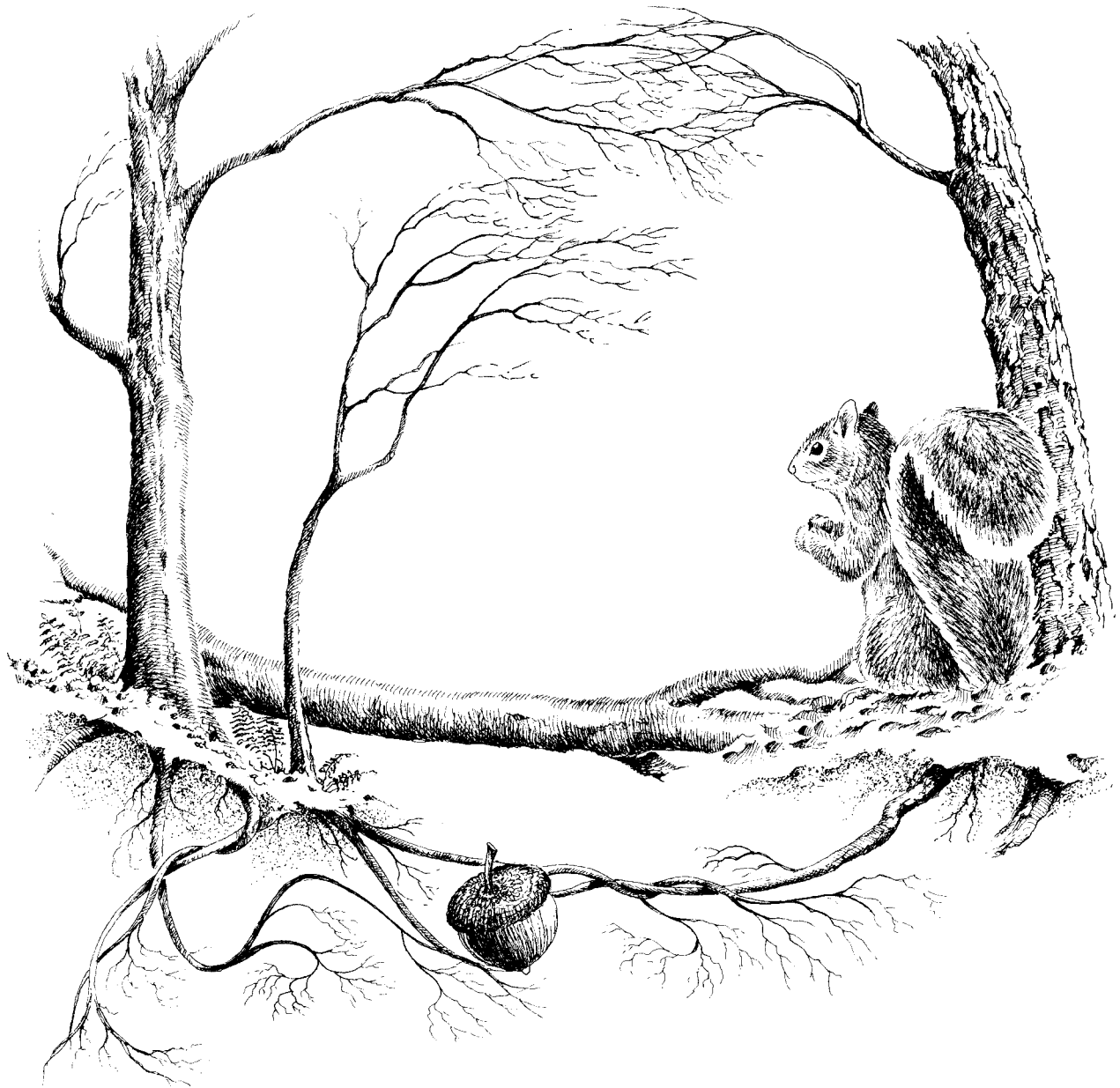


Adapted by York County Parks for use with Envirothon

**4-H WILDLIFE PROJECT—INTERMEDIATE UNIT BOOK 1**

# The Wildlife Ecologist



PENNSSTATE



College of Agricultural Sciences  
Cooperative Extension

# Chapter 2

## W I L D L I F E H A B I T A T



BOBCAT

The area that provides an animal with adequate food, water, shelter, and space is that animal's **habitat.**

### HABITAT: What Animals Need to Live

Wild animals need food, water, and shelter to survive. Food, water, shelter, and space are *habitat requirements*.

#### Food

Food is essential for all wildlife, and different species eat different kinds of food. Some animals eat only plant parts, such as nuts, berries, grass, twigs, and leaves. These animals are called *herbivores*. Deer and rabbits are examples of herbivores.

Other animals eat only meat, such as live animals or carrion (dead animals). These animals are called *carnivores*. Bobcats and hawks are carnivores. Insectivores, such as bats, shrews, and some birds, are specialized carnivores that eat only insects.

Animals that eat both plants and animals are called *omnivores*. These animals may eat nuts and berries in the morning, bird eggs in the afternoon, and frogs at night. Raccoons and opossums are omnivores. Are you a carnivore, omnivore, or herbivore?

With different animals eating different kinds of foods, the wildlife menu can get pretty complicated. Every day, animals eat plants or other animals to survive, and the whole time they are in danger of being eaten themselves! Every species fits into a *food web* based on what it eats and what eats it.

Animals that eat other animals are called *predators*, and the animals they eat are called *prey*. A gray fox is a predator of meadow voles. Meadow voles are prey for gray foxes, barn owls, and red-tailed hawks.

#### Water

Water is the most important substance on earth. Without it there would be no life. Animals can go without food for weeks, but they cannot go without water for more than a few days. Puddles, springs, streams, and ponds provide drinking water for wildlife. Some animals get all of the water they need from their food.

### Shelter

Shelter is any place that provides an animal and its young with protection from the weather and from predators. Wildlife biologists refer to shelter as *cover*. A rabbit hides under a bush when a fox or hawk is nearby. The bush provides the rabbit with cover. Woodchucks take cover in underground burrows. Your cover is your house or apartment.



### Space

Along with food, water, and cover, animals need a certain amount of space to carry out their life functions. A large animal may need a lot of space, while a small animal needs only a little. Black bears may travel several miles a day in search of food, while a white-footed mouse may spend its entire life just a few hundred feet from where it was born. The space that an animal occupies during its life is that animal's *home range*.

## Learning Can Be Fun!

### 1. Mystery Word

Fill in the blocks with the word or words described by the clues below to reveal the *mystery word*.

a. The area an animal travels through to find its habitat requirements is its \_\_\_\_\_.

b. Animals that are too crowded do not survive well because each animal needs a certain amount of \_\_\_\_\_.

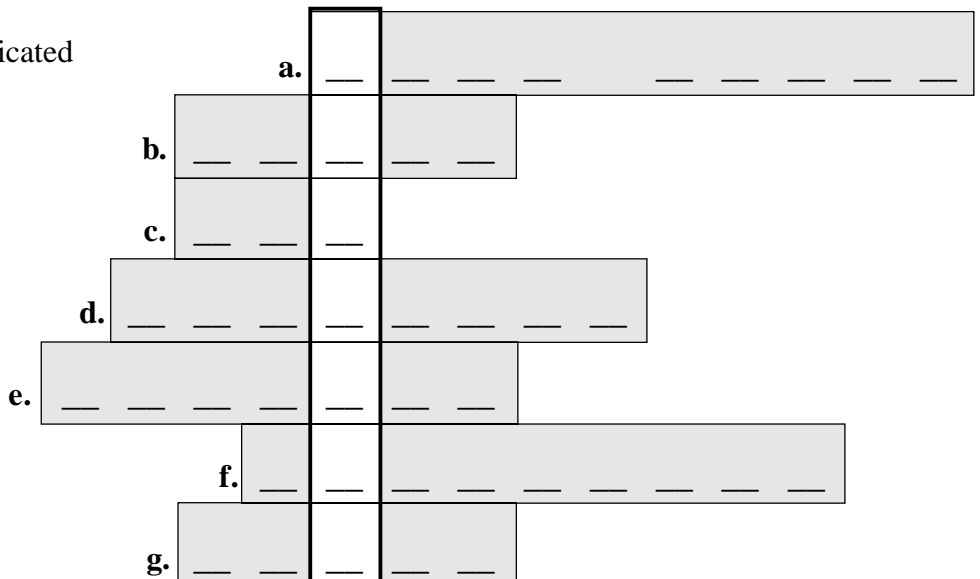
c. Each animal, along with the food it eats and its predators, is part of a complicated food \_\_\_\_\_.

d. An opossum eats meat, berries, vegetables, and other foods. It is an \_\_\_\_\_.

e. Animals need \_\_\_\_\_ to keep themselves and their offspring protected.

f. An owl eats only meat. It is a \_\_\_\_\_.

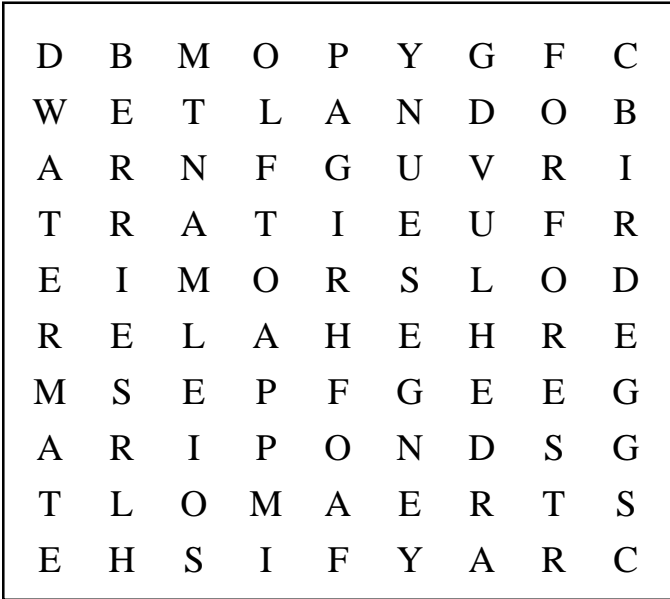
g. The most important substance on earth is clean \_\_\_\_\_.



Answers: (a.) home range, (b.) space, (c.) web, (d.) omnivore, (e.) shelter, (f.) carnivore, (g.) water

## 2. Habitat Word Search

A raccoon is having trouble finding all of his habitat requirements within his home range. In the space below, please help him find his food, water, and shelter.

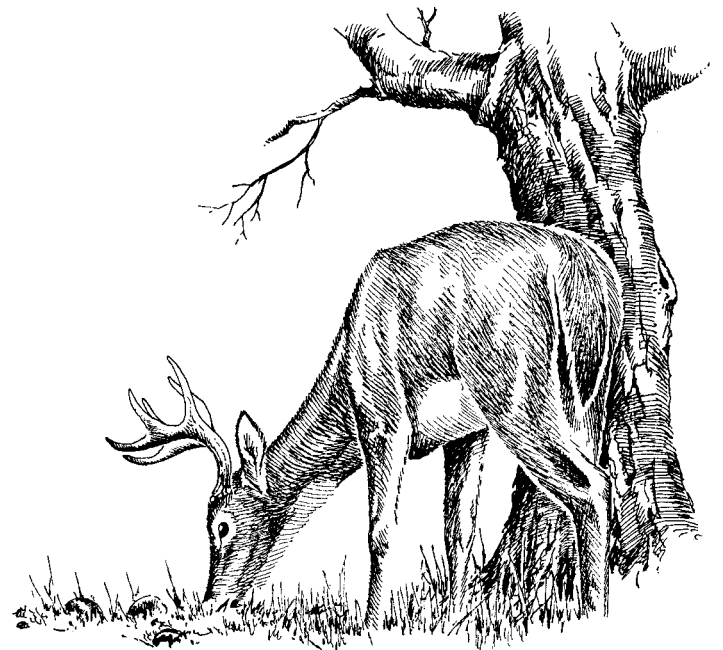
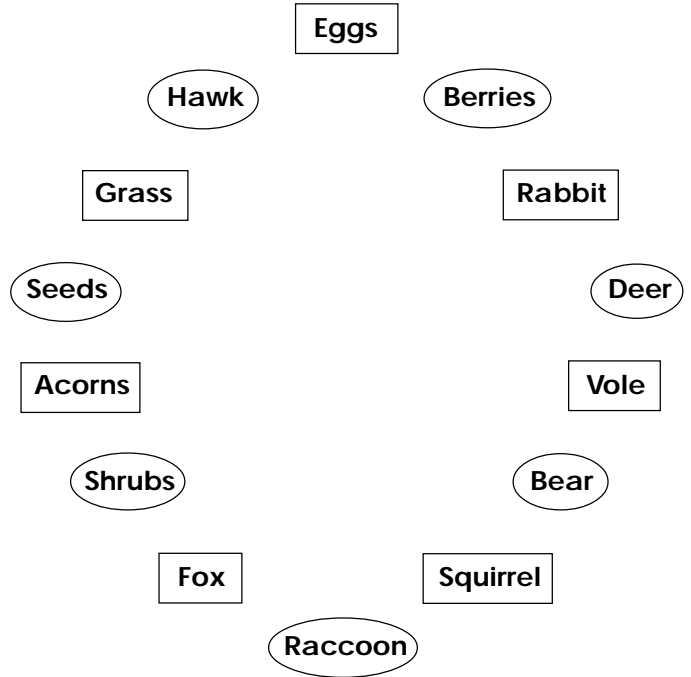


Raccoon habitat requirements:

Berries	Pond	Forest
Fish	Stream	Den trees
Bird eggs	Wetland	Brush pile
Crayfish	Water	Cover

## 3. The Web of Life

Draw a line from each animal to each of the items it may eat (see the Appendix for information on what animals eat).



WHITE-TAILED DEER

# Chapter 3

## WILDLIFE POPULATIONS

Imagine you are a wildlife biologist who works with bobwhite quail, a small game bird that lives in agricultural habitats. You hear from more and more farmers that they don't see as many quail as they used to. Birdwatchers and some hunters are also concerned about quail numbers and are starting to say that the quail hunting season should be closed. At the same time, some hunters don't agree that quail are declining and don't think the season should be changed. As a wildlife biologist, what should you do?

The first thing you need to know is whether quail are actually declining or if it just appears that way to some people. To answer that question, you need to know how many quail there are and how present quail numbers compare with those of past years. In other words, you need to know the quail population in your area.

$$\text{Population change} = (\text{birth} + \text{immigration}) - (\text{death} + \text{emigration})$$

### WHAT IS A WILDLIFE POPULATION?

The number of individuals of a particular species in an area is called a population. Wildlife populations naturally rise and fall at different times of the year. Wildlife populations increase through birth or when new animals move into the area (immigration). Populations decrease through death or when animals leave the area (emigration).

Knowing the factors that cause populations to change, we can use the following formula to estimate how a population will change through the year:  $\text{population change} = (\text{birth} + \text{immigration}) - (\text{death} + \text{emigration})$ .



BLACK BEAR AND CUBS

## Wildlife Populations Through the Year

Most wildlife populations show a regular pattern of increase after the breeding season and decline during other times of the year. You can see how this works by graphing a white-tailed deer cycle in the *Learning Can Be Fun* activity entitled, “Deer Population Cycle.”

Numbers of animals in a population may vary over the course of a year (as in the case of the white-tailed deer) or many times during a year. Little animals that have litters several times a year (like mice) may go through several population fluctuations in just one year.



WHITE-FOOTED MOUSE

# Learning Can Be Fun!

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## 1. How Many Rabbits?

Calculate the rabbits' population change in a grassy meadow from the beginning of the year to the end of the year. The original rabbit population in the meadow is 50 (25 males, 25 females):

- a. In May, each of the females gives birth to four kits (young rabbits).

How many rabbits are added to the population? \_\_\_\_\_

What is the rabbit population now? \_\_\_\_\_

- b. During early summer, predators and disease kill 50 kits and 20 adults.

What is the rabbit population now? \_\_\_\_\_

- c. An additional 20 rabbits immigrated to the meadow during early summer.

What is the rabbit population now? \_\_\_\_\_

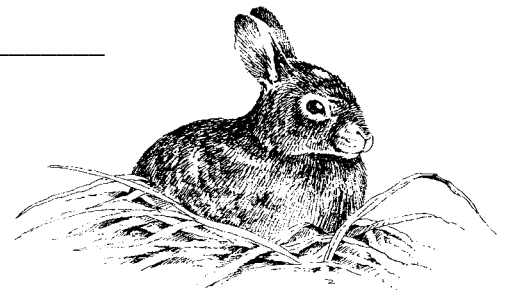
- d. Because of crowded conditions, 25 rabbits left the meadow and emigrated to

other fields and fencerows. Now what is the rabbit population? \_\_\_\_\_

- e. Compared to the original rabbit population you started with, the

rabbit population in the meadow now is: **higher** **lower**

(circle one)



EASTERN COTTONTAIL

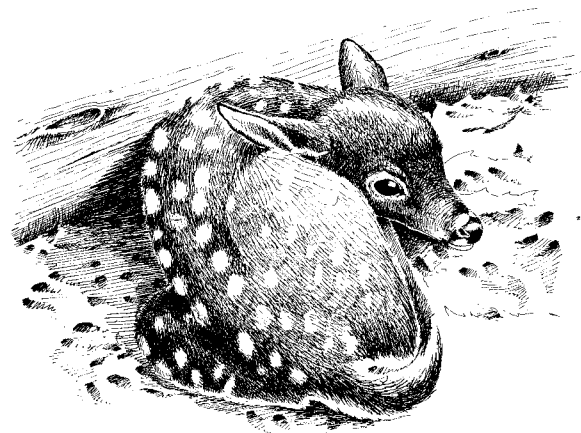
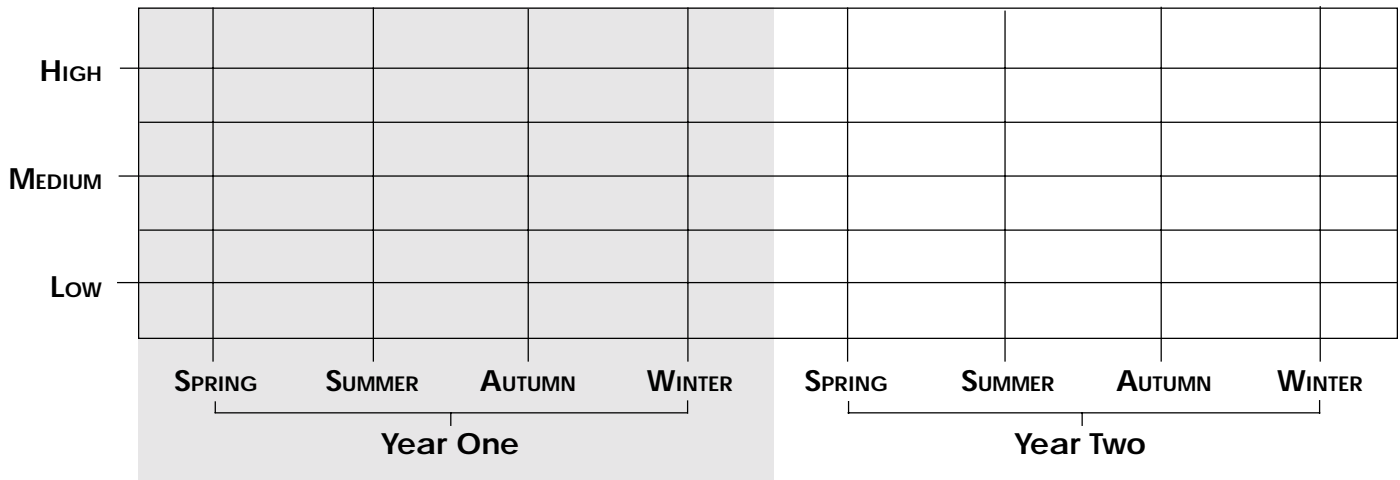
Answers: a. 100, b. 80, c. 100, d. 75, e. higher

## 2. Deer Population Cycle

In this activity, you will see how a deer population changes several times in just one year.

- a. In spring, fawns are born and the population increases. This is the season of highest deer population. In the diagram below, place an (X) at the high level above “spring” in Year One.
- b. In summer, most deer are healthy, but growing fawns are vulnerable to predation. Put an (X) between medium and high population levels for “summer.”
- c. In autumn, hunters harvest surplus individuals so that populations will not be too high going into winter. Put an (X) between medium and low above “autumn.”

- d. During winter, some deer die from disease. In severe winters, deer may die of starvation and disease. Winter is the time when deer populations are at their lowest. Place an (X) at the low level above “winter.”
- e. Now repeat the above steps for Year Two.
- f. Draw a line connecting the X’s to plot the yearly change in a deer population.



WHITE-TAILED FAWN

## ESTIMATING WILDLIFE POPULATIONS

One way to estimate wildlife populations is to take a census. A *census* is an exact count of *every* animal in an area. It is difficult to conduct a census of wildlife. Wild animals are often difficult to see and will not stand still long enough to be counted once you've found them.

When it is not possible to census animal populations exactly, biologists use a sampling method instead. A *sample* is not an exact count—it is an estimate based on studying just part of the entire population.

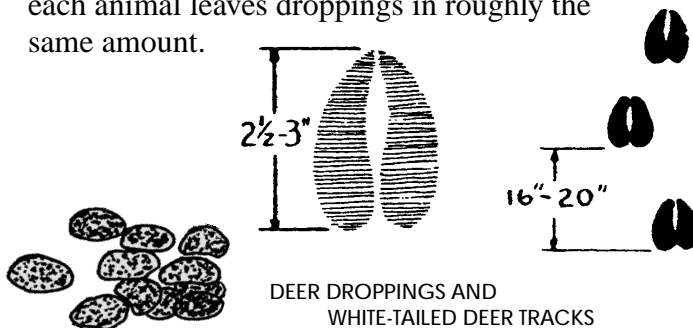
For example, the total population of ducks on a pond can be estimated by counting the ones on half the pond, then doubling that number. Of course, if all of the ducks happen to be resting on just one side of the pond on the day you counted them, then your estimate would be wrong. That is why biologists never rely on just one sample. Many samples are needed to make an accurate estimate of the total population.

### Population Index

In some cases, we do not need to know the exact number of animals in an area. A *population index* is a method of telling how abundant animals are by counting *signs* the animals leave instead of counting the animals themselves.

Imagine that you walk around the edge of a farm field and see many deer droppings and deer tracks. You would assume that a lot of deer use this area. Then you visit a city park and see no deer droppings or deer tracks. You would assume that deer do not heavily use this area. You have just conducted a simple population index!

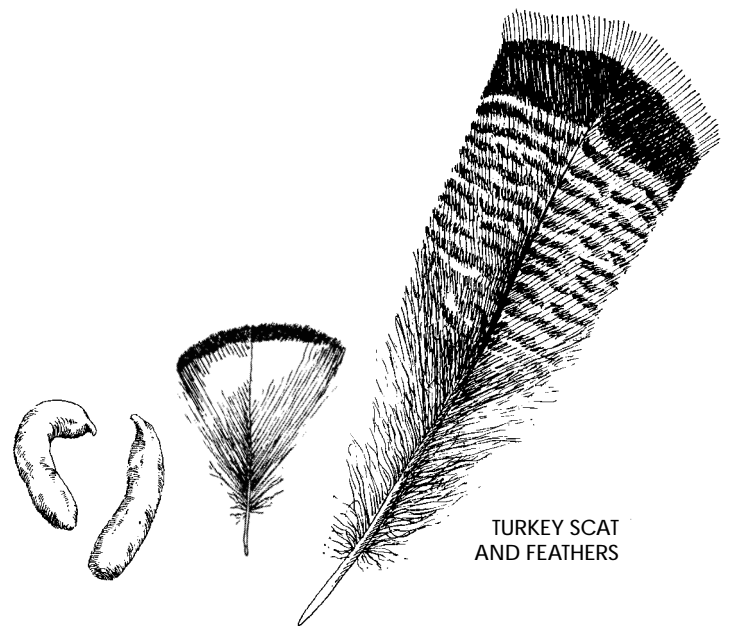
Almost any type of animal sign can be used for a population index, as long as it is something that each animal leaves in roughly the same amount. Counts of animal droppings are often used because each animal leaves droppings in roughly the same amount.



## Monitoring Wildlife Populations

Biologists are often interested in how wildlife populations change over time. For example, a biologist may want to see how badly an endangered bird has been affected after a storm destroyed nesting habitat. Another may want to see if turkey populations increase after timber harvesting that created more forest clearings. Both biologists need to do some population monitoring.

*Population monitoring* involves using censuses, sampling, or indexes to determine whether wildlife populations have changed over time. Monitoring usually does not result in an estimate of exactly how many animals live in an area; it just tells you whether there are more or fewer than the last time you checked.

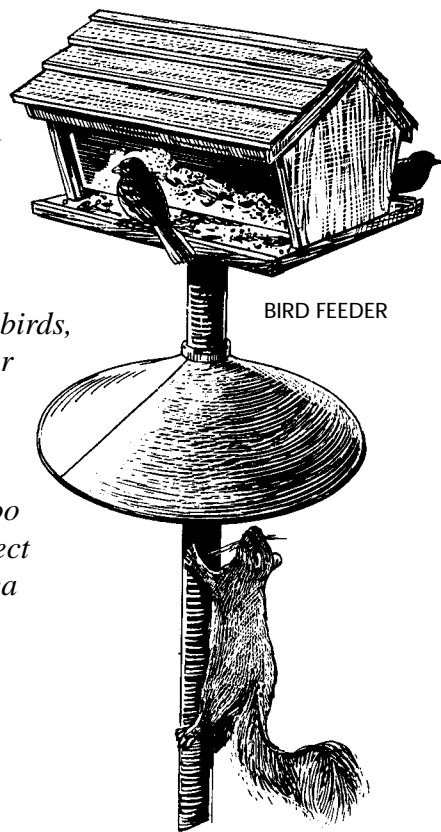




**NOTE:** If no bird feeder is available, you can do the same study by counting the number of flowers in bloom for a certain species.

For example, you can count the number of dandelions blooming in a yard or local park.

*Follow the same instructions as for birds, but do not count for just 15 minutes—try to count all of the flowers at each visit. If there are too many to count, select a small sample area and count the flowers in that area only.*



## TOOLS OF THE WILDLIFE RESEARCHER

Wildlife biologists use many different tools to conduct wildlife research. Each is important in collecting information about the animal being studied.

- **Radio-telemetry**

A transmitter, placed on an animal's body, sends out radio signals. The biologist carries a radio receiver in order to hear the radio signals even without seeing the animal. This tool is useful when you want to know how the animal moves around in its habitat.

- **Marking and banding**

Biologists can mark animals with numbered ear tags, leg bands, or wing bands, and then release the animals. If the animal is found later, the biologist knows how long it took the animal to move a certain distance. This practice is useful for working with animals like migrating birds that travel far distances.

- **Trapper-hunter-birdwatcher surveys**

Biologists ask people who watch and hunt animals to keep track of how many they have seen or harvested. This is useful because it provides more information than one biologist could gather working alone.

## WILDLIFE CAREER: Wildlife Research

Wildlife and fisheries researchers design and carry out studies that answer questions about the welfare of wildlife populations. Researchers may work with game animals and sport fish, some work with nongame species like songbirds and salamanders, and some work with endangered species.

- **Wildlife technician**—Technicians usually work directly in the field with wildlife. They conduct the studies that wildlife biologists design and provide data to the supervising biologist. Technicians usually have an associate's degree or bachelor's degree in Wildlife and Fisheries Science.

- **Wildlife biologist**—Biologists design experiments to answer questions about the species they are studying and supervise field personnel. Biologists usually have a master's degree in Wildlife and Fisheries Science.
- **Wildlife ecologist**—Many wildlife ecologists teach courses in wildlife science at the university level. They also help their students design wildlife studies as part of their wildlife degree. Wildlife ecologists are often interested in answering questions that have never been studied. They usually have a Ph.D. in Wildlife and Fisheries Science or Ecology.

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