Massive Migrations

WILDLIFE That Move Us
NATIONAL WILDLIFE WEEK
MARCH 14-20, 2011

Goal:
Students will map and calculate the migration routes of Arctic species to learn about animals that spend part of their lives in the Arctic and how they are connected to other parts of the world for food and shelter.

Objectives:
- Measure the distances traveled by migratory Arctic species.
- Identify Arctic species that spend parts of the year in their own local areas.
- Explain how migratory Arctic species meet their habitat requirements in various regimes.

Grade Level: 5-8

Subject Areas:
science, math, and geography

Materials Needed:
- map of North America
- computer with internet access
- science notebook

Time to Complete:
50-60 minute class period

Background

A habitat is the place where a species' requirements for food, water, cover, and places to raise young are found (distinguished from an ecosystem, which is the set of interactions between living and nonliving components in the environment). Migratory birds require three different habitat types: breeding and nesting areas, where they lay their eggs; non-breeding areas (often used to find food, water, and shelter); and migratory stopover locations as the birds move from the breeding to the non-breeding areas. Some animals such as caribou migrate to areas where food is more plentiful and where they can safely have offspring. The caribou migrate from southern, inland areas of Alaska and Canada to arctic coastal plain in the summer. High winds on the coastal plain help keep away mosquitoes and warble flies which are parasites of the caribou.

Most arctic wildlife species are temporary residents; they move to more favorable climates during the harshest time of the year. However, some species spend the entire year in the arctic ecosystem. Year-round resident birds such as the ptarmigan, raven, ivory gull, bald eagle, and dovekie have thicker feather than migrants such as arctic terns, snow geese, eiders, and sandhill cranes. The best time of year for birds to live in the arctic is during the summer months with long days in which to find food, warm temperatures, and plenty of insects! In May, thousands of birds descend upon the thawing tundra to begin their reproductive cycle. As the top soil layer of the tundra thaws, the remaining permafrost below the surface prevents the melt waters from draining, creating standing pools, called "thaw lakes", and marshy soil. For migratory birds, the process of egg-laying and rearing of young must be a fast one, as the summer months are few and quickly pass.

Most tundra birds lay their eggs directly onto the ground, in a slight depression. Some, like the golden plover, line their nests with vegetation such as moss, grass and leaves. American golden plovers and black-bellied plovers have their young in the arctic during the summer months, then travel about 6,000 miles each winter to South America! They use Texas and other states on the way as a stopover, to take advantage of warm temperatures and plentiful food before completing their long journey. *Flight of the Golden Plover: The Amazing Migration between Alaska and Hawaii*, Debbie S. Miller (1996), is an informative book about the impressive migration of the golden plover.

Arctic terns make the longest migration of any species on earth, traveling from the northern arctic to the southern Antarctic each year, a distance of 25,000 miles (40,000 km) total or about 11,000 miles (17,700 km) each way.

Arctic loons breed on tundra lakes and winter mostly on the U.S. Pacific coast.

Snow geese nest in the arctic during the summer, traveling from their winter homes in the Gulf of Mexico, a distance of 2,000 miles.

"Massive Migrations" from Arctic NatureScope Kit, National Wildlife Federation 2001
www.nwf.org/nationalwildlifeweek email: educators@nwf.org

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Snowy owls may migrate depending on prey availability-if there is enough prey in their home habitat, they don't need to migrate, but if there isn't enough prey, they will migrate south. Alaska's snowy owl s then to spend autumns in the prairies and marshlands of Canada.

Sandhill cranes breed and lay their eggs mainly in the marsh grasses of the arctic and winter in grasslands throughout the southern and mid-western U.S.

Caribou are well-known travelers across the tundra. Theses herbivores are attracted to the abundant lichens and grasses of the arctic, and spend winter farther south in the shelter of the taiga's trees. They are excellent swimmers, which is essential since there are many rivers to cross along their way.

The Porcupine caribou herd today numbers about 130,000 to 150,000 individuals. As spring approaches each year, the herd begins a 400-mile migration northward along three principal routes from its boreal forest wintering range. Their destination is the coastal plain of the Arctic National Wildlife Refuge. By mid-May, the first pregnant cows arrive, followed soon by the rest of the herd. Calving reaches a peak in early June. The narrow coastal plain between the Brooks Mountain Range to the south and the Arctic Ocean to the north is ideal for calving and the early nurturing of the young. Thick fields of protein rich cotton-grass provide nourishment. Ocean breezes deter swarms of mosquitoes. Predators in this season are few. The coastal plain is so well-suited for calving that, although it is only one-fifth the size of the calving area used by the Central arctic caribou herd, six times as many Porcupine caribou inhabit it. By early September, the young calves are strong enough to initiate their migration southward and the cycle begins again. *A Caribou Journey*, by Debbie S. Miller (1994) is a story of caribou migration, including information on the natural history of caribou which would complement this activity.

Preparation

Sign up for computer lab time.

Procedure

1. Assign students a migratory bird species from the U.S. Fish & Wildlife Service Arctic National Wildlife Refuge, http://arctic.fws.gov/birdpost.htm.
2. Divide students into small groups of two or three and use the Cornell Lab of Ornithology, http://www.allaboutbirds.org/guide/search.aspx, to discover more about the migratory bird they were given. Questions and answers should be recorded in the science notebook by each member of the group. Have each group answer these questions about their bird –
   a. What does their species eat?
   b. What are its habitat requirements for food, water, and shelter?
   c. What are its habitat requirements for raising young?
   d. How far do they migrate? Go to http://www.infoplease.com/atlas/calculate-distance.html. Type in "Arctic National Wildlife Refuge" for "from" and then the closest city and the state for your migratory bird for "to".
   e. Predict challenges they face during migration? Ask students to visualize what challenges they would face if they had to migrate for to find warmer weather, food, shelter, and water...
3. Compare the distances of different species migration routes.
   a. Ask students to gather distances from four other groups.
   b. Create a chart and or bar graph in the science notebook that denotes the migratory bird species and the distance flown during its migration. Be sure students are including all applicable labels.
   c. An optional or additional task would be to create the migration distance to scale outside, using string and tape measures or meter sticks. For example on foot on the schoolyard could equal 200 miles (or whatever increments make the most sense based on your pool of migratory birds). Students could then sketch what they observe and write answers to these questions.
      i. Which species has the longest migration?
      ii. The shortest?
      iii. Why do you think birds would travel on these long journeys?
      iv. What makes the journey worthwhile for them? Why not just stay?

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Assessment

1. Have students create a circle map in their science notebook and demonstrate what they know about bird migration.

Circle Map

2. Write a paragraph in their science notebook about bird migration and have students include the words *journey*, *route*, *migration*, *species*, *habitat*, *distance*. Require students to include information about reasons for migration and potential threats associated with migration..

3. Create a foldable to be glued into science notebook. The foldable has 4 parts. Label each triangle as follows: What is migration?, Priority 1, Priority 2, and Priority 3. Under each triangle write the information needed. Under Priority 1—nesting/breeding needs with details, Priority 2—non-breeding needs with details, and Priority 3—stopover location needs with details.

Children's Literature

- *Whistling Wings* by Laura Goering
- *On the Wing: American Birds in Migration* by Carol Lerner
- *The Man Who Flies with Birds* by Carole G. Vogel
- *Migrating Animals of the Air* by Jacqueline A. Ball
- *The Flight of the Golden Plover: The Amazing Migration between Alaska and Hawaii* by Debbie S. Miller

Resources

- **List of Selected Arctic Birds and States They Migrate to or Through:** Check the list of Arctic birds below to see which bird is an example of a species that summers in Alaska and winters in your state. In addition to these, there are likely many other local species in your area with similar migration patterns.
- **Smithsonian National Zoological Park – Migratory Bird Center:**
  http://nationalzoo.si.edu/scbi/MigratoryBirds/Education/default.cfm
  - Songbird kit-loaner chest of all things birds
  - Computer-based games
    - Migration Game
    - Online Coloring Book
  - Citizen Science (all ages)
    - Neighborhood Nestwatch
- **U.S. Fish and Wildlife Service:**
  http://www.fws.gov/educators/E_birds.html
  Has both educator and student pages.
- **Thinking Maps®:**
  http://www.thinkingmaps.com/products.php
- **Dinah Zike's Notebook Foldables®:**
  http://www.dinah.com/

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List of Selected Arctic Birds and States They Migrate to or Through

Alabama – Ruby-crowned Kinglet
Alaska – Redpoll
Arizona – Fox Sparrow
Arkansas – Mallard
California - Snow Goose
Colorado – Bohemian Waxwing
Connecticut – Greater Scaup
Delaware – Black-bellied Plover
Florida – Peregrine Falcon
Georgia – Gray-cheeked Thrush
Hawaii – Golden Plover
Idaho – Short-eared Owl
Illinois – Northern Flicker
Indiana – Dark-eyed Junco
Iowa – Sharp-shinned Hawk
Kansas – Smith's Longspur
Kentucky – Merlin
Louisiana – Long-billed Dowitcher
Maine – Least Sandpiper
Maryland – Tundra Swan
Massachusetts – Golden Plover
Michigan – Oldsquaw
Minnesota – Red-throated Loon
Mississippi – Norther Waterthrush
Missouri – American Pipit
Montana – Golden Eagle
Nebraska – Wilson's Warbler
Nevada – Green-winged Teal
New Hampshire – Dunlin
New Jersey – Canvasback
New Mexico – Sandhill Crane
New York – Semipalmated Sandpiper
North Carolina – Semipalmated Plover
North Dakota – Rough-legged Hawk
Ohio – American Tree Sparrow
Oklahoma – Savannah Sparrow
Oregon – Brant
Pennsylvania – Lapland Longspur
Rhode Island – Horned Grebe
South Carolina – Ruddy Turnstone
South Dakota – Northern Shrike
Tennessee – Yellow-rumped Warbler
Texas – White-crowned Goose
Utah – White-crowned Sparrow
Vermont – Snow Bunting
Virginia – Lesser Scaup
Washington – Varied Thrush
West Virginia – Rusty Blackbird
Wisconsin – Snipe
Wyoming – Townsend's Solitaire

Source: US Fish and Wildlife Service, www.fws.org and www.r7.fws.gov/nwr/arctic

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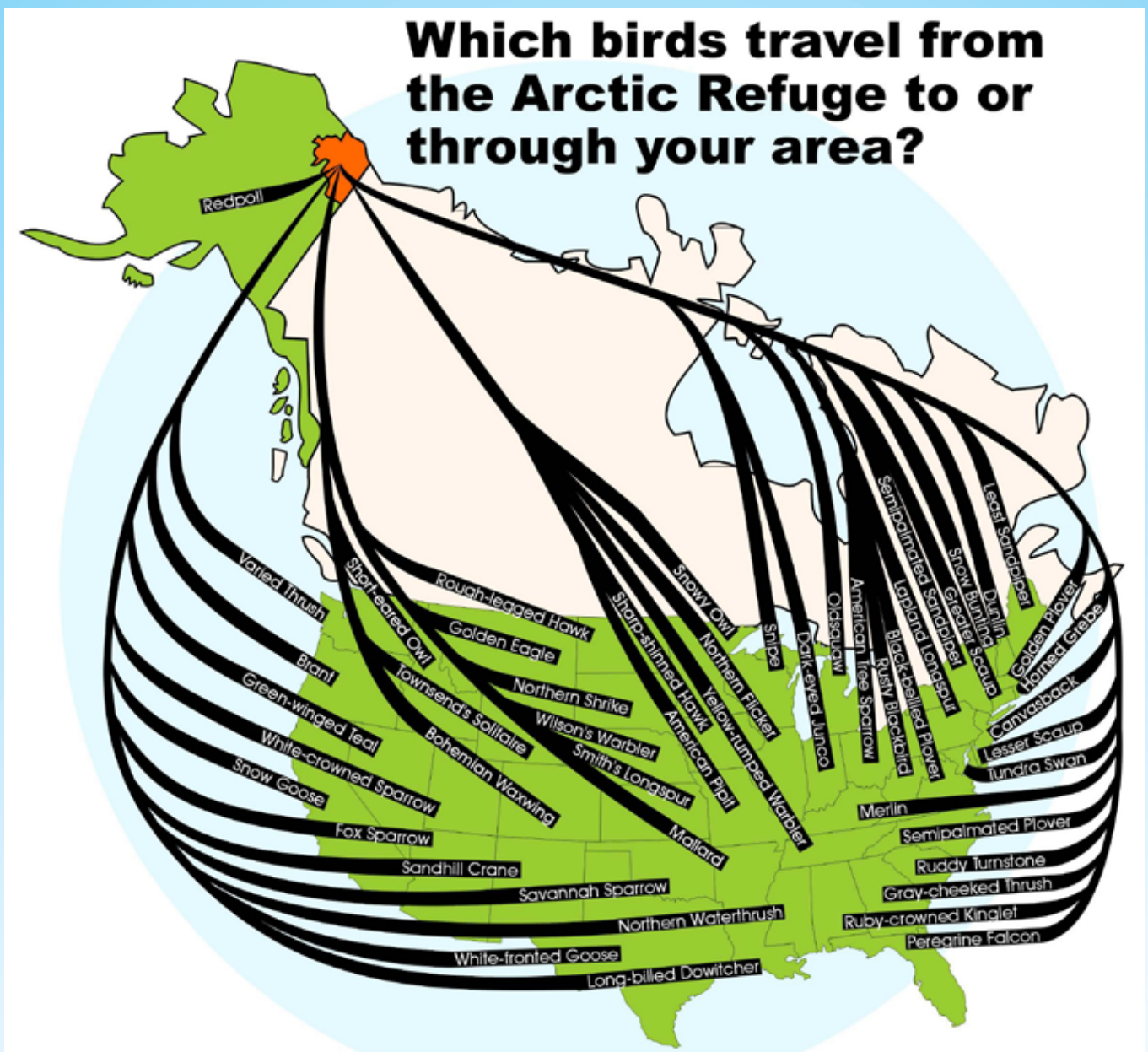

Each summer, birds use the Arctic Refuge to nest, raise young, feed, or rest. They then migrate to destinations in the States and beyond. This map shows some birds that may visit your area.

Arctic National Wildlife Refuge
907/456 0250 800/362 4546
arctic_refuge@fws.gov
http://arctic.fws.gov/

AMERICA'S NATIONAL WILDLIFE REFUGE SYSTEM...
Conserving the Nature of America

Source: US Fish and Wildlife Service, http://arctic.fws.gov/pdf/isbirdmap.pdf