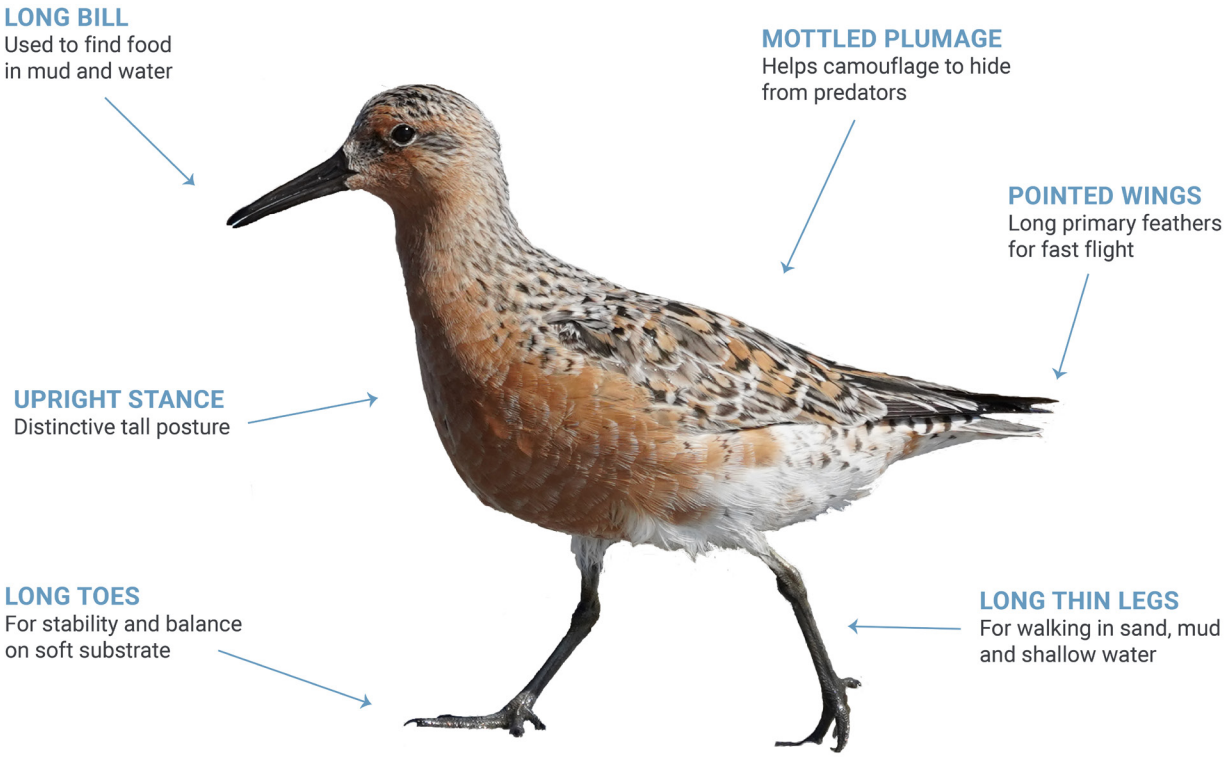
Lesson I: What is a Shorebird?

Shorebirds are a diverse group of birds in the order Charadriiformes, including sandpipers, plovers, avocets, oystercatchers, and phalaropes. There are approximately 220 recognized species of shorebirds in the world, 84 of which occur in the Americas for all or part of their lifecycle.

Most shorebirds are found near water, but several species prefer habitats far from shore. Shorebirds are found from intertidal mudflats, sandy beaches, and rocky coastlines to freshwater wetlands, grasslands, plowed fields and flooded agricultural lands. They feed mainly on mollusks, small crustaceans, marine worms, and insects. Shorebirds span a variety of sizes, bill shapes, and leg lengths, each species uniquely adapted to access their preferred foods in their specific habitats.

Shorebird traits:

- Long bill: Used to find food in mud and water
- Upright stance: Distinctive tall posture
- Long toes: For stability and balance on soft substrate
- Long, thin legs: For walking in sand, mud and shallow water
- Pointed wings: Long primary feathers for fast flight
- Mottled plumage: Helps camouflage to hide from predators



Adaptations

Adaptations are the *physical and behavioral traits* of an organism that make them better able to survive in an environment and, in turn, have more successful rates of reproduction. Physical traits are those that are part of an animal's body or plant's structure, whereas behavioral traits are actions or things that an organism does. Many times physical and behavioral traits are closely linked. Species with traits that make them better suited to their environments will be more likely to survive and pass their genes onto the next generation. Due to their unique life histories, shorebirds can be distinguished by adaptations that help them to survive in a variety of habitats, such as estuaries, mudflats, marshes, grasslands or tundras.

Eggs and Nesting

Shorebirds are typically *ground nesters*, making them very vulnerable to predation during breeding season. Because of this, many of the adaptations of shorebird eggs and nesting sites allow them to camouflage with their surroundings and incubate their eggs without being seen. When building nests, shorebirds tend to create shallow, saucer shaped structures that are inconspicuous at their nesting sites. In addition to having camouflaged nests, shorebird eggs are typically speckled to blend in with surrounding substrate and flora.

In most cases, shorebird eggs will also be shaped to have a point at one end. Although the exact reason behind this is not known, one theory is that this shape allows the eggs to fit together like a pinwheel in the nest. The advantage of this is that the eggs are more successfully incubated because more of each egg is covered by the incubating parent.

Beaks

All birds use their bills, or beaks for eating and have different traits that allow them to find food successfully depending on where they live. One of the most notable features of shorebirds are their long, slender beaks that are ideal for *probing* sand and mud for insects, clams, crustaceans, snails, worms and other invertebrates. Most shorebirds have beaks with similar shape and structure, but the varying lengths of shorebird beaks can be very telling as to where these birds find their food. Shorter bills are ideal for probing for animals living near the surface of the earth and longer bills are used to find animals buried deep within the ground.

Some shorebirds have unique adaptations for eating very specific types of food. For instance, Oystercatchers have large, chisel-like bills that are ideal for prying open mollusks. Surfbirds and species of plovers have very short, stout beaks that they use to forage for food on the surface of the beach.

Feet and Legs

Where water meets land often creates unstable and unpredictable substrate to navigate; however, this is something that shorebirds do not need to worry about due to their specialized legs and toes. Most shorebirds are equipped with long legs and long, pointy toes. These are ideal adaptations for walking and wading along the water's edge and preventing the birds from sinking into soft ground.

The long legs of shorebirds keep their bodies out of the water while they wade. Just as a shorebird's beak can tell us about where these birds find food when probing, the length of their legs can help to determine where they can be found along the water's edge. The longer a shorebird's legs, the more likely it is to be found wading deeper in the water searching for food. Equally as important for survival are the elongated toes of the shorebird. This special adaptation, which helps to distribute their weight over a larger surface area, is crucial for keeping individuals from sinking into the muddy, soft ground beneath them as they find food and wander through nesting grounds.

Additional Adaptations

Honing in on one aspect of an organism's life history exposes the unique adaptations that allow it to be successful in its environment. Focusing on shorebirds, many behaviors and physical characteristics can be linked to successful foraging, breeding, and overall survival. Some additional adaptations of shorebirds include:

Flocking: Many birds coming together in a large group or flock. Often seen when predators approach, flocking helps to reduce an individual's chance of being eaten. Even species that are known to be primarily solitary will join together with other shorebirds to escape potential threats.

Migration: This behavioral adaptation is thought to occur in order for birds to take advantage of the abundance of seasonal food sources in nesting grounds. For shorebirds, this often means flying from areas such as Mexico and South America to the United States and Canada in the spring and making the return journey in the fall.

Distraction Displays: Due to the nature of ground nesting, shorebirds can often be susceptible to predation. One way to protect their nests and chicks is to put on elaborate displays and lure predators away from their nests. An excellent example of this can be seen from Killdeer pretending to have broken wings. They will act as if they cannot fly and make a lot of noise to distract predators from a nearby nesting site. Once the predator gets close to the displaying Killdeer, it will quickly fly to safety.

Courtship Displays: There is often a lot of competition for males to attract females during the breeding season. Because of this, many elaborate courtship displays have evolved overtime in order to impress females and increase chances of breeding and passing on genes to the next generation. Some of these displays include excessive wing fluttering, tail cocking, nest scraping and singing.

Additional Resources:

All About Birds, Shorebirds list:

https://www.allaboutbirds.org/guide/browse/shape/Shorebirds

WHSRN About Shorebirds:

https://whsrn.org/about-shorebirds/

Explore the World of Shorebirds - Shorebird Adaptations:

https://migration.pwnet.org/pdf/Shorebird_Adaptations.pdf

Identifying Shorebirds in British Columbia:

https://bit.ly/identifyinbc

Hinterland Who's Who, Shorebirds:

https://www.hww.ca/en/wildlife/birds/shorebirds.html

Habitat

Shorebirds get their name from their tendency to be found by the shore, but they can be found anywhere from intertidal mudflats, sandy beaches, and rocky coastlines to freshwater wetlands, grasslands, plowed fields and flooded agricultural lands.

When thinking about the adaptations of shorebirds, it is crucial to consider how their characteristics increase survival and chances of successful reproduction in the habitat they are found in. Due to the nature of their landscapes, shorebird habitats have the potential to change dramatically in times of flooding, drought, excess evaporation, or the fluctuation of tides. In addition to these naturally occurring changes, there are many anthropogenic impacts on the composition of shore habitats including urbanization, agriculture, and managed water flow.

Willet eating a crab. *Photo: Maina Handmaker*

Why study shorebirds?

Because of their specific survival needs, shorebirds are excellent indicators of a healthy ecosystem. When indicator species populations are not doing well, are booming, or are staying relatively constant, researchers can learn a lot! A decline in shorebird populations is often indicative of less food availability, habitat loss or a number of other ecosystem disruptions.

Not only can shorebirds tell us a lot about the overall health of the habitats they rely on, but they also contribute to the health of these ecosystems by living there! Shorebirds are an important piece of the food chain. One unsuspecting way in which shorebirds contribute to their habitats is the production of guano, a.k.a. shorebird droppings! Guano is an excellent fertilizer for mudflats and other shore-like habitats. The high nutrient levels of guano also make it a substantial source of food for organisms at the base of the food chain like phytoplankton, small fish, and crustaceans!