



Connecting Kids Through Birds
**RESOURCE
PAGES**



Susan Spear



Resource Pages

Connecting Kids Through Birds




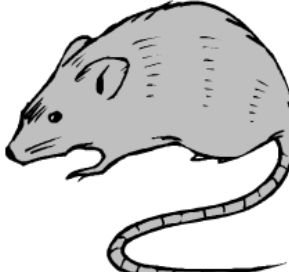







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What is Habitat?

Habitat is the place where a plant or animal normally lives and grows. It includes four important features: food, water, shelter, and space—all in the right arrangement.

FOOD	WATER	SHELTER	SPACE
Different birds eat many different kinds of foods, including: seeds, nectar, and other animals, like insects, worms, and rodents.	Birds can get water from a birdbath or natural sources like creeks and puddles. They may need it to drink, to bathe in, or to swim in.	Shelter protects birds from cold, rain, and snow. It gives them a place to lay their eggs and hide from predators.	Every bird needs room to roam and an area where it finds food, water, and shelter. This space might be a park, a forest, or an urban area, just to name a few.
   	 	  	 





Sleuth

Bird Survivor! Game Cards

Find and Defend a Territory

You successfully defend a large territory within a protected wildlife refuge.

Take two steps forward.

Find and Defend a Territory

The forest you nested in last year has become very fragmented and nest predators are everywhere.

Take two steps back.

Find and Defend a Territory

You land at a school where students have created a schoolyard habitat, complete with a bird feeder and several nest boxes.

Take one step forward.

Find and Defend a Territory

You exert a lot of energy defending a potential nest site against European Starlings.

Take one step back.

Find and Defend a Territory

You begin migrating early so you can find the best territory. Though the weather seemed good when you left, an early spring snowstorm hits, and you freeze. Sorry, the game is over for you.

Go back to your seat.

Find a Mate

After some elaborate courtship displays, you finally have a mate.

Take one step forward.



Birds Survivor! Game Cards

Find a Mate

You find a mate, but while feeding at a nearby bird feeder, your mate is killed by a Cooper's Hawk.

Take two steps back.

Find a Mate

You find a mate but another male is also courting her.

Stay in place while you continue singing your heart out.

Find a Mate

You're in luck; your mate from last year has survived the winter and you quickly form a pair bond!

Take two steps forward.

Build a Nest and Lay Eggs

You and your mate quickly build a nest and immediately begin laying your eggs.

Take two steps forward.

Build a Nest and Lay Eggs

Pesticides have been sprayed near your nest and eggs, and you get sick.

Take two steps back.

Build a Nest and Lay Eggs

You have trouble locating a nest cavity to build your nest in, but finally find a tree hole.

Stay in place.



Birds Survivor! Game Cards

Build a Nest and Lay Eggs

A Brown-headed Cowbird has laid an egg in your nest.

Take one step back.

Incubate Eggs

A snake eats three of your eggs.

Take two steps back.

Incubate Eggs

Your mate guards you and feeds you throughout the incubation period.

Take two steps forward.

Incubate Eggs

The weather forecast during your two-week incubation is mild and food is plentiful.

Take one step forward.

Incubate Eggs

Your mate dies during incubation, forcing you to leave your eggs unattended while you find your own food.

Take one step back.

Feed and Raise Nestlings

*None of your eggs hatch and you'll have to try again next year.
Sorry, the game is over for you.*

Go back to your seat.



Bird Survivor! Game Cards

Feed and Raise Nestlings

All of your eggs hatch and you begin feeding your nestlings all day long!

Take two steps forward.

Feed and Raise Nestlings

Only three of your eggs hatch, but food is plentiful.

Take one step forward.

Feed and Raise Nestlings

Your eggs hatch but the weather is unusually dry and it is hard to find enough food.

Take one step back.

Fledge From the Nest

Days after your eggs hatch, a raccoon finds the nest and eats all the young birds. Sorry, the game is over for you.

Go back to your seat.

Fledge From the Nest

Food is plentiful, and you are able to keep your young safe in their nest until fledging day! Congratulations, all of your babies fledge from the nest!

Take two steps forward.

Fledge From the Nest

Your babies are weak when they leave the nest because they have mites.

Stay in place and hope they survive.





Migratory Obstacles Visuals



Migratory Obstacles Visuals

Electric Transmission Line Collisions

Power lines are perfect perches for birds. Larger birds like raptors can easily connect power lines when they land and take off, often instantly killing them.

Habitat Loss

Many shorebirds and waterfowl are area-specific migrators. These birds rely on key stopping points along their migration for food and shelter. Many wetlands are being polluted or drained, leaving these birds no place to stop!



Migratory Obstacles Visuals



Migratory Obstacles Visuals

Building Lights

Birds have enough trouble seeing glass during the daytime, but during night migration, lit up city buildings present a massive problem for birds. Building lights confuse birds, and hundreds of thousands of birds die each year from night collisions with lit up buildings.

Automobile Collisions

U.S Fish and Game estimate that 100 million birds are killed each year on our highways. Highways attract birds in several ways. During the summer, highways are full of food that cars have hit, from bugs to animals. In the winter black highways are often much warmer than other places.



Migratory Obstacles Visuals



Migratory Obstacles Visuals

Glass Windows

Dr. Daniel Klem of Muhlenberg College has done studies over a period of 20 years, looking at bird collisions with windows and his data shows that striking glass kills 900 million birds!

Domestic Cats

The National Audubon Society says that domestic house cats kill 100 million birds a year. Feral cats and outdoor pets are a massive drain on birds that are already facing natural predators and conservational threats.



Migratory Obstacles Visuals



Migratory Obstacles Visuals

Windmill Strikes

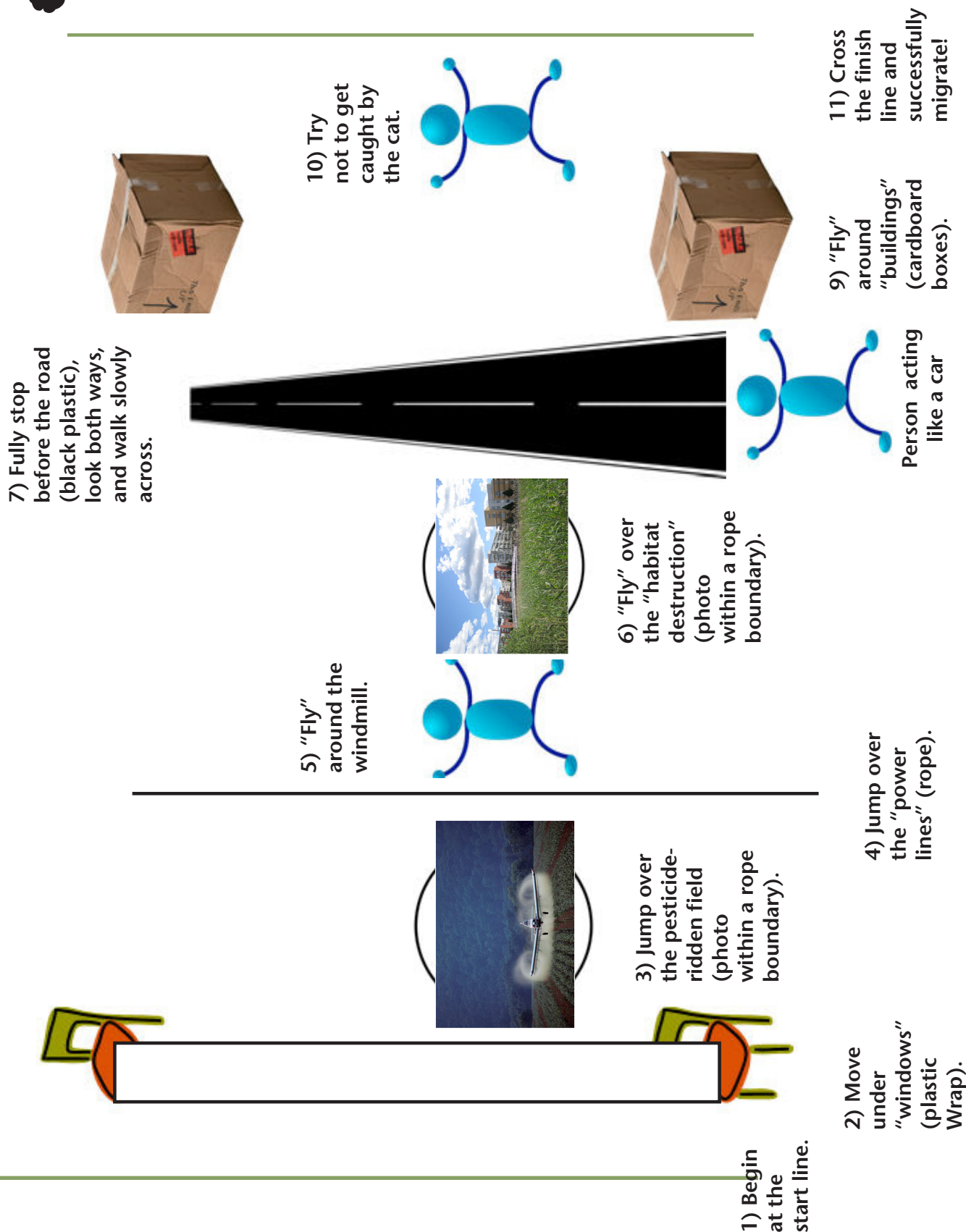
Windmill farms can be a healthy energy source, but their location is critical. Wind farms placed along migration flyways causes up to 60,000 bird deaths a year. This is a big problem for raptors whose migrational use of thermals often put them directly through wind farms.

Pesticide Field

Pesticides likely poison an estimated 67 million birds per year according to the Smithsonian Institution. While many species that eat bugs or plants in these agricultural fields are affected, top predators like raptors are affected the most because of bioaccumulation through the food chain.



Migration Course Layout





Sleuth

Should I Stay or Should I Go?

<p><i>As you migrate to the breeding grounds, a storm rolls in and pushes you off course.</i></p> <p>Pay 1 Token</p>	<p><i>You're a resident, so you don't have to deal with the hazards of migration.</i></p> <p>Receive 2 Tokens</p>
<p><i>Many predators in the tropics might prey on your eggs or your young.</i></p> <p>Pay 2 Tokens</p>	<p><i>Food is scarce during the long, cold winter.</i></p> <p>Pay 3 Tokens</p>
<p><i>During your long migration flight, you've lost half your body weight and arrive on the breeding grounds in poor condition.</i></p> <p>Pay 2 Tokens</p>	<p><i>You are a temperate resident and have first choice of territories on the breeding grounds.</i></p> <p>Receive 2 Tokens</p>



Should I Stay or Should I Go?

<p><i>Thanks to strong tail winds, you've migrated to your breeding grounds in time to secure a good territory.</i></p> <p>Receive 1 Token</p>	<p><i>During the cold winter, you spend lots of energy to keep warm.</i></p> <p>Pay 2 Tokens</p>
<p><i>There is a lot of competition for food in the tropics. You are limited in the number of nestlings you can raise.</i></p> <p>Pay 1 Token</p>	<p><i>You have an adequate food supply year round because you don't spend winter in the temperate zone.</i></p> <p>Receive 2 Tokens</p>
<p><i>While migrating south to your wintering grounds, you hit a cell tower and are badly injured.</i></p> <p>Pay 2 Tokens</p>	<p><i>You have plenty of food to eat while you are nesting in the temperate area. You can lay many eggs and raise lots of young.</i></p> <p>Receive 2 Tokens</p>



Sleuth

Meet a Scientist: Nate Senner

Nate Senner has been around birds his entire life, but he became excited about studying them when he was in school. Growing up in Alaska, Nate learned about different species and their natural habitats by volunteering with biologists, or scientists who study living organisms.

Now, Nate studies the Hudsonian Godwit, a type of migratory bird. Right now, scientists don't know a lot about godwits. Nate wants to know when and where they travel and stop, which habitats they live in, and how many godwit adults and chicks survive each year. These birds live in habitats that are being damaged by humans and climate change. Nate works to learn about godwits and their habitat needs to help with conservation efforts to protect birds.

Nate spends a lot of time observing Godwits in their different habitats. This means spending the summer months at the Hudsonian Godwits' breeding grounds in the Arctic, where chicks are born and raised. Nate watches the birds' behaviors and counts the adults and chicks that survive after the summer. By counting every year, Nate can see if the population of Hudsonian Godwits is increasing, decreasing, or staying the same over the years.

The Godwits spend the fall and winter months on the other end of the world, at the southern tip of South America. Because Nate cannot follow them there and back, he and his team use special tools to track the birds and learn about their migration patterns. During the summer, Nate and his team attach tiny machines to the godwits' feet. As the tagged godwits travel, twice each day the machines log data about their location.

When Nate returns to the Arctic the next summer, he recaptures the godwits and analyzes the data logged on the machines. A computer creates a map of where each godwit has been, showing that godwits spend most of their time in northern Canada in the summer and in South America in the winter. On the way back from South America, they stop in Northern Mexico, Texas, Kansas, and Southern Canada. One bird can travel 61,000 miles in a day, and from the Hudson Bay to the Amazon in 5 days!

Nate shares his information with other scientists and local communities by writing articles and talking about his work. He thinks that one difficult part of being a scientist is not being able to know everything about the godwits, because so much information still needs to be collected. However, this is exciting because it means that there is still a lot left to learn about birds and science!



Nate Senner

Nate and a member of his team putting a band on a Hudsonian Godwit in the Arctic.





Habitat Name Slips

North America Habitat	Tropical Habitat
Temperate Grassland	Tropical Grassland
Arctic Coast	Tropical Coast
Deciduous Forest	Cloud Forest
Coniferous Forest	Tropical Dry Forest
Boreal Forest	Rainforest





Sleuth

Habitat Map Key

North and South America





Blackburnian Warbler

Summer Habitat:

Deciduous Forest

Winter Habitat:

Cloud Forest

Diet: Insects and spiders year-round

Conservation Status: least concern (populations appear to be stable)



Chestnut-collared Longspur

Summer Habitat:

Temperate Grassland

Winter Habitat:

Tropical grassland in Mexico

Diet: Seeds and insects

Conservation Status: near threatened (populations appear to be declining in most areas)



Red Knot

Summer Habitat:

Arctic Coast

Winter Habitat:

S. American Coast

Diet: Insects in the summer; mussels and crabs in winter

Conservation Status: least concern (but occurrence in large numbers, at traditional staging areas during migration makes them vulnerable to habitat loss)

Migratory Bird Cards



Summer Tanager

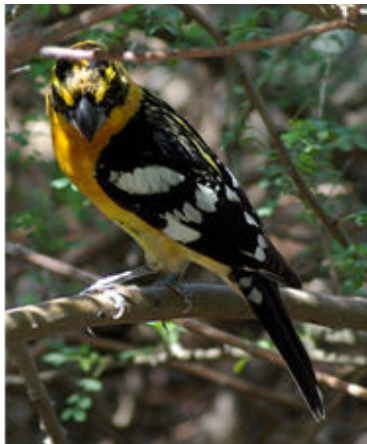
Summer Habitat:
Temperate Forest

Winter Habitat:
Rain Forest

Diet: Insects (especially bees, wasps) in summer; fruit during the winter

Conservation Status: least concern (populations appear to be stable)

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Black-headed Grosbeak

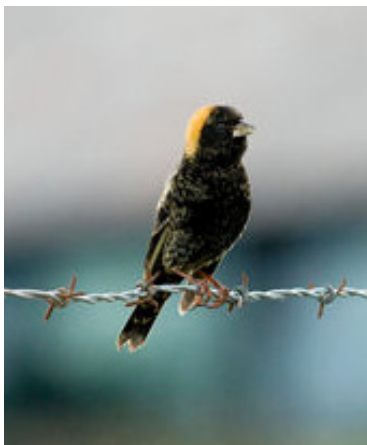
Summer Habitat:
Coniferous Forest

Winter Habitat:
Tropical Dry Forest

Diet: Insects, seeds, fruits

Conservation Status: least concern (populations are slightly increasing)

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Bobolink

Summer Habitat:
Temperate Grasslands

Winter Habitat:
Tropical Grasslands

Diet: Seeds, rice, and grains

Conservation Status: least concern (but populations are declining)



Temperate Habitat: TEMPERATE GRASSLAND

Example: Great Plains of the United States

Conservation Challenge: Overgrazing by livestock and plowing are the two of the greatest threats to temperate grasslands. Since the development of the steel plow, much of these grasslands have been converted to agricultural lands because of their rich soil. Lack of fire and habitat fragmentation are also threats.

Habitat Photos



Temperate Habitat: BOREAL FOREST

Example: Evergreen forests in Northern Canada and Alaska

Conservation Challenge: Large parts of forests are being cut down for trees to make paper products like sales catalogs and toilet paper. Sometimes, people also damage these forests as they search for natural resources such as oil, minerals, and lumber.



Habitat Photos



Temperate Habitat: ARCTIC COAST

Example: Northern coasts of Alaska and Canada

Conservation Challenge: This habitat is being altered by increasing temperatures and changing weather conditions due to climate change, and by humans drilling for oil. Climate change and oil exploration disturb the ice that the Arctic plants and animals depend upon.

Habitat Photos



Temperate Habitat: DECIDUOUS FOREST

Example: Forests in many states east of the Mississippi River

Conservation Challenge: Forests are being cut down to build housing developments and roads. There is increasing demand to drill in North American forests for natural gas. Acid rain (caused by industrial and vehicle emissions) is a threat. Non-native species have been introduced and may compete for food and habitat space, possibly threatening the native species.

Habitat Photos

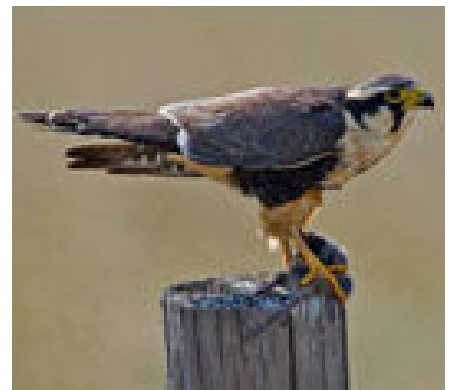
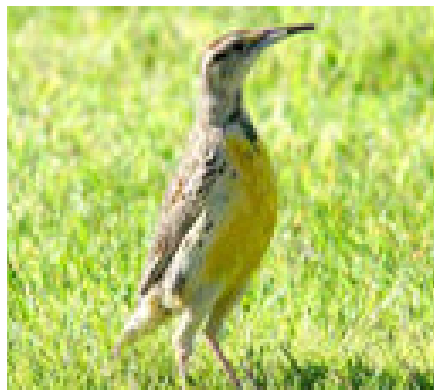


Temperate Habitat: CONIFEROUS FOREST

Example: Forests in California

Conservation Challenge: New diseases and insect pests are affecting trees in this habitat. Acid rain (caused by industrial and vehicle emissions) is a threat. Humans prevent forest fires, which are a normal and natural part of encouraging the growth of new trees in this habitat. Forests are being flooded to make reservoirs for drinking water.

Habitat Photos



Tropical Habitat: TROPICAL GRASSLAND

Example: Chihuahuan grassland in Mexico

Resident Species: Worthen's Sparrow, Lillian's Meadowlark, Aplomado Falcon

Conservation Challenge: Native Grasslands are being cleared to make space for agriculture that uses a lot of chemical fertilizer, water and energy, which are scarce resources. In time, soil nutrients are used up, and the land tends to turn to un-natural wastelands.

Habitat Photos



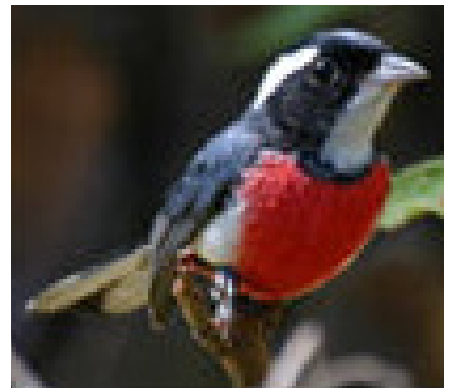
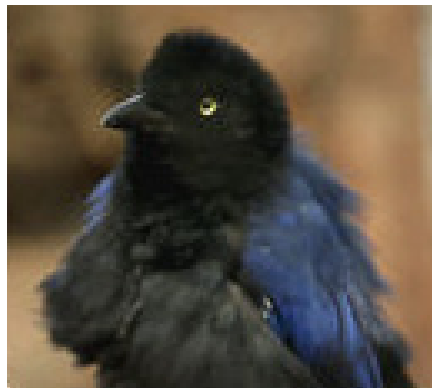
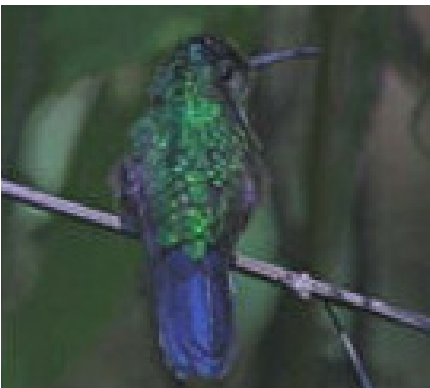
Tropical Habitat: SOUTH AMERICAN COAST

Example: Coast of Argentina

Resident Species: Crested Duck, Two-banded Plover, Snowy-crowned Tern

Conservation Challenge: Overfishing and unsustainable aquaculture are damaging this habitat and removing key species from it. Invasive species affect birds through competition, predation, and changing the plant communities in the area.

Habitat Photos



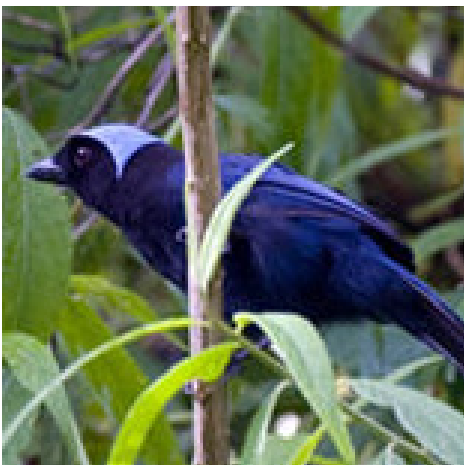
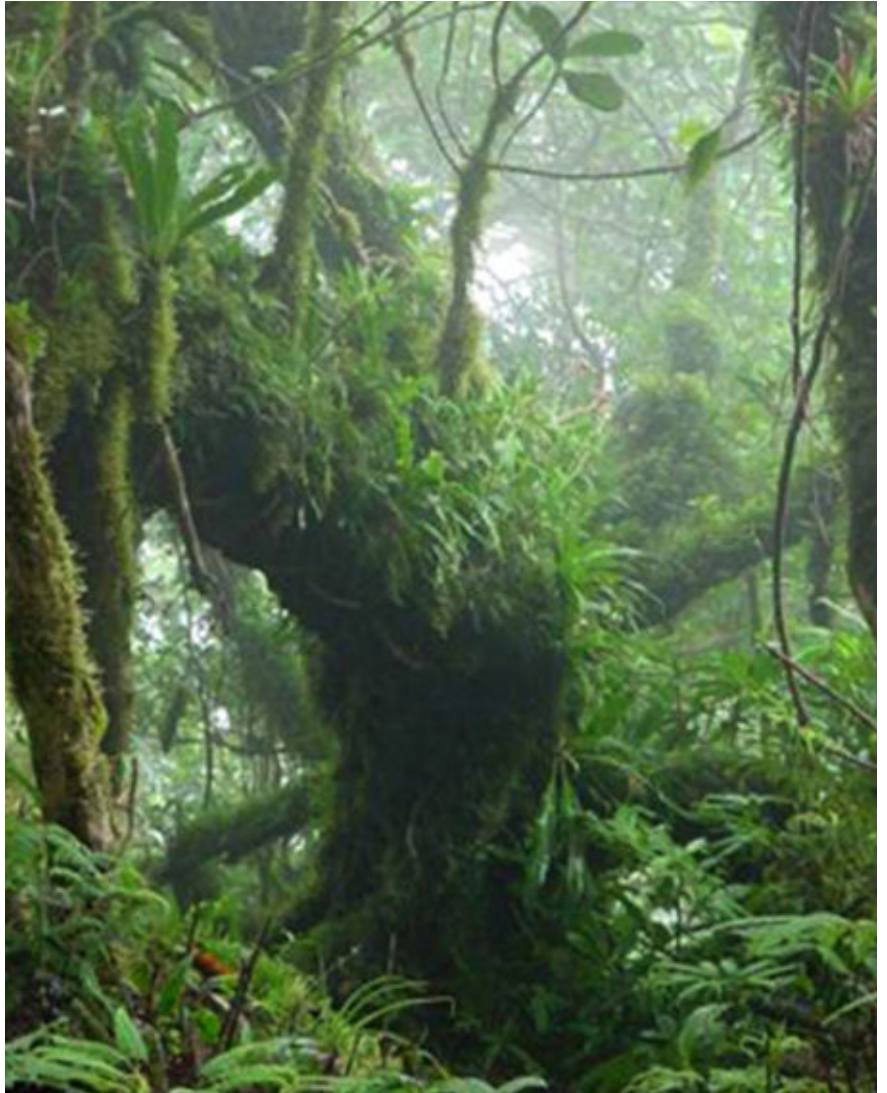
Tropical Habitat: TROPICAL DRY FOREST

Example: Deciduous dry forests in Mexico and northwestern South America

Resident Species: Mexican Wood-nymph, Purplish-backed Jay, Red-breasted Chat

Conservation Challenge: These forests are cut down to make space for crops and to build tourist resorts in coastal areas. Trees found here are often slow growing, and ecosystems can take hundreds of years to recover.

Habitat Photos



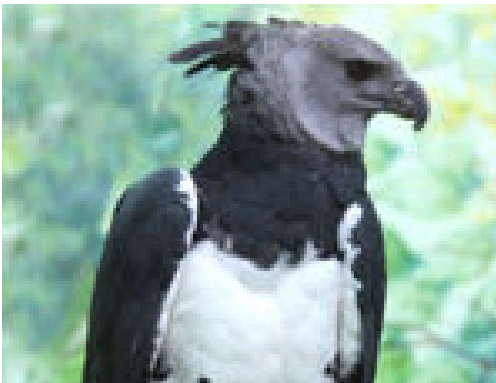
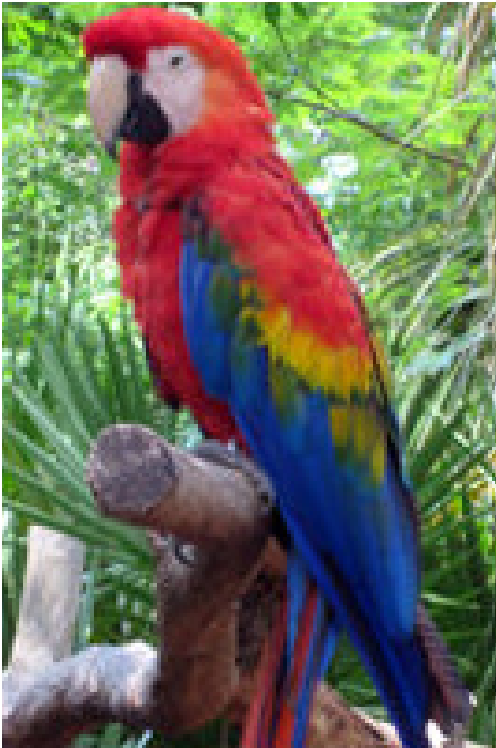
Tropical Habitat: CLOUD FORESTS

Example: The very humid rainforests of Costa Rica and Guatemala

Resident Species: Azure-hooded Jay, Resplendent Quetzal, Highland Guan

Conservation Challenge: These rainforests are cleared for raising livestock and growing crops. The soil in these forests quickly loses nutrients through deforestation, agriculture, and erosion. This causes more rainforest to be cut down.

Habitat Photos



Tropical Habitat: RAIN FORESTS

Example: Evergreen forests in the mountains of southern India

Resident Species: Harpy Eagle, Scarlet Macaw, Great Tinamou

Conservation Challenge: These forests are being cut down to make space for livestock and agriculture. These farms use a lot of chemical fertilizer, water, and other precious resources. Once cut down, it can take thousands of years for a forest to return to its original state.



Pick a Project

eBird

eBird is a quick and simple online bird checklist. Visit **<http://ebird.org/content/ebird/about>** to learn more about the program, and register to start entering data. The best thing about eBird are the citizen scientists adding their data every day from all over the world! You can look at organized charts, graphics, and timelines based on the eBird data to discover things you never knew about birds all around the world and in your own backyard. You can do eBird any time, anywhere. Students with lots of different interests will be able to find answers to their questions using the eBird data. Give it a try!

Celebrate Urban Birds

Celebrate Urban Birds or CUBs promotes conservation in urban areas through gardening, observing birds, and the arts. You can sign up at **<http://www.birds.cornell.edu/celebration/join-us/about>** and get your free kit. CUBs encourages participants to submit data about the birds in their area online, to make a good home for local birds by gardening and growing bird-friendly plants, and to show their love of local birds by drawing, painting, photographing or sculpting them. If you already love your urban birds, or are just getting to know a few, then CUBs might be right for you.

Project FeederWatch

Project FeederWatch is a citizen science program that takes place in the winter. Set up a bird feeder and base your counts on who visits the feeder every day. You can learn more and get started submitting data at **http://www.birds.cornell.edu/pfw/InstruxandUpdates/inst_index.html** and then use your data and data from around the country to learn more about what birds are up to during the winter months. If you want to keep the birds in your neighborhood fed and happy all winter while learning more about them and helping scientists, try Project FeederWatch!





adaptation—a characteristic that allows a bird to survive and reproduce in the area in which it lives.

arctic coast—the coastline above Canada, and up into the Arctic is characterized by constant changing of ice flows.

arthropods—invertebrate animals, such as insects and spiders, with a segmented body and external skeleton.

boreal forest—subarctic evergreen forests of pine, spruce, fir, and larch stretching in northern North America and Eurasia.

breeding range—the geographic area where a bird species can be found while breeding and raising young. This is sometimes called the bird's "summer range."

carnivore—an animal whose diet consists mainly of meat.

Celebrate Urban Birds—a citizen science project that connects people to nature through science and the arts, and raises awareness of city birds and urban greening.

citizen science—A network between public observations and scientists that help to answer large questions.

citizen scientist—a person who collects data to be used for scientific studies.

classification—how animals are grouped together according to their shared characteristics and evolutionary relationships.

cloud forest—high mountain forests where temperatures are uniformly cool and fog or mist keeps vegetation wet all the time.

common name—a bird's non-scientific name. For example, *Ceryle alcyon* is also known by its common name, Belted Kingfisher.

coniferous forest—a type of forest with mostly cone-bearing trees.

conservation—preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife.

consumer—an organism that cannot produce its own food and gets its energy by eating other organisms. Animals are consumers.

deciduous forest—a temperate deciduous forest with trees that lose their leaves every year.

decomposer—living creatures, such as bacteria and fungi, that break down dead plant or animal matter for energy.

distribution—the geographic locations where a bird is found. Distributions are shown on maps as shaded areas.

eBird—a citizen science project that provides a simple way to record bird observations online. The information is shared among scientists, educators, students and bird watchers who want to know more about the distribution and movement of birds around the world.

ecosystem—a community in nature where animals, plants, and other living things interact with each other and the non-living things around them.

egg—bird eggs are laid by females and incubated for a time that varies according to the species. A single young hatches from each egg.

evolution—ongoing process by which living organisms change over time in response to changing environments. The diversity of life we see today are a result of the evolutionary process.

Science Glossary

feeder—an outdoor container for bird feed that is used to attract wild birds.

feather—a growth that comes from the skin of all birds, feathers are used in flight, insulation, and waterproofing.

field guide—a book with illustrations and descriptions of various bird species. Most field guides group birds according to their taxonomic order, instead of alphabetically.

field marks—distinctive colors and patterns used in identification. Breast spots, wing bars (thin lines across the wings), and eyerings (circles around the eyes) are common field marks.

fledgling—a young bird that has left the nest and is capable of flight.

food chain—a sequence that shows the flow of energy through organisms.

food web—a diagram showing all of the food-chain interactions in a group of species.

habitat—the place where a bird (or other animal) lives which provides the food, water, cover, and space that it needs to survive. Examples include wetlands, open woods, and forest edges.

herbivore—an animal whose diet consists mainly of plants.

introduced species—a species that was not originally part of an ecosystem, but was brought there either on purpose or by accident.

interdependence—the relationship between living and non-living things in which all must coexist together and need each other to survive.

invasive species—an introduced species that has a negative effect on native species.

invertebrates—animals without a backbone, such as spiders, insects, snails, and worms.

keystone species—a species whose role in the ecosystem has great influence over the environment's health.

migration—the seasonal movements of animals from one geographic region to another.

migratory bird—a bird that makes seasonal journeys. Most migrants move to their breeding grounds each spring, then back to their nonbreeding grounds in the fall.

native—original to a particular location, meaning the species or community started and developed there rather than arriving later.

natural selection—the process by which organisms who are better adapted to their environment tend to survive and produce more offspring.

nestling—a young bird that has not left the nest.

nonbreeding range—the geographic area where a bird can be found during the nonbreeding winter months (also called the “wintering range”). Birds that do not migrate have the same range year-round.

non-native—opposite of native. Not original to a location but either introduced or arrived at a later time

non-renewable resource—natural resources that can be completely used up, for example: coal, oil, gas, and metal ores.

omnivore—an animal that eats both plants and animals.

plumage—a bird's feather colors and patterns.

Project FeederWatch—a citizen science project in which participants survey birds that visit their feeders in winter months. The data collected helps scientists track bird movement, distribution, and abundance.

Science Glossary

predator—an animal that hunts and kills other animals for food.

producer—an organism that makes its own food through photosynthesis. Plants and algae are producers.

rain forest—A flourishing, dense forest rich in biodiversity, found typically in tropical areas with consistently heavy rainfall.

range map—map showing the geographic area where a species is found.

renewable resource—a natural resource that is replenished naturally over time, for example: wood, solar energy.

scavenger—an animal that either eats dead animals or searches through garbage for food.

scientific name—a bird's Latin name which has two parts—genus and species. The Belted Kingfisher's scientific name is *Ceryle alcyon*.

sexual dimorphism—males and females appear different from each other.

silhouette—the shape created by a bird's outline. Silhouettes are shown as dark shapes against light backgrounds.

South American coast—a variety of ecosystems exist along the South American coast line, to mangrove swamps, sand beaches, and rocky shores.

species—in taxonomy, this category is the most specific classification. Birds grouped in the same species can breed with each other and generally share common habitats, appearance, and behavior.

species account—the information about each bird that is provided in a field guide. Most species accounts include a common name, scientific name, size, visual description, distribution map, habits, sound description, and a picture.

taxonomic order—the scientific categories used to group living organisms: kingdom, phylum, class, order, family, genus, and species. These categories are arranged in a hierarchy, with “kingdom” being the most general and “species” the most specific.

temperate grassland—ecosystem that is dominated by grasses, has few trees, and is characterized by cold winters.

temperate resident—a non-migratory species that is found in cool temperate regions.

territory—an area defended by an animal or group of animals against others of the same species or other species.

tropical dry forest—a type of forest found near the equator that has distinct rainy and dry seasons. Many tropical dry forest plants are adapted to withstand high temperatures and seasonal droughts.

tropical grasslands—a grassland biome located in subtropical and tropical latitudes. Grasslands are dominated by grass and other herbaceous plants.

tropical resident—a non-migratory species that is found in warm tropical regions.

vertebrates—animals with a backbone, such as humans, lions, lizards, birds, and fish.

year-round range—the geographic area where a bird can be found year-round. This is the total range for a nonmigratory bird, or the overlap zone between breeding and nonbreeding ranges for some migratory birds.

