

Precarious Paths

Adapted with permission from "New Jersey's Shorebirds: A Local and Global Perspective." New Jersey Audubon Society. 1998.

Grade Level: upper middle school/ high school

Duration: one class period

Skills: vocabulary, discussion, critical thinking, collection and interpretation of data, presentation, and comparison

Subjects: science, geography, and language arts; fine arts (with additional activity)

Concepts:

- During each year of their lives, most shorebirds migrate between habitats located in different geographic areas.
- Arctic-nesting shorebirds undertake some of the longest migrations of any animals.
- Shorebirds migrate between northern breeding areas and southern wintering areas to take advantage of seasonal food resources.
- Migratory shorebirds depend on at least three habitats: breeding, nonbreeding, and migratory stopover sites.
- Most migratory stopovers are nutrient-rich habitat, like estuaries, which also provide resources desirable to humans, making them vulnerable to alteration, pollution, disturbance, and destruction.

Vocabulary

- migration
- migration flyway
- Pacific Flyway
- Atlantic Flyway
- Central Flyway
- threat
- predator
- bird-banding
- stopover site
- distraction display
- incubate
- mate

Overview

Students read clue cards to map the migration paths of their “mystery shorebirds.”

Objectives

After this activity, students will be able to:

- Describe factors that affect shorebird migration.
- Label the three major migration routes of North American shorebirds.

Materials

- One copy for each student of the *Blank Western Hemisphere Map* measuring tool
- pencils or markers
- Copies of the *Shorebird Clue Cards* so each student has one to four cards
- Additional geography resources
- One overhead transparency of the *Western Hemisphere Migration Flyways Map*

Introduction

Shorebirds experience incredible *migration* journeys that follow the same general paths each year. Their migration is subject to weather, food availability, predators, changes in habitat, pollution, and other human-induced disturbances. Each species of shorebird has specific needs that dictate its selection of feeding, resting, and breeding sites.

For more specific information about shorebird migration, read *The Magnificent Shorebird Migration* and *Shorebirds Depend on a Chain of Healthy Wetlands* in the *Shorebird Primer*.

Activity Preparation

1. Photocopy the *Blank Western Hemisphere Map* so there is one for each student.
2. Make a transparency of the *Western Hemisphere Migration Flyways Map*

3. Decide which Shorebird Clue Cards you will use for the activity. Photocopy and cut the cards so each student will get between one to four cards.

Procedure

1. Pass out a *Western Hemisphere Map* to each student. Have the students identify the countries and bodies of water shown on the map by using additional geography resources.
2. Introduce the concept of migration flyways. Using the transparency of the *Western Hemisphere Migration Flyways Map*, show students the routes of the three flyways of North America. Ask each student to identify the flyway route of his or her shorebird.

Atlantic Flyway: Red Knot and Ruddy Turnstone

Central Flyway: Marbled Godwit

Pacific Flyway: Western Sandpiper

3. Now that each student has identified the flyway his or her shorebird uses, have students work together to assemble a six-piece shorebird migration story. (Note: the Marbled Godwit has eight cards in the story.)
4. Once the teams are confident they have pieced their entire story puzzles together correctly, ask them to mark the bird's location on their migration maps. If a team's bird is not clearly following one of the three flyways, have the team check its story cards against the master. Once all the teams are done, have each one read its shorebird's migration account to the class. Have teams use the migration map as a visual aid.
5. Ask the students to use additional resources (bird books,



the Internet, the Audubon Society, or the *Shorebird Profiles* located in the *Appendix* of this education guide, etc.) to find out about their shorebird's life history. Have them prepare a written, oral, or visual presentation about the shorebird that includes the following:

- the bird's migration route
- what challenges (threats) the bird encountered
- whether or not the bird had chicks and if not, why and what it did instead

6. Discuss some of the following questions with the class.

- Why do different types of shorebirds use different migration routes? Why do some use different routes in the spring and fall?
- Why do they stop along the way? What would happen to these birds if pollution or development changed the stopover sites they depend on?
- How are the habitat requirements different and similar for each bird on both their breeding and nonbreeding territories?
- Which habitats are important for resting and feeding as the make their migration flights?

Additional Activities



Cultural Connections

- Students can write additional precarious paths clue cards that describe the interactions among the shorebirds and the cultural groups along their migration paths.
- Students can research the Exxon Valdez oil spill and how it impacted the communities along the coast and the birds.

Salt Clay Migration Map

Create either a classroom-sized map of the Western Hemisphere or have each student create his or her own map using the recipe below. After the clay has dried thoroughly, use acrylic paint to color the map in order to identify landforms. For example, paint the rivers and lakes blue, the mountain ranges brown, and the prairie areas light green. Then use pins and string to chart out the migration route of each of the shorebirds described in this activity. Include a picture of the birds and a short biography of each to display below the map. Give students the choice of also researching the migrations of other shorebirds and adding them to the map.

Salt Clay Map

2 cups flour
1 cup salt
1 tablespoon alum (You must include this!)
1 cup water

Stir ingredients and then knead until smooth and blended. Use a 12" x 18" board or heavy cardboard to hold an individual map. If making a classroom map, double or triple the recipe as needed.



Precarious Paths Clue Card Red Knot (Atlantic Flyway)

(Make one photocopy.)

Precarious Paths Clue Card-Red Knot	Precarious Paths Clue Card-Red Knot
<p><i>January 8th</i> There are thousands of us feeding on the sandy beaches and mud flats at the southern tip of South America in Tierra del Fuego. I spend most of the day feeding in the mussel beds, devouring young mussels. The rest of the time I roost and preen with the rest of the flock.</p>	<p><i>March 14th</i> I arrived on the central coast of Argentina to feed again on the invertebrates living in the mud of the immense tidal sand flat. I need to increase my body weight by 80 percent and to do that I eat a lot of the small snails found here.</p>
Precarious Paths Clue Card-Red Knot	Precarious Paths Clue Card-Red Knot
<p><i>May 19th</i> After a nonstop flight to the northern coast of South America, then across the ocean, I arrived on the sandy beaches and tidal flats of the Delaware Bay. There are about 50 to 100,000 of us here with tens of thousands of other shorebirds. We are all here for one reason: food! Horseshoe crab eggs galore! We eat and eat and eat...that is unless we are sleeping or trying to stay away from people and other animals.</p>	<p><i>May 31st</i> I weigh so much that I don't think I can lift off the ground, but late in the afternoon, the incoming tide pushes me and the flock higher up on the beach. We all move away from the advancing water, moving as one. Someone jumps a certain way and we are all up in the air, flying north, knowing that we will not stop until we fly over Hudson Bay and reach the Arctic tundra.</p>
Precarious Paths Clue Card-Red Knot	Precarious Paths Clue Card-Red Knot
<p><i>June 3rd</i> As we fly over the northern Canadian tundra pools and hummocks of the Melville Peninsula, I leave the flock and fly down to a barren area scattered with vegetation. It is here that I will find my mate and we will spend the next six weeks establishing a nest, incubating the eggs, and raising our young.</p>	<p><i>July 18th</i> Leaving our young behind, I make it to James Bay. This is my favorite spot on my southward migration. The tidal mud flats are full of clams. From here I will follow the west winds to the Atlantic coastline where I will feed almost constantly until late August. The best places to stop along the coast are national and state refuges, parks, and forests. By September I'll be ready for the nonstop, four-day flight over the ocean to Suriname. I'll rest and feed before my return flight to Tierra del Fuego, Argentina.</p>



Precarious Paths Clue Card Ruddy Turnstone (Atlantic Flyway)

(Make one photocopy.)

Precarious Paths Clue Card-Ruddy Turnstone	Precarious Paths Clue Card-Ruddy Turnstone
<p><i>April 10th</i> I have been working my way northward for the past month or so, finding many sandy beaches and mud flats in coastal south Florida. Much of my time is spent looking for food by turning over stones and seaweed to look for and catch my preferred food – sand fleas. But I will eat anything I can scavenge, such as dead animals and bits of food left over from other animals feeding.</p>	<p><i>May 16th</i> For the last couple of years, I stop along the Delaware Bay to gorge myself on horseshoe crab eggs. I feed a little differently than the other shorebirds that join me – I dig up the eggs that are right under the surface, while they pick the eggs up off the surface. I guess in this way I am making more eggs available to everyone.</p>
Precarious Paths Clue Card-Ruddy Turnstone	Precarious Paths Clue Card-Ruddy Turnstone
<p><i>June 3rd</i> I thought I ate enough horseshoe crab eggs so I could fly directly to my breeding grounds, but I guess I didn't gain as much weight as usual. I stop at Churchill, on the Hudson Bay to feed along their jetties before continuing. I hope I will have enough time to select a mate and nest.</p>	<p><i>June 16th</i> I arrive on the breeding grounds north of Hudson Bay and look for the location I have used in the past. The boulder on the tundra is an ideal place for me to perch and call and watch for predators. As I touch down, I am immediately assaulted by another Ruddy Turnstone, driving me out of range.</p>
Precarious Paths Clue Card-Ruddy Turnstone	Precarious Paths Clue Card-Ruddy Turnstone
<p><i>July 8th</i> As much as I try, I am unable to find a suitable nest site and available mate. Leaving the breeding grounds early, I head south. Along the way I meet up with other Ruddy Turnstones and we form small flocks as we work our way down the Atlantic coastline, stopping at Parker River National Wildlife Refuge in Massachusetts, Pea Island National Wildlife Refuge in North Carolina, and Sapelo Island National Estuarine Reserve in Georgia.</p>	<p><i>September 4th</i> After we depart from the national wildlife refuges and sanctuaries at the southern tip of Florida, our small flock arrives in northern Argentina. This is the same beach I started out at last season when I migrated north. We spend most of our time feeding and preening. I hope that next year I can make it back to the Arctic with plenty of energy and plenty of time to breed.</p>



Precarious Paths Clue Card Marbled Godwit (Central Flyway)

(Make one photocopy.)

Precarious Paths Clue Card-Marbled Godwit	Precarious Paths Clue Card-Marbled Godwit
<p><i>April 15th</i> Well, I'm fattening up on worms and insect larvae in the mudflats of Humbolt Bay. I'll soon be ready for my journey to the Canadian grasslands to nest.</p>	<p><i>April 30th</i> I made it to the Great Salt Lake. I'll rest and eat here for a couple of weeks before I continue my long flight. I will stop once more at Benton Lake, Montana before reaching the breeding grounds.</p>
Precarious Paths Clue Card-Marbled Godwit	Precarious Paths Clue Card-Marbled Godwit
<p><i>June 4th</i> I've arrived at Quill Lakes in Saskatchewan, Canada. I quickly recognized my mate's call, the same male I have nested with for the past four years! We better hurry to choose a nest site and scrape a simple hollow in the grass so I can lay our eggs. We'll nest in the dry uplands of the grasslands not too far from the lake.</p>	<p><i>June 15th</i> This morning I had a frightening experience! When I was searching for grubs and insect larvae in the grass, a man grabbed me! He put these funny-looking bands on my legs—a silver one, bright red and orange ones, and a white one with an end sticking out. These odd bands don't bother me when I walk or fly, but they sure do look funny. I wonder what they mean?</p>
Precarious Paths Clue Card-Marbled Godwit	Precarious Paths Clue Card-Marbled Godwit
<p><i>June 30th</i> Our four spotted eggs hatched just when they were supposed to, about 24 days after I laid them. Our chicks are already pecking for insects in the grass. They surely are a hungry bunch!</p>	<p><i>August 14th</i> It's time to head south again before winter blows in. It's lonely migrating all by myself, but it will be good to get to those wonderful sand crabs—a change from my summer diet in the grasslands.</p>
Precarious Paths Clue Card-Marbled Godwit	Precarious Paths Clue Card-Marbled Godwit
<p><i>September 15th</i> I stop to rest and feed at Antelope Island State Park in the Great Salt Lake. It's a wonderful smorgasbord of food here! There's thousands of other birds here too!</p>	<p><i>November 10th</i> I made it! I completed another successful flight down to Humbolt Bay, California. Many of us Marbled Godwits continue even farther south to Bodega Bay or to the west side of the Gulf of California. Me, I'm satisfied to stay here and spend the winter resting and eating.</p>



Precarious Paths Clue Card Western Sandpiper (Pacific Flyway)

(Make one photocopy.)

Precarious Paths Clue Card-W.Sandpiper	Precarious Paths Clue Card-W.Sandpiper
<p><i>April 10th</i> Everyone's flocking up, getting ready for our long trip north to the breeding grounds. It's amazing having so many of us together at one time. We'd better hurry; we've got a long way to fly, starting way down here along the coast of Peru!</p>	<p><i>April 20th</i> After stopping at several locations to rest and refuel, we've made it to the United States at the national wildlife refuges in San Diego Bay. We'll rest and refuel in the mudflats before heading to our next stop-- San Francisco Bay National Wildlife Refuge.</p>
Precarious Paths Clue Card-W.Sandpiper	Precarious Paths Clue Card-W.Sandpiper
<p><i>May 10th</i> After leaving Oregon Island National Wildlife Refuge, we stopped at Nisqually National Wildlife Refuge before heading to the nutrient-rich Alaska coast!</p>	<p><i>May 20th</i> I bet there are one million of us here at Alaska's Copper River Delta. This is a wonderful stopover site along our way north. The endless mudflats give me a chance to probe the mud for tiny clams, worms, and sand fleas until I replace some of the body fat I used getting here. I'm going to need the energy to make it all the way up into northwestern Alaska.</p>
Precarious Paths Clue Card-W.Sandpiper	Precarious Paths Clue Card-W.Sandpiper
<p><i>June 1st</i> Looks like the males have beaten us here to the Alaskan Artic Tundra of the Arctic National Wildlife Refuge. Well, that's O.K. They've already selected nesting sites, so all I have to do is choose a mate and lay my eggs.</p>	<p><i>June 10</i> I'm so glad that my mate and I take turns incubating the eggs. That gives me a chance to feast on the large numbers of insects that are hatching now. I'd better watch out while I'm feeding. The Arctic fox is always looking to make a meal out of us shorebirds!</p>

Precarious Paths Clue Card Western Sandpiper (Pacific Flyway)

(continued)

(Make one photocopy.)

Precarious Paths Clue Card-W.Sandpiper	Precarious Paths Clue Card-W.Sandpiper
<p><i>June 24th</i> Here we go again! Those gulls are nasty predators and are after our chicks. Maybe I can distract them with the “broken wing act” while my mate leads our chicks to safety. Looks like they’ve seen this trick before and aren’t falling for it this time.</p>	<p><i>July 18th</i> Having left the young behind, I fly to Kachemak Bay at the Alaska Maritime National Wildlife Refuge, then to Stikine River Delta along the Canadian coast. This is my favorite spot on my southward migration because of the abundance of clams in the tidal mudflats. Then I will travel along the coast line, stopping every couple hundred miles. We take our time getting home.</p>
Precarious Paths Clue Card-W.Sandpiper	Precarious Paths Clue Card-W.Sandpiper
<p><i>August 30th</i> We have arrived at Marismas Nacionales near Tepic, Mexico. This is a great place to rest. In fact, some Western Sandpipers will stay here all winter. I will continue to Peru with one stop in Panama before arriving.</p>	<p><i>August 15th</i> I’m glad to be back in Peru for the winter. I need a rest! Every year the trip gets harder for me. There are so many people along the coast who disturb me when I try to rest and feed along the way. Sometimes the food has a strange, unfamiliar taste that makes me feel weak. Well, at least I can rest here for a few months and regain my strength.</p>



*Map provided
by New Jersey
Audobon Society*

