Migration Mysteries

The mystery of bird migration has filled people with a sense of wonder and amazement for thousands of years. Consider, for example, the mystery of a Tennessee warbler which, after a journey of 3,000 miles, may return to the same tree to nest year after year. Greater shearwaters migrate 8,000 miles annually, and mallards have been observed by jets at an altitude of 21,000 feet. Hummingbirds can fly 500 miles in 25 hours at an average speed of 20 mph. How and why do these birds migrate?

Birds migrate, or move periodically from one region or climate to another, for feeding, breeding, or molting. Studying migration patterns is difficult. Many birds migrate at night; many follow certain pathways. The Mississippi Flyway is a very important migratory pathway for waterfowl and songbirds in the Midwest. In a landscape that is mostly agriculturally dominated, the Mississippi River is both a great source of food and cover.

There are several theories to explain why birds migrate. One theory suggests that changes in weather, temperature, and food supplies are important factors in determining when birds start to migrate. Day length also seems to be an important factor. Another theory suggests that it is a genetic or inherited trait; the instinct is to return to the bird's ancient habitats. The main reason for migration, however, seems to be that the species must find enough food. Birds must find a habitat that offers an ample supply of food for the birds to care for their young during the nesting season, as well as a habitat that provides food during winter. Are there a lot of insects and fruits available in the winter in Iowa for birds to eat? The answer is obviously no, so birds that need insects and fruit to eat must leave, adapt, or die. Seed eaters, on the other hand, have no problem surviving the Midwest winters.

How do birds find their way back and forth between their nesting and wintering grounds? Again there are several theories. Some scientists believe birds orient their progress by using the sun. Birds might use polarized light, Earth's magnetic fields, or the stars to find their way. Other scientists think birds follow major landforms such as rivers, mountains, and shorelines.

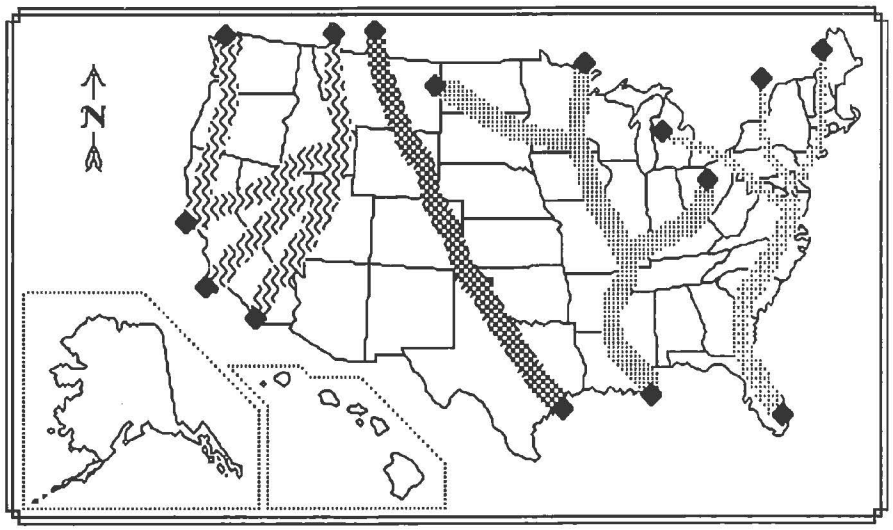
Birds have many adaptations for migration. They have powerful flight muscles, hollow bones, internal air sacs, and specialized body shapes that enable them to fly high and fast.

When do birds begin to migrate? Migration times vary according to the types of birds. Shorebirds will start to migrate in early July, while geese leave breeding grounds in late fall. Many birds tend to migrate at night and spend the day feeding and resting. Night flight seems to protect migrating birds from predators. By aiming a telescope and focusing on a full moon, you can watch the silhouettes of the birds as they fly across the silhouette of the moon. Researchers have counted more than 9,000 birds per hour flying through the night sky.

How do we know the same bird will return to the same area each year? Many migration studies involve putting numbered bands on birds' legs so that the movements of individual birds can be followed. Specially-authorized people called banders use a variety of nets, traps, or other means to catch birds so they can place bands on them.

Special numbered bands are attached to the birds' legs. The date, time, and place of capture are recorded, along with the species of bird. These data are recorded and sent to the U.S. Fish and Wildlife Service. If the bird band is found and the numbers have been sent to the Fish and Wildlife Service, they can determine when and where the bird was banded. They also can determine nesting and wintering grounds, as well as flyways. For example, scientists determined from banding reports that the chimney swifts that nest in Iowa spend their winters in the rainforests of the upper Amazon! Through banding records of geese and ducks, major flyway routes have been discovered. Check with your local bird club to meet banders performing research in your area.

Of course, there are hazards during migration. Skyscrapers, picture windows, and radio towers are obstacles that kill thousands of migrating birds each year. The birds also may fly into violent storms and be blown off course. A curve-billed thrasher, which is native to southern Texas and Arizona, was once seen near Iowa City feeding at a feeder for several weeks, and a bean goose which is native to Asia was seen at DeSoto National Wildlife Refuge. These birds were definitely lost!



If you see a banded bird, what should you do? Many ducks, geese, swans, and eagles have nasal, wing, or neck bands with numbers. For banded or marked waterfowl: Waterfowl Biologist, Iowa DNR,1203 North Shore Drive, Clear Lake, IA 50428 (515/357-3517). For banded American kestrels and bald eagles: Wildlife Diversity Program, 1436 255th St., Boone, IA 50036 (515/432-2823). For other banded birds: 1-800/327- 2263. For Bird Banding Office, 12100 Beech Forest Rd., Laurel, MD 20708-4037. (301/497-6800).

Pacific Flyway

Central Flyway

Mississippi Flyway

Atlantic Flyway

Major Bird Migration Flyways

These flyways continue north into Canada and the Arctic and south into the Caribbean, Central and South America.

Activity: Migration Mysteries

Objective: Students will describe the migration routes of several Iowa birds by plotting their course on a map of North and South America.

Materials: Outline map of North and South America, bird cutouts, and markers

Procedure: Have the students identify the different countries on their maps. Lightly outline the location of Iowa. Students should read the migration path outlines of the eight Iowa birds and plot the birds' courses using different colored markers to identify the route of each species.

The following eight examples describe the migration patterns of some Iowa birds:

1. *American robin* - Most robins spend the winter in the southern United States and migrate each spring to the northern states and southern Canada where they nest and spend the summer. Although most leave Iowa in the fall, every year a few robins winter in Iowa. Robins that nest in Iowa typically winter in Missouri, Arkansas, Louisiana, Kansas, Oklahoma, Texas, Tennessee, and Mississippi.

2. *Dark-eyed junco* - Juncos nest from the far northern United States north into Canada. In fall, they migrate south, where many winter in Iowa and surrounding states. In spring, they leave Iowa to go back north to their nesting grounds in northern Minnesota and Wisconsin, as well as in the boreal forests of Manitoba and Ontario in southern Canada.

3. *Ruby-throated hummingbird* - This hummingbird nests in the central United States and southern Canada. In late fall it migrates south, eventually crossing the Gulf of Mexico, and winters in southern Mexico, Guatemala, Honduras, Nicaragua, or Costa Rica. In spring, it reverses this migration pattern and returns to Iowa in May.

4. *Upland sandpiper* - This bird nests on grasslands in Iowa and other prairie states. In fall it migrates south, eventually reaching Argentina and Paraguay in South America, where it spends the winter. It returns to Iowa in April of the next spring. It has one of the longest migrations of any Iowa bird.

5. *Tundra swan* - This swan has an unusual migration pattern because it moves not only in a north-south direction but also from west to east. The birds nest in northern Canada and Alaska near the Arctic Ocean. In fall they migrate to the southeast and usually winter along the Atlantic Coast from Maryland to North Carolina. In spring they fly northwest to their breeding grounds. In Iowa we most often see wild swans in the northeastern part of the state, along the Mississippi River. One of the best places to see tundra swans in Iowa is on the Mississippi River near Harper's Ferry.

6. *Bobolink* - The bobolink nests in tall grasses, flooded meadows, and prairies in the Midwest. In the fall it starts its journey to South America, staying mostly east of the Andes Mountains. It winters in South America, from southern Brazil through Bolivia and Paraguay to northern Argentina.

7. *Red-winged blackbird* - This bird signals the arrival of early spring in Iowa. The males show up as soon as the snow melts in late February or early March to stake out their territories. Even in snowstorms, the red-winged blackbird may be seen in many of Iowa's road ditches. In early August large flocks of blackbirds can be seen congregating to get ready for their flight to the southern United States. Most blackbirds from Iowa winter in Missouri, Arkansas, Kansas, Oklahoma, Texas, Kentucky, and Tennessee. During migration and on the wintering grounds, these birds form flocks of hundreds of thousands or even several million birds. These flocks can be a nuisance because they feed on grain that farmers have fed to their livestock. The birds also are a problem because of their droppings; the droppings that accumulate below the winter roosts are messy and they may cause a health hazard.

8. *Baltimore oriole* - Orioles' nests are hard to see in the summer. The nest looks like a gray basket woven of milkweed silk, plant fibers, and hair. It's hidden in tall maple and other trees. The oriole feeds on caterpillars, beetles, and fruit in the summer. In the winter, orioles drink mostly nectar from flowers found in southern Mexico south into Guatemala, Honduras, Nicaragua, Costa Rica, and Panama.

Follow-up: Discuss the effects of the destruction of tropical rainforests on populations of Iowa's nesting songbirds. Pick a country in Latin America and see what Iowa birds migrate there. Our sister state is Yucatan in Mexico. What can you determine about the environment? What dangers do birds face during migration? Have students investigate which bird migrates the greatest distance, the highest altitude, and so on. Several articles have been published about migrating birds flying into the wires of TV towers. Why?

Contact local bird banders to ask about the migratory habits of the birds they have banded. Call the Iowa birdline (319/338-9881) to see if there are any special migrants in the state. During a spring birdwatching activity, monitor the dates from year to year when some Iowa migrants arrive.

Activity: Migration Mysteries

Plot the migration routes of the eight Iowa birds you've studied on this map.

Equator

Disappearing Neotropical Migrants

Approximately half of the terrestrial bird species that nest in North America are classified as neotropical migrants. Neotropical habitat or New World tropics are located in Mexico, Central and South America and the Caribbean Islands.

In the spring and summer, many of these birds can be found nesting in Iowa. In the winter, they spend their time in neotropical habitats. Most neotropical migrant birds depend on insects for food, so migration is essential to surviving the winter season.

Breeding bird surveys conducted throughout the United States have shown a marked decline of these neotropical birds. Breeding bird surveys which began in 1966 are conducted every year in the U.S. and Canada. There are 34 different survey routes in Iowa.

According to these survey results, many of our neotropical birds are disappearing. Habitat fragmentation, deforestation, fragmented grasslands, and intensive agricultural practices are the problems. Tropical rainforests once covered 20 percent of the Earth's surface; today only seven percent of the tropical forests are left. Many rainforests are fragmented, where habitat has been broken up into smaller pieces of forest or grassland instead of remaining one continuous habitat. Some tropical lands are being used for intensive agricultural purposes, such as growing bananas and grazing cattle. "Research is beginning to reveal just how devastating the loss of critical wintering areas can be to neotropical migratory birds," says Lisa Hemesath, wildlife diversity biologist with the Iowa Department of Natural Resources. "One study, for example, has found that the elimination of a two-acre plot down south may be the same as destroying up to 20 acres of northern breeding habitat." Due largely to the fact that migratory species are forced into those small winter acreages, deforestation creates a greatly amplified effect.

Agricultural changes in both Iowa and the neotropics play an important part in the decline of many Midwest species. Species such as dickcissels and bobolinks are especially affected. Dr. Louis Best with Iowa State University has documented that many Iowa species nest in row crops, hayfields, road ditches, and grass waterways. Because of farming practices such as cultivation and mowing of hayfields, road ditches, and grass waterways, nest success is low. Predators roam these areas with great success. Brown-headed cowbirds, whose numbers have increased due to fragmentation, because they thrive in agricultural areas, parasitize the nests of other birds. This also contributes to low nesting success. With these conditions in Iowa and with similar problems in the neotropics, many of our songbird species are declining.

What can you and your students do?

Study your local area. Find out what Iowa was like 150-200 years ago and what changes in the forests, wetlands, and prairies have taken place. Make a list of the changes that are positive for migrants and a list of those changes that have been negative.

Landscape your school yard for wildlife to invite birds into your life. Contact your county conservation boards and local Iowa State University Extension for plans to build feeders and nest boxes.

Aid in the establishment of extractive reserves in the tropics. These are areas protected from large agribusiness operations where indigenous people live off the land by harvesting products of the rainforest such as rubber, palm nuts, and brazil nuts. These reserves allow native people to become self-sufficient. For more information, write to the National Wildlife Federation, International Division, Chico Mendes Fund, 1400 16th St. NW, Washington, D.C., 20036-2266.

The Partners in Flight Program sponsors Project Feeder Watch. Participants watch birds at their backyard feeders once every two weeks from November to March. For more information, write to Project Feeder Watch, Cornell Lab of Ornithology, 159 Sapsucker Woods Rd., Ithaca, NY 14850-1999.

Aid in the establishment of wildlife preserves. An international effort by children has led to the creation of a children's rainforest in Costa Rica. For more information, write to the Monteverde Conservation League, Podo 100165, San Jose, Costa Rica.

Compare and contrast the problems that rainforests face, including habitat fragmentation and destructive agribusiness and farming practices.

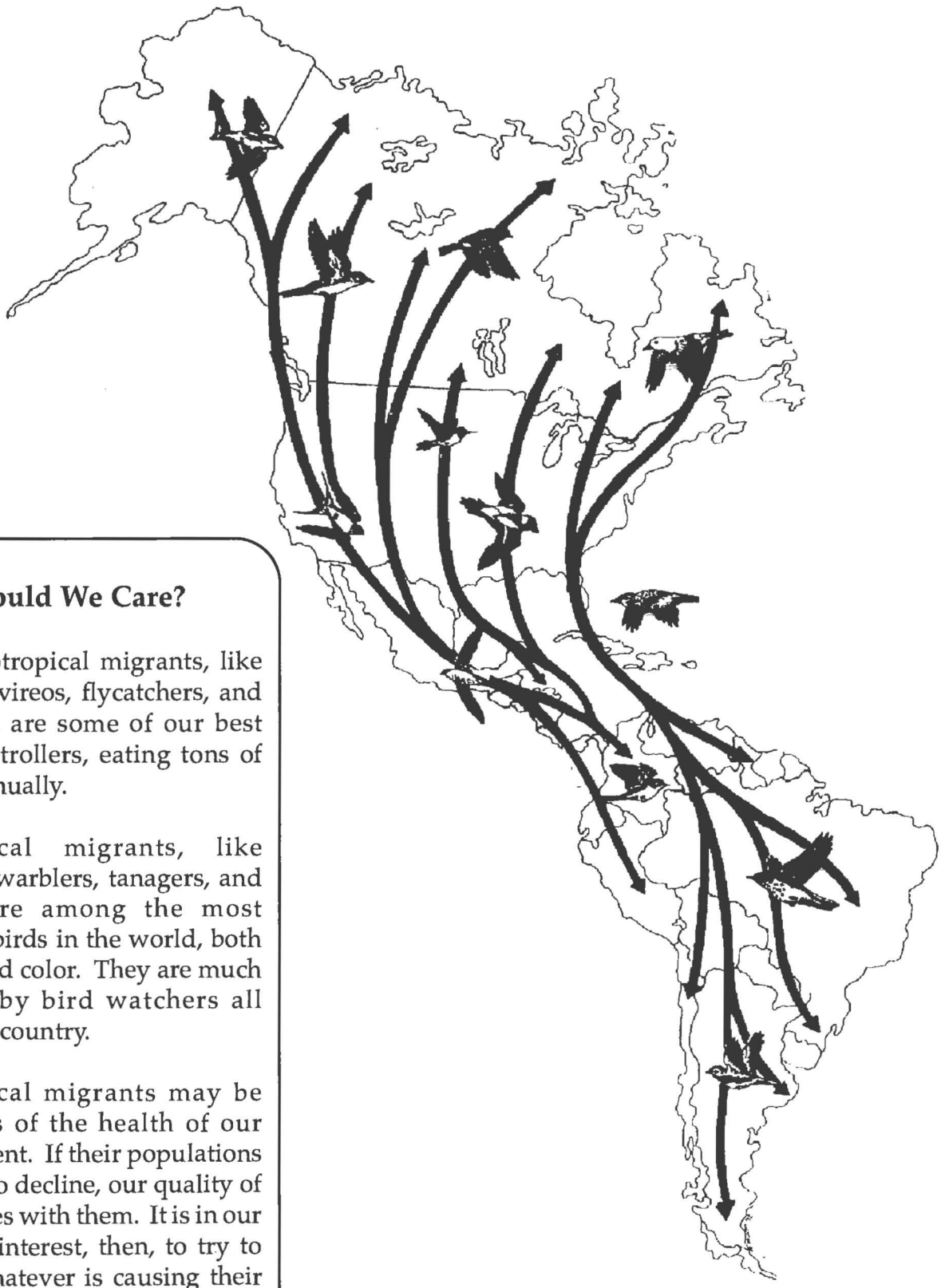
Take your students on an imaginary trip to Yucatan, our sister state. Examine the indigenous people and their way of life. Identify the country's natural resources. Find World Wide Web pages on Yucatan and other countries and learn about their natural resource management.

Contribute to Iowa's Wildlife Diversity Program to help biologists study neotropical birds in Iowa. Write to the Wildlife Diversity Program, 1436 255th St. Boone, IA, 50036.

Included in this booklet is a poster of **Birds of Two Worlds.** This poster was produced by the Handley Corporation, U.S. Forest Service, Minnesota Department of Natural Resources' Nongame Wildlife Program, Partners in Flight, Missouri Conservation Department, U.S. Fish and Wildlife Service, and University of Missouri.

Special thanks to the Iowa Department of Natural Resources for donating these posters.

Birds of Two Worlds



Why Should We Care?

Many neotropical migrants, like warblers, vireos, flycatchers, and swallows, are some of our best insect controllers, eating tons of insects annually.

Neotropical migrants, like thrushes, warblers, tanagers, and vireos, are among the most beautiful birds in the world, both in song and color. They are much admired by bird watchers all across the country.

Neotropical migrants may be indicators of the health of our environment. If their populations continue to decline, our quality of life declines with them. It is in our own best interest, then, to try to correct whatever is causing their problems.

Activity: A Trip to the Lied Jungle

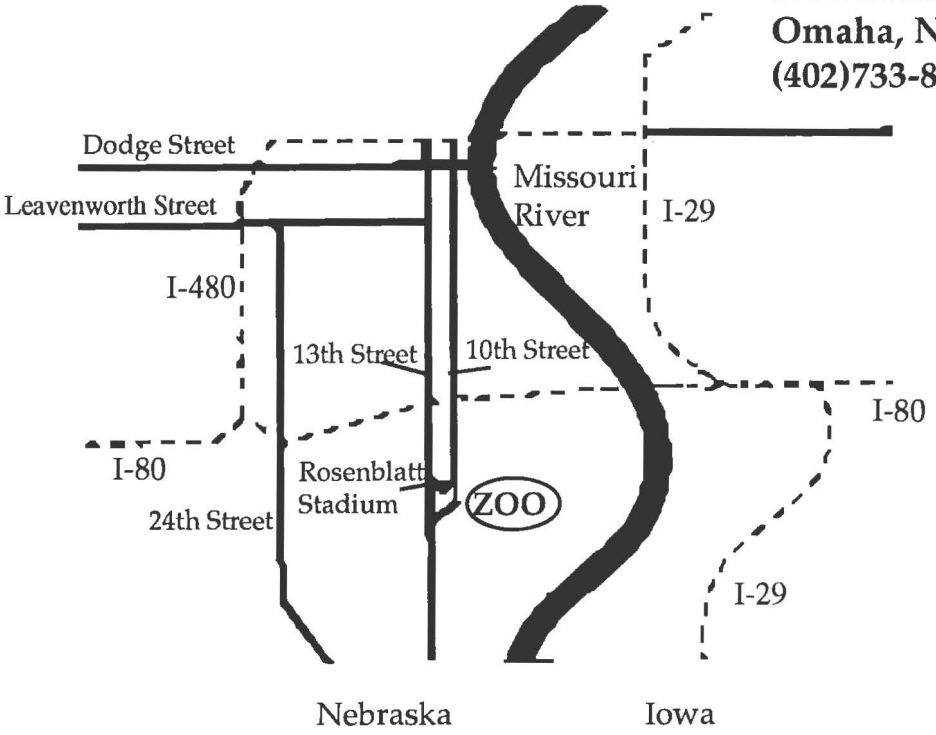
Objective: At the zoo, students will compare and contrast Iowa birds and habitats with neotropical birds, neotropical migrant birds, and their habitats.

Background: The Henry Doorly Zoo's Lied Jungle features three separate reconstructed rainforests representing the areas of South America, Africa, and Asia. The display occupies 1.5 acres under a sky-light roof that is 80 feet in height. The Lied (pronounced *leed*) Jungle contains 2,000 species of tropical plants. More than 200 species of birds occupy the exhibit along with 200 species of mammals, reptiles, amphibians, and insects. Many of the birds, butterflies, tree frogs, and lizards are free-ranging and readily interact with visitors.

The Henry Doorly Zoo's Lied Jungle is open year-round from 9:30 a.m. to 5 p.m. daily. Contact the zoo at 3701 South 10th St., Omaha, NE 68107-2200, (402/733-8401) to inquire about school rates for admission.

Procedure: Explore the jungles with your students to compare and contrast neotropical habitats with Iowa's habitat. Find out which of our birds come from these different habitats and which do not migrate from their tropical homes.

Henry Doorly Zoo's
Lied Jungle
3701 South 10th Street
Omaha, NE 68107-2200
(402)733-8401



Activity: International Partnerships for Birds

Objective: Students will use written and artistic skills to describe migratory birds on their wintering grounds in Iowa's sister state, the Yucatan Peninsula of Mexico.

Materials: Maps of the Yucatan Peninsula (Contact PRONATURA - Peninsula De Yucatan, Joann Andrews, Calle 13, No. 203-A, Garcia Gineres, Merida, Yucatan 97070).

Background: Migratory birds cross international borders and, therefore, are an international resource. As such, migratory birds can provide an educational window for study of the tropical forests, geography, ecology, and cultures of the countries which make up their wintering habitat.

Procedure: Start by identifying at least five migratory birds that summer in Iowa. Ask students to identify wintering habitats of these birds. Discuss with the students the basic geography, ecology, and cultures of Yucatan. Are there any students in your class from Mexico? Try to determine the Spanish names of these birds to help students understand that they spend a large part of the year in Mexico. You may wish to contact a local birder or naturalist to schedule a presentation about the birds you are studying.

Studying the international dimensions of migratory birds can quickly lead to a desire to form a partnership with a school and teacher in one of the countries that make up your birds' non-breeding habitat. There are many projects you could conduct with an international partner school.

A good place to start is a pen pal or art exchange with a partner school. Have your students draw or paint pictures of migratory birds you have been studying. Display the students' artwork during the month of May, with a special exhibit on International Migratory Bird Day. Have the students write letters to accompany their pictures to students at their sister school.

Package pictures and letters for shipping. You may wish to include other supplies, such as field guides and educational materials about migratory birds. Include in your shipment a request that your sister school display your students' artwork and draw pictures of birds in their area and letters to send back to your classroom. What a wonderful opportunity to learn more about the birds, people, and cultures of the Yucatan Peninsula!

Note: Initiating an international partnership requires creativity and patience. Communication is key. Currently the best method is e-mail. If possible, identify someone in our sister state with E-mail to help you coordinate with local schools. Be patient. Shipping in and out of Mexico can be time-consuming.

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