Canadian Wildlife Service

Hinterland Who's Who

Shorebirds

The long legs, long bill, long wings, and streamlined body of the Greater Yellowlegs illustrate the anatomy of a typical shorebird.

The lifestyles of shorebirds have long fascinated ornithologists and lovers of wildlife. Shorebirds comprise a diverse group of species, including the plovers, turnstones, sandpipers, yellowlegs, snipes, godwits, curlews, and phalaropes. To the uninitiated, many species, especially the smaller sandpipers, appear confusingly similar, representing variations on a design involving long legs, a long bill, sharp, dynamic wings, and a streamlined body. These design features all reflect the lifestyle for which the birds are adapted — long legs for wading in water or on mudflats or marshes; the long bill for searching for invertebrate prey by probing into a variety of substrates, whether Arctic tundra, mudflats, or mussel beds; and long wings and a streamlined body for swift flight over long distances.

Shorebirds are attractive for many reasons. Few people will not feel a sense of beauty and mystery as they watch a huge flock of sandpipers wheeling over the mudflats of a large estuary, ripples of light and dark passing through the flock as the birds' wings catch the sun. In addition to providing aesthetic pleasures, shorebirds are of great interest scientifically — how do they cope with such an energy-demanding lifestyle, how do they find their way between destinations continents apart, and how are they adapted to cope with environments ranging from Arctic tundra to tropical mudflats?

Breeding behaviour

In North America, most species of shorebirds breed in the Arctic or sub-Arctic, especially the sandpipers and allied species, which make up the largest component of the Canadian set of breeding shorebirds. Smaller number of species breed in the boreal and temperate areas of North America, and a few breed southward through the tropical zone.

In the Arctic, shorebirds inhabit the vast expanses of open tundra north of the treeline. The summer breeding season is short, often with not more than six to eight weeks available for nesting, and there is thus a premium on early arrival. Many species arrive while the ground is still covered with snow and food is scarce. As the spring thaw proceeds, nesting commences, with the male setting up a territory over which flight and song displays are made, and from which rivals are chased. Pairing takes place, if it has not already done so, and the male makes a series of nest scrapes in suitable habitat, one of which is selected by the female in which to lay the eggs. Species vary in their choice of habitats: some prefer marshy areas, with nests hidden in the vegetation, whereas others nest on drier, more open habitats, with the nest perhaps in a low spreading patch of vegetation, where the breeding plumage on the back of the bird provides effective camouflage from predators.

Females usually lay four eggs over a five-day period, the weight of the clutch in some cases approaching the weight of the female herself. Incubation usually starts when the clutch has been completed, sometimes after the third egg, and is shared by both male and female about equally. Despite being located on the ground, nests are often hard to find, even for predators, which include mammals, such as the Arctic fox, and other birds, such as jaegers and gulls. The birds deal with predators in a variety of ways. Some sit motionless, melting into the tundra until the danger passes. Others utter loud alarm calls and attack vigorously with an aerial chase or by dive-bombing; often birds from adjacent territories join forces in expelling an intruder. Ground predators may be led away from the nest by a distraction display in which the bird feigns injury, flopping along the ground as though it had a broken wing, or by a "rodent run," in which it runs along in a hunched-up posture with its back feathers up and tail depressed, emitting a high-pitched squeal.

The eggs hatch after about three weeks. The new chicks already have a downy covering of feathers and well-developed legs and bills, and within 24 hours the family has left the vicinity of the nest. Although the young are able to run around and feed themselves from the start, they must return to the adult for the first few days for brooding, until they are capable of maintaining their own body temperatures. Both adults attend the young for the first few days, leading them to suitable habitats and keeping watch for predators. Territorial boundaries dissolve, and often the family party may wander several kilometres from the location of the nest. In many cases, the female departs before the young have fledged, leaving the male to stay with the chicks until they can fly: there is greater long-term survival value — and reproductive success — in making an early departure on migration than in staying to help guard the young. After some three weeks, the young fledge. Soon after, the male departs. The young follow after most of the adults have already left.

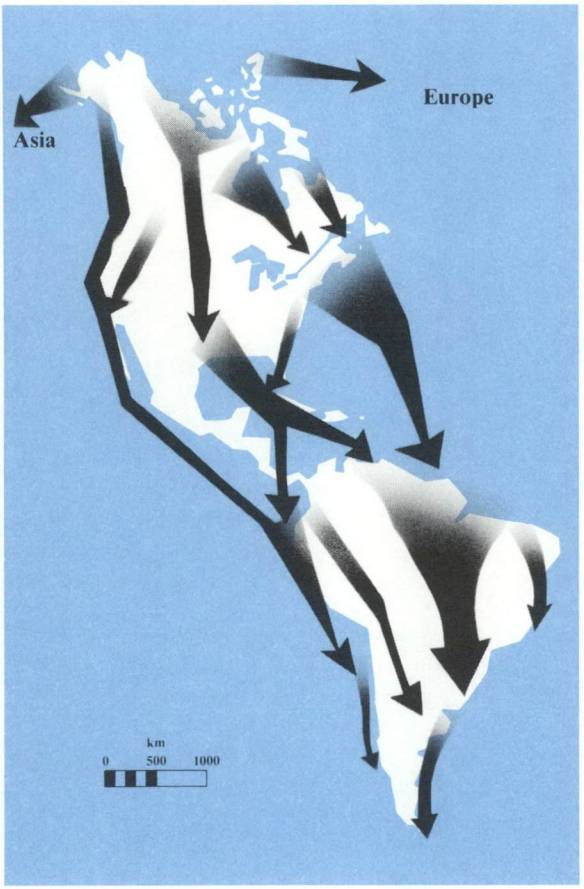
The majority of sandpiper species adopt the breeding behaviour and strategies outlined above. There is, however, a wide variety of breeding behaviour across the shorebird family. In some species, only one of the parents incubates the eggs. In others, a female may lay more than one clutch of eggs, either for successive different male partners or perhaps one for a partner and one for herself. In still others, males gather at communal display grounds called "leks," which are visited by females for mating, leading to an essentially promiscuous breeding system.

"Fall" migration

Many shorebirds undertake extensive migrations between breeding areas in the north and "wintering" areas far to the south. Their migrations include some of the most spectacular animal movements known in the western hemisphere; the Red Knot *Calidris canutus* and Hudsonian Godwit *Limosa haemastica*, for instance, breed in the central Canadian Arctic and migrate to wintering grounds in Tierra del Fuego, near the southern tip of South America.

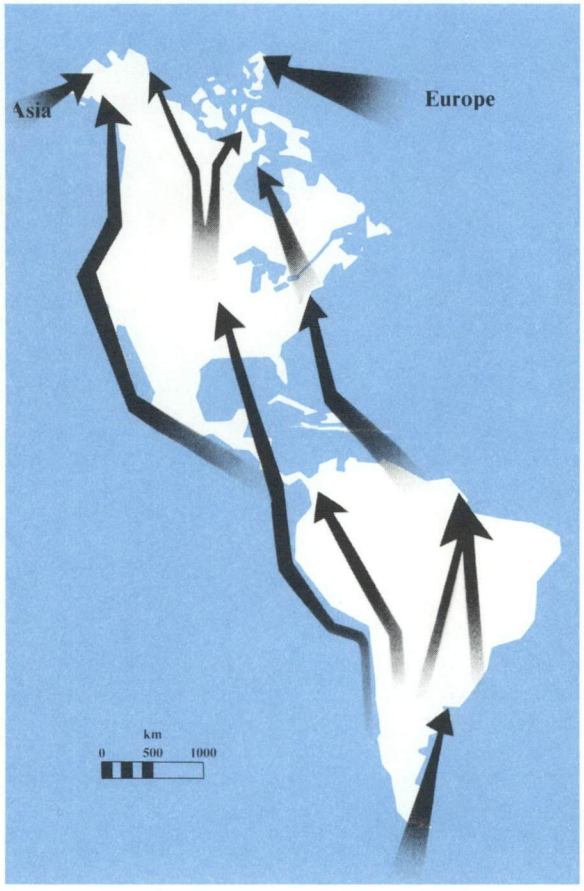
Shorebird flyways

Southward migration



Shorebird flyways

Northward migration



To North Americans, shorebirds are familiar as migrants, flocks appearing in the spring en route to remote northerly breeding grounds, and returning in the autumn, this time bound for the south where they will escape the northern winter months. With the reversal of the seasons between the hemispheres, the picture is similar for South Americans — once again, shorebirds arrive in the spring, bound for shorelines and wetlands where they will spend the southern summer, before returning north to breed as the southern autumn arrives. Shorebirds thus spend the summer season at both ends of their migration routes.

With the departure from the breeding grounds in autumn comes a distinct change in the lifestyles of most shorebirds. On the tundra, many shorebirds feed on surface insects and are dispersed widely over breeding territories, occuring in small numbers in family parties or small flocks. On migration, they feed on intertidal invertebrates on coastal flats at low tide and gather into enormous flocks at favoured roosting sites at high tide. Areas that provide the habitats and resources needed by the birds are often separated by long distances and involve flights over "ecological barriers," such as oceans or forests, where landing and feeding would not be possible. In order to make these long flights, the birds have to be able to put on enough fat to provide the energy to fuel the many hours of continuous flying needed to reach their next destination. Birds leaving the east coast of North America, for instance, may fly for some 40–60 hours on a direct flight across the ocean to the north coast of South America. They fly at enormous heights, up to 3000 m or more.

South American habitat

In South America, shorebirds occupy a wide range of habitats and climatic zones, and the main centres of distribution of the various species may differ considerably. Red Knots and Hudsonian Godwits, for instance, occur in large numbers on the vast intertidal bays of Tierra del Fuego in the south of the continent, almost as far south of the equator as their breeding grounds are to the north. Upland species, such as the Lesser Golden-Plover *Pluvialis dominica*, are found on the grasslands and lagoons of Argentina and Uruguay. Sanderlings *Calidris alba* are most numerous on the long ocean beaches of the Pacific coast, especially in Peru and Chile. Ruddy Turnstones *Arenaria interpres* and Semipalmated Sandpipers *Calidris pusilla* occur principally on tropical, mangrove-lined estuaries and coastlines on the north coast of South America, in Brazil and the Guianas.

Moult

After reaching their southern quarters, many shorebirds moult their body and flight feathers, replacing each with a new set. Feather wear is considerable during the course of the year; without the annual moult, the flight feathers would soon become so worn that the bird

would be unable to fly. The flight feathers are moulted a few at a time, so that the bird is able to maintain the power of flight; this is in contrast to the geese and ducks, which moult all their flight feathers at once and are then unable to fly until the new ones have grown. Shorebirds moult their body feathers at least twice in the year: once in the spring before the northward migration, when they attain a generally rather colourful breeding plumage, often with reds, browns, and blacks in striking patterns; and again in the autumn, when a much plainer "winter" plumage is gained, usually consisting of combinations of grey and white. As with many aspects of shorebird biology, there is considerable variation in the above pattern, with some species moulting before departure from the breeding grounds, and others moulting, perhaps in part, during pauses in migration.

"Spring" migration

In "spring," most birds head north again; however, for the medium-sized and larger species, which may not start breeding until they are two or three years old, "summering" populations, consisting mostly of subadults, may remain in the south or migrate only partway to the breeding grounds. For many species, the route northward is different from that which the birds followed southwards. Food resources and climate result in different sites being attractive at the two seasons, and elliptical migration patterns are the result. As during the fall migration, spectacular concentrations of birds may gather at favoured sites.

Survival

Banding studies have shown that the same birds often return to the same areas from year to year, whether it is during northward or southward migration, on the wintering grounds, or on the breeding grounds. In some cases, birds adopt the same nesting territory from one year to the next, and may well mate with the same partner; they may perhaps even have the same neighbors. The birds' travels are thus far from random, each individual becoming familiar with a series of areas providing the resources needed at different times of the year.

Familiarity with the same sites that is gained over a lifetime enables the birds to use the resources they need efficiently, thus increasing their chances of survival. Once they have survived the first year or so, shorebirds may live for considerable periods. Longevity records show that the largest species can live for over 30 years; medium-sized species probably live for 10–20 years; and the small species may live for less than 10 years, perhaps only four or five years, on average.

Conservational concerns

Although shorebird populations may appear numerous, several aspects of their biology indicate that conservational concern is needed. Because they gather in large numbers at favoured areas, considerable percentages of the population become vulnerable to environmental incidents at the same time and in the same place. In addition, because they are relatively long-lived and produce few young each year, shorebird populations are very vulnerable to increased adult mortality and are unlikely to increase rapidly if depleted. Shorebirds are enormously dependent on the resources used at different stages of their annual cycles, and their migrations must be precisely timed to reach each area at the right moment.

In addition, many of the areas frequented by the birds, including wetlands, estuaries, and coastlines, are prime targets for development, both industrial and recreational, and are often at risk from pollution. These habitats are among the most productive environments in the world, providing great natural and economic benefits to humankind as well as to wildlife. Many human activities depend on the healthy biological functioning of wetland ecosystems. Shorebirds depend on wetlands for their survival and are thus excellent indicators of the health of these important systems. In this sense, the study of shorebird populations and concern for their preservation are more than simply a luxury or diversion, as they will provide valuable insights into the state of the environment. And the extensive migrations of the birds themselves remind us that the environmental concerns we are addressing need to be approached on an international level, and ultimately on a global level. The challenge of maintaining healthy shorebird populations is one that is related directly to our own future survival. This challenge has recently been taken up through the formation of a "Western Hemisphere Shorebird Reserve Network," a conservation initiative designed to protect all the key sites used by the birds throughout their extensive migrations. This concept, which arose from CWS research programs, has been endorsed by a wide range of both government and non-government agencies in North and South America.

Reading list

Bent, A.C. 1927, 1929. Life histories of North American shorebirds. Parts 1 and 2. Reprinted in 1962 by Dover Reprints. New York.

Bodsworth, F. 1954. Last of the Curlews. Reprinted in paperback in 1963 by McClelland and Stewart Ltd. Toronto.

Burger, J. and Olla, B.L. (eds.) 1984. Shorebirds: breeding behavior and populations *and* Shorebirds: migration and foraging behavior. Behavior of Marine Animals, Vols. 5 and 6. Plenum Press. New York.

Godfrey, W.E. 1986. The birds of Canada. Rev. ed. National Museums of Canada. Ottawa.

Hale, W.G. 1980. Waders. Collins. Glasgow.

Hayman, P., J. Mardrant, and A.J. Prater. 1986. Shorebirds: an identification guide to the waders of the world. London: Croom Helm.

Johnsgard, P.A. 1981. The plovers, sandpipers and snipes of the world. Univ. of Nebraska Prèss. Lincoln and London.

Morrison, R.I.G. 1984. Migration systems of some New World shorebirds *in* Shorebirds, migration and foraging behavior, Behavior of marine animals, Vol. 6, pp. 125–202. Plenum Press. New York.

Stout, G.D. (ed.) 1967. The shorebirds of North America, with text by Peter Matthissen, paintings by R.V. Clem, and species accounts by R.S. Palmer. The Viking Press. New York.

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 co-operates with the provinces, territories, Canadian Parks Service, and other federal agencies in wildlife research and management.

For more information about the Canadian Wildlife Service or its other publications, please write to:

Distribution Section
Canadian Wildlife Service
Ottawa, Ontario
K1A 0H3

Également disponible en français sous le titre *Les oiseaux de rivage*

Environment Canada | Environnement Canada
Canadian Wildlife Service | Service canadien de la faune

Published by Authority of the Minister of the Environment

Catalogue No. CW69-4/74E
ISBN 0-662-16669-8
Text and photo: R.I.G. Morrison

Canada

5