The Magnificent Shorebird Migration

Shorebirds Are Record Breakers!

- *The Largest Congregation of Shorebirds*
  Over one million shorebirds, mostly Western Sandpipers and Dunlins, have been recorded in a single spring day on Alaska's Copper River Delta. In fact, practically the entire North American population of Western Sandpipers stops there to rest and refuel on a diet that consists almost entirely of tiny clams!

- *The Longest Nonstop Flyer*
  Bar-tailed Godwits make the longest nonstop migration of any shorebird species traveling 6500 miles from Alaska to New Zealand, one way, without stopping.

- *The Farthest Traveler*
  Pectoral Sandpipers make the longest migratory flights of all birds! They winter in southern South America but breed as far North as Central Siberia.

- *The Fastest Flyers*
  When migrating with good tail winds, shorebirds can fly up to 60 miles per hour!

- *Timed to Dine*
  Eighty-percent of Red Knots in the Western Hemisphere time their arrival at the Delaware Bay, from the southern tip of Argentina, just in time to dine on millions of horseshoe crab eggs. The eggs have been stirred up to the beach surface by tides and the masses of egg-laying horseshoe crabs.

- *Ravenous Eaters*
  In order to gain enough weight to continue their migration to the Arctic, Sanderlings eat one horseshoe crab egg every 5 seconds for 14 hours each day until they have rested and fed enough to continue migrating.

The Mystery of Migration

Bird *migration*, the seasonal movement of birds from their *breeding grounds* to their *wintering grounds*, is perhaps one of the most spectacular, physically demanding, and mysterious wildlife events. We know that some birds are physically designed for long, rapid flight. There are a variety of remarkable migrating birds, including songbirds, waterfowl, and raptors. Arctic-nesting shorebirds are famous for their spectacular migrations, both because of the long distances they fly to extreme-north summer destinations and for the huge numbers of birds that concentrate at *stopover* sites along the way.

How and why do birds migrate? How do they find their way across such long distances? Why do they travel in swarms of hundreds of thousands of birds? How do they know when to leave for either their breeding or wintering areas? Although migration is still not fully understood by scientists, it is a strategy that has evolved over time as conditions in the Earth's geography and climate changed. One theory suggests that as the last Ice Age ended and northern areas began to experience warmer weather, short summers favored insects because of their short life spans and rapid breeding cycles. Some birds moved north to take advantage of this abundant food source and because there were fewer species to compete for food. Soon *natural selection* took hold. The birds that were most *efficient* at migrating arrived at the breeding grounds first and were more likely to produce and raise young successfully. Do you know of other reasons (theories or stories) in your culture or science books to explain why birds migrate?

Although we may not know what first enticed birds to migrate, we do know that shorebirds still take advantage of abundant sources of invertebrate prey. Since the insects are only available as a food source during the Northern Hemisphere summers, the birds need to fly south again to find food for the rest of the year. This involves flying long distances over traditional routes (see Flyways section) and often across international boundaries. Shorebirds' habitat needs must be met within designated time periods and at specific sites.

A Note About Migration Terminology

- In any discussion of globally-occurring animals like shorebirds, "spring" and "fall" are relative terms. We often use the terms "summer" and "breeding" to mean the same season, because the Arctic is experiencing summer when shorebirds are there to breed. Also, we tend to use the terms "nonbreeding" and "winter" interchangeably.

Migration Terminology Continued

- Remember that winter in the Northern Hemisphere (from November to March) is actually summer in the Southern Hemisphere. We might refer to those shorebirds which have migrated south of the equator for their "nonbreeding" months as "wintering" in, say, South America, but they are really experiencing another summer. While the equator divides two physical halves of the globe, because of the tilt of the Earth's axis, it generally divides the seasons too.

- In North America, we generally refer to our seasons as "spring," "summer," "fall," and "winter." In other areas of the world, particularly those close to the equator, seasons may be divided differently, such as "rainy," "dry," or "monsoon."

Timing of Migration

The shorebird migration season lasts a long time. Some individuals begin heading toward their breeding grounds as early as February. They fly just behind the 35 degree Fahrenheit *isotherm*, an imaginary moving line that represents air temperature at any one given time, stopping along the way to rest and refuel. This ensures that when the birds reach their nesting areas, the water and ground will not be frozen. This explains why peak migration dates may vary from year to year and emphasizes that shorebirds are affected by the weather.

Shorebirds do not migrate in family groups like geese, swans, or cranes. In both spring and fall migrations, there is often a difference in timing between the females and males. Adults leave the breeding grounds first during fall migration. Juveniles follow in an average of two weeks. This gives the chicks extra time to grow strong before migration and to fatten up without the added competition of the adults. Because of these trends, you can see that shorebird migration, as a whole, can cover a period of time between February and November.

Spring Migration Is a Rush to the Breeding Grounds

The tendency to *bottleneck* is most prominent in the spring when shorebirds are racing to reach their *breeding grounds*. To find mates successfully, an entire population needs to arrive within a few days of each other. The short Arctic summer compounds the rush, giving shorebirds only about two months to find a mate, establish a territory, lay eggs, and raise a family!

Fall Migration Is a More Leisurely Trip

Fall migration back to wintering areas occurs in waves from late June through November. The first to head south are usually failed breeders, those with no chicks to raise. Successful breeders may begin flying south by mid-July. Fall migrants also use stopover sites but are not concentrated in nearly the same numbers as in the spring, and they appear more spread out over time. They also use other wetlands as refueling stops, besides the main stopover sites. Without the rush to breed, the migratory pace to wintering grounds is relatively leisurely by comparison to spring migration.

Amazing Travelers

Biologists separate migratory shorebirds into three groups: long-distance migrants (those that fly more than 8000 miles one way); medium-distance migrants (those that fly 3500 – 7500 miles; and short-distance migrants (those that travel fewer than 3000 miles). As a group, shorebirds are among the world's record holders for long-distance migration. The White-rumped Sandpiper is an example of a species found breeding in northern Alaska and living during the nonbreeding season in Tierra del Fuego (the most southern tip of South America). However, some shorebirds do not migrate all the way to the Arctic to nest. Several species, such as the Marbled Godwit, nest in the prairies of North Dakota and Saskatchewan while wintering along the Gulf Coast or in San Francisco Bay. The endangered Piping Plover winters in Florida, then migrates a short distance to breed along the Atlantic Coast from Georgia to Massachusetts. Some populations of other species have a very short migration distance. The Wilson's Plover breeds and winters in Florida.

For those species that do migrate, enormous energy requirements are necessary for these biannual flights. Most individuals spend their time preparing for migration by feeding and storing fat reserves for their upcoming flight. Some shorebirds will gain half their weight or more in stored fat.