf (COSEWIC 2006c). • Reach sexual maturity at 3 - 4 years, and gestation is 10 - 11 months (ACS 2006). Intercalving interval of 1 - 2 years (COSEWIC 2006c; ACS 2006). • Feed on small schooling fishes and cephalopods (Hammond et al 2008d). **Environmental Preferences**		
	Present: Year round	40	Coastal/Estuarine
	Seasonal Presence	*Foraging Depth (m)*	*Marine Habitat*

4.2.3.3 Pinnipeds

Four seal species are known to occur regularly in the Study Area, a summary of the key characteristics of which is provided in Table 4.16. Two additional species, the bearded and ringed seal, are typically Arctic dwellers, although they may occasionally occur in the Study Area in the winter months.

Table 4.16 Overview of Pinnipeds Known or Likely to Occur within the Study Area

Species	Details
Phocidae - The Earless Seals	
Harp Seal (*Pagophilus groenlandicus*)	**Population** Western North Atlantic (*groenlandicus*) subspecies **Status** Populations are considered secure; it is the most abundant pinniped in the northern hemisphere, and numbers are increasing (Kovacs 2008a). The Northwest Atlantic stock is estimated at 5,900,000 (DFO 2005). **Biology and Ecology** • Summer in the Canadian Arctic and Greenland, migrating to the Gulf of St. Lawrence in December - January and returning north in April - May after breeding. Presence in the Study Area is likeliest in the winter months, when the Grand Banks provide an important feeding/overwintering area (Lesage et al 2007; Templeman 2007). • Widespread in pack ice in coastal and offshore waters of the North Atlantic and adjacent Arctic Ocean (Kovacs 2008a). • Highly social, travelling and foraging in groups (Kovacs 2008a). • Reach sexual maturity at 4 - 8 years, and gestation is 11.5 months. Pups are born on pack ice and nursed for approximately 12 days (Kovacs 2008a). • Feed on a wide variety of fish and invertebrates; typical diving depths up to 100 m, although deeper dives have been documented (Kovacs 2008a; Hammill and Stenson 2000). **Environmental Preferences** Present: Dec-Apr — 100 — Open ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Harbour Seal (*Phoca vitulina*)	**Population** Western Atlantic (*concolor*) subspecies **Status** Not At Risk (COSEWIC). Populations have been stable and likely increasing since the 1980s.

Species	Details
	Biology and Ecology • Very widespread distribution; occurs in temperate to polar latitudes in the northern hemisphere in coastal waters, bays, rivers, estuaries and intertidal areas (Thompson and Härkönen 2008a). • Generally considered non-migratory (Thompson and Härkönen 2008a); likely present in the Study Area year-round (Lesage et al 2007). • Gregarious at haul-out areas, but at sea, most often seen alone or in small groups (Thompson and Härkönen 2008a). • Reach sexual maturity at 3 - 4 years, and gestation is 10.5 - 11 months (Thompson and Härkönen 2008a). • Generalist feeders, taking a wide variety of fish, cephalopods and crustaceans from surface, mid-water, and benthic habitats, typically diving to a depth of 100 m (Olesiuk et al 1990). **Environmental Preferences** Present: Year round — 20 — Coastal *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Hooded Seal (*Cystophora cristata*)	**Population** East Coast Canada breeding stock **Status** Not At Risk (COSEWIC). In the northwest Atlantic, populations are stable or increasing slightly (Kovacs 2008b). **Biology and Ecology** • Occurs in high latitudes in the North Atlantic and into the Arctic Ocean. Associated with pack ice during breeding and over much of the year, but also spend significant periods of time at sea without hauling out (Lavigne and Kovacs 1988; Kovacs 2008b). • Congregate at one of four major pupping areas in mid-March, where they remain for approximately 2.5 weeks (Kovacs 2008b); individuals in the Study Area pup near the Magdalen Islands. Individuals again congregate in August for moulting. Following the moulting period, seals disperse throughout the North Atlantic (Kovacs 2008b). Primarily found in the winter months in the Study Area (Lesage et al 2007). • Form loose aggregations during breeding and moulting, but otherwise believed to be solitary (Kovacs 2008b). • Pups are born on pack ice and nursed for just 4 days (Kovacs 2008b; Bowen et al 1985). • Feed on a wide variety of fish and invertebrates throughout the water column (Kovacs 2008b), typically diving to depths of 100 - 600 m. **Environmental Preferences** Present: Year round — 600 — Open ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

Species	Details
Grey Seal (*Halichoerus grypus*)	**Population** West Atlantic (*grypus*) subspecies **Status** Not At Risk (COSEWIC). Populations apparently secure, numbering approximately 250,000 in the western Atlantic, divided between two herds, one in the Gulf of St Lawrence and the other at Sable Island (DFO 2006b). **Biology and Ecology** • Occurs in cold temperate to sub-Arctic regions of the North Atlantic, over the continental shelf; in the West Atlantic, ranges from the Gulf of Maine to southern Labrador (Thompson and Härkönen 2008b). • Not long-distance migrants, but will forage hundreds of kilometres from haul-out sites (Thompson and Härkönen 2008b). Pupping peaks in January in the Gulf of St. Lawrence and Sable Island colonies, and moulting occurs in the spring. Most abundant in the Study Area in the summer months, although they occur year round (Lesage et al 2007; Stenson 1994). • Pups may be born on land or pack ice, and are nursed for 15 - 18 days (Thompson and Härkönen 2008b). • Feeds primarily on fish, typically diving to depths of 30 - 70 m; in Canada, Atlantic cod, herring and capelin are the main species taken (Thompson and Härkönen 2008). **Environmental Preferences** Present: Year round Common: Apr-Aug — *Seasonal Presence* 70 — *Foraging Depth (m)* Coastal/Open ocean — *Marine Habitat*

4.2.3.4 Sea Turtles

Three species of sea turtles do or may occur in the Study Area, as described in Table 4.17.

Table 4.17 Overview of Sea Turtles Known or Likely to Occur within the Study Area

Species	Details
Dermochelyidae - The Leatherback Turtle	
Leatherback Sea Turtle (*Dermochelys coriacea*)	**Population** Atlantic **Status** Endangered (*SARA* Schedule 1, COSEWIC). Populations in the northwest Atlantic are increasing (Wallace et al 2013), and estimates in the North Atlantic range from 34,000 - 94,000 individuals (COSEWIC 2012d). They are considered a regular but uncommon part of the Newfoundland marine fauna (Goff and Lien 1988). **Biology and Ecology** • Occurs in tropical to sub-polar regions in the Atlantic, Pacific and Indian oceans. They are predominantly pelagic, typically inhabiting coastal shelf waters to a depth of less than 200 m (COSEWIC 2012d). • Undertake extensive migrations between different feeding areas at different seasons, and to and from nesting areas in the tropics (Wallace et al 2013). In Atlantic Canadian waters, present from April to December and most numerous from July to September; the south coast of Newfoundland, in particular the Placentia Bay area, is a relatively high-use habitat for this species, particularly in the summer and fall (Templeman 2007). • Females produce 3 - 10 clutches of 60 - 90 eggs per season, with an inter-migration interval of 2 or more years between reproductive seasons (Wallace et al 2013) • Feed primarily on jellyfish and other gelatinous organisms (COSEWIC 2012d); typical diving depth of adults is 16 to 90 m (Wyneken et al 2013). **Environmental Preferences** Present: Apr-Dec — 90 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Cheloniidae - The Sea Turtles	
Loggerhead Sea Turtle (*Caretta caretta*)	**Population** Atlantic **Status** Endangered (COSEWIC). No population estimate available; they are believed to be the most abundant marine turtle in Canadian waters (COSEWIC 2010c), but are less commonly observed than Leatherbacks in the Study Area. **Biology and Ecology** • Occurs in temperate to tropical regions of the Atlantic, Pacific and Indian Oceans. Nest on ocean beaches; outside of nesting, they inhabit the oceanic and near-shore zones of temperate and tropical waters (COSEWIC 2010c). In the waters off Atlantic Canada, they are generally associated with the warmer waters of the Gulf Stream. • Nests in tropical to sub-tropical regions, and undertake extensive lateral migrations between different feeding areas at different seasons, as well as north-south

Species	Details
	migrations to and from nesting areas in the tropics. In Atlantic Canadian waters, they are most abundant in the spring, summer and fall (Canadian Sea Turtle Sighting Database, cited in COSEWIC 2010c). • Lay 3 - 4 clutches of over 100 eggs per season, with an interval of 2 - 3 years between breeding seasons (Miller 1997). • Feeds on crustaceans, molluscs and jellyfish (COSEWIC 2010c), routinely diving to depths of 3 to 60 m (Wyneken et al 2013).
	Environmental Preferences Present: Apr-Dec — 60 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	**Status** Critically endangered; however, populations are showing signs of recovery in the last 50 years (Marine Turtle Specialist Group 1996). **Biology and Ecology** • Extremely restricted breeding range in the Atlantic coast of Mexico and Texas. Outside the nesting season, occurs offshore in the Northwest Atlantic in tropical and temperate waters, usually as far north as New Jersey (Marine Turtle Specialist Group 1996); however, juveniles occasionally wander further north and may occur in the Study Area. • Nesting occurs from April to July, after which females return to the offshore environment. Individuals forage in coastal areas along coastal United States, more northerly feeders moving to more favourable overwintering sites south of Cape Hatteras in late fall (NMFS et al 2010). • Lay 2 - 3 clutches of over 100 eggs per season, with an interval of 1 - 3 years between breeding seasons (Marine Turtle Specialist Group 1996). • Feeds on crustaceans, fish, molluscs and jellyfish (Marine Turtle Specialist Group 1996). No data on adult foraging depth, but maximum recorded diving depth of juveniles is 5 m (Sasso and Witzell 2006). **Environmental Preferences** Present: Jun-Sep — 5 — Open Ocean *Seasonal Presence* — *Foraging Depth (m)* — *Marine Habitat*

4.2.3.5 Species at Risk and Otherwise of Special Conservation Concern

A number of marine mammal and sea turtle species at risk and other species of conservation concern occur in the waters offshore Eastern Newfoundland (Table 4.18).

Table 4.18 Overview of Marine Mammal and Sea Turtle Species at Risk or Otherwise of Special Conservation Concern

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	***SARA* Listing**	**COSEWIC Assessment**		
Blue Whale - Atlantic Population	Endangered Schedule 1	Endangered	• Coastal and pelagic waters; frequently at shelf edge where food production is high (Schoenherr 1991). • Found in all oceans except the Arctic (Reilly et al 2008b). • No critical habitat has been identified for the species.	Present in small numbers throughout the year; most common in the winter and early spring.
Fin Whale - Atlantic Population	Special Concern Schedule 1	Special Concern	• Coastal shelf edge and offshore (COSEWIC 2005). • World-wide distribution; most abundant in temperate and polar latitudes (Reeves et al 2002) • Summer distribution is typically in areas with high prey concentration (e.g., the Grand Banks).	Present year-round, but likely most common in the summer months.
North Atlantic Right Whale	Endangered Schedule 1	Endangered	• Usually found in waters 100 – 200 m deep with surface temperatures between 8 and 15°C (Kenney 2001). • Distribution shifts with prey distribution and abundance. • Aggregate in five seasonal habitat areas along the east coast of North America, including two in Canada: the lower Bay of Fundy and Roseway Basin on the Scotian Shelf. These two areas have been designated as critical habitat for the species (Brown et al 2009).	Likely to be very rare visitors to the area, primarily in the summer months.
Northern Bottlenose Whale - Davis Strait population; Scotian Shelf population	Endangered Schedule 1 (Scotian Shelf population)	Special Concern (Davis Strait population) Endangered (Scotian Shelf 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). • Davis Strait population seemingly tends to migrate north to south seasonally; however, patterns are not consistent (Reeves et al 1993). • Scotian Shelf population apparently non-migratory. Three marine	May be present in small numbers in the area year round; most sightings have been in the spring and summer. It is unclear to which population individuals observed in the Study Area belong.

Species	Federal Status		Habitat and Distribution	Potential Presence in Study Area
	SARA Listing	COSEWIC Assessment		
			canyons, all along the Scotian Shelf, have been identified as critical habitat for this population (DFO 2010c).	
Sowerby's Beaked Whale	Special Concern Schedule 1	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 2008).	May be present year round in deep water habitats.
Beluga Whale (St. Lawrence Estuary population)	Threatened Schedule 1	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 2004). • 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).	Small numbers have been observed in the area at all times of year.
Harbour Porpoise	none	Special Concern	• Coastal shelf, bays and estuaries; occasionally offshore (Hammond et al 2008d). • Found in cold waters throughout the northern hemisphere (Hammond et al 2008d). • Seasonal movements poorly known.	Fairly common in the Study Area, possibly present year round.
Leatherback Sea Turtle (Atlantic population)	Endangered Schedule 1	Endangered	• Typically found in coastal shelf waters with depths of less than 200 m. • Range from tropical to sub-polar regions in the Atlantic, Pacific and Indian oceans (COSEWIC 2012c). • Undertake extensive migrations between feeding areas and to tropical nesting areas (Wallace et al 2013). • To date, critical habitat has not been	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 Listing	COSEWIC Assessment		
			identified; however, DFO (2012b) observed three high-use feeding areas: 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 2013d).	
Loggerhead Sea Turtle	none	Endangered	• Found in oceanic and near-shore zones of temperate and tropical Atlantic, Pacific and Indian Oceans. (COSEWIC 2010c). • Nest on beaches in subtropical and tropical climates. • In Atlantic Canada, most abundant in spring to fall, and generally associated with the Gulf Stream.	Uncommon; most frequently observed in the spring to summer months.

A third sea turtle species, the Kemp's ridley, has not been assessed by COSEWIC, but is considered by the International Union for Conservation of Nature (IUCN) to be critically endangered. This species is usually found south of New Jersey, but juveniles are sometimes observed further north and could potentially occur in the Study Area in the summer months.

4.2.3.6 Key Areas and Times for Marine Mammals and Sea Turtles

Figures 4.65 to 4.67 (data from DFO Marine Mammals Sightings Database, which includes sightings from the late 1940s to 2013) depict the locations of marine mammal (baleen whales, large toothed whales, and dolphin and porpoises) observations reported off Eastern Newfoundland (Database provided by Dr. Jack Lawson of DFO).

Although useful and informative at a regional scale, there are a number of caveats associated with this dataset which should initially be noted (J. Lawson, pers. comm.). Firstly, the sighting data have not been completely error-checked by DFO, 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. As the sighting effort has not been quantified, the numbers cannot be used to estimate true species density or abundance for an area, and a lack of sightings does not necessarily indicate a lack of presence in a particular location. 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. Sightings of unidentified whales that were not identified as either toothed or baleen whales are not included in the Figures, although these make up only a small proportion (less than two percent) of the total number of sightings in the database.

In the Figures, it is evident that the greatest concentration of marine mammal sightings within the Study Area overall has occurred in the Southern Grand Banks area and within the 200 nautical mile limit; 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 continental shelf waters, but were particularly abundant on the Tail of the Grand Banks. Sperm whale sightings appeared to be highly associated with the continental slope.

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, five EBSAs are wholly or partly within the Study Area (Virgin Rocks, Southeast Shoal and Tail of the Banks, Lilly Canyon - Carson Canyon, Northeast Shelf and Slope, and Orphan Spur) and several more are situated nearby.

Table 4.19 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 seabirds.

Table 4.19 EBSAs within or in Proximity to the Study Area and their Importance to Marine Mammals and Seabirds

EBSA Name	Description	Importance to Marine Mammals and Seabirds
Southeast Shoal and Tail of the Banks	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.
Placentia Bay Extension	All of Placentia Bay, across the mouth of the bay from Point Crewe (Burin Peninsula) to Point Lance (Avalon Peninsula), and extending out to the 50 m isobath	• High level of biodiversity. • Supports important seabird breeding areas along the coast, as well as a high biomass of birds and mammals typical of river and estuarine habitats. • In the spring and summer, supports a high aggregation of cetaceans and leatherback sea turtles. • Otters and harbour seals use the area year round. • In terms of aggregation and fitness consequences, an important feeding area from spring to fall for many seabird species, cetaceans (especially humpbacks and porpoises) and leatherback turtles; otters, harbour seals and some cetaceans feed in the area year-round. • Important for reproduction of many seabird species, harbour seals and otters; female cetaceans with young inhabit the area during critical feeding periods. • Thought to be a possible migratory path for leatherbacks.
Southwest Shelf Edge and Slope	The area from 55°W to 52°W, encompassing the shelf edge of the Grand Bank to the 2000 m isobath	• Critical to a wide variety of seabirds, providing the highest density of pelagic seabird feeding within the Placentia Bay Grand Banks Large Ocean Management Area. • Many marine mammals and leatherback sea turtles aggregate here, particularly in the summer months.
Eastern Avalon Coast	The area from Blackhead to Cappahayden, out to the 100 m isobaths	• Potentially important feeding area for marine mammals, particularly humpback whales. • Many marine mammals aggregate in the area, particularly in the summer months. • Diverse assemblage of cetaceans, seals, leatherback sea turtles and seabirds feed in the area from spring to fall.
Lilly Canyon-Carson Canyon	The area 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.
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 1000 m isobath	• Moderate fitness consequences as a potentially important marine mammal feeding area; harp seals, hooded seals and pilot whales in particular aggregate in this area.
Fogo Shelf	Extends from the headlands at the	• Includes Funk Island, an important Common Murre and Northern Gannet breeding colony.

EBSA Name	Description	Importance to Marine Mammals and Seabirds
	western entrance of the Bay of Exploits, approximately follows the 200 m isobaths eastward to study area boundary near Cape Freels	• Common Eider, Atlantic Puffin, Great Black-backed Gull, Greater Shearwater, Herring Gull, Northern Fulmar, Thick-billed Murre and terns also aggregate in high concentrations. • Important cetacean feeding areas have also been identified in this area.
Notre Dame Channel	The southeast branch of a larger channel, this EBSA extends between the Fogo Shelf area and Funk Island Bank	• Harp seals are known to feed in this area in the winter months. • Significant area for cetacean feeding and migration. • Frequented by many seabird species, including Common and Thick-billed Murres, Black-legged Kittiwake, Great Black-backed Gulls, Northern Fulmar, phalaropes, skuas and jaegers, Sooty Shearwaters and storm-petrels.
Orphan Spur	Extends along Labrador Slope and Outer Shelf in NAFO Division 3K, and includes Orphan Spur and part of the Trinity Trough Mouth Fan	• Significant concentrations of marine mammals of several species. • Frequented by several seabird species, including Thick-billed Murre, storm petrels, Black-legged Kittiwake, skuas and jaegers, Northern Fulmar, Greater Shearwater and Dovekie.
Sources: Templeman (2007), DFO (2013b), Amec (2014)		

Critical habitat has been identified in the federal recovery strategies for the northern bottlenose whale (Scotian Shelf population) and the North Atlantic right whale. Critical habitat for the former species is located in three deep underwater canyons off the southern coast of Nova Scotia, along the Scotian Shelf (DFO 2010c). The North Atlantic right whale's critical habitat is located within the Bay of Fundy and off of southern Nova Scotia at Roseway Basin (Brown et al 2009). 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 (Beauchamp et al 2009).

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 2013d).

Key times of year for marine mammals and sea turtles, including species of conservation concern, are detailed in the preceding sections. In general, cetaceans and sea turtles are most abundant in the area during the summer months, when the Grand Banks and surrounding waters provide important feeding habitat. Pinnipeds are most abundant in the winter months, with the exception of grey and harbour seals which are present year-round.

Figure 4.65 Baleen Whale Sightings off Eastern Newfoundland

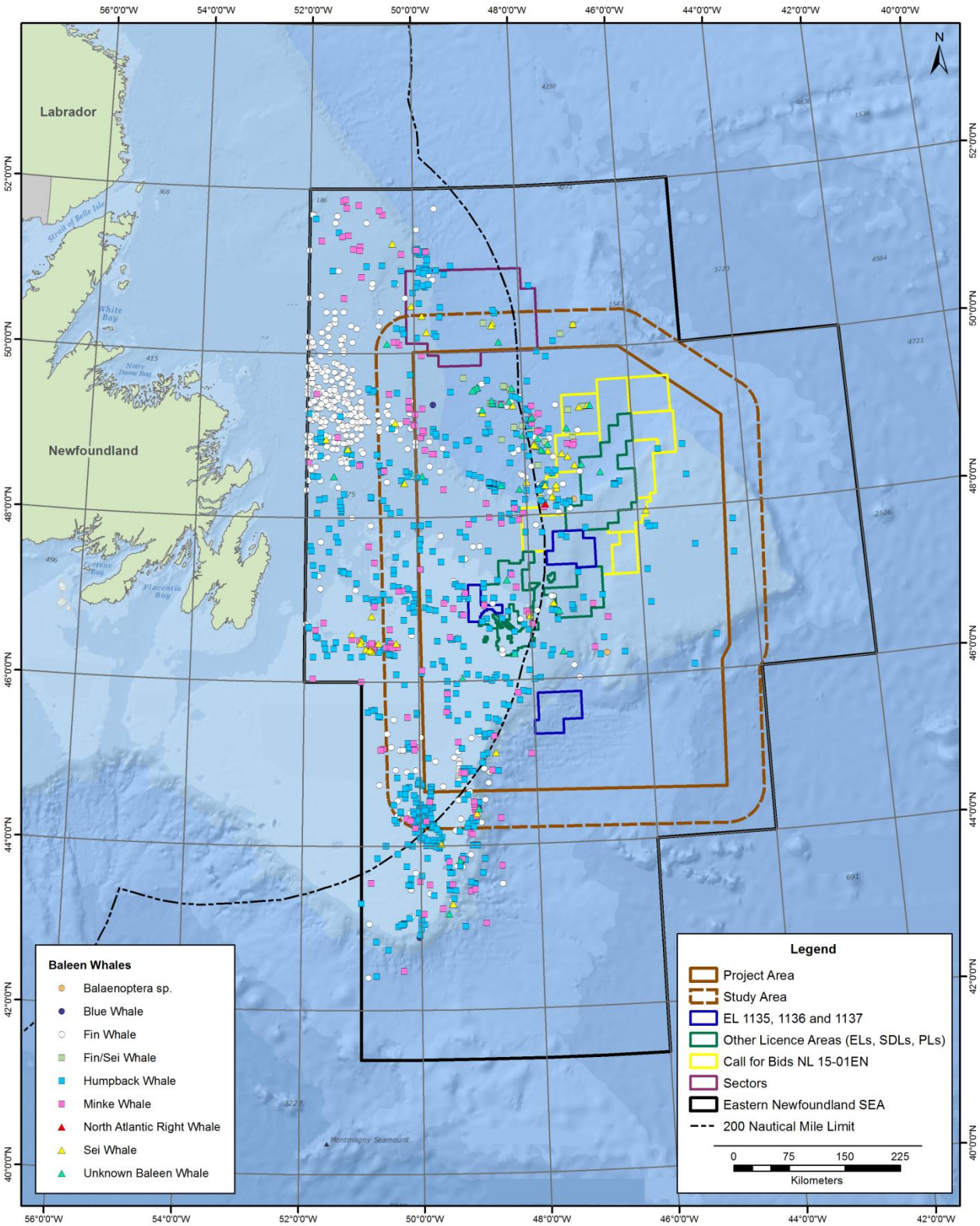


Figure 4.66 Large Toothed Whale Sightings off Eastern Newfoundland

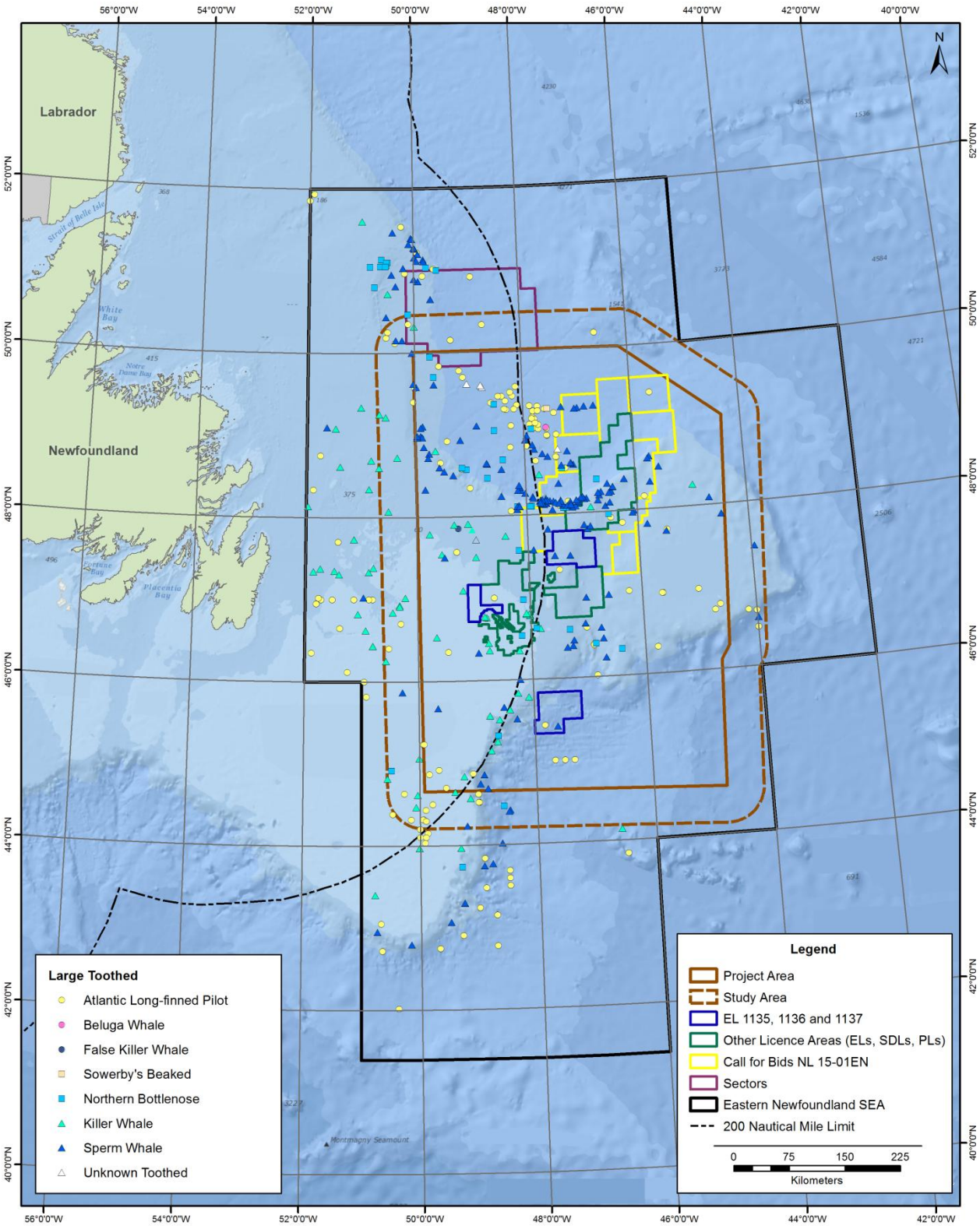
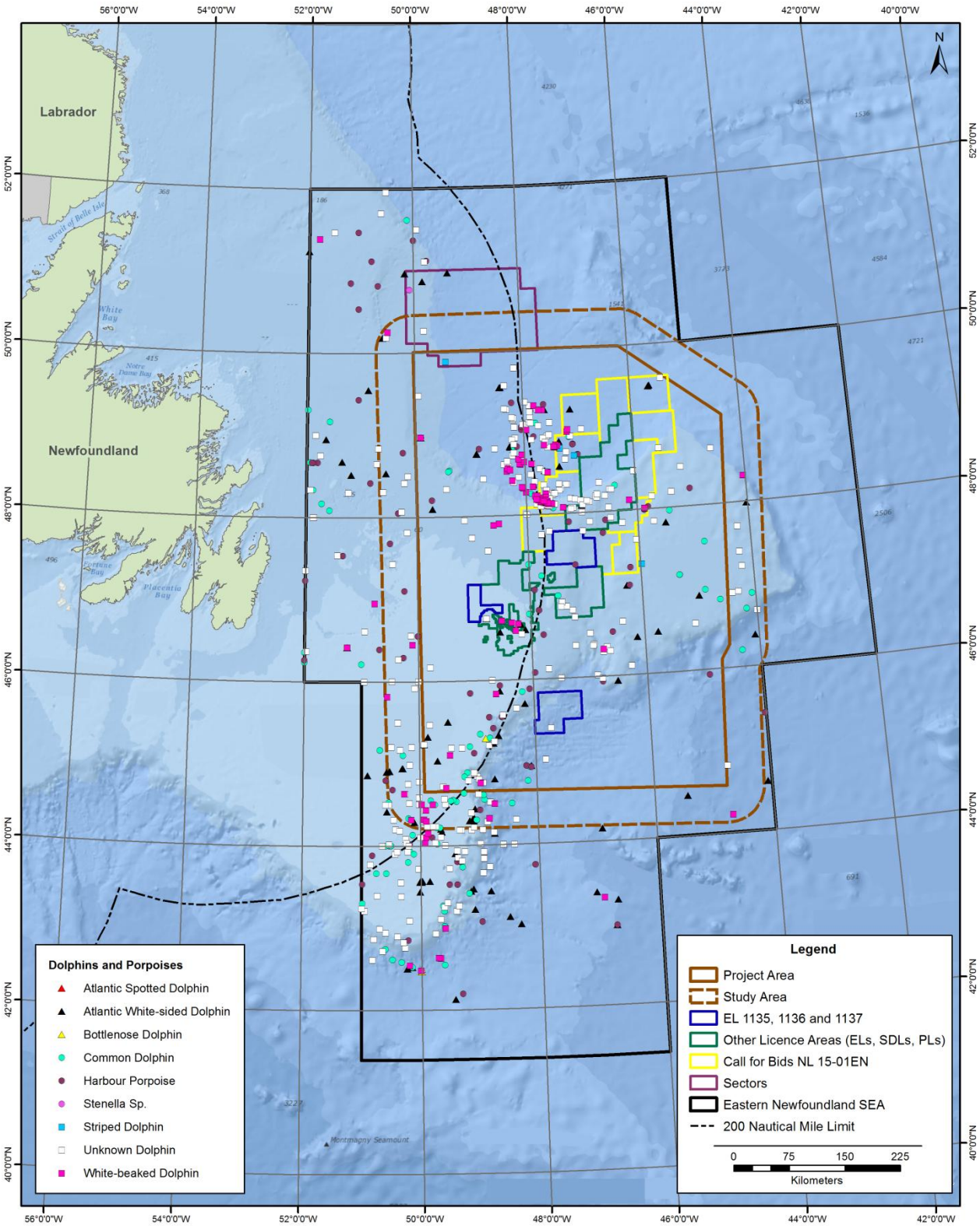


Figure 4.67 Dolphin and Porpoise Sightings off Eastern Newfoundland



4.2.4 Protected and Special Areas

In coastal and inland areas of Newfoundland and Labrador, as in the rest of Canada, unique or sensitive environments may be designated as protected through federal or provincial legislation or other means. These special places may be set aside to protect important or sensitive species and habitats, as representative natural areas, for cultural or historical reasons, and / or for human use and enjoyment.

This section discusses protected and identified sensitive areas in Eastern Newfoundland coastal and marine environments, beginning with any designated protected areas followed by a description of other areas that have been identified as sensitive but which do not have formal protection. The discussion focuses mainly on those protected and identified special areas that are located within the Study Area itself, which is within the offshore Newfoundland marine environment. Those that are located outside of the Study Area, particularly along the coast of Eastern Newfoundland or elsewhere, are discussed and mapped more generally, for background and reference.

4.2.4.1 Fisheries Closure Areas

The United Nations, General Assembly has defined Vulnerable Marine Ecosystems (VMEs) and mandated regional fisheries management organizations to adopt conservation measures to protect these areas from bottom fishing activities. The NAFO Scientific Council has identified VME candidate areas for corals, sponges and seamounts in NAFO areas 3LMNO (DFO 2012).

Through the Northwest Atlantic Fisheries Organization (NAFO) and in cooperation with other fishing nations of the northwest Atlantic, the Government of Canada has established various Fisheries Closure Areas (FCAs) to help conserve ocean bottom (benthic) species, habitats and biodiversity (Figure 4.68). Canadian NAFO closures are targeted towards VMEs that have been identified in response to a UN Directive to protect marine habitats that are vulnerable to alteration and will be slow to recover from disturbance (FAO 2009). Within the EEZ of Canada, DFO manages these areas through the *Fisheries Act* by restricting one or more types of bottom contact fishing gear. Outside of Canadian jurisdiction, DFO is responsible for the fishing activities of the Canadian fleet and other fishing vessels are administered by their respective country or flag state (DFO 2009).

NAFO reviews and updates FCAs on a regular basis by amending boundaries of existing areas or adding new closure areas (DFO 2014). In 2014, NAFO expanded an existing FCA, and added a new area, in international waters near the Flemish Cap to provide protection for sensitive coral and sponge areas. This action has resulted in a total of 20 fisheries closures in the northwest Atlantic (DFO 2011, 2014, 2015). Several of these NAFO FCAs are located within, or partially within, the Study Area and were established to protect sensitive habitats from damaging fishing activities such as trawling (Table 4.20 and Figure 4.68).

Figure 4.68 Protected and Special Areas

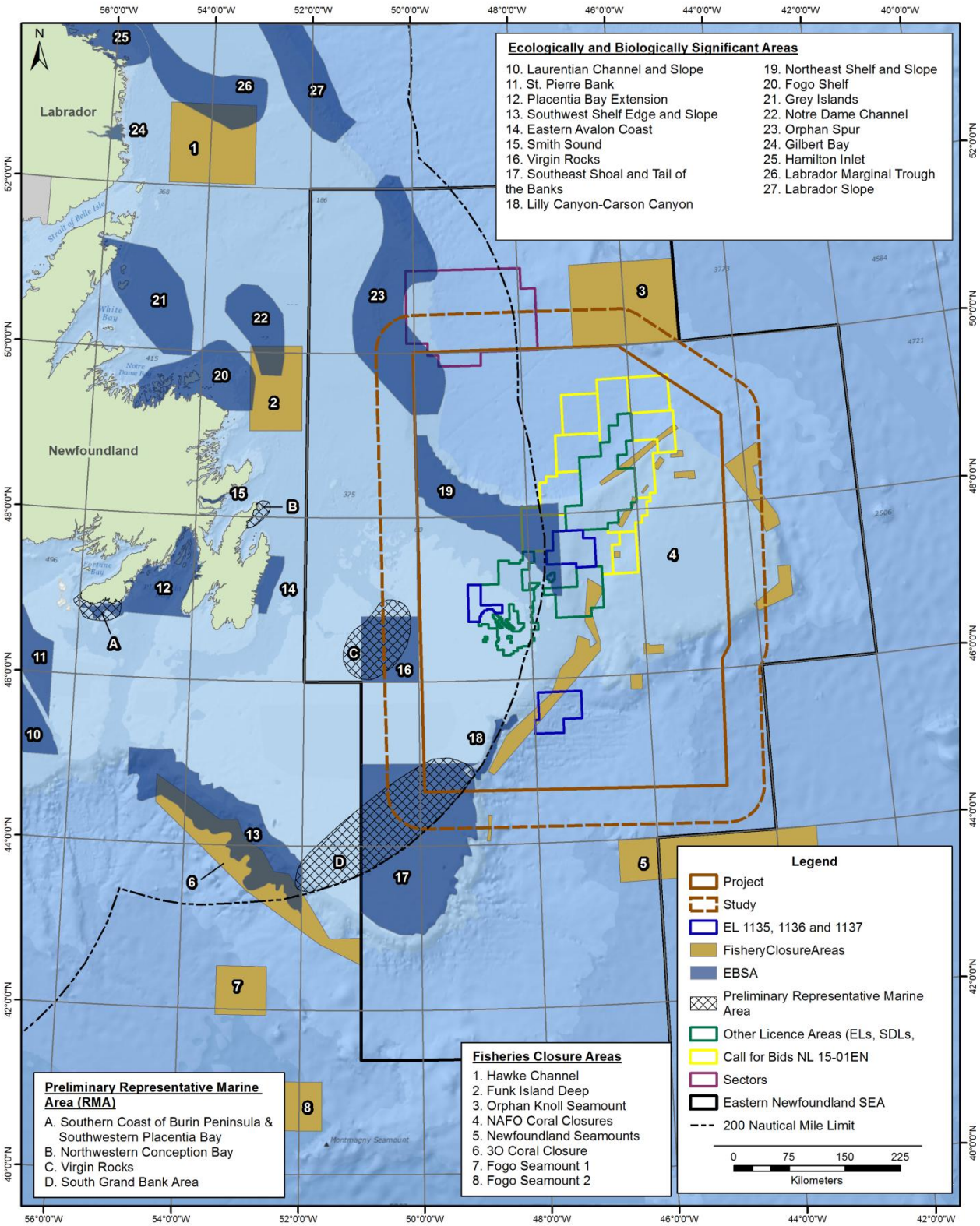


Table 4.20 Fisheries Closures in the Study Area

Name	Size (km^2)
Orphan Knoll Seamount	15,737
NAFO Coral Closures	12,324
Newfoundland Seamounts	16,114
Source: DFO (2011, 2015); NAFO (2013)	

4.2.4.2 Marine Protected Areas and Areas of Interest

Fisheries and Oceans Canada (DFO) is charged with establishing a network of Marine Protected Areas through Canada's *Ocean's Act*. Marine Protected Area (MPA) designation provides protection for marine ecosystems and their resources in areas that are ecologically significant, with species and / or properties that require special consideration. The first step in MPA establishment is the identification of Areas of Interest (AOI), which then undergo detailed evaluation and public consultation before a decision is made concerning formal designation. Two MPAs have been established in Newfoundland and Labrador and two AOIs are located near the southwest coast of Newfoundland (DFO 2014). No MPAs or AOIs have been identified within the Study Area.

4.2.4.3 National Marine Conservation Areas (Preliminary Representative Marine Areas)

Parks Canada establishes National Marine Conservation Areas (NMCAs) under the Canada *National Marine Conservation Areas Act*. NMCAs are marine areas managed for ecologically sustainable use and that contain smaller zones of protection. NMCAs include the seabed, the water column above it and may also take in wetlands, estuaries, islands and other coastal lands. The NMCA program has subdivided the Atlantic Ocean Marine Region into ten subregions for the purposes of evaluation and potential designation of protected areas. Conservation is the principal goal of NMCA protection but traditional fishing activities are permitted (Parks Canada 2013; Parks Canada 2012). No NMCAs have yet been established in the Study Area or elsewhere in Eastern Newfoundland.

Parks Canada has identified preliminary Representative Marine Areas (RMAs) in each of its 29 Marine Regions that encompass all of Canada's coastlines. One preliminary RMA will be selected as a preferred candidate for establishment of a NMCA within each Marine Region. Along with scientific study, formal establishment is subject to consultations with governments, stakeholders and the public. Four Preliminary RMAs have been identified off Eastern Newfoundland (Figure 4.68). The Virgin Rocks preliminary RMA and South Grand Bank Area preliminary RMA are both partially located within the Study Area (Parks Canada 2012, 2013; Amec 2014).

4.2.4.4 Ecologically and Biologically Significant Areas

As discussed in previous sections of this Chapter, the Placentia Bay / Grand Banks Large Ocean Management Area (PB / GB LOMA) has been designated by DFO under Canada's *Oceans Act* as it possesses 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 (DFO 2012). Along with protected areas established through legislation, DFO has also defined Ecologically and Biologically Significant Areas (EBSAs) within the PB / GB LOMA (Figure 4.68). This was achieved by ranking candidate areas using criteria of fitness consequence, aggregations, uniqueness, naturalness and resilience.

A number of EBSAs are located entirely or partially within the Study Area (Templeman 2007), as summarized in Table 4.21.

Table 4.21 EBSAs in the Study Area

EBSA	Description
Virgin Rocks	Identified as an EBSA partly because of high aggregations of capelin, as well as being a point of aggregation for several other spawning groundfish species such as Atlantic cod, American plaice and yellowtail flounder.
Southeast Shoal and Tail of the Grand Banks	Identified as an EBSA due to its importance to finfish, invertebrate and plankton communities. The Southeast Shoal was designated primarily because of its importance as a spawning area for several commercial (American plaice, yellowtail flounder, capelin and Atlantic cod) and non-commercial (northern sand lance) species. The EBSA contains a rare offshore spawning and aggregation area for capelin and is the single nursery area for the entire stock of yellowtail flounder. The Tail of the Grand Banks has been identified because it has the highest density of American plaice and yellowtail flounder on the Grand Banks. The EBSA is important to the benthic community, where wedge clams occur in extremely high densities and offshore blue mussels have the highest benthic biomass anywhere on the Grand Banks. The EBSA is an area of high productivity and has the densest concentrations of the listed striped wolfish and is an important seasonal forage area for marine mammals, especially humpbacks.
Lilly Canyon and Carson Canyon	Identified as an EBSA partly due to its importance as a feeding and high production area for Iceland scallops. It is an overwintering area for marine mammals and year-round aggregation area for feeding.
Northeast Shelf and Slope	Identified as an EBSA for having the highest concentrations of Greenland halibut and spotted wolffish, which aggregate in the area in spring. Potentially important feeding area for marine mammals.
Orphan Spur	Identified as an EBSA due to presence of corals and densities of species of conservation concern (including Northern, Spotted and Striped wolffish, skates, roundnose grenadier, American plaice, redfish) and sharks. Significant concentration of marine mammals.
Southern Pack Ice	Southern Pack Ice occurs in the Study Area seasonally. Identified as an EBSA due to its importance to marine mammals and seabirds.
Sources: Templeman (2007); DFO (2013); Amec (2014)	

4.2.4.5 Other Protected Areas

Migratory Bird Sanctuaries (MBS) are designated by Environment Canada. The *Migratory Bird Sanctuary Act* and *Regulations* prohibits the taking, injuring or destruction of migratory birds or their nests or eggs, and hunting migratory species, within a Migratory Bird Sanctuary. Three MBS have been established in Newfoundland and Labrador: Shepherd Island, Île aux Canes and Terra Nova, which is part of Terra Nova National Park. No MBS are located in the Study Area (Environment Canada 2014).

Through the Canada *Wildlife Act*, the Government of Canada has established 54 National Wildlife Areas on federally owned lands for the purposes of wildlife conservation, research and interpretation. These areas, some of which are relatively undisturbed, protect approximately one million hectares of nationally significant plant and animal habitats, with nearly half of the total area protecting marine habitats. No National Wildlife Areas are located in Newfoundland and Labrador (Environment Canada 2015).

In 1994, the Canada *Wildlife Act* was amended to allow identification of Marine Wildlife Areas (MWAs) beyond the 12 nautical mile territorial sea limit out to the 200 nautical mile Exclusive Economic Zone limit. No MWAs have yet been identified, but several candidate sites are currently being evaluated in Canada (ACZISC 2013).

Parks Canada establishes National Parks (under the *National Parks Act*) to protect representative examples of Canada's 39 terrestrial natural regions, and National Historic Sites to commemorate significant historical locations or events. Newfoundland and Labrador has three national parks and 45 national historic sites nine of which are managed by Parks Canada and the rest by other agencies (Parks Canada 2008, 2009). Some of these sites (including Signal Hill, Fort Amherst and Cape Spear) are located along the shoreline of Eastern Newfoundland but distant from the Study Area.

The Government of Newfoundland and Labrador has established a system of protected areas which includes 31 Provincial Parks, 16 Ecological Reserves, three Wildlife Reserves, two Wilderness Reserves, one Wildlife Park and one Public Reserve. Provincial Parks are established for environmental conservation and recreation purposes. Wilderness and Ecological Reserves are created to protect and conserve ecosystems or ecoregions and/or to protect rare, unique or endangered species of plants, animals and other identifiable components of natural heritage. A number of Provincial parks (including La Manche and Chance Cove) and Ecological Reserves (such as Witless Bay, Mistaken Point, Baccalieu Island and Funk Island) exist along the coastline in Eastern Newfoundland but are all well outside of the Study Area (NLDEC-PNA 2014).

4.2.4.6 Other Identified Special and Sensitive Areas

A number of areas in Newfoundland and Labrador have been identified as special due to their ecological and/or societal importance. While several of these have formal protection through legislation, others do not have formal protection.

The Important Bird Areas (IBA) Program is an international partnership of 120 countries working together to implement science-based initiatives to identify, conserve and monitor a network of sites that provide essential bird habitat (BLI 2010). BirdLife Canada lists 325 sites in Canada, including 11 in Eastern Newfoundland outside of the Study Area. Seven of these (Baccalieu Island, Cape St. Mary's, Funk Island, Corbin Island, Green Island, Middle Lawn Island and Witless Bay Island) are also located within Provincial Protected Areas (NLDEC-PNA 2014).

The 1998 *Convention on Wetlands of International Importance* (also referred to as the Ramsar Convention) is an intergovernmental treaty for conservation of important wetland habitats. Canada, which became a Contracting Party to the Ramsar Convention in 1981, has designated 37 Sites (Environment Canada 2013). The only Ramsar site in the province is Codroy Valley Estuary, which is located on the west coast of Newfoundland (Ramsar 2014) and is therefore well outside of the Study Area.