



Audubon

# ADVENTURES<sup>®</sup>

## Teacher's Guide

Ohio Series

### THE OHIO OF YESTERYEAR

In the 1700s a green blanket of forest, interrupted here and there by open prairies, bogs, and marshes, covered what is now Ohio. Although the rich woodland was probably among the greatest forests ever to grace the earth, the settlers were more interested in other riches. Pioneers were impressed by the deep soils of the west, the lake to the north and river to the south, the magnificent wildlife, and the clear and cool streams. But they feared the forest.

Today, as Ohioans walk through second-growth woodlands and the few small tracts of preserved old-growth timber, they can only try to imagine the dark and forbidding grandeur of this forest-the-harbinger of darkness, strange beasts, and hostile Indians, which Ohio settlers fought and, at least for a time, conquered.

Despite its grandeur, the forest of giant trees that dominated the Ohio Country was a formidable enemy to farmers. Eager to establish a corn patch and vegetable garden, the backwoods settler attacked and conquered the forest armed with little more than great fortitude and a sharp axe. The “deadening” created by girdling the giant trees, followed by log-heap fires, became a common sight.

This assault on nature originated out of need, but in less than half a century had established a record of destruction of flora and fauna that perhaps stands unequalled.

Under frontier conditions, ecological and aesthetic consideration for the Ohio forest was out of the question. The commercial lumbering operation that followed a generation or so later merely completed the job at a faster pace. The tragedy of the reckless removal of the primeval forest was compounded by the nearly complete waste of what was perhaps the finest lumber in North America. More than likely the timber market arrived soon enough that many of the former backwoods settlers recalled with regret the prime timber which they had reduced to ash piles in their younger days.

Prairies in the glaciated western and north-central sections of the state were permanent openings in the forest, some several miles in length. And there were short-term natural openings created by tornadoes, deadfalls, and fires set by lightning (and some possibly set by Indians). Numerous frontiersmen, soldiers, and pioneers prayed in relief when, at last, they emerged from the dense canopied forest into sunlit openings.

The prairies were too wet in spring and too dry in summer and autumn to support trees, except in their more elevated portions called “islands,” where oak-hickory forests grew. James Kilbourne, in his *Report to the Scioto Company* (a real estate company), described a “clear meadow” of a thousand acres that existed in central Ohio in 1802, in which grasses grew “higher than a horse’s back” and was “without a tree or bush in

the whole extent.” Samuel R. Brown, writing in 1815, described “open and extensive prairies” surrounded by “fine oak and chestnut land in the vicinity of Sandusky Bay”; also “a natural meadow 90 miles long and from two to ten wide, extending from the mouth of the Portage” River, Ottawa County, westward around the western end of Lake Erie “to Brownstown” south of Detroit, Michigan.

The Great Black Swamp in northwestern Ohio ranked as one of the region’s greatest natural features and is estimated to have been 40 miles wide and 120 miles long, covering part or all of 18 present-day counties.

The Ohio Country was as rich in wildlife as it was in vegetation. Prior to the arrival of the settlers, the abundant wildlife populations were evidently in balance with one another and with the habitat. The Indian apparently had little impact on fish and game populations. Identification of skeletal remains from midden or refuse piles indicated Indian diets included all species of native mammals present in Ohio today, plus black bear, puma, and wolf. Elk and buffalo were present in at least limited numbers. The white-tailed deer was most important, but the Indians also ate passenger pigeons (now extinct), wild turkey, grouse, quail, Canada goose, and many kinds of ducks. From all indications the rivers provided an abundance of fishes, mollusks, turtles, and amphibians. It is believed that the elk and the buffalo were gone before many whites arrived, but during settlement times the balance of the wildlife community was intact.

*adapted from Hutchings, Edward F. 1979. Ohio’s Natural Heritage, Chapter 1. Michael B. Lafferty; Editor. Reprinted with permission of the Ohio Academy of Sciences, Columbus, Ohio.*

## OHIO’S ECOSYSTEMS

### Ohio’s Wetlands

Wetlands can be thought of as transition zones between open water and dry land. Three factors are usually used to define wetlands: 1) **hydrology** - water at or near the surface during some part of the growing season, 2) **hydric soils** - those that lack oxygen, and 3) **hydrophytic vegetation** - plants that are adapted to life in saturated conditions. There are many types of wetlands in Ohio: wet prairies, sedge meadows, fens, bogs, marshes, swamps, wet woods, and vernal pools. Many contain unique species of plants and animals adapted to a specific range of conditions.

Wetlands are among the earth’s most diverse and productive ecosystems. They can be compared to tropical rain forests and coral reefs in the diversity of species they support. Species that live in wetlands are influenced greatly by the presence of water and by fluctuating water levels throughout the year and from

year to year. As described in the student guide, some plants and animals have developed interesting and unique adaptations to these conditions.



Wetlands once covered about 19 percent of Ohio. Today, they account for less than 3 percent of the landscape. This amounts

to a 90 percent loss of this valuable ecosystem. With this loss has come the failure of the many functions that wetlands perform in the landscape. The Ohio Department of Natural Resources considers wetland loss to be the second leading cause of wildlife endangerment in the state. Also lost are some of the many benefits wetlands provide to humans, including storage of floodwater during heavy rains, recharge

of groundwater supplies, filtering of contaminants from surface water, and numerous recreational opportunities.

## Wetlands Vocabulary

adaptation  
migration  
purification  
marsh  
swamp  
bog  
insectivorous

## Ohio's Forests

Early land surveys conducted in the late 1700s reveal that 95 percent of Ohio was once covered by mature forest. The forests of the rugged, unglaciated hill



regions of southern and southeastern Ohio were predominately mixed oak and hickory. Beech and hemlock forests often appeared in the cooler gorges of this region. Much of the central, western, and northern portions of Ohio were covered by forests dominated by beech and maple. Swamp forests

dominated by elm and ash were found growing on the floodplains of the river valleys.

Today, forested areas cover about 30 percent of Ohio's landscape. In some western counties of the state, where agricultural production is rich, forests cover as little as three or four percent of the land. In the hilly and less productive regions of southern and southeastern Ohio, the land may be covered by more than 70 percent forest. Most is broadleaf, deciduous forest.

Only about three percent of our forests are dominated by coniferous (evergreen) trees. Virtually all of Ohio's existing forests have been altered by human activity. Only a few untouched stands of mature trees where the forest ecosystem is still complete can be referred to as "old growth" forest.

Ohio's fertile soils, plentiful rainfall, and moderate climate make it perfect for growing trees. Left undisturbed, nearly all of Ohio would eventually become forest once again. Left uncut, grasses would give way to shrubs, which would shade the soil, hold in moisture, and allow trees to grow. Pioneer species, such as elm, ash, and black cherry, would further shade the ground, allowing for dominant species such as oaks, maples, and beeches to take over once again. Evidence of this slow, but inevitable process of succession is visible in any abandoned Ohio farm field after just a few years.

## Forest Vocabulary

old growth  
deforestation  
succession  
decomposition  
erosion  
environmentalist  
wildlife biologist

## Ohio's Prairies

Prairies are beautiful and complex natural ecosystems dominated by perennial grasses mixed with a rich diversity of flowering plants. The prairies of North America are unlike any other natural community on earth. While they may at first look much like abandoned fields or meadows, they are very different. Fields and meadows, when left alone, undergo rapid succession and invasion by weeds and trees. Prairies are stable, fire-adapted communities that, when left

undisturbed, are seldom invaded by alien species.

When settlers first arrived in Ohio, they encountered over 300 prairies that ranged in size from several acres to several square miles. Most of these prairie “islands” were located in the western part of the state and surrounded by vast forest. Today prairies are considered to be one of Ohio’s rarest ecosystems, with most having disappeared to the plow and other human changes to the land. A few prairie remnants can still be found growing along roadsides, railroad right-of-ways, abandoned pioneer cemeteries, and other undisturbed areas.

Ohio prairies range from wet meadows – a system that is both a wetland and a prairie due to saturated soil conditions – to dry prairies that grow on the thin, rocky soils of hillsides. Prairies are composed mostly of perennial grasses and forbs with deep root systems. More than two-thirds of the typical prairie plant is underground, compared to one half or less for most forest plants or lawn grasses. This and other adaptations make prairie plants able to survive stressful conditions of heat, drought, and periodic fires. Many prairie plants have become popular with gardeners because of their varied color and ability to flourish under harsh conditions.



### Prairie Vocabulary

annual  
germination  
grass

grassland  
herbivore  
mixed prairie  
perennial

## ECOSYSTEM ACTIVITIES

### Natural State Symbols

While your students are learning about native Ohio ecosystems, teach or review the ways that scientists group forms of life. This activity will provide a fun introduction to categorizing various living and non-living objects, while teaching the official state symbols.

Provide your students with a list of Ohio’s official state symbols:

Mammal	white-tailed deer
Bird	Northern cardinal
Wildflower	large-flowered trillium
Tree	Ohio buckeye
Insect	ladybird beetle
Fish	small-mouthed bass
Reptile	blue racer
Fossil	trilobite
Gemstone	flint

Help them to decide what order / or other grouping is appropriate for each (bird, mammal, fossil, etc.). Then ask your students to find the pictures of Ohio’s official state symbols in one of the three student issues. They can circle each symbol as they find it.

### Follow-up:

\* Break your students into small groups. Assign each group one of the state symbols. Have each group research their symbol using field guides, encyclopedias, and other sources. Have them write a story or a report about their assigned symbol.

\*Quiz your students on the state symbols.

## Threatened and Endangered Species in Ohio

w – found mostly in wetlands

f – found mostly in forests

p – found mostly in prairies

### *Birds*

American bittern – w

bald eagle – w

black tern – w

Canada warbler – f

common tern – w

hermit thrush – f

king rail – w

least bittern – w

Magnolia warbler – f

Northern harrier – w

pipit plover – w

sandhill crane – w

sedge wren – w, p

upland sandpiper – p

winter wren – f

yellow-crowned night heron – w

### *Mammals*

Indiana bat – f

Eastern wood rat – f

bobcat – f

river otter – w

woodland jumping mouse – w, f

star-nosed mole – w

### *Amphibians*

Eastern spadefoot toad – w

### *Reptiles*

Blanding's turtle – w

Eastern plains garter snake – p

fox snake – w

Massasauga rattlesnake – w, p

Northern copperbelly watersnake – w

spotted turtle – w

timber rattlesnake – f

## A Wildlife Inventory

This activity will build upon the state symbols activity, giving your students more experience in grouping wildlife according to animal orders. It will also introduce them to another way of grouping wildlife – according to where they live.

Ask your students to examine each of the three student issues and then complete a list of all animals in each ecosystem.

### Follow-up:

\* Have students do a similar inventory for the wildlife in their yards or in the school yard.

\* Have students study one or more of the ecosystems through books, videos, etc., and have them add several species of wildlife to each order of their inventory.

\* Have the students keep a wildlife inventory during field trips.

\* Have a wildlife biologist / naturalist visit the class and talk about ways they inventory wildlife.

\* Have students explore the Ohio Wildlife History Timeline. (See *Suggested Curriculum/Activity Guides* section.)

## Extirpated Species In Ohio

### *Mammals*

snowshoe hare

rice rat

porcupine

timber wolf

marten

fisher  
mountain lion  
lynx  
wapiti (elk)  
bison

### *Birds*

American swallow-tailed kite  
greater prairie chicken  
common raven  
Bachman's sparrow  
ivory-billed woodpecker  
passenger pigeon (extinct)  
Carolina parakeet (extinct)

### Where is the Nearest Wetland, Prairie, and Forest?

Have your students research where the nearest wetland, prairie, and forest is to your school, and / or to their homes. Have them list any wetlands, prairies, or forests they might know of near your school. Then have them check with the local park district, field office of the Ohio Department of Natural Resources, Ohio Environmental Protection Agency, or the Soil and Water Conservation District for your county to find some good examples of these ecosystems near your school. Have the students find and mark these areas on a map. Then have them map out a route between each ecosystem and their school and / or home. Call the county engineer's office to see if maps are available for your area, or use the *Ohio Gazetteer*. This could be a preparatory activity prior to a field trip to a local site.

### Growing Prairie Plants

Growing a prairie garden can be an enjoyable way for students to learn about this most endangered of Ohio's native ecosystems. Space requirements are limited. A corner of your schoolyard should do. Consult with

an experienced person or agency that can give you a list of plants that are native to your particular area and can advise you on how and when to plant. The Ohio Department of Natural Resources, Aullwood Audubon Center and Farm, or Grange Insurance Audubon Center (see contact section) can provide you with information on planting prairie gardens. Starting a prairie can be lots of fun and watching the results of your care and time is very rewarding. The Web Resources list at the end of this guide includes links to a number of grant programs to help fund development of school wildlife gardens and outdoor learning areas.

### Forest Artwork

This activity will get your students to explore the various objects found in the woods. Provide each student with a sturdy piece of blank paper. Have them "paint" a picture of a forest using only natural materials as their medium. Dirt, flowers, moss, and other objects can all be rubbed onto the paper to create various colors.

### Adopt A Wetlands Study Animal

Your students can learn much about wetlands and their role in the life of a salamander or newt by adopting a wetland study animal for your classroom. Prepare a terrarium following internet research. Have the students help research the habitat needs of their new animal in advance. Students can help to catch insects to feed their amphibian. Visit your local pet store or science supply company for information on what kinds of salamanders or newts are available. Make sure you get plenty of information on the care and feeding of the pet in advance. An alternative would be to acquire tadpoles and grow them into adult frogs in a terrarium. Be sure to ask your pet store owner if the animal you wish to purchase was born and raised in captivity and not captured from the wild. In the interest of protecting our native amphibians, only captive raised

animals should be purchased.

### Experience Ohio's Natural Heritage First Hand

Nothing can teach your students more about native Ohio ecosystems than a well-planned trip to a local wetland, prairie, or forest. It is not necessary, however, to visit a high quality natural area. Students can learn much from a visit to a small local wetland, wooded area, or grassland. Study some of the features of the ecosystem to be visited in advance and help prepare the students to identify some of the most common plants and animals of the area. Take field guides with you. You do not need to be able to identify plants and animals to take your students on a field trip. Look the plants and animals up with your students and try to identify them.

Many individuals and agencies are available to help your class learn more about native Ohio ecosystems. Consider contacting your local park district, nature center, college, or Ohio Department of Natural Resources office. Also consider asking your local Audubon Society chapter to help lead your students on a field trip to a local wetland, forest, or prairie.

#### *Did You Know?*

... The once-extensive inland and coastal marshes of western Lake Erie have been reduced to less than 5 percent of their original expanse.

... Some of the finest hardwoods in the world grow in Ohio. A walnut tree in Pioneer, Ohio was once sold for \$35,000.

... Early Ohio settlers thought any land that could not grow trees would be too poor to be farmed. Prairie soils have since proven to be among the most productive in the world.

... Tallgrass prairies once covered over 400,000 square miles in the United States.

... Prairie is the name for North America's native grasslands. Names for other grasslands around the world include: steppes, downs, savannas, veldts, and pampas.

... The world's largest grasslands are the steppes of Europe and Asia.

... Most of the crops that feed the world are actually seeds of domesticated grasses.

... One square acre of North America prairie in mid-summer contains 10 million insects according to one estimate.

... Of the 200 species of fish found in the Great Lakes, about 90 percent are directly dependent upon wetlands during some stage of their life cycle.

... Festivals such as International Migratory Bird Day in May and Wing Watch Weekend in April attract thousands of visitors from all over Ohio, as well as from out of state, to the marshes of Lake Erie to watch the spring bird migration.

... There are over 100 different hardwood tree species and 25 softwood tree species growing in Ohio.

... Ninety-four percent of Ohio's forests are privately owned.

... Ohio ranks fourth nationally in maple syrup production, averaging 100,000 gallons each year.

### Ohio Academic Content Standards - 2007

Over the past several years Ohio teachers have continued to strengthen their classroom science curriculum to address important skills needed by students to successfully complete the science portion of the Ohio Achievement Test. The activities presented in the three special Ohio ecosystem (prairies, wetlands, forests) issues of Audubon Adventures Ohio Series

have been designed to be an additional resource for student competency learning.

### Grade-Level Indicators Addressed

#### English Language Arts – Acquisition of Vocabulary

**Grade 3 – ELAV1** – Determine the meaning of unknown words using a variety of context clues, including word, sentence and paragraph clues.

**Grade 3 – ELAV5** – Apply knowledge of individual words in unknown compound words to determine their meanings.

**Grade 3 – ELAV9** – Determine the meanings and pronunciations of unknown words by using dictionaries, glossaries, technology and textual features, such as definitional footnotes or sidebars.

**Grade 4 – ELAV1** – Determine the meaning of unknown words by using a variety of context clues, including word sentence and paragraph clues.

**Grade 4 – ELAV7** – Identify the meanings of prefixes, suffixes and roots and their various forms to determine the meanings of words.

**Grade 4 – ELAV9** – Determine the meanings and pronunciations of unknown words by using dictionaries, glossaries, technology and textual features, such as definitional footnotes or sidebars.

**Grade 5 – ELAV1** – Define the meaning of unknown words by using context clues and the author’s use of definition, restatement and example.

**Grade 5 – ELAV6** – Apply the knowledge of prefixes, suffixes and roots and their various inflections to analyze the meanings of words.

**Grade 5 – ELAV8** – Determine the meanings and pronunciations of unknown words by using dictionaries, thesauruses, glossaries, technology and textual features, such as definitional footnotes or sidebars.

#### English Language Arts – Writing Processes

**Grade 3 – ELWP1** – Generate writing ideas through discussions with others and from printed material.

**Grade 3 – ELWP5** – Organize writing by providing a simple introduction, body and a clear sense of closure.

**Grade 3 – ELWP13** – Use resources and reference

materials, including dictionaries, to select more effective vocabulary.

**Grade 4 – ELWP1** – Generate writing ideas through discussions with others and from printed material.

**Grade 4 – ELWP5** – Organize writing, beginning with an introduction, body and a resolution of plot, followed by a closing statement or a summary of important ideas and details.

**Grade 4 – ELWP13** – Use resources and reference materials, including dictionaries, to select more effective vocabulary.

**Grade 5 – ELWP1** – Generate writing ideas through discussions with others and from printed material, and keep a list of writing ideas.

**Grade 5 – ELWP6** – Organize writing, beginning with an introduction, body and a resolution of plot, followed by a closing statement or a summary of important ideas and details.

**Grade 5 – ELWP17** – Prepare for publication (e.g., for display or for sharing with others) writing that follows a format appropriate to the purpose, using techniques such as electronic resources and graphics to enhance the final product.

#### Mathematics – Data Analysis and Probability Standard

**Grade 3 – MDA1** – Collect and organize data from an experiment, such as recording and classifying observations or measurements, in response to a question posed.

**Grade 3 – MDA5** – Match a set of data with a graphical representation of the data.

**Grade 3 – MDA7** – Analyze and interpret information represented on a timeline.

**Grade 4 – MDA1** – Create a plan for collecting data for a specific purpose.

**Grade 4 – MDA2** – Represent and interpret data using tables, bar graphs, line plots and line graphs.

**Grade 4 – MDA3** – Interpret and construct Venn diagrams to sort and describe data.

**Grade 5 – MDA1** – Read, construct and interpret line graphs, circle graphs and histograms.

**Grade 5 – MDA2** – Select, create and use graphical representations that are appropriate for the type of data collected.

**Grade 5 – MDA3** – Compare representations of the same data in different types of graphs, such as a bar graph and circle graph.

### **Science – Life Science:**

**Grade 3 - SCLS1** – Compare the life cycles of different animals including birth to adulthood, reproduction and death (e.g., egg-tadpole-frog, egg-caterpillar- chrysalis-butterfly.)

**Grade 3 - SCLS2** – Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

**Grade 3 - SCLS3** – Classify animals according to their characteristics (e.g., body coverings and body structure).

**Grade 3 - SCLS6** – Describe how changes in an organism’s habitat are sometimes beneficial and sometimes harmful.

**Grade 4 - SCLS1** – Compare the life cycles of different plants including germination, maturity, reproduction and death.

**Grade 4 - SCLS2** - Relate plant structures to their specific functions (e.g., growth, survival and reproduction).

**Grade 4 - SCLS3** - Classify common plants according to their characteristics (e.g., tree leaves, flowers, seeds, roots and stems).

**Grade 4 - SCLS5** - Describe how organisms interact with one another in various ways (e.g., many plants depend on animals for carrying pollen or dispersing seeds).

**Grade 5 - SCLS1** – Describe the role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis.

**Grade 5 - SCLS2** – Explain how almost all kinds of animals’ food can be traced back to plants.

**Grade 5 - SCLS3** – Trace the organization of simple food chains and food webs (e.g., producers, herbivores, carnivores, omnivores and decomposers).

**Grade 5 - SCLS4** – Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms.

**Grade 5 - SCLS5** – Support how an organism’s pattern of behavior are related to the nature of that organism’s ecosystem, including the kinds and numbers of other organisms present, the availability of food and resources, and the changing physical characteristics of the ecosystem.

**Grade 5 - SCLS6** – Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g., beaver ponds, earthworm burrows, grasshoppers eating plants, people planting and cutting trees and people introducing a new species).

### **Social Studies - Geography**

**Grade 3 – SSG6** – Identify and describe the landforms and climate, vegetation, population and economic characteristics of the local community

**Grade 3 – SSG7** – Identify ways that physical characteristics of the environment (i.e., landforms, bodies of water, climate and vegetation) affect and have been modified by the local community.

**Grade 4 – SSG4** – Use maps to identify the location of major physical and human features in Ohio including: Lake Erie; rivers; plains; the Appalachian Plateau.

**Grade 4 – SSG5** – Describe and compare the landforms, climates, population, vegetation and economic characteristics of places and regions in Ohio.

**Grade 4 – SSG8** – Identify how environmental processes (i.e., glaciation and weathering) and characteristics (landforms, bodies of water, climate, vegetation) influence human settlement and activity in Ohio.

**Grade 4 – SSG9** – Identify ways that people have affected the physical environment of Ohio including: use of wetlands; use of forests; building farms, towns and transportation systems; using fertilizers, herbicides and pesticides; building dams.

**Grade 5 – SSG3** – Describe and compare the landforms, climate, population, culture and economic characteristics of places and regions in North America.

**Grade 5 – SSG8** – Explain how the characteristics of different physical environments affect human activities in North America.

**Grade 5 – SSG9** – Analyze the positive and negative consequences of human changes to the physical environment.

# Suggested Curriculum / Activity Guides:

*Wow: The Wonders of Wetlands: An Educator's Guide.*

1995. 330 pp. Environmental Concerns Inc. P.O. Box P, St. Michaels, Maryland 21663 (410) 745-9620. An excellent K-12 activity guide full of helpful background material and innovative activities that teach about wetlands.

*Habitats For Learning: A Planning Guide For Using and Developing School Land Labs.* 1995. 76 pp. And *Habitats For Learning: A Directory Of School Land Labs.* 137 pp. Ohio Environmental Education Fund – Ohio Environmental Protection Agency and the Ohio Department of Natural Resources. OEEF, Ohio Environmental Protection Agency, P.O. Box 1049, Columbus, OH 43216. (614) 644-2873. The guide helps educators begin to use what already exists on school grounds to promote outdoor education as well as teaching them how to enhance and develop these areas to better meet their school's needs.

There are some excellent environmental education programs available to Ohio teachers who will take the time to attend a short training session. These programs include interdisciplinary activity guides for K-12 classrooms.

*Project Learning Tree.* American Forest Foundation. In Ohio, Contact the ODNR, Division of Forestry, 1855 Fountain Square Court H-1, Columbus, OH 43224. (614) 265-6694 Activity guide is only available to those who attend a 6-hour PLT workshop.

*Project WET (Water Education for Teachers)* Montana State University. In Ohio, Contact the Ohio Water Education Program, c/o ODNR Division of Soil and Water Conservation, 1939 Fountain Square Court E-2, Columbus, OH 43224 (614) 265-6610. K-12 activity guide available through in-service workshops.

*Project WILD, Project WILD Aquatic and Project Flying WILD.* In Ohio, Contact the ODNR, Division of Wildlife, 1840 Belcher Drive G-1, Columbus, OH 43224 (614) 265-6300. Interdisciplinary activity guides available only to those who attend a workshop.

*Nature Scope*, National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036-2266. Curriculum packets on various topics, including: “Wading Into Wetlands”; “Incredible Insects”; “Let’s Hear It For Herps!”; “Birds, Birds, Birds,”; “Amazing Mammals – Part I and II”; and “Endangered Species.”

## Music Recordings:

*Magpie: Living Planet, and Seed on the Prairie*, Greg Artzner and Terry Leonino, Collectors Records, 1604 Arbor View Road, Silver Springs, MD 20902.

*The Bat Chorus, and The Frog Chorus*, David Stokes, Tomorrow River Recordings, Milwaukee, WI.

## Further Reading:

Braun, E. Lucy. 1961. *The Woody Plants of Ohio – Trees, Shrubs, and Woody Climbers Native, Naturalized, and Escaped.* Ohio State University Press. Columbus, OH 362 pp.

Eastman, John and Amelia Hansen. 1992. *The Book of Forest and Thicket – Trees, Shrubs, and Wildflowers of Eastern North America.* Stackpole Books. Harrisburg, PA 212 pp.

Kircher, John C. and Gordon Morrison. *A Field Guide to Eastern Forests.* Houghton Mifflin Co. Boston, MA 368 pp.

Ladd, Doug and Frank Oberle. 1993. *Tallgrass Prairie*. The Nature Conservancy. Falcon Press Publishing Co. Helena, MT. 262 pp.

Lafferty, Michael (ed). 1979. *Ohio's Natural Heritage*. Ohio Academy of Sciences. Columbus, OH. 324 pp.

Lyons, J. and S. Jordon. 1989. *Walking Wetlands: A Hiker's Guide to Common Plants and Animals of Marshes, Bogs, and Swamps*. John Wiley and Sons Inc. New York. 222 pp.

Madson, John. 1995. *Where the Sky Began*. Houghton Mifflin Co. Boston, MA. 326 pp.

Niering, W.A. 1985. *Wetlands: Audubon Society Nature Guides*. Alfred Knopf, New York. 638 pp.

Smith., J. Robert and Beatrice S. Smith. 1980. *The Prairie Garden: 70 Native Plants You Can Grow in Town or Country*. University of Wisconsin Press. Madison, WI.

### Contacts:

Ohio Department of Natural Resources  
Fountain Square, Columbus, OH 43224  
(614) 265-6565  
<http://www.dnr.state.oh.us>

#### Divisions of ODNR:

Wildlife	(614) 265-6300
Soil and Water Conservation	(614) 265-6610
Forestry	(614) 265-6610
Publications	(614) 265-6659

Ohio Environmental Protection Agency  
50 W. Town Street, Suite 700  
Columbus, OH 43215  
(614) 644-3020  
<http://www.epa.ohio.gov/>

USDA, Forest Service  
Wayne National Forest  
Supervisor's Office  
219 Columbus Rd., Athens, OH 45701  
(614) 592-6644

*For general information and local chapters contact:*  
Audubon Ohio

c/o Grange Insurance Audubon Center  
505 West Whittier Street  
Columbus, OH 43215  
Phone: (614) 545-5475  
<http://www.audubonohio.org/>

*Ohio Audubon nature centers;*  
Aullwood Audubon Center and Farm  
1000 Aullwood Rd.,  
Dayton, OH 45414  
Phone: (937) 890-7360  
<http://aullwood.center.audubon.org/>

Grange Insurance Audubon Center  
505 West Whittier Street  
Columbus, OH 43215  
Phone: (614) 224-3303  
<http://grange.audubon.org>

## Web Resources:

### FORESTS:

Buckeye Forest Council -  
<http://www.buckeyeforestcouncil.org/>  
Ohio DNR Division of Forestry -  
<http://www.ohiodnr.com/forestry/>  
Ohio Tree Index -  
<http://www.dnr.state.oh.us/forestry/trees/default.htm>

### PRAIRIES:

42 Explore – Prairies -

<http://42explore.com/prairie.htm>

Ohio Prairie Association -

<http://www.ohioprairie.org/>

Ohio Prairies – ODNR-DNAP -

<http://www.ohiodnr.com/dnap/prairies/default.htm>

Ohio State Marion – Prairie NC

<http://www.marion.ohio-state.edu/prairie/default.html>

Prairies Forever -

<http://www.prairies.org/>

### **WETLANDS:**

Learning About Wetlands -

<http://vathena.arc.nasa.gov/curric/land/wetland/>

National Wetlands Research Center -

<http://www.nwrc.usgs.gov/>

Ohio Watershed Network -

<http://ohiowatersheds.osu.edu/index.html>

U.S. EPA Wetlands -

[http://www.epa.gov/region5/water/wshednps/topic\\_wetlands\\_education.htm](http://www.epa.gov/region5/water/wshednps/topic_wetlands_education.htm)

Ohio Wetlands Foundation -

<http://www.ohiowetlands.org/>

### **GENERAL INTEREST:**

EEK – Environmental Ed for Kids -

<http://www.dnr.state.wi.us/org/caer/ce/eeek/index.htm>

National Geographic – Habitats -

<http://www.nationalgeographic.com/geographyaction/habitats/>

Ohio History Central -

<http://www.ohiohistorycentral.org/index.php>

Ohio State Symbols -

<http://www.ohiohistorycentral.org/category.php?c=SS>

Missouri Botanical Gardens -

<http://www.mbgnet.net/>

Blue Planet Biomes-World Biomes -

[http://www.blueplanetbiomes.org/world\\_biomes.htm](http://www.blueplanetbiomes.org/world_biomes.htm)

### **ENVIRONMENTAL ORGANIZATIONS:**

Akron Zoo -

<http://www.akronzoo.org/>

American Forests -

<http://www.americanforests.org/>

Audubon Ohio -

<http://www.audubon.org/chapter/oh/oh/index.html>

Aullwood Audubon Center and Farm (Dayton) -

<http://www.audubon.org/local/sanctuary/aullwood/>

Boonshoft Museum of Discovery (Dayton) -

[www.boonshoftmuseum.org/](http://www.boonshoftmuseum.org/)

Brukner Nature Center (Troy) -

<http://www.bruknernaturecenter.com/>

Cincinnati Zoo -

<http://www.cincyzoo.org/>

Cleveland Metroparks Zoo -

<http://www.clemetzoo.com/>

Columbus Zoo -

<http://www.colszoo.org/>

Dawes Arboretum (Newarkj) -

<http://www.dawesarb.org/>

Grange Insurance Audubon Center (Columbus) -

<http://www.grangeinsuranceauduboncenter.org/>

Holden Arboretum (Willoughby) -

<http://www.holdenarb.org/>

Lake Erie Nature and Science Center (Bay Village) -

<http://www.lensc.org/>

National Wildlife Federation -

<http://www.nwf.org/>

Nature Center at Shaker Lakes -

<http://www.shakerlakes.org/>

Ohio Historical Society -

<http://www.ohiohistory.org/>

Ohio Parks and Recreation Association -

<http://www.opraonline.org/>

Sierra Club – Ohio -

<http://www.sierraclub.org/oh/>

The Nature Conservancy – Ohio

<http://www.nature.org/wherewework/northamerica/states/ohio/>

Toledo Metroparks -

[www.metroparkstoledo.com/](http://www.metroparkstoledo.com/)

Toledo Zoo -

<http://www.toledozeo.org/>

U.S. Fish and Wildlife Service -

<http://www.fws.gov/>

The Wilds (Cumberland) -

<http://www.thewilds.org/>

### **OHIO STATE AGENCIES:**

Ohio Department of Natural Resources -

<http://www.dnr.state.oh.us/>

Ohio DNR Division of Natural Areas and Preserves -

<http://www.ohiodnr.com/dnap/>

Ohio DNR Division of Wildlife -

<http://www.ohiodnr.com/WILDLIFE/>

Ohio Environmental Protection Agency -

<http://www.epa.state.oh.us/>

Ohio EPA Office of Environmental Ed -

<http://www.epa.state.oh.us/oef/>

Ohio Geological Survey -

<http://www.ohiodnr.com/geosurvey/>

### **TEACHER WORKSHOPS:**

National Flying Wild Website -

<http://www.flyingwild.org/>

Ohio Flying Wild -

[http://www.muc.edu/academics/nature\\_center/whats\\_new/flying\\_wild\\_has\\_migrated\\_to\\_northeast\\_ohio](http://www.muc.edu/academics/nature_center/whats_new/flying_wild_has_migrated_to_northeast_ohio)

Ohio Project Learning Tree -

<http://www.ohiodnr.com/forestry/education/plt.htm>

Ohio Project WET -

<http://www.ohiodnr.com/water/educate/owep/wetmain.htm>

Ohio Project WILD -

[http://www.ohiodnr.com/wildlife/resources/projectwild/project\\_wild.htm](http://www.ohiodnr.com/wildlife/resources/projectwild/project_wild.htm)

### **FREE OHIO NATURAL HISTORY MAGAZINES:**

Ohio Natural Areas Magazine -

<http://www.ohiodnr.com/dnap/publications/newsletter/default.htm>

Ohio State Parks Magazine -

<http://www.ohiodnr.com/parks/explore/magazine/default.htm>

Wild Ohio Magazine -

<http://www.ohiodnr.com/wildlife/Resources/wildohio/wildohio.htm>

Project funded by:



Audubon OHIO

Printing Courtesy of



Printed on recycled paper

