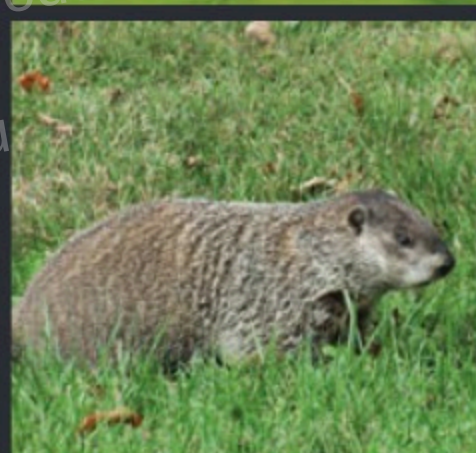
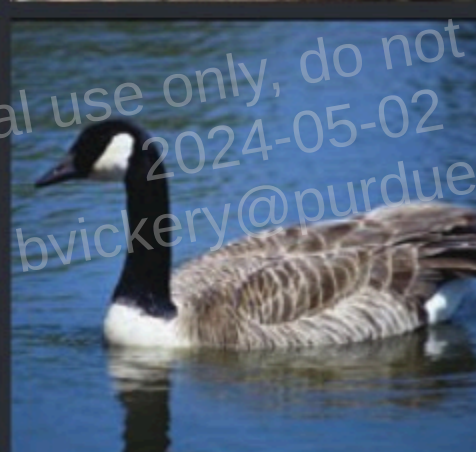
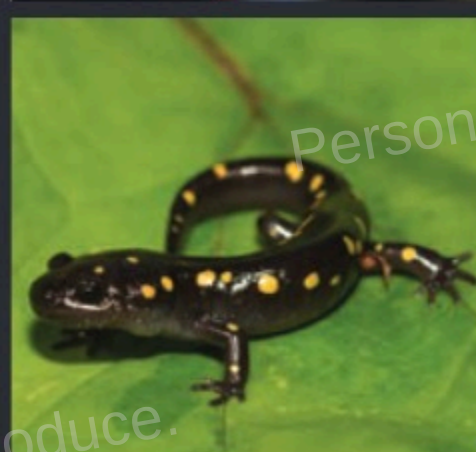
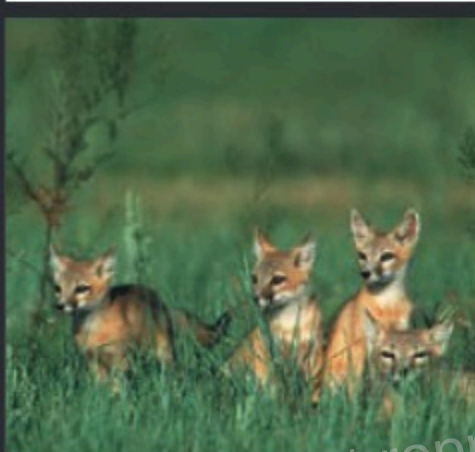
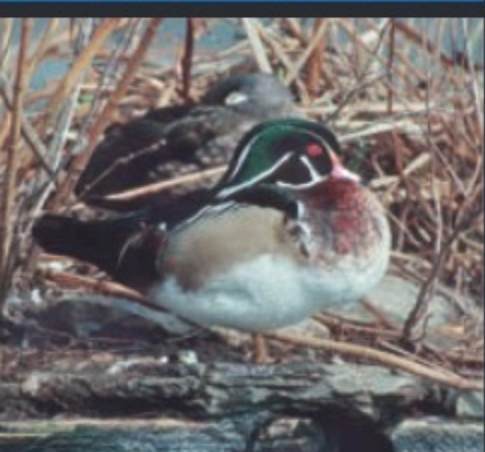
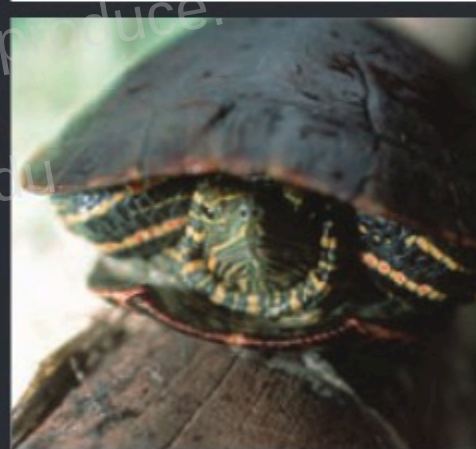
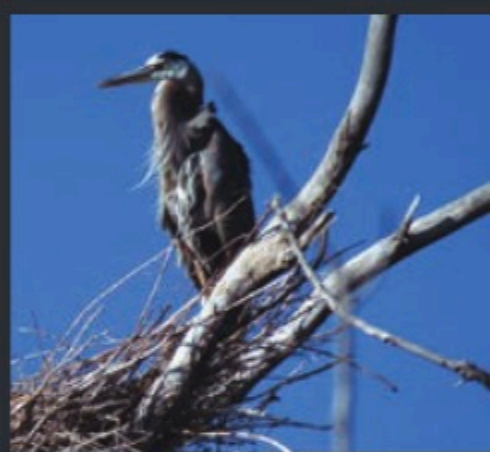
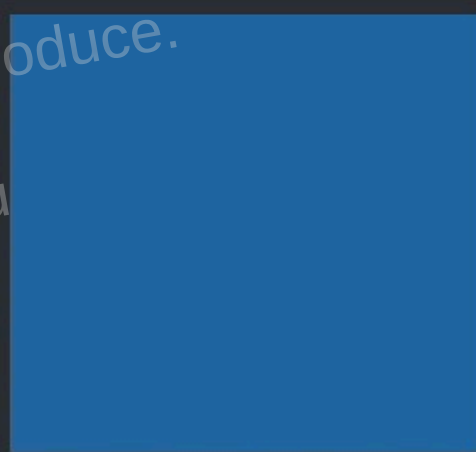
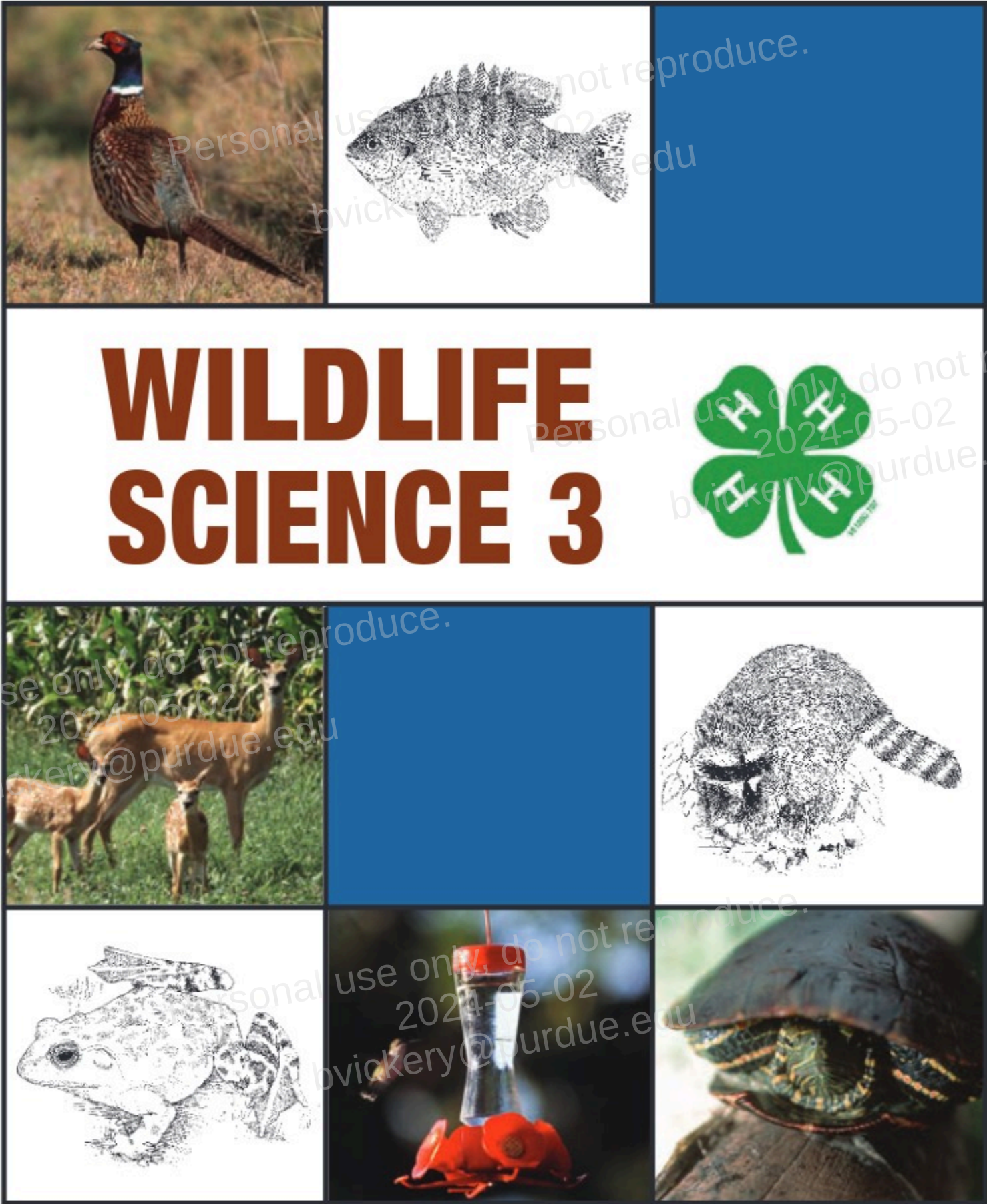


# WILDLIFE SCIENCE 3





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## NOTE TO 4-H MEMBER

The 4-H Wildlife Science curriculum is for youth who enjoy studying wildlife. Activities in Level 3 are divided into chapters based on how you might use the information you've learned—as a homeowner, resident of a watershed, food and fiber producer (farmer), mayor, teacher, or legislator. Level 3 delves deeper into the study of wildlife. It can prepare you to be well informed and to study wildlife-related topics at a college or university.

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Words defined in the glossary are in **bold** the first time they appear in the text.

### Your Wildlife Journal

Keep track of all your wildlife observations. You can organize your journal in different ways:

- A section for each month and year of study
- A section for each vertebrate class: mammals, birds, fish, reptiles, and amphibians
- Another method of your choosing

Discuss the Let's Chat questions with your parent, 4-H leader, or other facilitator after you have completed the activity.

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Homeowners and renters should have a basic understanding of wildlife so they can properly and safely manage their home while enjoying the wildlife around them. Wildlife in the wrong place can

cause costly damage and other problems. Activities in this chapter help you learn to study the wildlife around you, create wildlife **habitat**, and reduce possible conflicts with wildlife

## STUDYING WILDLIFE HABITAT

*What is the home range of vertebrates that live near you?*

### INTRODUCTION

Wild animals must be able to find food, shelter, and water in their **home range**. Home range is the amount of room a species typically travels to fulfill its basic needs. Wildlife biologists have researched many species to estimate the amount of room they need. The estimates are approximate and can change during food shortages, drought, and extreme weather conditions. Examples:

- Beaver: less than 6 square miles
- Cottontail rabbit: 3 to 20 acres
- Raccoon: a half-mile to 2 miles
- Red fox: 1-2 square miles
- Striped skunk: 120-150 acres



Flight allows birds access to food, water, and shelter over a larger area than other vertebrates, so wildlife biologists cite birds' range, rather than home range. Range indicates where you could expect to find a



particular bird species, rather than the distance one animal may travel. Here are two examples of ranges:

- Eastern wild turkey: eastern and southwestern United States
- Red-tailed hawk: all of the United States and most of Canada

### Evaluating wildlife habitat with aerial photographs

Wildlife biologists use aerial photos to evaluate habitat—what is available and what might be lacking for a particular species. An aerial photo is a plan view or view from above, which a bird or pilot would see. Many features look different in an aerial photo-



graph. For example, a silo looks like a circle, buildings look like squares or rectangles, woods are rough, and fields are smooth. In addition to observing how habitat features are arranged and their relationship to neighboring habitats, you need to apply what you know about a species' behavior and habitat requirements to judge whether a certain habitat meets the animal's needs.

All objects appear small in an aerial photo, but you can often determine what they are by observing their shape and comparing their size with the size of a known object. These guidelines will help you interpret what you see in an aerial photograph.



### Guidelines for interpreting an aerial photo

- Start by aligning the photo so any shadows fall toward you; otherwise, valleys appear as ridges and vice versa.
- Use recognition elements, or features, to help interpret what an object is. Recognition elements include:

**Shape.** Fields are usually square. Streams are narrow and generally meander. Ponds are round, while reservoirs have a dam (flat side) at one end with a stream emerging from it. A long narrow feature that crosses roads and woodlands may be a power line, gas pipeline, or railroad track.

**Relative size.** Rivers are wider than ditches. Roads are wider than driveways.

**Pattern.** Crop fields have patterns (rows) that differ from the patterns of pastures or forage fields. A cornfield might have a coarser texture than a wheat field.

**Shadow.** Helps determine shape and gives an indication of an object's size.

**Color (tone).** Shades of black and gray help to distinguish conifer trees (evergreens) from deciduous trees, or one field type from another.

**Texture.** A deciduous forest with large trees has a coarser texture than a young forest. A pasture with brush in it has a coarser texture than a clean pasture.

**Association of one feature to another.** A series of square ponds near a large barn is probably a lagoon, not a pond.

**Site.** Look where an object is located with respect to other features for additional ideas of what that object might be.

- Travel corridors—fencerows, streams, water, railroads, ditches—are often important for animals moving from one patch of habitat to another. An isolated block of habitat is not as accessible as one connected to other blocks of habitat.
- Notes for species primarily requiring various habitats

**Woodland habitat** – Large, unbroken blocks of woodland are best.

**Water and edge** – Habitats containing the best interspersions of these elements with the woodland blocks.

**Agricultural habitat** – Good blocks of agricultural habitats with the best interspersions of other needed elements (water, edge, woods, or fencerows). A mix of field types is best for many species. They prefer smaller fields with less interior over large, square fields with interiors a long way from edge or escape cover.



### LET'S DO IT

1. Study the aerial photographs.
2. List any wildlife habitat features you see in the photos.
3. Discuss each aerial photograph with your adult facilitator.



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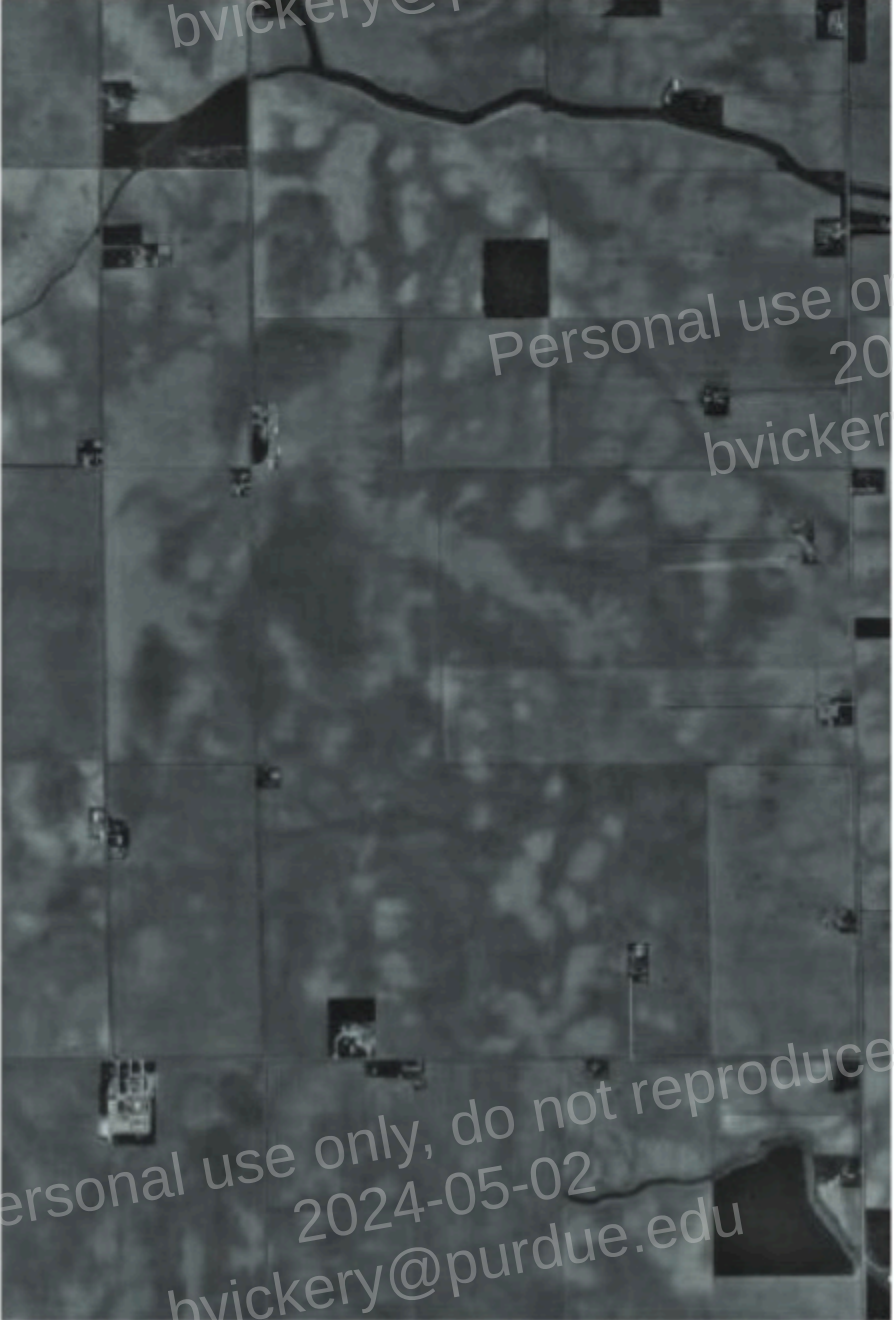
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**PREDOMINANTLY FORESTED HABITAT**



Urban habitat features

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Urban/rural interface habitat features

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Predominantly agricultural habitat

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---

Predominantly forested habitat

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## LET'S CHAT

**Share What Happened:** What did you notice first in each aerial photograph?

**Apply:** How does human activity impact wildlife habitat and wildlife's ability to find food, water, shelter, and space?

**Generalize to Your Life:** Why do human needs often come before wildlife needs?



## LET'S FLY HIGHER

- Read Evaluating Habitat with Aerial Photographs at the Indiana 4-H wildlife web page, [www.ydae.purdue.edu/natural\\_resources/4-H,NR,Projects/Projects/wildlife](http://www.ydae.purdue.edu/natural_resources/4-H,NR,Projects/Projects/wildlife).
- Evaluate the habitat around your home. Find or sketch a map for an area of about 1 square mile (mi<sup>2</sup>, 1 mile x 1 mile) with your house near the center of the map. Indicate the location of all buildings, roads, driveways, trees, woodlots, and water. You can use Google Maps ([maps.google.com](http://maps.google.com)) to get a closer look at the area. Circle primary habitat: urban – rural – forested – water (including wetlands) List any animals you think (or know) live around you. Examples: squirrels, rabbits, deer, raccoons, skunks, fox, frogs, fish, snakes, eagles, robins, goldfinches. Study the habitat needs of the wildlife you listed.
- Consider the wildlife habitat under you when you fly in an airplane.





# CREATING WILDLIFE HABITAT

How can you create and maintain habitat for wildlife?

## INTRODUCTION

The primary goal of habitat development and management is to provide vegetation and water in a species' home range. This activity will help you become familiar with wildlife habitat needs.

Some components of a wildlife habitat require large spaces, but you can create others, especially feeders for birds, squirrels, and insects, in a garden or even on an apartment balcony. Keep safety in mind when creating wildlife habitat. Do not use pesticides, herbicides, fungicides, or fertilizers in or around it. Be particularly careful that these contaminants do not enter surface water or groundwater.

## GEAR

- Wildlife Species Read and React Worksheet



### LET'S DO IT

- Read the Wildlife Species Read and React Worksheet.
- Answer the questions for each vertebrate.



### LET'S CHAT

**Share What Happened:** How many eastern deciduous forest successional stages can you name?

**Apply:** Why is vegetation important for wildlife?

**Generalize to Your Life:** How might you become more involved in creating habitat for wildlife?



### LET'S FLY HIGHER

- Learn more, and create your own wildlife habitat. Recommended resources:
  - Junior Master Gardener, Texas A&M Extension, <http://jmgkids.us/>. Click on Store to find Wildlife Gardener (under Curriculum at the bottom center of the page).

- Purdue Department of Forestry and Natural Resources websites:
  - [www.purdue.edu/wildlife/homeowners](http://www.purdue.edu/wildlife/homeowners)
  - [www.purdue.edu/wildlife/faq/backyard.html](http://www.purdue.edu/wildlife/faq/backyard.html)
- National Wildlife Federation websites:
  - Garden for Wildlife: [www.nwf.org/How-to-Help/Garden-for-Wildlife.aspx](http://www.nwf.org/How-to-Help/Garden-for-Wildlife.aspx)
  - Certify your wildlife habitat with the National Wildlife Federation (fee required), [www.nwf.org/CertifiedWildlifeHabitat](http://www.nwf.org/CertifiedWildlifeHabitat)



- Join, or create, a 4-H or FFA Wildlife Habitat Education team, and compete in your state's Wildlife Habitat Education Career Development event. The Wildlife Habitat Education Program (WHEP) helps students understand wildlife ecology and management practices. They also gain skills in teamwork, oral and written communication, decision-making, and leadership. Ask your local Extension 4-H youth development educator for information about this educational opportunity.

**The central hardwood region is home to more than 60 species of mammals, 40 species of reptiles, 130 species of birds, and 30 species of amphibians.**



## WILDLIFE SPECIES READ AND REACT WORKSHEET

Understanding major wildlife-management concepts and practices helps you develop and manage your wildlife habitat. Important terms are described below. Some of the descriptions use other terms in the list, which are italicized. Note that although these concepts and practices are especially important for vertebrates other than birds and larger habitat areas, they apply to all wildlife, including insects to some degree. For example, if the habitat you create is a birdfeeder or small wetland for frogs, both benefit by having trees or shrubs nearby for perching or shade.

### Corridors

Corridors are areas of continuous habitat that permit animals to travel between separate regions of similar habitats. Corridors allow animals to move to areas where they can breed with other animals of the same species but from different populations. This maintains genetic diversity. Corridors also allow animals to find and use suitable habitat for feeding. They can offset the negative consequences of *fragmentation*. Streams and vegetated ravines are examples of urban-area corridors that allow wildlife to move into parks and other urban habitats. Preserving, maintaining, and creating uninterrupted corridors are important wildlife habitat-management tools. Narrow corridors of less than 100 yards wide, however, can be dangerous for many wildlife species because predators are more likely to be there.

### Edge

The area between two *successional stages* or habitat types is called edge. Many species prefer a balance of edge habitats with blocks of vegetation in one successional stage. Blocks of vegetation of 10 to 40 acres provide a good balance of edge habitat (a narrow band of vegetation around the edge of the block) and unbroken sections of habitat (the interior of the block). Blocks of up to 100 acres are desirable in large forests for species that prefer interior habitats.

### Fragmentation

Breaking up tracts of habitat into smaller pieces causes fragmentation. Habitat fragmentation can be caused by roads, power line rights-of-way, building lots, parking lots, subdivisions, and clearing land for agriculture. Fragmentation can leave islands of habitat that are too small for some species to survive on.

### Interspersion

Interspersion refers to habitat containing different successional stages. Many wildlife species require more than one successional stage or habitat type to meet their needs for food, water, cover, and space. The habitats must be close to each other or linked by corridors to allow for safe travel. More interspersion usually supports a greater variety of wildlife.

### Patch size

Patch size refers to the size of a block or parcel of habitat. Habitat patch sizes must meet species' range requirements.

### Plant succession

Disturbed soil follows a certain sequence in plant cover over time until it reaches its climax (top) stage. The steps in this sequence are called *successional stages*. When the climax stage isn't disturbed, it stays stable for a long time. Humans or natural forces that disturb the soil or a wetland might set back succession, and the cycle continues forward from the new starting point. Some species of wildlife need large, unbroken areas in a particular successional stage.



## WILDLIFE SPECIES READ AND REACT WORKSHEET (continued)

The following six stages of plant succession occur in the Eastern Deciduous Forest and still-water wetlands. *Note:* These stages generally don't apply to wetlands with moving water.

Stage	Eastern Deciduous Forest	Wetlands
1	Bare ground	Deep water with little vegetation
2	Annual forbs and grasses	Shallow water dominated by submerged and floating aquatic vegetation
3	Perennial forbs and grasses	Very shallow water or wet ground dominated by any variety of emergent aquatic vegetation
4	Shrubs	Ground becomes drier and upland vegetation similar to the surrounding area becomes dominant
5	Young woodland	See <i>wetland succession note</i> directly below.
6	Woodland	

*Wetland succession note:* Succession proceeds slowly in wetlands with large amounts of deep water or a rocky bottom. Fluctuations in water level can cause final stages to regress to earlier stages. For example, if a wetland in stage 3 of succession is flooded with deep water for a period of time, the aquatic emergent vegetation may die, leaving the wetland back in stage 1 or 2. How much it regresses depends on the length of time the wetland is flooded with deep water, how much the water level changes, and how long the present vegetation can survive in the changed water level. Management of water levels is an important tool in managing wetlands for wildlife habitat.

### Riparian buffer

A riparian buffer is an area of trees, shrubs, forbs, and grasses adjacent to streams, lakes, ponds, and wetlands. Riparian buffers are important for providing habitat and protecting water quality in streams and wetlands. The minimum recommended width is 100 feet.

## READ AND REACT

### American robin

Habitat information: Urban settings with large open areas and nearby trees and shrubs. Parks, golf courses, and lawns in residential areas are favorites. Requires water daily in warm seasons. Can get water from yard irrigation, rain-filled gutters, low-lying areas, ponds, etc. People can provide birdbaths and pans of water. (Do not place water in areas where cats or other pets can catch the birds.)

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Black-capped chickadee

Habitat information: Stages 4, 5, and 6 of plant succession. Usually gets enough water from snow and surface water. In summer is attracted to watering facilities such as birdbaths in urban areas.



## WILDLIFE SPECIES READ AND REACT WORKSHEET (continued)

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Bobcat

Habitat information: Occupies a wide variety of habitats throughout the U.S., except for some areas in the northern Midwest states with intensive agriculture; areas lacking rugged or rocky mountainous terrain; or areas with extensive bogs and swamps. Found in semi-open farmlands (stage 2 and 3), bushy areas (stage 4), and heavily wooded uplands and bottomland forests (stage 5 and 6). Although water requirements are not well documented, is known to use free-standing water. Diet may meet much of its water requirements. Nocturnal and seldom active in the daytime.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Brown thrasher

Habitat information: Stages 3 and 4 of plant succession. Dense, woody vegetation associated with shrub thickets, hedgerows, shelterbelts, forest edges, riparian areas, and young forests. Water requirements are unknown.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Bullfrog

Habitat information: Permanent bodies of standing or slow-moving water. Prefers shorelines with dense vegetation (stages 3 and 4 of wetland succession), adjacent to shallow open water areas (stage 2) dominated by floating and submerged aquatic vegetation. All habitat requirements are often found in and around a single pond. Needs stable water levels for hibernation and egg development.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Canada goose

Habitat information (breeding habitat): Nests and rears young in or near stage 2 wetlands interspersed with some stage 3 wetlands. Wetlands containing 20 percent tall emergent aquatic vegetation and 80 percent open water are usually good habitat. Riparian areas adjacent to rivers also provide habitat.



## WILDLIFE SPECIES READ AND REACT WORKSHEET (continued)

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Eastern bluebird

Habitat information: Stages 2 and 3 of plant succession interspersed with stages 5 and 6 vegetation. Gets the water it needs from diet, but uses other water sources when available.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Eastern cottontail

Habitat information: Stages 3 and 4 of plant succession. Ideal habitat is interspersed one-third grassland, one-third cropland, and one-third shrub cover. Also uses parks, golf courses, and stream corridors in urban areas. Gets enough water from its diet.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Eastern fox squirrel

Habitat information: Stages 5 and 6 of plant succession with interspersed small openings (stages 2 and 3 of plant succession). Riparian areas are important in the Midwest. Also uses urban areas with lots of trees. Usually gets enough water from its diet but might need more water in late summer.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Eastern gray squirrel

Habitat information: Deciduous woodland in stages 5 and 6 of plant succession. Usually gets enough water from its diet.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---



## WILDLIFE SPECIES READ AND REACT WORKSHEET (continued)

### Hummingbird

Habitat information: In or near mixed woodlands and forests rich in flowering plants. Prefers stages 5 and 6 of plant succession mixed with areas in stages 2, 3, and 4. In urban settings, prefers areas with large trees and nearby flowering plants. Gets its water from diet.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Largemouth bass

Habitat information: Ponds, lakes, and slow-moving rivers. Requires adequate quantity and quality of water.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Raccoon

Habitat information: Most abundant near water, riparian areas, and lands adjacent to wetlands. Also found in urban areas. Prefers areas interspersed with different successional stages. Riparian areas in stages 5 and 6 of plant succession are ideal. Requires water frequently during warm seasons.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### Red-tailed hawk

Habitat information: Open areas (stages 2 and 3 of plant succession) interspersed with trees (stages 4, 5, and 6 of plant succession). Often perches in single trees in open areas. Gets enough water from diet.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---

### White-tailed deer

Habitat information: Stages 3, 4, and 5 of plant succession all interspersed. Drinks water when it is available but can go for long periods without it.

- Have you seen this animal? If so, where?

---

- How could you create or improve habitat for this animal in your area (home or county)?

---



# WILDLIFE INFORMATION ONLINE

Where should you go to find wildlife information online?

## INTRODUCTION

In this activity you will learn more about wildlife and the resources available online. A great deal of information is available at your fingertips. Although you might be tempted to do a general online search for wildlife information, we recommend that you use research-based articles. You might find what you need by doing a general search, but you could also find unsubstantiated information.

The information on university (\*.edu) or government (\*.gov) websites is based on research and reviewed by experts. Many organizations (\*.org) offer research-based information as well. University and government scientists have developed many resources and tools to help people find research-based wildlife information online.

## GEAR

- Internet access



## LET'S DO IT

1. Visit each website listed below. Name the entity/agency and list the major links on the homepage.

- [www.nps.gov](http://www.nps.gov)

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- <https://ag.purdue.edu/fnr>

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- <http://purdue.edu/wildlife>

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- [www.fws.gov](http://www.fws.gov)

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- [www.whep.org](http://www.whep.org)

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- [www.in.gov/dnr](http://www.in.gov/dnr)

Name: \_\_\_\_\_

Links: \_\_\_\_\_

- [www.in.gov/dnr/fishwild](http://www.in.gov/dnr/fishwild)

Name: \_\_\_\_\_

Links: \_\_\_\_\_

2. Choose one of the websites listed above and follow three of its major links. Describe the type of information available at each link.

- Name: \_\_\_\_\_

- Web address: \_\_\_\_\_

Link 1 (title and summary):

Link 2 (title and summary):

Link 3 (title and summary):



## LET'S CHAT

**Share What Happened:** Describe the major topics that you noticed at these websites.

**Apply:** How might you use any of these websites in your future?

**Generalize to Your Life:** Why is it important to be careful when using information you find online?



## LET'S FLY HIGHER

- Find other research-based online resources (\*.edu and \*.gov) for wildlife information.
- Investigate how many research-based online resources (\*.edu and \*.gov) come up in the first 20 listings of a general internet search using your usual search engine.



# CITY DWELLERS, COUNTRY DWELLERS

How does wildlife study differ depending on whether you live in a city or in a rural area?

## INTRODUCTION

The wildlife you see often depends on where you live or visit. Songbirds, rabbits, and raccoons are common in both urban and rural areas. Larger wildlife species have been sighted in cities, but this is more unusual. Wildlife species choose to live where they can meet their needs for food, water, and shelter and with enough space to avoid conflict. In this activity you will explore how many wildlife species you can find near your home.



### LET'S DO IT

1. Estimate the number of vertebrates in each class that you see in a normal week:  
  
Mammals \_\_\_\_\_ Fish \_\_\_\_\_  
Birds \_\_\_\_\_ Herptiles \_\_\_\_\_
2. Record the vertebrates you see in a week. Use your wildlife journal or make a data sheet on a computer. Include the following information:
  - Start date
  - A table containing the day (1, 2, 3, etc.) in the first column and vertebrate classes in columns 2-5.
  - List of general locations where you saw the wildlife (home, school, when walking, biking, driving, etc.). You do not need to list the location for each species; rather, get a general idea of the wildlife you could expect to see on a typical day for your location and the time of year.
  - Complete a second data sheet two weeks later.
  - Count the number of species in each vertebrate class and enter the total in the vertebrate sightings table (or make your own table).
3. Compare your data.

Start date: \_\_\_\_\_

DAY	MAMMALS	BIRDS	FISH	HERPTILES
1				
2				
3				
4				
5				
6				
7				

General locations: \_\_\_\_\_

## VERTEBRATE SIGHTINGS

WEEK	MAMMALS	BIRDS	FISH	HERPTILES
1				
2				



### LET'S CHAT

**Share What Happened:** How did your estimate compare with your actual data?

**Apply:** Did keeping a record affect the number of animals you saw?

### Generalize to Your Life:

- What other data could you collect to give you a more complete understanding of the wildlife around you?
- What is the value of keeping data records?



### LET'S FLY HIGHER

- Collect data for a week in the spring, summer, winter, and fall, and compare your data.
- Collect data for a week each month, and compare your data.
- Collect data for a week when you are not at home, such as on vacation or visiting relatives.
- Collect data that includes signs of wildlife (see Wildlife Science, Level 2).



# WILDLIFE PESTS

What mammals cause the most problems for homeowners?

## INTRODUCTION

Inviting wildlife into your yard is both fun and educational, but sometimes you attract wildlife you don't want. Creating feeding stations, wildlife shelters, birdbaths, and plantings for wildlife can encourage animals to visit and live in your yard. However, your efforts can also invite in destructive or **nuisance species**. Birdfeeders in particular can be a problem when chipmunks, raccoons, opossums, and other wildlife visit regularly to eat the seed that birds drop.



Wildlife that manage to get into a home can cause real problems. Mice, bats, and squirrels are the mammals that most commonly enter homes. Mice enter through tiny spaces and reproduce quickly. Larger mammals are less likely to enter homes but often live in or under sheds and barns.

In this activity you will study common nuisance species and learn about ways to reduce conflict between people and wildlife. Encouraging wildlife while discouraging nuisance wildlife has tradeoffs. You might need to make decisions based on the wildlife you want around your house.

## GEAR

- Conflicts with Wildlife Around the Home. Available at The Education Store, [www.edustore.purdue.edu](http://www.edustore.purdue.edu); search PPP-56.
- Camera (optional)



## LET'S DO IT

- Read Conflicts with Wildlife Around the Home. Pay particular attention to Controlling Nuisance Wildlife: Patience, Trapping, and Repairs (pages 11-12).
- Use the sample tables below to create your own tables with checklists and long-term solutions to keeping wildlife outside and managing wildlife outdoors.
- Use your checklists to assess your house and yard.
- Implement solutions you feel are necessary.  
*Optional:* Take pictures to document what you find and the solutions you implement.

## KEEPING WILDLIFE OUT OF THE HOME

Check any that apply and indicate what should be done (solution).

AREA OF CONCERN	YES	SOLUTION
Access to house from trees or ivy	<input type="checkbox"/>	Block access
Electric lines accessible to squirrels	<input type="checkbox"/>	Consult with electric company

## MANAGING WILDLIFE OUTDOORS

Check any that apply and indicate what should be done (solution).

AREA OF CONCERN	YES	SOLUTION
Brush piles	<input type="checkbox"/>	Remove
Thick layer of mulch	<input type="checkbox"/>	Reduce thickness or use rock







**Apply:** What solutions did you use to reduce wildlife conflicts? If none, what solutions might you use in the future?

**Generalize to Your Life:** Most people who encourage wildlife to their yard also have conflicts with wildlife. This is called benefits and costs. A benefit is something of value, like feeding birds. A cost is a problem, like attracting raccoons that raid and damage a bird-feeder. In what other areas of your life do you have both benefits and costs?



- Use your checklist to assess someone else's house and yard.
- Some of the suggestions in the publications might not align with a wildlife area you or your family

has created. Try to develop your own solutions, if you have wildlife problems that were not discussed in the publication. Common problems might include raccoons and chipmunks eating most of your bird or squirrel feed, or sparrows that have chased bluebirds out of a house you provided for them.

- Learn about the people whose job it is to help with animal conflicts in the home or property by talking with your parents, 4-H leader, or another knowledgeable adult, or by searching online.

Preventing Wildlife Damage – Do You Need a Permit? Available at The Education Store, [www.edustore.purdue.edu](http://www.edustore.purdue.edu); search FNR-404.

Why Do Animals Eat the Bark and Wood of Trees and Shrubs? Available at The Education Store, [www.edustore.purdue.edu](http://www.edustore.purdue.edu); search FNR-203.

## MY NOTES and IDEAS





Wildlife exists all around you. The species you can find depend on where you live and the habitat around you. This chapter has activities to help you search for

wildlife that is around you but that you might not be aware of, and shows you how to manage for the wildlife you want to see, wherever you live.

## LOCAL WILDLIFE AREAS

*Where can you observe wildlife?*

### INTRODUCTION

Of course you can see birds and squirrels almost anywhere, but if you want to see larger vertebrates, you might need to travel. Most people think about parks and zoos when they want to see wildlife. While those are good places to start, many other places in your community, or within a short drive of it, might also offer opportunities to observe wildlife. In this activity you will research where these areas are and create a brochure that shows where people in your community can go to observe wildlife.

.....

### GEAR

- State highway map
- Internet access
- Computer program or paper and markers to make a brochure

.....



### LET'S DO IT

1. Search for public places where people can view wildlife within an hour's drive of your town. Start with the map search, and then look online and talk to people you know.

- *Map search:* Sketch a circle on the map, with your town at the center and a radius of approximately 50 miles (about an hour's drive). Study the area in the circle. List any city, county, state, or national

parklands included there. You might also see a nature preserve, wildlife refuge, or even a fish and wildlife area. *Note:* You should be able to find multiple local wildlife viewing areas within an hour's drive. However, if that isn't possible, increase the radius of your circle.

- *Online search:* Try to find a website for any of the wildlife areas you located in the circle on your map. Search the following websites to see if they have any wildlife areas near you:
  - The Nature Conservancy, [www.nature.org](http://www.nature.org)
  - The Izaak Walton League of America, [www.iwla.org](http://www.iwla.org)
  - Ducks Unlimited, [www.ducks.org](http://www.ducks.org)
  - Zoos and museums that have a wildlife exhibit
- *Word of mouth:* Ask around to see if any local businesses have developed a wetland or nature preserve.





2. Visit each location you found, and take a photo of the sign or other identifying information.
3. Determine the information you will include to encourage people to visit each location and so they can find it. Examples:
  - Title or organization
  - Web address and phone number
  - Mailing address
  - Availability of nature center, hiking or biking trails, observation sites, etc.
4. Make a trifold brochure to promote the local wild life area.
  - Use three columns or a three-column table format. This can be a bit tricky, so make a trifold brochure by hand first to determine what should be on each side before trying this on a computer. Once you have your hand-drawn brochure, open it up and see what belongs in each column. Print it two-sided, or tape two sheets of paper together to finish your brochure.
5. Share your brochure with other wildlife enthusiasts



## LET'S CHAT


**Share What Happened:** How many local wildlife observation areas were you able to find?

**Apply:** Why do people like to watch wildlife?

**Generalize to Your Life:** What careers need people who can educate and communicate information to others?



## LET'S FLY HIGHER

- 
- Create a trifold brochure that lists all the state or national parks in your state.
  - Create a trifold brochure that has information about sites to view migratory birds in your area or state.

## MY NOTES and IDEAS

Personal use only, do not reproduce.  
2024-05-02  
bvickery@purdue.edu

Personal use only, do not reproduce.  
2024-05-02  
bvickery@purdue.edu

Personal use only, do not reproduce.  
2024-05-02  
bvickery@purdue.edu



# MANAGE WILDLIFE

Can you develop a wildlife-management plan?

## INTRODUCTION

Wildlife management is complex. It requires the following:

- An understanding of habitat needs, movement patterns and restrictions, and basic habitat concepts
- An ability to assess components of existing habitat (often using aerial photos) to determine which are adequate and which need improvement
- Knowledge of proper management measures that will improve an existing habitat.

For example, if you wished to manage a property so bluebirds are seen regularly, you would need to know all about bluebirds—their range, food preferences, and needs at all life stages, especially nesting. You would need to understand the current habitat and its ability to support certain plants as well as know relevant management practices.

Wildlife management can involve increasing, decreasing, or maintaining the number of different species. Wildlife biologists assess an area and write a management plan based on their knowledge of the species



that are present or desired and the habitat type. The plan details what is needed to manage one or more species on the property. Developing the plan includes:

1. Knowing the landowner's objectives.
2. Evaluating the habitat's current condition.
3. Identifying habitat components that are adequate for each species to be managed.

4. Identifying habitat components that are in short supply for each species to be managed.
5. Identifying the wildlife-management practices needed to improve the components in poor condition or short supply.
6. Describing how the management practices will positively or negatively affect each species. The National Wildlife Habitat Education (WHEP) website, [www.whep.org](http://www.whep.org), describes wildlife-management practices (WMPs) in a PDF document on the National WHEP Manual page.
7. Indicating where the management practices will be located within the area.
8. Creating an evaluation plan to assess the management plan's success.

## GEAR

- Paper and pencil or computer
- Internet access



## LET'S DO IT

1. Choose an area to manage, preferably near your home.
2. Create a data sheet with places to write the landowner's objectives, current conditions, data table, map of the area, and evaluation plan. Write these terms in the first column of the table: Animal; Adequate Components; Components Needed; WMPs
3. Pretend you are the landowner of this area, and choose three animals to manage—either to increase or decrease in numbers. Choose animals from at least two vertebrate classes.
4. Complete as much of the data sheet as you can. Use your imagination and what you currently know.
5. Use the internet to help you complete the data sheet. Sources:
  - [www.whep.org](http://www.whep.org)
  - [www.purdue.edu/wildlife/homeowners](http://www.purdue.edu/wildlife/homeowners)
  - [www.purdue.edu/wildlife/faq/backyard.html](http://www.purdue.edu/wildlife/faq/backyard.html)
  - \*.gov or \*.edu websites



- Ask an adult— your parent/guardian, a teacher, or the local (district) wildlife biologist—to review your management plan and give you feedback on how you might improve it.



### LET'S CHAT

**Share What Happened:** Did your reviewer(s) have many suggestions?

**Apply:** Did the animals you chose have conflicting habitat needs?

**Generalize to Your Life:** What is the benefit of reviewing and rewriting a management plan?



### LET'S FLY HIGHER

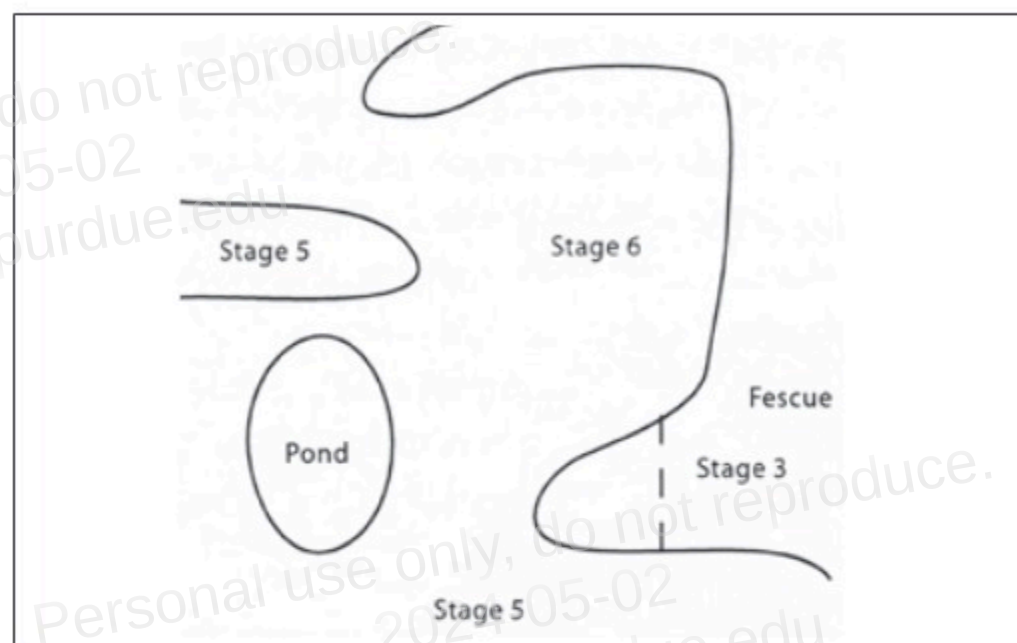
- Learning to write a wildlife-management plan takes time, serious study, and practice. A good place to begin is by working with a coach and team in the 4-H/FFA WHEP. Contact your local Extension 4-H youth development educator or visit the National WHEP webpage, [www.whep.org](http://www.whep.org), for opportunities near you.
- Learn more about developing a plan by studying the two training example plans from Developing a Wildlife Habitat Management Plan, 4-H-991 (V1, 2006, pp5-14) at [www.ydae.purdue.edu/natural\\_resources/WHEP](http://www.ydae.purdue.edu/natural_resources/WHEP). A 2015 revision of this publication is available from The Education Store, [www.edustore.purdue.edu](http://www.edustore.purdue.edu); search 4-H-991.



## SAMPLE MANAGEMENT PLAN

**Landowner objectives:** The landowner (Ima Wildlifer) wants to develop her property so she will see more bluebirds, turkeys, and wood ducks.

**Current conditions:**

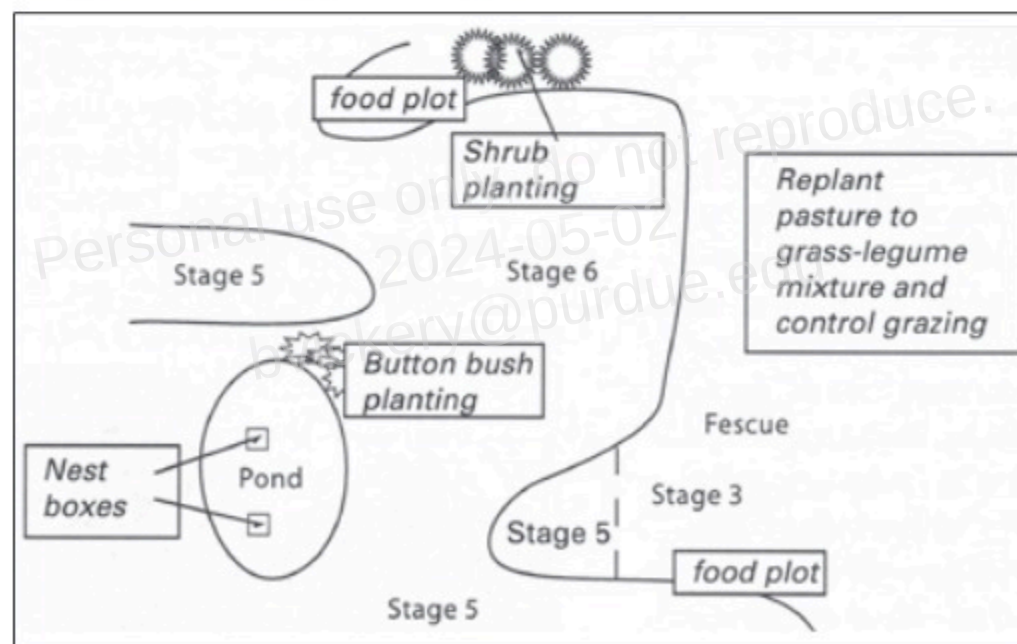


ANIMAL	BLUEBIRDS	TURKEYS	WOOD DUCKS
<b>Adequate Components</b>	Edge (stages 3 and 5/6)	Adequate stage 5&6	Pond, stage 5&6 woodlands
<b>Components Needed</b>	Nesting boxes	No soft mast	Nest cavities near pond

(See map)

- Plant food plots
- Plant shrubs
- Replant stage 3 (former pasture) to grass-legume mix and control grazing
- Add duck nest boxes in pond
- Add bluebird boxes on edges

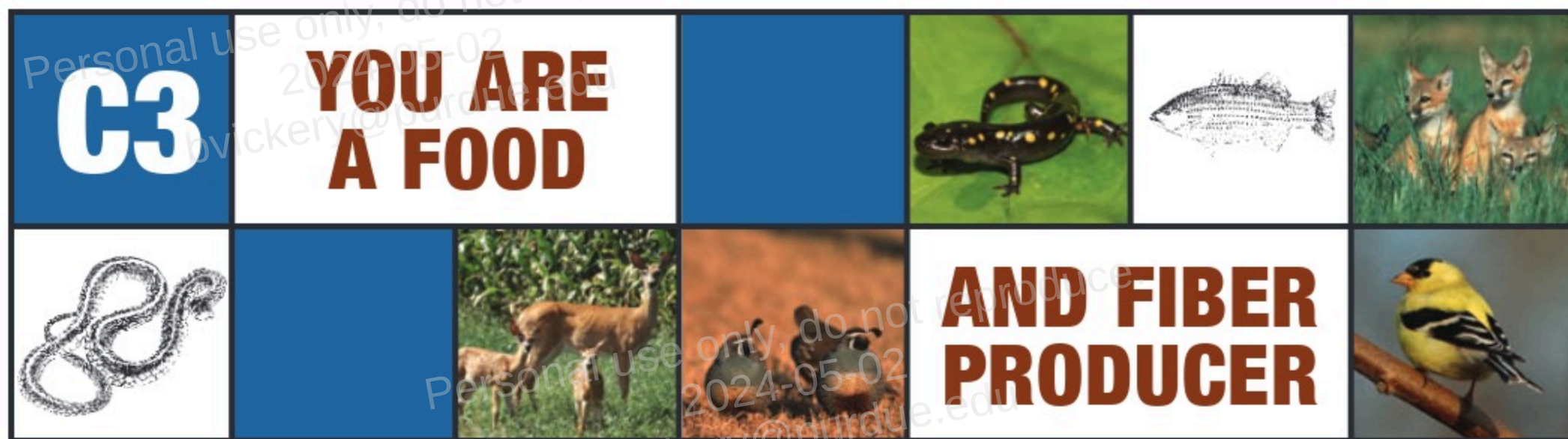
**Map and management plans:**



**Evaluation Plan:**

The landowner will keep records of the number of bluebirds, ducks, and turkeys she sees each month. These values will be compared from year to year.





Although there are few farmers today, a large proportion of the Midwest is farmland and many people are part of the agribusiness sector of the U.S. economy. Agribusiness includes all businesses that create and sell the food products you see in the store—operations that grow, process, and distribute food products. Agribusiness provides the food we eat and drink and many other products such as lumber and cotton. The average farmer produces food for 130 other people.

The U.S. Environmental Protection Agency webpage, Ag 101, [www.epa.gov/agriculture/agriculture-ag-101](http://www.epa.gov/agriculture/agriculture-ag-101),

gives an overview of American agriculture. It covers the primary commodities produced today and the methods used to produce them.

Because farming is a dominant use of land that was once wildlife habitat, conflicts sometimes arise. Gardeners, too, may be dismayed by wildlife damage to flowers, vegetables, and ornamental plants. Understanding the causes of these conflicts can help solve them. This is especially important in rural areas. In this chapter you will learn about potential conflicts with wildlife and efforts to return certain species to areas they once lived in.

## CROP DEPREDATION

*Does wildlife damage a lot of crops?*

### INTRODUCTION

Crop depredation by wildlife can be an economic problem for farmers and gardeners. It's difficult to objectively assess wildlife damage to field crops. A casual observer often misinterprets the type and extent of damage. Researchers have studied this problem in the Midwest to assess farmers' perspectives and collect data to see what animals cause crop depredation and how much depredation they cause.

This activity focuses on farm crop fields, not gardens. But wildlife can harm flower and vegetable gardens by eating or damaging a valuable flower or shrub or even an entire crop. Gardeners who have problems with deer and other wildlife often must fence them out. Raccoons can destroy an entire sweet corn crop, usually just as it ripens!

### GEAR

- Purdue Extension publication, Corn and Soybean Crop Depredation by Wildlife, available at The

Education Store, [www.edustore.purdue.edu](http://www.edustore.purdue.edu); search FNR-265.

- Crop Depredation Worksheet (included)



### LET'S DO IT

- Read Corn and Soybean Crop Depredation by Wildlife.
- Complete the Crop Depredation Worksheet.



### LET'S CHAT

**Share What Happened:** What surprised you the most in this publication?

**Apply:** How could you share the information in this publication with others?

**Generalize to Your Life:** How can collecting data change your perceptions? What could you study to test your perception against reality?



## CROP DEPREDATION WORKSHEET

Answer the following questions after you read the publication, *Corn and Soybean Crop Depredation by Wildlife*. Answers are found under the corresponding headings.

### Introduction

\_\_\_\_\_ was the dominant land use throughout the Indiana landscape with \_\_\_\_\_ percent of Indiana's land area in farmland in 2002.

### What Do Indiana Farmers Think?

When asked about economic loss, the wildlife species responsible for it, and their general attitudes toward wildlife, what animals did farmers report most often?

\_\_\_\_\_  
\_\_\_\_\_

What animals were *reported* as causing the most damage to:

Corn \_\_\_\_\_

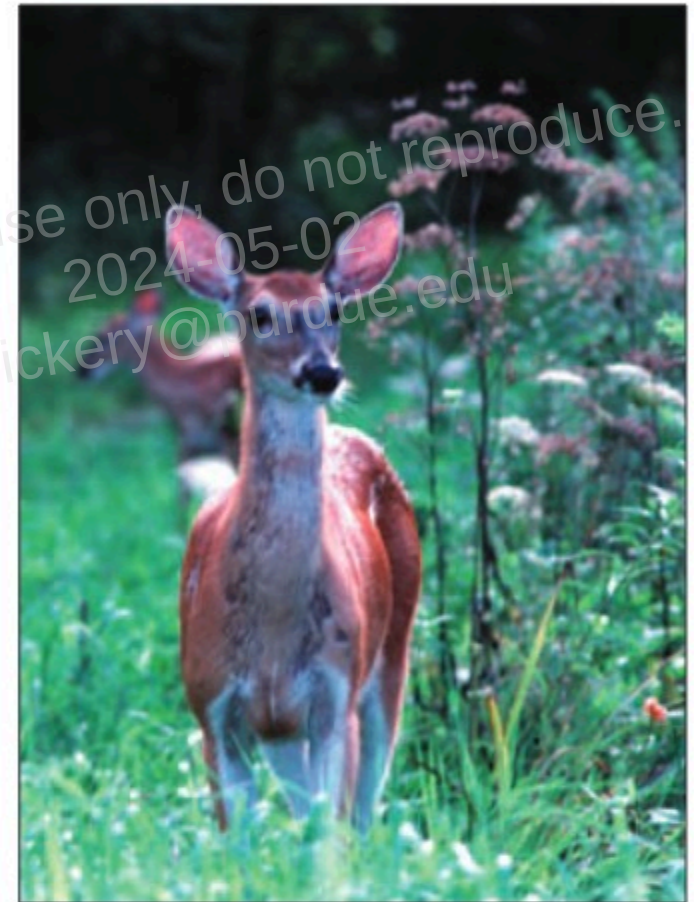
Soybeans \_\_\_\_\_

### Amount and Timing of Wildlife Damage

What wildlife *actually* did the most damage to:

Soybeans \_\_\_\_\_

Corn \_\_\_\_\_



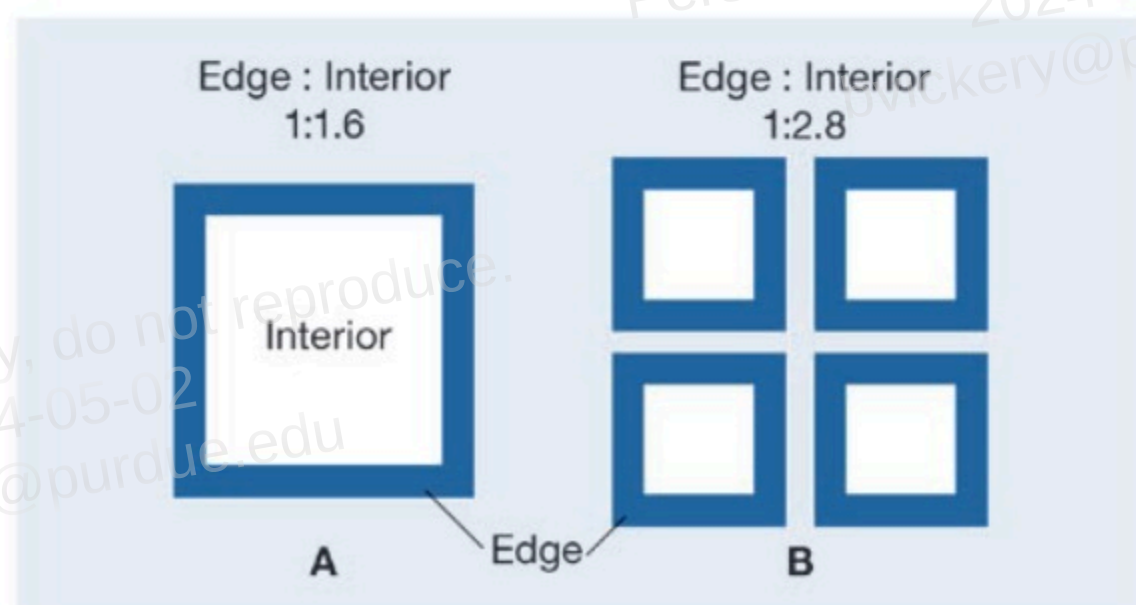
### Edge and Landscape Effects

Not all fields are created equal with regard to susceptibility to crop damage from wildlife. Two important components to consider are landscape variables and local variables.

List three landscape variables \_\_\_\_\_

List two local variables \_\_\_\_\_

In which field would you expect to see more wildlife damage (A or B)? \_\_\_\_\_





## CROP DEPREDATION WORKSHEET (continued)

What is the influence of wildlife damage on yield?

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What are the key factors that influence yield?

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### Perception vs. Reality

List three farmer perceptions:

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### Management Implications

What management implications did the authors list for the following:

- Wildlife damage depends on many variables, such as:  

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- \_\_\_\_\_ are a major contributor to damage to crops in Indiana—over 87 percent. They mainly target corn, and this trend is on the rise.
- \_\_\_\_\_ to crops is an important management practice that determines the proper actions to take to counter the effects of crop degradation.



# CONSERVATION RESERVE PROGRAM (CRP)

*How can the Conservation Reserve Program increase habitat for wildlife?*

## INTRODUCTION

The Conservation Reserve Program (CRP), started in 1985, encourages landowners to conserve and improve their land by having the government pay on farmland used for conservation. The program's primary goals are to improve water quality, decrease soil erosion, and increase wildlife habitat. Lands are committed for 10 to 15 years to ensure long-term results.

Many practices can be put into place to reach the conservation goals. Landowners can enroll their land in the program. Local agencies sometimes seek out particular landowners and encourage them to enroll to fulfill larger goals that involve several properties. For example, an agency trying to protect a river from soil and other farming contaminants might contact every landowner along that river to enroll some of their land into CRP. This could put a buffer around the river to improve the river's water quality, decrease soil erosion from the surrounding land, and create habitat for wildlife.

The CRP has areas of focus to help a species, improve wildlife habitat, or improve water quality and soil erosion. These are the 2016 areas of focus:

- Bottomland Hardwoods Initiative
- Duck Habitat Initiative
- Floodplain Wetland Initiative
- Highly Erodible Land Initiative
- Honeybee Habitat Initiative
- Longleaf Pine Initiative
- Non-Floodplain and Playa Lakes Wetland Initiative
- Pollinator Habitat Initiative
- State Acres for Wildlife Enhancement (SAFE) Initiative
- Upland Bird Habitat Initiative

## GEAR

- Internet access
- Materials to create an interactive demonstration







### LET'S DO IT

1. Learn more about the benefits of CRP by reading the information provided by the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) and Farm Service Agency (FSA) websites:

- NRCS: [www.nrcs.usda.gov/wps/portal/nrcs/detail/nationaltechnical/?cid=stelprdb1041269](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/nationaltechnical/?cid=stelprdb1041269)
- FSA: [www.fsa.usda.gov/programs-and-services/conservation-programs/index](http://www.fsa.usda.gov/programs-and-services/conservation-programs/index)
- FSA 30-year celebration: [www.fsa.usda.gov/CRPis30](http://www.fsa.usda.gov/CRPis30)

2. Answer the following questions.

- *How does NRCS describe the program?*
- *What are the major conservation issues?*
- *What is the CRP?*
- *What does the Farmable Wetland Program do?*
- *What does the Source Water Protection Program do?*
- *FSA recently celebrated 30 years of the CRP. What type of projects are highlighted?*
- *What are three programs for your state featured on the 30 Years of CRP website?*

3. Contact your local NRCS office and find out what CRP projects have been implemented in your county in the last five years.

4. Create an interactive demonstration (or poster exhibit) that explains how the CRP benefits wildlife, farmers, and the general population. Before you begin, review the guidelines at the Indiana 4-H interactive demonstration website, <https://extension.purdue.edu/4-H/Pages/project.aspx?proj=22>.



### LET'S CHAT

**Share What Happened:** Were you aware of the CRP before doing this activity?

**Apply:** Do you know of any places in your community that could benefit from the CRP?

**Generalize to Your Life:** What other governmental programs provide resources to citizens? Why do they do that?



### LET'S FLY HIGHER

- Learn more about any or all of the CRP initiatives.
- Talk to a CRP participant to find out why he or she decided to apply for the program, what they did, and how it has worked for them. Your Extension agricultural and natural resource educator may be able to recommend someone in your community to talk to.

## MY NOTES and IDEAS

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U.S. communities are growing and changing. Population growth can affect communities in positive and negative ways. A community that plans carefully and acts proactively can protect its natural resources.

As a mayor, many people will suggest to you how you should manage local resources and funding to respond to growth. New schools and roads (and maintaining them) are often priorities, but they are expensive. Decision-making is often complex. Short-term fixes might be cheaper than long-term solutions, but they also might harm the environment.

The activities in this chapter will help you start learning about local decision-making and thinking about how local decisions affect land use and natural resources.

Land-use decisions significantly affect our water and wildlife, because more intense land use usually increases negative effects. Farmland, forests, and managed green spaces are examples of low-intensity uses. Commercial, industrial, and high-density housing are examples of high-intensity land use.

## TALK TO A PLANNER

*Does community planning include the welfare and control of wildlife?*

### INTRODUCTION

Local governments often employ city planners to consider the future needs of a growing community. Their plans often address environmental concerns. Local parks and green spaces are included. Any new development should take into account how it might impact the environment.

### GEAR

- Camera (optional)
- Paper and pencil or your wildlife journal



### LET'S DO IT

1. Contact your local county or city office and ask for the person who is in charge of the planning office. Tell them your name, and explain that you are a 4-H member studying wildlife and are interested how the planning office deals with wildlife issues. Ask to interview the local planner (by phone or in person)

2. Prepare a list of questions prior to the interview, and leave space for answers. Be ready to ask a follow-up question such as "Why?"

### Suggested Questions

*What wildlife considerations impact new development or construction plans?*

*Are there guidelines that encourage creating and maintaining wildlife areas or open spaces?*

*What are the costs of considering wildlife when planning?*

*What are the benefits of considering wildlife when planning?*

*Are there regulations that protect wildlife?*

*If so, what species are protected?*

*Are there regulations that help distract or eliminate unwanted wildlife?*

*If so, what species are identified as unwanted wildlife?*

*How can the public be involved in local planning?*





## MY NOTES and IDEAS



# IMPACT OF HUMAN ACTIVITY

How has human activity impacted wildlife habitat?

## INTRODUCTION

Human activity and population pressures have changed the earth dramatically from what it was 200, 500, 2,000, or 100,000 years ago. Population growth, agriculture, and industrialization have led to the destruction of wildlife habitat and loss of some species. Areas that remain are significantly different from the original habitat that wildlife adapted to over time. Because of these changes, wildlife must adapt to survive, move to habitat more suited to their needs, or, in some cases, lose a local population.

Some areas might provide the right habitat for a species, but it's fragmented into spaces that create islands of habitat, which can lead to excessive **in-breeding**. Even seemingly large areas preserved for wildlife might only be remnant islands due to the species' range.



Human activity has also moved plant, insect, and animal species from areas they adapted to over time. Some species become invasive because they have no natural predators in the new location and reproduce quickly. This can lead to new species outcompeting native species and disrupting the natural balance. The worksheet in this activity will help you better understand how habitats change.

## GEAR

- Impact of Human Activity
- Impact of Human Activity Worksheet
- Materials for drawing a map
- Camera (optional)



## LET'S DO IT

1. Read Impact of Human Activity.
2. Complete the Impact of Human Activity Worksheet.
3. Look for examples of human activity where you live.



## LET'S CHAT

**Share What Happened:** Did you enjoy reading Impact of Human Activity?

**Apply:** Briefly describe how humans impact wildlife in your county.

## Generalize to Your Life:

- What choices might you make in the future that hurt wildlife?
- What choices might you make in the future that help wildlife?



## LET'S FLY HIGHER

- Learn more about purple loosestrife, an **invasive** wetland plant, with the Biocontrol of Purple Loosestrife curriculum, [www.ydae.purdue.edu/natural\\_resources/PurpleLoosestrife](http://www.ydae.purdue.edu/natural_resources/PurpleLoosestrife)
- Read more about the theory of island biogeography online using research-based sources.





## IMPACT OF HUMAN ACTIVITY

Each wildlife species has a preferred habitat with abundant food, water, shelter, and space that suits its needs. The species will have difficulty existing in the area if any one of the basic needs is limited or missing.

Many wildlife species also depend on the presence of other wildlife species in the same environment. For example, rabbits produce many offspring because predators often take rabbits. Without the rabbits, the predators suffer. Without the predators, the rabbits become too plentiful and exhaust the food supply. The natural balance of wildlife and plants has developed over thousands of years. Human activities can have profound effects on the balance in an environment.

### The Indiana Landscape

About 85 percent of Indiana was forested 200 ago. Forestland was some of the best for agriculture, so by 1860, about half of the forests had been cleared for farming. By 1900, only about 7 percent of the state's original forestland still contained trees. Since 1950, however, improvements in forest management have increased the amount of Indiana forestland to 20 percent.

Private landowners own most of the woodland (85 percent), and most of that is fragmented into small woodlots surrounded by cropland. Fragmented woodlots are like islands in the ocean for many wildlife species, because they can't move safely to other areas. Southern Indiana has some continuous woodland favoring wildlife species that need large home ranges. Fifteen percent of the woodlands in Indiana are protected public areas. Increased residential and commercial demand for development still threatens these wooded areas.

### Island Biogeography

Wildlife biologists describe a theory that islands will find equilibrium in the number of species (not the number of individual animals) found on an island. The island's size and its distance from the mainland determine the number of species. More species are found on a larger island than a smaller one, and more species are found on an island closer to the mainland than one farther away. Robert H. MacArthur and Edward O. Wilson came up with this theory of island biogeography in the 1960s. They developed a simple calculation that estimates the number of species expected to be found on an island. The equation is:

$S = cAz$ , where:

$S$  is the species richness

$c$  is a constant that represents how the distance from the mainland affects the migration of species

$A$  is the size of the island (the area)

$z$  is a constant that is a theoretical value

You can calculate the number of species to expect on a certain sized island if you know the values for  $c$  and  $z$ . Similarly, you can calculate the size of the island if you know how many species are on an island.

The island biogeography theory can be used to evaluate fragmented woodland or prairie landscapes and is helpful in understanding species diversity in a fragmented environment. Cropland, farms, housing developments, industry, roads, and other human structures often limit where wildlife can live or move. But while the island biogeography theory can be useful, keep in mind several differences between a fragmented wildlife landscape and islands. For example:



## IMPACT OF HUMAN ACTIVITY (continued)

- Islands have a relationship to a mainland; island species may interact with other individuals or wildlife species, depending on how far the island is from the mainland.
- Although human-built structures may deter wildlife from living in or even traveling from one habitat to another, some species can often navigate them in times of distress.
- Some species can live and thrive in cropland and urban areas, so these areas are not devoid of wildlife.
- Wildlife-management practices on a fragmented landscape can provide diversity and corridors that make for easier movement between habitats.

### Succession

Plant succession is the orderly progression of plant species over time until they reach the climax stage, where they are in balance for a particular habitat. The particular plant mix remains for a long time in natural conditions. Plant communities in wet climates are dominated by herbaceous (non-woody) plants such as grasses, forbs, and legumes, which usually are replaced by woody species. Perennial plants, rather than trees, may succeed herbaceous species in drier climates. A major disturbance—for example, fire, grazing, or flooding—sets plant succession back. Human disturbances, such as housing developments and industry, permanently disrupt natural succession.

### Edge

The boundary between two types of habitat is called an edge. Edges naturally occur at a change in successional stage between two vegetation types, like when a forest is next to a prairie or marsh. Fences create narrow edge areas called fencerow habitats. Edges can be abrupt or gradual and are rarely permanent; they tend to advance or retreat. Sometimes natural factors such as soil type, topography, or climate prevent succession, and a more permanent edge is produced. Edges generally have a greater diversity of plant and animal species than single habitat.

Human activity can delay or eliminate natural plant succession. Continual mowing near the edge of a woodland eliminates successional plants that try to move into the mowed area, and the woodland does not intrude into that space. Similarly, human activities such as agriculture, urban development, industry, and road construction eliminate plant succession, creating permanent edges. The remaining wildlife habitat is fragmented. Smaller habitat spaces with increased edge habitat replace areas once dominated by climax forests and the wildlife that thrive there. This alters the types and numbers of wildlife species and results in less climax environments and more edge environments. The wildlife that thrive in climax areas are restricted to smaller spaces, and species that thrive in edge environments can become dominant.

### Barriers

Large mammals roamed widely over vast areas of North America before the growing human population and development encroached on their territory. Bison, elk, and wolves are examples of mammals that had extensive home ranges. Some smaller mammals, reptiles, and amphibians had larger home ranges than are available to them today. Buildings, cropland, roads, and parking lots have replaced a lot of natural habitat. Fences and roads also create barriers that restrict wildlife movement. Fences along the interstate system have created extensive barriers that crisscross the nation. Animals that get through interstate fences or that cross unfenced roads may be hit and killed.



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IMPACT OF HUMA  
Landscape Plante

## Plants

system, reducing the diversity of species. Some native species are also out of equilibrium and decrease both the number of native species and species richness, and can eliminate several native species from a habitat.

the habitat responds, if allowed, by following the climax stage. However, humans often cause rapid and resulting in loss of habitat and wildlife species. The environment for both wildlife and humankind. The habitats and establish new ones.

# MY NOTES and IDEAS

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## IMPACT OF HUMAN ACTIVITY WORKSHEET

### Introduction

List three ways that human activity has disrupted wildlife habitat.

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### The Indiana Landscape

What caused the elimination of most forested areas in Indiana?

---

---

How much of Indiana's woodlands are owned by private landowners?

---

### Island Biogeography

What equation estimates the number of species of wildlife on an island?

---

How are fragmented wildlife landscapes similar to islands?

---

---

What are some differences between islands and fragmented wildlife landscapes?

---

---

### Succession

What is plant succession?

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---

What is the climax stage?

---

---

Blocks of vegetation, \_\_\_\_\_, provide a good balance of edge habitat and unbroken sections of habitat. Describe an area where you think plant succession is occurring.

---

---



## IMPACT OF HUMAN ACTIVITY WORKSHEET (continued)

### Edge

Explain how building a new subdivision of 50 homes in a forest affects plant succession.

Abundant fencerow habitats are found along the interstate system. Why are these roads mowed regularly? How might this affect wildlife?

### Invasive Plants

What is an invasive species?

Complete the chart by indicating if the plant listed is native to the United States or exotic, and invasive or non-invasive. You may guess and then check your answers in the Facilitator's Guide; or research the answers with a knowledgeable adult or online.

PLANT	NATIVE	EXOTIC	INVASIVE	NON-INVASIVE
Black locust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Honeysuckle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese maple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lilac	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multiflora rose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Osage orange	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sugar maple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thistle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tulip	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vetch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Human Impact, Positive and Negative

How is human impact on the environment both positive and negative?

What human impact do you see around you?



# WILDLIFE IN BUILT ENVIRONMENTS

*How do differences in built environments influence the presence of wildlife?*

## INTRODUCTION

Wildlife species that do well in a wide range of habitats and use a variety of resources are called **generalist species**. Wildlife species that thrive only in specific conditions or have limited diets are called **specialist species**. Generalist species are found in human-built environments more often because they can adapt to different conditions better than specialist species can. Common generalist species that thrive in **built environments** include raccoons, mice, rats, barn sparrows, and pigeons.

### Omnivores are often generalists.

Wildlife species on threatened and endangered lists are often specialist species, because built environments have reduced or eliminated their habitat, food, or required nesting conditions. These species may be called “canary species” because, like canaries in a coal mine, they are the first that environmental change affects. The hellbender salamander is an example of a canary species; it has specific needs, and the destruction of one of its habitat components can cause the loss of a local population.

Many wildlife species fall between generalist or specialist species. Species that are not true generalists but can adapt when important parts of the habitat meets their needs include squirrels, rabbits, cardinals, and barn swallows. Deer and coyotes also fall into this category because some have adapted to urban conditions.



In this activity you will use the scientific method to learn more about the vertebrate wildlife that inhabits two different built environments. The scientific method is an organized way to think about problems and attempt to solve them based on data. It has five steps.

1. Stating the problem – what you want to learn
2. Forming the hypothesis – what you think will happen
3. Observing and experimenting – what you need to observe to test your hypothesis
4. Interpreting data – review, tally, and interpret data
5. Drawing conclusions – Does your data support your hypothesis (proved) or not (disproved)?

## GEAR

- Two different built areas of approximately the same size (about 1 acre) to study. Ask for permission to be on the property, if necessary.
- The Scientific Method Worksheet (copy page 37 or make your own)
- Facilitator
- Electronic device, record book, or paper to collect data
- Graph paper
- Camera (optional)



## LET'S DO IT

1. Choose two built areas to study. They should look quite different from each other. The areas could be a city block, a field, or a garden and part of a park, depending on what is available to you.
2. Sketch each study area. Label your sketches Study Area A and Study Area B.
3. Consider all five steps of the scientific method before beginning your study by answering each question as well as you can. (Use The Scientific Method Worksheet.)
  - What problem are you going to study?
  - What hypothesis can you make about this problem?



- What data will you collect? How will you collect it?
- How will you interpret the data you collected?
- How will you know if your hypothesis was proved or disproved?

4. Review your worksheet with your facilitator, parent, teacher, or other adult who can help you refine your experiment before you begin.
5. Collect data as you specified in the worksheet. Keep extensive notes while collecting data. Note everything that you can, including the weather—your details might come in handy later. Use your sketches to note anything of interest and possible importance. Take pictures of each study area and any wildlife (optional).



6. Analyze your data by comparing the two study areas. How did the number of vertebrates you observed differ? How did the plants differ? How much human traffic (pedestrian or auto) occurred in each area?
7. Decide if your hypothesis was proved, disproved, or if you need more data.
8. Create an interactive demonstration (see Chapter 5 for suggestions) to present your experiment and results. Present your plan (Scientific Method Worksheet text), data collection challenges, and analysis.



## LET'S CHAT

**Share What Happened:** Were you able to follow the scientific method steps that you outlined in the worksheet before you began?

### Apply

- How might your data differ if you collected it on different days of the week or times of day?
- Did you see a difference in the number of generalist or specialist species between your study areas?
- Why do scientists repeat their experiments?

### Generalize to Your Life

- Do you think the amount of development or number of people in your study areas affected the number of wildlife you saw?
- Why do you think the scientific method has been used for over 200 years?

.....



## LET'S FLY HIGHER

- Study the two areas for a different vertebrate category—mammals, birds, fish, herptiles—or all four categories.
- Collect data at different times of day, during different seasons, or on different days of the week.
- Collect data that includes signs of wildlife (see Wildlife Science, Level 2) if you did not include this in your original experiment.
- Talk to people who live near the two areas you studied, and ask if your data is consistent with their observations.
- Study generalist and specialist plant species and the conditions (temperature, precipitation, soils, etc.) that affect them.





## SCIENTIFIC METHOD WORKSHEET

1. State the problem.

---

---

2. Write a hypothesis.

---

---

3. Observe and experiment (create a data sheet).

4. Tally, study, and interpret your data.

5. Draw conclusions.

a. Was your hypothesis supported, or not? (circle one)  
(or check)

Yes ☐ No ☐

b. Why or why not?

---

---

---

c. How do the results give you ideas for future studies and new hypotheses?

---

---

---

d. If you were to run the experiment again what would you do differently?

---

---

---





Teaching—sharing your knowledge with others—can be rewarding. You might enjoy informing your siblings, friends, or parents about what you learn from your 4-H project. But when you create an educational display for the fair or offer to present an activity from Level 1 of the 4-H Wildlife Science manual to younger 4-H members, you move into a teaching role.

Being a teacher takes time and thought as you plan, prepare, and present your educational message. Good teachers also analyze or evaluate student interest and learning, so they, too, can learn and improve their future presentations. This chapter has activities that will help you teach others about wildlife. Keep track of the time you spend planning as well as the challenges and benefits of teaching.

## INTERACTIVE DEMONSTRATION

*How can you engage an audience with an interactive demonstration?*

### INTRODUCTION

Any Indiana 4-H member may participate in an interactive demonstration at the state fair. Interactive demonstrations allow 4-H members to teach fairgoers what they learned in their 4-H project work. You will provide a demonstration that actively engages your audience in how-to-do-it skill development in three minutes or less. The best activities to adapt to an interactive demonstration are often in Level 1 because they are more likely to be simple, straightforward, and active.

Props help your audience better understand your topic. Live animals and PowerPoint presentations are not permitted in an Indiana interactive demonstration. You will continually repeat the how-to demonstration for a designated period of time, usually 45-60 minutes. Participants are not judged, but an adult watches the interactive demonstration and provides feedback to help you improve in the future.

### GEAR

- Selected activity from the 4-H Wildlife Science curriculum; activities in Level 1 might be best.
- Materials listed in the activity
- Additional materials needed to make the activity hands-on



### LET'S DO IT

1. Determine the activity you want to teach fairgoers about. Consider activities that can be done interactively; are economical; show what you have learned in the project; and that you can repeat to fill 45 minutes to an hour.
2. Contact your county Extension office in early July to indicate your interest in doing an interactive demonstration.
3. Plan and prepare for your interactive demonstration.
4. Practice your interactive demonstration at least once for an adult facilitator.
5. Discuss the Chat questions with your adult facilitator.



6. Complete the interactive demonstration at the Indiana State Fair, including discussing your presentation with the adult observer.



## LET'S CHAT

**Share What Happened:** Why did you choose the activity you did?

**Apply:** What did you learn by doing the interactive demonstration?

**Generalize to Your Life:** Where outside 4-H can you use the skills you practiced for this activity?



## MY NOTES and IDEAS

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# LIGHTS, CAMERA, LEARN BY DOING!

Can you learn while teaching others?

## INTRODUCTION

Share your wildlife knowledge with younger 4-H members by making a wildlife game they can play and learn by doing! Use the squirrel habitat game from Level 2, or adapt your favorite game to focus on some aspect of wildlife science you learned about in this project. Or perhaps you could design a treasure hunt that teaches wildlife facts or terminology.

## GEAR

- Selected activity from the 4-H Wildlife Science curriculum; a Level 1 activity might be best.
- Other materials, depending on the game or activity you use to present the information

### Game Ideas

Jeopardy, Scrabble, Wheel of Fortune, Treasure Hunt, Hide and Seek, Win, Lose or Draw



## LET'S DO IT

1. Determine your objectives for the game or activity. What do you want to teach?
2. If you choose to create a game, decide how to adapt the learning activity to a game format.
3. Write the instructions for your game.



4. Collect any props, game pieces, or equipment needed to play your game.
5. Practice your game with a friend or facilitator to make sure your instructions are clear and understood. Based on the practice, change your game to make it more fun or educational.
6. Talk with the Extension 4-H youth development educator to decide when you can present the game to other 4-H members, perhaps at a club meeting or workshop.
7. Ask a friend or adult to take pictures of you and the learners during the game or activity.
8. Ask the 4-H members what they learned. You might use the Chat questions from the original activity.
9. Consider having simple prizes for the winners and a snack for everyone.



## LET'S CHAT

**Share What Happened:** What difficulties did you have adapting the activity to a game format?

### Apply

- Did the 4-H members learn the concepts that you hoped to teach?
- What changes would you make the next time you presented your game or activity?
- Did you enjoy teaching your game or presenting your activity?
- What did you learn by developing and presenting your game?

**Generalize to Your Life:** Why is "learn by doing" such a successful educational tool?



## MENTOR A 4-H MEMBER

*Have you ever thought about becoming a teacher?*

### INTRODUCTION

Teaching other 4-H members about wildlife is a great way to share your knowledge and, maybe, get them interested in learning more. You might be surprised to find that teaching others helps you understand your topic better. Even if teaching isn't your career choice, you'll have many opportunities to teach others, especially as a future 4-H volunteer.

Although the title of this activity is Mentor a 4-H Member, it focuses on teaching, which is often a part of mentoring. Mentoring is more than just teaching, however. It might include sharing information on almost any topic or referring the mentee to others who can answer questions or help them.

Mentors are often looked up to and asked for advice. 4-H members might ask you questions about other 4-H projects, trips, Junior Leaders, or 4-H experiences. They might ask for advice or information about things other than 4-H, too.

Mentoring can increase the level of achievement for both the mentor and mentee by supporting people as they pursue their personal and career goals.

### GEAR

- Your knowledge and interest in wildlife
- Selected activity from the 4-H Wildlife Science curriculum; activities in Level 1 might be best because they are usually simple and active.
- Lesson plan template
- Camera
- 4-H member(s); your Extension 4-H youth educator can help you set up a teaching opportunity



### LET'S DO IT

1. Choose an activity from one of the Indiana 4-H Wildlife Science manuals to use at a 4-H meeting or other venue to teach younger 4-H members about wildlife.
2. Use the lesson plan template to plan how you will teach your class. Modify the lesson plan as you wish. Remember that 4-H members prefer to learn by doing, so limit descriptions.

3. Teach your class, and ask a friend to take pictures of you teaching and the youth doing the activity.
4. After your class, record the time you spent preparing for the class. Write down the challenges and advantages of mentoring, and how the experience might be useful in your life. Use photos and other documentation if you can.



### LET'S CHAT

**Share What Happened:** How did your activity go? Did the students learn what you hoped they would learn?

**Apply:** What other opportunities do you have to teach others?

**Generalize to Your Life:** How can anyone be a teacher?

### Lesson Plan Template

Use this template to complete the lesson plan for your activity with the 4-H members. Suggestions are in italics below the topics.

#### Activity title

#### Question

Try to draw youth in with an interesting question.

#### Introduction

Background information, why we should care about the topic, or how the activity will help answer the question.

#### Toolkit

Supplies and equipment needed to perform the activity. This will ensure you have all the required items on hand.

#### Do It or Make It

Make It, if youth construct something. Do It, if learners will do an activity.

#### Instructions

Step-by-step instructions of what you and the learners will do to complete this activity.

#### Chat

Write questions for each of the following to see if the 4-H members understood what they did and what they learned.

*Share What Happened –*

*Apply –*

*Generalize to Your Life –*

#### Fly Higher

Ideas for further learning, research, or exploration for those youth who want to learn more.

#### Glossary

Words used in the activity defined for younger audiences



# SHARE YOUR KNOWLEDGE

How can you share what you have learned in 4-H Wildlife Science?

## INTRODUCTION

Teaching others can be fun, but it's also challenging to make sure learners understand what you wish to teach. The classroom is a formal teaching environment because a trained teacher directs the learning at a set time and place. Text, worksheets, quizzes, and tests are usually part of a formal teaching experience.

Informal learning can take place anywhere and at any time. Some informal learning, such as in 4-H, is structured with learning objectives and curriculum, but can take place in a group or individually, indoors or outdoors, and at a time that works best for the learners. Informal learning can occur when you read, do an experiment, or during a simple conversation with a knowledgeable person. In this activity you will develop an educational presentation to teach others about wildlife.

## GEAR

- Selected activity from the 4-H Wildlife Science curriculum; activities from Level 1 might be best because they are usually simple, straightforward, and active.
- For poster presentation: poster board, markers, computer and printer (optional), pictures
- For oral presentation: paper and pencil, watch or timer, volunteers for practice
- For a discussion presentation: paper and pencil, volunteers for practice, another person or group



## LET'S DO IT

1. Decide on the type of presentation you would like to do.
2. Decide where you will present. 4-H opportunities include, but are not limited to, your county fair, 4-H interactive demonstration at the Indiana State Fair, 4-H club or project meeting, or mentoring a younger 4-H member or group. Other opportunities include local clubs, committees, or board meetings (Extension board or school board).
3. Outline the information you wish to present. Keep it simple—don't try to teach too much.

4. Go through the activity two or three times to make sure you understand it fully.
5. Gather any data or information you need.
6. Take pictures to tell the story visually, if possible.
7. Create your presentation. Use hands-on and experiential learning methods, if appropriate for your audience. (See the Indiana 4-H Wildlife Science Facilitator's Guide for more information on experiential learning.)
8. Present the educational poster or give your presentation at one or more venues.



## LET'S CHAT

**Share What Happened:** Why did you choose to present the topic you did?

**Apply:** What changes would you make for the next time you present?

**Generalize to Your Life:** How can presentations help people better understand wildlife?

## Presentation Suggestions

For an oral presentation

- Prepare.
- Don't try to present too much.
- Speak slowly and clearly.
- Repeat major points.

For a poster presentation

- Attract viewers' attention.
- Make it simple and clear.
- Interest the viewer in your work.

For a discussion presentation

- Prepare.
- Speak slowly and clearly.





Native Americans lived sustainably with wildlife before Europeans settled North America. The Native Americans had no roads, chemicals, or pesticides, and they left a small **carbon footprint**. They lived in harmony with wildlife, using many animals for sustenance but taking only what they needed. Their smaller population meant that some problems we worry about today, such as waste disposal, were not problems hundreds of years ago.

The influx of Europeans and the onset of the Industrial Age brought a cultural change that included extensive building of homes, stores, and factories; roads; and eventually, infrastructure to deliver water, electricity, and fuel. These all impact wildlife and wildlife habitat.

U.S. legislators began to express concern about the possible loss of unique and beautiful landscapes and habitat in the 1800s. Congress and President Ulysses S. Grant established Yellowstone as the first of 58 National Parks in 1872. You will learn more

about people and legislation that has supported wildlife in this chapter.

National funding from taxes helps government employees manage wildlands and researchers study human impact on wildlife. Funding for National Forests, National Parks, and Conservation Reserve Program helps wildlife and protects it for the future. State legislators are responsible for monitoring and funding such state-level departments as Environmental Management and Natural Resources as well as state parks and recreation areas. The Indiana Department of Natural Resources (DNR) manages the state's natural resources, including fish, wildlife, forestry, insects, plants, nature preserves, and outdoor recreation.

Legislation can take many years to have long-term impact. It's important that both legislators and the public understand the complex interactions of the economy and environment, so they are well informed when it comes time to vote.

## KNOW THE LAW

*What laws help protect wildlife and wildlife habitat?*

### INTRODUCTION

To protect wildlife and wildlife habitat, Congress passes legislation, which the president must sign for it to become law. Selected legislation that has helped protect wildlife is described briefly in Wildlife Legislation starting on page 45. In this activity you will review this document, choose one law to study in more detail, and create a presentation to inform others about it.

### GEAR

- Wildlife Legislation summaries
- Internet access
- Journal, computer, or paper

**The Lacey Act of 1900 is generally considered to be America's first wildlife protection law.**





## LET'S DO IT

1. Read the introduction and Wildlife Legislation summaries.
2. Choose one of the pieces of legislation listed under Wildlife Legislation to study.
3. Take notes in your journal (or on computer or paper) while you research the legislation. Record your sources of information along with your findings. Use \*.edu or \*.gov websites; if you find information at other websites, you must confirm that information is research-based (not opinion).
4. Write a one-page summary that describes the legislation you studied. Include:
  - Title: The piece of legislation you studied
  - Your name and the date you finished
  - Background: Why was the legislation written?
  - Describe the discussion about enacting this legislation.
  - The essence of the legislation
  - Results: What happened because of this legislation?
  - Your resources
5. Share your report with your parent(s) and facilitator. Consider creating a poster exhibit to show at the fair to inform others about the law you studied.

### Wildlife Legislation (see summaries on next page)

Lacey Act, 1900  
 Antiquities Act, 1906  
 National Park Service Organic Act, 1916  
 Migratory Bird Treaty, 1918  
 Endangered Species Act, 1925  
 Federal Aid in Wildlife Restoration Act (Pittman-Robertson) Act, 1937  
 The Federal Water Pollution Control Act, 1948  
 Convention on International Trade in Endangered Species, 1963  
 National Environmental Policy Act, 1969  
 Clean Air Act, 1970  
 Earth Day, 1970  
 Environmental Protection Agency (EPA), 1970  
 Clean Water Act, 1972  
 Marine Mammal Protection Act, 1972  
 The Endangered Species Act, 1973  
 Marine Mammal Protection Act Amendments, 1994  
 Multinational Species Conservation Acts, 1988, 1994, 1997, 2000, 2004



## LET'S CHAT

**Share What Happened:** What surprised you the most about the legislation you studied?

**Apply:** Why is informed legislation important for wildlife?

**Generalize to Your Life:** Why is informed legislation important for everyone?

.....



## FLY HIGHER

Learn more at:

- U.S. Fish & Wildlife Service, Forensics Laboratory, Students & Educators website: [www.fws.gov/lab/wildlife\\_laws.php](http://www.fws.gov/lab/wildlife_laws.php)
- U.S. Fish & Wildlife Service, Office of Law Enforcement, Laws and Regulations website: [www.fws.gov/le/laws-regulations.html](http://www.fws.gov/le/laws-regulations.html)
- U.S. Fish & Wildlife Service, International Affairs, U.S. Conservation Laws website: [www.fws.gov/international/laws-treaties-agreements/us-conservation-laws](http://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws)
- Learn more about raising game birds in Indiana. People who raise game birds—ring-necked pheasant or bobwhite quail, including their subspecies and color phases—must follow IDNR regulations. Find out what the rules and guidelines are.





## WILDLIFE LEGISLATION SUMMARIES

### *Summaries of selected U.S. legislation that affects wildlife in order of enactment.*

**Lacey Act, 1900.** Generally considered America's first wildlife-protection law.

- Prohibits interstate trafficking in wildlife (including live or dead specimens or parts or products of all wildlife and fish and protected domestic plants) that have been taken, possessed, transported, or sold in violation of a wildlife-related state, federal, foreign or tribal law, or regulation.
- Provides misdemeanor and felony penalties and forfeiture of both the wildlife involved in an offense, as well as vessels, vehicles, aircraft, and equipment used to aid in the commission of a felony violation.

### **Antiquities Act, 1906**

- Allows the president to "protect special natural, historical and cultural areas as national monuments." Has been used by 16 presidents, from Theodore Roosevelt to Barack Obama, to designate national monuments.
- Gives Congress the power to declare national monuments, which it has done 40 times. Congress has also redesignated 32 national monuments as national parks.
- Has been used to protect wildlands from development and provide protected habitat for wildlife.

### **National Park Service Organic Act, 1916**

- Created the National Park Service (NPS), an agency of the federal government.
- Manages all U.S. national parks, many American national monuments, and other conservation and historical properties with various title designations.
- Charges the NPS with a dual role of preserving the ecological and historical integrity of the places entrusted to its management while also making them available and accessible for public use and enjoyment.

### **Migratory Bird Treaty Act, 1918**

- Protects almost all native North American birds except for upland gamebirds (quail, grouse, and their relatives).
- Unless permitted by regulation, e.g., state hunting regulations, it is unlawful to "pursue, hunt, take, capture, kill, possess, sell, barter, purchase, ship, export, or import any migratory birds ... or any part, nests, eggs, or product thereof." This is a strict liability offense; the government need not prove intent on the part of the person or corporation that takes the bird.
- These prohibitions include the possession of feathers of protected migratory birds, even if these feathers were naturally molted.
- Provides a felony penalty for the sale or barter of listed species.

**Endangered Species Act (ESA), 1925.** Probably America's best-known wildlife-protection law.

- Currently (as of August 2016) lists 1,925 species and populations of plants and animals that are in imminent danger of extinction (endangered), or that may become endangered in the near future unless preventative action is taken (threatened).
- "Unless permitted by regulation, it is unlawful to import, export, take, transport, sell, purchase, or receive in interstate or foreign commerce any species listed as endangered or threatened."
- Provides civil and misdemeanor criminal penalties for a knowing violation of its prohibitions.
- Protections may apply to habitat critical for the species' survival.
- Implements the CITES treaty, an international convention that regulates transnational commerce in species considered to be at risk due to trade (see CITES, 1963).



## WILDLIFE LEGISLATION SUMMARIES (continued)

### Federal Aid in Wildlife Restoration Act (Pittman-Robertson) Act, 1937

- Ammunition tax used for wildlife restoration and research.

### Federal Water Pollution Control Act, 1948

- First major U.S. law to address water pollution.

### Convention on International Trade in Endangered Species (CITES), 1963

- International treaty regulating trade in threatened and endangered wildlife and plants, signed by the U.S. and 170 other countries around the world. Establishes three levels of protection summarized in these three Appendices as quoted from the CITES website:
  - “Appendix I lists species that are the most endangered... They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial.”
  - “Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. International trade in specimens of Appendix-II species may be authorized by the granting of an export permit.”
  - “Appendix III is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.”
- Import into the U.S. of live or dead specimens, or parts or products made from them, without a CITES permit issued by FWS, is a misdemeanor violation of the ESA (see above) and is also frequently prosecuted as a felony violation of the anti-smuggling statute (18 U.S.C. § 545). View the complete lists of Appendix I, II, and III species at the CITES Appendices.

### National Environmental Policy Act, 1969

- Requires an environmental impact assessment for every federally funded project.
- Assesses possible damage to the environment and recommends, when there is potential damage, possible measures that will be less harmful. The assessment cannot on its own stop projects from being completed.
- Findings are reported to the public.

### Clean Air Act, 1970

- Regulates air emissions from stationary and mobile sources. Among other things, authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare, and to regulate emissions of hazardous air pollutants.
- Couples these pollutant standards with directing states to develop state implementation plans (SIPs), applicable to appropriate industrial sources in the state, to achieve these standards.
- Amended in 1977 and 1990, primarily to set new goals (dates) for attaining NAAQS, because many areas of the country failed to meet the deadlines.
- Contains specific guidelines to protect the air in national parks and forests and therefore, the wildlife that exist there.
- Source: [www.epa.gov/laws-regulations/summary-clean-air-act](http://www.epa.gov/laws-regulations/summary-clean-air-act)



## WILDLIFE LEGISLATION SUMMARIES (continued)

### Environmental Protection Agency (EPA), 1970

- Purpose is to protect and enhance the environment by enforcing the laws that protect the environment.
- Laws written by Congress authorize EPA to write regulations.
- Regulations explain the technical, operational, and legal details necessary to implement laws.
- Helps regulated entities meet federal requirements, and holds entities legally accountable for environmental violations.
- Issues policy and guidance documents to assist the public and regulated entities.
- Source: [www.epa.gov/laws-regulations](http://www.epa.gov/laws-regulations)

### Clean Water Act, 1972. Amended the Federal Water Pollution Control Act of 1948

- Growing public awareness and concern for controlling water pollution led to sweeping amendments to the FWPC Act.
  - Established the basic structure for regulating pollutant discharges into U.S. waters.
  - Gave EPA authority to implement pollution-control programs such as setting wastewater standards for industry.
  - Maintained existing requirements to set water quality standards for all contaminants in surface waters.
  - Made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions.
  - Funded construction of sewage treatment plants under the construction grants program.
  - Recognized the need for planning to address the critical problems posed by nonpoint-source pollution.
- Source: [www.epa.gov/laws-regulations/history-clean-water-act](http://www.epa.gov/laws-regulations/history-clean-water-act)

### Marine Mammal Protection Act (MMPA), 1972

- Prohibits, with certain exceptions, the “take” of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.
- Why Congress passed MMPA:
  - Some marine mammal species or stocks may be in danger of extinction or depletion as a result of human activities.
  - These species or stocks must not be permitted to fall below their optimum sustainable population level (“depleted”).
  - Measures should be taken to replenish these species or stocks.
  - There is inadequate knowledge of the ecology and population dynamics.
  - Marine mammals have proven to be resources of great international significance.
- Source: [www.nmfs.noaa.gov/pr/laws/mmpa/](http://www.nmfs.noaa.gov/pr/laws/mmpa/)

### The Endangered Species Act, 1973. Key legislation for both domestic and international conservation.

- Provides a framework to conserve and protect endangered and threatened species and their habitats.
- States receive financial assistance and incentives to develop and maintain conservation programs.
- Provides a method to meet many of the U.S.’s international responsibilities to treaties and conventions such as the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) and the Western Hemisphere Convention.
- Intended to prevent the extinction of native and foreign animals and plants by providing measures to help alleviate the loss of species and their habitats.



## WILDLIFE LEGISLATION SUMMARIES (continued)

### Marine Mammal Protection Act Amendments, 1994

- Substantial changes provide:
  - Certain exceptions, including for Alaska natives who use their small takes of marine mammals to meet their basic needs (subsistence).
  - Permits and authorizations for scientific research.
  - A program to authorize and control the taking of marine mammals incidental to commercial fishing operations.
  - Preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction.
  - Studies of pinniped-fishery interactions.
- Source: [www.nmfs.noaa.gov/pr/laws/mmpa/](http://www.nmfs.noaa.gov/pr/laws/mmpa/)

### Multinational Species Conservation Acts. 1988 (African elephant), 1994 (rhinoceros and tiger), 1997 (Asian elephant conservation), 2000 (great ape), 2004 (marine turtle)

- Has a significant role in the Division of International Conservation's Wildlife Without Borders program.
- Grants the Division authority to establish the Multinational Species Conservation Funds and provide grants to projects benefiting elephants, rhinos, great apes, and marine turtles in their natural habitats.
- The Multinational Species Conservation Fund Semipostal Stamp Act of 2009 enacted as a way to provide the general public with a convenient way to contribute to the Multinational Species Conservation Funds. The Save the Vanishing Species Stamp released in spring 2011 has generated more than \$1.3 million that is equally divided among the five Conservation Funds.
- Source: [www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/multinational-species-conservation-acts.html](http://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/multinational-species-conservation-acts.html)

## MY NOTES and IDEAS



## CURRENT EVENTS

*What wildlife issues are important today?*

### INTRODUCTION

Youth who have progressed to Level 3 of the 4-H Wildlife Science curriculum should understand basic wildlife terminology, habitat needs, and how humans impact wildlife. Level 3 activities prepare you to be an informed citizen, make wildlife-friendly decisions, and study these topics further at a college or university. In this activity you will research a current issue or topic related to wildlife.

### GEAR

- Your knowledge and interest in wildlife
- Internet access



### LET'S DO IT

1. Choose a current issue that relates to wildlife. Suggestions:
  - A question you have formulated as a result of your studies in this project.
  - A question posed by a knowledgeable adult who works in a related area.
  - Find wildlife topics of concern at one of these websites:
    - U.S. Farm Bill, <https://agriculture.house.gov/farmbill>
    - USDA agricultural research focus, [www.ars.usda.gov/research/research.htm](http://www.ars.usda.gov/research/research.htm)
    - Natural Resource Conservation Service (NRCS), [www.nrcs.usda.gov](http://www.nrcs.usda.gov)
    - Environmental Protection Agency (EPA), [www.epa.gov](http://www.epa.gov)
2. Research the topic to make sure you understand problems and concerns. Take notes while you are reading. Resources can include knowledgeable people and internet sources hosted by the U.S. government, United Nations, universities and colleges, and professional societies.
3. Write a news release. A news release is similar to a research report but written to inform the general public. It also is shorter than a report, usually about one page. You should include:

- Title
  - Your name and the date the news released is finished
  - Issue
  - Background
  - Describe the problem, concerns, or cost/benefits
  - Recommendations
  - The resources you used
4. Ask an adult to read your news release, share his or her feedback, and discuss the Chat questions.
  5. Revise your news release, if needed.



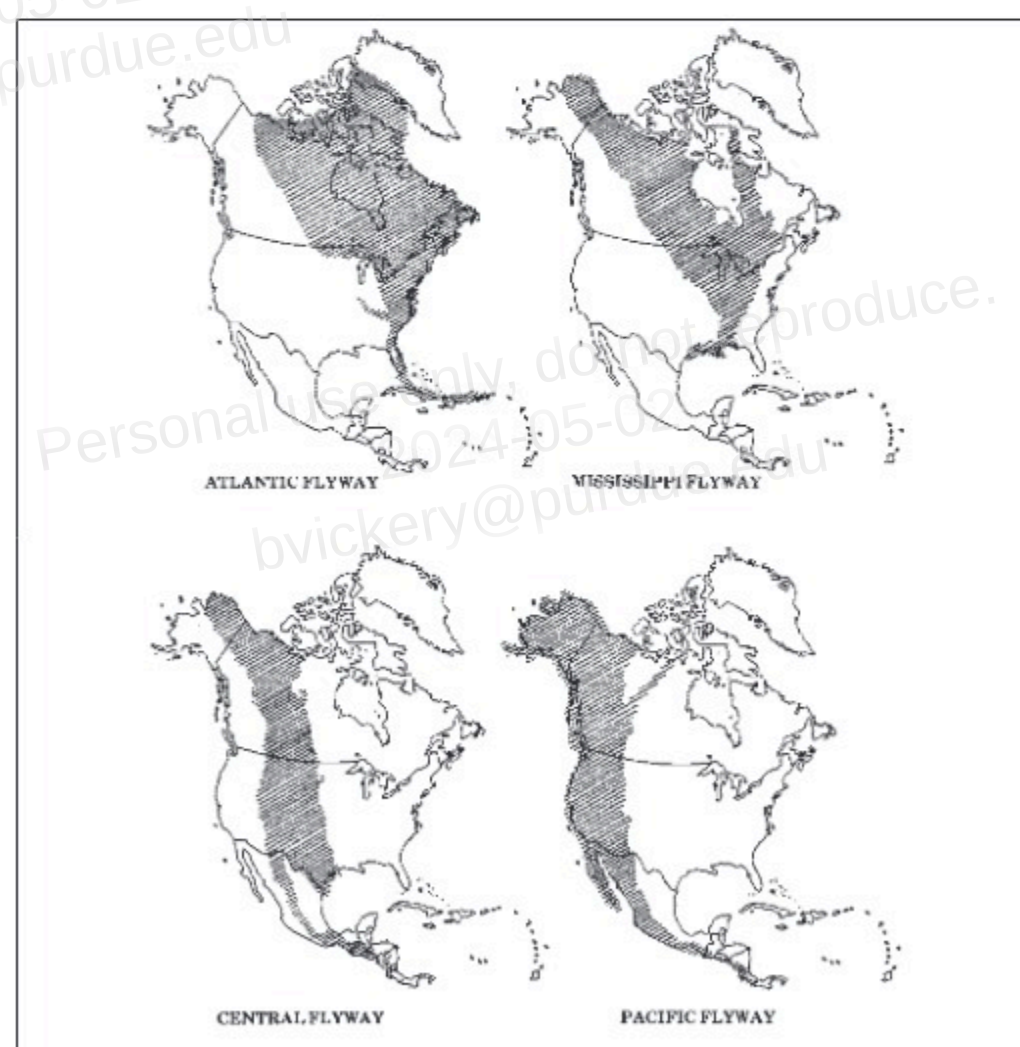
### LET'S CHAT

**Share What Happened:** Why did you choose your topic?

**Apply:** Who needs to know the information you developed?

**Generalize to Your Life:** Why is your topic important for the general public to understand?

**Learn about wildlife photography at the U.S. Fish And Wildlife website, [www.fws.gov/refuges/photography](http://www.fws.gov/refuges/photography)**







## FOLLOW A PROFESSIONAL PATH

*What is a wildlife professional's typical day like?*

### INTRODUCTION

A wildlife professional might work in research, management, or education. Many wildlife-related occupations combine all three. Working with a professional is the best way to learn what he or she does and if you might be interested in a career in wildlife.

### GEAR

- Wildlife professional who will let you work with them for a day. See the suggestions for entities that employ wildlife biologists to do research, management, and educational activities.
- Paper and pencil or your wildlife journal
- Camera



### LET'S DO IT

1. Contact a wildlife professional. Ask if you can help them for a day.
  - Set up a time that works for both of you.
  - Ask if there is anything you should read beforehand. For example, if you'll be helping record data from a deer hunt, knowing the deer-hunting laws and why the state collects this information is useful.
2. Spend a day with the wildlife professional.
  - Take notes when you can, but remember your first responsibility is to help.
  - Take pictures that document your work, when appropriate.
  - Ask the wildlife professional to be in a picture with you. Ask someone else to take a picture of the two of you working together, if possible.



### LET'S CHAT

**Share What Happened:** What did you enjoy best about your day with the wildlife professional?

**Apply:** What did you learn that you could apply to your daily life?

**Generalize to Your Life:** Why does job shadowing (working with a professional) give a better idea of what a career in the profession would be like?



### LET'S FLY HIGHER

- Work with other professionals in an area you are considering for a career.
- Apply for a summer internship that has a wildlife focus.
- Learn more about hunting and trapping regulations in Indiana by exploring the Indiana Hunting and Trapping Guide, [www.in.gov/dnr/fishwild/2343.htm](http://www.in.gov/dnr/fishwild/2343.htm)





# FOLLOW A WELL-TRAVELED PATH

What can you learn about wildlife issues from a book or movie?

## INTRODUCTION

Many people concerned about the environment and the welfare of wildlife have tried to inform others through books, movies, news articles, and magazines. Media can inspire appreciation of the environment and illustrate human impact on it both negative and positive. Some works have even influenced legislation and how we treat our environment.

In this activity you will read a book or watch a video about a wildlife concern or issue. You'll then write a report using the Purdue Online Writing Lab (OWL), an excellent writing resource open to anyone at <https://owl.english.purdue.edu/owl/section/1/3>

## GEAR

- Book and Video List
- Purdue Online Writing Lab (OWL) guidelines on Writing a Book Report. (<https://owl.english.purdue.edu/owl/resource/703/1/>)



## LET'S DO IT

1. Choose a book or video series from the Book and Video List. You can usually find these books and videos in public or school libraries, local bookstores, or online.
2. Read Writing a Book Report from the Purdue Online Writing Lab (OWL) before reading your book or watching your video.
3. Read or view your selection. Take notes while you read or watch.
4. Write a report or review using the Purdue OWL format for book reports.



## LET'S CHAT

**Share What Happened:** Why did you choose the particular book or video?

**Apply:** What can you learn by writing and revising a book or video report?

**Generalize to Your Life:** What did you learn that you can use now or in the future?

## Book and Video List

### Books (Title, Author, Date)

- *A Girl of the Limberlost*, Gene Stratton Porter, 1909
- *A New Century for Natural Resources Management*, Richard L. Knight & Sarah F. Bates, 2013
- *A Sand County Almanac and Sketches Here and There*, Aldo Leopold, 1949
- *American Canopy: Trees, Forests, and the Making of a Nation*, Eric Rutkow, 2012
- *An Inconvenient Truth*, Al Gore, 2007
- *Cry of the Kalahari*, Mark James Owens and Cordelia Dykes Owens, 1992
- *Frail Ocean*, Wesley Marx, 1967
- *Freckles*, Gene Stratton-Porter, 1904
- *Intelligent Courage, Natural Resource Careers That Make a Difference*, Michael E. Fraidenburg, 2007
- *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, Richard Louv, 2008
- *My First Summer in the Sierra*, John Muir, 1911
- *Reflections from the North Country*, Sigurd F. Olson, 1976
- *Round River: From the Journals of Aldo Leopold*, Aldo Leopold, Edit: Luna Leopold, 1972
- *Silent Spring*, Rachel Carson, 1962
- *The Animal Dialogues: Uncommon Encounters in the Wild*, Craig Childs, 2009
- *The Singing Wilderness*, Sigurd F. Olson, 1956
- *Travels in Alaska*, John Muir, 1915
- *Undeniable*, Bill Nye, 2014
- *Unstoppable*, Bill Nye, 2015
- *Voyage of the Beagle*, Charles Darwin, 1839
- *Where the Wild Things Were: Life, Death, and Ecological*
- *Wreckage in a Land of Vanishing Predators*, William Stolzenburg, 2009
- *Wildlife in America*, Peter Matthiessen, 1978
- *Winter World: The Ingenuity of Animal Survival*, Bernd Heinrich, 2009

### Videos

- *Life*, 2009 BBC TV series by David Attenborough
- *The National Parks: America's Best Idea*, 2009 PBS TV series by Ken Burns, [www.pbs.org/nationalparks](http://www.pbs.org/nationalparks)
- *The Blue Planet*, 2001 BBC Earth TV series
- *Everglades of the North: The Story of the Grand Kankakee Marsh* by Lakeshore Public Television, [www.kankakeemarsh.com/buy-the-dvd/](http://www.kankakeemarsh.com/buy-the-dvd/)



## LET'S FLY HIGHER

- Choose another book to read or video to watch.
- Share your book or video with others.



# FOLLOW AN EDUCATIONAL PATH

What college degrees are available for students pursuing a wildlife-related career?

## INTRODUCTION

Your interest in wildlife could lead to a career. If you plan to earn a degree that prepares you for a profession related to wildlife, you need to learn what it takes to get into your college of choice, the degrees it offers, and the requirements for entering that program. Many colleges have wildlife-related degree programs.

## GEAR

- Internet access



## LET'S DO IT

1. Choose a college or university that you might be interested in attending.
2. Investigate the different degree programs of interest to you.
  - You might need to search several different departments; for example, studying biology, environmental studies, and/or natural resources can all lead to a career that involves wildlife.
  - Keep notes about each program that interests you. Include entrance requirements, required courses, internships offered, estimated costs, and other pertinent information.



The Agriculture Administration Building is familiar to students pursuing a wildlife-related career at Purdue University.

- You might want to contact an academic counselor at the college or university to ask more specific questions about programs and requirements.
3. Choose another college or university, and repeat the process.
  4. Discuss what you learned with your parents.



## LET'S CHAT

**Share What Happened:** Why did you choose the two colleges/universities that you did?

**Apply:** Are there courses you need to take in high school to be prepared to apply to the college or university of your choice?

**Generalize to Your Life:** How might the decision you make on what college or university to attend affect your career?



## GLOSSARY

**Built environment:** The human-created environment, including cities, buildings, roads, crops, and their supporting infrastructure such as water supply and energy systems

**Carbon footprint:** The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company. See the U.S. EPA website, [www.epa.gov](http://www.epa.gov), for more information (search “carbon footprint”)

**Generalist species:** A species that can adapt to a wide variety of environmental conditions and diets.

**Habitat:** The natural environment in which an animal lives and can meet its needs

**Home range:** The area in which an animal lives that contains the necessary resources for food, water, and shelter

**Inbreeding:** Animals breeding with close relatives, often because of low populations. This can lead to a lack of diversity and sometimes, an increase in genetically linked problems

**Invasive:** Describes an exotic species that can outcompete native species

**Nuisance species:** A species that creates some kind of conflict with people; not all people will consider a species a nuisance

**Specialist species:** A species with needs so specific, it does not adapt well to an environment (or habitat) that differs from what it has evolved to inhabit. Example: the koala, which eats only eucalyptus leaves.



## PHOTO AND ILLUSTRATION CREDITS – WILDLIFE SCIENCE, LEVEL 3

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27	<b>C4 You are the Mayor</b> <ul style="list-style-type: none"> <li>• Great horned owl, photo by USDA NRCS</li> <li>• Rabbit, photo by USDA NRCS</li> <li>• Great blue heron, photo by USDA NRCS</li> <li>• Swift foxes, photo by USDA NRCS</li> </ul>
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