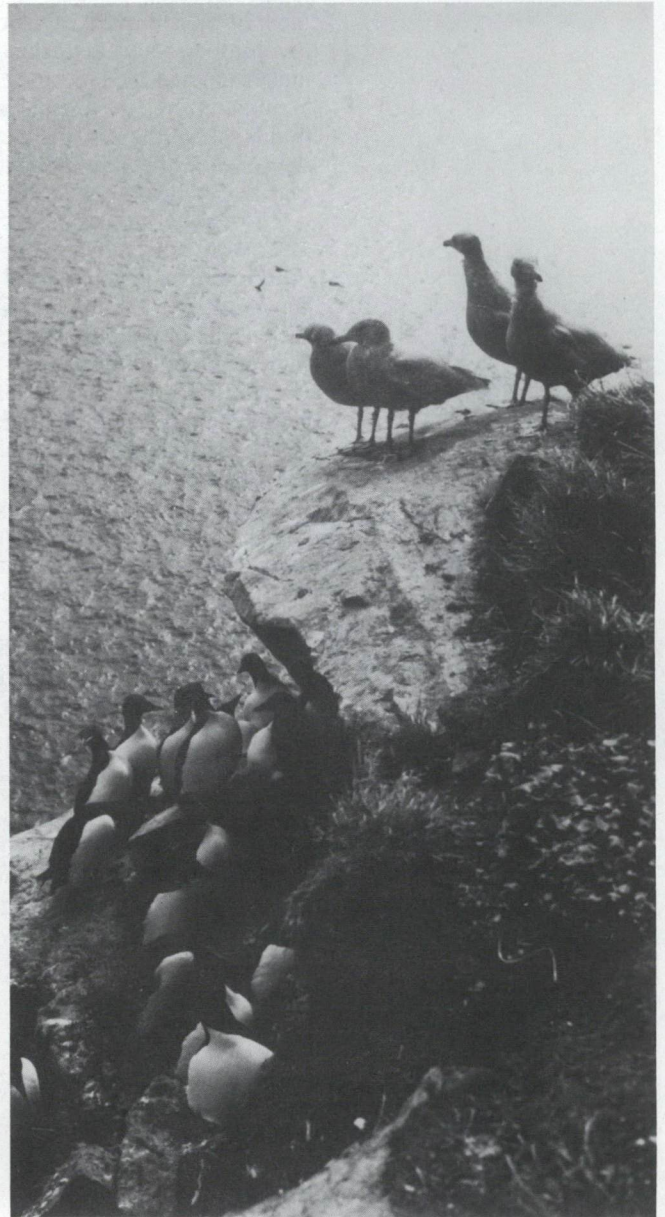
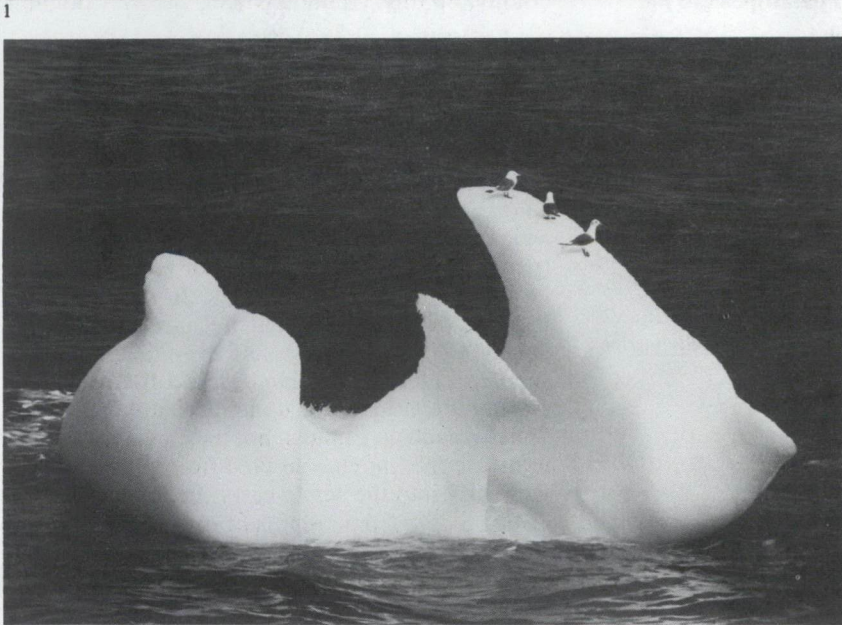


# Seabirds



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Cover photos

1. Herring Gulls  
Photo: Canadian Wildlife Service
2. Black-legged Kittiwakes on iceberg  
Photo: Tony Beck
3. Gulls and murres  
Photo: B. Lyon

Everyone who has visited the coast is familiar with gulls, those graceful, long-winged birds that through the beaches and harbours and boldly beg for scraps. The gulls are a family of birds that live mainly at sea, either along the shore, or out in the ocean itself. Worldwide, there are more than 250 species of birds in more than 15 families that live either partially or exclusively at sea, and these are generally known as "seabirds." Although two-thirds of Earth is covered by water, seabirds constitute only 3% of the world's bird species. This is probably because, in the sea, many of the roles that birds play on land are performed by fishes.

Although seabirds are highly visible from coasts and at sea, most people do not think of birds as sea creatures in the same way that they think of whales or seals. Because many seabirds spend most of their time flying above the sea surface or perching on rocks and islands, and because they must return to land to breed, they do not qualify as genuine marine organisms in many people's minds. Nevertheless, they derive their food from the sea, and they are indisputably a part of the marine food web: the sea is their home as much as it is for crabs and corals.

The table lists the 15 families into which ornithologists have grouped marine birds and shows the approximate number of species in each. (The exact number of species is continually being revised. Genetic research is revealing that some very similar-looking birds are so different in their genetic makeup that they constitute different species.) All species belonging to the albatross, auk, frigatebird, gannet, penguin, petrel, and storm-petrel families feed exclusively at sea. In addition, many species of cormorants, grebes, gulls, jaegers, loons, pelicans, and terns feed either entirely or mainly at sea. The Phalaropes are the only shorebirds that feed at sea.

Seabird distributions tend to be much affected by the different conditions (e.g., water temperature, depth, currents) in different parts of

the oceans. Seabirds are more numerous in polar than in tropical waters, and there is a much greater diversity in the southern hemisphere than in the northern, probably because much more of the southern hemisphere consists of ocean. In Canada, the greatest diversity is found off Newfoundland. There, at the edge of the Grand Banks, the cold waters of the southward-flowing Labrador current meet the warm waters of the Gulf Stream, which supports an entirely different array of animals, including many seabirds characteristic of more southerly latitudes. The drawing shows the silhouettes of some of the families and species found off Newfoundland.

On the Grand Banks, birds that breed in the Arctic and Subarctic, such as murres and Atlantic Puffins, intermingle with birds that breed in more temperate regions, such as shearwaters, gannets, and storm-petrels. The coastal waters of British Columbia, although at the same latitude as Newfoundland, are warmed by northward-flowing currents and hence support only seabirds that breed and winter in temperate climates, such as Cassin's and Rhinoceros auklets.

Many seabird populations are very numerous. Among those that breed in the southern hemisphere, Wilson's Storm-Petrels, Sooty and Short-tailed shearwaters and Fairy Prions number in the tens of millions. In the northern hemisphere, Leach's Storm-Petrel, the Common and Thick-billed murres, the Atlantic and Tufted puffins, and the Dovekie also have populations exceeding 10 million birds. Canada alone supports more than 5 million Leach's Storm-Petrels, most of them in Newfoundland, more than 2 million Thick-billed Murres, practically all in the eastern Arctic, and more than 1.5 million Cassin's Auklets, more than half of which breed in one colony, on tiny Triangle Island, British Columbia.

*Feeding behaviour and diet*

Many seabirds feed at the sea surface, seizing prey in flight (storm-petrels, terns, jaegers), or while sitting on the water (kittiwakes, phalaropes, Northern Fulmars). Others, sometimes called "pursuit divers," chase prey below the surface, swimming underwater by means of their wings (penguins, auks, shearwaters), or feet (cormorants, loons). The deepest diver is the 20-kg Emperor Penguin of Antarctica, which can reach 300 m during a 10-minute dive, and even the much smaller murres (1 kg) can descend 100 m while staying underwater for up to three minutes. Species such as gannets, boobies, pelicans, and terns use the impetus derived from plunging vertically into the sea to carry them underwater. Gannets dive from heights of up to 50 m above the surface to depths of as much as 15 m.

In general, underwater-feeding seabirds are less common in tropical waters than in polar and temperate waters. For instance, the distribution of the penguins, a family of birds found only in the southern hemisphere, reaches as far north as the equator only in the Galapagos Islands, where the Humboldt Current maintains relatively cool water. The range of the auks, northern hemisphere equivalents of the penguins, extends into tropical waters only in California and on the Pacific coast

Families of birds in which all species feed either entirely or partially at sea, the approximate number of species in each family, and the number of species that breed in Canada in parentheses. Ducks and grebes that feed at sea are not included.

Family	Number of species	
	Wholly marine	Partially marine
Albatrosses	15	
Auks	23(13)	
Boobies/gannets	9(1)	
Cormorants	17(3)	10(1)
Frigatebirds	5	
Gulls	20(6)	26(5)
Loons/divers		5(4)
Pelicans	1	6(1)
Penguins	16	
Petrels	64(2)	
Phalaropes		3(3)
Skuas/jaegers	4	3(3)
Storm-petrels	20(2)	
Terns/skimmers	25(2)	19(4)
Tropicbirds	3	
Totals	222(29)	72(21)





Characteristic silhouettes of common seabirds of the western North Atlantic (drawing by Ian Jones)

1. American Robin (for scale)
2. Northern Gannet
3. Herring Gull
4. Parasitic Jaeger
5. phalarope
6. tern
7. Razorbill (auk family)
8. cormorant
9. murre (auk family)
10. puffin (auk family)
11. Dovekie (auk family)
12. Black Guillemot (auk family)
13. shearwater (petrel family)
14. Leach's Storm-Petrel
15. Wilson's Storm-Petrel
16. Common Eider (duck family)
17. Oldsquaw (duck family)

of Mexico, areas affected by the cool California Current. The paucity of diving birds in the tropics, where there are many surface-feeding petrels and terns, may be due to competition or predation from large fishes that thrive in warmer waters.

The general affinity between seabirds and cold water makes Canada a good place for them to live. Fifty species breed here and a further 20 or more that breed elsewhere feed in Canadian waters for part of the year. On a world scale, Canada is especially well endowed with loons, phalaropes, jaegers, and auks. The coast of British Columbia supports more than half the world population of three auks: the Ancient Murrelet, Cassin's Auklet, and Rhinoceros Auklet.

The nutrient-rich arctic marine waters off eastern Newfoundland are especially attractive to seabirds. Many of those that breed in the eastern Atlantic visit Newfoundland in winter, along with most murres and gulls breeding in the eastern Arctic and the majority of the world's Dovekies, which breed in northwest Greenland. In addition, many Black-legged Kittiwakes and Northern Fulmars reared in the eastern Atlantic spend both summer and winter off Newfoundland during their prebreeding years. The shallow waters of the Grand Banks provide a nursery area for them. In summer also, millions of Greater and Sooty shearwaters from the southern hemisphere come to spend their nonbreeding season.

The total numbers of seabirds on the Grand Banks at any time therefore greatly exceeds the local breeding population. The birds, like the former European fishing fleets, come to exploit some of the most productive waters in the world. Marine productivity is very high in the shallow waters of the Grand Banks, because turbulence created by tides and currents brings minerals and other nutrients close to the surface, allowing

plankton, which need both light and nutrients, to flourish. The health of the marine ecosystem off Newfoundland is important for seabirds from the entire Atlantic Ocean.

Many seabirds travel constantly, in response to changes in weather and food supply. Their food is often very patchily distributed, requiring them to search enormous areas to be sure of finding it. When a patch, such as a school of fish at the surface or a dead whale, is located, the food may be very easy to obtain and the birds gorge themselves until they can scarcely take off. Compared with many land birds, therefore, most seabirds are accustomed to alternations of feast and famine.

Most seabirds feed either on small fishes or on zooplankton, the small, mainly crustacean, organisms that browse the oceans' primary producers, the phytoplankton. Seabirds tend to be generalized in their diet, taking a wide spectrum of different sizes and types of prey. However, while rearing chicks they are more selective. Murres and puffins, for instance, take a very diverse diet, but feed their chicks exclusively on fish. In some situations a particular species of fish may become dominant in the diet. In the northwest Atlantic, for instance, the capelin, a small schooling smelt, is important to most seabirds, as well as to cod and marine mammals. In the Arctic, the arctic cod, a small relative of the Atlantic cod that occurs in enormous schools in arctic waters, is the main prey of many seabird species. In British Columbia waters the sandlance is similarly important. Where birds are very dependent on a single type of prey the potential for disruption of their food supplies through human exploitation is high.

Oceanic seabirds are amazingly unaffected by storms and waves. The large albatrosses are actually dependent on strong winds to allow them to glide the enormous distances that they need to cover in order to find the squid that are their main prey. However, a prolonged period of adverse weather conditions, especially in winter, can exhaust the energy reserves of some birds, resulting in their being washed up exhausted on beaches, or even driven far inland. Certain species are famous for such periodic "wrecks." In eastern North America showers of Dovekies appear inland at irregular intervals, apparently as a result of an adverse combination of strong winds and poor food supplies.

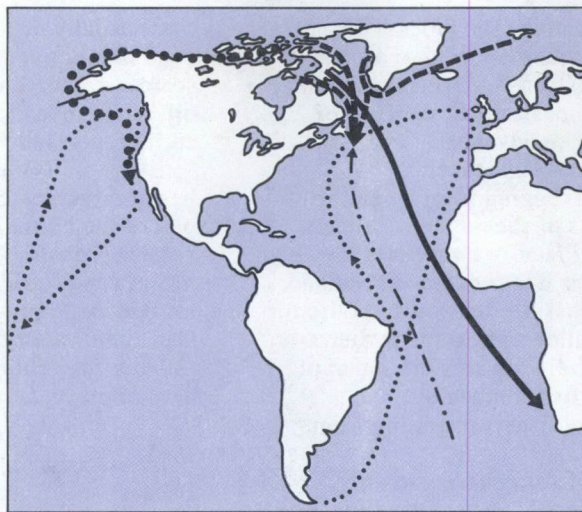
#### Migration

Like whales, seabirds are highly mobile and many of them undertake regular seasonal migrations (see map). Seabird migrations include the longest recorded for any bird: the Arctic to Antarctic migration of the Arctic Tern, and the spectacular circuit of the Pacific Ocean made by Sooty Shearwaters breeding in New Zealand. Almost equally impressive, for a relatively weak flier, is the migration of the Pacific Loon from breeding areas in the central Canadian Arctic, along the north coast of Alaska, through the Bering Strait, and south to waters off California. The tiny Wilson's Storm-Petrel, no heavier than a starling although with much longer wings, makes an annual trip from its breeding places in the



Regular seasonal migrations of selected seabird species

- ..... Sooty Shearwater
- Thick-billed Murre
- Sabine's Gull
- Pacific Loon
- - - - Great Shearwater



Antarctic to waters off Nova Scotia and Newfoundland.

Among seabirds breeding in Canada, those nesting in the eastern Arctic winter mainly off Newfoundland and Nova Scotia, or farther south in the Atlantic, and those breeding on the coasts of the Beaufort Sea and in the central High Arctic mainly winter in the Pacific. Many species are split into eastern and western populations that winter, respectively, in the Atlantic and Pacific (Common and King eiders, Thick-billed Murres, Red-throated Loons).

In some cases, such populations have evolved separately to form distinctive subspecies, or races, well on their way to becoming species. This is the case for the Iceland Gull. The western race (Thayer's Gull) migrates to the Pacific, and the eastern (Kumlien's Gull) migrates to the Atlantic. The two races breed side by side in northern Hudson Bay, yet migrate in almost diametrically opposite directions, presumably retracing the route by which they spread into the Arctic following the retreat of the Pleistocene ice sheets. The existence of such contacts between formerly isolated populations tells us much about how species evolve.

#### *Seabirds and people*

Seabirds and their eggs have been an important source of food for coastal people around the world for millennia. Some communities, like that of St. Kilda in the western isles of Scotland, were almost totally dependent on harvesting seabirds. In Canada, seabirds were an important constituent of native diet in British Columbia, in Newfoundland, and throughout the eastern Arctic, where every major colony is accompanied by archaeological remains attesting previous use. In the Arctic, the Thick-billed Murre was the most commonly taken species. At Digges Island in northern Hudson Bay, one of Henry Hudson's crew described finding stone huts containing murres "hanged by the neck"; the remains of the huts are still visible on the island. The Inuit name of a nearby headland translates as "the place of beating with sticks," recalling the early method of killing the birds as they flew over.

Seabird eggs are harvested worldwide, as they provide a good source of protein neatly packaged

in a convenient container and they keep for weeks or even months if stored properly. In addition, careful harvesting, where only a proportion of eggs are taken, has little effect on populations. Murre eggs are an important food source for certain Inuit communities in Canada. The eggs of gulls and terns were taken by native peoples throughout Canada.

Unfortunately, after the arrival of Europeans, the introduction of commercial egg harvesting, with thousands of eggs being removed to towns and cities for sale, led to overexploitation and drastic reductions in populations. This damage was halted by the Migratory Birds Convention, signed in 1916 with the United States, which provided protection for most migratory birds, including gulls and terns. Populations of gulls, especially, have since rebounded in a spectacular fashion, in part because of abundant food in the form of human garbage and fish offal.

In addition to their use for food, seabirds were harvested in the past for feathers. This was the ultimate cause for the extirpation of the Great Auk from its most important colony, on Funk Island, Newfoundland. Gannets and terns were also much reduced by the feather industry in the early 20th century.

Common Eiders provide the famous eiderdown, still the best insulation material for filling parkas and sleeping bags. This down comes from the breast of the female eider, which plucks it to line her nest. It can be harvested from the nest without harming the birds if only a fraction of the lining of each nest is taken. This is still done commercially on certain islands in the Gulf of St. Lawrence and by Inuit from the community of Sannikiluaq, in Hudson Bay.

#### *Conservation*

Seabirds, like most of the world's animals, have suffered enormous disruptions to their habitats and populations as a result of human ambitions to corner most of Earth's resources. Direct harvesting, especially during the period of the great European mercantile expansion in the 16th–19th centuries, led to the extinction of the Great Auk and the Labrador Duck in the Atlantic and the reduction or extirpation of many local seabird populations.

More important, though less obvious, was the impact of human camp followers such as pigs, cats, and rats, and of deliberate introductions of foxes and other carnivores for fur farming. Seabirds are aggressive predators when at sea, but on land they had evolved over millennia on islands without mammalian predators. If predatory mammals arrive, many seabirds find it impossible to adapt their behaviour rapidly enough to cope with the new threat.

It is likely that the polynesian rat, spread to many Pacific islands, including Hawaii, by the canoes of the early polynesians, caused major seabird extinctions before science had a chance to record them. The subsequent effects of ship and Norway rats, disseminated by Europeans, are better documented. In Canada, these two species were responsible for the decimation of the formerly enormous seabird colony at Langara



Island in British Columbia. The process of introductions is still underway, with raccoons in the Queen Charlotte Islands of British Columbia, and cats and rats on the islands of the Gulf of California, continuing to advance.

Many seabird species have taken enthusiastically to scavenging from human fishing activities. Huge flocks of shearwaters, fulmars, and gulls form behind factory trawlers as they haul their nets on the Grand Banks of Newfoundland, and such scavenging has become a way of life for many birds. On a smaller scale, terns in Sierra Leone have learned to fly towards the sound of gunfire to collect the fish stunned by hand-grenades used by fishers operating from dugout canoes.

The byproducts of fishing have certainly benefitted some species. A spectacular expansion of the Northern Fulmar in the Atlantic and the recent rapid increase in numbers of Black-legged Kittiwakes in the Gulf of St. Lawrence probably derive from the advantage that both the species obtain from fisheries waste. Conversely, the moratorium on cod fishing in Newfoundland in 1992 and the consequent closure of fish plants led to lower reproductive success for large gulls in that province.

Not all fishing activity benefits birds. Certain practices are jeopardizing populations of large albatrosses and petrels in the southern oceans. Such birds frequently take bait from the hooks used in long-line fisheries. This is clearly an attractive food source, but it comes with a poison pill, because a proportion of birds take the hook as well as the bait and are drawn up to their deaths on the winding gear. Another cause of mortality for albatrosses is a cable that forms part of the sonar equipment on some trawlers. It whips about unpredictably as the trawl is being laid and can clip off the wing of a ship-following albatross.

In Canada, especially in Newfoundland, the setting out of monofilament gill nets, which are less visible than other nets, for cod and salmon sometimes results in the entanglement and drowning of seabirds. Murres and Razorbills are particularly vulnerable to this type of tragedy and hundreds are sometimes killed in a single net, especially if it is left in the water overnight.

During the late 1960s, hundreds of thousands of Thick-billed Murres from breeding colonies in the eastern Arctic were drowned in salmon gill nets while they were on migration off the coast of Greenland. This fishery has now been curtailed and mortality from this cause is negligible at present. Fragments of nylon fishing nets are also used by gannets in nest building and some chicks become entangled in such wastes.

Seabirds that spend long periods sitting on the water are very vulnerable to oil spills at sea, especially in winter. Once crude oil, or other petroleum products, gets on their plumage, it destroys the natural oils that the birds preen onto their feathers, causing the feathers to lose their waterproofing. Once water penetrates the feathers, the birds are no longer insulated against the cold and have to use a lot of energy to stay warm. In addition, the birds may ingest oil when they preen their feathers, leading to poisoning. Heavily oiled

birds usually die from a combination of causes and even lightly oiled birds may succumb if food is scarce. Auks are generally the most affected by oil, while in inshore waters loons, grebes, cormorants, and sea ducks also suffer heavily.

Large spills due to shipping accidents cause heavy mortality, but routine discharges of oil as part of the normal operating procedures of many vessels probably cause more harm to seabirds. In recent years, strict regulations have been introduced to prevent the discharge of oil at sea in Canadian waters, but such practices continue (oiled birds continue to wash up on land) and are hard to prevent.

#### *Where to look for seabirds*

Because they spend most of their lives at sea, and because many of them breed on inaccessible islands, seabirds are not easy to find, apart from the familiar gulls. However, there are a few major breeding colonies that can be reached without difficulty. In Newfoundland, the large gannet, murre, and kittiwake colony at Cape St. Mary's is accessible by road from St. John's. A visit in the breeding season (April–August) is a truly spectacular experience.

The kittiwake, puffin, and murre colonies on islands in Witless Bay and at Baccalieu Island are visited by regular tourist boats operating from nearby fishing ports (respectively, Bay Bulls and Witless Bay, just south of St. John's; Bay de Verde at the north end of Conception Bay). At the tip of the Gaspé Peninsula, in Quebec, the large gannet and murre colony at Bonaventure Island can be reached by regular tour boats from Percé. Whether seen from the land or from a boat cruising below the cliffs, this gannetry is awe-inspiring.

At sea, seabirds can be seen from the various ferries that cross the St. Lawrence Estuary, especially the Matane–Godbout ferry, the ferry from Cape Breton to Port aux Basques in Newfoundland, or the ferry from St. Barbe, Newfoundland, to Blanc-Sablon, Quebec. In British Columbia, many seabirds can be seen from the Vancouver–Victoria ferry, especially in the passes between the Gulf Islands, where strong currents create good feeding conditions for the birds. A good way to see albatrosses and other oceanic birds is to take one of the whale cruises that operate from the west coast of Vancouver Island.

Two organizations in North America are especially concerned with the study and conservation of seabirds: The Pacific Seabird Group (c/o Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, CA 94970, USA) and the Colonial Waterbird Society, (National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.). In eastern Canada, the Quebec–Labrador Foundation Canada (1253 McGill College Ave., Suite 680, Montreal, Quebec H3B 2Y5 or Box 3, Nagle's Place, St. John's, Newfoundland A1B 2Z2) works for seabird conservation through education, while in Haida Gwaii (Queen Charlotte Islands) the Laskeek Bay Conservation Society (Box 867, Queen Charlotte City, B.C. V0T 1S0)



organizes volunteer seabird research and interpretation. Anyone interested in becoming more familiar with seabirds can contact these societies, or the Canadian Wildlife Service, for further information.

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*The Canadian Wildlife Service*

The Canadian Wildlife Service of Environment Canada handles wildlife matters that are the responsibility of the Canadian government. These include protection and management of migratory birds as well as nationally significant wildlife habitat. Other responsibilities are endangered species, control of international trade in endangered species, and research on wildlife issues of national importance. The service cooperates with the provinces, territories, Parks Canada, and other federal agencies in wildlife research and management.

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Publié également en français sous le titre  
*Les oiseaux de mer*

Published by Authority of the  
Minister of the Environment  
©Minister of Supply and Services  
Canada, 1995  
Catalogue No. CW69-4/93-1995E  
ISBN: 0-662-22939-8  
Text: A.J. Gaston