



Adapted with permission from *Aquatic Project WILD* "Migration Headache"

Description: Students act out the trip sandhill cranes make between their nesting habitats in Idaho and their winter home in New Mexico. They experience the hazards cranes face at either end of the migration path as well as along the way.

Objectives: Students will:

- list the factors adversely affecting the population of sandhill cranes wintering in New Mexico;
- predict the effects of these restricting factors; and
- describe the effects of habitat loss and degradation on sandhill cranes and the importance of preserving wetland habitats for the cranes and other migrating water birds.

Materials: large playing field or gymnasium

two paper plates for every three students (clearly marked to differentiate top from bottom, i.e., paint one side blue to represent a wetland habitat and paint the other side brown to represent the loss of wetland habitat. Or write "habitat" on one side to represent wetland habitat. Alternative materials are 12" x 12" carpet samples from carpet retail stores or computer mouse pads).

Background: Migration is a fascinating and yet mysterious topic. How do migratory birds, fish, mammals and insects travel such huge distances with such precision, arriving at the same spot year after year? Although the answer isn't completely clear, visual clues of geographical features, the sun and the stars and even the earth's electromagnetism probably all play a role.

23. Crane Migration



Grades: 2–6

Time: two 30-minute sessions

Subjects: science, social studies

Terms: *degradation, migration*



What stimulates birds to migrate? Scientists have speculated that various factors contribute to the timing of migration. These include increases and decreases in daylight, endocrine interactions, gonad development, fat deposition, and the availability of food. Each species migrates at a particular time of the year and sometimes at a particular time of the day. Most sandhill cranes who winter in the wetlands of the Middle Rio Grande Valley begin their migration in September from wetlands like those at Gray's Lake National Wildlife Refuge in Idaho. By the end of November, the majority of cranes have arrived in New Mexico for their winter stay, and they start to leave in mid-February. Many migrating cranes stop in the San Luis Valley of Colorado, at what is termed a staging area, to spend several weeks. Here they feed, and in the spring they socialize and choose partners before flying on to their northern nesting areas. Unlike many smaller birds, cranes fly only during the day, usually at an altitude of about 2,500 feet (750 meters). They follow the same flyway they have used for centuries. Along the way they need wetlands where they can rest and eat before continuing their migration.

There are 15 different species of cranes worldwide. Only two species, the sandhill (*Grus canadensis*) and the whooping crane (*Grus americana*), live in North America.

The whooping crane is on the endangered species list. Whooping cranes never had a large population; probably fewer than 2,000 lived in the U.S. when the first Europeans began arriving on this continent. They reached a low of 19 in 1945. In 2001 there were about 185 migratory whooping cranes in the wild and another 100 in captivity, with only one whooping crane wintering at Bosque del Apache. There are current projects to increase their numbers and reintroduce them to historic ranges.

This activity focuses on sandhill cranes. Through the efforts of refuges like the Bosque del Apache National Wildlife Refuge the sandhill cranes have made a comeback from their status as rare. In 1941 there were only 1,000 greater sandhill cranes in the Rocky Mountain population, and 17 wintered at the Bosque del Apache. The population was estimated in 2001 at between 30,000 and 40,000 cranes. Today 12,000 to 17,000 sandhill cranes winter at the refuge, among some 23,000 in the Middle Rio Grande Valley, with the balance wintering in Mexico, and they are no longer considered endangered.

All cranes need habitat which include wetlands. These habitats have been reduced through degradation. Before the development of the 20th century, the natural flooding nature of the Rio Grande and the high water table in the valley created rich wetland habitats in the



floodplain. Humans began to widely use the river for irrigation and began adding flood control to protect their crops and homes; these dams and irrigation canals changed the natural flooding regime of the Rio Grande. The installation of riverside drains lowered the water table and caused many wetlands to dry up. Many wetlands where cranes and other birds used to live or stop during their migration are now cities, towns and farms. Today the Rio Grande is confined, and many wetland habitats have been eliminated. Introduction of non-native plants such as saltcedar and Russian olive had a negative effect on the health of Middle Rio Grande wetlands. Increased pollution, through the use of pesticides and herbicides, has also affected the cranes. Evidence suggests that acid rain may be affecting insect populations, which in turn affects the cranes' food sources. In addition, predators, weather, disease and fire pose hazards to the birds and their habitats. In particular, disease is of concern at the Bosque del Apache refuge where the high concentrations of bird populations can create epidemic conditions.

In 1939, the Bosque del Apache National Wildlife Refuge was created as a safe place for birds (especially the sandhill crane) and wildlife that migrate to the wetlands of the Middle Rio Grande for the winter. The refuge is 13,000 acres (5,200 hectares) of bottomlands where the water of the Rio Grande has been diverted to create extensive wetlands. There are several other refuges in the valley, both state and local, that provide wintering wetland habitat as well. In the larger picture, there are international treaties and national laws affecting migratory species. State wildlife agencies share some responsibilities with the U.S. Fish and Wildlife Service, which is the regulating authority for managing and protecting migratory animals.

There are several sub-species of sandhill crane but the greater sandhill crane is the most abundant in the Middle Rio Grande Valley. They stand four feet (1.2 meters) tall with a wingspan of six to seven feet (2–2.1 meters). They fly at 25 to 35 miles per hour (40–56 kilometers per hour), often migrating 1,000 miles (1,600 km) or more each way.

Although sandhill cranes are no longer considered endangered, their habitat is. If their habitat disappears, cranes will disappear.

During this activity students, as cranes, will “migrate” between their winter habitat in the wetlands of the Middle Rio Grande Valley to their nesting habitat at Gray’s Lake in Idaho. Discuss migration hazards with your students before the activity; these are: predators, highline wires, hunters and bad weather. Each student (assuming a class size of 25 to 30) represents 1,000 sandhill cranes.



Thus occasional losses due to predation and other minor events are not emphasized in the role play. The emphasis of the activity is on habitat loss. The major purpose of this activity is for students to dynamically experience some of the major destructive factors affecting sandhill crane habitats and the survival of the sandhill cranes as a species.

Procedure:

1. Begin by asking the students what they know about sandhill cranes. If available, show one of the videos listed in *Resources/References* in this activity. Discuss the information from the *Background* section to supplement their knowledge.
2. Explain to the students that many factors can limit the survival of sandhill cranes. These include elimination of wintering and nesting habitats because of development (houses, industry), times of abundance or lack of food, drought, or flood.
3. Select a large playing area about 70 feet (21 meters) in length. Place one plate for each three students at each end of the field. Designate one end as the “winter habitat” and the other as the “nesting habitat.”
4. Explain to the students that they are sandhill cranes which will migrate between the two areas at your signal.

To increase interest, teach them the dance of the cranes. They bow their heads, flap their wings and leap high in the air. The cranes’ dancing activity increases at the end of their stay at their winter habitats and then increases even more upon arrival at their nesting habitats in Idaho. Younger students can dance while waiting for the signal to migrate.



Tell them the paper plates represent wetlands. These wetlands provide a suitable habitat for the sandhill cranes.

Have them flap their wings. Cranes make a slow downbeat with a quick upbeat as they fly. They fly with their necks extended as they make their journey.

At the end of each trip, the students will have to have one foot on a paper plate in order to be allowed to continue. If they cannot get their foot on a plate, they have not found



any suitable habitat, so they die and have to move, at least temporarily, to the sidelines and watch.

Only **three** sandhill cranes can occupy a “habitat haven” (paper plate) at any one time.

Two students can be made permanent monitors to turn over the paper plates as per your instructions.

5. Begin the activity at the wintering habitats in New Mexico. The students will be doing the dance of the cranes. Signal the start of the first migration. Have the students migrate in slow motion until they become familiar with the process. Then they can speed up. On the first try, all the birds will migrate successfully to the nesting habitat.
6. Explain that there has been no loss in the nesting habitat. Thus, the students can do the crane dance and begin a successful nesting season.
7. Turn over one plate in the wintering region. Explain that a large wetland area has been drained and used for agricultural purposes. Repeat the signal to migrate and send the cranes on their journey to southern and central New Mexico for the winter. Have the three displaced students stand on the sidelines. Remind the students that these three represent 3,000 cranes. Thus these 3,000 died as a result of habitat loss. Let the students playing dead birds know that they can get back in the activity as surviving hatchlings when conditions are favorable and habitat is available in the nesting ground.
8. Before the next migration to the northern nesting area, turn over four plates in that area. Tell the students this is a catastrophic forest fire which has severely polluted and damaged wetlands. Give the dancing cranes the signal to migrate. At least 12 students will not find nesting habitat. Note: this results in a large number of students waiting on the sidelines. Before many cycles are repeated, provide them with an opportunity for re-entry in the nesting habitat. Each time, give the students examples of changes in habitat conditions that make increases in population possible. For example; the Rio Grande Nature Center State Park has constructed a new wetland habitat for wading birds and shore birds.
9. Repeat the process for eight or 10 migration cycles to illustrate changes in habitat conditions that affect the cranes. See the lists below for suggestions of factors that might influence the sandhill cranes’ survival.



Factors limiting the survival of sandhill cranes:

- * wetland drainage
- * drought, causing less available food and drying out of wetlands
- * pollution and contamination of water
- * pollution of food on which cranes feed
- * urban expansion
- * conversion of wetlands to farm lands
- * conversion of natural waterways to canals
- * illegal hunting (poaching)
- * crane flies into power line and is killed or severely injured
- * diseases such as avian cholera
- * conversion of wetlands to industry or residences
- * not wanting wildlife to feed in agricultural fields

Factors favoring the survival of sandhill cranes:

- * preservation of wetlands
- * wildlife forage crops, corn or alfalfa left for wintering birds (such as at Los Poblanos and Candelaria farms in Albuquerque)
- * habitat restoration (such as a new refuge)
- * human action aimed at protecting and restoring wetlands including education programs
- * regulation of hunting and reduced poaching



Although some limiting factors to the cranes' survival are a natural part of any environment, the largest threat to these big birds seems to be the loss or degradation of suitable habitat, most often as a result of human intervention, draining of wetlands, and pollution.

Be sure to create one or more "disaster" years to illustrate catastrophic loss of large areas of available habitat. Remember that wetland habitats are diminishing both locally and worldwide, so the activity should end with fewer areas of available habitat than can accommodate all the cranes. The result is a smaller population of cranes locally and worldwide.

Play several rounds of the game noting population changes for each round.



- Assessment:**
1. Have students choose among the following:
 - a. Write a story as if you were a crane. Explain what happened to you and your flock over your many migrations.
 - b. Draw a series of pictures about what happens to you and your flock.
 - c. Give a presentation to someone in your family about crane migrations.
 2. Have the students write a summary of the ideas generated in the discussion. Be sure to have them distinguish between the human-caused factors and the environmental factors involved in the success or decline of the crane's population. Working from the students' summaries, generate a class list of population increases or declines. Compare the similarities and differences between these limiting factors. Finalize the discussion by having the students identify the factors which pose the most significant long-term threat to the survival of the cranes.
 3. Finally, discuss what kind of things can and should be done to protect the wetland habitats necessary to the survival of the sandhill cranes and all migratory birds. Discuss the compromises and trade-offs related to these recommendations.

- Extensions**
1. For variation set the activity back in time. Start in the early 1900s before the urban and agricultural development changed the natural flooding nature of the Rio Grande. At this time the sandhill crane population was between 30,000 and 40,000. Bring the student crane population down to the low of 1,000 and then show how the creation of the Bosque del Apache National Wildlife Refuge helped increase the sandhill crane population, and removal from the endangered species list. Continue to the present time highlighting current problems facing the sandhill cranes.
 2. Use a graph to chart the cycles of declines or increases in crane population. Use this chart for further discussion after the activity. The students can be asked to:
 - a. identify the apparent causes of any changes in population from year to year;
 - b. identify the major factors contributing to habitat loss and degradation;
 - c. make predictions about the effects of these factors;
 - d. distinguish between short-term and long-term effects;
 - e. distinguish between catastrophic and gradual changes; and
 - f. support their ideas with evidence, engaging in research if necessary.



*Resources/
References:*

3. Take a trip to Bosque del Apache National Wildlife Refuge.
4. Make videos of cranes at the refuge or other locations.

Elphick, C., J.B. Dunning, D.A. Sibley, eds. 2001. *The Sibley Guide to Bird Life and Behavior*. National Audubon Society/Alfred A. Knopf, New York.

Aquatic Project WILD—Aquatic Education Activity Guide. 1992. Western Regional Environmental Education Council, Inc., Bethesda, MD.

Price, Alice Lindsay. 2001. *Cranes the Noblest Flyers—In Natural History & Cultural Lore*. La Alameda Press, Albuquerque, NM.

Bosque del Apache National Wildlife Refuge. 1996. Southwest Natural and Cultural Heritage Association, Albuquerque, NM.

The International Crane Foundation at <http://www.savingcranes.org>

Video: “Back to the Bosque.” Educational Products from Educators, Leading Object™, Box 30003, MSC 3AI, Las Cruces, NM, 88003-8003; 505-646-5368 or 1-888-750-4156; www.leadingobject.com/products/videos/#southwest

Video: “Birds of the Bosque.” Agricultural Information Video Studio, New Mexico Cooperative Extension Service, College of Agriculture and Home Economics, New Mexico State University, Department 3AL, P.O. Box 3003, Las Cruces, NM, 88003-0003.

Video: “Sandhill Cranes—Wintering in New Mexico.” Judith Shaw Productions. 2002. Albuquerque, NM. (16:30 min).