Endangered Populations

Students research the decline of certain species and the reasons for the decline. A visit to a state park or natural area will introduce them to diverse habitats. Using the scavenger hunt activity in this exercise will help to sharpen their observation skills.

Background

A visit to a state park, zoo, aquarium or natural history museum can be a reminder of the great diversity of life on Earth. This diversity provides a countless variety of foods, life-saving medicines and materials for daily life. The species around today have evolved and changed through time, and thousands of types of plants and animals once in existence have been lost to extinction. Some species have gone the way of the dinosaurs, wiped out by some change in ecological conditions or by other natural causes such as disease or predation. In recent times, plants and animals have been rendered endangered or extinct by human activities: exploitation (such as market hunting), habitat alteration or destruction, pollution, climate change and the introduction of invasive species.

Why save endangered species? Congress gave one answer to this question with the Endangered Species Act of 1973. The act's preamble states that endangered species of fish, wildlife and plants "are of esthetic, ecological, educational, historical, recreational and scientific value to the Nation and its people." This law works to preserve imperiled species and calls for the conservation of critical habitat—the areas of land, water and air space that these species need for survival. Species in trouble are identified and placed on a state or federal list of endangered and threatened wildlife and plants. An endangered species is defined as one that is in danger of extinction. A threatened species is one that is likely to become endangered within the foreseeable future.

Some of Virginia's endangered species include mammals such as the gray bat, freshwater fish such as the Roanoke logperch, breeding birds such as the peregrine falcon and the red-cockaded woodpecker, and many small invertebrates that most people have never seen or heard of, such as the Madison cave isopod or Virginia fringed mountain snail.

The gray bat roosts in relatively large limestone caves, migrating to and hibernating in just a few caves in winter. Roosts are always near large bodies of permanent water such as rivers, lakes and reservoirs, and the caves always have flowing water on their floors. During the summer, gray bats roost in caves from southwestern Virginia across to central Missouri, south to northern Florida, and west to southeastern Kansas and northwestern Oklahoma. Adult female gray bats migrate first, in early September. By mid-October juveniles and adult males also migrate; some colonies move as far as 300 miles between summer roosts and winter hibernation sites. The females emerge from hibernation in early April and return to their summer roosts, followed by yearlings and adult males. The entrances of the caves used by these bats may be only a few feet in diameter and can be impossible to locate from more than a few feet away. Because gray bats navigate using echolocation signals that can travel no more than about 6 feet, it is not known how these bats learn the migration route and then locate hidden cave entrances hundreds of miles away.

Migrating gray bats tend to follow rivers, where they can also feed on flying insects that hover over the water. (All

Grade Levels: 3-6

Objective

Students will *investigate* changes in population levels by *modeling* the behavior of a species confronted with impediments to survival.

Materials

- plants, shovels, watering cans

Where

All parks and selected natural area preserves. Endangered and threatened plants and animals are often, by definition, uncommon and shouldn't be disturbed. Before visiting a park or preserve for this activity, check with staff to find out if any of these species can be seen without disturbing them.

When

Daylight hours; year-round.

Time Required

60 minutes for the walk.

bats in Virginia eat insects.) As they migrate, gray bats use suitable caves as temporary roosting stops. Even though these stopover caves are used by gray bats for only a few days in spring and fall, they provide critical resting places. Some of these caves may provide the only suitable shelter between the bats' summer and winter roosts. If these caves were no longer available, many bats might not survive their migratory journey.

The winter roosts of gray bats are in Missouri, Tennessee, Kentucky, Alabama and Arkansas. Ninety percent of all gray bats hibernate in just nine cave systems in these states; less than 5 percent of available caves have the right conditions for gray bats to hibernate. Hibernating gray bats form dense clusters of thousands of individuals, making them especially vulnerable to intentional and accidental acts that cause death. Thousands of roosting gray bats have been intentionally killed by vandals. Many more are killed by white nose syndrome or accidentally by amateur cave explorers who don't realize that these animals can use up all their winter fat reserves (and thus literally starve to death) if they are prematurely awakened from hibernation. This species is listed as endangered because so many bats are concentrated in so few caves each winter. Loss of the bats (due to intentional or accidental acts of people or white nose syndrome disease) in any one of these caves would represent a significant reduction in numbers of this species.

Procedure

Before the Trip:

1. Consult with park staffers to find an open area suitable for this activity.
2. Review with the class the concept of a habitat: the area in which a plant or animal finds the things it needs for survival, such as light or food, water, shelter, space and the opportunity to reproduce.
3. Have students draw or describe their own habitats, depicting where they get their food, water, shelter and space.
4. Lead students into a discussion about extinction with questions such as:
   - *What would happen if you were deprived of one of your basic needs?*
   - *What would you do?*
   - *What would an animal do? A plant?*
   - *What would happen if you or the plant or animal didn't fulfill that need?*
   - *What would happen if all members of a species were unable to fulfill that need?*
5. Next, have students brainstorm about ways that some of these needs might not be met (in both healthy and disturbed environments). Have them write their ideas on the board.
6. Print the attached Habitat Scavenger Hunt List.

At the Site

Divide students into groups and give each student a habitat sheet to complete. Large groups of students can be divided into smaller groups. Have one group start in an area to find habitat for birds, another for mammals, etc. Students can use cameras to take pictures, make a drawing and take notes during the hike.

Follow-up

1. Back in the classroom, have each group gather and discuss what it found on the scavenger hunt. Using pictures, drawings and notes, the students give an oral report on what was found.
2. Access information on the Internet and help students find out more about a species chosen from the accompanying lists of threatened and endangered species or from a more complete one provided by a state or federal agency (see "Resources"). Have them write short reports (with original art) or fictional stories about the species and its plights, bringing out such points as:
   - the species' needs for survival.
   - why the species became imperiled.
   - ways people can help (or could have helped) it to survive.

Resources

Bat Conservation International. http://www.batcon.org/

Project/Edubat. http://batslive.pwnet.org/edubat/curriculum.php

Complete list of Virginia's rare plants and animals can be downloaded at http://www.dcr.virginia.gov/natural_heritage/infoservices.shtml#lists

Natural Heritage Data Explorer-County lists of rare species. https://vanhde.org/species-search

Natural Heritage Resources Coloring Sheets of Rare Plants, Animals and Significant Communities. http://www.dcr.virginia.gov/environmental_education/documents/ybc-nh-coloring-pages.pdf

Natural Heritage Resources Fortune Teller Game. http://www.dcr.virginia.gov/environmental_education/documents/ybc-fortune-teller.pdf

WhiteNoseSyndrome. https://www.whitenosesyndrome.org/resources/education and http://www.dcr.virginia.gov/natural_heritage/vcbwhitenose.shtml

Department of Conservation and Recreation, Natural Heritage Division, 600 East Main Street, 24th Floor, Richmond, VA 23219.

Exploring Virginia's Endangered Species. Virginia Museum of Natural History. 21 Starling Ave., Martinsville, VA 24112. 276-634-4141.

U.S. Fish and Wildlife Service. Virginia Field Office, 6669 Short Lane, Gloucester, VA 23061. 804-693-6454

Virginia Department of Game and Inland Fisheries. http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf

Endangered Populations

Selected Endangered and Threatened Species of Virginia

Amphibians

Endangered
Tiger salamander (*Ambystoma tigrinum*)
Shenandoah salamander (*Plethodon shenandoah*)

Threatened
Mabee's salamander (*Ambystoma mabeei*)
Barking treefrog (*Hyla gratiosa*)

Shenandoah salamander

Endangered
Lee County cave isopod (*Lirceus usdagalun*)
Big Sandy crayfish (*Cambarus veteranus*)
Spruce-fir moss spider (*Microhexura montivaga*)
Virginia Piedmont water boatman (*Sigara depressa*)
Buffalo Mountain mealybug (*Puto kosztarabi*)
Mitchell's satyr (*Neonympha mitchellii*)

Threatened
Madison cave isopod (*Antrolana lira*)
Ellett Valley Pseudotremia millipede (*Pseudotremia cavernarum*)
Laurel Creek xystodesmid millipede (*Sigmoria whiteheadi*)
Madison cave amphipod (*Stygobromus stegerorum*)
Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*)
Appalachian grizzled skipper (*Pyrgus wyandot*)

Birds (based on breeding status)

Endangered
Wilson's plover (*Charadrius wilsonia*)
Peregrine falcon (*Falco peregrinus*)
Red-cockaded woodpecker (*Picoides borealis*)
Roseate tern (*Sterna dougallii*)
Appalachian Bewick's wren (*Thryomanes bewickii altus*)

Threatened
Bachman's sparrow (*Aimophila aestivalis*)
Henslow's sparrow (*Ammodramus henslowii*)
Upland sandpiper (*Bartramia longicauda*)
Piping plover (*Charadrius melodus*)
Loggerhead shrike (*Lanius ludovicianus*)
Gull-billed tern (*Sterna nilotica*)

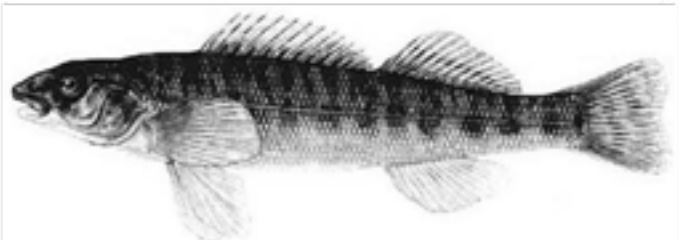
Endangered Populations

Selected Endangered and Threatened Species of Virginia

Fish

Endangered

Shortnose sturgeon (*Acipenser brevirostrum*)
Atlantic sturgeon (*Acipenser oxyrinchus*)
Blackbanded sunfish (*Enneacanthus chaetodon*)
Sharphead darter (Etheostoma acuticeps)
Blueside darter (*Etheostoma jessiae*)
Duskytail darter (*Etheostoma percnurum*)
Variegate darter (*Etheostoma variatum*)
Roanoke logperch (*Percina rex*)
Tennessee dace (*Phoxinus tennesseensis*)



Roanoke logperch

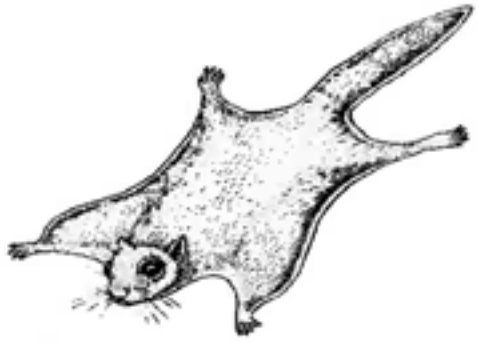
Threatened

Blackside dace (*Chrosomus cumberlandensis*)
Western sand darter (*Ammocrypta clara*)
Turquoise shiner (*Cyprinella monacha*)
Steelcolor shiner (*Cyprinella whipplei*)
Slender chub (Erimystax cahni)
Greenfin darter (*Etheostoma chlorobranchium*)
Carolina darter (*Etheostoma collis*)
Tippecanoe darter (*Etheostoma denoncourti*)
Whitemouth shiner (*Notropis alborus*)
Emerald shiner (*Notropis atherinoides*)
Yellowfin madtom (*Noturus flavipinnis*)
Orangefin madtom (*Noturus gilberti*)
Longhead darter (*Percina macrocephala*)
Paddlefish (*Polyodon spathula)*

Mammals

Endangered

Eastern big-eared bat (*Corynorhinus rafinesquii*)
Virginia big-eared bat (*Corynorhinus townsendii virginianus*)
*Eastern cougar (*Felis concolor couguar*)
Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*)
Snowshoe hare (*Lepus americanus*)
Southern rock vole (*Microtus chrotorrhinus carolinensis*)
Gray bat (*Myotis grisescens*)
Indiana bat (*Myotis sodalis*)
Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*)
Southern water shrew (*Sorex palustris punctulatus*)



Virginia northern flying squirrel

Threatened

Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*)

Indiana bat (drawing by Megan Rollins)

Selected Endangered and Threatened Species of Virginia

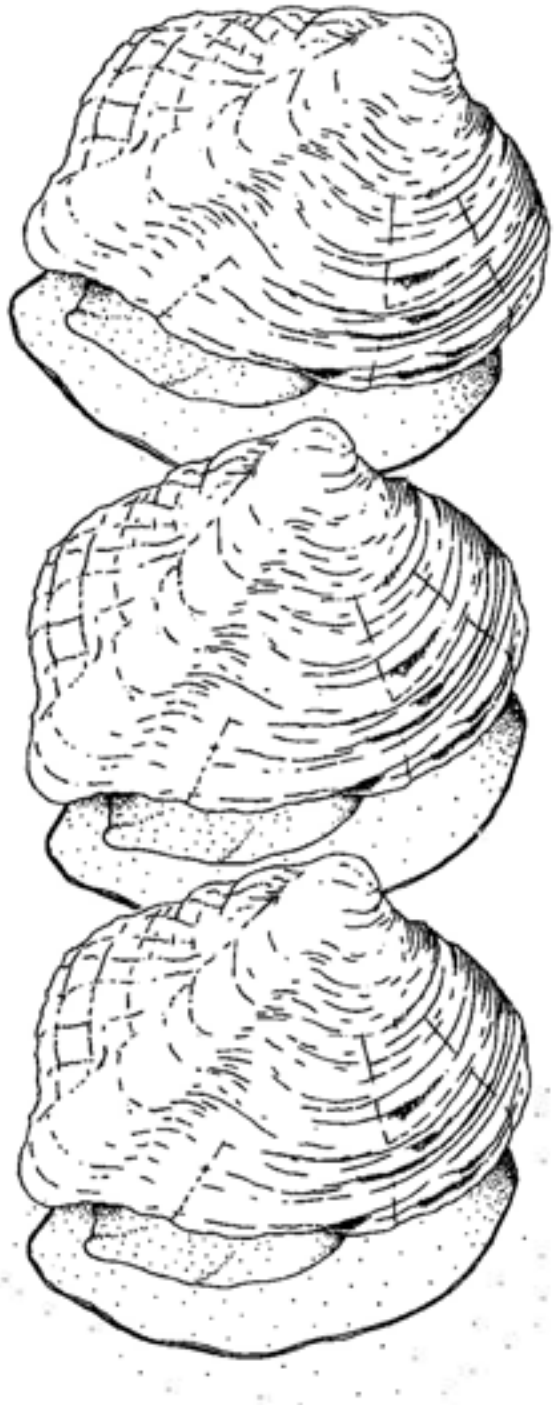
Mollusks

Endangered

Dwarf wedgemussel (*Alasmidonta heterodon*)
Brook floater (*Alasmidonta varicosa*)
Slippershell mussel (*Alasmidonta viridis*)
Spectacle case (*Cumberlandia monodonta*)
Fanshell (*Cyprogenia stegaria*)
Dromedary pearlymussel (*Dromus dromas*)
Elephant ear (*Elliptio crassidens*)
Cumberland combshell (*Epioblasma brevidens*)
Oyster mussel (*Epioblasma capsaeformis*)
Tan riffleshell (*Epioblasma florentina walkeri*)
*Green-blossom pearlymussel (*Epioblasma torulosa gubernaculum*)
Snuffbox (*Epioblasma triquetra*)
Shiny pigtoe (*Fusconaia cor*)
Fine-rayed pigtoe (*Fusconaia cuneolus*)
Shaggy coil (*Helicodiscus diadema*)
Rubble coil (*Helicodiscus lirellus*)
Cracking pearlymussel (*Hemistena lata*)
An aquatic cavesnail (*Holsingeria unthanksensis*)
*Pink mucket (*Lampsilis abrupta*)
Tennessee heelsplitter (*Lasmigona holstonia*)
Birdwing pearlymussel (*Lemiox rimosus*)
Spirit supercoil (*Paravitrea hera*)
Little-winged pearlymussel (*Pegias fabula*)
James spinymussel (*Pleurobema collina*)
Ohio River pigtoe (*Pleurobema cordatum*)
Rough pigtoe (*Pleurobema plenum*)
Pyramid pigtoe (*Pleurobema rubrum*)
Virginia fringed mountain snail (*Polygyriscus virginicus*)
Rough rabbits foot (*Quadrula cylindrica strigillata*)
Cumberland monkeyface (*Quadrula intermedia*)
Appalachian monkeyface (*Quadrula sparsa*)
Purple liliput (Toxolasma lividus)
Deertoe (T*runcilla truncata*)
Purple bean (*Villosa perpurpurea*)
*Cumberland bean (*Villosa trabalis*)

Threatened

Atlantic pigtoe (*Fusconaia masoni*)
Spiny riversnail (*Io fluvialis*)
Fragile papershell (*Leptodea fragilis*)
Slabside pearlymussel (*Lexingtonia dolabelloides)*
Black sandshell (*Ligumia recta*)
Brown supercoil (*Paravitrea septadens*)
Sheepnose (*Plethobasus cyphyus*)
Pistolgrip (*Toxolasma lividum*)
Pimple back (*Quadrula pustulosa*)



Appalachian monkeyface

Selected Endangered and Threatened Species of Virginia

Plants

Endangered and Threatened
Sea-beach amaranth-(Amaranthus pumilus)
Small-anthered bittercress (Cardamine micranthera)
Sensitive Joint-vetch (*Aeschynomene virginica*)
Shale-barren rockcress (*Boechera serotina*)
Harper's fimbristylis (*Fimbristylis perpusilla*)
Michaux's sumac (*Rhus michauxii*)
Virginia sneezeweed (*Helenium virginicum*)
Swamp-pink (*Helonias bullata*)
Long-stalked holly (*Ilex collina*)
Peter's mountain mallow (*Iliamna corei*)
Small whorled pogonia (*Isotria medeoloides*)
Nestronia (*Nestronia umbellula*)
Northeastern bulrush (*Scirpus ancistrochaetus*)
Virginia spiraea (*Spiraea virginiana*)
Prairie Fringed Orchid (*Platanthera leucophaea*)
Narrow-leaved Spatterdock (*Nuphar sagittifolia*)
New Jersey Rush (*Juncus caesariensis*)

Small whorled pogonia

Reptiles

Endangered
Bog turtle (*Clemmys muhlenbergii*)
Canebrake rattlesnake (*Crotalus horridus atricaudatus*)
Chicken turtle (*Deirochelys reticularia*)
Kemp's ridley sea turtle (*Lepidochelys kempii*)

Threatened
Loggerhead sea turtle (*Caretta caretta*)
Wood turtle (*Clemmys insculpta*)
Eastern glass lizard (*Ophisaurus ventralis*)

*Extinct and Extirpated in Virginia

Endangered Populations

Habitat Scavenger Hunt List

Birds

- ☐ Nuts
- ☐ Seeds
- ☐ Materials for a nest
- ☐ Place where birds can get water
- ☐ Shelter

Red-cockaded Woodpecker

- ☐ Insect or spider
- ☐ Cavity in a tree
- ☐ Fallen tree (holes)

Pine Trees

- ☐ Longleaf Pine
- ☐ Shortlead Pine
- ☐ Loblolly Pine

Mammal (Squirrel)

- ☐ Nest
- ☐ Where they can get water
- ☐ Seeds
- ☐ Acorns
- ☐ Shelter
- ☐ Materials for nest

Insects and spiders

- ☐ Holes in leaves
- ☐ Spider web
- ☐ Decomposed wood
- ☐ Insects caught in web

Reptiles (Turtles)

- ☐ Water
- ☐ Riparian buffers
- ☐ Insects
- ☐ Mud
- ☐ Algae

Animal Sounds

- ☐ Birds
- ☐ Crickets
- ☐ Squirrels
- ☐ Frogs

SOLS: 3.1, 3.4, 3.5, 3.6, 3.10, 4.1, 4.5, 4.8, 4.9, 5.1, 5.7, 6.1, 6.9, LS.8, LS.10, LS.11, 7.1, 10.1