U.S. Fish & Wildlife Service

Junior Duck Stamp Conservation & Design Program

Conservation Through The Arts

U.S. Fish and Wildlife Service
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FEDERAL JUNIOR DUCK STAMP CONSERVATION AND DESIGN

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About the Junior Duck Stamp Conservation and Design Program

The purpose of the Junior Duck Stamp Conservation and Design Program (Junior Duck Stamp) is to "teach conservation through the arts." The Junior Duck Stamp Program provides students with a broad exposure to migratory waterfowl; includes lessons to help increase students' knowledge and appreciation of migratory birds and; provides activities geared to motivating students to take on active roles in conserving these species.

Initiated in 1989, the original Junior Duck Stamp education curriculum focused exclusively on waterfowl and the popular Junior Duck Stamp Art Contest. It provided an opportunity for students in grades K-12 to participate in a nationwide waterfowl arts competition. While the format of the Junior Duck Stamp Art Contest remains the same, the Junior Duck educational curriculum has been expanded to provide more information on all migratory birds, including songbirds, shorebirds, and raptors. The emphasis of the curriculum remains on migratory waterfowl, however, to support students' participation in the Junior Duck Stamp Art Contest.

An Art-based Education Program

The Junior Duck curriculum retains the original focus on an arts-based educational program. Many of the curriculum's exercises in observation encourage students to interpret the natural world through artistic expression. This focus is based on the theory that students will be more inclined to conserve and protect what they love. An emphasis on "nature journals" provides students with opportunities to sharpen observation skills and to record these observations on a continual basis. The Waterfowl Journal Project in conjunction with the Junior Duck Stamp Contest provides students with an intense experience in the observation and study of one waterfowl species.

Many other activities contained in the Junior Duck curriculum provide students with opportunities to learn about migratory birds; the mysteries of migration; requirements for adequate habitat and; the ways they can help conserve these species in their own back yards, school yards, and neighborhoods. By providing a basis for participation in the Junior Duck Stamp Art Contest, the curriculum encourages students to move beyond simply "learning about" wildlife and wildlife art to testing their abilities as wildlife artists. Arts-education objectives and methods for evaluation, are provided for each activity to help teachers identify which activities will satisfy art education requirements. Students demonstrate their learning through the range of visual, dance, musical, dramatic, and language arts.

Linking the Arts and Sciences

The updated Junior Duck Stamp curriculum incorporates a strong base in science education. Education about migratory birds provides an overall theme which can be used to teach environmental science concepts important to the mission of the United States Fish and Wildlife Service including biodiversity protection, ecosystem management, species recovery, and international wildlife conservation. The lessons also include opportunities for students to improve their science and art process skills, including observation, data gathering and interpretation, creative and critical thinking, problem solving, and artistic expression. The integration of science and conservation concepts with these important process skills provides the basis for fostering artistic and environmental literacy. As such, the Junior Duck Stamp curriculum truly links the arts and sciences in order to provide students with the knowledge and skills required for an active environmental citizenry.

Multiple Intelligence

By offering opportunities to learn about migratory birds and conservation through all of the art sub-disciplines - visual, dance, dramatic, musical, and language arts - the junior Duck Stamp curriculum supports the current "multiple intelligence" theory of education. The multiple intelligence, or "whole brain" learning theory, supports the left brain/right brain model for learning in which the creative, intuitive, holistic, visual, and playful right brain is engaged with the logical, systematic, linear, verbal, and judgmental left brain. Multiple intelligence theory encourages practitioners to develop activities that engage all of the senses in order to stimulate each of following seven areas.

1. Verbal and linguistic - dealing with words and language, both written and spoken.
2. Logical and mathematical - dealing with inductive and deductive thinking, numbers, abstract patterns and the ability to reason.
3. Musical - dealing with the ability to recognize tonal patterns, pitch, melody, rhythms, and tone.
4. Kinesthetic - dealing with the ability to use the body skillfully and to handle objects adroitly.
5. Visual and spacial - dealing with the sense of sight and ability to visualize including creating mental images, thinking visually, and having a keen sense of observation.
6. Interpersonal - dealing with a person's ability to understand work, and communicate with people and maintain relationships.
7. Intra personal - dealing with self knowledge, sensitivity to one's own values, purpose, feelings.

As you review the contents of the curriculum, you will note that specific activities target each of the seven areas. As you plan your Junior duck Stamp unit, we encourage you to identify a range of activities that

addresses each skill.

Suggested General Resources to Help Teach Your Junior Duck Stamp Unit

Field guides appropriate for your region of the country.

Audiotapes of waterfowl calls and bird songs common to your area.

Prints, books, journals, or magazines of famous works of bird and wildlife art.

Prints, posters, books, journals, and magazines containing photographs of birds.

Single species bird slides.

Videos on bird migration.

Bird mounts and study skins.

Binoculars.

Art for Conservation

Birds have inspired art throughout history. Birds can be found in paleolithic cave paintings. They are also represented in the art of ancient Egypt, Greece, and Rome, medieval Europe, the paintings of the renaissance as well as in works by impressionistic and modern artists. In early American history, birds dominated the art of naturalists and wildlife artists Alexander Wilson and John James Audubon. Today painters such as Roger Tory Peterson and Robert Bateman continue to dominate the wildlife art scene.

Birds have taken a major role in the cultures of people from around the world. For example they figure prominently in Mayan and Aztec religious ceremonies and artifacts. They can be found in native American crafts such as drums, pipes, and rugs, and in the totems of Haida and Eskimos as well as Aboriginal Australians. Among Northwest Coast Indians, the raven is the creator of the world. In American folk art, birds are represented in many diverse media including quilts, cross-stitch samplers, cuckoo clocks, and weather vanes. Today, the bird and wildlife art industry represents a huge and growing business that contributes large sums to the United States economy.

It is no wonder birds are found in such a varied and diverse array of art. Birds' freedom of flight has inspired a sense of wonder among peoples from around the world and throughout the centuries. For a growing number of children living in urban areas, birds may be the only form of wildlife they see - offering a rare and important connection to the natural world.

The arts-based activities contained in the Junior Duck Stamp curriculum are geared to helping children appreciate the natural world. The activities contained in the Art for Conservation section will help achieve the following objectives:

- enhance students' observational skills;
- introduce students to sketching in the field;
- expose students to basic bird drawing techniques;
- allow students to explore the world of birds in art.

Field Journals

Grades: Primary, Middle, and Secondary

Objectives: As a result of completing this activity, students will develop field sketching technique using pencil and charcoal (ART), and sharpen skills of observation of the living and nonliving environment. (SCIENCE).

Materials: unlined notebooks for journals
pens, pencils, charcoal sticks
binoculars and field guides (optional)
Bird slides, projector and screen (optional)

Activity I: Field Journal Technique

1) Introduce field journal-keeping by having students first work in the classroom. Practice gesture sketching in quick, timed (5-30 second) sketches of stationary objects.

2) A further exercise leading to wild bird sketching includes quick behavioral sketches at bird feeding stations. Your school may have a station already, or you may wish to set up a station for your class. Sketching from slides and videotapes also can give students good practice.

3) Pure contour sketching is another technique which emphasizes observation. Start by sketching hand-held objects while looking only at the object, not at all at the paper, and drawing one continuous line for the entire sketch. Process should be emphasized over product in the practice of field sketching. Students may gradually modify the technique, peeking at the paper, so that they are looking at the object being sketched 75% of the time, and their paper 25% of the time.

4) Introduce students to their journals by providing blank notebooks. Ask them to note at the top of the first page the date, time, location, weather conditions, and any background sounds they hear (natural or man-made). Students will include this information on every new entry to the journals.

5) If possible, take your class outside if birds are present. Have students develop quick sketches of three to five different bird species before settling in on their species of choice. Encourage students to develop quick, simple sketches using the following beginning techniques for drawing birds:

- start by drawing two circles - one for the body and one for the head;
- notice the size and position of the head relative to the body before starting;

- add the tail, beak and legs. Finally, fill in the details of color, feathers, etc.

Activity II: Field Journal Practice Exercises

1) Choose a specific place where birds are present. The important thing is that some birds are present to enable students to observe and sketch changes they witness over a period of time. This will help students develop an awareness of birds' appearance and behavior, as well as colors and textures of changing habitat conditions, and to record these changes in their sketches. (The location will most likely be your school yard and need not include a wetland or waterfowl, although this would be ideal.) Now, select one or more of the field sketching practice exercises below.

2) Ask students to draw all plants, or all insects, they can see in one square foot plot.

3) Have students identify a 5' x 5' plot in your school yard or at their home. Have them identify and sketch all they observe in the plot including weeks, leaves, flowers, fungi, seed pods, insects, etc.

4) Have students record stages of growth by sketching the same plant at different stages of development.

Activity III: Natural Area Field Trip

1) One of the objectives of the Junior Duck Stamp Program is to create naturalistic drawings and paintings of waterfowl and other birds. This requires opportunities to observe waterfowl and other migratory birds in their natural habitats. Look at a state or county map to determine the location of a nearby National Wildlife Refuge, wildlife sanctuary, state or county park, and/or nature center. You can also contact a local chapter of Ducks Unlimited or National Audubon Society to inquire of good locations to observe waterfowl and other birds in your general area. Zoos can also provide excellent viewing opportunities.

2) Remind students to bring their waterfowl project journals on the day of the field trip. Once at the site, have students develop sketches of plants and birds that they see using practice field sketching skills.

3) Have students disperse within a limited area for a limited period of time. If possible, have students develop sketches of waterfowl.

Evaluation:

Do students' sketches demonstrate a solid grasp of field sketching techniques? Do sketches reflect strong observational skills and ability to detect subtle differences and changes in nature?

Natural Sounds

Grades: Primary, Middle

Objectives: As a result of completing this activity, students will use music and language to communicate auditory observations (ART); and understand the importance of sound in observing the natural world, and birds in particular (SCIENCE).

Materials:

- audio tape with bird songs and calls
- tape player
- drawing materials - paper, colored pencils, crayons, etc.
- examples of poetry which feature birds.

Instructions:

Activity I: Bird Songs

1) Hold a general discussion of the role of sound in our daily lives and in nature. Ask students which sense they rely on most heavily - smell, hearing, touch, or sight? Explain that bird watchers develop a strong sense of sight to identify birds by discrete markings such as color of wing bars and eye rings. Bird watchers also develop a strong sense of hearing to identify birds by their songs or calls. In fact, many expert bird watchers rely on their hearing to a greater degree than sight to identify birds.

2) Ask students to think about the bird songs and calls they have heard.

3) Darken the room. Tell students you will play a tape of bird songs. Encourage students to try to identify as many songs or calls as possible. After five minutes of listening, pause the tape and ask students the following questions:

a) How many different birds did they hear?

b) What other sounds did they hear in the background?

c) Which bird songs had they heard before?

d) Can they identify any of the birds on the tape?

Activity II: Onomatopoeic Poetry

1) Onomatopoeia (on-ah-mat-ah-PEE-ah) means to use language to describe what we hear. Words like *swish, thump, and gurgle* are onomatopoeia Ornithologists use this term to describe bird calls or songs. For example, the song of the American robin sounds like "cheerily, cheer up, cheerio, cheerily!" Even the names of some birds are onomatopoeia, such as veery, jay, killdeer and chickadee.

Ask students if they can think of any birds named by onomatopoeia. Note the examples included in the background section and ask students to list any others they can think of. Tell them that poets use onomatopoeia to enliven their poetry. An example by the famous naturalist John Burroughs follows in which he refers to the bluebirds " "turalee" flight note:

Bluebird

A wistful note from out the sky,
"Pure, pure, pure," in plaintive tone
As if the wand'rer were alone,
And hardly knew to sing or cry.

2) Play the tape again. Ask students to pay attention to any onomatopoeia they hear (for example *swish, thump, and gurgle*). Tell them to listen carefully because they will be writing short poems using onomatopoeia.

3) Assign students poems using onomatopoeia either as an in-class writing exercise or as a take home writing assignment. You could also have students write their onomatopoeia poems in small cooperative working groups. If you work with younger students, you could develop your onomatopoeia poems as a class.

Activity III: Sound Maps

1) Distribute 8 ½" X 11" paper and have students draw a large circle on a blank sheet, placing an "x" in the center to indicate their location as shown on the diagram.

2) Take students back to the location of your sensory field trip, (or to another predetermined location). Relative to their position, have them mark the location inside the circle of each sound they hear. These marks should be simple representative sketches or symbols to indicate bird songs and other sounds. Have them try to note the direction the songs or sounds are coming from, their loudness, pitch, melody, and apparent distance away.

3) Allow approximately ten minutes for listening and recording. Back in the classroom, hold a discussion to identify the loudest, the softest, most pleasant, mysterious, or annoying bird songs.

4) Pass out colored pencils, crayons, and other drawing materials. Have students complete their sound

maps by "coloring in" the spaces between the symbols with other elements of the habitat. Display sound maps in the classroom.

Activity IV: Bird Music

1) Tell students you will play the tape one more time and have them listen very closely to one song.

2) Have students who play an instrument such as the flute, oboe, clarinet, trumpet, etc. try to emulate the bird's song on their instrument. Even if they do not own and play an instrument, students can produce the song's "beat" with their hands or simple percussion instruments. You may wish to work with a music teacher on this exercise. With some help, students might even try to develop simple musical notation of the bird's song.

Activity V: A Symphony of Animal Sounds

1) obtain a tape of "Peter and the Wolf" by the Russian composer Serge Prokofiev (1891-1953) which tells the story of the boy, Peter, and his three friends - the bird, the duck, and the cat.

2) Explain that "Peter and the Wolf" includes various musical instruments to represent animals: the bird is a flute; the duck is an oboe; the cat is a clarinet and; the wolf is three French horns. Ask students why they think Porkofiev selected the instruments he did for each character.

3) Play a portion of the recording and have students decide whether they want to perform the part of Peter, the wolf, the bird, the duck, or the cat.

4) Resume the recording and allow students to perform the role of Peter, the work, the bird, the duck, or the cat. Play recordings of other instruments and ask the students to describe what animals might be represented with each instrument.

5) have students create a mural of a background scene for their favorite scene from the composition.

Evaluation:

Were students able to identify any of the birds they heard on the tape? Did students' poems demonstrate an understanding of onomatopoeia? Were students able to communicate what they heard graphically on their sound maps? Were they able to emulate aspects of bird song on instruments? Were they able to visually represent a scene that they listened to from "Peter and the Wolf?"

Junior Duck Stamp Painting

Grades: Primary, Middle, and Secondary

Objectives: As a result of completing this activity, students will integrate all art and design principles previously introduced within a single painted or drawn composition, using a variety of technical art production skills (ART), and communicate knowledge of waterfowl anatomy and habitat (SCIENCE).

Materials:

- pencils
- paints
- watercolor paper or illustration board meeting competition requirements.

Important note to teachers: The painting activity should be considered a culminating project for your Junior Duck stamp curriculum and would likely be your final class/student assignment. If entering student designs in your state Junior Duck stamp competition, please note that entry requirements may change from year to year. For information on obtaining current entry information, contact your state coordinator or the Duck Stamp Office at (202) 208-4354. This activity is presented early in the curriculum in order to prepare students for a final Junior Duck Stamp project. Whether or not entering your state's Junior Duck Stamp Contest is one of your students' goals, you may want your students to practice with these techniques throughout the course of the curriculum in order to link the class room learning activities to their final compositions.

Instructions:

1) Students will work with the adopted species and all the studies and reference materials already compiled in their journal projects.

2) Have students prepare a series of composition studies for their competition painting or drawing that considers the following issues. Are there one or several birds in the picture? Will they be in flight, on the water, or on the ground? Will the vantage point be from above, from below, or at eye level? What habitat will comprise the setting? Encourage students to study various combinations of these elements and finally select a strong composition, which also provides opportunities to focus on the anatomy of waterfowl, using artistic technique. Do not allow students, under any circumstances, to reproduce materials that are protected by copyright - this is against contest entry rules, and also discourages artistic creativity.

3) Next, have students select a medium over which they have some mastery, and execute the painting or drawing of their chosen design. Begin this work with enough time for repetitions if something goes wrong or if the student wants to try several different compositions or techniques.

Evaluation:

Does the composition combine biological accuracy and creative power? Does the composition integrate the waterfowl within a landscape habitat? Do the painting and drawing techniques accurately represent the waterfowl anatomy? Does the work convey an understanding of waterfowl ecology as well as mastery of design principles and art techniques? Does the student understand the composition requirements, and does the entry meet the requirement?

*If entering the design in your state's Junior Duck Stamp competition, be sure to use the current entry requirements.

Meet the Migrants

Scientists estimate that about 9,000 species of birds exist world wide. Approximately 660 species of birds breed in North America. Some birds are known as resident birds which means they stay in one place all year long. Others migrate as the seasons change. Some travel short distances and remain within the United States. Others migrate longer distances and travel into South America. There are approximately 60 species of ducks, swans, and geese classified under the Migratory Bird Treaty Act by the U. S. Fish and Wildlife Service.

Approximately 340 species of birds migrate to the tropical regions of Mexico, Central America, South America and the Caribbean. These species are known as "neotropical" migratory birds and include raptors, waterfowl, shorebirds, and songbirds. "Neo" refers to "new world," or the Americas, and tropical refers to the latitudinal region between the Tropic of Cancer and the Tropic of Capricorn. Of the 60 species of ducks, swans and geese, approximately one third to one half can be said to be neotropical migrants.

All birds have certain features in common. These include feathers, wings, although a few, such as ostriches, cannot fly. Except for some flightless and diving birds, they all have hollow bones. All birds have beaks. And all birds lay eggs. Ducks, swans, geese, and most seabirds spend months on the water and many birds dive underwater in search of food, but they never get wet through to the skin. They coat their feathers with oil from a special gland and constantly preen to keep feathers overlapping like tiles on a roof.

It is important to note that populations of many birds are in danger. In the past ten years, the number of threatened birds in the world has risen sharply. The root cause of population decline is loss of habitat throughout their migratory range. As our human population increases, more and more land is cleared for agriculture, livestock, timber, and development while resources are degraded and consumed faster than nature can replenish them. Many birds, once well adapted to their habitat, cannot survive sudden changes in their environment, they must have adequate time to develop new survival mechanisms and/or skills. Among the birds most affected by changes are:

- top carnivores with relatively small populations that are susceptible to over-harvesting and/or changes in the availability of prey. An example is the bald eagle whose population has been dramatically affected by DDT contamination in prey species such as rodents;

- island species, as well as other geographically isolated species, that are frequently adapted to predator-free or competition-free habitats. An example is the Hawaiian Nene Goose which is federally listed on the islands of Hawaii. Another example is the Golden Checked Warbler. Rapid rates of development in and around this neotropical migrants limited breeding habitat in south Texas has resulted in its listing as an endangered species;
- birds with specialized diets.

The U.S. Fish and Wildlife Service is charged with managing populations of endangered species. The agency carries out this responsibility by maintaining over 500 National Wildlife Refuges which provide safe haven for many endangered species whose habitats have been destroyed or drastically reduced. There are some 50 - 55 species of birds classified under the Migratory Bird Treaty Act listed as endangered. Each of these represents hope for the future - hope that wise conservation practices will produce balance within the natural world once again.

Adaption Artistry

Grades: Primary

Objective: As a result of completing this activity, students will experiment with a three-dimensional medium to represent a natural object and compare the use of line, form, and shape to represent the same object in two-dimensional media (ART), and understand the adaptive advantage of specific morphological characteristics of birds (SCIENCE).

Materials:

- clay or modeling dough
- pipe cleaners
- premixed papier mache material
- tape, markers, crayons, or colored pencils
- white cardboard or stiff white paper
- paints
- scissors

Instructions:

Activity I: Feet are Fantastic

1) Ask students to think of some of the ways birds use their feet. Then discuss different shapes and characteristics of birds' feet and their uses. (In other words, do water birds' feet serve the same purpose as song birds'? Do they look the same?)

2) Distribute pictures of different birds - including their feet - you have collected from birding books etc. to your students

3) Cluster students in working groups and distribute lumps of clay or modeling dough. Tell students they will be making models of a bird's feet from the modeling clay. They may choose to model the feet of a waterfowl or a songbird or any bird whose picture you have distributed to them.

4) When students have completed their clay "feet," have each student draw a picture of his or her bird on a piece of white cardboard or stiff white paper, color it, and cut out the shape. Then have students construct legs by twisting two pipe cleaners together. The pipe cleaners, with the bodies attached, are then pushed down into the clay feet before the clay dries.

5) Have students present their models to the class and then display the models around the room.

Activity II: Feet are Fantastic Dances

1) (Optional) Have individual groups of students develop Feet Are Fantastic dances (independently or in a group). Discuss Native American dances that represent birds. Have student think about how their birds move, based on the feet and anatomy. Ducks waddle; songbirds hop; cranes strut; etc. Have students present their Feet Are Fantastic dances to the class.

Activity III: Bills and Beaks are Beautiful

1) Hold a general discussion of the different types of bills and beaks and how each is necessary for different food preferences and feeding behaviors among birds. Discuss some of the more unique beak and bill shapes, such as those of Roseate spoonbills, Shovelers, Flamingoes, Pelicans, Woodpeckers, and Hummingbirds. Explore with students the reasons for the particular bill or beak shape.

2) Cluster students into working groups and distribute field guides or pictures of different kinds of birds. Tell students they will be working as a group to make papier mache masks depicting one bird.

3) Have groups select the bird for which they will make their mask. Have them outline their selected bird's head on a piece of paper and consider what molding shapes they will need to create their papier mache mask. Will they need a balloon, baseball cap, or other object to provide a mold for the shape of the head or beak?

4) Once each group has developed a reasonable plan for its mask, distribute papier mache materials. Allow groups to construct their papier mache bird head and bill or beak. Several class periods may be required for completing the basic papier mache mold. The papier mache molds will need to dry for a day or two.

5) Once the basic molds are dry, students can finish the papier mache to depict the birds facial features and bill or beak using paints or markers. Have them carefully consider pictures of their selected bird in the field guides.

6) After the papier mache masks are completed, have the groups present their masks, perhaps with one student wearing the mask and several others describing the bird and why they developed their mask as they did.

Activity IV: Bills and Beaks Are Beautiful Skits

1) Have students consider what types of food their bird eats based on its beak or bill shape. Does it "dabble" for underwater plants and other aquatic organisms. Does it feed on berries and seeds, insects while flying, worms from the ground, grubs from under tree bark? Have students develop a dance to represent their bird's feeding behavior based on the shape of its beak.

2) Have students with different bird and beak masks get together and develop a short skit based on the differences of their food preferences and feeding behaviors.

Activity V: Nests are Neat

1) Hold a general discussion about different birds' types of nests. Discuss the difference between ground nesters, tree nesters, and cavity nesters. Discuss the main purposes of nests and ask students why they think certain types of birds have developed different types of nests.

2) Have each student select the type of next he or she would like to build. Have each student consider the materials necessary to build the nest - clay, straw, etc. Have each student make a materials list.

3) Cluster students into working groups and distribute nest building materials -clay, straw, newspaper, yarn, etc. Have students build their nests and present them to the class. (Students may wish to place their "nests" outside to see what they attract!)

4) (Optional) Another way to conduct this activity would be as a basket-making activity. In this approach, students can design and weave baskets that represent birds' nests and discuss the similarities and differences between the baskets and nests.

Evaluation:

Do student's feet models demonstrate a strong facility in the use of the materials of construction. Do students' understand how the food shapes relate to the different ways birds use their feet? Do students' papier mache masks, dances, and skits demonstrate an understanding of how birds' unique food preferences require different bills or beak shapes and structures? Do students' nests demonstrate an understanding of the purposes of nests and the materials birds use to build nests?

Endangered Birds

Grades: Middle

Objectives: As a result of completing this activity, students will create placard costumes and conduct dramatic role-playing to determine the reasons for the endangerment of selected migratory birds (ART), and develop an understanding of the ecological reasons for certain species' endangerment and possible extinction (SCIENCE).

Materials:

- field guides
- pieces of large poster board or poster paper
- magic markers
- cord or yarn
- hole reinforcers (found in office supply stores)
- pictures of extinct birds such as the GREAT AUK, PASSENGER PIGEON, CAROLINA PARAKEET, HEATH HEN, and LABRADOR DUCK (optional)
- list of threatened and endangered birds.

Instructions:

Activity I: Dateline Endangered

1) Discuss concepts of extinction and endangerment referring to bird species that have become extinct such as the GREAT AUK, PASSENGER PIGEON, CAROLINA PARAKEET, HEATH HEN, and LABRADOR DUCK. (Refer also to the discussion on endangerment in Meet the Migrants.)

2) Distribute the list of Endangered Migratory Birds. Tell students they will be creating life-size poster placards of an endangered bird of their choice. Have students identify several of the birds listed as endangered in field guides. Have each student choose an endangered bird and research its basic habitat requirements. Students can get most of the necessary habitat information from field guides.

3) Distribute poster paper, markers, crayons, and other drawing materials and have the students create an enlarged image of their bird to fit the size of the paper. Once students have completed their endangered bird posters, punch holes in the top of the posters and thread the top with a piece of cord or yarn. Reinforce the holes with circular, adhesive reinforcers to avoid tearing.

4) Divide the class into two groups. Tell members of group one that they will be interviewing members of group two. Members of group two will "wear" their endangered bird posters. The job of group one is to

determine why the members of group two have become endangered. Have the students in group one develop a series of interview questions following a line of inquiry, to develop critical-thinking skills. Questions may include, but are not limited to, the following:

a) What bird species are you?

b) What is your habitat like?

c) What are your favorite foods?

d) Where do you spend the winter?

e) Where do you spend the summer?

f) What is happening to your habitat in your breeding grounds?

g) What is happening to your habitat in your wintering grounds?

5) Once members of group one have developed their questions, have them pair up with one of the members of group two and conduct their investigative interviews. Once the interviews are complete, have each member of group one present the results of his or her interview. Presentations by members of group one should adequately address the causes of why the species represented by his partner (from group two) has become threatened or endangered.

6) Now switch and have members of group two interview members of group one.

Activity II: Endangered Species Skits

1) Cluster the students into groups of four or five. Tell the students they will be creating skits based on the information they obtained about why the birds represented on their placards became endangered, what conservation efforts could be conducted to help them, and what may happen if nothing is done. Have them bring their placards with them to the working groups.

2) Have the students in each group present their skits to the rest of the class. The endangered species skits could provide a wonderful presentation for a school-wide International Migratory Bird Day festival.

Evaluation:

Do students' placard/posters effectively illustrate the endangered species they chose? Do the presentations of the results of students' interviews and the group skits reflect an understanding of the concepts of endangerment and extinction and the main reasons why these occur?

Mysteries of migration

In most areas of the country, changing seasons mean birds on the wing. Every fall, millions of birds that have nested in the United States and Canada fly south to wintering grounds in the southern United States, Mexico, Central and South America, and the Caribbean. Each spring, when the weather warms in the Northern Hemisphere, migrating birds leave their wintering grounds and return to the United States and Canada to breed. Watching bird migration in progress is an inspiring and simple way for children to learn about the remarkable rhythms of the natural world. Although much about bird migration remains one of nature's great mysteries, scientists have learned much about the "whys" and "hows" of bird migration. For example, we know that most migrating birds rely on a variety of the following senses and cues.

Photoperiodism, the lengthening and shortening of days in spring and autumn, affects birds' pituitary and pineal glands. These glands generate hormones that stimulate birds to become increasingly restless. Daytime migratory birds use vision to steer by the sun, aided by a precise sense of time. Night fliers take compass cues from star patterns. While in flight, birds may use geographic land forms to help them orient direction and course. The outline of North American coasts, and the north-south direction of many large rivers and mountain chains, aid in migration. Homing pigeons and some migratory birds see ultraviolet and polarized light to assist their migration.

Many scientists believe that migratory birds tune in to the earth's magnetic field in combination with gravity for direction. Birds usually wait to migrate until the passage of weather fronts. They make use of the favorable winds that follow storms to aid their flights. Most long-distance migrants have a highly developed respiratory system, hollow bones, internal air sacs, and specialized body shapes. Birds' pectoral chest muscles, which power their wings, are much larger and better developed in relation to overall size than are any similar muscles in mammals. Before migration, most species build up layers of fat. All of these features enable migrating birds to fly high, fast, and for long periods of time.

The destination to which birds migrate is generally determined by the presence of food, water, and shelter. The term migratory route indicates the general direction of flight that is annually followed by migrating birds on their journeys between wintering and breeding grounds. Migratory routes do not refer to exact, specific routes. Rather, birds tend to follow general north-south pathways between major habitats and avoid crossing obstacles such as mountain ranges.

Migratory birds and waterfowl cross international boundaries on their biannual migration to and from breeding grounds in Canada and the United States and wintering grounds in Mexico, Central and South America, and the Caribbean. As such, international approaches to conservation must be implemented to maintain populations of migratory birds. The U.S. Fish and Wildlife Service Office of International Affairs works in these countries to protect critical habitat, particularly wetlands, and to train wildlife managers in state-of-the-art wildlife and habitat conservation techniques. The U.S. Fish and Wildlife Service is also the lead agency in negotiating and enforcing international agreements and laws regulating the import and export of migratory birds and other wildlife.

In addition, the U. S. Fish and Wildlife Service carries out a variety of research and monitoring projects that help track bird migration, including bird banding, radio telemetry, and satellite imaging projects. These projects provide valuable information for conservation and management of migratory waterfowl, shorebirds, songbirds, and raptors. Activities in this section will:

- introduce students to the concept of migration;
- expose students to the four major flyways;
- increase students understanding of the resources that aid, and the hazards that pose threats to, bird migration.

Migratory Bird Collages

Grades: Primary

Objectives: As a result of completing this activity, students will be able to use color, shape, line, and texture to create a collage that communicates the concept of migration (ART), and demonstrate an understanding of the benefits that aid, plus the obstacles that hinder bird migration (SCIENCE).

Materials:

- paper or poster board
- old magazines
- map of North and Central America
- pencil, pens, markers, crayons, glue.

Instructions:

1) Tell students they will be making two collages. The first will represent all the items students would need to take a long trip. The second will represent all the items birds need to migrate.

2) Discuss with students all that they know about bird migration. How do they think a bird travels such a long distance without stopping? Discuss cues for migration, as outlined in the section overview, "Mysteries of Migration." Now create a list of all the items students think they would need to go on a road trip traveling a similar distance as the birds - such as a car, gasoline, rest stops, suitcases, etc.

3) Have students select a specific species for their collage. They may choose their adopted waterfowl or another species of their choice.

4) As homework, have students research their selected bird's migratory route and ask students to bring in old magazines from home.

5) Cluster students into groups so that they can share magazines. Distribute two copies of the Western Hemisphere map for each student. Have students trace the migratory route of their selected bird on one map. Have them trace the route of an imaginary vacation car trip on a second copy. Students will make collages of all the items their selected species needs to "migrate" on the first map. They will make a representation of all the things they need to migrate on the second map. Students may wish to add free hand drawings to fill out their collages.

6) Have several students present their migratory collages to the class and display collages around the room.

Evaluation:

Do the collages communicate an understanding of birds' requirements for migration? Can students articulate similarities and differences between a bird's migration and a long car trip?

I'll Fly Away

Grades: Primary, Middle

Objectives: As a result of completing this activity, students will develop ability in the use of symbols and drawings to tell a factual story (ART), and increase their understanding of the North American flyway (SCIENCE).

Materials:

- butcher paper
- magic markers
- crayons
- poster board
- poster paints
- crepe paper streamers (four colors)
- field guides
- map of North American flyways
- map of the National Wildlife Refuge System

Instructions:

Activity I: I'll Fly Away Murals (Primary)

1) Prepare for this activity by covering one wall or area of the classroom with white mural paper and drawing a large representative map of North America on the paper.

2) Divide the class into four (or eight) groups of no more than four or five students each. Assign one of the flyways to each of the four (or eight) groups - Atlantic, Mississippi, Central, and Pacific. Explain that flyways generally follow major coastlines, river systems, and mountain chains. Have the groups refer to the flyway maps to identify where each of the flyways originates and ends.

3) Distribute crepe paper and have groups attach crepe paper streamers to the wall mural map to represent the flyways from beginning to end. For example, the Pacific flyway originates in Alaska and extends roughly southward along the Pacific coast into northwestern Mexico.

4) Now have students embellish their flyway murals by using paints to add other geographic, physical, and living features they might find along their flyways. Examples include mountain chains, rivers, major cities, lakes state boundaries, etc.

Activity II: North American Flyways and the National Wildlife Refuge System (Middle)

1) Distribute maps of the National Wildlife Refuge System. Explain to students that the National Wildlife Refuge System now includes more than 500 refuges. Most refuges are aligned more or less along major flyways. This is because many refuges were originally created to provide safe habitat for migrating waterfowl. Waterfowl require habitat throughout their flyways and National Wildlife Refuges represent "links in a habitat-chain.

2) Have students identify five to ten refuges located on their designated flyway. Have them identify the approximate locations of these refuges on the way flyway murals. Now have them either write the names of the refuges, or paint representative images of the refuges at the approximate locations on the flyway mural maps.

3) Distribute field guides. Have students select one waterfowl that migrates on their flyway. Distribute 8 ½ " by 11" sheets of paper. Have them paint images of their birds and cut silhouettes of the birds from the paper. Now have students adhere their waterfowl on their flyways.

Evaluation:

Do students' flyway mural maps in Activity I exhibit an understanding of the North American flyways? Do students flyway murals in Activity II represent an understanding of the relationship between the location of National Wildlife Refuges and the North American flyways?

Waterfowl Anatomy

Grades: Middle, Secondary

Objectives: As a result of completing this activity, students will create line drawings to represent the external anatomy of a bird (ART), and demonstrate an understanding of bird anatomy (SCIENCE).

Materials:

- waterfowl anatomy worksheets
- reference such as an encyclopedia or biology book
- field guides
- pencils
- paper
- modeling clay
- papier mache

Instructions:

1) Hold a general discussion on the essential aspects of bird physiology. What anatomical features allow birds to fly, many for long distances, during migration? What features allow ducks to float, swim, and stay warm in cold water? Do students know which species represents the largest bird and which represents the smallest bird?

2) Distribute waterfowl anatomy worksheets. Review the terms used to identify various parts of a bird's external anatomy. Pay particular attention to the specific features that enable waterfowl to fly and swim including hollow bones, strong pectoral muscles, and webbed feet. Review anatomical terms with students.

3) You may wish to provide a blank copy of the waterfowl anatomy diagram and have students identify anatomical features on the blank diagram to enforce learning.

4) Cluster the class into groups of four students each, and distribute reference materials and field guides. Ask members of each group to select either a duck, swan, or goose.

5) Tell students they will each be making an anatomical sketch of their bird. Ask students to identify the species they selected in a field guide.

6) Students will begin by making a simple line drawing of the species they selected and by identifying its anatomical features.

7) Students should make their illustrations detailed enough to highlight as many anatomical features as possible. Have several students present their illustrations to the class. Display illustrations around the room.

8) (Optional) Obtain a slide show, or compile individual species slides of various migratory birds. Show a series of slides of waterfowl, shorebirds, raptors, and songbirds, pausing long enough at each slide for students to develop a quick line sketch noting the species' particular anatomical features. After you have finished showing the slides, have students identify the specific anatomical features they have sketched.

Activity II: Anatomy Sculptures

1) Have students make papier mache or clay sculptures of the birds they sketched. Once the basic structure is in place, have students paint their sculptures to highlight as many anatomical features as possible.

Evaluation:

Do student drawings reflect an understanding of the external anatomy of their selected species? Do students' sculptures represent an ability to manipulate the materials (clay, papier mache, other materials) in order to develop a three dimensional form of their bird's anatomy?

Habitat is Where It's At

Every species of bird, fish, insect, reptile, amphibian, and mammal has basic needs for food, water, shelter and space. These components make up an animal's *habitat.* While animals have different needs and thus different habitat requirements, migratory birds require a wide variety of habitat types. Waterfowl are dependent on wetlands, which are among the most productive ecosystems on earth and home to more endangered species than any other type of habitat. Wetlands also support shorebirds, wading and marsh birds, and songbirds. It is not surprising that wetlands-dependent birds have experienced significant declines. The United States has lost more than one-half of the wetlands that existed prior to European settlement. Today, fewer than 93 million acres remain, and wetlands continue to decline by about 200,000 acres each year.

Migratory songbirds, including warblers, vireos, finches, flycatchers, thrushes, swifts, tanagers, and orioles, require intact forests and grasslands throughout their migratory range. Vast woodlands once covered much of eastern North America from the boreal forest of Canada to the pine forests of the southeastern United States. In the more arid west, the Rocky Mountains are forested too. Since the time of European settlement, approximately 90 percent of the original forest cover in the contiguous United States has been logged or lost to urban and agricultural development.

Migratory birds require adequate habitat in their wintering grounds in Mexico, Central and South America, and the Caribbean. Tropical forests and wetlands of the Western Hemisphere are home to several thousands of bird species both resident (remaining in the tropics all year) and migratory. Tropical forests worldwide continue to be eliminated at the rate of nearly 50 acres per minute.

As a group, grassland-dependent migratory bird species have shown steeper, more consistent, and more geographically widespread declines than have any other group of birds. Songbirds, shorebirds (e.g. the long-billed curlew and the upland sandpiper), and many raptors are among the migratory birds dependent on grassland habitats. Since 1830, tall grass prairie has been reduced by more than 95 percent because of destruction of native prairie for agriculture, grazing, and development.

The National Wildlife Refuge System encompasses a broad array of the habitats required by migratory birds. Managed by the U.S. Fish and Wildlife Service, the National Wildlife Refuge System includes over 500 refuges, which range in size from just a few acres to millions of acres. Many refuges are dominated by wetlands, but all other habitats are represented, including coastlines, forest, grassland,

deserts, and even arctic tundra. Each refuge is entirely unique, yet all have one characteristic in common - a goal to conserve wildlife and their habitats for people.

The National Wildlife Refuge System provides a means to protect a remnant of what America was once like, where you, your students and their families can witness squadrons of Canada geese, snow geese, black ducks, canvasback ducks, mallards and many other species of waterfowl in precision flight on their way from Canada and the northern United States to warmer climates. Through the Junior Duck Stamp Program and other contributions, you and your students can be a part of the continued growth and development of the National Wildlife Refuge System.

As a result of completing the activities in this section, students will:

- become aware of the basic components of habitat required by all animals - food, shelter, water;
- understand the different habitat types required by migratory birds;
- understand the balance of ecosystems and that all components of the ecosystem are required to maintain habitat health;
- become aware of the important role played by National Wildlife Refuges in maintaining populations of migratory birds.

Wonderful Habitats for Wacky Birds

Grades: Primary, Middle

Objectives: As a result of completing this activity, students will use art production skills and employ principles of three-dimensional shape, color, and texture to create imaginary habitats and birds (ART), and gain an increased understanding of the relationship of species' adaptations to habitat conditions (SCIENCE).

Materials:

- paper
- drawing materials - colored pencils, markers, paints
- arts and crafts materials - pipe cleaners, modeling clay, toilet paper tube, construction paper, etc.
- field guides (optional)

Instructions:

Activity I: Wacky Birds

1) Define and discuss adaptation as it relates to the evolution of a bird's anatomy and behavior. Have students brainstorm about some "adaptations" they may have developed to "survive" in their own habitats (homes). Have students consider both the "physical" and "behavioral" adaptations that birds have developed to survive in their habitats. These may include hollow bones for light weight in flying; fast growing fledglings that can fend for themselves early on and will be big and strong enough to migrate in the fall; camouflage coloring of young to hide from predators; air sacs in their bones to help them float (they pump air out when they dive). Have students list all the adaptations they can think of that their adopted waterfowl specie has evolved to survive in its habitat. You may wish to have them record this list in their Waterfowl Journals.

2) Tell students they will each have a chance to design and create a "Wacky Bird" - one well adapted to its habitat. Have students consider the various adaptations they will want to include in their wacky-bird creations by completing the chart below before they get started.

Wacky Bird Planning Chart:

size	dominant colors	favorite foods
habitat preferences	nesting materials	features that protect from predators e.g. camouflage

3) Cluster students into small groups and distribute crafts materials, including toilet paper tubes, pipe cleaners, modeling clay, paper, colored pencils, crayons, etc. Have students develop craft sculptures of their Wacky Bird using their adaptations charts as a reference.

4) (Optional) You may wish to have students write short narrative descriptions of their Wacky Birds to more fully describe their Wacky Birds adaptations, habitat, and food preferences, etc.

5) Have students present their birds to the class, paying particular attention to what they wrote in the habitat preferences section of their Wacky Bird planning chart. Once all the students have presented their Wacky Birds, hold a general discussion about the ways in which real birds have developed specific physical and behavioral adaptations to survive in their environment and particular habitat.

Activity II: Wonderful Habitats

1) Students should now fully understand, and be able to articulate, how their Wacky Bird is adapted to a particular type of habitat and how this habitat supports the Wacky Bird. Tell students they will be creating a wonderful habitat for their Wacky Bird. You may wish to have students develop their wonderful habitats as a large mural-type illustration, a diorama, or in another format. Tell students that their wonderful habitats must be developed to support their Wacky Bird's adaptive characteristics. Have students consider the habitat components required by all birds before getting started. What specific characteristics will students incorporate for each of these habitat components to support their Wacky Bird? What **food; shelter; water; space?**

2) Have students create wonderful habitats incorporating these habitat requirements.

3) (Optional) Have students take their Wacky Birds to "visit" the wonderful habitats developed by their classmates. Have students consider whether or not their Wacky Bird could survive in any of the other habitats based on its particular habitat needs. Have the entire class evaluate all of the wonderful habitats and determine if any one wonderful habitat could support a variety of the Wacky Birds.

Evaluation:

Do students' Wacky Birds demonstrate principles of composition: balance, repetition and variation? Do students' Wacky Birds' wonderful habitats demonstrate general facility with the use of the elements of art: line; color; flat shape three-dimensional form; and texture? Do students" Wacky Birds demonstrate a basic understanding of adaptations?

Bird and Habitat Balance Mobiles

Grades: Primary, Middle

Objectives: After completing this activity, students will be able to manipulate form and shape to construct two mobiles, the first representing contour and symmetry of birds in flight and the second illustrating the need to balance basic components in an ecosystem (ART), and identify birds based on silhouette shape as well as understand the concept of the health of an ecosystem is based on the balance of its various components (SCIENCE).

Materials:

- slides, photographs, decoys, and/or field guides
- black construction paper
- scissors
- glue
- straight wire or short straight sticks, 5-10" long
- fishing line
- white poster board or foam core board
- card stock paper

Instructions:

Activity I: Bird Silhouette Mobile (Primary)

1) Hold a general discussion with students about mobiles - moving works of art that are created by suspending and balancing shapes. The first mobile was created by an American artist, Alexander Calder, who experimented with combinations of shapes and weights balancing each other. Calder also discovered that the suspended objects move in a rotating fashion due to air currents. Explain that most birds can be identified by a general silhouette shape. Creating silhouettes can be helpful in learning to identify birds.

2) Divide the class into groups of five or six students. Distribute field guides and the "Lists of Commonly Seen Migratory Birds." Have each student select a species with a distinctive silhouette while in flight or in a stationary position. Encourage *each student in each group* to select a bird from each of the four species groups - waterfowl, raptors, shorebirds, and songbirds.

3) Have students sketch silhouettes of their birds on black construction paper paying attention to the overall dimensions and shapes of the body, head, neck, and the feet of the birds. Encourage students to

add outline details of wing and tail feathers.

4) Have students cut out silhouettes and mount them on a square or circle of white poster board or foam core (a single circle or square could display two silhouettes depicting one side of the bird in flight, and one side depicting the bird in a perched position.)

5) Have students make a small hole in the top of the square or circle, attach fishing line for hanging, and attach the silhouettes to the horizontal wires. Have them begin with the shorter lengths of wire at the bottom of the mobile and progress to the longer lengths at the top. Balance each section as it is assembled. Each wire can contain a single object at both ends, or a single object on one end balanced with a shorter balanced wire (containing two objects) on the other end.

6) When mobiles are completed, have students hang them where they can catch air currents.

Activity II: Habitat Balance Mobile (Middle)

1) Review birds' habitat requirements for food, shelter, water, and cover (see Habitat is Where It's At section overview). Can students describe the habitat needs of the birds they selected for their bird silhouette mobiles?

2) Tell students they will be creating a physically well-balanced mobile to depict the specific habitat of one bird represented in the bird silhouette mobile.

3) Cluster students into groups and have *each group select one bird.* Have the groups create lists of all the things the bird needs to survive in its habitat including its specific requirements for food, water, shelter, and cover. Groups' lists may vary greatly from one another depending on the bird selected by the group. Waterfowl will require marsh grass, water, and a wide variety of food substances, including phytoplankton, aquatic plants, small fish (every specie of ducks has different food requirements), while songbirds will require trees, worms, insects, berries, grubs, etc. (every songbird has different food requirements.)

4) Distribute old magazines, pens, crayons, magic markers, or other drawing materials. Have each group clip pictures from the magazines or create new pictures to represent the varied items birds need to survive.

5) Once groups have created, or gathered representative images, of all the things their bird need to survive, have them adhere pictures to poster board and cut out poster board shapes. Now have students follow the procedure outlined in Activity I, steps 4 and 5, to construct their second mobile.

6) Explain that the most important aspect of the habitat mobile is that it is well-balanced, just as healthy ecosystems must be well-balanced. Ask students to describe what they think will happen if one element of the mobile is removed. Ask them to describe verbally how balance or imbalance of their habitat mobile relates to the health of ecosystems.

Evaluation:

Did students' bird silhouette mobiles reflect mastery of elements of contour, shape, and symmetry? Did the habitat mobile represent an understanding of balance as it relates to healthy ecosystems?

Continuing the Conservation Journey

Migratory waterfowl and other migratory birds have often been likened to "canaries in the mine shaft." In this familiar metaphor, miners sent canaries into the mine shaft to help provide an indicator of the depth at which sufficient oxygen was present for the miners to work. Similarly, migratory birds are key indicators of biological diversity and shifts in bird populations reflect overall changes in the health of the ecosystems on which they depend. Migratory waterfowl, raptors, shorebirds, and songbirds require healthy ecosystems throughout their migratory range in the Western Hemisphere. Protecting these species requires conservation efforts at all levels - local, state, regional, national, and international.

Fortunately, much can be done to help protect migratory waterfowl and other migratory birds. Many things can be done by teachers and students working together in school or outreach educational settings. First and foremost, we encourage you to participate in the Junior Duck Stamp Conservation and Design contest by entering your class in your state contest. Second, make use of the Junior Duck stamp curriculum as a means to link up with other conservation outreach programs such as International Migratory Bird Day, National Wildlife Refuge Week, National Wetlands Week, and other. Third, use the materials as a springboard to a number of other "action-based" conservation education activities, such as schoolyard habitat restoration and nest-box building projects. Finally, encourage students to extend their understanding of migratory birds and to become even more active conservation stewards by conducting any one or a number of the following Conservation, Imagination and Stamp Activities described in this section.

Conservation, Imagination and Stamp Activities to Continue the Journey

International Migratory Bird Day (IMBD). IMBD is celebrated annually on the second Saturday in May to coincide with the return of migratory birds to their breeding grounds and raise awareness of the need for conservation of their habitats. Many teachers make use of IMBD as an opportunity to display artwork and other products that students have produced through their participation in the Junior Duck Stamp curriculum. IMBD can serve as a wonderful culminating event for your Junior Duck Stamp unit, and you may wish to integrate an IMBD school festival into your Junior Duck Stamp Program. To learn more about IMBD events and programs, obtain the IMBD Organizers' Packet and IMBD Educators' Supplement.

National Fishing Week. National Fishing Week is geared toward raising awareness of the importance of fisheries, watersheds, and wetlands. It is a multi-agency event in which the U.S. Fish and Wildlife Service is a main partner. National Fishing Week is celebrated annually the first week of June. Although National Fishing Week occurs right at the end of the school year, you may wish to integrate observation of National Fishing Week with one of the wetlands-focused activities in the Junior Duck Stamp curriculum.

National Wildlife Refuge Week (NWRW). National Wildlife Refuge Week is celebrated annually the second week in October. The goals of NWRW are to raise awareness of the rich diversity of wildlife and habitats included in the National Wildlife Refuges and the importance of conserving refuges. National Wildlife Refuges serve as wonderful outdoor, living laboratories and most have excellent interpretation and education programs geared to students. Most refuges celebrate NWRW during which education and outreach activities are enhanced. Observing National Wildlife Refuge Week by highlighting the importance of refuges to migratory waterfowl and other migratory birds could be an excellent extension activity to include in your Junior Duck Stamp curriculum. See the National Wildlife Refuge Map to identify the refuge closest to you.

Design a Schoolyard Wetlands or Other Habitat. Waterfowl and other migratory birds benefit from even the smallest areas of restored habitat. Ask students to consider the ways in which your schoolyard or backyard could be enhanced for waterfowl (or other wildlife) including possible needs for additional water sources, food, and cover. Then have them employ elements of design to create a schematic layout of an enhanced habitat at the chosen site. First have them create an illustrated map of what your school yard currently looks like. Then have them consider all the ways they could improve your school yard's

"habitat"and create a second map which portrays a more ideal habitat for waterfowl or other migratory birds. This could be considered an exercise in "landscape design" in which students integrate the beneficial habitat components, such as water sources, feeding stations, areas of cover, etc., into a map of your existing school site. Restoring an area of your school yard to provide habitat for birds can also provide an excellent outdoor classroom. This project could be expanded to include cross-curricular teaching activities for your school

Develop a Nest Box, Bird House, and/or Bird Feeding Station Project. Some bird species are cavity nesters, requiring holes in dead trees in which to nest. These species, including wood ducks and blue birds, have benefitted from the availability of next boxes. Others, such as house wrens and purple martins benefit from bird houses. Most (but not all) birds benefit from feeding stations. Have students research appropriate designs and build a nest box, bird house, or bird feeding station. This could be conducted in conjunction with a vocational education program. You may also wish to conduct a contest in which students compete to create award-winning nest box, bird house, or feeder designs. Local chapters of the American Institute for Architects have been known to help judge such contests. Audubon Societies may help with this project.

Bird Buttons. Buttons are popular with both children and adults. Teach students about migratory birds by having them select a particular bird species from which they will design and make a button. Provide students with a precut circle of card stock on which they will create an illustration of their species. They may wish to include the bird's common and scientific name and any other information they want to communicate about the bird. When students have completed their illustrations, have the card stack laminated and attach a pin to it with glue. Students may wish to make a collection of bird buttons and/or trade them with other students. As a class you could provide a set of bird buttons as a gift to a classroom in another state or country. Bird bookmarks could be made using the same basic procedure with rectangular bookmark shaped card stock.

Cartoons and Bumper Stickers - Communicating with Humor. Humor may be one of the best ways to communicate information about important topics. Bumper stickers and cartoons are two means by which popular media makes use of humor to communicate messages. Have students consider all that they have learned about waterfowl and other migratory birds and the need for conservation of their habitat. Have them write quick, short messages they would want to communicate about these issues. Then have students design either a cartoon or a graphically illustrated bumper sticker that communicates these messages. You may wish to exhibit students cartoons in a visible location in your school many print

shops are now able to produce bumper stickers at a low cost.

Alice in Waterland. Explore different bodies of water, and try to identify various aquatic wildlife present in each one. Have students make simple "water scopes" using the following techniques:

- using a can opener, remove both ends of a juice can;
- carefully tape the sharp edges so you don't cut yourself;
- stretch a piece of clear plastic wrap tightly over one end of the can, overlapping on all sides;
- put an elastic band around the end of the can so the plastic wrap is held tightly in place;
- trim edges of the plastic to make them even and then tape them down with waterproof tape;
- test your water scope in a basin of water;
- lower plastic wrap end into the water making sure the open end never goes below the water.

Now visit a nearby pond or marsh, look through the open end of the scope and see for yourself what lurks below the watery surface.

Banquet for Birds. Have students research the food preferences of a variety of birds that breed in your area. Provide the basic ingredients, such as millet, sunflower seed, corn, etc., and swatches of remnant cloth. Instruct students to make up sample seed satchels by creating the appropriate seed mix. Then have them pour just enough onto a piece of cloth. Gather the cloth up at the edges and tie a piece of yarn around the top. Last, have students prepare small gift cards indicating for what species the seed mix is appropriate and the basic ingredients of the seed mix. The satchels can then be given as gifts to parents, other classes, or senior centers, used at boys and girls clubs, or provided for holiday benefit sales.

Plaster Casts. Plaster casts are a great way for students to get "up close and personal" with animal tracks. Have students practice with plaster casting technique by developing a cast of a leaf. Have them press a leaf into a thin slab of damp plaster in a cardboard box. Make a good impression then remove the leaf. Poke a hanging hole in the top with a pencil. Now visit a local natural area and search for tracks of birds or other animals. Make casts using basic casting techniques as directed on bags of Plaster of Paris.

Bird Origami. Birds are found throughout Japanese art including origami, the ancient Japanese art form of paper folding. Obtain an origami design book and copy several of the origami designs of birds for students to try. Have students make their origami birds in many different colors of origami paper. When students have completed their birds, you may wish to make an origami mobile following the mobile construction technique outlined in Bird and Habitat Mobile.

Edible Birds. Have students select a bird that has become a favorite through their work in the Junior Duck Stamp Program. Have them create a stencil of this bird by making the cutting out a line drawing on card board. Make rolled dough cookie batter such as sugar cookies or short bread. Have students cut out shapes of their bird by pressing their stencils into the dough and cutting around the stencil with a dinner knife. Cook cookies; have students present their "cookie birds" stating one piece of information about its natural history, and enjoy a class bird cookie feed.

Bird Stained Glass. Stained glass is a wonderful way to convey concepts of color, intensity, and hue. Have students identify a bird for which they would like to make a stained glass construction. Have them identify colorful birds that would lend themselves to stained glass. Work with a vocational education program or shop class to produce the stained glass.

Crazy Critters. Tell students they will be making a three-part bird. Have them fold a piece of paper into three equal sections. The first student will draw a picture of a bird's head on the first section making sure that the bird's neck extends to the second section. The second student draws a body without looking at the head. The third student draws the bird's legs and feet without looking at the other sections. Have students unfold their drawings and give their Crazy Critter a name.

Notable Quotables. Have students create drawings from any one of the following quotations and topics. "Duck soup," "You're a dead duck," Sitting duck," "Tempus fugit," (time flies), "That's just ducky," "Walks like a duck," "Sounds like a duck," "Lame duck administration," What's good for the goose is good for the gander," "You've cooked your goose," "Wild goose chase," "Graceful as a swan," "A little bird told me," "Egg Head," "Which came first the chicken or the egg?" " She's an old crow," "He's batty," "A quack doctor," "He's an odd duck." "Feather in your cap," "Feather your nest," "Nesting instincts," "Feather weight," "Get your ducks in a row."

Totem Poles. Have students draw small one-to-two inch square images of bird species that have become their favorites during the Junior Duck Stamp Program. Then have them glue them to a tube taken from the inside of a paper towel roll. Add feathers and geometric Native American designs to the pole.

Flying Machines. Have students list all the things they can think of that fly. Airplanes, bats, birds, kites, hot air balloons, gliders, helicopters, hand gliders, baseballs, and butterflies are a start. Have students create a mural with images of these flying machines. Then discuss the similarities in shape and design that helps keep them aloft.

Bird Headdresses. Have students research the headdresses and helmets in art books on pre-Columbian Mayan and Aztec, American Indian, Egyptian, Greek, Roman, African, Eskimo, medieval, and contemporary helmets. Have them select a bird species they would like to represent and design an original headdress for themselves. Contact a local costume or performing arts store for artificial feathers. Use this as an opportunity to discuss the marketing of feathers from water birds to supply the millinery trade in the early part of the twentieth century. Waterbird populations plummeted as a result of the huge demand for plumes resulting in the establishment of the first National Wildlife Refuge and National Audubon Society.

Stamps and Stamp Collecting. Stamps and stamp collecting represent an interesting and rich tradition in the United States. Make sure students understand the distinction between Federal Duck Stamps, regular postage stamps, and commemorative stamps. Federal Duck Stamps must be purchased by hunters to accompany their state hunting licenses. They are revenue stamps, not postage stamps. Proceeds from Federal Duck Stamp sales are used to purchase wetlands. Duck stamps are printed on a one time only basis and not reprinted after the first run is sold out. All unsold stamps are destroyed after three years. These represent some of the more novel designs among the stamp collecting world. You may want to show students a series of Federal Duck Stamps and winning Junior Duck Stamps from years past. (Available on the Federal Duck Stamp home page at www.fws.gov/r9dso/.)

Neighbors, friends, and relatives are a good source for stamps. Office mail may be even better. Tell students to be very careful when handling stamps. Most collectors go to great pains to protect stamps from greasy fingers, food and drink spills, and fading from direct sunlight.

Stamp Design Mural. Cover a table with white butcher paper and outline several stamps (perforations only) with black marker. Have students select waterfowl species and draw waterfowl stamp designs directly on the paper. The finished paper can be used for a mural on the wall.

Glossary

adaptation - a trait that improves a plant's or animal's ability to live in a particular environment.

avian - of, or relating, to birds.

bird banding - research technique in which a small aluminum band is attached to a bird's leg. If the bird is captured again or found dead, and if the band number is reported to the responsible federal agency, the bander and other researchers can learn about avian movements and longevity.

breeding grounds - environment where an animal mates and produces offspring.

brood - the birds that hatch from a single clutch of eggs.

camouflage - a genetically controlled pattern or markings that protects an individual organism.

carnivore - a flesh eating animal, or any of an order of mammals, that feeds mostly on animal flesh.

clutch - the number of eggs laid by a female bird in one nesting.

conservation - the use of natural resources in such a way that ensures their continuing availability.

culture - the arts, beliefs, and traditions of a particular population of a region or country.

docent - teacher, or lecturer, often at a museum.

ecology - the science of the relationships between living organisms and their environments.

ecosystem - all living and nonliving things within an area that are all linked together by energy and nutrient flow.

endangered species - a species which is in danger of extinction throughout all or a significant portion of its range.

environment - conditions in an area influenced by the climate, soil, topography, and living components in an area.

estuary - an arm of the sea at the mouth of a river.

extinction - no longer existing.

fat loading - build up of fat reserves by a bird before migration.

fledgling - a young bird that has recently left the nest, has feathers, and still depends on its parent for food.

flyways - general routes of travel used by birds when migrating between breeding and wintering grounds. Four major flyways are Atlantic, Mississippi, Central, and Pacific.

forage - to search for food.

fragmentation - division of large continuous tracts of habitat into smaller areas.

geography - study of the earth and its features and of the distribution of life on the earth.

habitat - the place where an animal makes its home and meets all its needs for survival. Components of an habitat are food, water, shelter, and space.

instinct - a natural impulse or motivation arising from within.

inventory - a detailed list of items or the process of making a list of items.

marsh - a tract of soft, wet land.

migration - movement of a species from one place to another, often following a change of season.

molt - the shedding of feathers by a bird.

navigate - to follow or plan a course across or through to a destination.

neotropical - the area of the Americas which lies between the Tropics of Cancer and Capricorn.

neotropical migratory bird - a bird that moves seasonally between temperate or mild climate regions of North America (where it nests), and warm tropical areas of Mexico, the Caribbean and other parts of Latin America (where it waits out the northern winter months.)

nonbreeding grounds - environment where an animal spends the winter, also referred to as the wintering grounds.

orientation - location or position relative to the points of a compass.

ornithologist - one who engages in the scientific study of birds.

Photoperiodism - seasonal response by organisms to change in length of the daylight period.

population - group of individuals of a particular species in a given area.

prairie - a broad tract of level or rolling grassland.

predator - an animal that kills and eats other animals.

preening - to dress or smooth up; to trim or dress with the beak.

preservation - maintenance of a natural environment undisturbed by the influence or activities of humans.

prey - an animal that is killed and eaten by other animals.

range - land upon which animals live.

raptor - a bird of prey, such as an hawk or owl.

resident bird - a bird that does not migrate, but makes its home in the same place and climate all year.

riparian - bordering water; at the water's edge; the water influence zone. "Riparian area or Riparian Zone" refers to the vegetation that grows on or near the banks of streams, rivers, lakes, and other bodies of water.

shelter - provides protection or cover from the weather.

shore bird - a bird that frequents coastal or inland shores.

shrub land - land covered by shrubs, or woody plants that are usually relatively short, and differ from trees by having several stems instead of a single trunk.

species - a population of individuals that are more or less alike and are able to breed and produce fertile offspring under natural conditions.

swamp- wet, spongy land.

temperate - area of the earth that lies between the tropical and polar regions and has a mild climate.

topography - physical features of a place or region.

vegetation - mass of plants that covers a given area.

waterfowl - a swimming bird ,such as a duck, goose, or swan, usually frequenting freshwater areas. Swimming game birds as a group.

wetlands - land frequently covered by water.

wildlife - animals in their natural environments. Wild animals and vegetation, especially animals living in their natural undomesticated state.

woodland - land covered by trees; refers to a more open arrangement than a forest.

Federal Junior Duck Stamp Conservation and Design Program Resource List

Web Sites and Internet Connections

U.S. Fish and Wildlife Service - (http://www.fws.gov). Visit the U.S. Fish and Wildlife Service's World Wide Web site in order to view the Home Pages of any of the following Service divisions:

- Federal Duck Stamp Office and Federal Junior Duck Stamp Home Pages
- Office of Migratory Bird Management Home Page
- Division of Refuges Home Page
- North American Waterfowl Management Plan Home Page.

Partners in Flight
(http://www.pwrc.nbs.gov/pif) Provides interagency clearing house for migratory bird programs.

Waterfowl Identification in the Central Flyway
(http://www.npsc.nbs.gov/resource/tools/waterfwl/waterflw.htm) Aids sportsmen in waterfowl identification

Ducks at a Distance
(http://www.usgs.gov) Go to Northern Prairie Biological Resources under waterfowl.

Western Hemisphere Shorebird Reserve Network
(http://www.npsc.nbs.gov/resource/tools/birdhouse/birdhouse.htm) Provides information on shorebird reserve sites, handbook, events, and image gallery.

Journey North
(http://www.learner.org/k12) Provides on-line studies in the phenomenon of migration and allows students to track actual migration of various species, including migratory birds, using current data provided by practicing scientists. May have to go through "search" to get to Journey North on site.

Project Wild
(http://eelink.umich.edu/wild/) Includes general information and lesson plans from this interdisciplinary, environmental education program. Also provides information on educator training in every state.

National Fish and Wildlife Foundation
(http://www.NFWF.org) Offers information about existing programs including the Neotropical migratory bird program and International Migratory Bird Day.

Ducks Unlimited
(http://www.ducks.org) Provides information on existing program and useful information gleaned from Ducks Unlimited bi-monthly magazine.

National Audubon Society
(http://www.audubon.org) Web site emphasizes Audubon's programs that rely on contributions from volunteers including students.

Cornell Laboratory of Ornithology
(http://www.ornigh.cornell. Edu/) General information on laboratory's programs.

VIDEOS

"Status of Waterfowl" U.S. Fish & Wildlife Service, Office of Public Affairs, 1849 C Street, NW, Washington, DC 20240.

"Know Your Waterfowl - the Swans, Geese, and Ducks of North America," AXIA.

"Ducks Under Siege," "Messages From the Birds," "Crane River," and "Desperately Seeking Sanctuary," Audubon Productions, National Audubon Society, 700 Broadway, New York, NY 10003.

"Never a Silent Spring: Neotropical Migratory Bird Conservation," U.S. Fish and Wildlife Service Office of Public Affairs, 1875 Century Blvd, Atlanta, GA 30345.

"Home for Pearl," video which accompanies Home for Pearl instructional guide, U.S. Fish and Wildlife Service, Publications, Unit, Rt. 1, Box 166 Shepherdstown, WV 25443.

"Out of the Blue," U.S. Fish and Wildlife Service, Region 2, P.O. Box 1306, Albuquerque, NM.

"Strictly for the Birds," Oxford Science Films, Survival Series, New York, NY
"Wonders on the Wing," video which accompanies Wonders on the Wing instructional guide, Colorado Division of Wildlife, 6060 Broadway, Denver, CO 80216.

"Singing in the Rainforest," "For the Birds - Comeback of the Peregrine Falcon," "Birders of a Feather; Birders Moving from Canada to Costa Rica," "Night Moves - the Migration of Burrowing Owls," Missing Links Productions Inc. #400, 119 14th Street, NW, Calgary, Alberta, Canada T2N 1Z6.

"The Loons of Golden Pond," the Company for Home Video Entertainment, 414 College Ave. P.O. Box 577, Woodstock, VT 05091.

"The Video Guide to Stamp Collecting," Premiere Home Video, 6824 Melrose Avenue, Hollywood, CA 90036.

The films listed below are available on a free loan basis from the Philatelic Marketing Division, United States Postal Service, Washington, DC 20256-9994 and Audience Planners, Inc. 5107 Douglas Fir Road, Calabasas, CA 91302-1472.

"America the Beautiful," relates recent stamp design to the natural beauty and scenic wonders of America.

"Images of America," depicts a history of commemorative stamps, explains the selection procedure for stamp subjects, and conveys the spirit of an artist preparing original art work for a new stamp.

"Stamps, A Nation's Calling Cards," discusses how stamps serve as a means by which a nation pays homage to those events and people that they wish to honor: great explorers, presidents, personalities, events, inventions, organizations, and animals.

SLIDE COLLECTIONS AND SLIDE SHOWS

The Slide Collection of the U.S. Fish and Wildlife Service includes many single species images. Write to request use of images of specific species. Office of Public Affairs, 1849 C Street, NW, Washington, DC, 20240.

Viero (Visual Resources for Ornithology) is a collection of 85,000 slides representing over 5,500 species of birds. Vireo sells and leases slides for lectures and publications. Vireo, The Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103.

Cornell Lab of Ornithology Slide Visual Services. For a catalogue of color slides of all North American Birds, contact Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850.

Partners in Flight Slide Show. Depicts problems facing Neotropical migratory birds and what can be done to help stem declines in populations. Available from Crows Nest Bookstore, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850.

Birds in the Balance Slide Show. 60 slides and audio tape presentation. Convey issues of migratory bird conservation. National Audubon Society, Education Department, 700 Broadway, New York, NY 10003.

AUDIO TAPES OF BIRD SONGS AND CALLS

Bird Songs and Calls. More than 25 different audio cassettes available. Crows nest, Cornell laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850

Know Your Birds: Sound Volumes I and II. Elliot Lang, North Sound, PO Box 1360 Minocqua, WI 54548.

Peterson's Guides to Birding By Ear. Audio cassette or CD series with booklet. Wild Bird Centers of America stores or corporate headquarters, Wild Bird Centers of America, 7370 MacArthur Boulevard, Glen Echo, MD 20812.

"Peter and the Wolf" Prokofiev, Serge. Recordings by Eugene Ormandy and the Philadelphia Orchestra; Vienna Philharmonic; New York Philharmonic with Leonard Bernstein. Contact music stores and local libraries.

Nature Sounds. Land Elliott (617) 257-4995.

REFERENCE TEXTS

Ducks, Geese and Swans of North America, Third edition. Stackpole Press, Harrisburg, PA

Flyways., Hawkins, A.S.R.C., Hanson, H.K., Nelson, and H.M. Reeves, eds. U.S. Department of Interior.

Waterfowl of North America, Johngard, P.A., Indiana University Press, Bloomington, IN.

Waterfowl Tomorrow, Linduska, J.P. and Nelson, A.L. eds, U.S. Department of Interior.

The Birders Handbook, Ehrlich, P., Simon and Schuster.

The Audubon Society Master Guide to Birding-Loons to Sandpipers, Farrand, J., Alfred Knopf.

The Illustrated Encyclopedia of Birds, Holiday, T., Holt, Rinehart and Winston.

North American Ducks, Swans, and Geese, Heintzelman, D., Winchester Press.

Bird Migration, Burton, R., Eddison Sadd Press.

Bring Back the Birds, Greenberg, R., Stackpole Books.

Mysteries of Migration, Baker, R., Viking Press.

Waterfowl Identification, Lemaster, R., Contemporary Books.

The Natural History of Ducks, Vol. I, II,III., Phillips, J., Houghton, Mifflin.

A Guide to North American Waterfowl, Diving Birds of North America, Ducks, Geese, and Swans of the World., Johnsgard., University Press, Lincoln, NE.

FIELD GUIDES

Birds of North America Field Guide, Bull, J., Macmillan, New York.

A Field Guide to the Birds East of the Rockies., 4th ed., Peterson, Tory, Houghton-Mifflin, Boston.

A Field Guide to Western Birds, 3rd ed., Peterson, Tory, Houghton-Mifflin, Boston.

A Field Guide to the Birds of North America. National Geographic Society, Washington, DC.

CHILDREN'S BOOKS

The Snow Goose, Ahlstrom, Baker Street Publications.

Swan Lake, Helprin, Houghton-Mifflin.

City Geese, Hirschi, Dodd, Mead and Co.

Birds, Osborne, First Nature Books, Hayes Books.

The Bird Alphabet Book, Pollota, Charlesbridge Publishing.

Birds at My Feeder., Loates, Crabtree Publishing.

Birdwise: Forty Fun Feats for Finding Out About Our Feathered Friends, Hickman, Addison Wesley.

Catching the Wind., Ryder, Morrow Junior Books.

Dancers in the Garden, Ryder, Morrow Junior Books.

An Educational Coloring Book of Birds, Spizzirri, Caroline House.

Eyewitness Books: Birds, Burnie, Alfred A. Knopf.

First Look at Birds, Selsam, Walker and Co.

Flute's Journey - the Life of a Wood Thrush, Cherry, Harcourt-Brace and Co.

For the Birds, Atwood, Firefly Books.

Have You Seen Birds:, Oppenheim, Scholastic, Inc.

How Birds Fly, Freedman, Holiday House.

How Do Birds Find Their Way, Gans, Harper Collins.

The Hummingbird Garden, Widman, Macmillan.

The Hummingbird's Gift, Rhodes-Czernecki, Hyperion Books for Children.

The Hummingbird King, Palacios, Troll Associates.

A Kid's First Book of Birdwatching, Weidensaul, Running Press.

On the Frontier with Mr. Audubon, Brenner, Coward, McCann & Geoghegan.

Peterson's 1st Guides: Birds, Peterson, Houghton-Mifflin Co.

Racoons and Ripe Corn, Arnosky, William Morrow & Co.

She's Wearing a Dead Bird on Her Head!, Lasky, Hyperion Books for Children.

What Makes a Bird a Bird?, Garlick, Mondo Publishing.

BIRDS IN POETRY

Birds, Adoff., J.B. Lippincott.

Bird Songs, Reed, Atheneum.

Bird Watch, Yolen, Philomel Books.

Feathered Ones and Furry, Fisher, Thomas Y. Crowell.

CURRICULA

MIGRATORY BIRD CURRICULUM NEEDS ASSESSMENT PROJECT. Includes descriptions of over 100 migratory bird education programs, projects and materials including curricula and materials focused on waterfowl. Contact Sally Laughlin, Birds of Vermont Museum, PO 157, Cambridge, VT 05444.

US FISH AND WILDLIFE SERVICE ISSUE PACS. Education pacs produced by U.S. Fish and Wildlife Service, National Conservation Training Center on topics such as migratory birds, wetlands conservation and use, rivers and streams, freshwater marsh, urban areas and wildlife conflicts. Each provides factual information about the topic, habitat and resource management and a series of three lesson plans. National Institute for Urban Wildlife, Box 3015, Shepardstown, WV 25443.

TEACH ABOUT GEESE. Teachers use relevant topics which motivate students and contribute to an education effort dedicated towards increasing goose populations and the awareness of wildlife management on the Yukon Delta Wildlife Refuge. Contact Yukon Delta NWR, PO Box 346, Bethel, AK 99559.

HOME FOR PEARL. Video and accompanying instructional guide explores issues of endangered species, habitat and habitat diversity. U.S. Fish and Wildlife Service Publications Unit.

JOURNEY NORTH. Provides instruction on migration of various species including migratory birds via the Internet. Students write to species experts, track the migration of birds and other wildlife and learn ecological concepts. Journey North, 125 North First Street, Minneapolis, MN 55401.

SISTER SHOREBIRD PROJECT. Curriculum focuses on shorebird migration and allows students to track shorebirds as they move from nesting grounds in the Arctic to wintering grounds in Mexico and Latin America.

INTERNATIONAL CRANE FOUNDATION. The foundation offers numerous curriculum packets including coloring books, activity booklets, study sheets, accompanying slide shows and more for grades K-12 and adults. Posters, books, photographs, films and slide shows also available. International Crane Foundation E-11376 Shady Lane Road, PO Box 447, Baraboo, WI 53913-0447.

NATIONAL AUDUBON SOCIETY EDUCATIONAL RESOURCES. Audubon adventures provides a set of 32 newspapers on migratory birds with teachers guide to be used in a classroom setting; teachers guides and posters. Education Division, National Audubon Society, 700 Broadway, NY, NY 10003.

PROJECT WILD. An interdisciplinary, supplementary conservation and environmental education program emphasizing wildlife. Primarily for educators of K-12. Offers educator training workshops in every state. Project WILD, 5430 Grosvenor Lane, Bethesda, MD 20814.

SHOREBIRD MIGRATION GAME BOOKLET. Includes lesson plans and game rules; ages 9-12. Manomet Observatory, Box 1770, Manomet, MA 02345.

THE SONGBIRD BLUES TRUNK. A comprehensive curriculum contained in a trunk. This mobile kit includes everything needed to teach a full unit on Neotropical migratory birds and their conservation. The trunk contains a teacher's guide, lesson plans, student research packets, puppets, felt boards, books, posters, audio and video tapes, and study skins. Songbird Blues, Montana Natural History Center, PO Box 8514, Missoula, MT 59807.

THE SONGBIRD CONNECTION. Videos, posters and multi disciplinary lessons offered on bird ecology and forest conservation for grades K-12. Contact Songbird Connection, New Jersey Conservation Foundation, 300 Medham Road, Morristown, NJ 07690.

WONDERS ON THE WING. Video and accompanying curriculum on the natural history of migratory birds. Colorado Division of Wildlife, 6060 Broadway, Denver, CO 80216.

ILLINOIS BIRDS. Illinois Department of Conservation, 524 South 2nd Street, Springfield, IL 62701-1787.

ONE BIRD-TWO HABITATS. A program of twenty-two 6-8th grade activities, with background information and support materials, in a curriculum unit disseminated through workshops. One Bird-Two Habitats, Wisconsin Department of Natural Resources, 1350 Femrite Drive, Monona, WI 53716.

PROJECT FEEDERWATCH. A November through March project that involves participants watching and counting feeder birds. Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850.

RANGER RICK'S NATURE SCOPE - BIRDS, BIRDS, BIRDS. Lesson plans focused on birds and habitat. One in a series of educational booklets. Nature Scope, National Wildlife Federation, 1400 Sixteenth Street, NW, Washington, DC 20036-2266.

GARDENING WITH WILDLIFE KIT. National Wildlife Federation Backyard Wildlife Habitat Program National Wildlife Federation, 1400 Sixteenth St. NW. Washington, DC 20036-2266.

BILINGUAL - SPANISH/ENGLISH

BIRDS WITHOUT BORDERS. Project has developed lesson plans and materials in Spanish for use in bilingual classrooms in Colorado and schools in Mexico. Birds beyond Borders, Colorado Bird Observatory, 13401 Piccadilly Road, Brighton, CO 80601.

SAVE OUR MIGRATORY BIRDS. This guide for middle school teachers provides a series of lessons and fact sheets that encourages students' global perspective on natural resources by focusing on birds which link countries through their seasonal migration. Save our Migratory Birds, Manomet Observatory, PO Box 1770, Manomet, MA 02345.

SAVE OUR SHOREBIRDS. A teachers interdisciplinary guide to understanding shorebirds and their migration; upper elementary to middle school students and available in Spanish and English. Manomet Observatory, Box 1770 Manomet, MA 02345.

BIRD QUEST. A program for all ages consisting of six levels of classroom and field instruction that lead students from basic bird identification to independent studies. Bird Quest, Canadian nature Federation, 1 Nicholas Street, Suite 520, Ottawa, Ontario, K1N 7B7.

PERIODICALS

Nearly every state fish and wildlife agency produces a magazine focused on wildlife issues in the state. Many have excellent articles and reference materials on waterfowl and other migratory birds. Contact your state fish and wildlife agency to obtain current issues of their publications.

Ducks Unlimited. Bi-monthly publication of Ducks Unlimited. Ducks Unlimited, Inc. National Headquarters, One Waterfowl Way, Memphis, TN 38120.

Puddler. Quarterly youth oriented publication of Ducks Unlimited, Ducks Unlimited, Inc., National Headquarters, One Waterfowl Way, Memphis, TN 38120.

Wild Fowl. Publication for duck and goose hunters. Wildfowl PO Box 372, Mt. Morris, IL 61054-8087.

Waterfowl and Wetlands Magazine. Official quarterly publication of the South Carolina Waterfowl Association, SCWA 434 King Street, Charleston, SC 29403.

Audubon, bi-monthly publication of the National Audubon Society, Audubon, Membership Data Center, PO Box 2666, Boulder, CO 80322.

Audubon Field Notes. Seasonal reports on population distribution of birds. Subscription includes the Christmas Bird Count issue. Field Notes, National Audubon Society, 700 Broadway, NY, NY 10003.

Partners in Flight Newsletter. Reports on Partners in Flight conservation projects. Partners in Flight, National Fish and Wildlife Foundation, 1120 Connecticut Ave., NW, Suite 900, Washington, DC 20036.

Ranger Rick, My Big Backyard, National Wildlife, International Wildlife. The four publications of the National Wildlife Federation. The first two are high quality children's nature magazines, the last two are aimed at a general audience and focus on wildlife issues. National Wildlife Federation 1400 Sixteenth Street, NW, Washington, DC 20036-2266.

Falcon. Popular children's wildlife magazine featuring much useful information and fun activities. Falcon Magazine, PO Box 15936, North Hollywood, CA 91615-5936.

WATERFOWL AND WILDLIFE ART BOOKS

The Life and Lore of Birds in Nature, Art, Myth and Literature, Armstrong, E.A., Crown Publishers, Inc.

The Illustrator, Vol. 13, No.1, Art Instruction School Publication. 500 South Fourth Street, Minneapolis, MN.

Ducks of North America and the Northern Hemisphere, Gooders, J., Illustrated by Boyer, Trevor, 38 color plates of magnificent illustrations in winter and summer plumage.

The Illustrated Encyclopedia of Birds, Heintzelman, D., New Yoir, Winchester Press.

The Flame of Peace: A Tale of the Aztecs, Lattimore, D., Los Angeles, Harper Row,

The Artists' Magazine, "Secrets of Painting Waterfowl Reflections," Seslar, P., F and W Publications, 1507 Dana Avenue, Cincinnati, OH 41207.

North American Ducks, Swans, and Geese

Fulvous Whistling Duck
Black Bellied Whistling Duck
Tundra Swan
Trumpeter Swan
Mute Swans are not permitted as they are not native to North America
Greater White-fronted Goose
Snow Goose
Ross Goose
Brant
Canada Goose
Emperor Goose
Wood Duck
Green-winged Teal
Blue-winged Teal
Cinnamon Teal
American Black Duck
Mottled Duck
Mallard
Northern Pintail
Northern Shoveler
Gadwall
American Wigeon
Canvasback
Redhead
Ring-necked Duck
Greater Scaup
Lesser Scaup
Common Eider
King Eider
Spectacled Eider
Steller's Eider
Harlequin Duck
Oldsquaw
Black Scoter
Surf Scoter
White-winged Scoter
Common Goldeneye
Barrows Goldeneye
Bufflehead
Hooded Merganser
Common Merganser
Red-breasted Merganser
Ruddy Duck
Hawaiian species permitted in Junior Duck Stamp Competition.
Nene Goose
Koloa
Laysan Duck

please note: loons are water birds, not waterfowl and are, therefore, not permitted in contest.

Common Migratory Bird Species

Waterfowl

Mallard
Black Duck
Pintail
Shoveler
Gadwall
American Wigeon
Blue-winged Teal
Green-winged Teal
Cinnamon Teal
Wood duck
Canvasback
Redhead
Ring-necked Duck
Bufflehead
Greater Scaup
Lesser Scaup
Common Goldeneye
Barrows Goldeneye
Ruddy Duck
Hooded Merganser
Common Merganser
Red-breasted Merganser
Fulvous Whistling Duck
Black-bellied Whistling Duck
Trumpeter Swan
Whistling Swan
Canada Goose
Brant
Snow Goose
White-fronted Goose

Songbirds

Chimney Swift
Mourning Dove
Yellow-shafted Flicker
Barn Swallow
Purple martin
Blue Jay
Carolina Chickadee
House Wren
Eastern Bluebird
American Robin
Red-winged Blackbird
Baltimore Oriole
Cardinal
House Finch
Scarlet Tanager
Indigo Bunting
American Redstart
Blackburnian Warbler
Yellow Warbler
Red-eyed Vireo
Ruby Throated Hummingbird
Rufous-sided Towhee
Chipping Sparrow
Wood Thrush
Eastern Kingbird
Red-shafted Flicker
Black Swift
Black-chinned Hummingbird
Scissor-tailed Flycatcher
Western kingbird
Green-tailed Towhee
American Goldfinch
Scrub Jay
Western Bluebird
Yellow-rumped Warbler
Black-headed Grosbeak
Red-winged Blackbird
Lazuli Bunting
Bullock's Oriole

Raptors

Bald Eagle
American Kestrel
Osprey
Peregrine Falcon
Red-tailed Hawk
Golden Eagle
Northern Harrier
Snowy Owl
Loggerhead Shrike
Turkey Vulture

Shorebirds

Killdeer
Spotted Sandpiper
American Avocet
American Oystercatcher
Black-necked Stilt
Piping Plover
Whimbrel
Eskimo Curlew
Willet
Common Snipe
Ruddy Turnstone
Sanderling
Upland Sandpiper

United States State Birds and Canadian Provincial Birds

United States

Alabama	Yellow Shafted Flicker
Alaska	Willow Ptarmigan
Arizona	Cactus Wren
Arkansas	Northern Mockingbird
California	California Quail
Colorado	Lark Bunting
Connecticut	American Robin
Delaware	Blue Hen
Florida	Northern Mockingbird
Georgia	Brown Thrasher
Hawaii	Nene Goose
Idaho	Mountain Bluebird
Illinois	Northern Cardinal
Indiana	Northern Cardinal
Iowa	American Gold Finch
Kansas	Western Meadowlark
Kentucky	Northern Cardinal
Louisiana	Brown Pelican
Maine	Black-capped Chickadee
Maryland	Baltimore Oriole
Massachusetts	Black-capped Chickadee
Michigan	American Robin
Minnesota	Common Loon
Mississippi	Northern Mockingbird
Missouri	Eastern Bluebird
Montana	Western Meadowlark
Nebraska	Western Meadowlark
Nevada	Mountain Bluebird
New Mexico	Roadrunner
New Hampshire	Purple Finch
New York	Eastern Bluebird
New Jersey	American Goldfinch
North Dakota	Western Meadowlark
North Carolina	Northern Cardinal
Ohio	Northern Cardinal
Oklahoma	Scissor-tailed Flycatcher
Oregon	Western Meadowlark
Pennsylvania	Ruffled Grouse
Rhode Island	Rhode Island Red
South Dakota	Ring-necked Pheasant
South Carolina	Carolina Wren
Tennessee	Northern Mockingbird
Texas	Northern Mockingbird
Utah	California Gull
Vermont	Hermit Thrush
Virginia	Northern Cardinal
Washington	American Goldfinch
West Virginia	Northern Cardinal
Wisconsin	American Robin
Wyoming	Western Meadowlark

Canada

Alberta	Great Horned Owl
British Columbia	Steller's Jay
Manitoba	Great Gray Owl
New Brunswick	Black-capped Chickadee
Newfoundland	Atlantic Puffin
Northwest Territories	Gyrfalcon
Nova Scotia	Osprey
Ontario	Common Loon
Prince Edward Island	Blue Jay
Quebec	Snowy Owl
Saskatchewan	Sharptailed Grouse
Yukon Territory	Common Raven

Migratory Birds Listed as Endangered

The more highly migratory species are denoted by capital letters.

Parentheses are used to indicate subspecies of a more widely distributed species.

Blackbird. Yellow-shouldered
Caracara. (Audubon's) Crested
Condor. California
Coot. Hawaiian
Crane. (Mississippi) Sandhill
CRANE. WHOOPING
CURLEW. ESKIMO
Duck. (Hawaiian) Laysan
EIDER. SPECTACLED
FALCON. AMERICAN PEREGRINE
Falcon. Northern Aplomado
Flycatcher. (Southwestern) Willow
Gnatcatcher. (Coastal) California
GOOSE. ALEUTIAN CANADA
Goose. (Hawaiian) Nene
Hawk. Hawaiian
Hawk. (Puerto Rican) Broad-winged
Hawk. (Puerto Rican) Sharp-tailed
Moorhen. (Hawaiian) Common
Moorhen. (Mariana) Common
MURRELET. MARBLED
Nightjar. Puerto Rican
Owl. (Mexican) Spotted
Owl. (Northern) Spotted
PELICAN. BROWN
PETREL. HAWAIIAN DARK-RUMPED
Pigeon. (Puerto Rican) Plain
PLOVER. PIPING
PLOVER. WESTERN SNOWY
Rail. (California) Clapper
Rail. (Light-footed) clapper
Rail. (Yuma) clapper
Scrub-Jay, Florida
SHEARWATER. NEWELL'S TOWNSEND'S
Shrike. (San Clemente) Loggerhead
Sparrow. (Cape Sable) Seaside
Sparrow. (Florida) Grasshopper
Sparrow. (San Clemente) Sage
Stilt. Hawaiian
STORK. WOOD
tern. (California) Least
TERN. LEAST
TERN. ROSEATE
Towhee. (Inyo) California
VIREO. BLACK-CAPPED

VIREO (LEAST) BELL'S
WARBLER. BACHMANS
WARBLER. GOLDEN-CHEEKED
WARBLER. KIRTLAND'S
Woodpecker. Ivory-billed
Woodpecker. Red-cockaded

* All these species protected under the Migratory Bird Treaty Act which are listed as endangered species. U.S. Fish and Wildlife Service. Office of Migratory Bird Management. 1996.

Famous Bird Artists and Their Works
Sculptors Inspired by Birds

Jean Hans Arp, (1886-1966), French - "Flight of the Birds," 1930; "Leaf or Bird," 1959; "Bird Skeleton," 1952; "Winged Configuration," 1925; and "Bird Masquerade, 1964. Abstract shapes and forms.

Constantin Brancusi, 1876-1957), Rumanian -"A Bird in Space," 1924. Suggests the essence of a bird's sudden upward movement through space. An extended and simplified ovoid form.

Examples of Artists Who Have Birds in their Art

John James Audubon (1785-1815) American

Giacomo Salia (1871-1958) Italian

Pieter Bruegel (1525-1569) Belgium

Mary Cassatt, (1844-1926) American

Henry Moore (1898-1986) English

David Smith (1906-1965) American

Gerard Dou (1613-1675) Dutch

Thomas Gainsborough (1727-1788) English

Paul Gaugin,(1848-1903) French

Morris Graves, American

Fran Hals (1580-1666) Dutch

William M. Harnett, American

Winslow Homer (1836-1910) American

Paul Klee (1879-1940) Swiss

Nicholas Maes (1623-1693) Dutch

Claude Monet (1840-1926) French

Roger Tory Peterson, American

Pablo Picasso (1881-1973) Spanish

Henri Rousseau (1844-1910) French

Peter Paul Rubens (1577-1640) Dutch

George Seurat (1858-1891) French

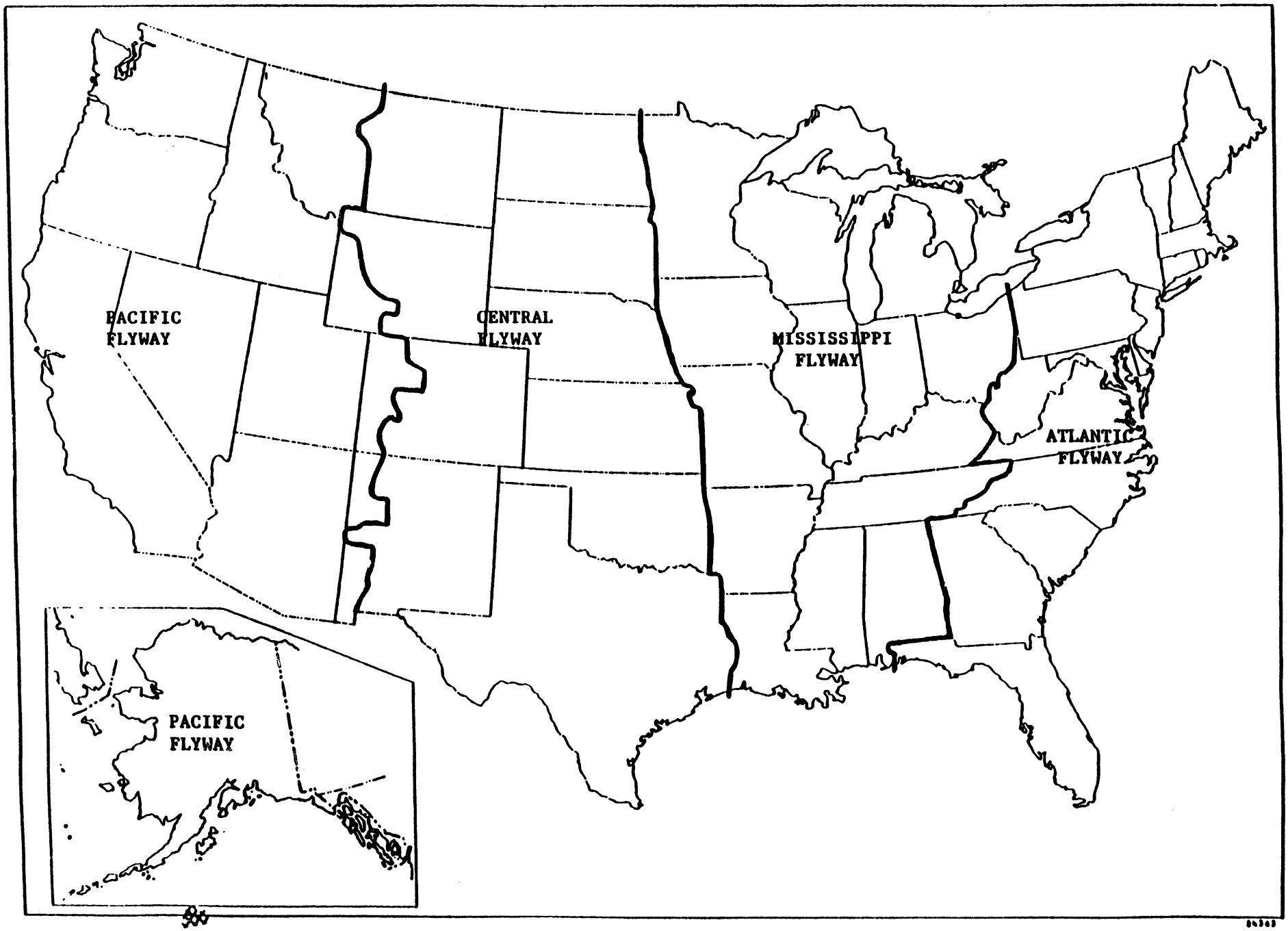
Frans Snyders (1579-1657) Dutch

Vincent Van Gogh (1853-1910) Dutch

Johannis Verspronck (1597-1662) Dutch

Map of the Western Hemisphere




PACIFIC
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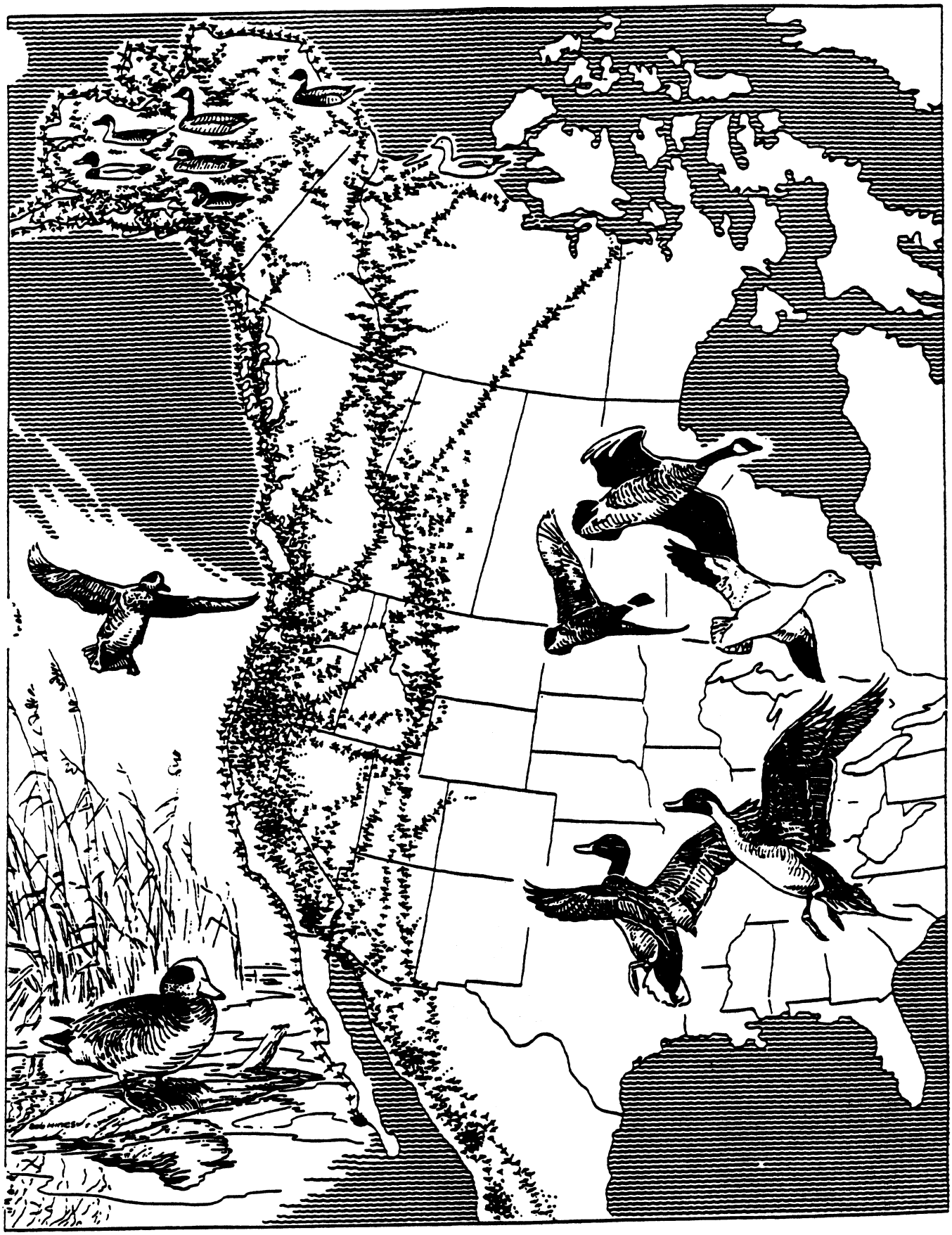
PACIFIC FLYWAY



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CENTRAL FLYWAY



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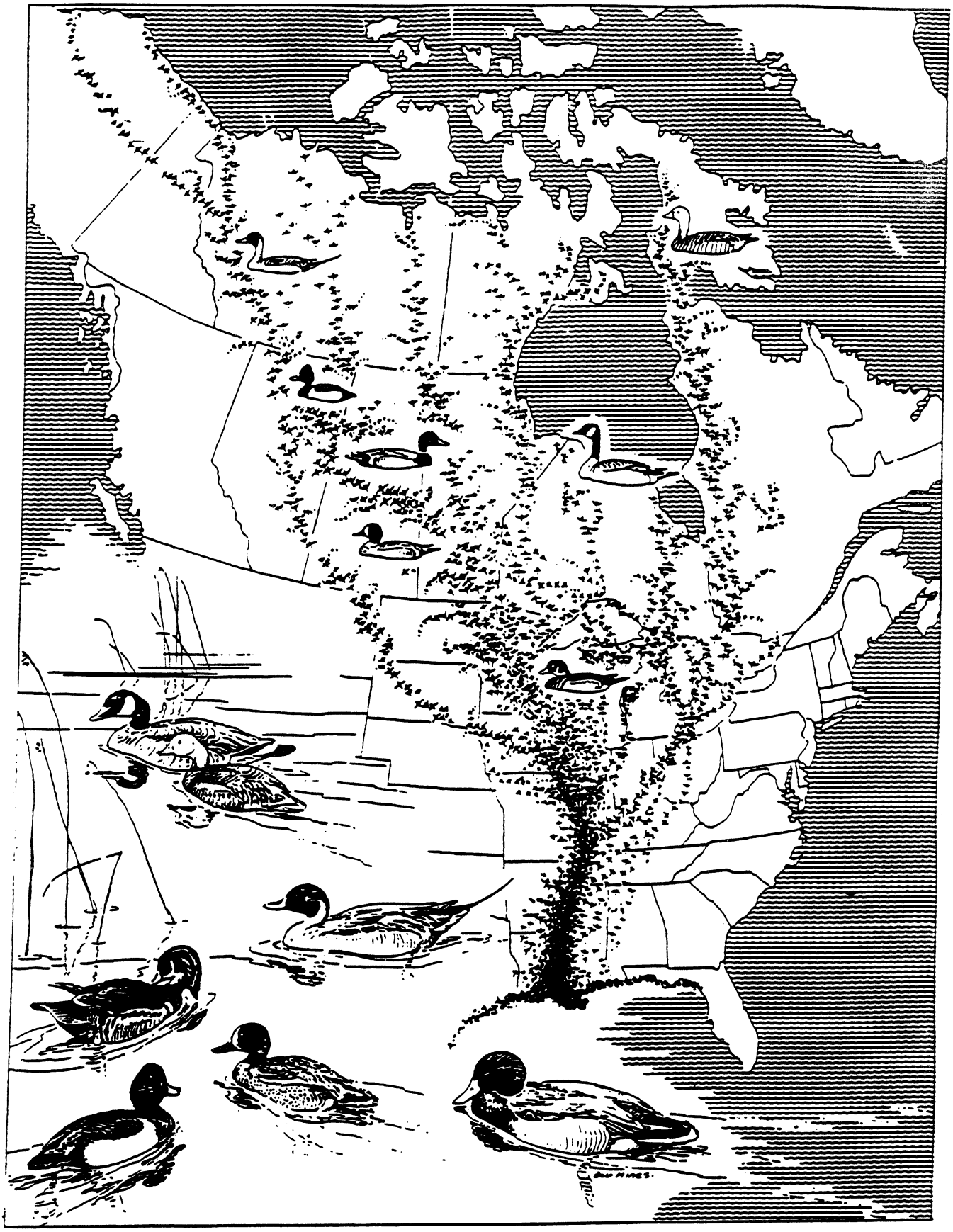
MISSISSIPPI FLYWAY



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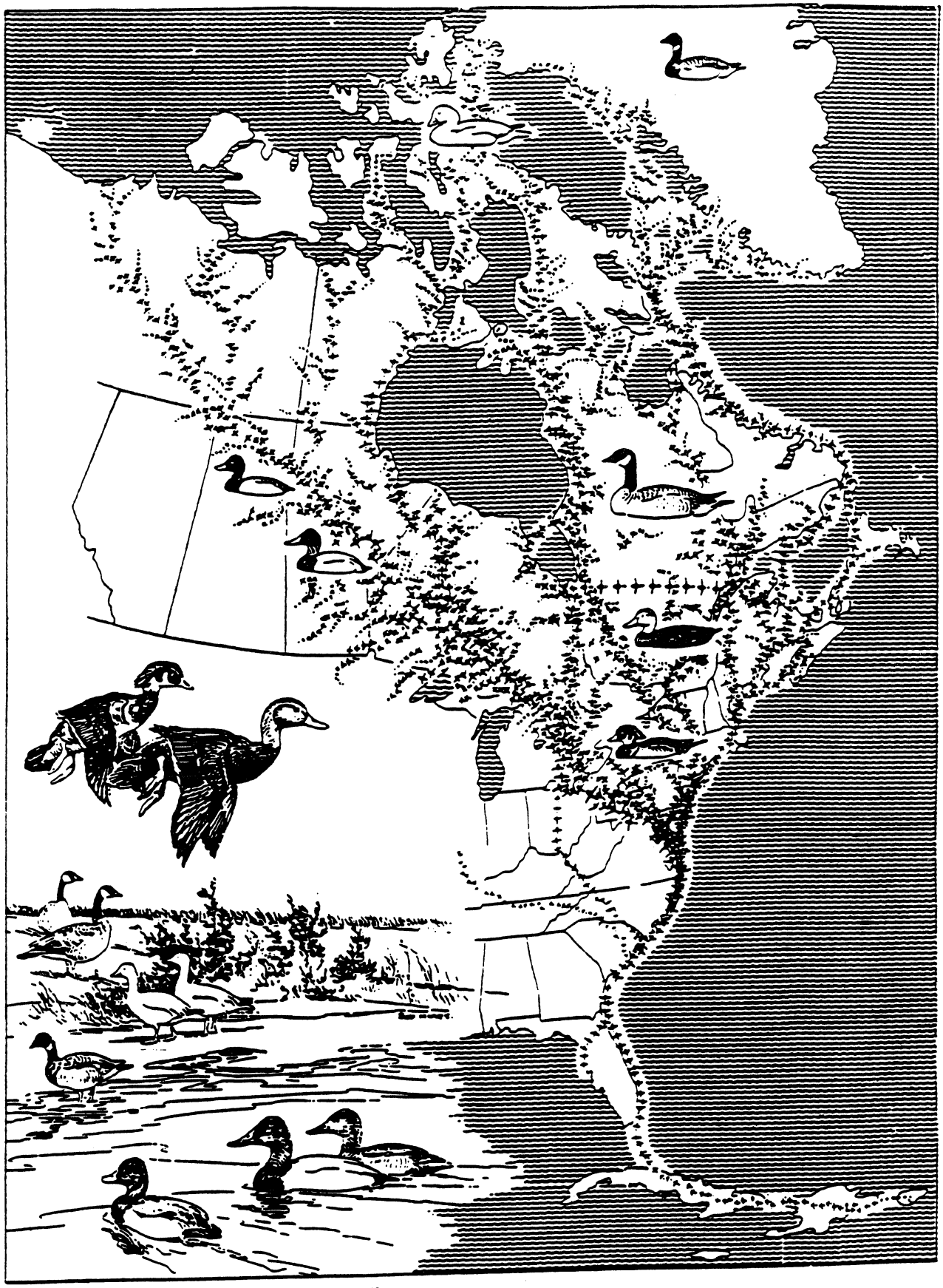
ATLANTIC FLYWAY



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