

Shorebirds Have Special Adaptations

“Each shorebird is a beautifully functioning organism, the parts finely tuned by natural selection to work together to adapt the bird to its environment.”

—Dennis Paulson, *Shorebirds of the Pacific Northwest*

Amazing Shorebird Designs!

- Up to 50 percent of a migrating sandpiper’s body weight is deposited as fat. This fat provides the energy for long-distance flight.
- Long, pointed wings enable some shorebirds to fly up to 50 miles per hour!
- Curlews and woodcocks have extremely sensitive bills. They are *tactile* feeders and can “feel” their prey deep in the mud, allowing them to find food they cannot see.
- Long-billed shorebirds probe in the mud, opening just the tip of their bills. This helps them pick out their food without getting a mouthful of mud in the process!
- Plovers are visual feeders and have large eyes so they can see their prey.

How Adaptations Evolve over Time

A group of *organisms* that can breed and produce fertile offspring is called a *species*. For example, bulldogs and collies belong to the same species (dog) because they can mate and produce puppies that will grow up and have their own puppies. Members of a species have similar *traits* or characteristics.

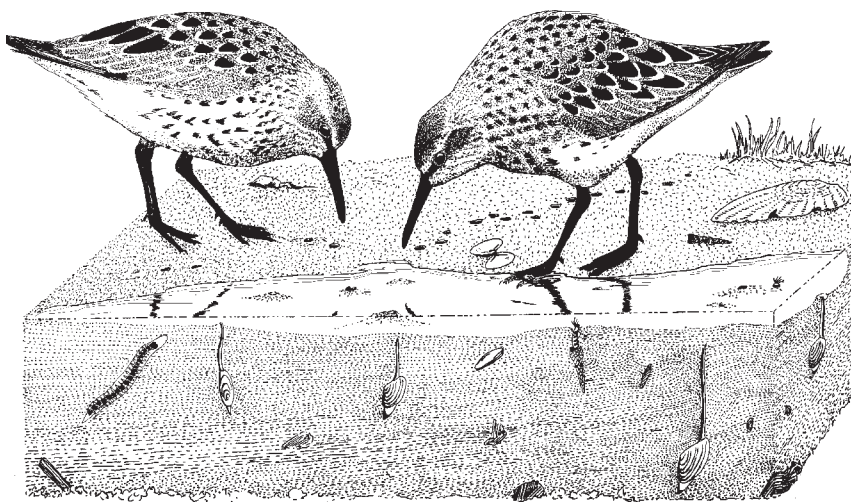
These traits are what help species use the resources found in their *habitat* to survive and reproduce. A trait can be physical or behavioral. If a trait gives a species an advantage in surviving to *breed* (flying faster than others, having better eyesite or coloration), it will be passed on from generation to generation through the species *DNA* or *genes*. This helpful trait, called an *adaptation*, enables the individual to out-compete others. The *Theory of Natural Selection* explains this process: those individuals of a species best suited to survive and reproduce in their environment will pass their genes to the next generation.

Physical Adaptations

Colored to Blend in with Their Surroundings

Shorebirds are designed, or *adapted*, to survive in open habitats. Their brown, rust, black, and white *plumage* makes them less conspicuous to predators. Their bi-coloration, dark on the back and lighter on the belly, further *camouflages* them from *predators*. Their light bellies blend in against the light sky when seen from below. When observed from above, by a falcon for example, their dark backs blend in with the beach or *mudflat* below. Have you ever seen a flock of brown sandpipers suddenly appear white as they turn together in the air and flash their undersides at you?

Shorebirds also have special adaptations to successfully nest



in open habitats. Most shorebirds lay three or four eggs in a nest on the ground. Nesting on the ground exposes the eggs and the incubating parent to many predators. The camouflage coloring of the adults, eggs, and chicks are physical adaptations to help keep them from being seen by predators. Additionally, the eggs are small and perfectly formed to fit tightly together so the parent can fully cover them.

Legs Designed for Wading and Walking on Mud

Shorebirds have long legs for wading. Their long toes give them the stability they need for their seemingly endless walking and running along the water's edge and in soft mud.

Bills Designed for Feeding and Preening

Their *bills* are highly adapted tools for finding food. Some species will probe for invertebrates in mud or water, poking their bills up and down in rapid succession like a sewing machine until they feel something to eat. Others have bills perfectly adapted to swishing through the water to filter food from the water column. Oystercatcher bills are able to pry mollusks from rocks, while turnstones use their bills to flip rocks and find food underneath. By closely observing bill length, shape, and how the bird uses it, you can separate shorebird species.

Not only used for finding food, bills are used for preening as well. A special *oil gland* located at the base of their tails helps to keep their feathers dry. The birds spread the oil from this gland with their bills or the backs of their heads when *preening* themselves. The oil repels water from the feathers, keeping them warm and dry.

Wings Designed for Distance and Speed

The long, pointed shape of a shorebird's wing is designed for flying long distances at fast speeds. Red Knots have been tracked flying over 40 mph. Other species have been clocked at 60 mph with good tail winds. Some shorebirds, like the America Black Oystercatchers, make short migrations, and their wings are not so long and pointed.

Behavioral Adaptations

Flocking for Protection

Shorebirds also have many *behavioral adaptations* that increase the odds they will survive from one season into the next. For example, they tend to lift off in unison from a beach or mudflat when they sense trouble. Traveling in huge migratory flocks is an adaptation to protect individual birds from predators. Just like a school of fish, these large flocks zig-zag back and forth to appear to be a much larger animal. In fact, even other bird species will join these

flocks to take advantage of this "safety in numbers" strategy.

Migrating to Favorable Habitat

Even migration itself is a behavioral adaptation. By nesting within the few months of Arctic summer, shorebirds take advantage of the abundant seasonal food sources of insects and the long daylight to feed. In the Arctic, the vast open space means there is little competition from other bird species, and it is a relatively predator-free environment, that is otherwise inhospitable most of the year.

Fooling Predators

Many shorebirds, like the common Killdeer, use *distraction displays* to protect their nests and chicks from predators. One such display is the "broken wing act." In this case, the shorebird parent, who is faster and less naïve when it comes to predator evasion, lures the predator away from its nest or young chicks by pretending to have a broken wing. The predator follows, thinking that it has found an easy meal, only to be disappointed. As soon as the predator gets close, the



Distraction Display

adult Killdeer flies away to safety. This distracts the predator from the nest or from slower moving, less experienced chicks.

Attracting a Mate

Perhaps some of the most interesting behavioral adaptations occur on shorebird breeding grounds. Generally, male shorebirds reach the Arctic nesting grounds first. They quickly establish *territories*. Once the females arrive, the males begin an elaborate system of *courtship displays*, which are adaptations to ensure they will attract females and increase their chances of *breeding*. These displays may include wing fluttering, tail cocking, nest scraping, and, of course, singing. For more details, read the *Elaborate Shorebird Mating Systems and Displays* section.

Raising Chicks

Another behavioral adaptation is seen in the rearing of chicks. In some species, the male is solely responsible for incubating the eggs and raising the chicks to fledgings. In others, both parents may care for the chicks together. How parents care for the chicks is specific to the species and an adaptation to the environmental conditions. Once shorebird chicks hatch, they quickly leave the nest. Chicks are able to feed on their own but depend on their parents for protection from weather and predators.

Explore the World with Shorebirds!

Help your students discover the amazing adaptations of shorebirds with these classroom activities

- [Build a Shorebird](#)
- [What Can I Eat with This Beak?](#)
- [Avian Olympics](#)

