4-H Wildlife Project—Intermediate Unit Book 2

The Wildlife Manager

PENNSTATE

College of Agricultural Sciences
Cooperative Extension

CONTENTS

Note to Educators and 4-H Leaders:
This project is most appropriate for youth ages 12 and up. It addresses several key sections of Pennsylvania's Academic Standards for Environment and Ecology, including sections: 4.6.7, 4.6.10, 4.7.7, and 4.7.10.

4-H ACTIVITIES REPORT

This report will help you keep a better record of your club activities. Fill it in as you complete each assignment. Refer to this record when you are entering county, state, and national programs. Ask your 4-H leader to explain these programs to you.

Projects taken _____

_____

Offices held _____

Club _____

County _____

Committees _____

_____

"Show-and-tells" or presentations given to:

Local club _____

County _____

Region _____

State _____

Others _____

News articles _____

Radio _____

TV _____

Displays or exhibits _____

_____

Things done to improve your health _____

_____

Community service or citizenship work done:

By yourself _____

With club _____

Number of meetings your club(s) held this year _____

Number you attended _____

Number of persons you encouraged to join 4-H _____

Number of 4-H'ers you helped with projects _____

In what way _____

_____

_____

Check activities in which you participated and tell how you helped

- ❑ **Camp** _____
- ❑ **Club or county tours** _____
- ❑ **Club picnic** _____
- ❑ **County fair** _____
- ❑ **Achievement programs** _____
- ❑ **Roundup** _____
- ❑ **Leadership training** _____
- ❑ **State 4-H Capital Days** _____
- ❑ **Penn State 4-H Achievement Days** _____
- ❑ **Pennsylvania Farm Show** _____
- ❑ **National 4-H Week** _____
- ❑ **State Ambassador Conference** _____
- ❑ **Quiz bowls** _____
- ❑ **Hippology** _____
- ❑ **Judging** _____
- ❑ **Others** _____

_____

_____

_____

_____

_____

_____

4-H Club Motto

"To make the best better"

4-H Club Pledge

I pledge
my head to clearer thinking,
my heart to greater loyalty,
my hands to larger service, and
my health to better living, for
my club,
my community,
my country, and
my world.

4-H Club Colors

Green and White

AUTHORS: Lisa M.Williams, conservation education specialist; Margaret C. Brittingham, associate professor of wildlife resources, Penn State; and Sanford S. Smith, natural resources and youth specialist, Penn State

ILLUSTRATIONS: Jeffery Mathison, pp. 3 (backyard), 4 (field), 5, 6, 22 (neighborhood), 23, 24, and 34; and John Sidelinger, cover, and pp. 1, 2, 3 (wetland and stream), 4 (squirrel and blackbird), 16–19, 22 (bird), 25, 28 (lawn), and 29

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INTRODUCTION

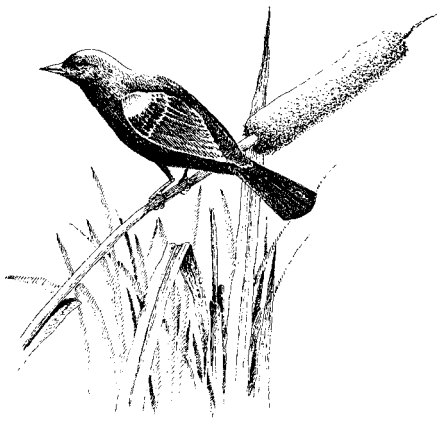
This 4-H project book is the second book in the Intermediate Unit. It is designed to lead you more deeply into the topic of wildlife management. While Book 1: **The Wildlife Ecologist** focused on observation of the natural world and its processes, Book 2: **The Wildlife Manager** goes beyond observation to the more complex idea of managing wildlife and habitats. In this book, you will survey an outdoor area to identify its habitat suitability for wildlife, inventory the wildlife present, identify those that could live in the area, and make management recommendations to improve the habitat for target species. Understanding how the pieces fit together is exciting—this is the essence of wildlife management!

Book 2 is divided into four chapters. Chapter 1 describes the major habitat types found in Pennsylvania and provides a review of the factors influencing habitat suitability. Chapter 2 introduces the important concept of carrying capacity and basic habitat management practices. Chapter 3 describes some common habitat management practices for neighborhood, park, backyard, or schoolyard habitats. Chapter 4 takes you through the process of writing a habitat management plan.

As in Book 1, this project book provides facts and information about the study of wildlife ecology and wildlife management. To become a true wildlife manager, you will need to go beyond the simple learning of facts and information. Most wildlife professionals have a keen interest, respect, and often, passion for wildlife and their habitats. This feeling for the outdoors will take root and grow if you spend time with nature, observing the seasons, watching wild animals, and thinking about how natural systems work. You can learn the *facts* of the outdoors from a book, but you can only really *understand* the outdoors by spending time in it. So go outdoors and begin to learn how the wild world works—it will be a lesson that stays with you for a lifetime!

This 4-H project book contains many "Field Work!" exercises. These activities are designed to take you a step beyond nature journaling to actively recording details of wildlife species and habitats around you and planning management activities to benefit wildlife. Nearly all habitat managers record field observations and plan their management activities in a field notebook. This project book can serve as your field notebook, or you may use a three-ring binder. The only other tools needed for this project are a few pens and pencils. A pair of binoculars and a few basic field identification guides may also be useful. Field guides can be borrowed from most libraries.

When selecting a location to conduct "Field Work!" activities, make sure you have permission from the landowner if the property is privately owned. This will be your "study area" for the project. Select a safe location and always inform a parent or another trusted adult where you will be at all times. Your study area does not have to be good wildlife habitat right at this time; your area could be a vacant lot, a park, a backyard, or even a schoolyard!



RED-WINGED BLACKBIRD

Chapter 1

FOREST HABITAT

PENNSYLVANIA HABITATS

WHY STUDY HABITAT?

Directly changing wildlife populations is difficult. For example, if we want to increase the number of bluebirds in an area, we can't just force female bluebirds to produce more nestlings. And if we want to decrease the number of black bears in an area, we can't just prevent them from having cubs.

This book focuses on the study and management of habitat. Remember that an animal's habitat is the area that provides all of the life requirements for that animal. Wildlife populations usually increase or decrease based on changes in the quality of the habitat they rely on for their survival. For that reason, the most effective way to manage wildlife populations is to manage wildlife habitat.

AN OVERVIEW OF PENNSYLVANIA HABITATS

Pennsylvania is home to a rich diversity of fish and wildlife because it has many different habitat types. There are six major habitat types in Pennsylvania.

Forest

Pennsylvania is 57 percent deciduous forest habitat (17 million acres). This is the most common habitat type in the state. Trees are the dominant life form in a forest, and deciduous trees are those that lose their leaves each fall. Our most common trees are chestnut oak, red oak, white oak, black cherry, white ash, American beech, red maple, sugar maple, black birch, black gum, and tulip poplar. Evergreens such as hemlock and pine are also distributed widely in Pennsylvania's forests.

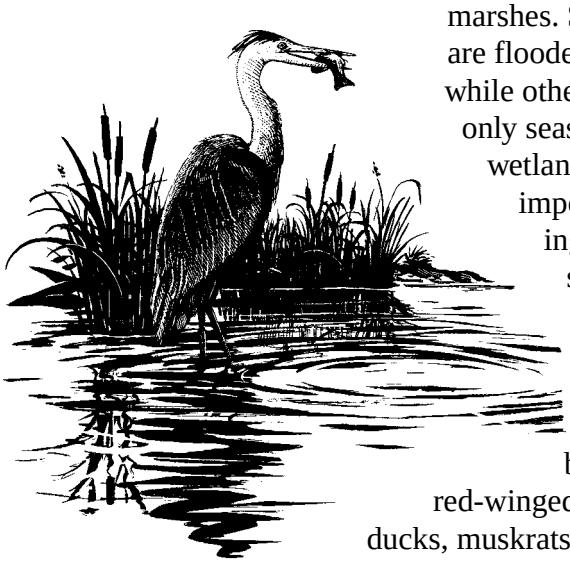
Beneath the forest canopy are understory plants that thrive in shade. Common understory plants include mountain laurel, viburnums, dogwood, redbud, sassafras, striped maple, spicebush, ferns, and many types of wildflowers. Large tracts of forest provide habitat for wildlife species that are forest specialists, such as the scarlet tanager and wood thrush.

Field

Field habitat offers a variety of grasses interspersed with wildflowers, shrubs, and herbs. Plants found in this habitat thrive in direct sunlight. In Pennsylvania, field habitats are most often found in agricultural areas in the form of hay fields and pastures. Field habitats also occur in strip-mined areas when grasses are planted after mining is complete. Fields provide habitat for early successional wildlife species, such as chipping sparrows, goldfinches, pheasants, meadowlarks, meadow voles, meadow jumping mice, and woodchucks.

Wetlands

Wetlands are areas that are regularly wet or flooded. There are many different types of wetland habitats, such as forested wetlands, swamps, bogs, ponds, and marshes. Some wetlands are flooded all year round, while others are flooded only seasonally. Seasonal wetlands are especially important as breeding habitat for salamanders, toads, and other amphibians. Permanent wetlands may be home to red-winged blackbirds, ducks, muskrats, beavers, salamanders, turtles, and a variety of other reptiles and amphibians.



WETLAND HABITAT

Streams and Rivers

Open and moving waterways and their grassy or brushy edges provide important wildlife habitats. The grassy, brushy, or forested edges bordering streams and rivers are known as "riparian zones." Riparian zones often serve as wildlife corridors for animals moving through an area. Streams and rivers are home to otters, mink, tree swallows, Louisiana waterthrushes, and many fish, reptiles, and amphibians.

STREAM AND RIPARIAN HABITAT

Neighborhoods

There are many different types of neighborhoods; some have many buildings with little or no yards while others have few buildings surrounded by large lawns. Wildlife can be found in all types of neighborhoods. Species such as pigeons, house finches, house sparrows, robins, starlings, cardinals, chickadees, juncos, and titmice can all be found in human neighborhoods. Raccoons, skunks, opossums, mice, and chipmunks can also be found in this habitat.

BACKYARDS AND NEIGHBORHOOD HABITAT

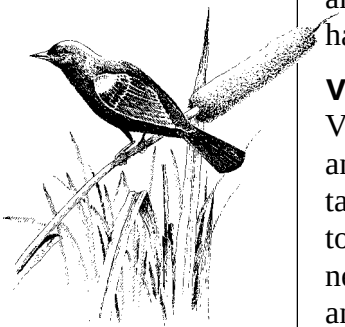
GRAY SQUIRREL

HABITAT SUITABILITY

The amount and type of food, water, shelter, and space in an area determines that area's **habitat suitability** for a particular species. In order for an animal to live in an area, the right kinds of food, water, and shelter must be present and must be available at the right time of year.

A habitat that is suitable for one species may be unsuitable for another. The forest is an excellent habitat for the gray squirrel, but the tall trees of the forest do not make a good habitat for muskrats and red-winged blackbirds. These species require open, grassy wetlands for their food and shelter.

The following section provides a brief review of the most important factors that affect habitat suitability. For a more detailed explanation of habitat suitability characteristics, see Project Book 1.



RED-WINGED BLACKBIRD

FACTORS AFFECTING HABITAT SUITABILITY

Plant Succession

Plant succession is the process of one plant community replacing another over time. This is one of the most important factors affecting habitat suitability because plants provide both food and cover for wildlife. In general, the stages of plant succession in Pennsylvania include: bare ground followed by forbs and grasses, then shrubs, which are slowly replaced by trees.

Some species and wildlife communities rely on early stages of plant succession. Once the habitat grows into the next stage, the area is no longer suitable for them. These are called "early successional" species. Likewise, "late successional" species rely on mature woodlands for their survival and will not thrive if the woodland is heavily harvested or cleared.

Vertical Structure

Vertical structure refers to how plants are layered in an area. To understand layering, just think of how tall plants get. Grasses and forbs usually grow close to the ground and make up the *ground layer*. The next highest level is usually comprised of shrubs and is called the *shrub layer*. The branches and tops of mature trees make the tallest layer. This is called the *canopy layer.*

PLANT SUCCESSION IN AN OLD FIELD

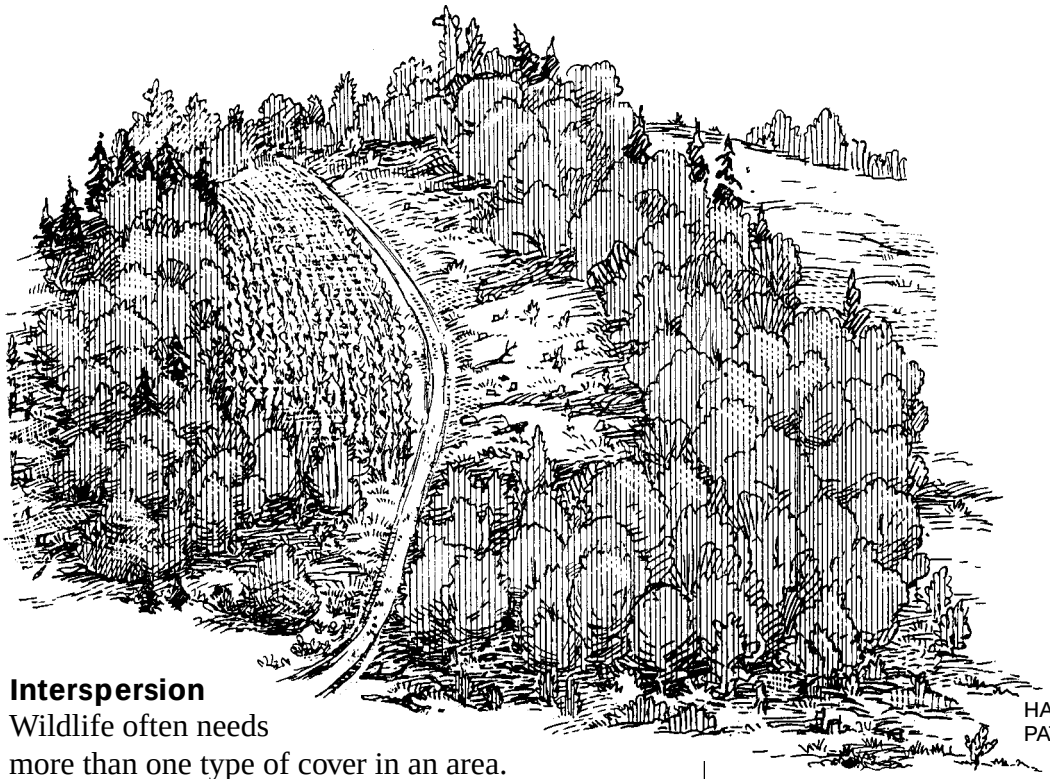
How these different layers are arranged in an area is important to wildlife. Some animals may require a grassy ground layer for food but also need a tree canopy for cover. In general, the more layers in a habitat, the better the area is for wildlife. Although humans often like to see a "clean" forest of tall trees with little underbrush, these park-like settings are not very good for wildlife.

VERTICAL STRUCTURE IN FOREST HABITAT

Edge

Edge is the boundary where different types of vegetation meet. An edge also occurs where different habitat types meet, such as field and forest. Edges attract many wildlife species because different types of food and cover are close together. Edge is not good for all wildlife. Some species need large, continuous patches of grassland for their survival, while others need large continuous tracts of forest.

An area's habitat suitability is also influenced by how the habitat is put together. Factors describing how a habitat is put together include the *interspersion* of resources, *fragmentation* of habitats, and *corridors* between habitats.



HABITAT INTERSPERSION OR PATCHINESS IS HIGH AT THIS SITE.

Interspersion

Wildlife often needs more than one type of cover in an area. For example, a rabbit will feed in grassy areas but also needs to have thick shrubs nearby for protection from predators. **Interspersion** refers to the mix of habitat types or successional stages from a bird's-eye view. Interspersion can also be thought of as habitat patchiness.

Usually, a habitat with high interspersion supports more species than an area with low interspersion. Remember, though, that some species obtain all their habitat requirements from one successional stage. Interspersion would lower the habitat suitability of an area for these species.

Fragmentation

When roads, suburban areas, or agricultural areas break up large blocks of natural habitat, such as forest, that habitat is **fragmented**. Fragmented habitats often do not provide enough food, water, cover, or secure nest sites for wildlife species to survive in the area.

Corridors

Corridors are areas of secure cover that permit animals to travel from one patch of suitable habitat to another. In fragmented habitats, corridors can connect small islands of good habitat with one another, allowing animals to use an area that they otherwise could not. Preserving, creating, and maintaining unbroken corridors are very important in wildlife management.

CORRIDORS PROVIDE TRAVEL LANES FOR WILDLIFE.

WILDLIFE CAREER: Food and Cover Technician

Food and cover technicians work for state and federal wildlife agencies to carry out habitat management practices on public lands. These individuals do the hands-on work that is involved in creating wildlife food and cover. Their work may include mowing hay fields, brush-hogging shrubs, planting food crops, planting cover plants such as trees and shrubs, and cutting down trees to create forest openings. No formal education is required beyond high school, but technicians must be mechanically skilled and trained to operate heavy equipment and machinery.

Field Work!

Activity 1—Habitat Survey

PURPOSE: This activity will help you recognize how different habitats are home to different species.

1. Visit two *different* Pennsylvania habitats (for example, a suburban neighborhood and a forest).

2. For each habitat type visited, complete a Habitat Evaluation Worksheet (two are provide on the following pages). The appendix in **The Wildlife Ecologist** (Book 1) gives habitat requirements for a variety of Pennsylvania wildlife species. You can also look them up in a field guide or a reference book on Pennsylvania wildlife.

Worksheet 1 for Activity 1

HABITAT EVALUATION

Name _____ **Location** _____

Date _____ **Weather** _____

I. General Description of Habitat

A. Habitat type (circle all that apply):

Forest, Woods	River	Vacant Town or City Lot
Farmland	Pond	Urban Neighborhood
Agricultural Field	Stream	Rural Neighborhood
Field, Pasture	Wetland	Suburban Neighborhood
Lake	Mowed Lawn	Park
	School	

B. Briefly describe the habitat:

_____

_____

_____

II. Food

Soft and hard mast—soft mast includes soft fleshy fruits like those produced by grapes, crabapples, dogwoods, viburnums, and elderberries. Hard mast refers to nuts and includes walnuts, hickory nuts, and acorns.

A. Abundance of plants that produce **soft** mast (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

B. Abundance of trees that produce **hard** mast (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

C. List other sources of food available on site (for example, bird feeders and crops in agricultural fields):

_____ _____

_____ _____

III. Cover

A. List potential sources of cover and shelter for:

Breeding/nesting _____

_____

Protecton _____

_____

Resting _____

_____

B. Cavity trees

In Pennsylvania, 35 species of birds and 20 species of mammals use tree cavities. The most important cavity trees are ones with large openings. Small cavities are also important, but they are generally more abundant.

Walk through your site and record the number of hollow trees, the number of trees with large cavities (big enough for a raccoon), and the number of trees with small cavities (big enough for a small bird). Record any animals you see using these cavities or going in and out of them.

Hollow trees # _ _ _ _ _ _ Animals: _____

Large cavities # _ _ _ _ _ Animals: _____

Small cavities # _ _ _ _ _ Animals: _____

C. Evergreens

Evergreen cover from both trees and shrubs is extremely important to wintering wildlife and is rare in Pennsylvania woods.

Record the abundance of evergreen **tree** cover (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

Record the abundance of evergreen **shrub** cover (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

IV. Water

A. List the water sources present:

Type of water source	**Present**	**Comments** (for example, size and wildlife observations)
Lakes or ponds	_____	_____
Wetlands	_____	_____
Permanent streams	_____	_____
Temporary streams (flow during part of the year)	_____	_____
Spring seeps	_____	_____
Vernal ponds (ponds that hold water in spring only)	_____	_____

B. List other sources of water available to wildlife (such as a birdbath):

_____ _____

_____ _____

_____ _____

V. Wildlife

A. Based on this habitat evaluation, what species of wildlife do you think could live here?

_____

_____

_____

_____

_____

B. Note all wildlife and signs of wildlife seen or heard on the site (continue on next page if needed):

_____

_____

_____

_____

_____

C. For the following wildlife species, or group of species, evaluate the habitat quality on a scale of 1 = poor (the species would have a difficult time surviving there) to 4 = excellent (habitat provides needed food, water, cover, and space). Explain why you gave the score you did. For example, you might say you gave a high score because food, water, and cover were present. Use the appendix in Book 1 or another book on Pennsylvania wildlife to learn about habitat requirements of these species.

SPECIES OR GROUP OF SPECIES	HABITAT QUALITY ASSESSMENT SCORE	EXPLANATION FOR SCORE
White-tailed deer	_____	_____
Eastern cottontail	_____	_____
Eastern gray squirrel	_____	_____
Eastern bluebird	_____	_____
Mourning dove	_____	_____
Ovenbird	_____	_____
Wood duck	_____	_____
Wetland-dependent species	_____	_____

Worksheet 2 for Activity 1

HABITAT EVALUATION

Name _____ **Location** _____

Date _____ **Weather** _____

I. General Description of Habitat

A. Habitat type (circle all that apply):

Forest, Woods	River	Vacant Town or City Lot
Farmland	Pond	Urban Neighborhood
Agricultural Field	Stream	Rural Neighborhood
Field, Pasture	Wetland	Suburban Neighborhood
Lake	Mowed Lawn	Park
	School	

B. Briefly describe the habitat:

_____

_____

_____

II. Food

Soft and hard mast—soft mast includes soft fleshy fruits like those produced by grapes, crabapples, dogwoods, viburnums, and elderberries. Hard mast refers to nuts and includes walnuts, hickory nuts, and acorns.

A. Abundance of plants that produce **soft** mast (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

B. Abundance of trees that produce **hard** mast (circle one phrase):

None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

C. List other sources of food available on site (for example, bird feeders and crops in agricultural fields):

_____

_____

III. Cover

A. List potential sources of cover and shelter for:

Breeding/nesting _____

_____

Protecton _____

_____

Resting _____

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B. Cavity trees

In Pennsylvania, 35 species of birds and 20 species of mammals use tree cavities. The most important cavity trees are ones with large openings. Small cavities are also important, but they are generally more abundant.

Walk through your site and record the number of hollow trees, the number of trees with large cavities (big enough for a raccoon), and the number of trees with small cavities (big enough for a small bird). Record any animals you see using these cavities or going in and out of them.

Hollow trees # _ _ _ _ _ _ Animals: _____

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C. Evergreens

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None or very rare	Isolated individuals	Scattered small patches	Abundant in patches	Available over most of site

IV. Water

A. List the water sources present:

Type of water source	**Present**	**Comments** (for example, size and wildlife observations)
Lakes or ponds	_____	_____
Wetlands	_____	_____
Permanent streams	_____	_____
Temporary streams (flow during part of the year)	_____	_____
Spring seeps	_____	_____
Vernal ponds (ponds that hold water in spring only)	_____	_____

B. List other sources of water available to wildlife (such as a birdbath):

_____

_____

_____

V. Wildlife

A. Based on this habitat evaluation, what species of wildlife do you think could live here?

_____

_____

_____

_____

_____

B. Note all wildlife and signs of wildlife seen or heard on the site (continue on next page if needed):

_____

_____

_____

_____

_____

C. For the following wildlife species, or group of species, evaluate the habitat quality on a scale of 1 = poor (the species would have a difficult time surviving there) to 4 = excellent (habitat provides needed food, water, cover, and space). Explain why you gave the score you did. For example, you might say you gave a high score because food, water, and cover were present. Use the appendix in Book 1 or another book on Pennsylvania wildlife to learn about habitat requirements of these species.

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Eastern cottontail	_____	_____
Eastern gray squirrel	_____	_____
Eastern bluebird	_____	_____
Mourning dove	_____	_____
Ovenbird	_____	_____
Wood duck	_____	_____
Wetland-dependent species	_____	_____

Chapter 2

Introduction to Habitat Management

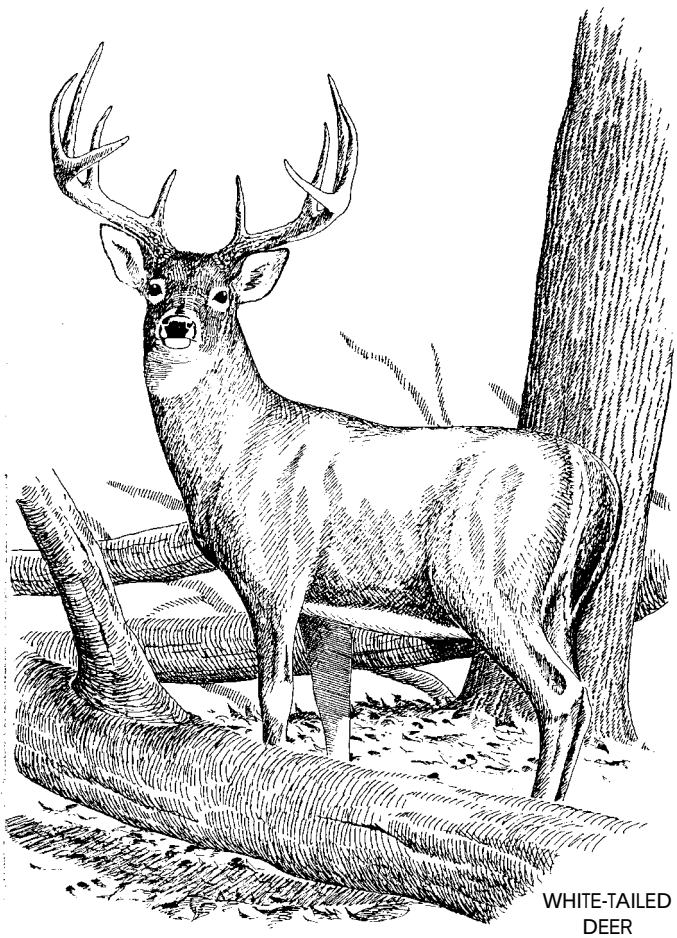
Anytime we work to change wildlife populations in an area by changing the amount of food, water, shelter, or space, we are involved in habitat management. By providing additional food, water, and cover, we can increase the population of a desired species. By reducing the amount of food, water, and cover we can decrease population size.

IDENTIFYING MANAGEMENT OBJECTIVES

Before beginning habitat management, you must decide what your objectives are. In some cases, habitat managers are interested in managing for only one or a few species. This is referred to as managing for **featured species**. A wildlife manager interested in improving hunting opportunities in an area may focus on deer, bear, or turkey as featured species.

In other cases, a manager may be interested in increasing the total number of species or **species diversity** in an area. A manager wishing to increase the species diversity of an area would want to provide habitat for as many different wildlife species as possible.

Still another wildlife manager might be interested in managing for **human–wildlife interactions**, such as at a wildlife viewing area. This manager would identify the species to be attracted, then try to create the appropriate habitat conditions so that people could observe the animals in their habitat.



WHITE-TAILED DEER

PLANNING HABITAT MANAGEMENT

Once you decide on your management objectives, you must identify habitat requirements of the species you want to manage for and decide whether the area is capable of providing these requirements. Remembering that when we improve an area for one species, we may be making it less desirable for another is important. Managing for a diversity of species often requires a delicate balance of management practices.

There is a limit to how many animals can live in a habitat. The number of animals that a habitat can support is that habitat's **carrying capacity**. The amount of food, water, cover, and space in an area determines the area's carrying capacity. If one basic requirement is in short supply, the carrying capacity is lowered. By adding the missing ingredient, wildlife managers can increase the number of animals a habitat can support.

The basic steps of habitat management are simple: 1) identify the requirement that is limiting the number of animals in an area, and then 2) provide the missing resource. It is usually best to select management practices that increase the resources that are in shortest supply. For instance, if a species requires trees for cover with water nearby, and your study area has plenty of trees but no water, starting with a management practice that provides water will be more useful than planting more trees.

In general, wildlife habitat management practices involve increasing the food, water, shelter, or space available to wildlife in an area. Of course, in situations where wildlife are causing problems, you would work to decrease the availability of resources to decrease the wildlife population. Either way, you are changing the wildlife population in an area by changing the carrying capacity of the habitat.

WILDLIFE CAREER: Naturalist

A naturalist is a professional or hobbyist who has taken the time to become very familiar with the species and habitats surrounding them.

Naturalists often work as environmental educators in nature centers and state parks. They are skilled at conveying their love of the outdoors and their knowledge of wild plants and animals to audiences of children and adults.

No special degree is required to be a naturalist, just a love of nature, skill in talking to audiences, and a desire to teach. Some colleges offer courses and degrees in environmental education that help students become effective educators.

There are so many species of fish and wildlife in Pennsylvania that we cannot manage each one on its own. Habitat management is the only way to manage for the diverse array of species that occur in our state.

Number of native species in Pennsylvania

Birds: 394
(186 of these species breed in Pennsylvania)

Mammals: 63

Fish: 194

Reptiles/Amphibians: 73

AMERICAN ROBIN

AN OVERVIEW OF HABITAT MANAGEMENT PRACTICES

We can manage habitats through both natural and artificial means. Providing a bird feeder full of sunflower seeds creates an artificial food source. Planting berry bushes and sunflowers creates a natural food source. Changing habitat conditions in a natural way is often better for wildlife over the long term because it doesn't require humans to maintain the improvements.

Habitat management involves changing the amount of food, water, or shelter available to wildlife in an area. In this section, we will learn how to provide additional resources to wildlife. Of course, if we were interested in reducing wildlife populations, we would focus on eliminating resources.

Provide Food

Animals need to get enough food from natural sources to survive. If there weren't enough natural foods in your area, you wouldn't have wildlife at all. Human sources of food like bird feeders do not replace natural sources. Even the chickadees that visit a bird feeder everyday are getting only a small part of their daily diet from the feeder. Most of the food they eat comes from natural food sources.

Still, you can improve habitat by providing additional food sources for wildlife. You can provide natural food sources for wildlife by planting flowers, shrubs, and trees. Some plants provide food, some provide cover, and some provide both food and cover. In a wild area, such as a large forest tract, we generally do not try to plant food sources. Instead, we use forest management techniques that encourage food plants to grow naturally. For example, you might remove some overstory trees to let in light and encourage berry-producing shrubs to grow.

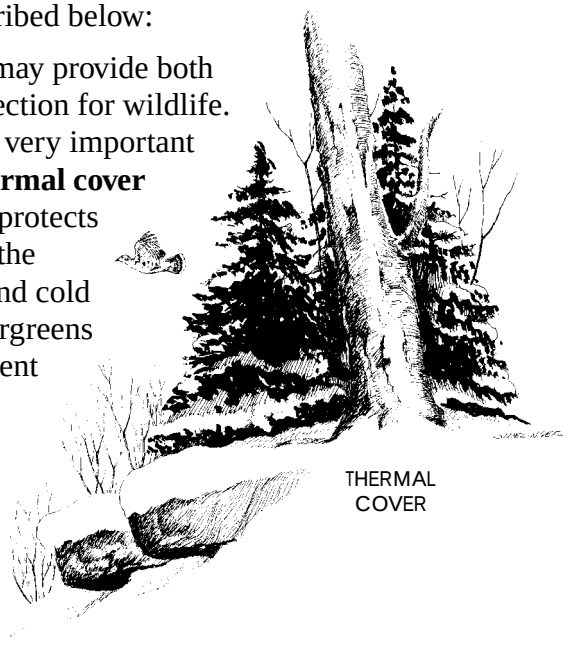
Installing wildlife feeders is an excellent way to attract animals to an area so that you can enjoy watching and studying them. Wildlife feeders are considered "artificial" food sources because humans must keep the feeders full. Bird feeders are the most common type of wildlife feeder. In some areas, you could attract other animals with feeders. Some people who live near forests use feeders full of corn to attract turkeys and deer. While this makes animals easier to watch, it can also cause problems for them if diseases get spread at feeders or if feeders cause them to lose their fear of humans. Therefore, providing feeders for animals other than birds is not recommended.

Provide Water

All living things need water. Some wildlife species get all the water they need from the foods they eat; others need to drink water. Providing a steady supply of water is one of the most effective habitat practices you can undertake. In most of Pennsylvania's habitats, water is usually plentiful. Providing a water supply can be a very useful management practice in neighborhood habitats.

Provide Shelter

All wild animals need shelter to raise their young and hide from predators. Types of wildlife shelter that can be used in any Pennsylvania habitat are described below:

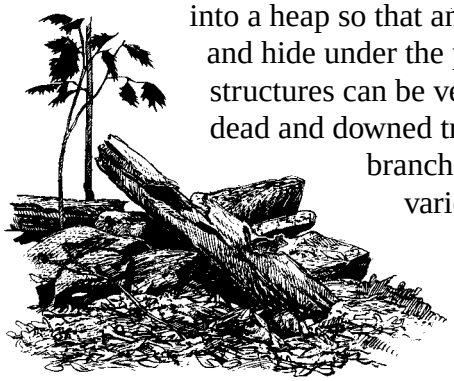


THERMAL COVER

- *Cover plants* may provide both food and protection for wildlife. Good cover is very important in winter. **Thermal cover** is shelter that protects animals from the worst winds and cold of winter. Evergreens provide excellent thermal cover. Birds roost in their branches and many mammals will huddle under them to stay warm. Evergreens planted in groups or clumps provide better cover than evergreens planted in a row. Small mammals and birds will also use grassy and brushy cover low to the ground. Warm-season grasses make very good winter cover for birds and mammals.

AMPHIBIANS LIKE THE SPRING PEEPER REQUIRE WATER FOR PART OF THEIR LIFE CYCLE.

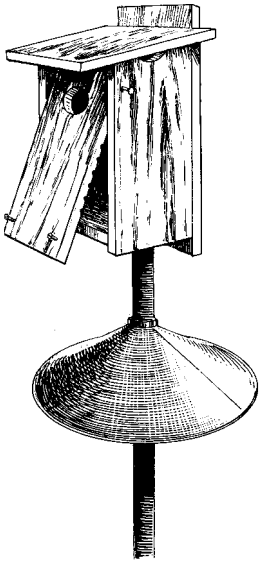
- *Cover structures* are used by many animals for resting and escape cover. Wildlife cover can be created just by piling brush or rocks into a heap so that animals can rest and hide under the piles. Cover structures can be very simple—dead and downed trees and tree branches are used by a variety of wildlife. Salamanders and various insects use fallen logs for cover, small mammals use them as runways for protection while they travel, and predators use them as hunting areas.



DOWNED WOOD

Provide Sites for Raising Young

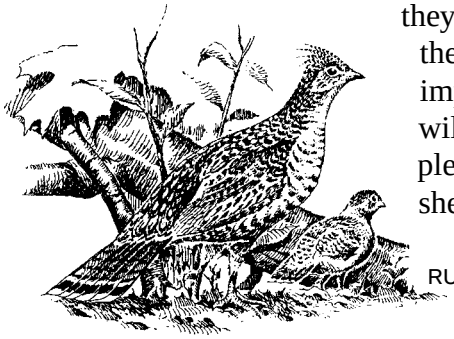
All animals need safe and secure sites to raise their young. Dense thickets provide protection for young fawns and nest sites for birds such as cardinals and eastern towhees. A number of animals nest or raise their young within cavities in trees. As a manager, you will want to identify important areas for nesting and rearing young and try to protect or even enhance them. In areas where tree cavities may be in short supply, managers often provide boxes as substitute cavities.



BIRDHOUSE WITH PREDATOR SHIELD

Conclusion

As you can see, there are many ways to manage habitat for wildlife. Though the techniques may seem confusing at first, just remember that they all have the same basic goal: to improve the habitat for wildlife by providing plenty of food, water, shelter, and nest sites.



RUFFED GROUSE

Hunting and Trapping?

Human beings once relied on hunting and trapping for survival. Now, these traditions are considered outdoor sports in many parts of the world, including Pennsylvania. But hunting and trapping are also important wildlife management tools. In some cases, hunting and trapping can help reduce the damage that wildlife cause to farm crops, forest plants and trees, and plants near people's homes. They also help to keep wildlife populations at balanced and healthy levels, especially where large predators may no longer exist. Hunting and trapping are important in protecting wildlife habitat as well. Do you see the connection?

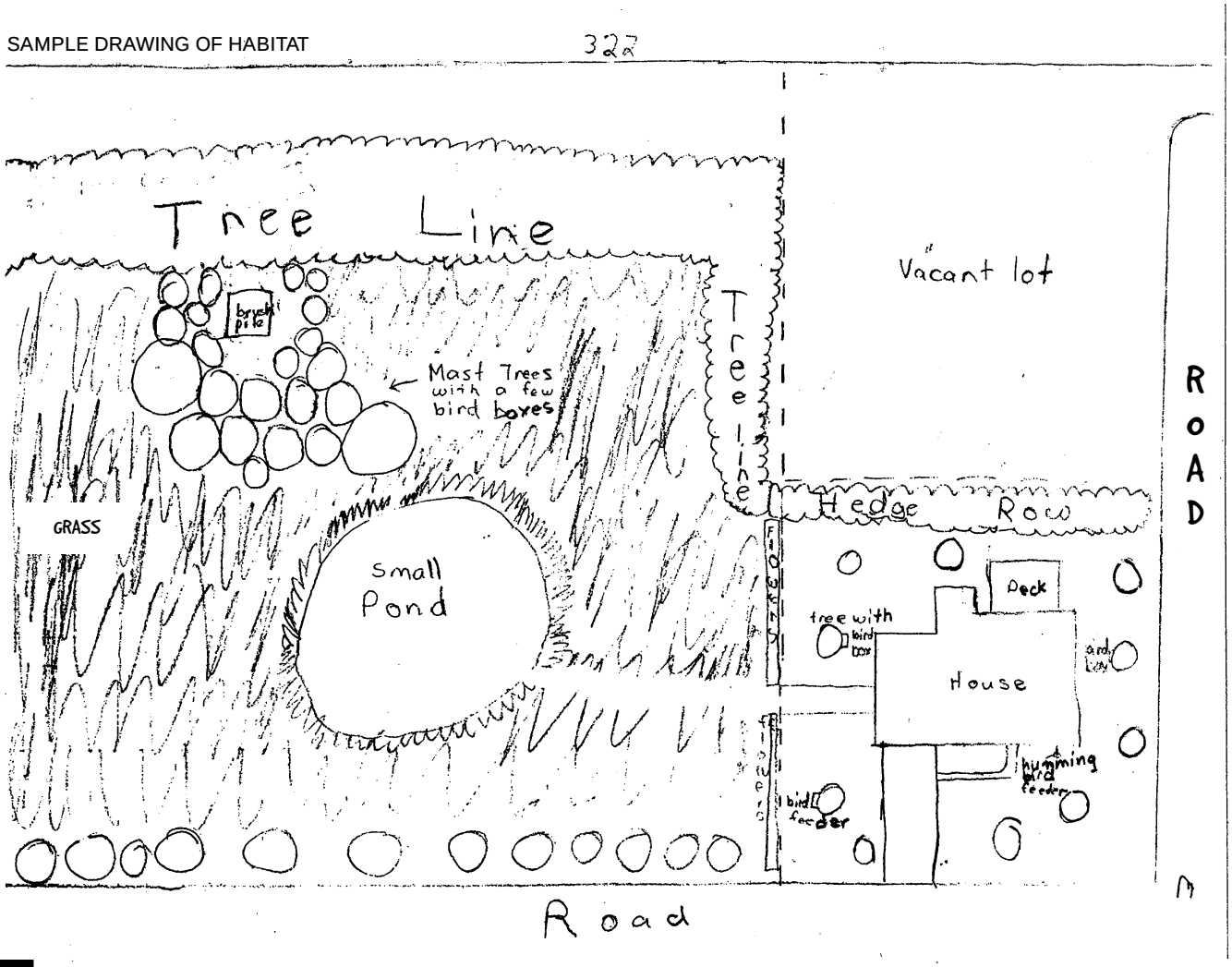
Activity 2—Identify Resources in Your Study Area

Purpose: This activity will help you look critically at your study area and assess its habitat value for wildlife. Select an area that is safe for you to visit and let an adult know where you are at all times.

1. Make a rough map of your study area on the following page.
2. Identify all sources of food you can find. Mark their locations on your map. Note if you find any evidence of wildlife feeding.
3. Mark sources of water on your map and label them.
4. Look for areas that animals might use as nesting, resting, or escape cover. Mark them on your map. Be sure to include cover such as rock piles, birdhouses, and thick vegetation.
5. Now sit quietly and observe wildlife. You will need to sit very still for at least one hour. You may want to do this at several different times of the day. Early morning is an especially good time for wildlife observation. Do you see mammals, birds, and insects? What are they doing? If any are feeding, drinking, or making use of cover, make a note of this on your map.

What factors do you think may be limiting wildlife populations in this area? What seems to be shortest in supply: food, water, cover, or space?

SAMPLE DRAWING OF HABITAT



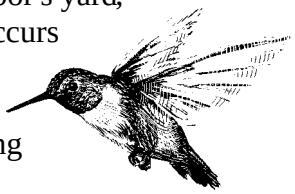
Rough Map of Your Study Area

Chapter 3

Managing Neighborhood Habitats

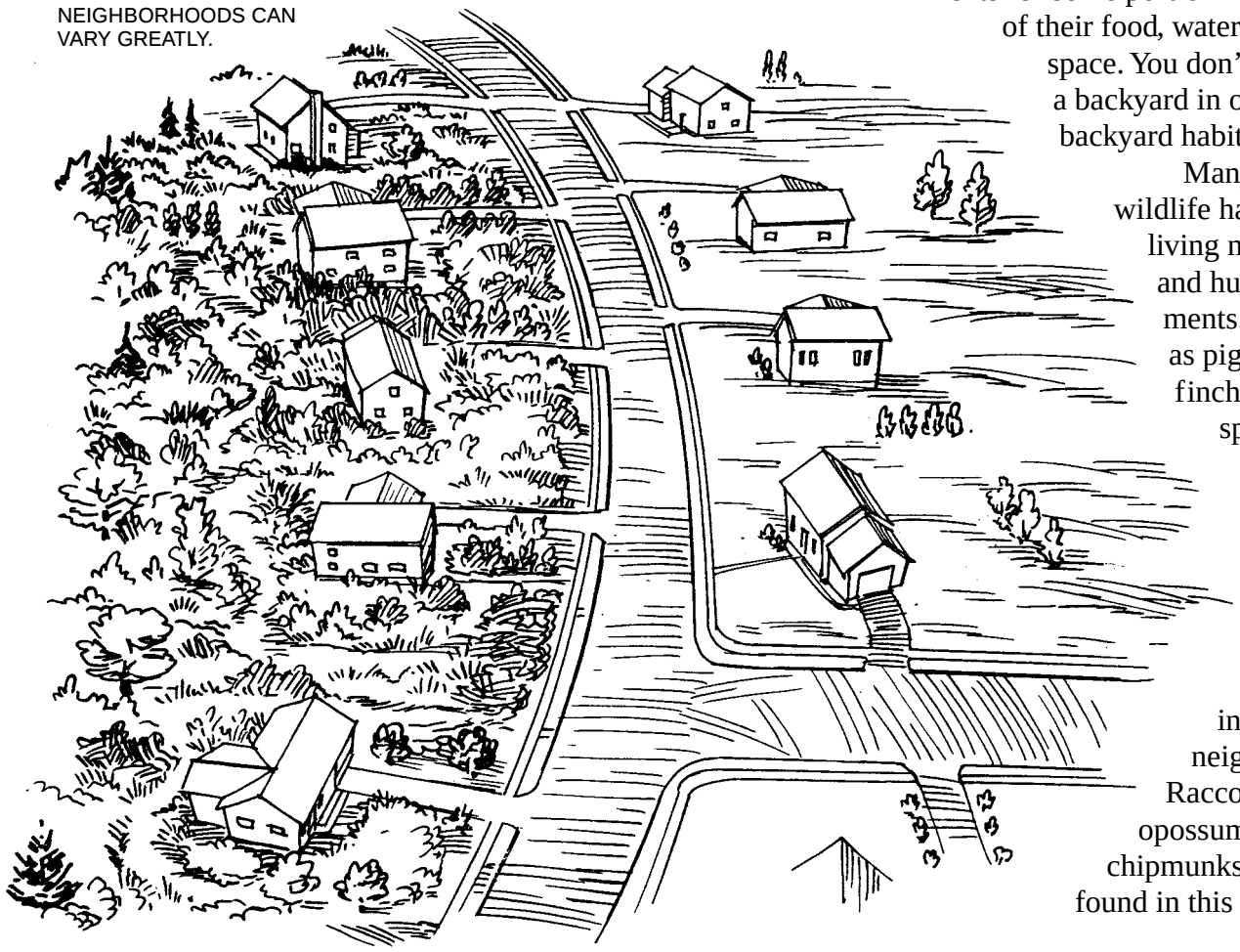
There are many different types of neighborhoods: some have many buildings with little or no yards (such as in cities), others have a few buildings surrounded by large yards (such as suburban areas). We often refer to the many types of neighborhood habitats as "backyard habitat." This is just a simple way of describing the same general type of habitat in different locations.

"Backyard habitat" may actually occur behind a house, but it can also be found in the vacant lot near a home, in a city park, in a neighbor's yard, or in a schoolyard. This habitat occurs anywhere that humans and wild animals live in close proximity. Animals are considered to be using this habitat anytime they rely on humans or human environments for some portion of their food, water, shelter, or space. You don't have to own a backyard in order to study backyard habitat!



RUBY-THROATED HUMMINGBIRD

HABITAT CONDITIONS IN NEIGHBORHOODS CAN VARY GREATLY.



Many species of wildlife have adapted to living near humans and human environments. Species such as pigeons, house finches, house sparrows, robins, starlings, cardinals, chickadees, juncos, and titmice can all be found in human neighborhoods. Raccoons, skunks, opossums, mice, and chipmunks can also be found in this habitat.

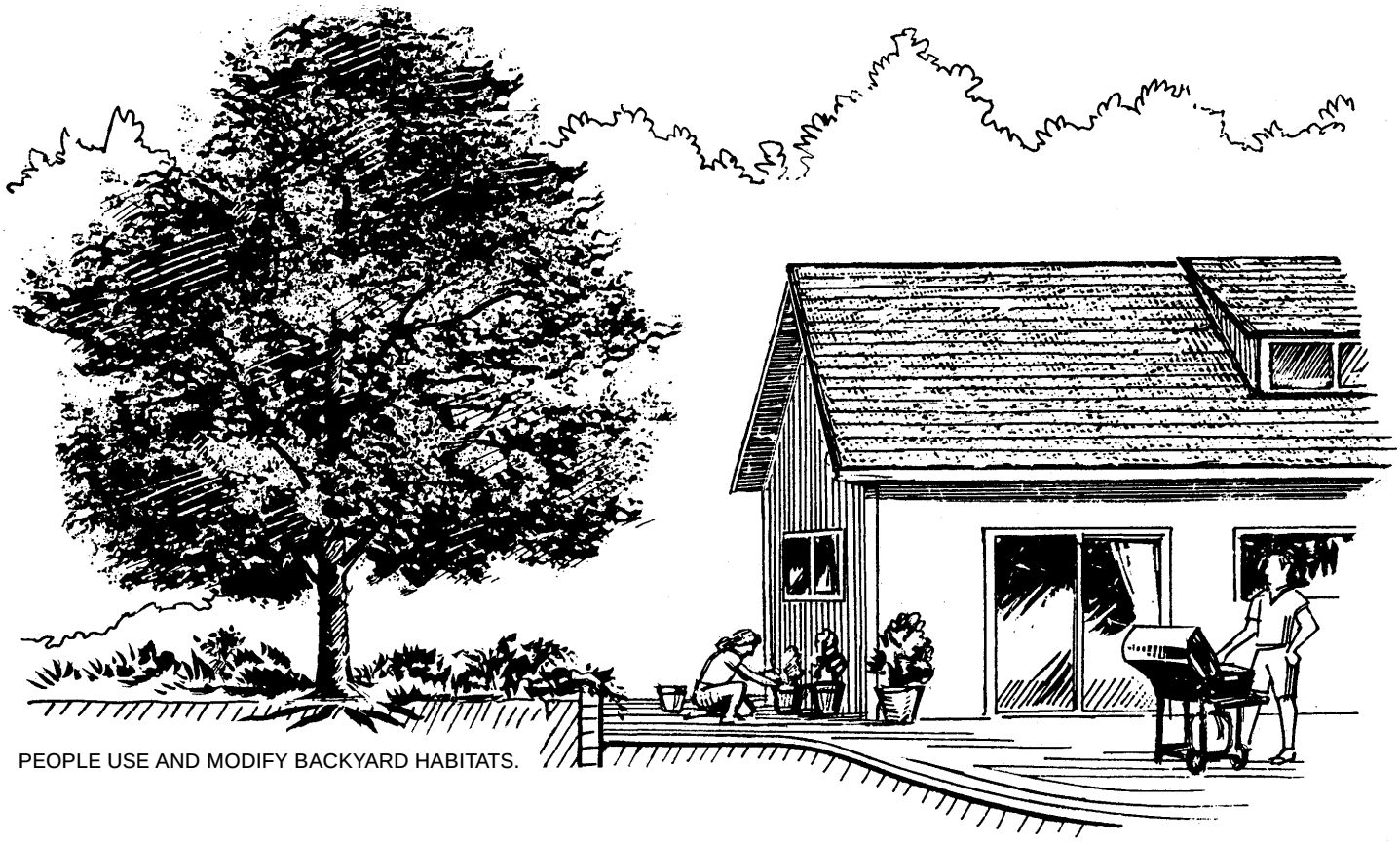
These animals have the same habitat needs as the animals living in more natural areas (food, water, shelter, and space) and face the same stresses in their daily lives, such as getting enough food and water, raising their young, avoiding predators, and finding mates. But the animals living in backyard habitats face other stresses that their forest-dwelling relatives never encounter—things like crossing roads without being killed, avoiding flying into windows or falling into window wells, and living side-by-side with domestic cats and dogs.

CHARACTERISTICS OF NEIGHBORHOOD HABITATS

Neighborhood habitats are a mixture of opposites. They often contain both native and non-native plants, a mix of intensely managed areas (lawns and flower beds), and less intensely managed areas (wooded areas, meadows, and shrubby areas such as hedgerows and borders). This habitat also contains a mixture of artificial food sources (bird feeders, garbage cans, cat and dog food left outside) and natural food sources (berry bushes, flowers, fruit and nut trees).

Few species rely entirely on backyards for all of their life needs. A raccoon may visit a backyard habitat to snack on leftover chicken bones in the garbage can, then retreat to his home in the neighboring forest. A bat may swoop and chase after insects in your backyard in the summer, then spend the winter months hibernating in a cave hundreds of miles away! Even small species such as toads and salamanders probably leave your backyard to find a watery pool when it comes time to breed.

There are many habitat management practices you can use to improve the habitat quality of your backyard and increase your chances of seeing wildlife. But as any habitat manager, before you begin changing an area, you must have a good idea of who lives there and what they need to survive. Appendix 1 describes some of the species you can expect to show up in a backyard habitat and gives some information on what they need to live.



PEOPLE USE AND MODIFY BACKYARD HABITATS.

HABITAT MANAGEMENT PRACTICES FOR NEIGHBORHOOD HABITATS

The following management practices are ones that are commonly used in backyard and neighborhood habitats.

Plant Trees and Shrubs

Providing natural sources of food and cover is an easy way to improve wildlife habitat. Many good wildlife food and cover plants can be purchased at your local nursery or garden supply store. When possible, try to buy plants native to your area. Pennsylvania wildlife have adapted to using Pennsylvania plant species. While some wildlife can benefit from introduced plant varieties, you will get the most wildlife benefit from native Pennsylvania plants.

Examples of the types of plants that can be used and the benefits they provide to wildlife are listed in the box to the right.

Wildlife benefits of common plants.

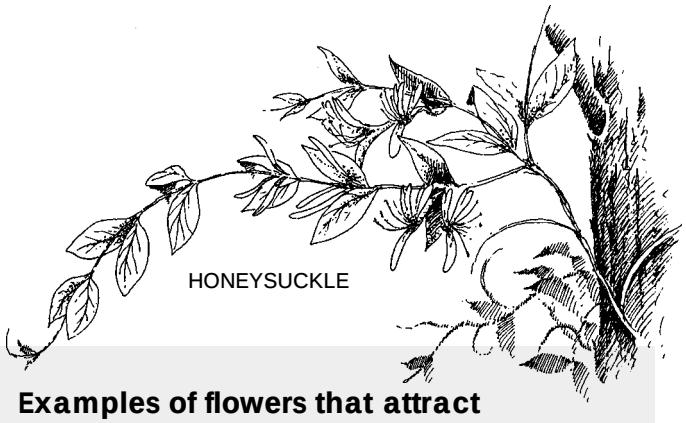
Plant type	Examples	Wildlife Benefits
Evergreens, conifers	white pine eastern hemlock rhododendron red cedar common juniper azalea	• winter cover for songbirds, deer, and other wildlife • nest sites for mourning doves and many other birds • food for red squirrels and many songbirds
Nut trees	oak hickory beech walnut	• food for blue jays, chipmunks, squirrels, deer, wild turkeys, bears, and many other species
Fruiting trees, shrubs, and vines	black cherry elderberry blackberry dogwood wild grape Juneberry	• food for gray catbird, fox, deer, wild turkey, bear • nesting site for cardinals and many other songbirds

TREES AND SHRUBS PROVIDE FOOD, SHELTER, AND COVER.

Plant Flowers

Planting flowers is a great way to attract both hummingbirds and butterflies. Depending on the plant, the flowers will be a source of nectar for the hummingbirds and butterflies and may also be a food source for caterpillars. The flowers most attractive to hummingbirds are red, orange, or pink and are tubular in shape. Butterflies prefer purple, red, yellow, orange, or pink blossoms; flat-topped or clustered flowers; and short flower tubes. Select plants that flower at different times so you have flowers from May through September. Hummingbirds and butterflies are attracted to large clusters of flowers, so group the plantings to make them more noticeable.

FLOWERS ATTRACT BUTTERFLIES.



HONEYSUCKLE

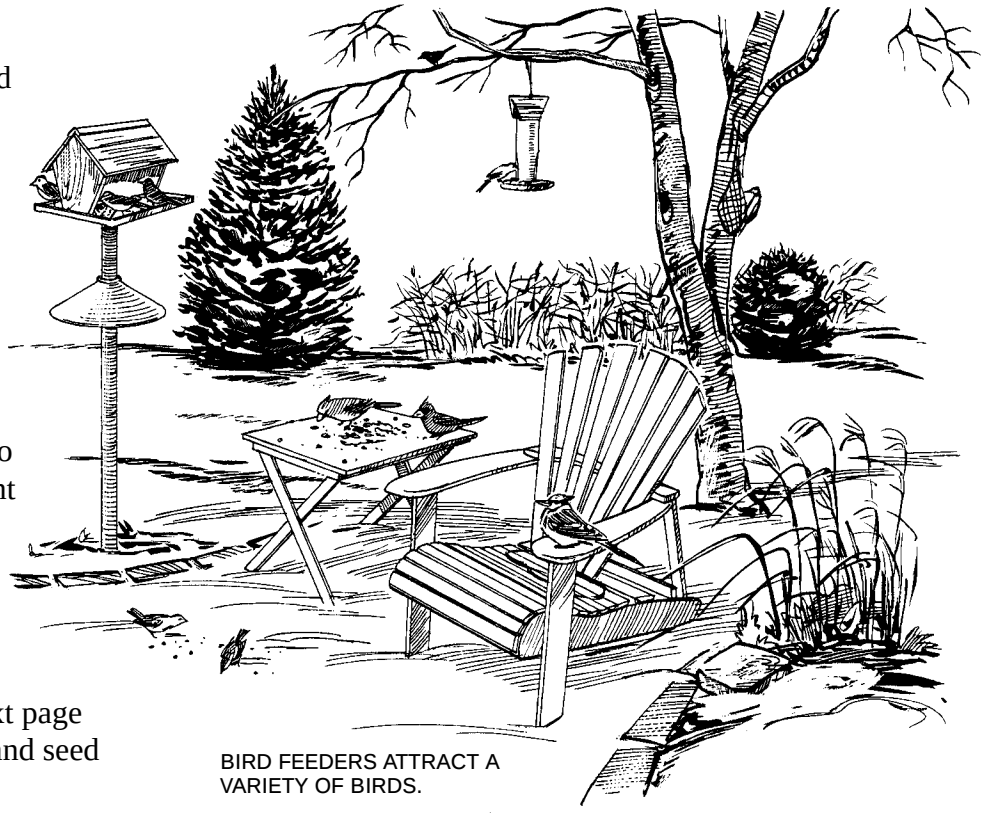
Examples of flowers that attract hummingbirds and butterflies

Bergamot, bee balm	Jewelweed
Black-eyed susan	Lantana
Bleeding heart	Liatris
Butterfly weed	Milkweed
Butterfly bush	Nasturtium
Cardinal flower	Purple coneflower
Columbine	Scarlet sage
Cosmos	Trumpet creeper
Coral bells	Verbena
Impatiens	Zinnia

Provide Bird Feeders

Artificial food sources, such as bird feeders, attract wildlife to an area for purposes of viewing and study. Though bird feeders cannot replace natural food supplies, they may help individual animals survive during severe conditions. The use of feeders is not recommended for animals other than songbirds.

You can attract different birds to your study area by offering different types of food in different types of feeders. Some birds have strong preferences for where and what they eat, while others are less picky and will come to a variety of foods and feeders. The table on next page describes the most common birds and seed and feeder preferences.



BIRD FEEDERS ATTRACT A VARIETY OF BIRDS.

Species Food and Feeder Preferences

Species	Food Preference	Feeder Preference
Mourning dove	Cracked corn, millet, sunflower seeds	Ground, low tray
Red-bellied woodpecker	Suet, sunflower seeds, peanuts	Suet feeder, hanging feeder
Downy and hairy woodpeckers	Suet, sunflower seeds, peanuts	Suet feeder, hanging feeder
Blue jay	Sunflower seeds, suet, peanuts	Platform feeders
Black-capped chickadee	Sunflower seeds, suet, peanuts	Almost all feeders
Tufted titmouse	Sunflower seeds, suet, peanuts	Hanging feeders, suet feeders
White-breasted nuthatch	Sunflower seeds, suet	Almost all feeders
Carolina wren	Peanut butter, suet	Hanging suet feeder
White-throated sparrow	Sunflower seeds, millet	Ground, low tray
Song sparrow	Sunflower seeds, millet	Ground, low tray
Dark-eyed junco	Sunflower seeds, millet	Ground, low tray
Northern cardinal	Sunflower seeds	Ground, low tray, tube feeder with tray
Purple finch	Niger, sunflower seeds, millet	Niger hanging tube feeder
House finch	Niger, sunflower seeds, millet	Niger hanging feeder, ground
American goldfinch	Niger, sunflower seeds	Niger feeder, hanging tube feeder, ground
House sparrow	Millet, sunflower seeds	Tray, platform, tube feeder with tray

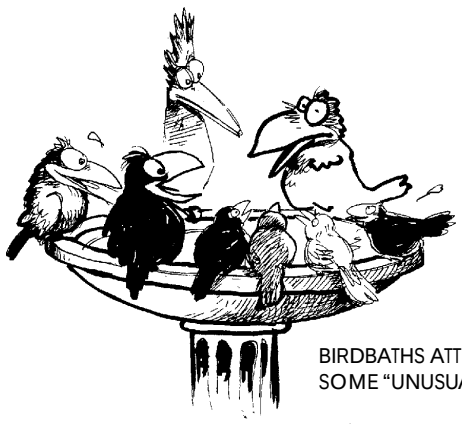
Bird feeders can be made at home with things you already have. You can make a simple suet feeder by hanging a chunk of beef fat in a plastic mesh onion bag. Setting an old cookie tray or cake pan on a stump or cinder block and filling the pan with seed can make a platform feeder. If you fill your tray with raisins, peanuts, and earthworms, many different birds will come! A peanut feeder can be made in the winter by spreading peanut butter on a pine cone, then rolling the gooey pine cone in birdseed—or just by spreading peanut butter on a piece of log and hanging it in a tree.

Provide Water

Providing a water source in the neighborhood habitat can be as simple as setting out a shallow pan of water with a rock in the middle for birds and insects to land on or as elaborate as creating a pond.

Any clean shallow container can be used as a wildlife water source. Remember to keep it clean, since animals will be using the water for both drinking and bathing. Wash it out every 3 to 5 days and it will draw birds, squirrels, toads, butterflies, and chipmunks.

Water dishes set right on the ground attract the most wildlife. Toads, insects, and chipmunks will all make use of a water dish set on the ground in some protective vegetation. A water dish set on a post will attract many species of birds, especially if you place it near food sources or escape cover.



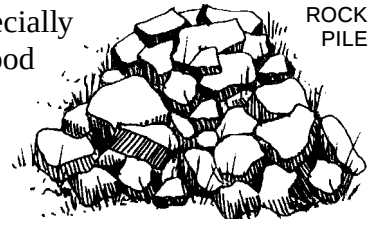
BIRDBATHS ATTRACT SOME "UNUSUAL" SPECIES.

You can also create fountains and pools for wildlife. Most garden supply stores carry everything needed to create a small backyard pool. These are useful because birds are very attracted to water that is misting, dripping, flowing, or splashing.

If you have a natural water supply, such as a small stream or wet area, you can create an excellent wildlife habitat just by planting some wildlife-friendly plants around the water's edge.

Many people forget that wildlife need water in the winter. In fact, they need it even more in the winter than in summer because most of their natural water sources are frozen. You can continue to provide water in the winter by using a heating coil to keep the water warm.

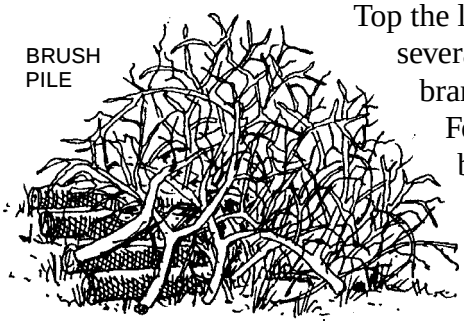
Create Brush Piles/Rock Piles


ROCK PILE

Providing shelter is especially important in neighborhood habitats. Many backyards lack wildlife shelter because humans prefer a "neat" appearance. Homeowners are quick to rake up grass clippings and autumn leaves and clear away brush. Fortunately, we can provide wildlife shelter and still have a tidy backyard.

Brush piles are treetops, branches, brush, or logs that are piled up to provide resting/escape cover and den sites for wildlife. Eastern cottontails and other small mammals, snakes, amphibians, and many insects use brush piles. Songbirds may also use brush piles for perch sites, especially if the piles are located near feeding or nest sites.

The best brush piles are made by placing large materials (logs) at the bottom and smaller materials (small branches) at the top. Lay the bottom logs on the ground with about 12 inches between them to create runways for animals scurrying under the pile. Then pile another row of logs on top of the bottom row, with the runways going in the other direction. Top the log layers off with several feet of small branches and brush. For best results a brush pile should be 3 to 5 feet high and 15 feet across.


BRUSH PILE

Brush piles are most beneficial when placed near food sources and in places where low cover is absent. Forest openings, forest edges, large lawn areas, or fields are good places to build brush piles. Then wildlife can feed in the open area or along the forest edge and use the brush pile for cover if they need to make a quick getaway.

Rock piles can be made similar to brush piles, with larger rocks (with gaps between them) on the bottom layers and smaller rocks at the top. These are favorite basking spots for lizards and snakes and will be used as lookout perches by many songbirds. They may also provide hibernation sites for insects.

Provide Nest Boxes and Structures

Birds and other animals need safe and secure places to nest. Providing nest boxes and structures within your site is a great way to provide extra nesting sites. Nest boxes, platforms, and other types of structures provide nest sites for wildlife in areas where natural nest sites are limited or absent. In Pennsylvania, nest boxes or "birdhouses" are commonly used to provide nest sites for bluebirds, tree swallows, and wrens. Mourning doves, eastern phoebes, barn swallows, owls, ducks, and geese also use nest boxes, platforms, and other structures. Even some mammals will use nest boxes. Big brown and little brown bats will use specially designed bat boxes. Gray squirrels and flying squirrels will use nest boxes designed for them, and many mice have been born in abandoned birdhouses!

The types of nest boxes you can provide for your wildlife neighbors are limited only by your imagination. "Woodcrafting for Wildlife," a booklet available from the Pennsylvania Game Commission, has building plans for many different nest structures (see Appendix 2).

Limit Lawn Space

Although many people enjoy the sight of a well-kept lawn, these areas are not very useful to wildlife. Some lawns, which are heavily treated with fertilizers, herbicides, and pesticides, actually become "green deserts" where few wild things can survive.

Devoting less of your property to lawn can save time and money while improving the area for wildlife. You can eliminate lawn areas and still keep your yard looking good by substituting flowerbeds, vegetable beds, shrubby areas, and ponds or pools. All of these substitutions make better habitat for wildlife than an open lawn because they provide increased food, cover, or water.

MINIMIZE THE AMOUNT OF LAWN.

Reduce Chemical Use

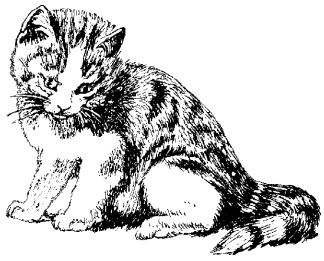
Proper use and reduction of the chemicals used on lawns and yards can make these areas safer for wildlife, people, and pets. Amphibians, in particular, are susceptible to lawn care chemicals, and special care should be taken when using these chemicals near wet areas of the lawn. Follow manufacturers' instructions exactly when applying chemicals to your lawn. Using natural fertilizers and pest control techniques will enable you to limit chemical use.

Maintain/Enhance Riparian Buffers

It is important to maintain wooded corridors along flowing streams and other water sources. Nearly all species of wildlife and birds will make use of these protected corridors. In addition to providing food and cover, these buffers help shade the stream, thus keeping it cool for the aquatic life living within. Riparian buffers can be composed of shrubs, trees, or a mix of both. As a general rule, the wider the buffer, the more valuable it is for wildlife.

Keep Cats Indoors

It has been estimated that domestic cats in the United States kill four *billion* songbirds and small mammals each year. Even the most well-fed house cats have a hunter's instinct that will lead them to kill even when they are not hungry. The cats' owners are often completely unaware of their pets' predatory habits. Keeping cats indoors can dramatically improve your backyard's quality for birds and small mammals, particularly during the nesting season.



KEEP CATS INDOORS AND AWAY FROM WILDLIFE.

Maintain or Create Corridors

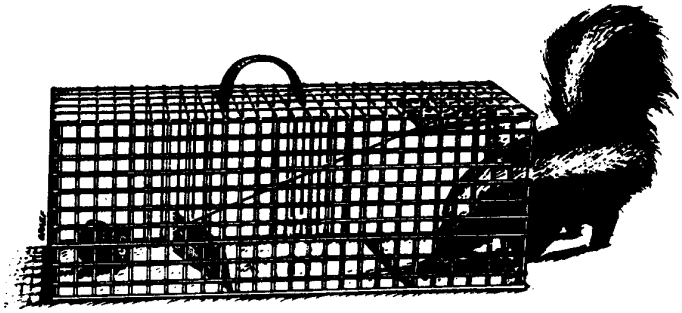
Corridors are areas of continuous habitat that permit animals to travel from one block of habitat to another. These can be particularly important in urban and suburban areas where roads, parking lots, and houses break up the habitat.

WILDLIFE CAREER: Conservation Officers

Wildlife conservation officers and waterways conservation officers work for fish and wildlife agencies. Both are called WCOs, and they are sometimes referred to as "game wardens" or "fish wardens." Conservation officers work hard to protect fish and wildlife. Conservation officers investigate illegal shooting and collecting of wildlife, hunting and boating accidents, pollution, and habitat destruction. Conservation officers also present education programs to sportsmen's organizations, citizen groups, and school children. A college degree is not required, but conservation officers undergo extensive training in natural resource management and law enforcement.

WILDLIFE DAMAGE MANAGEMENT

In some situations, wildlife and people may come into conflict and some type of damage management may be needed. Wildlife damage management includes practices that make the habitat less suitable for a species—fencing or other means of excluding a problem species or, in some cases, trapping and removing a problem species. For example, in your management plan, you might suggest fencing a garden to keep rabbits out. This would be an example of wildlife damage management.



LIVE TRAP

Practices Summary List

Here is a summary of the habitat management practices appropriate for backyard, park, or schoolyard:

- Plant trees and shrubs
- Plant flowers
- Provide bird feeders
- Provide water
- Create brush piles/rock piles
- Provide nest boxes/structures
- Limit lawn space
- Reduce chemical use
- Maintain/enhance riparian buffers
- Keep cats indoors
- Maintain or create corridors
- Wildlife damage management

See Appendix 1 for examples of wildlife commonly found in backyards along with a table of habitat management practices.

Activity 3—Habitat Management

Purpose: Your answers to the questions in this activity will help you begin to think about how to improve your study area for wildlife. Write your answers below.

1. Based on your observations, list the most common bird or mammal species in your study area.

2. Name one other species you would like to attract to your area.

3. What are the habitat requirements for the species? List requirements for food, water, and nesting/resting cover.

4. What three habitat management activities could you undertake in your study area to improve the area for the species you want to attract?

(1)

(2)

(3)

Field Work!

Activity 4—Landowner Interviews

Purpose: This activity will help you realize some of the practical limitations faced by habitat managers and landowners. Different landowners have very different goals for their property and view wildlife with different values. Personal values have a great effect on wildlife management. Wildlife managers must be aware of and respect landowner attitudes.

1. Interview two different people. They should be people such as homeowners, park managers, or someone responsible for managing a piece of land. The land could be a schoolyard, forest, park, or private residence.

2. Ask them the questions on the next page and record notes in the spaces provided.

3. Present your interview findings to your class or at a club meeting. Address these questions in your presentation: Did the two different landowners have different values? How would their objectives affect you as a wildlife manager working on their property?

Notes on the *1st* Interview

Name of Person Interviewed: _____ **Date:** _____

Location: _____

"What wildlife do you see regularly on your property or the property you manage?"

_____

_____

_____

"What values do you get from wildlife?" *(These may be observing/viewing, hunting, recreation, and so forth.)*

_____

_____

_____

"What is your main objective in managing this property?"

_____

_____

_____

"Have you done anything to improve the wildlife habitat on your property?" If yes, describe.

_____

_____

_____

"Would you like to improve your property's wildlife habitat?" Why or why not?

_____

_____

_____

"What are the main obstacles to improving wildlife habitat on your property?" *(Obstacles may include cost, the landowner doesn't know how, time, no one to help, and so on.)*

_____

_____

_____

Notes on the *2nd* Interview

Name of Person Interviewed: _____ **Date**: _____

Location: _____

"What wildlife do you see regularly on your property or the property you manage?"

_____

_____

_____

"What values do you get from wildlife?" *(These may be observing/viewing, hunting, recreation, and so forth.)*

_____

_____

_____

"What is your main objective in managing this property?"

_____

_____

_____

"Have you done anything to improve the wildlife habitat on your property?" If yes, describe.

_____

_____

_____

"Would you like to improve your property's wildlife habitat?" Why or why not?

_____

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_____

"What are the main obstacles to improving wildlife habitat on your property?" *(Obstacles may include cost, the landowner doesn't know how, time, no one to help, and so on.)*

_____

_____

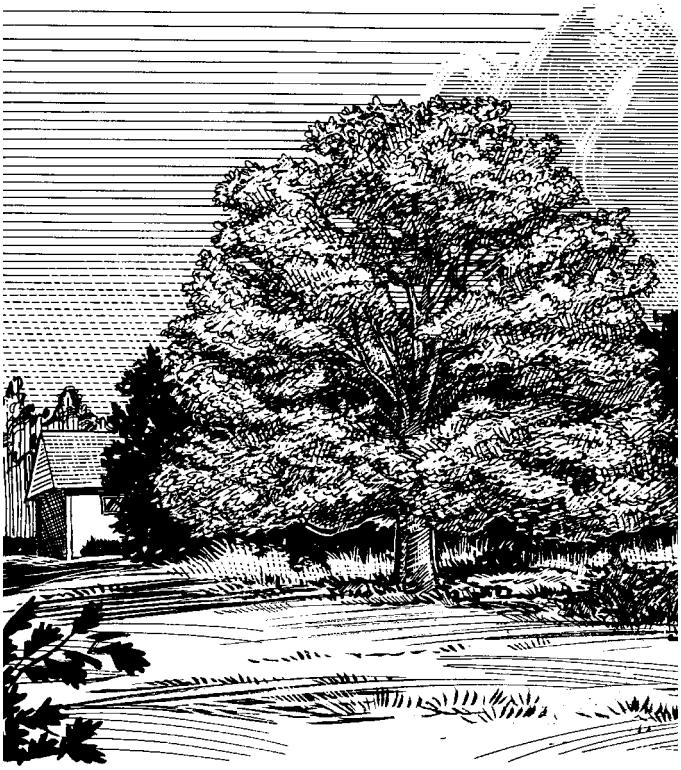
_____

CHAPTER 4

DEVELOPING A HABITAT MANAGEMENT PLAN

Animals choose where to live based on a few basic needs: food, water, and shelter. Habitat management involves three basic steps: 1) deciding on your management objectives, 2) identifying which habitat requirements are in short supply for the species of interest, and 3) developing a habitat management strategy that will provide the necessary resources for the species of interest.

Biologists often rely on habitat management plans to guide their activities. Habitat management plans are used to describe the study area, identify the area's strengths and weaknesses, and recommend management practices. Habitat plans are useful because many people may work together on a habitat improvement project. A well-written plan can guide everyone's efforts. Your final project activity will be to prepare a short, three-page, neighborhood habitat management plan for your study area. Follow the steps described in "Field Work!" on the next page.



OAK TREES PROVIDE BOTH FOOD AND SHELTER.

WILDLIFE CAREER: Wildlife Consultants

Wildlife consultants are professional biologists who work with landowners or agencies to solve wildlife management issues.

Some consultants work with agencies to determine the impact that a planned project might have on wildlife in an area. Such consultants often work with departments of transportation or other developers who wish to avoid causing unnecessary harm to wildlife habitats. Consultants will survey the project area to determine whether any vulnerable species live in the area, then work with project planners and engineers to minimize the project's wildlife impacts.

Other wildlife consultants work with landowners who want to improve their lands for wildlife. These consultants also survey the area to determine which species are present, then develop management plans to meet the landowner's objectives.

Wildlife consultants usually have an advanced degree, such as a master's degree or doctorate in wildlife management.

Activity 5—Preparing a Neighborhood Management Plan

Most habitat managers follow a step-by-step process to accomplish their habitat improvement goals. Most habitat management plans are based on the five steps listed below. First use scratch paper to develop your plan. When you're finished, copy it into the Habitat Plan Worksheet provided at the end of this chapter. You may also paste or tape computer generated text into each section of the worksheet.

STEP 1: MAP YOUR STUDY AREA

To begin developing a management plan for your study area, prepare a base map of the site. A base map is a drawing of the site that shows all of the permanent structures (buildings, sidewalks, driveways, roads) and all of the existing habitat resources (water sources, food sources, den sites, and so on).

You may want to look at topographic maps and aerial photos of the area (if available) when making your map. Make your final map the size of one page in this book, and draw the final version into Section 1 of the Habitat Plan Worksheet.

STEP 2: IDENTIFY THE MANAGEMENT OBJECTIVES

There are many factors to consider when deciding on the management objectives for an area. Different people often have different goals for their property. For this plan, pretend you are the landowner and set your own objectives. But keep them simple! If your objective is to improve the area for wildlife viewing, you still have to decide which species or group of species you are targeting in your management efforts. What are their habitat requirements? What do they eat? Where do they nest? Is it realistic to try to provide these resources? Remember, you can improve habitat for animals already living in the area, you don't have to attract new ones.

You may need to use a field guide to learn about the habitat requirements of the wildlife in your area (or refer to Appendix I in this book. Or, check with someone knowledgeable about wildlife in your area and ask them which species could live at your site. List at least two management objectives in Section 2 of the Habitat Plan Worksheet.

You may want to review Chapter 2 for an overview of management objectives.

STEP 3: EVALUATE THE CURRENT CONDITIONS

Before developing a plan, a manager must first evaluate the current conditions of the existing habitat and then explain the evaluation in terms of the management objectives. For example, if your goal is to manage for bluebirds, a manager would describe the area in detail and then explain how well the current conditions are providing food, water, cover, and space for bluebirds.

Try to identify the major types of plants and animals living at your site. Where is the nearest water source? Which of the critical resources—food, water, or shelter—seem to be the most limited? How would you describe the area's successional stage? Evaluate the habitat in terms of your management objectives.

Now think about habitat suitability. Are there a variety of resources available? Are there scattered patches of food and shelter or are there large areas lacking food and shelter? Are there different vertical layers in the habitat or is it all short mown grass? Write your evaluation in Section 3 of your plan.

STEP 4: PLAN HABITAT IMPROVEMENTS

Once you have established your objectives and evaluated the available resources of your area, it is time to begin planning how to improve the site. The recommended management practices should be specific for the objectives. In addition, you need to state when and where each practice will occur. Will you plant nectar flowers for hummingbirds and butterflies? Construct brush piles for rabbits? Plant evergreens for wintering songbirds? Put up bird feeders and nest boxes? Or, will you do all of these?

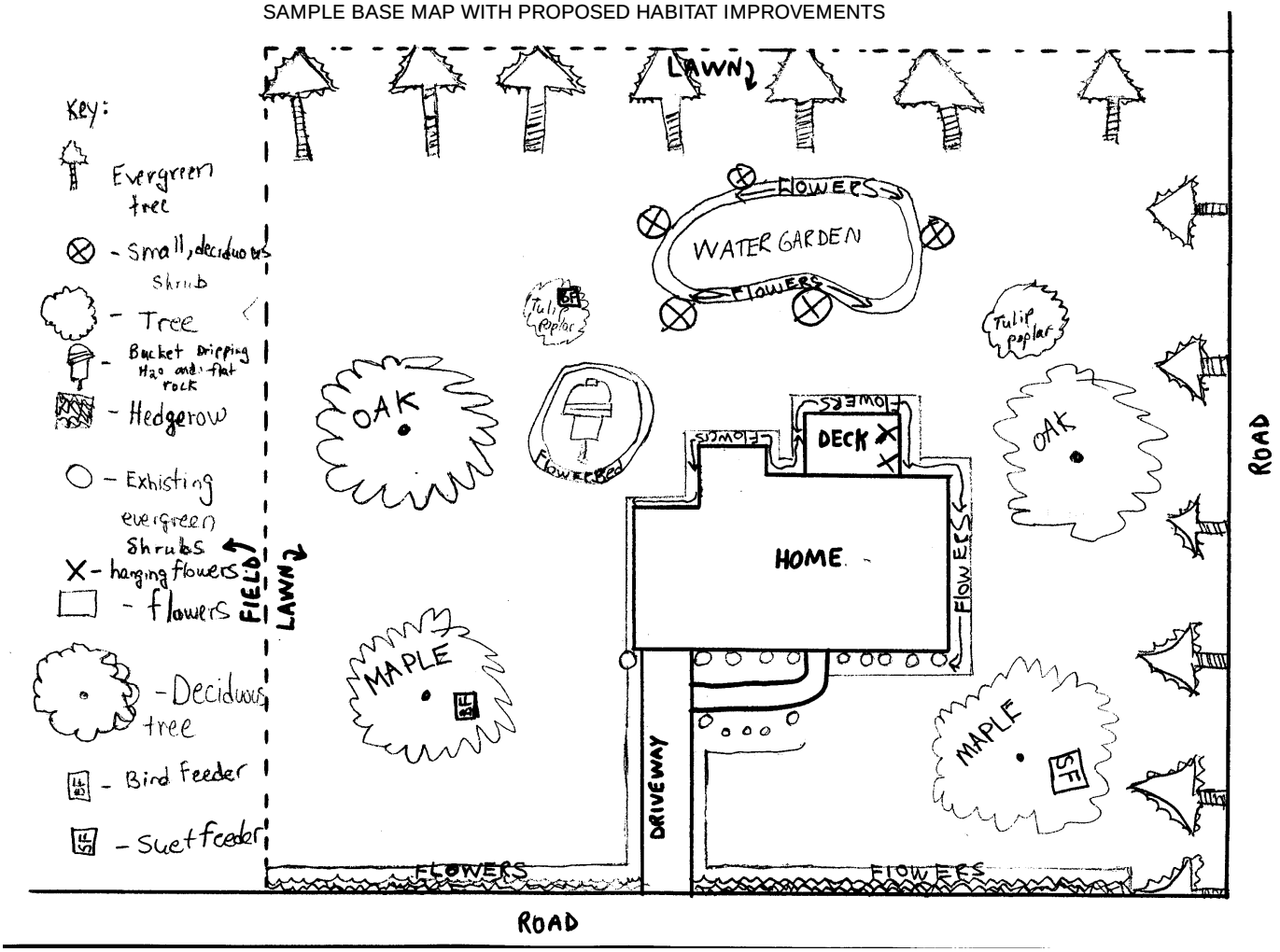
The easiest way to begin planning is to take a clear plastic sheet and lay it over your base map. Then with a dry eraser or watercolor marker, begin adding the practices you are considering to the map overlay. The plastic overlay and dry eraser marker allow you to make changes easily to your plan without messing up the original base map. If plastic sheets and markers aren't available, you can do the same thing with tracing paper and a pencil or simply make several photo copies of the base map, and draw directly on your extra copies.

Don't forget to include provisions for wildlife food, cover, and water in your plan. If any of these are missing, your plan will not be as successful. In Section 4 of your plan include a list of the practices you recommend. Make note of where and when they will be done (refer back to your map). Include a few sentences on why you are recommending the practice and what animals are likely to use the improved habitat.

STEP 5: EVALUATE THE PLAN

The final part of a management plan is designing some type of monitoring or evaluation of the effectiveness of the plan. A manager will never know if their plan was a good one if it is not evaluated. For example, if an objective of your plan is to increase the diversity of birds seen on a site, keeping a list of birds seen before and after the management plan was implemented would be a good way to evaluate the success of the plan. Include your evaluation plans in Section 5 of the Habitat Plan Worksheet.

SAMPLE BASE MAP WITH PROPOSED HABITAT IMPROVEMENTS



NEIGHBORHOOD HABITAT MANAGEMENT PLAN

(This plan may also be done on a word processor and then inserted into the project book at this spot.)

NAME _____ LOCATION _____

SECTION 1: Base Map of Study Area

SECTION 2: Management Plan Objectives

SECTION 3: Current Site Conditions

SECTION 4: Habitat Improvements

SECTION 5: Evaluation Plan

PROJECT COMPLETION IDEAS

Share your habitat management plan by selecting one of the following methods.

Display Your Project Book and Plan

Simply display your habitat management plan in the project book. You may also want to include photos of the site, drawings, or magazine cutouts of the species you are managing for, along with additional life history information.

Create a Three-Sided Display

On the first panel of a three-sided display, paste your base map. Below the map, write a brief paragraph about each species of tree, shrub, and flower you identified. Be sure to include a description of the wildlife value of each species.

On the center panel, show the species you are trying to attract. You can either draw them or cut pictures from a magazine. For each species, make a list of their habitat requirements.

On the third panel, draw your habitat improvement map. Label all plants and plant groupings, trees, shrubs, cover, feeders, and water sources you recommend for the site. Under the map, list your recommendations and the wildlife benefits each one is designed to provide.

Produce a Booklet or Field Tour Guide

On the first page of the booklet, draw a map of your study area and number the "points of interest," such as flower beds, berry bushes, water sources, a feathered edge, a snag, and so on. Number the points of interest so that they form sort of a loop around the area.

Now make a page for each numbered site in your area. On each page, describe what the visitor is seeing, what purpose it is serving wildlife, and what species a visitor could expect to see there. Include pictures or drawings on each page if you wish.

Congratulations...

on completing your management plan. We hope you have a better understanding of how to evaluate a habitat and develop a management plan. While the actual implementation and evaluation of your plan is beyond the scope of this project, we encourage you to seek further involvement in habitat improvement activities to gain additional experience.

Appendix 1

Habitat Requirements for Selected Species Found in Neighborhood Habitats

This appendix includes examples of some wildlife species that are commonly found in neighborhood habitats in Pennsylvania and a table that shows management practices that might be recommended for those species. This table is not meant to be a "cookbook." Instead, it lists practices that may be appropriate depending on management objectives and current habitat conditions. This list and table offer you a starting point, but you should not feel limited to these species or practices when you develop your own plan.

INSECTS

Butterflies and Moths

Food: Larvae of most species feed on plant material such as leaves, flowers, and fruit. Adults feed on nectar and other fluids. Plant and maintain bushes and flowers that attract butterflies and plants for caterpillars to feed on. Note, larvae (caterpillars) and adults of the same species may require very different plants. Tables of plants and species attracted can be found in butterfly guides, and gardening books.

Water: Obtain adequate moisture from diet. Adults sometimes drink from the edge of open water, birdbaths, and moist earth.

Cover/Shelter: Herbaceous and woody plants serve as both food and shelter for larvae and adults. Plant gardens for butterflies in areas sheltered from the wind.

Common families: Common butterflies include swallowtails, sulphurs and whites, fritillaries, admirals, skippers, and metalmarks. Common moths include sphinx, silk moths, tigers, noctuids, cutworms, and underwings.

Also see the fact sheet Pennsylvania Wildlife #8: Gardening for Butterflies.

AMPHIBIANS

Frogs

Food: Diet includes a variety of snails, insects, earthworms, and other small invertebrates. Larger frogs, like the bullfrog, may feed on fish, other frogs, crayfish, reptiles, and small mammals.

Water: Find most life requirements in or near water.

Cover: Dense vegetation on shore adjacent to water. Hide among floating vegetation in water next to shore. Mud bottoms are needed so frogs can bury themselves for hibernation during the winter. Corridors connecting streams or ponds may be used by frogs moving between areas.

Common Species: Bull frog, wood frog, pickerel frog, spring peeper.

BIRDS

American Robin

Food: Insects and worms in warm seasons. Fruits and berries from shrubs and trees in winter. Generally do not use bird feeders.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Nesting sites and hiding areas in shrubs and evergreen and deciduous trees. Evergreen trees are preferred for early spring nests. Commonly found in urban and suburban settings with large open areas and nearby trees and shrubs. Parks, golf courses, and lawns in residential areas are favorites. Will use nesting platforms.

Eastern Bluebird

Food: Insects and spiders make up a large portion of the diet. A limited amount of fruit is also eaten, especially during spring and fall migration. Usually forage in open grassy or weedy areas. Bluebirds do not come to bird feeders with seed, but they will come to feeders with mealworms.

Water: No specific requirements for open water. Obtain adequate moisture from diet. Attracted to birdbaths for drinking and bathing.

Cover/Shelter: Nesting sites are in natural cavities and old woodpecker holes. They also nest in birdhouses.

House Finch

Food: Soft fruits, buds, and weed seeds. Eat some insects in warm seasons. Will use artificial feeders of all types.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Found in nearly all urban areas that have trees, shrubs, and some open areas. Not as abundant in inner cities. Nest on low branches of trees, in bushes, in natural cavities, in old woodpecker holes, and on building ledges. Place nests 5 to 7 feet above ground. Nest is built of weed stems, small branches, and leaves.

House Sparrow (English Sparrow)

Food: Eat a variety of insects, fruits, buds, and weed seeds. Will use bird feeders of all types.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Found in nearly all urban areas that have trees, shrubs, and some open areas. Nest on low branches of trees, in bushes, in natural cavities, in old woodpecker holes, and on building ledges. Place nests 5 to 7 feet above ground. Nest is built of weed stems, small branches, and leaves.

House Wren (Carolina wren has similar habitat requirements.)

Food: Spiders, grasshoppers, crickets, beetles, caterpillars, ants, bees, ticks, and millipedes; also eat small soft fruits and berries. Bird feeders are usually not used.

Water: No specific requirements for open water. Obtain adequate water from diet. Will drink and bath in birdbaths.

Cover/Shelter: Prefer older residential areas with large shrubs and trees. Nest in natural cavities in trees, old buildings, and other structures. Will use nest boxes. House wren will occasionally destroy eggs and nestlings of other birds if nest boxes too close.

Mourning Dove

Food: Waste grain from cropland and a variety of grass and weed seeds. Will often feed on fallen seed under bird feeders.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Prefer tall shrubs and trees for nesting and resting. Nest is made of twigs placed on branches of shrub or tree. Nests may also be placed on ground. Will use artificial nest platforms.

Northern Cardinal

Food: Waste grain from cropland, weed seeds, fruit, buds, and insects.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Dense shrubs, tangled vines for resting and hiding. Nest in forked branches deep in dense pines, spruce, and hemlocks, vines, or climbing roses.

Pigeon (Rock Dove)

Food: Feed on the ground. Prefer waste grain and weed seeds. In urban areas, live mostly on handouts. Will feed on fallen seeds under bird feeders.

Water: No specific requirements for open water. Will drink and bathe in pools and birdbaths.

Cover/Shelter: Nest on window ledges, roof tops, and bridges.

Ruby-Throated Hummingbird

Food: Nectar from flowers and insects found on flowers. Hummingbirds require high energy foods. Nectar is high in sugars that supply energy, while insects are an excellent source of protein.

Water: Obtain adequate moisture from diet. Will drink from nectar feeders designed for them. Will bath in water misters.

Cover/Shelter: Construct tiny nests on tree branches, usually 5 to 20 feet above ground. Occasionally build nests on secluded areas of buildings. Nest is made out of leafy materials, lichen, and spider webs.

MAMMALS

Eastern Cottontail

Food: A variety of herbaceous plants, grasses, and garden vegetables are eaten from spring through fall. In winter, rabbits eat bark of trees and shrubs. Will eat small grains in food plots.

Water: No specific requirements for open water.

Cover/Shelter: Ideal habitats are one-third grassland, one-third cropland, one-third shrub cover all mixed together. Also use parks, golf courses, where shrubbery cover is available. Use thick shrub or herbaceous cover for hiding and resting. Will use brush piles. Avoids extensive forests or open areas with no cover.

Eastern Gray Squirrel

Food: Spend much time foraging on the ground. Feed on a variety of nuts, grains, acorns, seeds, mushrooms, and buds. Often a problem species at bird feeders.

Water: No specific requirements for open water. Will drink at birdbaths.

Cover/Shelter: Nest in cavities of trees or build nests out of twigs and leaves. Nest is usually placed in the crotch of a tree over 30 feet above the ground. In areas where den sites scarce, will use nest boxes.

Raccoon

Food: Eat a wide variety of foods, including garbage, birds, eggs, fish, small mammals, insects, crayfish, grains, seeds, fruits, and human and pet foods.

Water: Raccoons are most abundant near water, riparian areas, and lands adjacent to water.

Cover/Shelter: Nest and rest during the day in natural tree cavities, dens in the ground, under brush and junk piles, in abandoned buildings, and rocky cliffs and ledges. Most abundant near water, riparian areas, and areas near wetlands. Also found in urban areas. Prefer areas interspersed with different successional stages.

The following chart is a summary of some management practices you might use in neighborhood habitats in Pennsylvania.

MANAGEMENT PRACTICES FOR THE NEIGHBORHOOD HABITAT

	Butterflies	Frogs	American Robin	Bluebird	House Finch	*House Sparrow	House Wren	Mourning Dove	Cardinal	*Pigeon	Hummingbird	Eastern Cottontail	Grey Squirrel	Raccoon
Plant trees and shrubs	X		X	X	X	X	X	X	X		X	X	X	X
Plant flowers	X										X			
Provide bird feeders				X	X	X		X	X	X	X		X	
Provide water	X	X	X	X	X	X	X	X	X	X	X		X	X
Build brush piles/rock piles												X		
Provide nest boxes/structures			X	X		X	X	X					X	
Limit lawn space	X	X					X	X	X		X	X	X	X
Reduce chemical use	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Riparian buffers		X												X
Keep cats indoors			X	X	X	X	X	X	X	X	X	X	X	
Corridors	X	X	X	X			X	X	X		X	X	X	X
Wildlife damage management						X				X		X	X	X

*These species were introduced to the United States and in many places are considered pests because they out-compete native species for available habitat. In such situations, management objectives may be to reduce the quantity and quality of habitat available for these species. In urban neighborhoods, management may be limited to these and a few other species.

Appendix 2

Additional Resources

Woodcrafting for Wildlife.
Provides construction plans and instructions for building a variety of nesting, resting, and feeding structures for wildlife.

Available from the Pennsylvania Game Commission, Dept. AR, 2001 Elmerton Avenue, Harrisburg, PA 17110; phone: 717-787-4250. Can also be ordered through: www.pgc.state.pa.us.

Woodlands and Wildlife.
Provides information on various wildlife species and the management practices suited for forested habitats.

Available from Publications Distribution Center, 112 Agricultural Administration Building, Penn State, University Park, PA 16802; phone: 814-865-6713. Can also be ordered through: pubs.cas.psu.edu.

Wetlands and Wildlife.
Provides information on the various wetland-dependent wildlife species and the management practices suited for wetland habitats.

Available from Publications Distribution Center, 112 Agricultural Administration Building, Penn State, University Park, PA 16802; phone: 814-865-6713. Can also be ordered through: pubs.cas.psu.edu.

Wildlife of Pennsylvania and the Northeast,
by Chuck Fergus.
Provides life history information on every mammal, bird, reptile, and amphibian found in Pennsylvania.

Available from Stackpole Books, 5067 Ritter Road, Mechanicsburg, PA 17055; www.stackpolebooks.com. Can also be ordered through: www.pgc.state.pa.us.

"APATH"—Native Plants in the Creation of Backyard, Schoolyard, and Park Habitat Areas.
Provides step-by-step advice on planning habitat improvement efforts in residential habitats. Includes a detailed list of native plants with wildlife benefits as well as sources for purchasing native plants.

Available from Audubon Council of Pennsylvania, Pennsylvania Audubon Society, 100 Wildwood Way, Harrisburg, PA 17110; www.audubon.org.

Pennsylvania Wildlife Fact Sheet Series.
This fact sheet series is available free of charge from county extension offices and from the following distribution center.

Publications Distribution Center
The Pennsylvania State University
112 Agricultural Administration Building
University Park, PA 16802

Phone: 814-865-6713.

Web site: pubs.cas.psu.edu

The following titles are currently available in the Pennsylvania Wildlife series:

No. 1. Wildlife Habitat Relationships

No. 2. Attracting Wildlife Sources of Assistance

No. 3. Managing Habitat for Eastern Bluebirds

No. 4. House Finch Conjunctivitis

No. 5. Meadows and Prairies: Wildlife-Friendly Alternatives to Lawns

No. 6. Attracting Hummingbirds

No. 7. Landscaping for Wildlife: Trees, Shrubs, and Vines

No. 8. Gardening for Butterflies

No. 9. Managing Habitat for Eastern Cottontails

No. 10. Neighborly Natural Landscaping: Creating Natural Environments in Residential Areas

No. 11. The Basics of Winter Bird Feeding

No. 12. Warm-Season Grasses and Wildlife

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