3.4 Marine-associated Birds

Marine-associated birds are discussed below under the three categories: (1) seabirds, (2) coastal waterfowl, and (3) shorebirds.

3.4.1 Seabirds

The highly productive Grand Banks support large numbers of seabirds at all times of the year (Lock et al. 1994). Seabirds tend to concentrate over oceanographic features such as continental shelf edges and convergences of warm and cold currents. The upwelling of cold water brings mineral nutrients to the surface, allowing high phytoplankton productivity, which forms the basis for increased productivity at higher trophic levels. Part of the SEA Area is located on the edge of the Grand Banks where it begins to slope into the deep waters beyond the continental shelf. The major flow of the Labrador Current flows south along the outer edge of the Grand Bank. An inshore branch flows westward along the south coast of Newfoundland (Lock et al. 1994). Seabirds also concentrate at fish spawning areas, such as the inshore waters of Newfoundland and the Southeast Shoal, both of which are areas where capelin spawn in great numbers.

Seabird observations from the SEA Area are few, especially during the colder months (Lock et al. 1994). The first data were collected by the Canadian Wildlife Service (CWS) through PIROP (Programme intégré de recherches sur les oiseaux pélagiques) from 1967 to 1983 (Brown 1986) and up to the early 1990s (Lock et al. 1994). Additional seabird observations have been collected on the northeast Grand Banks by the offshore oil and gas industry. These data have been analyzed for the period 1999-2002 (Baillie et al. 2005) and 2007 (Lang 2008). Seismic exploration of the Laurentian and Jeanne d'Arc basins in warmer months from 2005 to 2008 also enabled the collection of valuable additional data by LGL biologists experienced in seabird identification (Lang et al. 2006; Moulton et al. 2006; Lang and Moulton 2008; Abgrall et al. 2008, in prep.). In 2006, CWS resumed surveying seabird abundance and distribution, and these data have become available. Information from all the above sources was used to predict abundances by month of seabirds occurring in the SEA Area (Table 3.8). In contrast, the nesting locations of colonially breeding seabird species are relatively well known (Cairns et al. 1989; Lock et al. 1994; JWEL 2003; JW 2007).

3.4.1.1 Nesting Populations and Breeding Biology

Leach's Storm-Petrel, Northern Gannet, cormorants, gulls, terns, murres, Razorbill, Black Guillemot, and Atlantic Puffin are common nesting birds concentrated in several colonies in or near the SEA Area. The majority of breeding seabirds in Newfoundland nest in colonies on the Avalon Peninsula. The seabird breeding colonies on Baccalieu Island, the Witless Bay Islands, and Cape St. Mary's alone hold more than 4.6 million pairs (Figure 3.69; Table 3.9). These include the largest Atlantic Canada colonies of Leach's Storm-Petrel (3,336,000 pairs on Baccalieu Island), Black-legged Kittiwake (23,606 pairs on Witless Bay Islands), Thick-billed Murre (1000 pairs at Cape St. Mary's), and Atlantic Puffin (272,729 pairs on Witless Bay Islands).

Table 3.8. Monthly Relative Abundance of Bird Species that Likely Occur in the Pelagic Waters of the SEA Area.

Common Name	Scientific Name	Monthly Abundance											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Procellariidae													
Northern Fulmar	*Fulmarus glacialis*	U-C	U-C	U-C	U-C	U-C	S-U	S-U	S-U	U-C	U-C	U-C	U-C
Cory's Shearwater	*Calonectris diomedea*							S	S	S			
Greater Shearwater	*Puffinus gravis*					S	C	C	C	C	C	S	
Sooty Shearwater	*Puffinus griseus*					S	S-U	S-U	S-U	S-U	S-U	S	
Manx Shearwater	*Puffinus puffinus*					S	S	S	S	VS	VS		
Hydrobatidae													
Leach's Storm-Petrel	*Oceanodroma leucorhoa*				S-U	S-U	S-C	S-C	S-C	S-C	S-U	S	
Wilson's Storm-Petrel	*Oceanites oceanicus*						S	S	S	S			
Sulidae													
Northern Gannet	*Morus bassanus*				S	S	S	S	S	S	S		
Scolopacidae													
Red Phalarope	*Phalaropus fulicarius*					S	S	S	S	S	S		
Red-necked Phalarope	*Phalaropus lobatus*					S	S	S	S	S			
Laridae													
Herring Gull	*Larus argentatus*	S-U	S-U	VS-S	VS-S	VS-S	VS-S	VS-S	VS-S	S-U	S-U	S-U	S-U
Iceland Gull	*Larus glaucoides*	S	S	S	S							S	S
Lesser Black-backed Gull	*Larus fuscus*					VS	VS	VS	VS	VS	VS	VS	VS
Glaucous Gull	*Larus hyperboreus*	S	S	S	S						S	S	S
Great Black-backed Gull	*Larus marinus*	U	U	VS-S	VS-S	VS-S	VS-S	VS-S	U	U	U	U	U
Ivory Gull	*Pagophila eburnea*	VS	VS	VS	VS								
Black-legged Kittiwake	*Rissa tridactyla*	U-C	U-C	U-C	U-C	S-U	S-U	S-U	S-U	S-U	U-C	U-C	U-C
Arctic Tern	*Sterna paradisaea*					S	S	S	S	S			
Stercorariidae													
Great Skua	*Stercorarius skua*					VS	VS	VS	VS	S	S		
South Polar Skua	*Stercorarius maccormicki*					VS	S	S	S	S	S		
Pomarine Jaeger	*Stercorarius pomarinus*					S-U	S	VS	VS	S-U	S		
Parasitic Jaeger	*Stercorarius parasiticus*					S-U	S	VS	VS	S-U	S		
Long-tailed Jaeger	*Stercorarius longicaudus*					S-U	S	S-C	S-U	S-U			
Alcidae													
Dovekie	*Alle alle*	U-C	U-C	U-C	U-C	S	VS	VS	VS	S	C	C	U-C
Common Murre	*Uria aalge*	S-U	S-U	S-U	S-U	S	S	S	S	S	S-U	S-U	S-U
Thick-billed Murre	*Uria lomvia*	U-C	U-C	U-C	U-C	VS-S	VS-S	VS-S	VS-S	VS-S	U-C	U-C	U-C
Razorbill	*Alca torda*				S	S	S	S	S	S	S	S	
Atlantic Puffin	*Fratercula arctica*				S-U	S	S	S	S	S-U	S-U	S-U	

Sources: Brown (1986); Lock et al. (1994); Baillie et al. (2005); Moulton et al. (2005, 2006); Lang et al. (2006); Lang and Moulton (2008); Abgrall et al. (2008).
Notes: C = Common, present daily in moderate to high numbers; U = Uncommon, present daily in small numbers; S = Scarce, present, regular in very small numbers; VS = Very Scarce, very few individuals or absent. Blank spaces indicate not expected to occur in that month. Predicted monthly occurrences derived from 2004, 2005, 2006 and 2007 monitoring studies in the Laurential Sub-basin, Orphan Basin and Jeanne d'Arc Basin and extrapolation of seabird distribution at sea in eastern Canada in Brown (1986) and Lock et al. (1994).

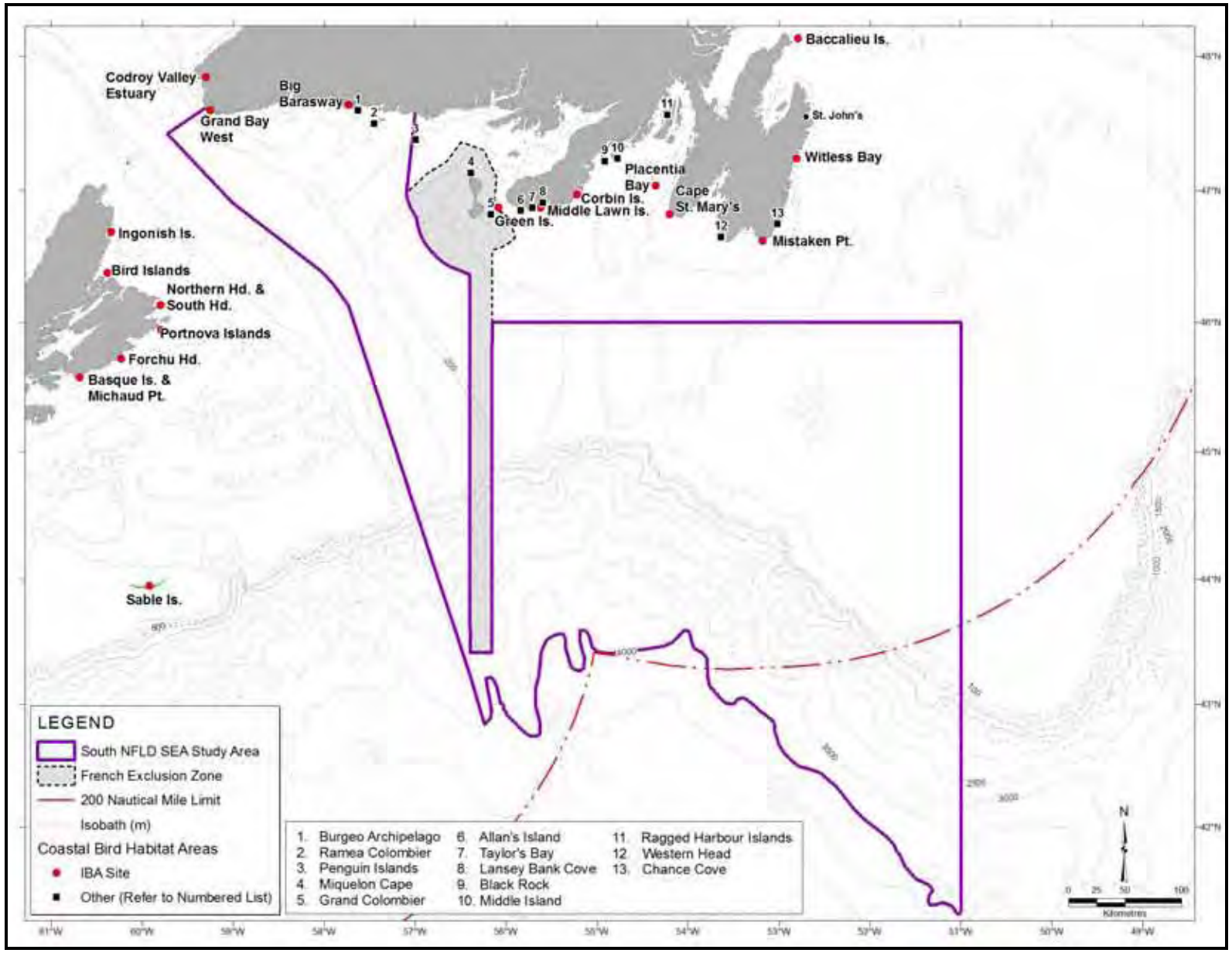


Figure 3.69. Locations of Coastal Habitat Areas for Marine-associated Birds within and Adjacent to the SEA Area.

Table 3.9. Estimated Pairs of Species at Risk and Colonial Seabirds Nesting at Important Bird Areas (IBAs) along Newfoundland's South Coast.

Species	Scientific Name	Witless Bay Islands[m]	Mistaken Point[m]	Cape St. Mary's[m]	Middle Lawn	Corbin Island	Green Island	Big Barasway	Grand Bay West	Codroy Valley
Anatidae										
American Wigeon	*Anas penelope*									Breeding[j]
Blue-winged Teal	*Anas discors*									Breeding[j]
Northern Shoveler	*Anas clypeata*									Breeding[j]
Procellariidae										
Northern Fulmar	*Fulmarus glacialis*	22[a,d]		Present[a]	-	-	-			
Manx Shearwater	*Puffinus puffinus*	-		-	13[i]	-	-			
Hydrobatidae										
Leach's Storm-Petrel	*Oceanodroma leucorhoa*	667,086[f,g,h]		-	13,879[f]	100,000[h]	103,833[b]			
Sulidae										
Northern Gannet	*Morus bassanus*	-		14,789[k]	-	-	-			
Charadriidae										
Piping Plover	*Charadrius melodus*							5-9[j]	10-21[j]	
Laridae										
Herring Gull	*Larus argentatus*	4638[c,h]		Present[h]	20[h]	5000[h]	Present[j]			
Great Black-backed Gull	*Larus marinus*	166[c,h]		Present[h]	6[h]	25[h]	-			
Black-legged Kittiwake	*Rissa tridactyla*	23,606[d,h]	4750[l]	10,000[h]	-	50[h]	-			
Arctic and Common Terns	*Sterna paradisaea & S. hirundo*	-		-	-	-	Breeding[j]			
Alcidae										
Common Murre	*Uria aalge*	83,001[d,h]	~ 100[l]	15,484[k]	-	-	-			
Thick-billed	*Uria lomvia*	600[h]		1000[h]	-	-	-			
Razorbill	*Alca torda*	676[d,h]	Present[l]	100[h]	-	-	-			
Black Guillemot	*Cepphus grylle*	20+[h]	Present[l]	Present[h]	-	-	-			
Atlantic Puffin	*Fratercula arctica*	272,729[d,e,h]	50[h]	-	-	-	-			
TOTALS		**1,052,546**	**>4900**	**40,373**	**13,918**	**136,910**	**>103,833**	**5-9**	**10-21**	**Present**

Sources: [a] Stenhouse and Montevecchi 1999a; [b] Russell (2008); [c] Robertson et al. (2001) *in* Robertson et al (2004); [d] Robertson et al. (2004); [e] Rodway et al. (2003) *in* Robertson et al. (2004); [f] Robertson et al. (2002); [g] Stenhouse et al (2000); [h] Cairns et al. (1989); [i] Robertson (2002), [j] www.ibacanada.ca; [k] CWS (unpubl. data) ; [l] Parks and Natural Areas (unpubl. data) ; [m] provincial Ecological Reserve.

All of these birds feed on the Grand Banks during the nesting season from May to September. Some may reach the Southwest Grand Banks during the breeding season. The numbers of nesting storm-petrels, gannets, kittiwakes, and auks decline as one moves westward along the south coast of Newfoundland (see Appendix D in JW 2007). Northern Fulmar nests in small numbers only on the east coast of the Avalon Peninsula (Lock et al. 1994). Northern Gannet, Common Murre, and Thick-billed Murre nest no farther west than Cape St. Mary's (Appendix D *in* JW 2007). Razorbill and Black-legged Kittiwake nest west to Miquelon. Leach's Storm-Petrel and Atlantic Puffin nest as far west as Ramea Columbier Island, but a much larger colony of 100,000 pairs is found farther east at Grand Columbier Island. Black Guillemot nests singly, or in small aggregations, west to the small islands off Brunette Island. Common Tern (*Sterna hirundo*), Arctic Tern (*S. paradisaea*), Herring Gull, and Great Black-backed Gull nest throughout the area. In contrast, Great and Double-crested Cormorants (*Phalacrocorax carbo* and *P. auritus*) nest along the southern coast only as far east as St. Mary's Bay (Appendix D in JW 2007). On the east and south coasts of Cape Breton Island, Nova Scotia, many of the seabird colonies that are Important Bird Areas contain only Great Cormorant, but three sites include nesting eiders, storm-petrels, gulls, terns, or auks (Tables 3.9 and 3.10). Further details on nesting colonies in and near the SEA Area may be found in previous SEAs for the Laurentian Sub-basin and Sydney Basin by JWEL (2003) and JW (2007).

Seabirds nesting near the SEA Area are long-lived with low rates of population growth (Table 3.11). Egg-laying commences in mid to late May and into June, and most species are fledged by July – August with Northern Gannets fledging into October and November (Table 3.12). Most nesting is on coastal islands, and Terns and gulls also nest at many of the sandy beaches and peninsulas in the SEA Area.

3.4.1.2 Prey and Foraging Habits

Seabirds in the SEA Area employ a variety of foraging strategies and feed on a variety of prey species (Table 3.13). Many of the shearwaters, storm-petrels, gulls, and phalaropes capture their food by seizing it from the surface, either while flying or resting on the surface. Gannets and terns search for prey from the air, then plunge dive to capture the prey item. Members of the auk family (Alcidae) dive from a resting position on the surface and actively pursue their prey underwater. Consequently, they spend most of their time on or under the ocean's surface. Diving depth and time also varies by species. Some species such as terns and phalaropes specialize in foraging in shallow depths at the surface, while at the opposite end of the range, species such as alcids and loons dive to great depths (i.e., 20 to 50 m). Larger species of seabirds feed on capelin, sand lance, short-finned squid, crustaceans, or offal, whereas smaller species such as phalaropes and Dovekies feed primarily on copepods, amphipods, and other zooplankton (Table 3.13).

Foraging strategies of seabirds affects their breeding success during periods of limited food availability. In 1992 and 1993, Black-legged Kittiwakes, Herring and Great Black-backed Gulls had lower hatching, fledging and breeding success than in previous years. This was attributed to reductions in food availability for seabirds in the SEA Area because the inshore spawning migration of capelin (a major prey species) was delayed by one month in the NW Atlantic (Bryant et al. 1999; Regehr and Rodway 1999). As well, the ground fisheries moratorium eliminated the production of fish offal, an important alternative food source for large gulls and kittiwakes. Other species, such as Atlantic Puffins and Common Murres were not negatively affected, and offshore surface feeders such as the Leach's Storm-Petrel had high breeding success (Regehr and Rodway 1999). Predation by large gull species on seabird adults, chicks and eggs increased in 1992 and 1993 (Rodway et al. 1996; Stenhouse and Montevecchi 1999b), and seabirds shifted their diets in concert with changes in sea surface temperature on the Newfoundland Shelf (Montevecchi and Myers 1997). The significance of gull predation on other seabirds and sea ducks is a matter of considerable debate, as some researchers have demonstrated such mortality to be compensatory to starvation or mediated by human disturbance (Swennen 1989; Goudie 1991a).

Table 3.10. Estimated Numbers of Pairs of Seabirds Nesting at IBAs Located on Coastal Nova Scotia near the SEA Area.

Species	Ingonish Island	Bird Islands	Northern Head and South Head	Portnova Islands	Forchu Head	Basque Island & Michaud Point	Sable Island
Anatidae							
Common Eider						100 [j]	
Hydrobatidae							
Leach's Storm-Petrel		Breeding [j]					50 [j]
Phalacrocoracidae							
Double-crested Cormorant		285 [j]					
Great Cormorant	198-502 [j]	904 [j]	350 [j]	250 [j]	122 [j]	250 [j]	
Laridae							
Herring Gull							2000 [j]
Great Black-backed Gull							630 [j]
Black-legged Kittiwake		1456 [j]	Breeding [j]				
Roseate Tern							1 [k]
Arctic and Common Terns							2856 [j]
Alcidae							
Razorbill		55-215 [j]					
Black Guillemot		336 [j]					
Atlantic Puffin		107 [j]					
TOTALS	**198-502**	**2,239-2,399**	**350**	**250**	**122**	**250**	**5546**

Sources: [a] Stenhouse and Montevecchi 1999a; [b] Chardine (2000); [c] Robertson et al. (2001) *in* Robertson et al (2004); [d] Robertson et al. (2004); [e] Rodway et al. (2003) *in* Robertson et al. (2004); [f] Robertson et al. (2002); [g] Stenhouse et al (2000); [h] Cairns et al. (1989); [i] Robertson (2002), [j] www.ibacanada.ca; [k] JWEL(2003).

Table 3.11. Reproductive Parameters of Seabirds Nesting in the SEA Area.

Species	Mean Adult Survival Rate	Age of First Breeding (yr)	Clutch Size	Breeding Success [1]	Sources
Northern Fulmar	0.97	6-12	1	0.55	Dunnet et al. (1963); Dunnet and Ollason (1978)
Leach's Storm-Petrel	>0.70	3-5	1	0.79-0.94	Huntington (1963); Wilbur (1969); Morse and Buchheister (1977)
Manx Shearwater	0.90	5-6	1	0.69	Perrins et al. (1973)
Northern Gannet	0.95	4-7	1	0.81	Nelson (1966); Montevecchi and Porter (1980)
Herring Gull	0.80-0.85	3-7	2-3	1.03-1.58	Haycock and Threlfall (1975); Kadlec (1976); Pierotti (1982)
Great Black-backed Gull	-	4-5	3	0.50-2.11	Butler and Trivelpiece (1981)
Black-legged Kittiwake	0.81-0.86	3-7	2	0.54-0.58	Maunder and Threlfall (1972); Wooller and Coulson (1977)
Common and Arctic Terns	0.86	2-4	1-3	0.59-0.77	Cullen (1956); Kirkham (1984 *in* Mobil 1985)
Common Murre	0.92	4-5	1	0.72	Birkhead and Hudson (1977)
Thick-billed Murre	0.91	3-5	1	0.68 0.76	Birkhead and Hudson (1977); Gaston and Nettleship (1981)
Razorbill	0.89-0.92	4-6	1	0.55-0.71	Bédard (1969); Lloyd and Perrins (1977); Hudson (1982)
Black Guillemot	0.77-0.89	2	1-2	0.12-0.78	Asbirk (1979); Cairns (1981)
Atlantic Puffin	0.95	4-6	1	0.60-0.66 0.42	Ashcroft (1979); Harris (1983); Rodway et al. (1998)

Source: From Mobil (1985) with updates.
Note: [1] Numbers of chicks fledged per breeding pair of adults.

Table 3.12. Seabird Nesting Phenology in the SEA Area.

Species	Egg Laying	Incubation	Hatching	Nesting	Fledging	Comments
Northern Fulmar	2nd half May[1]	47-51 days[2]	Observed July 10[1]	47-51 days[2]	late Aug-early Sept[2]	Canadian breeding population is 360,000 pairs[3]; Newfoundland colony may represent new colonization[2].
Manx Shearwater	-	-	-	-	-	Information on breeding activity in coastal Newfoundland is lacking. One colony has been identified on Middle Lawn Island[4, 25].
Leach's Storm-Petrel	mid May to mid August [5,6,7] peak: first half of June	41-42 days [5,6,7]	peak: last half of July[5,6,7]	63-70	until mid Nov. peak: late Sept.	Baccalieu colony is probably largest in the world.[8,9]
Northern Gannet	mid to late May[10,11]	42 days [10,11]	late June to early July	91 days[10,11]	late Sept. to early Oct.[9,10]	NL breeding population represents 17% of the eastern Canadian population. NF's population is stable and increasing
Herring Gull; Great black-backed Gull	mid to late May[12,13,14]	26-29 days [12,13,14]	mid-late June	45 days[12] 50-55 days [12,14]	late July - early August	Nest singly or in colonies at many locations along NL East Coast[15]. Study area breeding population is only a small proportion of total Canadian[3] population.
Black-legged Kittiwake	late May-early June[17]	27 days[17]	late June[17]	42 days[17]	early Aug.[17]	Three major colonies along Avalon Peninsula[16]. NL group represents approx. 33% total Canadian breeding population.
Common Tern, Arctic Tern	first half June[18]	22 days [18]	mid July	21-26 days[18]	late July-early Aug.[18]	Occur singly or in small colonies along the Avalon Peninsula[16]
Common Murre	mid May[19, 20]	32 days[19,20]		23 days[19,20]	mid-late July	Breeding population in study areas represents 17% total Canadian breeding population[3].
Thick-billed Murre	early June[19,20]				late July-early August	Nesting population in study area represents <1% of Canadian breeding population[21]
Razorbill	early June	34-39 days	early-mid July	24 days	late July - early August	Nesting population in study area represents 3% of the North American population[3]. Information extrapolated from data for Labrador [20].
Atlantic Puffin	mid-late May[22]	42 days[22]	early July[22]	40-45 days[22]	mid to late August[22]	Most abundant alcid in study area[3]. Includes approx. 72% of the N. American population[3].
Black Guillemot	mid May - early June[22]	28-33 days[22]	mid June - mid July[22]	34-39 days[22]	early - late August[22]	No estimate of the number of breeding birds in the study area, but considered to be low[3,24].

Source: Mobil (1985) with updates.

[1] Montevecchi et al. (1978)
[2] Cramp and Simmons (1977)
[3] Nettleship (1980)
[4] Lien and Grimmer (1978)
[5] Grimmer (1980)
[6] Huntington (1963)
[7] Wilbur (1969)
[8] Maccarone and Montevecchi (1981)
[9] Pitocchelli et al. (1981)
[10] Kirkham (1980)
[11] Montevecchi and Porter (1980)
[12] Haycock and Threlfall (1975)
[13] Pierotti (1982)
[14] Butler and Trivelpiece (1981)
[15] Erwin (1971)
[16] Brown et al. (1975)
[17] Maunder and Threlfall (1972)
[18] Hawksley (1950)
[19] Tuck (1961)
[20] Birkhead and Nettleship (1982)
[21] Gaston (1980)
[22] Cairns (1981)
[23] Renaud and Bradsteet (1980)
[24] Nettleship (1972)
[25] Robertson (2002)

Table 3.13. Foraging Strategy and Prey Types of Pelagic Seabirds that Frequent the SEA Area.

Species (Group)	Foraging Strategy	Prey	Source
Procellariidae			
Northern Fulmar	Surface seizing	Fish, cephalopods, crustaceans, offal	Hatch & Nettleship (1998)
Cory's Shearwater	Surface seizing, pursuit plunging, pursuit diving	Fish, cephalopods, crustaceans	Brooke (2004)
Greater Shearwater	Surface seizing, pursuit plunging, pursuit diving	Capelin, squid, crustaceans, offal	Brown et al. (1981), Brooke (2004)
Sooty Shearwater	Pursuit diving, pursuit plunging	Capelin, squid, crustaceans, offal	Brown et al. (1981) , Brooke (2004)
Manx Shearwater	Surface seizing, pursuit diving, pursuit plunging	Fish, cephalopods, crustaceans, offal	Lee and Haney (1996)
Hydrobatidae			
Storm-petrels	Surface seizing	Crustaceans, fish, cephalopods	Huntington (1996)
Sulidae			
Northern Gannet	Deep pursuit plunging	Mackerel, capelin, herring, squid	Mowbray (2002)
Phalacrocoracidae			
Cormorants	Pursuit diving	Mackerel, capelin, herring, squid	Brown et al. (1981)
Scolopacidae			
Phalaropes	Surface seizing	Copepods, other invertebrates	Rubega et al. (2000), Tracy et al. (2002)
Laridae			
Herring Gull [1]	Surface seizing	Fish, crustaceans, cephalopods, offal	Pierotti and Good (1994)
Iceland Gull	Surface seizing	Fish, invertebrates, tetrapods, offal	Snell (2002)
Glaucous Gull	Surface seizing	Fish, invertebrates, tetrapods, offal	Gilchrist (2001)
Great Black-backed Gull [1]	Surface seizing	Fish, invertebrates, offal, tetrapods	Good (1998)
Black-legged Kittiwake	Surface seizing	Fish, crustaceans, cephalopods, offal	Baird (1994)
Arctic Tern	Surface and pursuit plunging	Fish, invertebrates	Hatch (2002)
Stercorariidae			
Jaegers and skuas	Kleptoparasitism, surface seizing	Fish, offal, invertebrates, mammals, birds	Wiley & Lee (1998, 1999, 2000)
Alcidae			
Dovekie	Pursuit diving	Copepods, amphipods, mollusks, fish	Montevecchi & Stenhouse (2002)
Common Murre	Pursuit diving	Fish, cephalopods, crustaceans	Ainley (2002)
Thick-billed Murre	Pursuit diving	Fish, invertebrates	Gaston & Hipfner (2000)
Black Guillemot	Pursuit diving	Fish, invertebrates	Cairns (1981)
Razorbill	Pursuit diving	Fish, invertebrates	Hipfner & Chapdelaine (2002)
Atlantic Puffin	Pursuit diving	Fish, crustaceans, cephalopods	Lowther et al. (2002)

Note: [1] These species feed on eggs and chicks of seabirds, and occasionally adults (Rodway et al. 1996, Stenhouse and Montevecchi 1999b).

3.4.1.3 Geographic and Seasonal Distribution

The distribution and numbers of seabirds in the SEA Area vary geographically and seasonally (Figure 3.70). During the nesting season, numbers of seabirds in the SEA Area are greatest in the immediate vicinity of the larger nesting colonies, which are located mainly in coastal areas (Lock et al. 1994). Most seabird species mature slowly and some do not begin breeding until four to five years of age (e.g., alcids), but the immature cohorts are present offshore and in adjacent waters. Species such as the large auks may aggregate in very large numbers.

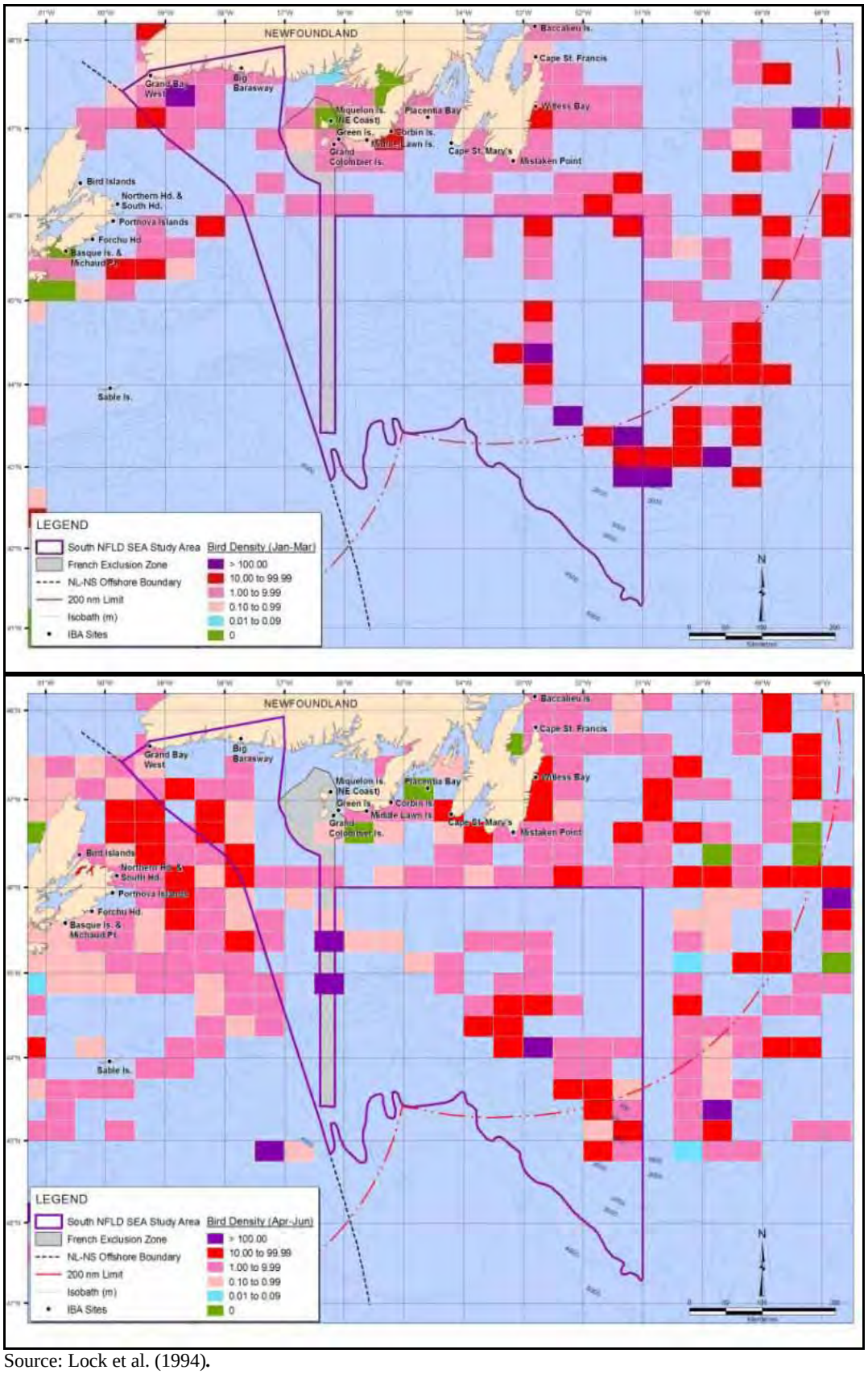
Greater Shearwater, Sooty Shearwater, Wilson's Storm-Petrel, and South Polar Skua nest in the South Atlantic during the northern hemisphere winter and are present in waters of Newfoundland and Labrador and Nova Scotia during the summer (June to October). Greater Shearwater is particularly abundant in the SEA Area because most of this species' population spends the austral winter in Newfoundland waters. During the winter, Northern Fulmars, Black-legged Kittiwakes, Glaucous Gulls, Thick-billed Murres and Dovekies, from breeding colonies in the Arctic, spend the winter in offshore waters south of the ice edge (Lock et al. 1994). Other Arctic-nesting species, i.e., jaegers, phalaropes, and Arctic Tern, pass through the SEA Area during spring and autumn migration.

The seasonal occurrence of these groups is summarized in Figure 3.6 of JWEL (2003) and Table 3.8 of this report.

3.4.1.4 Pelagic Seabird Abundance – Combined Species

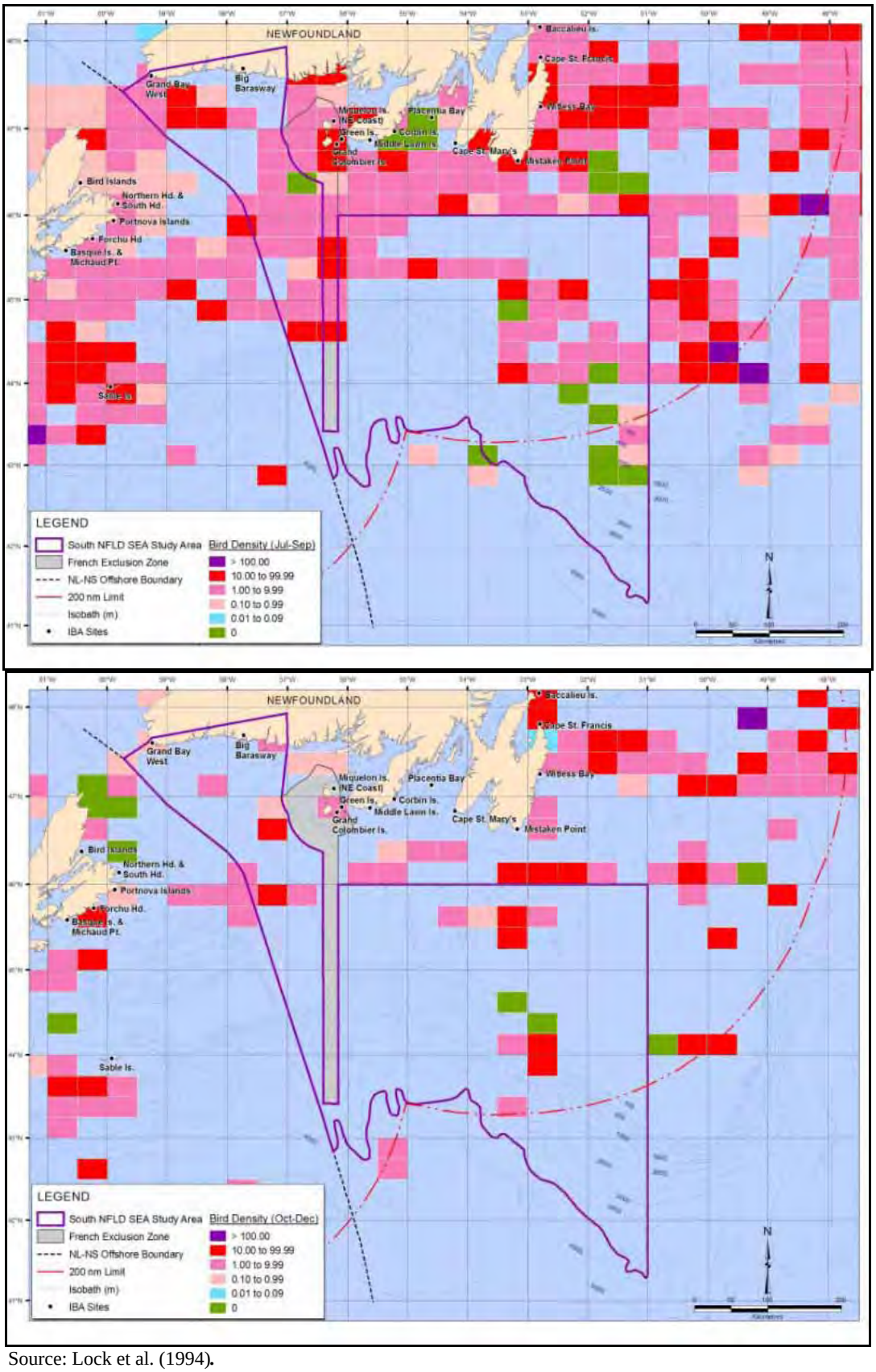
Pelagic seabird abundance (all species combined) derived from the PIROP database in most of the 15'N x 30'W blocks in the SEA Area during January to March fell in the range of 1.0–9.99 individuals per linear km, although full range of abundance was 0.1–0.99 to >100 birds/km (Figure 3.70) (Lock et al. 1994). The highest abundance was found in the northwest corner of the area on, and adjacent to, the Laurentian Channel and on the eastern section of the continental shelf slope (Figure 3.70).

During April to June, abundance ranged from 0.1–0.99 to >100 birds/km, with the greatest abundance in the Laurentian Channel, and along the shelf slope (Figure 3.70). During July to September, abundance varied from 0 to 10.0–99.99 birds/km, although most squares had 1.0–9.99 birds/km (Figure 3.70). The greatest abundance during these months was found on the northern edge and the mouth of the Laurentian Channel, Green Bank, Whale Bank and the eastern shelf slope. A group of blocks with low abundance is found in the southeast corner of the SEA Area. During monitoring of ConocoPhillips' 2005 seismic program in the Laurentian Sub-basin, seabird abundance and distribution were sampled during a total of 837 10-minute counts conducted from 16 June to 29 September (Moulton et al. 2006). Twenty-eight species of seabirds were recorded. The average density of all species combined per month varied from 5.6 birds/km^2 in June to 10.51 birds/km^2 in August (Table 3.14). Density was highest in July and August (Figures 3.71 and 3.72) due largely to Leach's Storm-Petrel (Table 3.14). Average densities tended to be lowest in the deepest water off the continental shelf (Figure 3.72). From October to December, abundance reported by Lock et al. (1994) ranged from 0.1–0.09 to 10.0–99.99 birds/km (Figure 3.70). However, few 15'N x 30'W blocks were surveyed. As a result, it is difficult to draw conclusions about patterns of abundance and distribution during those months.



Source: Lock et al. (1994).

Figure 3.70. Average of Combined Species (nos. of indiv./km) by 15'N x 30'W (Jan-Mar top; Apr-Jun bottom; Jul-Sep next page top; Oct-Dec next page bottom).



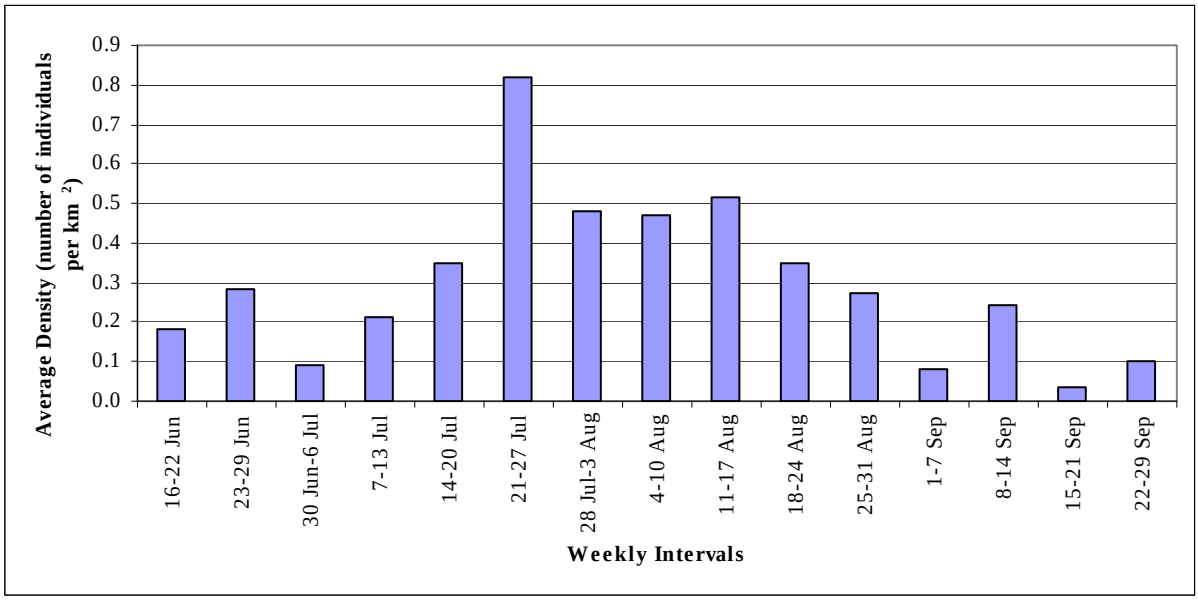
Source: Lock et al. (1994).

Figure 3.70 (concluded).

Table 3.14. Average Densities of Pelagic Seabirds (number of individuals/km^2) by Month (derived from 10-minute seabird counts in the Laurentian Sub-basin, 16 June to 29 September 2005).

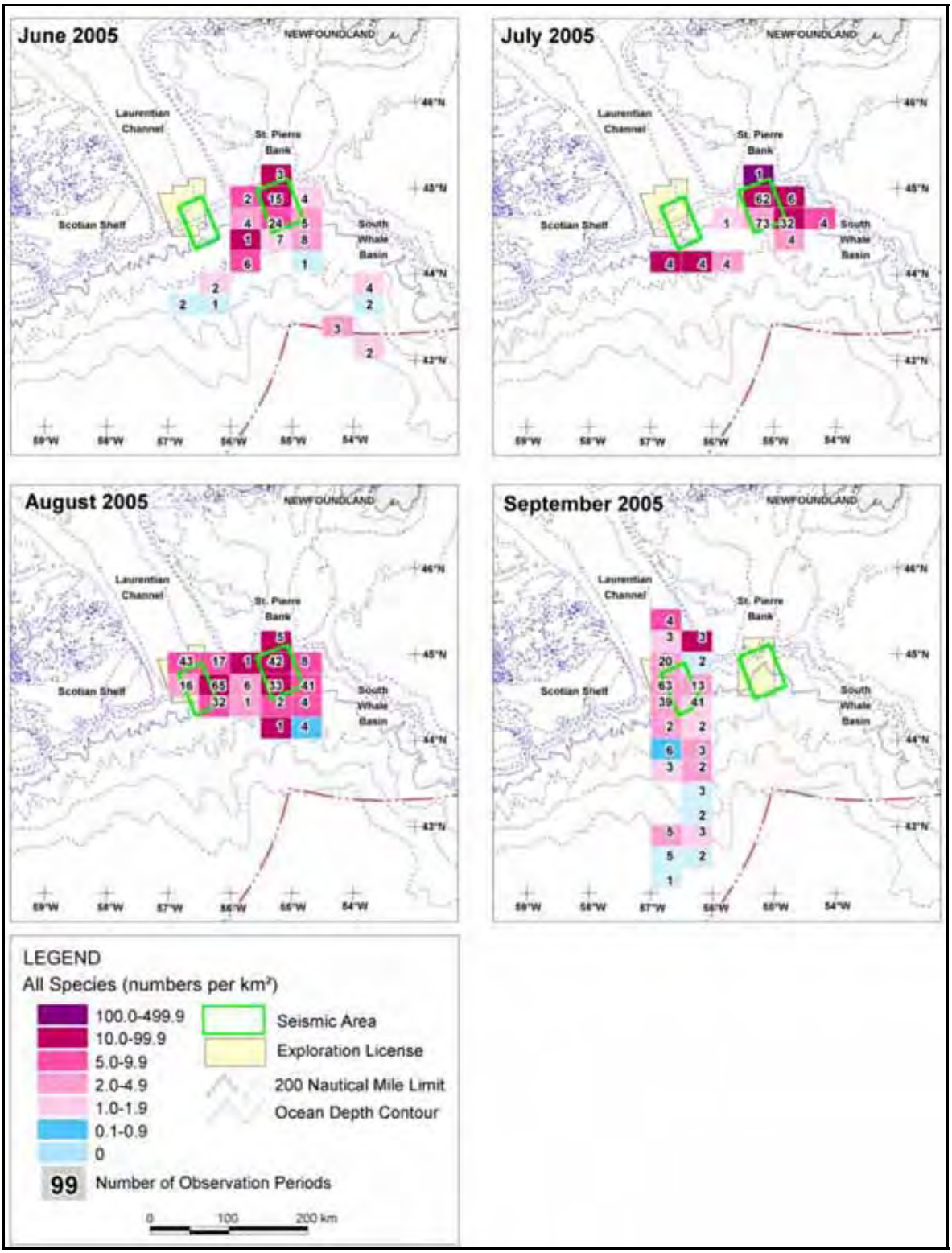
Species	Average Density (number of individuals per km^2)				
	June	July	August	September	All Months Combined
Leach's Storm-Petrel	2.12	7.95	8.62	0.63	5.56
Greater Shearwater	2.11	0.61	1.48	1.28	1.30
Long-tailed Jaeger	0.00	0.58	0.21	0.00	0.21
Northern Fulmar	0.99	0.05	0.02	0.15	0.17
Herring Gull	0.00	0.00	0.00	0.28	0.08
Cory's Shearwater	0.00	0.06	0.10	0.02	0.06
Great Black-backed Gull	0.03	0.00	0.00	0.20	0.06
Jaeger, unidentified	0.03	0.19	0.00	0.00	0.05
Parasitic Jaeger	0.00	0.13	0.01	0.00	0.03
Sooty Shearwater	0.14	0.01	0.02	0.00	0.03
Wilson's Storm-Petrel	0.09	0.00	0.01	0.04	0.02
Red Phalarope	0.00	0.04	0.00	0.03	0.02
Common Murre	0.09	0.01	0.00	0.00	0.01
Manx Shearwater	0.00	0.00	0.02	0.00	0.01
Black-legged Kittiwake	0.00	0.00	0.00	0.02	0.01
Dovekie	0.00	0.00	0.00	0.01	0.00
Lesser Black-backed Gull	0.00	0.00	0.01	0.00	0.00
Tern, unidentified	0.00	0.01	0.00	0.00	0.00
Northern Gannet	0.00	0.00	0.00	0.01	0.00
Pomarine Jaeger	0.00	0.00	0.01	0.00	0.00
All Species Combined	**5.60**	**9.64**	**10.51**	**2.67**	**7.62**

Source: Moulton et al. (2006).



Source**:** Moulton et al. (2006).

Figure 3.71. Combined Seabird Species: Average Density per 10-minute Counts by Weekly Periods, 16 June to 29 September 2005, Laurentian Sub-basin.



Source: Moulton et al. (2006).

Figure 3.72. Average Densities of Combined Seabird Species (number of individuals/km^2) by 15'N x 30'W blocks in the Laurentian Sub-basin, 16 June- 29 September 2005.

Northern Fulmar

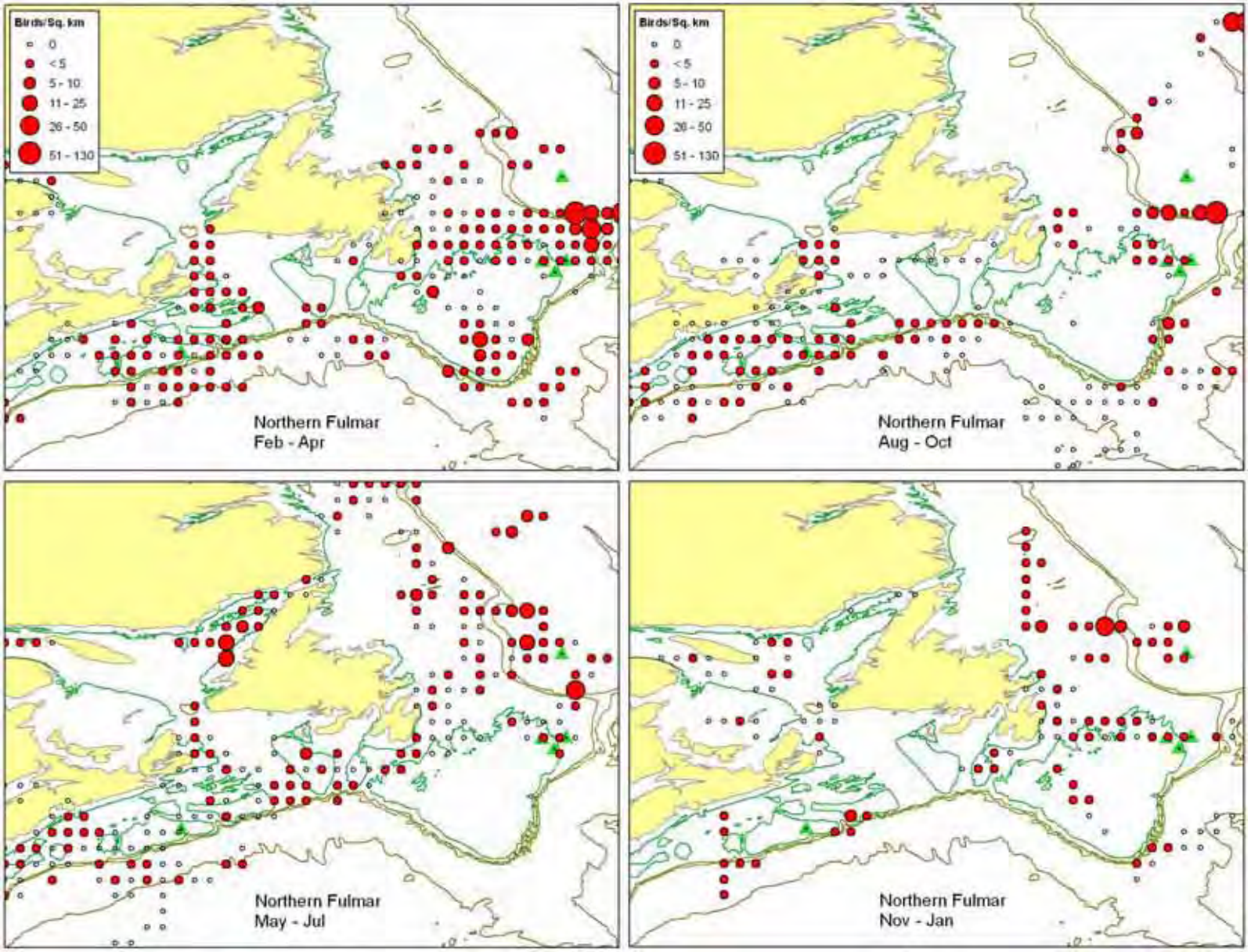
Northern Fulmar is present in the SEA Area year-round, but is most abundant during winter when birds from Arctic nesting colonies supplement non-breeding sub-adults. The PIROP data show that Northern Fulmar abundance in Sydney Basin 15'N x 30'W blocks ranged from 0–10 birds/km during January through March (Lock et al. 1994). During April to June, abundance ranged from 0 to >10 birds/km, with the majority of 15'N x 30'W blocks having >0.09 fulmars/km, and with the greatest abundance on the shelf slope (Lock et al. 1994). Abundance in July to September ranged from 0 to 1.0–9.99 birds/km, with the greatest abundance occurring in July (Lock et al. 1994). From October to December, abundance ranged from 0 to 1.0–9.99 birds/km in the few blocks surveyed. Moulton et al. (2006) recorded fulmar densities ranging from 0.02 birds/km^2 in August to 0.99 birds/km^2 in September in the Laurentian Sub-basin in 2005 (Table 3.14).

From 2006 to March 2008 CWS found fulmars in densities of <5 birds/km^2 in February to April in the 30'N x 30'W blocks sampled (Figure 3.73). There were insufficient data during the period May to July, fulmar densities ranged from 0 birds/km^2 to <5 birds/km^2 (Figure 3.73). From August to October, densities ranged from <5 birds/km^2 (Figure 3.73). During November through January, most blocks had densities of <5.0 birds/km^2, and the remainder had no fulmars (Figure 3.73).

Shearwaters

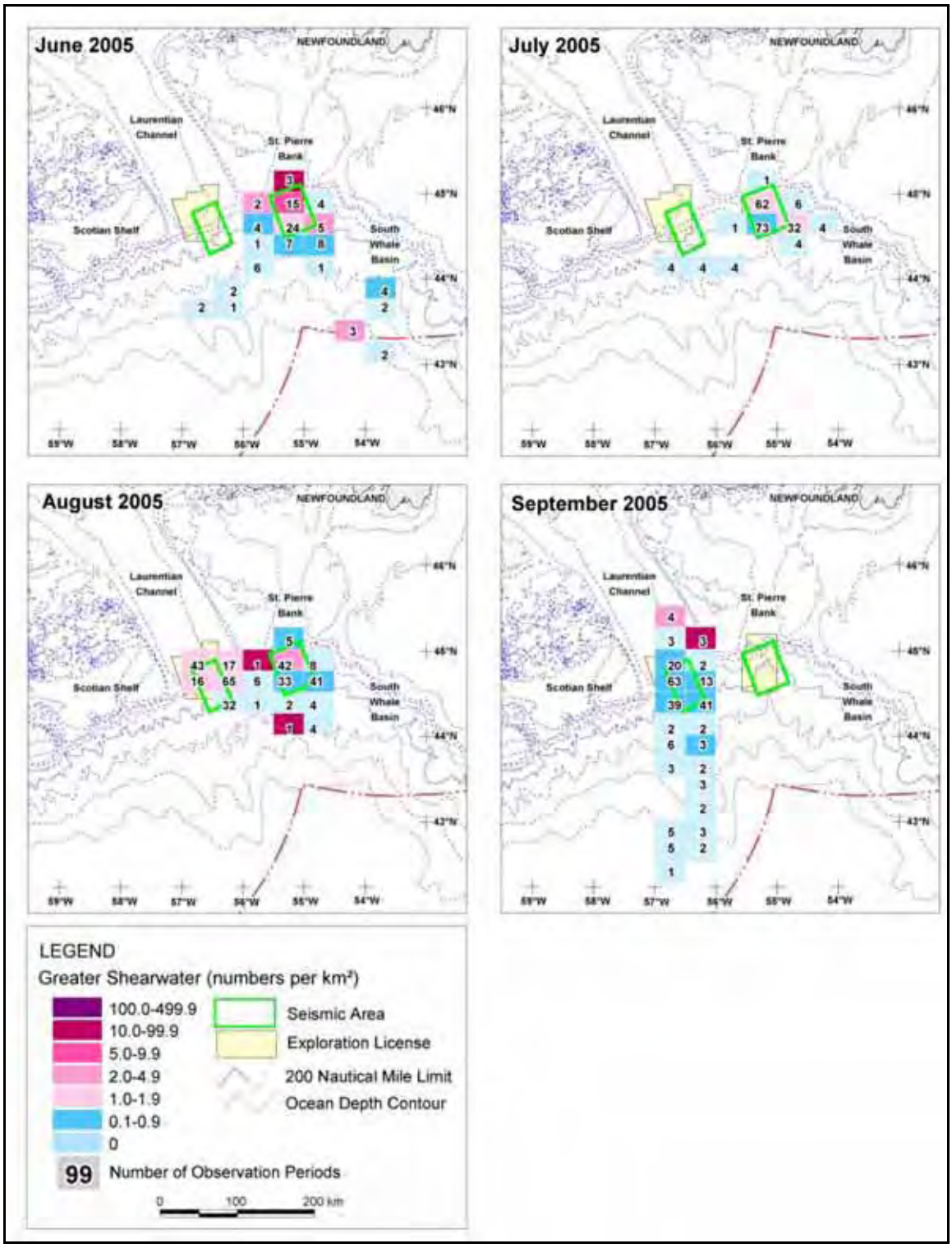
Cory's Shearwater reaches Canadian waters off Nova Scotia and southern Newfoundland where ocean temperatures are the warmest in Atlantic Canada (Brown et al. 1975). In the Atlantic, it breeds on eastern islands including the Azores, Madeira and Canary Islands. Prior to ConocoPhillips seismic program in the Laurentian Sub-basin in 2005, Cory's Shearwater in Newfoundland was known only from sporadic observations from the Laurentian Channel, St. Pierre Bank and the southern Grand Banks (Brown et al. 1975; P. Linegar, pers. comm., 2006). During ConocoPhillips' seismic program Moulton et al. (2006) recorded this species almost daily from 5 July to 22 September in average densities of 0.02 to 0.10 birds/km^2 (Table 3.14; Figure 3.74).

The most common shearwater species in Newfoundland waters is the Greater Shearwater. It breeds in the South Atlantic Ocean, mainly on the Tristan da Cunha Island group and Gough Island. A significant percentage of the total world population (five million) migrates to eastern Newfoundland in late May, particularly the Grand Banks, for the annual moult in June and July, and departs in September to October (Lock et al. 1994). In the Sydney Basin, Lock et al. (1994) reported combined shearwater species abundance of 0 to 0.01–0.09 birds/km from January to May, 0 to >10 birds/km from June to October, and 0.01–0.09 birds/km in November. More recent CWS data for this area show insufficient sampling during the period February to April, combined shearwater species densities of 26–50 to 51–120 birds/km^2 from May to July, 0 to 51–120 birds/km^2 from August to October, and insufficient data from November through January (Figure 3.75). Lock et al. (1994) reported abundance of combined shearwater species (mostly Greater Shearwater) in the Laurentian Sub-basin of 0 to >10 birds/km during April through June, 0.1–0.99 to >10 birds/km from July to September, and 0 to >10 birds/km from October to December but conducted no surveys in the Laurentian Sub-basin from January to March. Moulton et al. (2006) reported Greater Shearwater densities of 0.61 birds/km^2 in July to 2.11 birds/km^2 in June (Table 3.14; Figure 3.75). More recent CWS data reveal combined shearwater average species densities of <5 birds/km^2 from February to April, <5 to 26–50 birds/km^2 from May to July, <5 birds/km^2 from August to October and insufficient data from November to January (Figure 3.75). On the Southwest Grand Banks and shelf slope, Lock et al. (1994) reported abundance of combined shearwater species of 0 to 0.01–0.09 birds/km during the months of January through March, with shearwaters only recorded during March. During April to June, abundance ranged from 0 to >10 birds/km, although the majority of 15'N x 30'W blocks during April had 0 birds/km. Abundance during July to September ranged from 0 to >10 birds/km, but most blocks had >0.09 birds/km. During October to November abundance ranged from 0 to >10 birds/km. Recent CWS data for the Southwest Grand Banks and shelf slope show densities of combined shearwater species during February through April of <5 birds/km^2, insufficient data during May to July, <5 birds/km^2 during August to October, and 0 to 5–10 birds/km^2 during November to January (Figure 3.75).



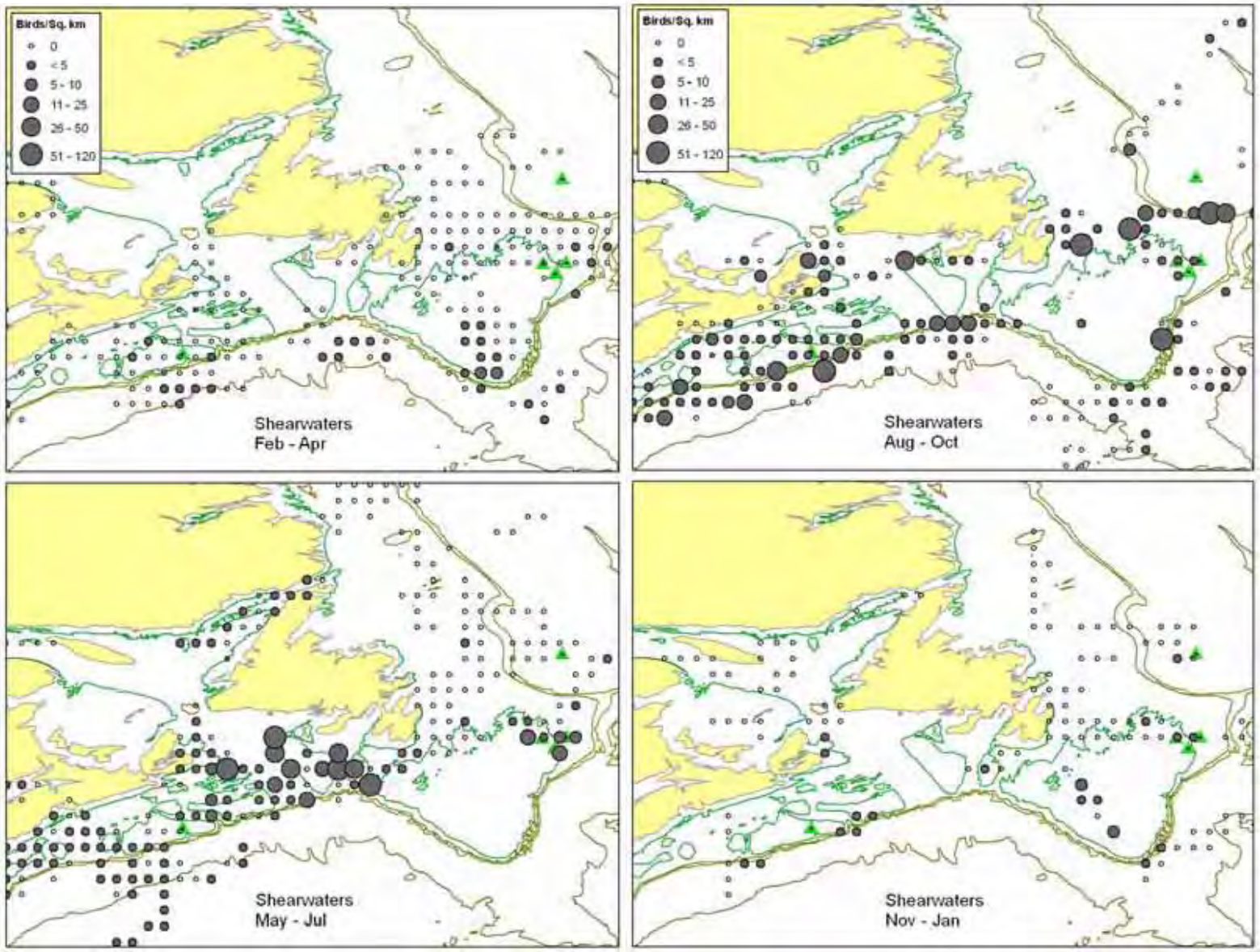
Source: D. Fifield, Canadian Wildlife Service.

Figure 3.73. Average Densities of Northern Fulmar (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-July, 2006 to 2008.



Source: Moulton et al. (2006).

Figure 3.74. Average Densities (number of individuals/km^2) of Greater Shearwater by 15'N x 30'W Blocks in the Laurentian Sub-basin during 16 June- 29 September 2005.



Source: D. Fifield, Canadian Wildlife Service.

Figure 3.75. Average Densities of Shearwater (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-Jul, 2006 to 2008.

Sooty Shearwater breeds on islands in the Southern Hemisphere from November to March. A large percentage of the population migrates to the Northern Hemisphere and is present from April to October. It is a common bird during the summer months off Atlantic Canada north to Labrador (Brown 1986). Sooty Shearwater average densities in the Laurentian Sub-basin from late spring to late summer of 2005 ranged from 0 birds/km^2 in September to 0.14 birds/km^2 in June (Table 3.14) (Moulton et al. 2006).

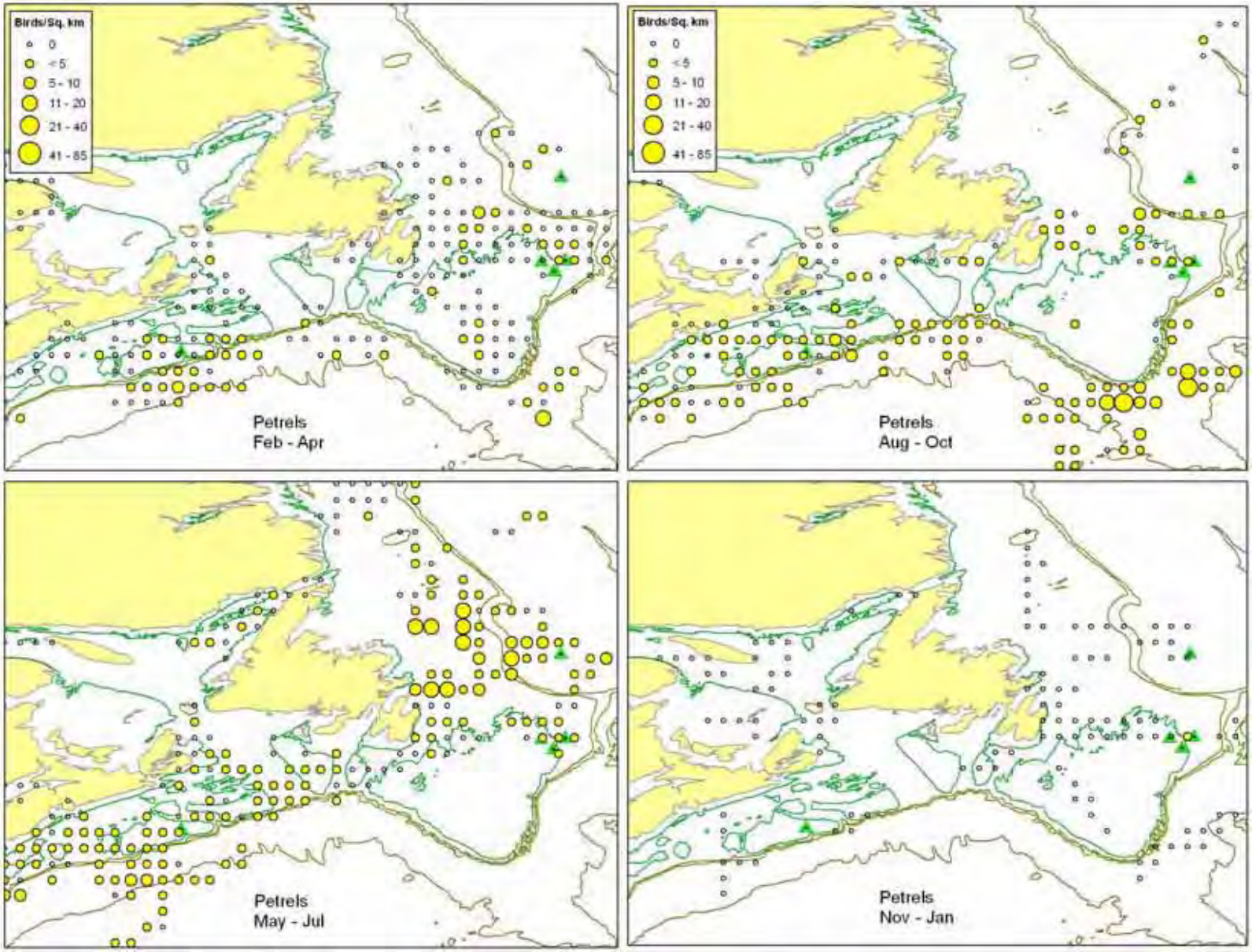
Manx Shearwater occurs in Canadian waters in small numbers during the summer months (see discussion on rare species below). Average densities of this species in 2005 in the Laurentian Sub-basin ranged from 0 birds/km^2 in June, July and September to 0.02 birds/km^2 in August (Table 3.14) (Moulton et al. 2006). Manx Shearwater probably also occurs in this area in May and October (Moulton et al. 2006).

Storm-Petrels

Two species of storm-petrels occur in Newfoundland waters. Leach's Storm-Petrel is a widespread and abundant species occurring in both the Atlantic and Pacific oceans. In the Atlantic it breeds in northwest Europe and in North America from southeast Labrador to Massachusetts (Huntington et al. 1996). The majority of Atlantic birds nest in colonies in Newfoundland. In the Atlantic, Leach's Storm-Petrel winters mainly south of the equator off both South America and Africa. Wilson's Storm-Petrel breeds on islands in the South Atlantic Ocean, including the Antarctic and Subantarctic, December to March. In the non-breeding season, the south Atlantic population migrates to the Northern Hemisphere. The northern limit of its range is Nova Scotia and southern Newfoundland (Brown 1986, Godfrey 1986). Lock et al. (1994) reported abundance of combined storm-petrel species in the Sydney Basin of 0 to 1.0–9.99 birds/km from May through September, and 0 birds/km from October through April. More recent CWS data show combined storm-petrel species density of <5 birds/km^2 from August through October, and insufficient data from November through July (Figure 3.76). In the Laurentian Sub-basin Lock et al. (1994) reported abundance of 0 to >10 birds/km during the months April to June, 0 to >10 birds/km in July to October, and 0 birds/km in October to December. The highest abundance was found at the mouth and margins of the Laurentian Channel, as well as at the continental shelf break (Lock et al. 1994). In 2005 in the Laurentian Sub-basin, average Leach's Storm-Petrel densities varied from 0.63 birds/km^2 in September to 8.62 birds/km^2 in August (Table 3.14, Figure 3.77) (Moulton et al. 2006). CWS reports densities of combined storm-petrel species of 0 to <5 birds/km^2 in the months of February through October, and insufficient data from November through January (Figure 3.76). Storm-Petrel abundance on the Southwest Grand Banks and shelf slope reported by Lock et al. (1994) was 0 birds/km during January to April, 0 to 1.0–9.99 birds/km during May to June, 0 to 1.0–9.99 birds/km during July to August with the highest density on the shelf slope, and 0 birds/km during October to November. Recent CWS data for the area show densities of <5 birds/km^2 during February to April, insufficient data during May to July, <5 birds/km^2 in most 30'N x 30'W blocks in August to October, and 0 birds/km^2 in November to January (Figure 3.76).

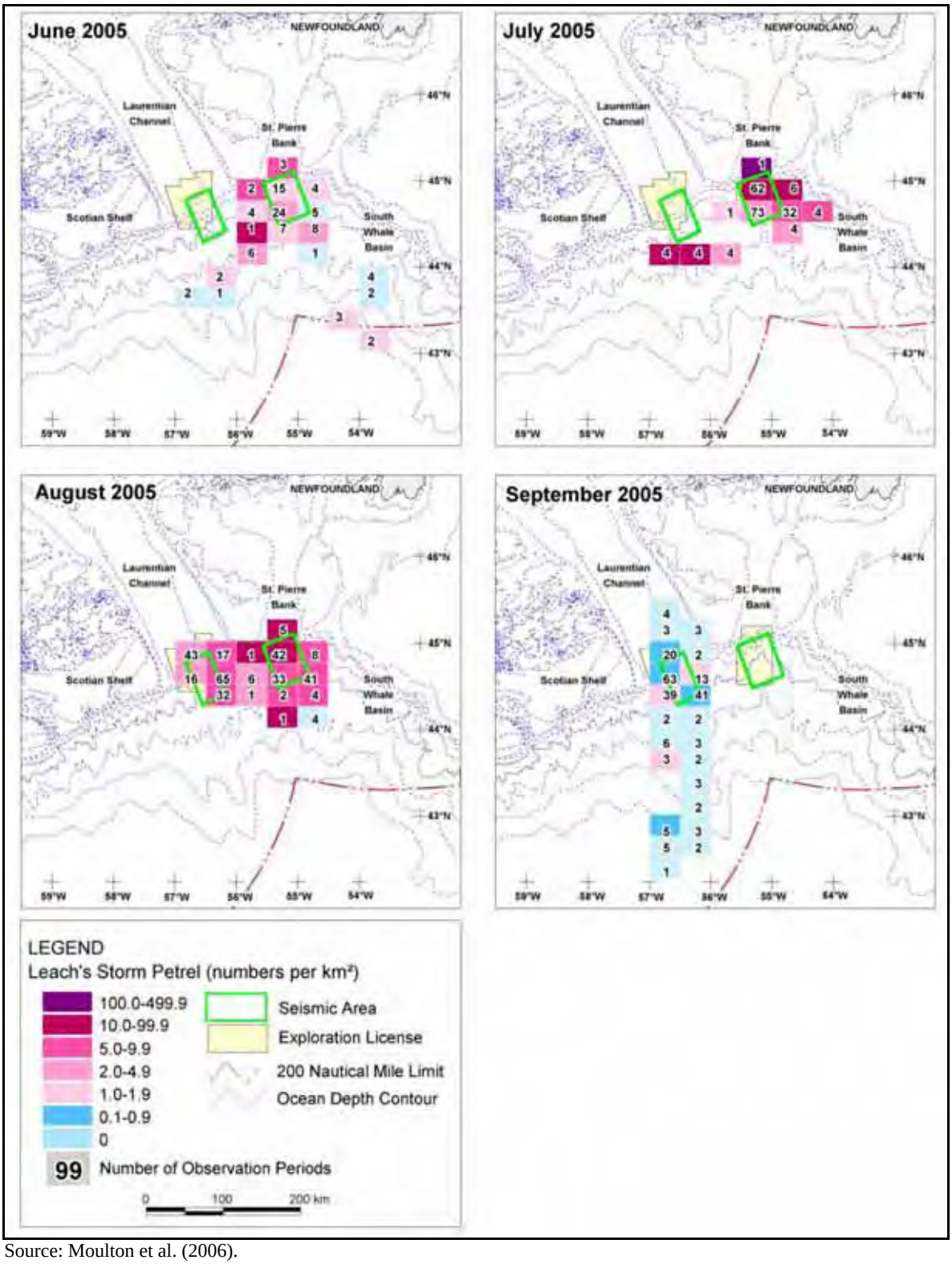
Northern Gannet

The Northern Gannet breeds in the North Atlantic from Canada to Iceland and the British Isles. It winters at sea south of its breeding range but north of the equator. About 12,000 pairs nest on three colonies in eastern Newfoundland (Table 3.9). Gannets are common near shore, but scarce beyond 100 km from shore. In the Sydney Basin, Lock et al. (1994) reported gannet abundance of 0 to 0.1–0.99 birds/km during April through October, and 0 birds/km in most 15'N x 30'W blocks from November through March. They reported abundance in the Laurentian Sub-basin of 0 to 0.10–99 birds/km in the months April through June, 0 to 0.01–0.09 birds/km in July to September, and 0 birds/km from October to December (Lock et al. 1994). Moulton et al. (2006) recorded densities in the Laurentian Sub-basin of 0 birds/km^2 from June to August, and 0.01 in September (Table 3.14). On the Southwest Grand Banks and shelf slope Lock et al. (1994) reported gannet abundance of 0 to 0.1–0.99 birds/km during January to September, and 0 birds/km from October to December. Recent CWS data analyses did not include gannet because of this species' low offshore densities.



Source: D. Fifield, Canadian Wildlife Service.

Figure 3.76. Average Densities of Storm-Petrel (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-Jul, 2006 to 2008.



Source: Moulton et al. (2006).

Figure 3.77. Average Densities (number of individuals/km^2) of Leach's Storm-Petrel by 15'N x 30'W Blocks in the Laurentian Sub-basin during 16 June-29 September 2005.

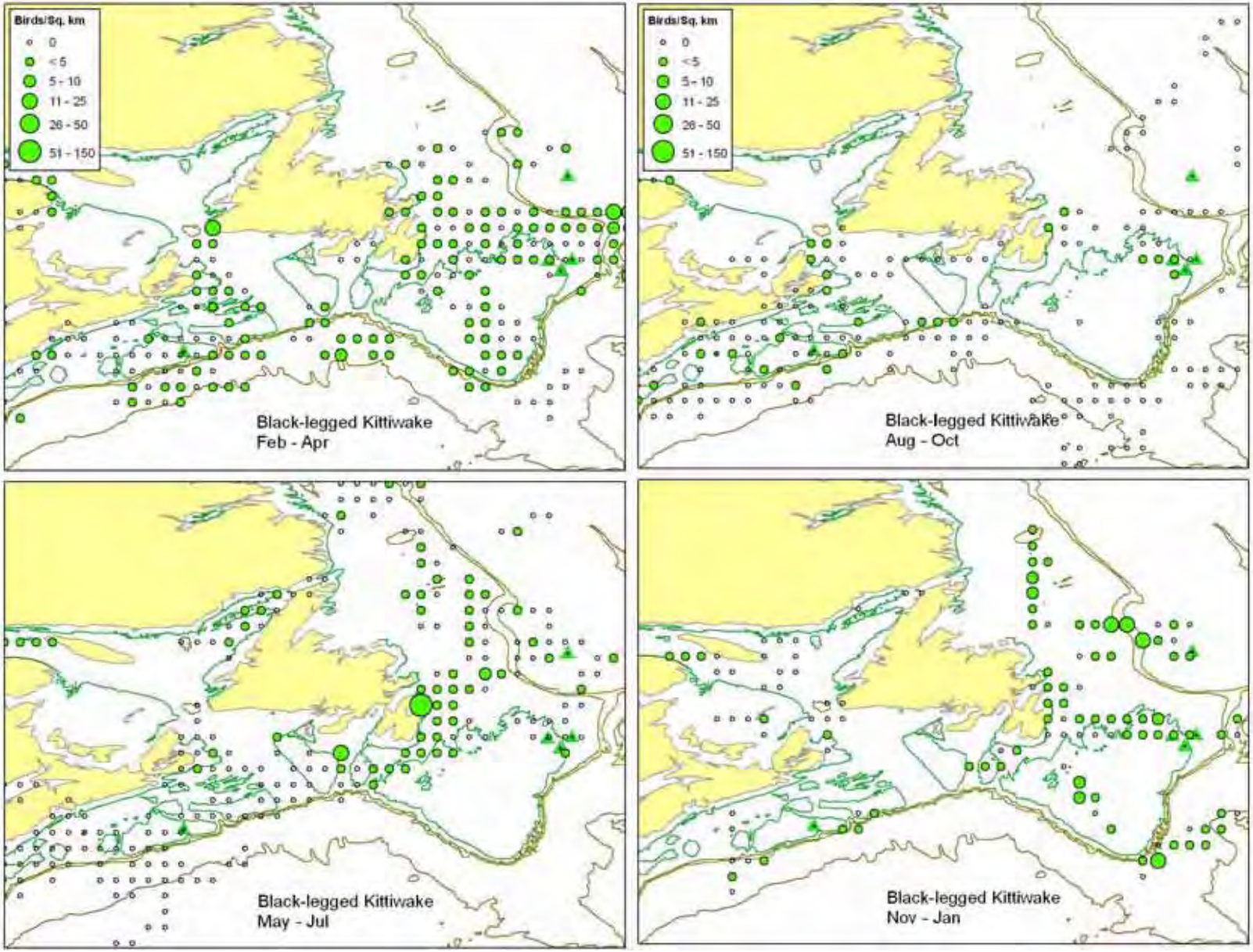
Gulls

The Black-legged Kittiwake has a circumpolar breeding range. Many of the four million pairs that breed in the North Atlantic Ocean spend some time off the east coast of Newfoundland, coming to coastal areas only during the nesting season (Brown 1986; Lock et al. 1994). In Newfoundland, this species breeds in large colonies, mainly on the Avalon Peninsula (see Table 3.9), but non-breeding sub-adults are present offshore in small numbers during the nesting season. In the Sydney Basin, Lock et al. (1994) found kittiwake abundance of 0.1–0.99 to >10 birds/km from January to March, 0 to 0.1–0.99 birds/km from April to June, 0 to >10 birds/km from July to September, and 0 to 1.0–9.99 birds/km from October to November. Recent CWS data from the same area show kittiwake densities of <5 to 5–10 birds/km^2 during February through April, <5 birds/km^2 from May through October, and insufficient data for the period November through January (Figure 3.78). Lock et al. (1994) reported kittiwake abundance in the Laurentian Sub-basin of 0 to 1.0–9.99 birds/km from April to June (lowest in June), and 0 to 0.1–0.99 from July to December. Moulton et al. (2006) recorded densities in this area of 0 birds/km^2 from June to August, and 0.01 birds/km in September (Table 3.14). Recent CWS data show densities in the Laurentian Sub-basin of <5 birds/km^2 during February to April, <5 birds/km^2 during May to July, <5 birds/km^2 during August to October, and insufficient data during November to January (Figure 3.79). On the Southwest Grand Banks and shelf slope Lock et al. (1994) reported kittiwake abundance of 0.1–0.99 to >10 birds/km during January to March. During April to June, abundance ranged from 0 to >10 birds/km, although the number of 15'N x 30'W blocks with 0 birds/km increased each month. During July, abundance was 0 birds/km in all blocks, but 0 to 0.1–0.99 birds/km during August and September. Abundance during October and November ranged from 0 to 1.0–9.99 birds/km. Recent CWS data show densities of <5 birds/km^2 from February to April with the lower densities found on the continental shelf (Figure 3.78). There were insufficient data for the period May to October (Figure 3.78). During November through January, densities ranged from 0 to 5–10 birds/km^2 (Figure 3.78).

Larger species of gulls, mostly Great Black-backed and Herring Gulls, often occur in offshore Newfoundland waters, most commonly during the non-breeding season. In the Sydney Basin, CWS reports densities of large gulls of <2 birds/km^2 during February through April, insufficient data during May through July, and 0 to <2 birds/km^2 during August through January (Figure 3.79). Moulton et al. (2006) found densities of Great Black-backed Gull in the Laurentian Sub-basin ranging from 0 birds/km^2 in July and August to 0.2 birds/km^2 in September (Table 3.14). They found Herring Gull in densities ranging from 0 birds/km^2 from June to August, to 0.28 birds/km^2 in September (Table 3.14). CWS recently recorded densities of combined large gull species in this area ranging from 0 to <2 birds/km^2 during February through October, but insufficient data from November to January (Figure 3.79). Lang and Moulton (2004) recorded no large gulls in late June in the South Whale sedimentary sub-basin along the slope of Southwest Grand Banks. More recently, CWS recorded densities on the Southwest Grand Banks and shelf slope of 0 to 2–5 birds/km^2, with the highest density found on the shelf slope (Figure 3.79). They reported 0 to <2 birds/km^2 from May to July, insufficient data from August to October, and <2 birds/km^2 from November to January (Figure 3.79). Lang and Moulton (2004) recorded no large gulls in late June in the South Whale sub-basin.

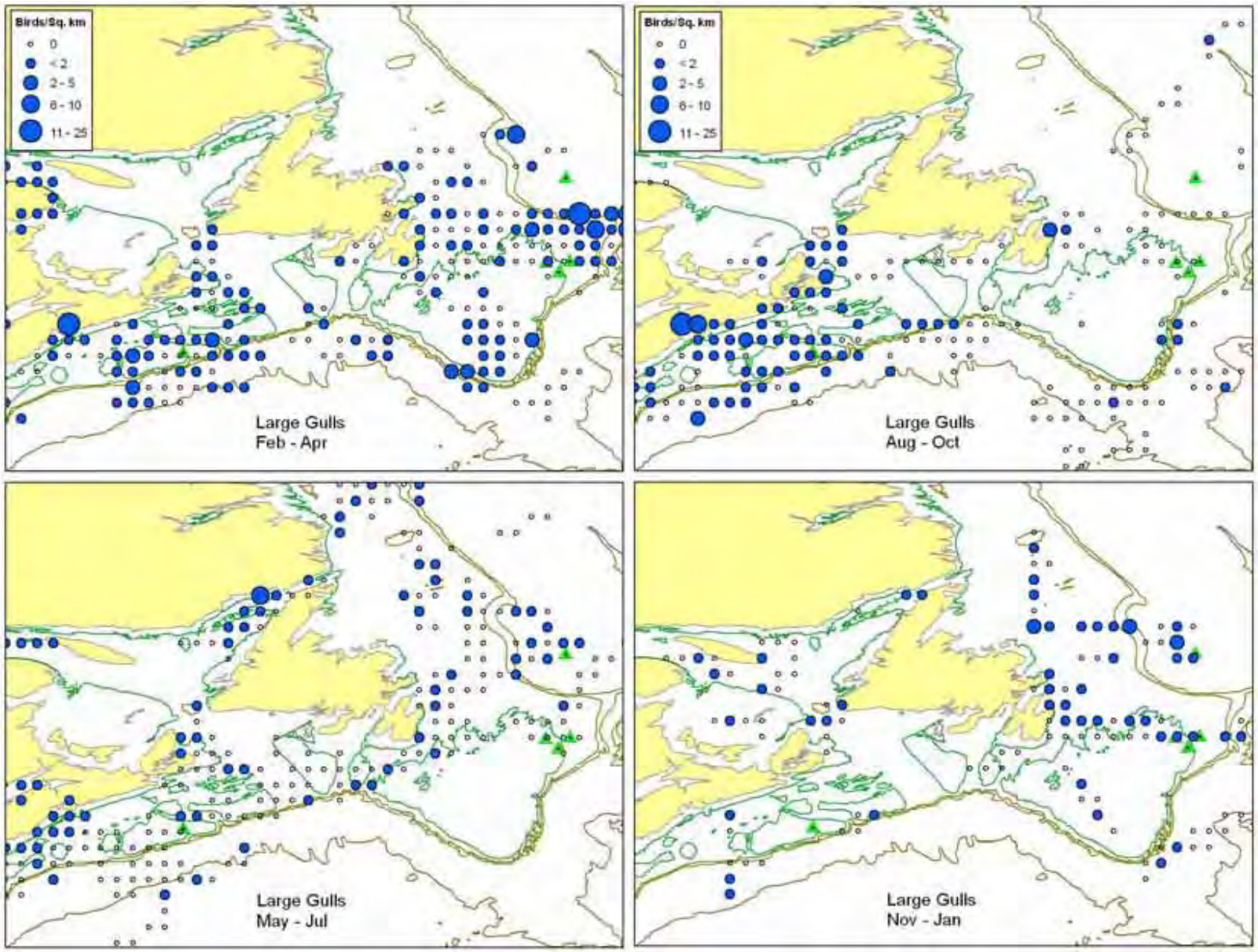
Auks

Large percentages of the Eastern Canadian Arctic and Greenland breeding populations of Dovekie and Thick-billed Murre winter in the western Atlantic, especially off Newfoundland and Labrador (Brown 1986; Lock et al. 1994). Common Murre is found during the breeding season in coastal areas in northern Europe, Iceland, Greenland, and from Labrador to Nova Scotia, including large colonies in eastern Newfoundland (see Table 3.9). The Common Murre winters from southern Newfoundland to New England. Razorbill breeds in the North Atlantic from northern Europe to the mid Labrador coast and south to Maine. It nests at several sites in eastern Newfoundland (see Table 3.9) and winters south to North Carolina and France. This species stays closer to shore than the murres in all seasons. The Atlantic Puffin breeds on the lands surrounding the North Atlantic from Maine to northwest Europe. About 320,000 pairs nest in Atlantic Canada, mostly in southeast Newfoundland (Brown 1986). In North America, Atlantic Puffins are thought to winter from southern Newfoundland to southern Nova Scotia.



Source: D. Fifield, Canadian Wildlife Service.

Figure 3.78. Average Densities of Black-legged Kittiwake (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-Jul, 2006 to 2008.



Source: D. Fifield, Canadian Wildlife Service.

Figure 3.79. Average Densities of Large Gulls (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-Jul, 2006 to 2008.

CWS report densities of combined alcids (auks) in the Sydney Basin of <10 to 10–25 birds/km^2 during February to April (Figure 3.80). There are insufficient data during May to July and November to January in this area. Auk densities during August to October range from <10 to 10–25 birds/km^2. In the Laurentian Sub-basin combined, auk densities ranged from 0 to 10–25 birds/ km^2 during February to April (Figure 3.80). Densities during May to July ranged from 0 to <10 birds/ km^2 in this area. During August to October auk densities varied from 0 to 10–25 birds/ km^2 in the Laurentian Sub-basin. There were insufficient data from this area for the period November to January. On the Southwest Grand Banks and shelf slope, CWS reported auk densities of 0 to 10–25 birds/ km^2 during February to April, <10 to 10–25 birds/ km^2 during May to July, insufficient data during August to October, and 0 to 26–50 birds/ km^2 during November to January (Figure 3.80).

In the Sydney Basin, Lock et al. (1994) reported abundance of Dovekies ranging from 0 to 1.0–9.99 birds/km from January to May, 0 birds/km in most 15'N x 30'W blocks from June to October, and 0 to 0.1–0.99 birds/km during November. Abundance of large auk species (murres, Razorbill, puffin) in this area ranged from 0 to 1.0–9.99 birds/km from January to August, 0 to 0.1–0.99 birds/km in September, and 0 birds/km in October and November (Lock et al. 1994). In the Laurentian Sub-basin, Lock et al. (1994) reported Dovekie abundance ranging from 0 to 0.01–0.09 birds/km during April through June, and 0 birds/km from July to September, and 0 to 1.0–0.99 birds/km from October to December. Moulton et al. (2006) recorded densities of Dovekies in the Laurentian Sub-basin of 0 birds/km^2 during June through August, and 0.01 birds/km^2 during September (Table 3.14). Lock et al. (1994) reported abundance of large auks (murres, Razorbill, and Atlantic Puffin) in the Laurentian Sub-basin ranging from 0 to 1.0–9.99 birds/km in April, 0 to 0.1–0.99 birds/km from May to September, and 0 to 1.0–9.99 birds/km from October to December. Moulton et al. (2006) recorded densities of Common Murre in the Laurentian Sub-basin ranging from 0 birds/km^2 during August and September to 0.09 birds/km^2 in June. They recorded no Thick-billed Murre, Razorbill, or Atlantic Puffin. Lock et al. (1994) reported Dovekie abundance of 0 to 1.0–9.99 birds/km during January to March, 0 to >10 birds/km during April to June, 0 birds/km from July to September, and 0 to 1.0–9.99 birds/km during October and November. Abundance of combined large auk species in this area ranged from 0.01–0.09 to 1.0–9.99 birds/km from April to June (Lock et al. 1994). During July to September abundance ranged from 0 to 0.1–0.99 birds/km, although most blocks had no large auks. During October and November, abundance of large auks varied from 0 to 1.0–9.99 birds/km.

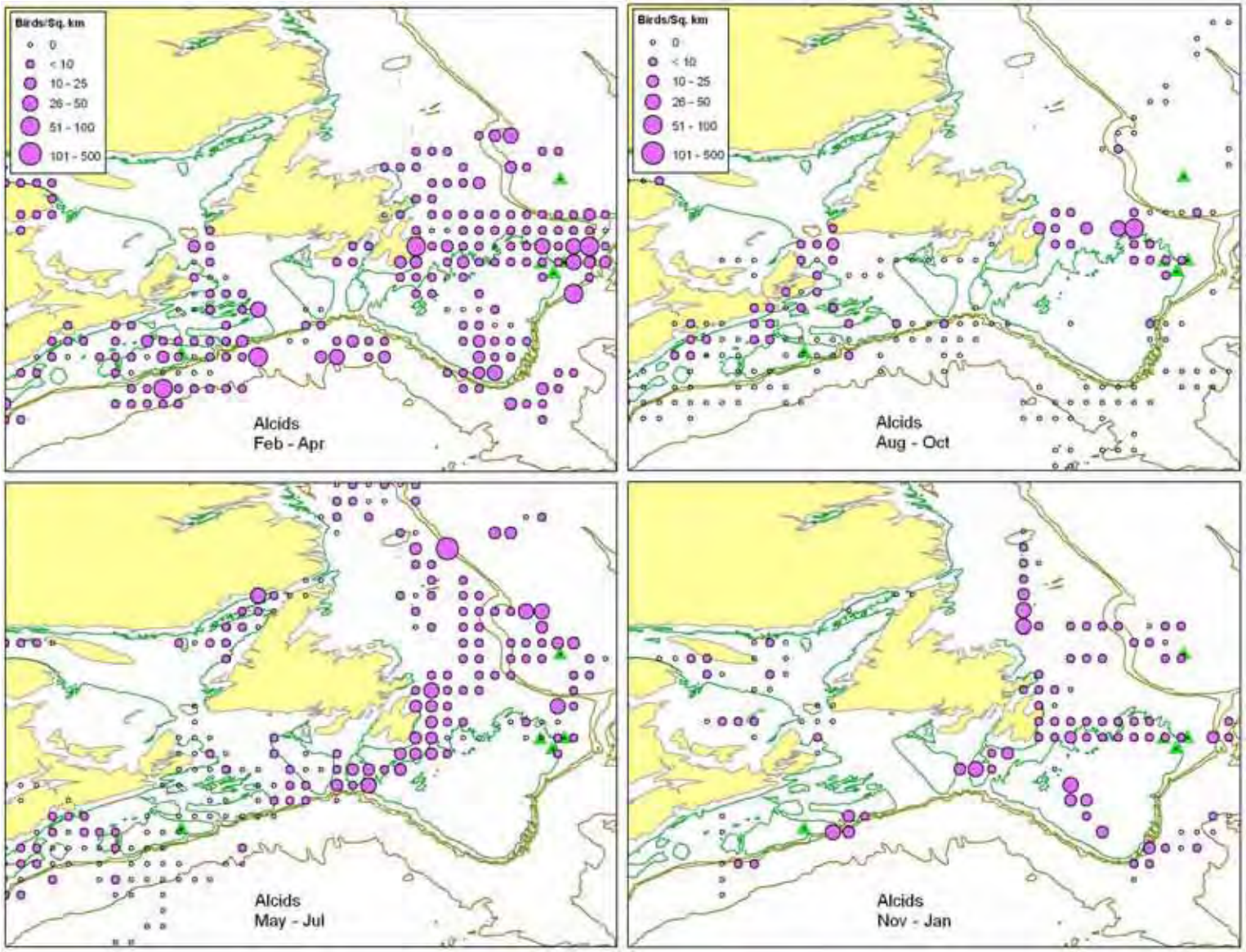
3.4.2 Coastal Waterfowl, Loons, and Grebes

Common Eider (*Somateria mollissima*) is the most numerous of the coastal waterfowl species in all seasons along Newfoundland coasts (Lock et al. 1994). This species has nested at Pass Island (off the Connaigre Peninsula), in the Puffin Island archipelago, Ramea Columbier Island, Wreck Island (off Connoire Bay), Grand Bruit Island, Barasway Island (off community of Grand Bruit), and Wreck Island (off Garia Bay) (see Appendix D in JW 2007), and on the Ragged Harbour Islands on the west side of Merasheen Island (see Figure 3.69, CWS, pers. comm.), but nesting along the south coast of Newfoundland is poorly documented (JW 2007). Gilliland & Robertson (in press), shows that about ½ of the eiders harvested along the south coast are *S. m. dresseri*. It is likely that some of the birds that breed in southern Newfoundland probably migrate south to Nova Scotia and Maine like the birds from further north however, it is likely that a portion of the eiders that breed along the south coast also winter locally along with migrants from further north (Labrador, Quebec and Nunavut). The locations of eider concentrations vary according to pack-ice cover (Lock et al. 1994). The areas of greatest concentration in recent years near the SEA Area are found at the southeast tip of the Avalon Peninsula, the tip of the Burin Peninsula, the southwest tip of the Connaigre Peninsula, and the southeast coast of Cape Breton Island (see Subsections 3.4.4.2 and 3.4.5 in the present report, and Figure 4.61 in JW 2007).

Large but unquantified numbers of scoters (*Melanitta* spp.) and Long-tailed Ducks (*Clangula hyemalis*) occur along the coast during spring and autumn (Lock et al. 1994). Significant numbers of Long-tailed Duck are also present in winter (Lock et al. 1994). Smaller concentrations of American Black Duck (*Anas rubripes*), Common Goldeneye (*Bucephala clangula*), Greater Scaup (*Aythya marila*), and Red-breasted Mergansers (*Mergus serrator*) are also found along the south Newfoundland and Cape Breton Island coasts during migration and winter. Scattered Red-throated Loon (*Gavia stellata*), Common Loon (*G. immer*), Pied-billed Grebe (*Podilymbus podiceps*), and Red-necked Grebe (*Podiceps grisegena*) use ice-free, coastal waters during migration and winter.

Concentrations of 400 to 600 Red-necked Grebes have been reported from coastal St. Pierre and Miquelon (Threlfall and Goudie 1986).

The eastern population of Harlequin Duck was listed as endangered in 1990 (Goudie 1991b), and is currently listed on Schedule 1 of *SARA* as a species of special concern. Concentrations of birds from this population winter at Cape St. Mary's, Chance Cove, the south coast of the Burin Peninsula, and occasionally the Northern Head to South Head area of Cape Breton Island (see below). Small numbers of summering birds are occasionally seen in the Cape St. Mary's area (see below). The eastern population of Barrow's Goldeneye (*Bucephala islandica*) is also listed on Schedule 1 of *SARA* as a species of special concern. It is rare along the coastlines of Newfoundland and Nova Scotia during migration and winter, but has occurred at St. Mary's Bay, Newfoundland, and Sydney, Nova Scotia (Tufts 1986; Schmelzer 2006).



Source: D. Fifield, Canadian Wildlife Service.

Figure 3.80. Average Densities of combined auks (alcids) (number of individuals/km^2) by 30'N x 30'W Blocks During Feb-Jul, 2006 to 2008.

All species of coastal waterfowl, loons, and grebes spend much of their time on the water's surface, either diving or dabbling for their prey. Foraging strategies and prey types of coastal species of waterfowl, loons, and grebes are summarized in Table 4.21 of JW (2007). The seasonal occurrence of these groups is summarized in Figure 3.6 of JWEL (2003).

3.4.3 Shorebirds

Small numbers of plovers and sandpipers occur at all times of the year in and near the SEA Area on the south and east coasts of Newfoundland, Cape Breton Island, Sable Island, and Miquelon (Lock et al. 1994; JWEL 2003; JW 2007). However, they are by far most abundant during autumn migration, in part because some Arctic-nesting species migrate through the area only in autumn. Several species use coastal habitats and have foraging strategies that can bring them into contact with marine oil spills. Different species forage at the water's edge, on flats exposed at low tide, or while wading in shallow water. They seize prey items by gleaning from the surface of the water or exposed substrate, probing, turning over stones or seaweed, plunging the head and neck in the water, or by sweeping the bill from side to side in the water.

Nesting species include Semipalmated Plover (*Charadrius semipalmatus*), Spotted Sandpiper (*Actitis macularius*), and the *at risk* Piping Plover (*C. melodus*) (Mactavish et al. 2003). These species nest on mud, sand, or cobble beaches, and lagoon shorelines, which are not abundant habitats on the south and east coasts of Newfoundland. The most common autumn migrants in the SEA Area in these habitats include these species and Black-bellied Plover (*Pluvialis squatarola*), American Golden-Plover (*P. dominica*), Greater Yellowlegs (*Tringa melanoleuca*), Lesser Yellowlegs (*T. flavipes*), Hudsonian Godwit (*Limosa haemastica*), Ruddy Turnstone (*Arenaria interpres*), the *at risk* population of Red Knot (*Calidris canutus rufa*), Sanderling (*C. alba*), Semipalmated Sandpiper (*C. pusilla*), Least Sandpiper (*C. minutilla*), White-rumped Sandpiper (*C. fuscicollis*), Pectoral Sandpiper (*C. melanotos*), Dunlin (*C. alpina*), and Short-billed Dowitcher (*Limnodromus griseus*) (Mactavish et al. 2003). During spring migration, the most common shorebird species in these habitats are Semipalmated Plover, Piping Plover, Spotted Sandpiper, Solitary Sandpiper (*Tringa solitaria*), Willet (*T. semipalmata*), Whimbrel (*Numenius phaeopus*), and Least Sandpiper (Mactavish et al. 2003). During winter, the only regularly occurring shorebird species is Purple Sandpiper (*Calidris maritima*). This species winters on rocky shores in wave wash and intertidal areas where seaweed is abundant (Lock et al. 1994; LGL 2007).

3.4.4 Important Bird Areas (IBA)

The IBA program identifies sites that provide essential habitat for one or more species of breeding or non-breeding birds (www.ibacanada.ca). The criteria used to identify important habitat are internationally standardized and are based on the presence of threatened and endangered species, endemic species, species representative of a biome (keystone species), or a significant proportion of a species' population. These criteria focus on sites of national and international importance and it is important to recognize that areas of regional and provincial significance can be overlooked if assessment of important habitat is limited to this approach.

There is a total of 17 coastal sites on the east coast of the Avalon Peninsula, the south coast of Newfoundland, and on Cape Breton Island, Nova Scotia, and to the south of that island have been designated IBAs (Figure 3.69; Tables 3.9 and 3.10):

1. Witless Bay Islands (NF002);
2. Mistaken Point (NF024);
3. Cape St. Mary's (NF001);
4. Placentia Bay (NF028);
5. Corbin Island (NF030);
6. Middle Lawn Island (NF031);
7. Green Island (NF032);
8. Big Barasway (NF037);

9. Codroy Valley Estuary (NF041), which is a wetland of international importance under the RAMSAR convention;
10. Grand Bay West to Cheeseman Provincial Park (NF038);
11. Ingonish Island NS055);
12. Bird Islands (NS001);
13. Northern Head and South Head (NS053);
14. Portnova Islands (NS006);
15. Forchu Head (NS047);
16. Basque Island and Michaud Point (NS045); and
17. Sable Island (NS025).

3.4.4.1 Witless Bay Islands

Nesting seabirds on small islands named Green, Great, Gull, and Pee Pee comprise a globally important seabird colony (Figure 3.69, Table 3.9, www.ibacanada.ca). The colony includes the largest Atlantic Puffin colony in North American, and 9.5% of the global Leach's Storm-Petrel population (Table 3.9). The islands are protected as the Witless Bay Ecological Reserve. The surrounding waters are also important habitat for migrant White-winged and Surf Scoters (*Melanitta fusca* and *M. perspicillata*), Long-tailed Duck, and Common Eider.

3.4.4.2 Mistaken Point

The Mistaken Point Ecological Reserve on the southeast Avalon Peninsula includes the coast and marine waters from Cape Race to The Drook, 20 km to the west. More than 1% of the North American population of Purple Sandpiper and significant numbers of Common Eider are often seen here in winter (Figure 3.69, www.ibacanada.ca).

3.4.4.3 Cape St. Mary's

This IBA consists of four kilometres of coastline and a sea stack with a combined 30,000 pairs of nesting seabirds (Figure 3.69, Table 3.9, www.ibacanada.ca). This includes 2% of the global Northern Gannet population and large numbers of Common Murre and Black-legged Kittiwake. Large numbers of migrant and wintering Long-tailed Duck, Black Scoter, White-winged Scoter, and Surf Scoter, Common Eider, and more than 1% of the eastern North American population of the *at risk* Harlequin Duck (*Histrionicus histrionicus*) use the adjacent waters around the Cape, the Bull, Cow, and Calf Rocks, and the St. Mary's Keys. This is the only site in Newfoundland to regularly host more than 50 Harlequin Ducks. Numbers of wintering Harlequins at Cape St. Mary's have been increasing recently, and February surveys have reported counts as high as 263 individuals (in 2008) (Thomas 2008). However, the number of Black Scoters wintering at the Cape has declined dramatically over the last 30 years (I. Goudie, pers. comm., 2009). Small numbers of Harlequin Ducks also summer or moult at Cape St. Mary's in some years (Gilliland et al. 2002, G. Robertson, Environment Canada [EC], pers. comm. *in* Thomas 2008).

3.4.4.4 Placentia Bay

The eastern half of Placentia Bay attracts globally significant concentrations of Greater Shearwater (Figure 3.69, Table 3.9, www.ibacanada.ca). As many as 100,000 of these birds are drawn to feed on concentrations of spawning capelin during summer.

3.4.4.5 Corbin Island

This island is important for its globally significant number of nesting Leach's Storm-Petrel (Figure 3.69, Table 3.9, www.ibacanada.ca). As many as 100,000 pairs have nested here, comprising 2% of the western Atlantic population of this species.

3.4.4.6 Middle Lawn Island

This island is an IBA because of the only North American nesting colony of Manx Shearwater (Robertson 2002) and because of globally significant numbers of nesting Leach's Storm-Petrel (Figure 3.69, Table 3.9, www.ibacanada.ca). Up to 26,313 pairs of Leach's Storm-Petrels have nested here.

3.4.4.7 Green Island

A globally significant number of Leach's Storm-Petrel pairs nest at Green Island between Miquelon Island and the Burin Peninsula (Figure 3.69, Table 3.9, www.ibacanada.ca). Herring Gull, Common Tern, and Arctic Tern also nest here.

3.4.4.8 Big Barasway

The beach associated with this bar lagoon provides nesting habitat for an average of seven Piping Plover pairs each year, representing 1.6% of the Atlantic Canada population and 24% of the Newfoundland population (Figure 3.69, Table 3.9, www.ibacanada.ca). The area is protected as a provincial Wildlife Reserve.

3.4.4.9 Codroy Valley Estuary

Located at the mouth of the Grand Codroy River, this IBA site supports a high diversity of breeding and staging site waterfowl species, and is a wetland of international importance (Ramsar Convention 1971, http://www.ramsar.org/index_list.htm) (Figure 3.69). At least 20 waterfowl species have been identified in the estuary including Wood Duck (*Aix sponsa*), Green-winged Teal (*Anas crecca*), American Black Duck, Northern Pintail (*A. acuta*), Gadwall (*A. strepera*), Lesser and Greater Scaup (*Aythya affinis* and *A. marila*), and Common and Red-breasted Mergansers (*Mergus merganser* and *M. serrator*). Rare ducks such as Eurasian Wigeon (*Anas penelope*) and Tufted Duck (*Aythya fuligula*) have also been seen at this IBA. In addition, thousands of Canada Geese staging during fall migration has been recorded here in continentally significant numbers. This IBA also has the first Newfoundland breeding record for Northern Shoveler (*Anas clypeata*), American Wigeon (*A. americana*) and Blue-winged Teal (*A. discors*).

The Piping Plover nests on Grand Codroy beach (Searston Beach and historically North Beach). This species is globally vulnerable and is listed as *endangered* on Schedule 1 of *SARA*. A pair successfully bred on the beach at the mouth of the estuary from 1992 to 1998.

3.4.4.10 Grand Bay West to Cheeseman Provincial Park

This area consists of eight kilometres of sand beach and small sections of rocky coastline stretching east from J.T. Cheeseman Provincial Park near Port aux Basques (Figure 3.69, Table 3.9, www.ibacanada.ca). The site is important nesting habitat for the Piping Plover, and supported an average of 17 adults during the period 1995 to 1998. The 18 individuals counted in 1996 comprised 4.2% of the Atlantic Canada population of the species. A diversity of shorebird species also stops at this site during migration (Rao 2009).

3.4.4.11 Ingonish Island

The number of Great Cormorants nesting on the cliffs of this island comprise 2.2% of the North American breeding population (Figure 3.69, Table 3.10, www.ibacanada.ca).

3.4.4.12 Bird Islands

These islands, off Dauphin Head on Cape Breton Island, host the largest North American colony of Great Cormorant (Figure 3.69, Table 3.10, www.ibacanada.ca). This comprises 9% of the North American population.

The largest concentrations in Nova Scotia of Black-legged Kittiwake, Razorbill, and Atlantic Puffin also nest here. Leach's Storm-Petrel, Double-crested Cormorant, and Black Guillemot also nest on the Bird Islands.

3.4.4.13 Northern Head and South Head

These headlands, enclosing Morien Bay, have hosted as much as 6.7% of the North American breeding population of Great Cormorant (Figure 3.69, Table 3.10, www.ibacanada.ca) and Black-legged Kittiwake has also nested here. Harlequin Ducks occasionally use the surrounding water during winter.

3.4.4.14 Portnova Islands

This group of islands, islets, and reefs meet the criteria of IBAs because of the relatively large nesting colony of Great Cormorant (Figure 3.69, Table 3.10, www.ibacanada.ca). Approximately 2.5% of the North American population of this species nests here.

3.4.4.15 Forchu Head

At least 2% of the North American breeding population of Great Cormorant nests on the rocks off Forchu Head (Figure 3.69, Table 3.10, www.ibacanada.ca).

3.4.4.16 Basque Island and Michaud Point

The number of Great Cormorants nesting on Basque Island amount to 3.6% of the North American population (Figure 3.69, Table 3.10, www.ibacanada.ca). Over 100 Common Eiders nest near Michaud Point. Spotted Sandpiper, Semipalmated Sandpiper, Least Sandpiper, Willet, and Wilson's Snipe (*Gallinago delicata*) have also been recorded at Michaud Point during north-south migrations.

3.4.4.17 Sable Island

Sable Island is a long sandbar island located off Nova Scotia about 240 km southwest of the SEA Area. The island is the location of tern and gull nesting colonies and breeding habitat for two species at risk, Ipswich Savannah Sparrow (*Passerculus sandwichensis princeps*) and Roseate Tern (*Sterna dougallii*). The total world population of the Ipswich Savannah Sparrow nests on the island. Some pairs nest in coastal dunes and upper beaches. About 2856 terns, including Common Tern, Arctic Tern and a small number of the *endangered* Roseate Tern nest here (Figure 3.69, Table 3.10, www.ibacanada.ca). The island is designated a core site in the Recovery Plan for Roseate Tern (www.ibacanada.ca). Great Black-backed and Herring Gulls also nest in globally significant numbers on the island.

3.4.5 Other Important Habitat Areas

The Southwest Grand Banks is an important wintering area for seabirds, especially Dovekie and Thick-billed Murre. During summer, warm core eddies from the Gulf Stream may bring seabirds with primarily southern distributions, such as Fea's Petrel (*Pterodroma feae*) (Rao et al. 2009).

Several coastal sites are used during winter by seabirds, especially by sea ducks and shorebirds. Chance Cove, on the southeast Avalon Peninsula, hosts sea ducks such as the *at risk* Harlequin Duck, as well as Common Eider, Surf Scoter, White-winged Scoter, and Common Goldeneye (see Figure 3.69, Rao et al. 2009). Concentrations of Purple Sandpiper are also noted each winter (B. Mactavish, pers. comm., 2009).

Large numbers of wintering Common Eider along the southern coast of the Burin Peninsula, from the coast adjacent to St. Lawrence west to Point May and on the west side of Placentia Bay, were noted during aerial surveys, conducted from February to April 2007 (LGL 2007). The greatest concentrations of eiders were found at Allan's Island, Taylor's Bay, Lansey Bank Cove, Black Rock, and Middle Island (Figure 3.69). During the

March survey a small flock of Harlequin Duck was sighted adjacent to Allan's Island near Lamaline (LGL 2007). The flock was sighted again during the April survey at the same location. The re-sighting suggests that this site is an established wintering area because of this species' strong fidelity to wintering sites (LGL 2007). Purple Sandpipers were common and ubiquitous during these surveys (LGL 2007).

A concentration of nesting and roosting Common Eider is found in the Burgeo Archipelago, which lies off the south coast of Newfoundland (see Figure 3.69, Goudie 1991c). West of Burgeo, nests or ducklings have been found on Smokey Island (south of Otter Point), Baring Island, and Grassy Island. Roosting eiders have been found on a small, unnamed island west of Smokey Island, Shag Island, Wreck Island, Baring Island, a rock adjacent to Green Island, Black Rock, and Green Island Rocks. South of Burgeo, Common Eider nests or ducklings have been found on Green, Pigeon, Harbour, Wow's, and Duck Islands.

Some important seabird nesting colonies have not been designated IBAs. Ramea Colombier is the nesting site for 1000 Leach's Storm-Petrel (Cairns et al. 1989), as well as Black-legged Kittiwake (CWS, unpubl. data, Figure 3.69). Seabird colonies are also found on the Penguin Islands (Figure 3.69). Species nesting there include Leach's Storm-Petrel, Caspian Tern (*Hydroprogne caspia*), Common Tern, and Arctic Tern (Lock et al. 1994). Large numbers of wintering seabirds also use the surrounding waters. Over 2000 pairs of kittiwake and Razorbill nest at Miquelon Cape at the northern tip of Miquelon (Figure 3.69, Cairns et al. 1989). Grand Columbier Island, just north of St. Pierre Island (Figure 3.69), is the location of large seabird colonies, the most abundant species of which are several thousand pairs of Black-legged Kittiwake, 800 pairs of Atlantic Puffin, over 300 pairs of Leach's Storm-Petrel, and hundreds of Herring Gull (Rao et al. 2009). Northern Fulmar also nests there, and Manx Shearwaters have been prospecting the island for nest sites. Western Head, near the southern-most tip of the Avalon Peninsula, hosts over 1000 nesting pairs of kittiwake, Common Murre, and Razorbill (Figure 3.69, Cairns et al. 1989).

3.4.6 Bird Species at Risk

A total of ten marine-associated bird species occurring in or near the SEA Area are considered to be SAR. Five of these are listed on Schedule 1 of *SARA*, three of which have legal implications. The remaining five species are considered SAR due to their designations under COSEWIC. These bird species are discussed in more detail in Subsection 3.7.2 on Species at Risk.

3.4.7 Rare Species

Manx Shearwater breeds in northwest Europe, the Azores Islands, and Canary Islands. The sole North American colony at Middle Lawn Island, Burin Peninsula, Newfoundland, most recently consisted of at least 13 pairs (Table 3.9) (Robertson 2002). Manx Shearwaters in Canadian waters are probably a combination of Newfoundland breeders, non-breeding sub-adults and migrants from European breeding colonies (Lee and Haney 1996).

3.4.8 Planning Implications

Of the potential effects associated with offshore oil and gas activities, accidental oil spills have the greatest potential impact on marine-associated birds. These species are at greatest risk during the months of year when sea temperatures are coldest, i.e., January through March (Lock et al. 1994).

Large numbers of marine-associated birds concentrate at various locations in and near the SEA Area at all times of the year. During spring and summer, pelagic seabirds, and to a lesser extent Common Eiders, concentrate in and near the SEA Area inshore at nesting colonies on several islands and headlands, and at concentrations of spawning fish such as capelin and herring. The number and species diversity of these seabirds is particularly high on the Avalon Peninsula. During summer, large numbers of Greater Shearwater use the continental shelf, shelf break, and Placentia Bay. In autumn, large numbers of seabirds and coastal waterfowl arrive from nesting colonies in the Arctic to winter inshore and offshore on the continental shelf and shelf break in the SEA Area. Nearshore shallow water areas are obviously very important to most marine birds at some time of the year.

Appropriate mitigations will have to be developed to minimize any impact of oil and gas activities on birds in all marine areas of the SEA AREA.

For most exploration, delineation and production drilling programs in recent years, the C-NLOPB has required that the operator undertake seabird monitoring from drilling rigs during the drilling program. For seismic programs, mitigation may include seabird monitoring and a stranded bird release program in the Newfoundland and Labrador offshore area. Therefore, it is anticipated that the Board will require similar monitoring programs during exploration, seismic and drilling programs in the Southern Newfoundland and Labrador Offshore Area. An Environmental Studies Research Fund (ESRF) study developed protocols for seabird monitoring programs for the offshore (Moulton and Mactavish 2004).

3.4.9 Data Gaps

Although many quantitative, at-sea surveys of pelagic seabirds have been conducted in the SEA Area, knowledge of the offshore distribution and abundance of seabirds in this area is still incomplete. There are gaps in the data that are geographic, seasonal, temporal, and statistical. There are portions of the SEA Area that have never been surveyed for seabird distribution. Among areas that have been surveyed, many have not been surveyed in all four seasons of the year. Data summarized in Lock et al. (1994) from some areas may not accurately represent current conditions because data date from 1976 to the mid-1980s. Last, within many subdivisions of the SEA Area, the survey effort, as measured by the number of 10-minute seabird watches, has been low. Without a sufficient number of watches, the full range of environmental conditions and other biases have not been sampled. As a result, there is uncertainty about whether data from such an area accurately represent its bird distribution and abundance.

Pelagic seabird distribution data are lacking during winter on much of the continental shelf and the deep waters beyond the shelf slope. Also, any existing data are old. Although the nearshore areas in the northwest corner of the SEA Area have been sampled, numbers of seabird watches are low (Lock et al. 1994). The middle section of the shelf slope has not been surveyed recently, and the historic survey effort in that area was low. During spring, much of the area on the continental shelf, shelf slope, and most of the abyssal areas of the Laurentian and Sydney basins have not been surveyed. The number of seabird watches conducted in the Sydney Basin is low (Lock et al. 1994). Most of that area and the shelf slope of the Southwest Grand Banks have not been studied recently. With the exception of the northwest corner of the Sydney Basin, most of the continental shelf has not been sampled during summer. The deep waters off the Southwest Grand Banks have also undergone few surveys during summer. Most of that area has not been surveyed recently or in adequate survey effort (Lock et al. 1994). Except for the northwest and northeast corners of the SEA Area, most of it has either not been surveyed or surveyed recently during autumn.