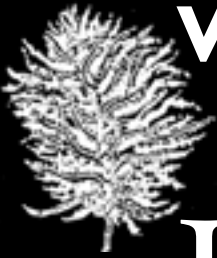


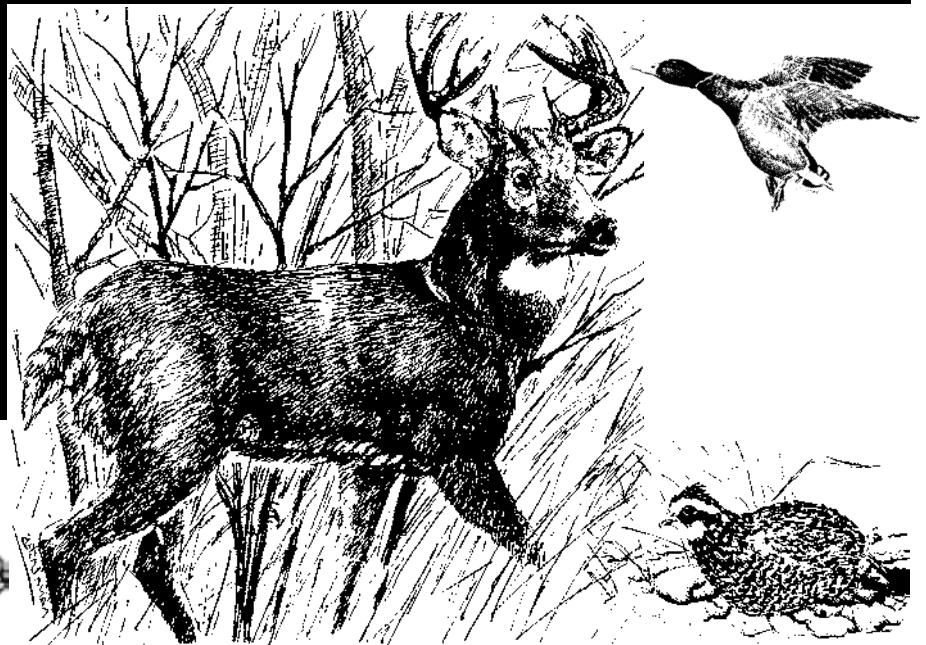
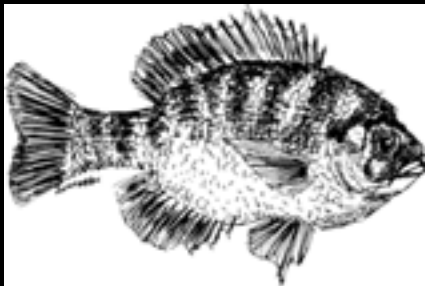
2nd Edition

# Wildlife Habitat Evaluation

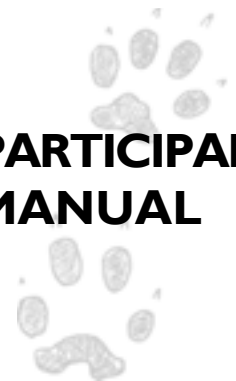
# HANDBOOK



K-State Research and Extension and University of Nebraska Cooperative Extension



**PARTICIPANT'S  
MANUAL**



# Wildlife Habitat Evaluation Handbook

## Kansas and Nebraska

### Participant's Manual, 2nd Edition

This revised 2<sup>nd</sup> Edition was developed to update the material and to maintain alignment with the national program. We are grateful to the many people who contributed to this second edition, especially key contributors listed below. Please note also the acknowledgments for the first edition because those earlier contributions are carried forward into this revision.

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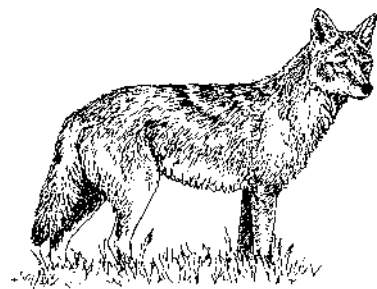
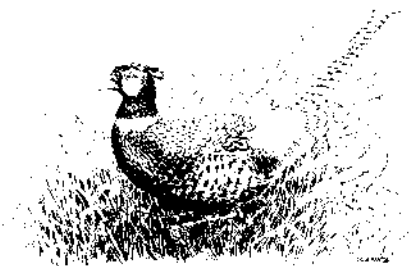
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#### *Agencies cooperating in the program include:*

K-State Research & Extension  
University of Nebraska Cooperative Extension  
University of Nebraska School of Natural Resources  
Nebraska Game and Parks Commission  
Kansas Department of Wildlife and Parks  
Natural Resources Conservation Service  
U.S. Bureau of Reclamation / Nebraska-Kansas Area Office



#### *Special thanks go to the following sponsors for their caring and generous support:*

Kansas Quail Unlimited Chapters  
Nebraska Pheasants Forever Chapters  
Izaak Walton League of America Endowment  
Nebraska Chapter, The Wildlife Society  
Nebraska Division, Izaak Walton League of America

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Bob Holcombe (some illustrations/graphics are clipart and were not produced by the above artists)

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University of Nebraska Cooperative Extension  
Nebraska Game and Parks Commission  
Kansas Department of Wildlife and Parks  
Natural Resources Conservation Service  
U.S. Bureau of Reclamation/Nebraska–Kansas Area Office

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# Introduction

Thank you for thinking of wildlife. This project has something for you whether your experience is with wildlife in a backyard, city birds downtown, or the more diverse wildlife of an acreage, farm, or wide open grassland. Wildlife is an important part of our everyday lives and an important key to understanding our environment. Wildlife brings us beauty and wonder as well as a learning window to nature. In addition, the health of wildlife populations can be an indicator of how healthy the environment is for us. There also is a unique genetic “library” in wild plants and animals that hold important keys to the discovery of new medicines, food varieties and other benefits. Recent examples include cancer-fighting drugs from the Paw Paw and Pacific Yew trees, corn disease resistance from the wild grass *teosinte*, and creation of a high blood pressure medicine patterned after a snake venom. Each year we spend over \$55 billion on wildlife-related recreation such as watching or feeding birds or other wildlife, hunting, fishing, hiking, or camping. Communities benefit from the money spent at stores, motels and other businesses.

How are wildlife populations doing? How about your favorite kinds of wildlife? You may have observed trends over the years of decreasing or increasing numbers of certain wildlife species. Some kinds of wildlife are doing quite well while others are declining. What is happening? Often the sharp decline of the species we most enjoy is caused by habitat loss. If we want to continue to have desirable wildlife, we must plan for their habitat needs as we plan and decide about our human needs.

In this program, you will learn that management for wildlife involves management of wildlife habitat and providing for the needs of wildlife. This handbook has information for learning wildlife habitat management concepts in both urban and rural settings and for preparing for judging events. The handbook and activities focus not only on increasing knowledge in the wildlife management field, but also in developing skills and applying learned knowledge.

Wildlife managers use these same activities when deciding how to manage areas for wildlife. Before making recommendations on habitat management, you should know the life requirements of the animal(s) for which the area is being managed. The sections of this handbook on wildlife, concepts and terms, wildlife species, and foods can help with learning the life requirements of many species of wildlife.

Next, a manager must be able to inventory and evaluate the present condition of the habitat and explain the condition to landowners and other interested parties. The aerial photography section is designed to show this inventory and evaluation process.

Once the inventory is complete, the manager decides which management practices can be applied to improve the habitat for one or many wildlife species. You will have the opportunity to experience this decision making effort by going outside and into the habitat.

Finally, so that others can clearly understand your proposed management decisions, you then explain the decisions on paper and locate them on aerial photos or some other type of map. The urban and rural management plans encourage participants to explain and illustrate their recommendations in writing so that others can understand and carry them out.

## Preface and Background

The Wildlife Habitat Evaluation Program represents the evolution of interest and work of many professionals and volunteers. The program began in Tennessee when Drs. Jim Byford and Tom Hill of Tennessee Cooperative Extension initiated the Wildlife Judging Project. A 1985 conference, along with support from the U.S. Fish and Wildlife Service, led to the first Southern Invitational in 1987. In 1988, the second Southern Invitational and concurrent conference, which was supported by the International Association of Fish and

Wildlife Agencies, led to the first national event in 1989. The 1989 national event was supported by both the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies.

In 1990–91, the program was expanded nationally and Kansas started the contest in June of 1991. Nebraska began in 1995. In 1995–96, Kansas and Nebraska jointly developed member and leader handbooks. These handbooks incorporate the basic concepts originated by Dr. Byford with the addition of urban landscape activities added by developers of the national manual.

This handbook is targeted for Kansas and Nebraska to make it more useful in local programs. A national manual can be obtained and used by the senior team as they advance to the national competition. This handbook is designed to mesh with the national manual and to provide uniformity for Kansas–Nebraska programs, with management techniques for representative species, and major habitats appropriate for these states.

The Wildlife Habitat Evaluation Program is designed to build life skills and teach youth about the fundamentals of wildlife management. Although the contest portion is competitive, its primary function is education. Participants learn natural resource management through both the contest and the associated programs. Additional benefits come from the development of leadership capabilities and meeting youth and professionals from parts of Kansas, Nebraska, and the nation. Participants increase their self-confidence through experience and the development of cooperation, teamwork, decision making and both oral and written communication skills.

## General Rules and Guidelines

The State Contest event will comply with all “Policies and Guidelines for Nebraska 4-H Policy”

### I. Contestants and Eligibility

- A. Each county or combination of counties can enter teams for the State contest. A team will consist of no less than three and no more than four entrants who are 4-H members.\* If a county is unable to assemble a team, it may send individuals to the State contest and be combined with other individuals to form a team for the State contest.
- B. Age divisions in Nebraska will be Novice Participants (8-11), Junior (12-13), and Senior (14-18). In Kansas, age divisions will be Junior (8-13) and Senior (14-18). Age is determined as of January 1 of the current year.
- C. A State winning team member must have passed their 14th birthday on or before December 31 of the preceding year and must not have passed their 19th birthday before January 1 of the contest year to be eligible for the National Contest.
- D. A team winning the State contest may not return as a team to the State contest but may return as an individual and compete in the individual events but is not eligible for awards.

\*4-H membership is optional, but recommended, for the State Contest.

## General Contest Rules and Information

The dates and location for the next State contest will be announced at the State contest.

- A. County team or teams must be submitted on the State entry forms.
- B. Novice participants will not compete in the State contest but participate in training activities for educational purposes.
- C. Contestants will work independently on Activities I, II, and III and in teams for Activities IV and V. Scorecards must be turned into an official judge or committee member after each event. The team score will be the three highest accumulative scores in each of Activities I, II, and III plus the team scores for Activities IV and V.



- D. Activity IV, Wildlife Management Plan, and Activity V, Urban Landscape and Backyard Habitat Plan, will be completed as a team effort.
- E. A maximum of 5 minutes will be allowed for oral reasons in Activity II, Aerial Photograph Interpretation.
- F. Absolutely no talking by contestants will be allowed during the contest except when working as a group on Activities IV and V.
- G. Anyone caught cheating will be disqualified.
- H. No use of alcohol, tobacco, or drugs will be allowed during the event.
- I. An official committee will score and analyze results.
- J. After the event, individual and team scores will be given to the team coach.
- K. Although there will be some limited training and practice before the contest, all contestants should study the handbook and be prepared before coming to the State contest.
- L. Award categories:
  - First Place Senior Team
  - First Place Junior Team
  - Top Individual Senior
  - Top Individual Junior
  - Runner-up Individual Senior
  - Runner-up Individual Junior

## Wildlife Management Concepts and Terms

Before an individual can evaluate wildlife habitat and make management recommendations, some basic concepts about habitat and its relationships to different wildlife species should be understood. In this section, some of the basic concepts will be described. Since most of the contest will be based on these concepts, it is important that you study and understand them.

Like other natural resource fields, wildlife management is both an art and science that deals with complex interactions in the environment. This means that management includes art or judgment based on experience as well as sound factual information based on scientific studies. For the purposes of this program, a number of assumptions and simplifications have been made to make the materials more understandable. In actual management cases, it is always wise to call upon trained, experienced professionals to assist you in making proper decisions to meet your goals and objectives.

Look up the definition of words or terms you do not understand in a dictionary, wildlife textbook, or in the glossary found at the back of this handbook. Youth should ask leaders or coaches for help in understanding the difficult concepts.

### CONCEPT I

#### Habitat Requirements

Wildlife have four basic habitat requirements: *food*, *water*, *space*, and *cover* or shelter. Each species has its own set of specific requirements. For example, the fox squirrel uses acorns for food, while the house wren eats insects. Mallards use thick grass and forb cover for nesting, whereas brown thrashers nest in shrubs. Habitat requirements for wildlife change during the seasons of the year. The food they eat in the winter may be much different from what is eaten in the summer. The cover they need for nesting may be much different from the cover needed to survive a winter storm.

## CONCEPT 2

### Choosing Wildlife Management Objectives

Almost any wildlife management activity or change in the landscape will result in benefit for some species but detriment for others. So thinking about what you want — your objectives — will help ensure the best outcome for your needs. One objective might be to provide the best habitat possible for specific wildlife species of interest, sometimes called featured species. Another objective, which is explained later in this handbook under the concept *Species Richness*, could be to provide habitat for as many different native wildlife species as possible in an area.

When evaluating habitat for featured species, you must first decide which species are to be favored. This can be done in several ways. Landowners may have certain objectives for specific species, or the general public may have concerns about particular game or endangered species. Once the species are selected, identify the habitat requirements for each species and evaluate the capability of the environment to provide the requirements. If the area is unable to supply or only partially provides the necessary habitat requirements, management practices may be used to improve the area's ability to supply needed requirements.

It usually is best to select management practices that provide requirements that are in shortest supply. For instance, if a species requires trees for cover with water nearby, and the habitat you are evaluating has plenty of trees but no water, a management practice that supplies water will improve the habitat more effectively than planting trees.

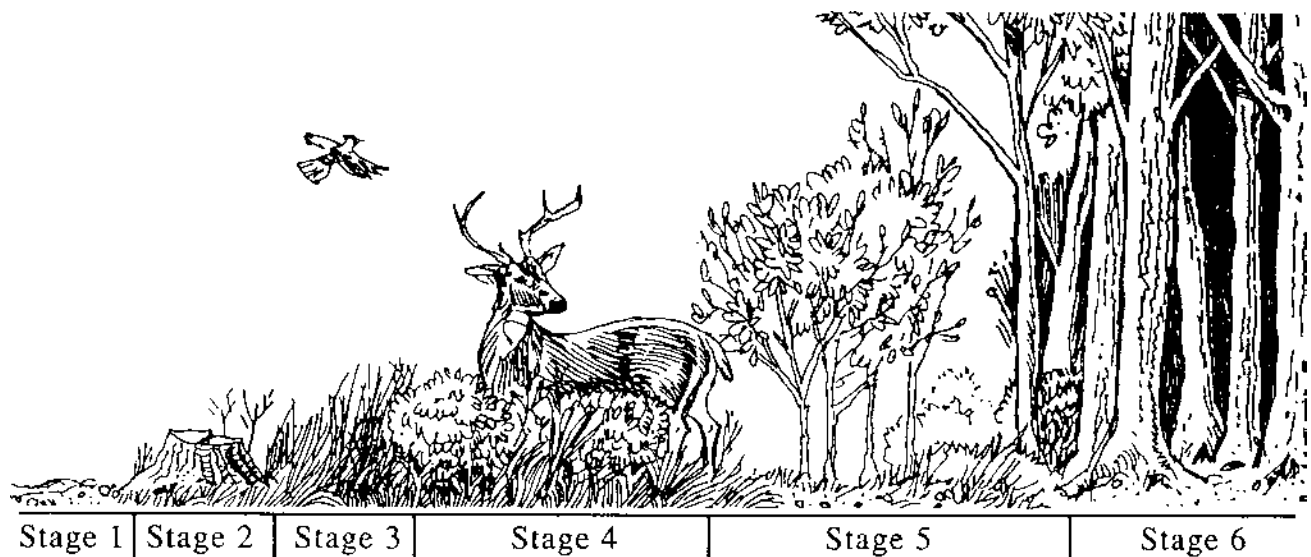
When determining which management practices to apply, remember, management practices that improve habitat for some wildlife species may be detrimental to other wildlife species. It is impossible to manage habitat for any one species without influencing other species in some way.

## CONCEPT 3

### Plant Succession and its Effect on Wildlife

#### Upland Succession

Vegetation and water are the basis of habitat management. Every acre of soil and water has a sequence in plant cover that occurs over time. The different types of plant cover in this sequence are called stages of *plant succession*. We usually can predict the type of vegetation that will occur in each stage as it progresses to a final or “climax” stage. When not disturbed, the climax vegetation is stable and will remain the same for long periods of time. If humans or nature disturb the soil or water level, the succession may be set back and the cycle will continue forward from the new starting point. Note that different species of wildlife are often associated with different stages of plant succession.



In this handbook, areas in different stages of plant succession often are referred to by vegetation types or habitat types. In general, the stages of plant succession that occur on land are as follows:

1. Bare ground
2. Annual forbs and/or grasses
3. Perennial forbs and grasses
4. Shrubs
5. Young woodland or trees
6. Mature woodland or trees

In some regions, natural factors such as the soil or the climate will prevent succession from proceeding past a certain stage. For instance, in western portions of Kansas and Nebraska (a shortgrass prairie region), lack of precipitation often prevents succession from proceeding past stage 3. In this case, stage 3 would be considered the climax stage. Many wildlife species found in this region do not require trees and may avoid habitat areas that have trees. In eastern Kansas and Nebraska, greater amounts of precipitation may allow succession to go to stage six. Succession may go beyond stage three in other Kansas or Nebraska sites where additional moisture is present, such as along streams, in ravines, in urban areas, around farmsteads, and in some other unique or protected areas.

A single step in this succession may take weeks, months, years, or even centuries depending on a variety of natural and human-caused factors. Land is always in transition toward the next level of succession. Nearly always, remnants of earlier stages will persist. If vegetation is disturbed, succession will revert to an earlier stage and begin again. Disturbance can be caused by natural factors such as insect or disease outbreaks, tornadoes, hurricanes, avalanches, or naturally occurring fires.

Succession is more frequently altered by humans, however, through plowing or cultivation (agriculture), burning, cutting of forests, grazing, and clearing shrubby areas, which may in many cases mimic natural disturbances.

Nature never gives up. Even abandoned, concrete parking lots are eventually taken over by plants. Plants first grow in the cracks and around the edges, then if left alone, a concrete parking lot will eventually become “habitat” for some wildlife species.

### **Wetland Succession — water cycles or cycling**

Most prairie wetlands go through various sequences or stages in a process termed cycling, which is influenced by alternating wet and dry periods. A single step in the process may take weeks, months, or years. Some factors that affect this process are precipitation levels, periodic droughts, muskrat feeding, siltation, tillage, grazing, mowing, salinity, flooding and draw-downs. Stages in this cycling process may include:

0. Open water — Nearly 100% open water with few or no emerged wetland plants.
1. Dry (drought or drawdown) — Exposed mudflats dominated by annual emerged wetland and/or upland plants.
2. Reflooded — A mix of annual, biennial, and perennial emerged wetland plants. Some floating or submerged plants present. Generally less than 50% open water.
3. Partially open water — Vegetation is dominated by perennial emerged, floating, and/or submerged wetland plants. Generally 50% or more open water.
0. Open water — Return to nearly 100% open water. Refer to the photographs for the general phases of wetland water cycles.

As a wetland becomes drier, the seeds of annuals and perennials germinate and grow. Annuals such as smartweed, wild millet, and beggar-ticks (*Bidens*) dominate initially. As precipitation increases or reflooding occurs, the annuals drown-out and perennials such as cattails, bulrushes, and sedges become dominant. Over time, the perennials may die-out or be eaten-out, primarily by muskrats, and the site becomes an open-water marsh dominated by submergent (under water) plants. The wetland will then remain in the open water stage until the next drought or draw-down.

Management of water levels is an important tool in managing wetlands for wildlife habitat. For example, water control structures that allow draw-down or reflooding of wetlands can be used to manage vegetation or to provide the proper habitat for migrating waterfowl and other aquatic birds.

## General Phases of Wetland Water Cycles



**Wetland Stage 0** — nearly all open water. *(Photo courtesy of T. G. LaGrange)*



**Wetland Stage 1** — plants emerging on an exposed mud flat. *(Photo courtesy of T. G. LaGrange)*



**Wetland Stage 2 – A mix of emergent wetland plants with some floating or submerged plants and generally less than 50% open water.** *(Photo courtesy of T. G. LaGrange)*



**Wetland Stage 3 – Vegetation is dominated by emergent, floating, and/or submerged wetland plants with generally 50% or more open water.** *(Photo courtesy of T. G. LaGrange)*

## CONCEPT 4

### Vertical Structure (Layering)

Vegetation can be classified by how high it grows. Grasses and forbs generally grow close to the ground and make up the ground layers. The next highest level is usually comprised of shrubs and is called the shrub layer. The tallest layer is made by trees and is called the tree canopy.

How different layers of vegetation are arranged in relation to each other is important to many wildlife species. For instance, some species may require a herbaceous layer for food but also need a tree canopy for cover. Not all areas in a single stage of succession are alike. One woodland in stage 6 of succession may have a variety of layers comprised of grasses, forbs, shrubs, and trees, while another stage 6 woodland may have only one distinct layer of tall trees. These differences in layers affect the habitat quality and which species it favors. For example, overbrowsing by an over population of white-tailed deer can remove the lower vegetation layers in a stage 6 woodland. Loss of the lower layers is a loss of food for deer, a loss of plant diversity and a loss of habitat for songbirds and other wildlife that depend on these layers for nesting and foraging.

## CONCEPT 5

### Horizontal Arrangement and Interspersion

How different successional stages or vegetation types are situated in relation to each other is often referred to as horizontal arrangement. Many wildlife species need more than one successional stage to provide all their habitat requirements. In this case, the different successional stages must be close to each other to allow close access and safe travel for wildlife. Mixing plots of different successional stages within an area is called *interspersion*. Usually, more interspersion supports a greater variety of wildlife, but interspersion is not good for all wildlife. Some species obtain all their habitat requirements from only one successional stage. In this case, a low amount of interspersion would be best. A way to measure interspersion is explained on page 80.

Generally, more interspersion or mixing of habitats means more edges, which benefits edge-adapted species. Unbroken blocks of habitat in one successional stage, without interspersion, is needed by area-sensitive species. These concepts are described further in the next two sections.

## CONCEPT 6

### Edges and Contrast

The boundary where two or more different types of vegetation or successional stages meet is called *edge*. Sometimes there is an abrupt change where one type of vegetation stops and another begins (Figure 1). Where abrupt changes occur the edge is narrow. Or an edge can be less distinct with a gradual transition from one stage to another (Figure 2). In places where a gradual change occurs, an edge looks a little like both successional stages or vegetation types.

Edges where extremely different types of vegetation meet are described as having high contrast. For example, there is high contrast where an area in stage 2 (forbs and grasses) meets an area in stage 6 (tall trees) of plant succession. In comparison, a boundary between stages 2 and 3 has low contrast.

Edges attract many different *edge-adapted* wildlife species because of the variety of food, cover, and other habitat requirements arranged close together. Generally, edges with high contrast have more species of wildlife

Figure 1

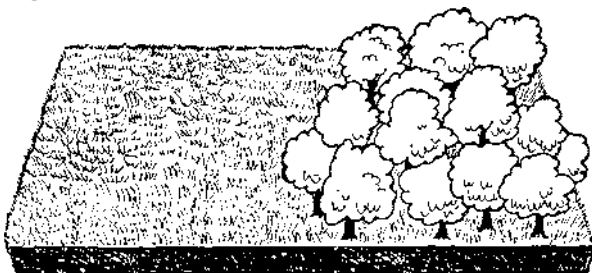
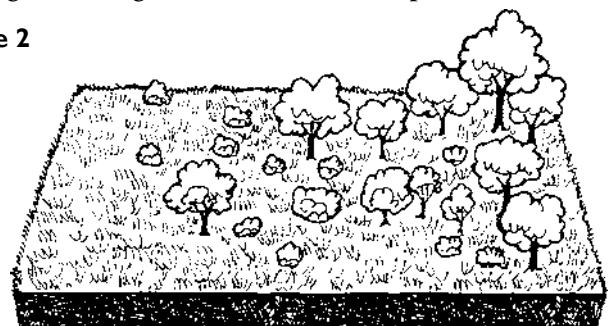


Figure 2



than edges with low contrast. Examples of edge-adapted wildlife include species such as pheasants, quail, cottontails, white-tailed deer, brown-headed cowbirds, cardinals and brown thrashers. Some predators, both birds and mammals, are adapted to searching along edges, especially narrow edges, for nesting birds that are more easily found in the limited edge area.

## **CONCEPT 7**

### **Area-Sensitive Wildlife**

Edge and interspersed areas are not beneficial for all wildlife. Some wildlife species are *area-sensitive* meaning that they need large, unbroken areas in a certain successional stage to provide some or all of their habitat requirements. Some need a suitable large area to meet their minimum area needs; some avoid edges and stay mostly near the core of the habitat they use; and some can use smaller patches if there are several close together. Examples include prairie chickens, grasshopper sparrows, meadowlarks, and pronghorn antelope that are found in large unbroken areas of grassland, or ovenbirds, woodthrush, and scarlet tanagers that need large unbroken areas of trees. In large forests or grasslands, blocks of up to 100 acres or more may be desirable. In such blocks, it is more difficult for nest predators, both birds and mammals, and nest parasites, such as brown-headed cowbirds, to find nests.

Brown-headed cowbirds lay their eggs in other birds' nests, resulting in baby cowbirds instead of other songbirds. This nest parasitism by cowbirds has become a serious problem and a factor in the decline of several songbird species. Cowbird numbers have increased; do you have ideas why? Think habitat: cowbirds have benefitted from the more broken up (*fragmented*) habitats resulting from many human activities. It is easier for cowbirds to watch and find other birds' nests. More on fragmented habitats comes next.

So, in developing a wildlife management plan, consider the objectives in relation to both edge-adapted and area-sensitive wildlife species. A balance of edge with blocks of vegetation in one successional stage may be appropriate.

## **CONCEPT 8**

### **Corridors**

Corridors are long strips of habitat that allow animals to travel securely from one area to another. Examples include vegetated fence rows, railroad corridors, stream or river edges, grass waterways, shelterbelts, windbreaks, hedgerows, and others. As environments become more broken up (*fragmented*) from construction of roads, parking lots, urban areas, harvest of timber or clearing for agriculture, small islands of habitat remain.

Corridors allow animals to find and use the islands of suitable habitat. For example, in an urban area, relatively unbroken corridors found along riparian areas, some hiker/biker trails, and ravines allow wildlife to move into parks, and other suitable habitats. Although corridors are often beneficial, they can sometimes bring unwanted species into an area. For example, a woody corridor might bring unwanted predators into a grassland habitat. Maintenance, preservation, and creation of appropriate habitat corridors are important considerations in wildlife habitat management.

## **CONCEPT 9**

### **Species Richness**

Species richness is defined as the number of wildlife species that are found in an area. As discussed earlier, one goal in wildlife management may be to provide habitat for as many native species as possible. Generally, the focus is on species native to an area and on providing a healthy, functioning ecosystem where there is balance associated with a wide variety of species. This goal may require that most attention be given to species that are uncommon or in need of help rather than to more common adaptable species.

Lands high in species richness usually have many of the following characteristics:

1. A mixture of areas in different successional stages.
2. A balance of edges with unbroken blocks of vegetation in one successional stage.
3. Unbroken (unfragmented) areas of 25 to 100 or more acres.
4. Edges with high contrast.
5. A wide variety of vegetation layers present within each area containing only one successional stage.

These characteristics can be used to estimate the relative number of different wildlife species that may be present in separate areas. They also may be used to identify management practices that could increase species richness. For example, consider an area that is in stage 6 of plant succession. It has been proposed to harvest the trees by clear-cutting one-half of the area. Clear-cuts in 40-acre blocks that leave adjacent unharvested blocks 40 acres or more in size may help maintain species richness. Strips or corridors of trees that link the larger unharvested blocks together could be left uncut (see Concept 8—Corridors).

Remember, when managing habitat for species richness, it often is not possible to provide the best habitat for featured species. Instead of providing the best habitat possible for a few species, the goal may be to provide some habitat for as many species as possible, or the goal may be to provide habitat primarily to increase numbers of one or more species of special interest.

## CONCEPT 10

### Migration

Some wildlife *migrate*, meaning they travel to different places during different seasons of the year. This requires that necessary habitats be available along the route. Migration distances may be short or very long depending on the species.

Here are three examples:

1. Many ducks and geese that nest in the northern United States fly south to warmer climates where they find food sources and wetlands that are not frozen during winter.
2. Orioles, hummingbirds, house wrens, chimney swifts, purple martins, many colorful warblers, dickcissels, grasshopper sparrows, bobolinks and others all nest in North America but fly south of the United States to Central or South America for the winter. These and other *neotropical migrant* birds are of special interest because many have seriously declined in numbers and may need habitat help to survive. The declines have resulted from loss of habitat in nesting and wintering areas and in stopover sites along the route, plus complicating factors such as nest predation and parasitism.
3. In some western mountain areas, deep snow in the Subalpine Zone covers the vegetation used for food by mule deer and wapiti (elk) during the winter. To find food, they travel to lower elevations (Intermountain Foothills or Intermountain Sagebrush Regions) where the snow is not as deep.

## CONCEPT 11

### Carrying Capacity

There is a limit to how many animals can live in a habitat. That limit is called the habitat's *carrying capacity*. The quantity and quality of food, water, cover, and space determines the carrying capacity. If one basic requirement is in short supply, the carrying capacity is lowered. By adding the missing ingredient, a manager can increase the habitat's carrying capacity. In contrast, removing a needed ingredient lowers the carrying capacity.

Carrying capacity varies from year to year and from season to season. It usually is greatest from late spring through fall. This is when most young are born and grow. With the coming of winter or summer drought, food and cover gradually diminish as does the habitat's carrying capacity.

More animals are produced each year than will survive to the next. When this happens, all extra or surplus animals will be lost in an existing habitat. ***A lasting increase in population can only be accomplished by increasing the habitat's carrying capacity.***



## CONCEPT 12

### Wildlife Damage Management

Wildlife sometimes cause nuisance problems, health hazards, or damage to crops and other natural resources. Examples include bird flocks consuming grapes, cherries, sunflower, corn, and other crops; coyotes preying on sheep, poultry, or pets; squirrels, raccoons, or bats in an attic; deer eating ornamental plants in the yard; skunks under the porch; snakes in the house; crows or raccoons in the garbage, bird strikes at airports; cormorants eating catfish fingerlings at an aquaculture facility; predators eating eggs of endangered least terns; or starlings roosting in urban trees and defecating on sidewalks, creating a health hazard.

Wildlife damage management is the art and science of working with habitats, wildlife, and humans to minimize or eliminate damage or danger to people's health or property or other species of wildlife. Three basic management approaches are used in wildlife damage management. 1) **Exclude** animals from where they are causing a problem. Examples include closing holes in buildings, placing netting over grapes, fencing endangered bird colonies, or penning livestock at night. 2) **Reduce the attraction or increase the risk** by removing the food or other attractive resource and by using repellents or frightening techniques. 3) **Remove the animal(s) causing damage** or reduce the population to a more manageable level by trapping, selective shooting, or toxicants (selective poison). Note that many problem-causing animals have high reproductive rates, so removal normally must be used in conjunction with other techniques for long-term effectiveness.

*No technique is a panacea or an answer to all problems.* Techniques that are appropriate and effective in one situation might not be in another. Normally a variety of techniques are needed and used in a way to fit the specific circumstances.

## CONCEPT 13

### Food Webs

Plants are primary producers in a food chain because they supply food at the lowest level of a food chain. It takes an enormous number of individual plants to support the other parts of a food web. At the next level of a food chain are primary consumers, that is, plant-eating animals or herbivores. Primary consumers include rabbits, mice, deer, and certain other mammals, some insects and fish, and dabbling ducks, geese, and certain other birds.

Primary consumers are eaten by secondary consumers, or carnivores (meat-eaters). This group includes predators such as birds of prey, snakes, foxes, wild cats, and people. Secondary consumers are eaten by tertiary consumers, which may be predators or scavengers such as turkey vultures, crabs, and sometimes people. Note that these categories are very broad and general. Many animals fit into more than one group, and there are more complex levels of the web.

Any of the food web components mentioned above can be broken down by decomposers, organisms such as bacteria and fungi that reduce dead plant or animal matter into smaller particles. A decaying plant, for example, will be broken down into nutrients that enrich the soil. This process supports the growth of more plants.

# Kansas and Nebraska Grasslands

## Physical Description:

The terrain is flat to rolling, sometimes hilly, with occasional valleys, canyons and buttes. Average annual precipitation ranges from about 40 inches in eastern areas down to about 15 inches in the far western portions of these two states. Precipitation decreases from east to west and is received primarily as summer rain and winter snow.

## Dominant Vegetation:

Climax vegetation in the Eastern Great Plains (or tallgrass prairie) was historically tall grasses such as various bluestems, Indiangrass, wheatgrasses, switchgrass and prairie dropseed. This native tallgrass climax stage was maintained under the original conditions of buffalo grazing and periodic fires that kept out woody species such as red cedar. Today, only remnants of this tallgrass prairie remain, and management of these and other grasslands commonly includes controlled (planned) burns and cattle grazing, similar to the original situation. A variety of forbs also are found. Native plums, snowberry, cottonwood, willow, and other shrubs and trees often are present along drainages, stream courses and other moist areas.

The Central Great Plains (or mixed-grass prairie area) consists of a mix of short, intermediate and tall grasses. Tall grasses dominate moist sites such as flood plains and valleys. Dry sites such as hill tops and south facing slopes are characterized by short grass species. In addition to the grass species mentioned previously, prairie sandreed, grama grasses and various dropseeds are found in this area. Drainages and other moist areas may have shrubs and trees such as native plums, snowberry, and cottonwood. In the Western Great Plains (or short-grass prairie) climax vegetation typically consists of short grasses such as the gramas, buffalo grass, needlegrasses, and some wheatgrasses, shrubs such as sagebrush, and various forbs.

Within the entire Great Plains Grasslands Region there are large areas along major rivers and drainages dominated by trees and shrubs such as black walnut, hackberry, cottonwood, green ash, maples, oaks, sycamore, box elder, eastern red cedar and various willows. Due to the abundant vegetation and readily available water, these sites are very attractive to wildlife.

Depressions (potholes) caused by glaciation in the north and closed drainages (playas) in the south, fill with water. This creates numerous lakes, ponds, and other wetlands that are extremely valuable to wildlife. These wetlands, especially the smaller ones, are susceptible to periodic droughts.

## Farming and Ranching

Cultivated cropland dominates much of this region. Agricultural crops in Kansas and Nebraska include corn, soybeans, wheat, milo, millet, flax, oats, barley, sunflowers, sugar beets, edible beans, potatoes and alfalfa.

Changes in farm machinery and management have produced large areas of cropland with little or no other types of vegetation available for use by wildlife. In the past, large areas of wetlands were drained or altered in some manner so crops could be grown. However, cooperative programs between landowners, governmental agencies, and private organizations are resulting in wetland restoration and enhancement in some areas.

Most of the native range is grazed by livestock except for a few locations where terrain is too rugged or water is unavailable. Often overlooked is the point that many unique plant and animal species, some rare or imperiled, have continued to thrive on cattle and sheep ranches in North America.

## Species Recommended for Judging:

American kestrel	Northern Harrier
Black-tailed prairie dog	Pronghorn
Brown thrasher	Red-tailed hawk
Coyote	Ring-necked pheasant
Eastern or western bluebird	Northern bobwhite
Eastern cottontail	Sharp-tailed grouse
Grasshopper sparrow	Wild turkey
Greater prairie chicken	Fox squirrel
Mallard (breeding and winter habitat)	White-tailed deer
Mourning dove	Largemouth bass
Mule deer	Bluegill

## Wetlands

### Physical Description:

Wetlands can be described as the zone between deep water and upland habitats. They are characterized by various amounts of open water, aquatic vegetation, and soil that often is wet or covered with shallow water.

There are many different types of wetlands or places where wetland plants grow. Typical wetlands include marshes, potholes, playas, old oxbows and swamps. However, wetland areas may be found along the edges of constructed ponds, beaver ponds, small lakes, rivers and streams. Because wetlands are important, some are defined by specific criteria so that they can be protected.

### Dominant Vegetation:

To describe wetland vegetation, the distinction between aquatic vegetation and upland vegetation must be made. **Aquatic vegetation** can survive in the water or on lands that are flooded or saturated with water for extended lengths of times. **Upland vegetation** cannot tolerate areas saturated or flooded with water for long periods. The vegetation found in association with wetlands varies depending on factors such as permanence of the water, depth of water, salinity and soil.

Wetlands with deep permanent water typically have more *floating or submerged* (below the water surface) aquatic vegetation and less *emergent* (above the water surface) aquatic vegetation. As the water depth decreases, emergent aquatic vegetation becomes more dominant.

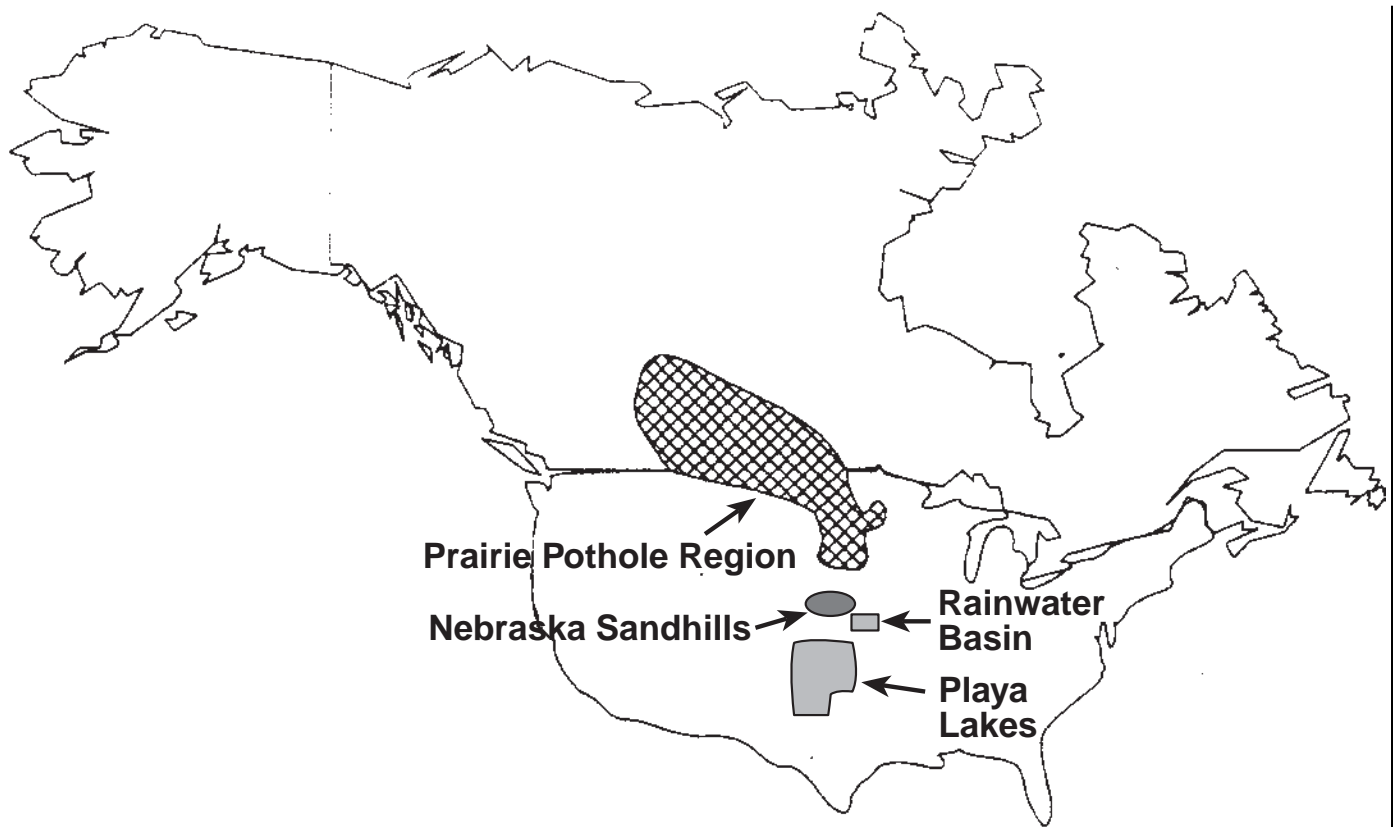
Less vegetation is found on rock and gravel bottoms than on bottoms that have characteristics more like those of soil such as the presence of silt, clay, and organic (dead plants and animals that are decomposed) matter.

Vegetation found in and near wetlands includes trees, shrubs and herbaceous plants. Some examples of these trees are willows, cottonwood, silver maple, oaks, and sycamore. Shrubs include willows, buttonbush and false indigo. Examples of herbaceous wetland vegetation include emergent cattails, bulrushes, saltgrass, wild millet, prairie cordgrass, eastern gamagrass, reed canarygrass, sedges, arrowhead and smartweeds; and floating or submerged plants such as water lilies, pond weeds, water milfoil, coontails and duckweeds.

The amount of open water and vegetation is important in determining how suitable the wetland is for different wildlife species. For instance, young ducks need open water for protection from predators. They also need emergent vegetation for hiding. Floating and submerged vegetation supports large amounts of food high in protein such as snails, mollusks, and crustaceans that the young ducks need for fast growth. Wetland vegetation may supply nesting areas such as trees used by wood ducks, grass used by mallards, and cattails used by red-winged blackbirds and muskrats. Wetland managers may use artificial water control structures to manipulate water cycles to reach management goals.

## Our Wetland Areas

The Great Plains region provides aquatic habitat essential to many different types of wildlife, especially waterfowl, wading birds, shore birds, fish, frogs, turtles, beaver, otter, muskrats, mink and others. The aquatic habitats that provide breeding, resting, and feeding areas for waterfowl are distributed throughout the Great Plains. The prairie pothole region in the north-central United States and south-central Canada contains several million wetlands formed by glaciation (Figure 3). This pothole region provides the major breeding grounds of waterfowl in North America.



**Figure 3. Primary breeding, resting and feeding areas for waterfowl in the Great Plains.**

Distinct wetland areas located in western Kansas and Nebraska occur in the form of small lakes and ponds known as *playas*. These areas were created when surface water percolated down and dissolved underground soil formations, resulting in depressions that were then deepened by wind erosion. Playas usually are shallow and circular with clay bottoms and no outlet. Kansas also has other natural wetlands. Cheyenne Bottoms, Maris des Cygne, and Quivera are remnants of what was, prior to pioneer settlement, vast wetlands in central and eastern Kansas. In addition, there often are wetland areas along the edges of thousands of small impoundments and farm ponds that provide water for livestock, wildlife, and recreation.

The Rainwater Basin area in south central Nebraska provides critical wetland habitat for millions of ducks, geese, and other birds during spring and fall migration. Biologists estimate that about 4,000 major wetlands totaling 100,000 acres existed in this area at the time of pioneer settlement. Although 90 percent of these wetlands have been lost, the Rainwater Basin has been recognized as internationally important by the North American Waterfowl Management Plan, and cooperative efforts are underway to improve the area for waterfowl. The Sandhills of north-central Nebraska is another large and distinctive area that provides unique wetland habitats for nesting and migrating birds, as well as a variety of fish, amphibians, reptiles and small

mammals. Other unique aquatic areas in Nebraska include riverine wetlands, especially along the Platte, Elkhorn, and Missouri Rivers; eastern and western saline wetlands; and playas in southwest Nebraska.

### Species Recommended for Judging:

Beaver	Muskrat
Bullfrog	Raccoon
Canada goose (breeding habitat)	Redhead
Mallard (breeding habitat)	Red-winged blackbird
Mink	Wood duck

## Urban Areas

Have you ever thought about how many different kinds of wildlife live in towns or cities? Actually there are quite a few that have adapted to living near people. Examples include robins, orioles, house wrens and other songbirds; rabbits, squirrels, opossum, deer, fox and sometimes coyotes. Can you think of any others?

As with other areas, vegetation takes on layering characteristics, with trees being the highest canopy, shrubs the next highest, and forbs and grasses the lowest. The location and sizes of buildings in relation to vegetation also affects wildlife. Although precipitation and climate vary among different urban areas, irrigation and landscaping often produce urban environments with similar habitats.

Below are examples of urban areas used by wildlife:

**Urban forests** are groups of trees or where many trees are planted in suburban areas.

**Corridors** are long strips of habitat that provide needs of some wildlife, especially birds, and allow animals safe travel from one area to another. Examples of corridors in urban areas include vegetated streams, recreational trails, railroad rights-of-way, and perhaps, tree-lined streets. To benefit wildlife, a corridor needs to have suitable vegetation for habitat.

**Neighborhood parks, school grounds, golf courses and cemeteries** also provide wildlife needs and are areas that can be managed to enhance wildlife in addition to the primary uses.

**Residential areas** often have trees, shrubs, and other vegetation that can offer benefits to wildlife, especially in the older residential areas with mature and well-established vegetation.

**Inner-city** areas are characterized by tall buildings, high rooftops, ledges, and little vegetation. Inner-city areas are used by pigeons and house sparrows and, in a few sites, by Peregrine falcons that nest on ledges of tall buildings as if they were ledges on tall cliffs.

### Species Recommended for Judging

American robin	House finch
Butterflies	House sparrow
Common nighthawk	House wren
Eastern cottontail	Northern cardinal
Eastern screech owl	Northern flicker
European starling	Raccoon
Fox squirrel	Rock dove (pigeon)
Frogs	Ruby-throated hummingbird

# Wildlife Species

As mentioned before, different wildlife species have different requirements—some may live underground, some in water, some in trees; some eat plants, others eat animals, some eat both. This section covers needs of some of the more common wildlife species of Kansas and Nebraska.

## Birds

The following bird descriptions will include approximate length and width measurements to help the participant learn to identify and compare different bird species. Length will be abbreviated as “L,” and wingspread will be abbreviated as “W.” Length is measured from the tip of the beak to the tip of the tail, and wingspread is measured wing tip to wing tip with the wings extended.

### American Kestrel

#### Distinguishing Characteristics:

- Small hawk-like bird—L=8.5", W=21"
- “Whisker” like markings present on each side of face
- Rust-colored back

#### General Habitat Preference:

Stages 2 and 3 of plant succession for feeding, and stages 4, 5 and 6 for nesting.  
Large, open areas where adequate nesting sites are available.

#### Habitat Requirements:

**Food:** Primarily insects and small mammals associated with open areas.

- Brush chop (mow), small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 (shrub) vegetation. Mowing should be done outside the primary nesting season.
- Control burn small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 (shrub) vegetation.
- Clear-cut and selective-cut small areas in large expanses of stage 5 and 6 woodlands.
- Livestock grazing management should leave enough herbaceous canopy to support insects and small rodents.

**Cover:** Kestrels nest in tree cavities and other sites including holes in cliffs, canyon walls and artificial nesting boxes.

- Maintain areas of stage 5 and 6 vegetation interspersed with stage 2 and 3 vegetation.
- Plant trees in large, open areas (irrigate if necessary) on idle lands.
- Provide kestrel nesting boxes in areas lacking adequate nesting cavities. Boxes can be placed on fence posts in open areas.
- Manage livestock grazing to maintain trees in riparian areas.

**Water:** Obtain necessary water from diet; do not need open water for drinking.



### American Robin

#### Distinguishing Characteristics:

- L=8.5"
- Orange-breasted adults
- Common, well-known bird of lawns

#### General Habitat Preference:

Urban settings with large, open areas and nearby trees and shrubs. Parks, golf courses and lawns in residential areas are favorites.



### Habitat Requirements:

**Food:** Insects and worms in warm seasons. Fruits and berries from shrubs and trees in winter. Seldom use artificial feeders.

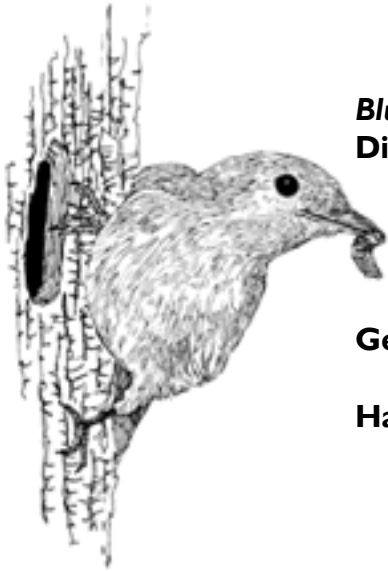
- Plant fruit and berry-producing shrubs such as sumac, flowering crab, Nanking cherry, golden currant, dogwood and cotoneaster.
- Leave open areas of short grass and forbs, mow to maintain.
- Use insecticides only when necessary. When using insecticides, carefully follow the instructions given on the label.

**Cover:** nesting sites and hiding areas in shrubs, evergreen trees, and broad-leafed trees are preferred. Will use nesting platforms.

- Plant and maintain trees and shrubs. Include some evergreen trees in plantings.
- Provide nesting platforms in areas lacking nest sites.

**Water:** Require water daily in warm seasons. Obtain water from yard irrigation, rain filled gutters, low-lying areas, ponds, etc.

- Birdbaths and pans of water can be provided. Do not place water in areas where cats and other pets can catch the birds.



### Bluebird (Eastern/Western)

#### Distinguishing Characteristics:

- L=5.5"
- Rust-colored throat and breast
- Male with bright blue back
- Female with blue in wings and tail

#### General Habitat Preference:

Stages 2 and 3 of plant succession interspersed with stages 5 and 6 vegetation.

#### Habitat Requirements:

**Food:** Insects and spiders make up a large portion of the diet. A limited amount of fruit is also eaten. Bluebirds usually forage in open areas.

- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 5 and 6 woodland.
- Brush chop (mow) small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 vegetation.
- Control burn small areas in large expanses of stage 4 and 5 vegetation.
- Manage livestock to leave sufficient cover to support insects.

**Cover:** Nesting sites are in natural cavities and old woodpecker holes.

- Leave 3 to 4 standing dead or nearly dead large trees per acre during timber harvest operations.
- Plant trees in areas lacking in this type of cover to potentially develop into nest sites.
- Place nest boxes 4 to 5 feet high in or adjacent to open areas. Boxes should be spaced more than 200 feet apart. Keep house sparrow nests removed.

*For specifics on nest box design and placement, visit the local Cooperative Extension office or state wildlife agency.*

**Water:** Obtain necessary water from diet, but will use other water sources when available.

## **Brown Thrasher**

### **Distinguishing Characteristics:**

- L=10"
- Topside rufous brown
- Underside light in color with heavy dark streaks
- Long tail

### **General Habitat Preference:**

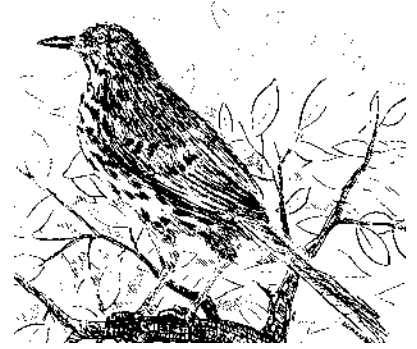
Stages 3 and 4 of plant succession. Dense, woody vegetation associated with shrub thickets, hedgerows, shelterbelts, forest edges, riparian areas, and young forests.

### **Habitat Requirements:**

**Food:** Invertebrates and plant seeds are the principal foods. Forage primarily on the ground. Occasionally feed on fruits and berries in shrubs and trees. There is more food available when more ground litter is present. The management practices listed under "Cover" will usually supply sufficient food.

**Cover:** Nesting and hiding cover are supplied by dense shrubs with trees. Will use areas that have shrubs only. Need a minimum of 2.5 acres of woody vegetation to support a breeding population.

- Selective-cut forests in large expanses of stage 5 or 6 woodland.
- Clear-cut timber harvest can improve habitat once succession proceeds to stage 4 after harvest.
- Plant shrubs and trees (shelterbelts, hedgerows, field borders, clumps).
- Controlled (prescribed) burning and brush chopping (mowing) can be used to rejuvenate and improve habitat in large areas of old decadent stage 4 vegetation.
- Manage livestock grazing in riparian areas and other woody areas so shrubs and trees can regenerate and ground litter is present. Elimination of grazing from such areas preferred.
- Use root pruning to discourage wooded border removal.



## **Canada Goose (Breeding Habitat)**

### **Distinguishing Characteristics:**

- Heavy-bodied, long-necked bird, L=16 to 25", W=50 to 68"
- Brownish backside, underside light in color
- Black head and neck
- White cheek patch

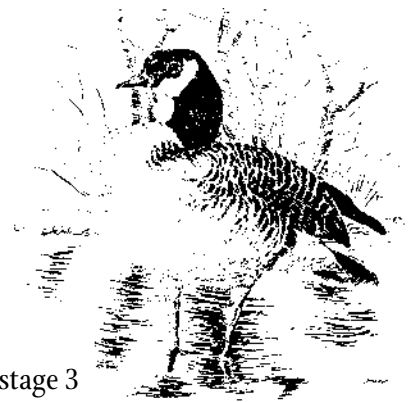
### **General Habitat Preference:**

Nest and rear young in or near stage 2 wetlands interspersed with some stage 3 wetlands. Wetlands containing 20 percent tall emergent aquatic vegetation and 80 percent open water are usually good habitat. Also frequent riparian areas adjacent to rivers. Golf courses and open city parks are excellent habitat for breeding Canada geese.

### **Habitat Requirements:**

**Food:** During the nesting season and summer prefer new, green forbs and grasses. Also eat some aquatic insects and pond weeds. During migration, waste grain in corn fields provides an important food source.

- Livestock grazing management, mowing or burning can be used to produce the preferred lush green vegetation.
- Burn or brush chop small areas (40 acres maximum, 10 to 20 acres preferred) every 3 to 5 years.





- Plant areas to lush, turf type grasses for goose grazing.  
**Cover:** Nest in a variety of places such as mats of bulrushes, tops of muskrat houses, in trees, and most of all, on islands. Use artificial nest structures. Usually nest within 200 feet of water's edge.
  - Construct ponds and wetlands.
  - When possible, use water control structures for managing water levels to maintain approximately 80 percent open water and 20 percent emergent vegetation.
  - Protect natural nest locations. These include muskrat houses, islands, etc.
  - Build islands and/or peninsulas surrounded by open water.
  - Install predator-proof fencing around likely nesting locations.
  - Construct small dikes for temporary flooding.
  - Provide artificial nest structures.
- For specifics on nest structure design and placement, visit the local Cooperative Extension office, or state wildlife agency.*
- Water:** Require water as described above.



### **Common Nighthawk**

#### **Distinguishing Characteristics:**

- L=9", W=23"
- Wings long and pointed, white bar present on wing
- Head large and flat
- Small bill, large mouth

#### **General Habitat Preference:**

Nighthawks can often be found in a variety of habitats, including grasslands, open woodlands, cities and towns, commonly roosting on fence posts, or flying overhead.

#### **Habitat Requirements:**

**Food:** Nighthawks diet consists solely of insects caught on the wing. \*Use pesticides carefully. Brush chop (mow) or control burn small areas.

**Cover:** Lay eggs directly on the ground in burned pastureland, nearly bare ground or gravel and on flat roofs of buildings. \*Do not disturb nesting areas.

**Water:** Requirements unknown.



### **Eastern Screech Owl**

#### **Distinguishing Characteristics:**

- Small owl—L=10", W=22"
- There are two distinct color phases, one gray and the other red
- Has large "ear-tufts;" only small owl with these tufts
- Eyes are yellow

#### **General Habitat Preferences:**

Common in small woodlots, orchards, and towns.

#### **Habitat Requirements:**

**Food:** Mostly insects, but often will take small mammals, crawfish, frogs, toads, lizards, fish and small birds.

- Brush chop or control burn small areas (20 acres maximum, 5 to 10 acres preferred) in large expanses of stage 4 succession.
- Clear-cut small areas in large expanses of stage 5 and 6 woodlands, otherwise use selective cutting when harvesting timber.

- Livestock grazing management should leave enough herbaceous canopy to support insects and small rodents.

**Cover:** Nest in tree cavities, including woodpecker holes. Will use artificial nest boxes.

- Where natural cavities are lacking, place nest boxes on tree trunks 10 to 30 feet off the ground.
- Do not disturb nesting areas. When harvesting timber, thinning trees, etc., avoid cutting obvious den trees.
- Plant trees in areas lacking this cover type.

*For specifics on nest box design and placement, visit the local Cooperative Extension office or state wildlife agency.*

### **European Starling**

#### **Distinguishing Characteristics:**

- L=6"
- Short tail; wings form triangular shape in flight
- Yellow bill during reproductive cycle (January to June); dark at other times
- Dark plumage, heavily speckled in winter



#### **General Habitat Preference:**

Prefer older urban residential areas with large trees and shrubs. Most urban areas that have large trees or old buildings with holes and cavities are used.

*Starlings were introduced to the United States from Europe and are considered pests as they are numerous and often out-compete native birds for available habitat. They also can pose health hazards and economic loss in livestock feedlots. In some situations the management objectives may be to reduce the quality and quantity of available habitat. However, in the inner cities where there are few wildlife species, management may include providing for the only wildlife that exists.*

#### **Habitat Requirements:**

**Food:** Insects, fruit, seeds, human garbage, dog and cat food.

- Starlings can be attracted to an area by spreading bread crumbs and small grains on the ground in yards, etc.
- Place artificial feeders.

**Cover:** Nest in cavities in trees, old buildings, and old houses. Will use artificial nest boxes.

- Plant and maintain deciduous trees.

**Water:** Require water during warm seasons.

- Birdbaths, pans of water, or puddles of water can attract starlings.

### **Grasshopper Sparrow**

#### **Distinguishing Characteristics:**

- L=4.5"
- Small conical beak
- Yellow lores and bends of wings
- Short narrow tail
- Brownish streaked back and light unstreaked breast
- Buzzing grasshopper-like song

#### **General Habitat Preference:**

Associated with grasslands (stage 3 of plant succession), do not often use areas when shrub canopy exceeds 25 to 35 percent.

#### **Habitat Requirements:**

**Food:** Eat insects of all types. As you might have guessed, grasshoppers are a favorite. In winter eat forb (weed) seeds.

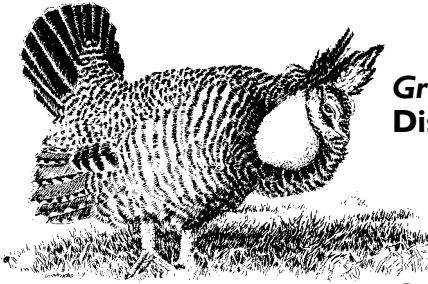
- Use pesticides only when necessary. Carefully follow the directions on the label.



**Cover:** Prefer to nest in dense grass with abundant litter (residual vegetation from previous years growth). Needs larger blocks of habitat and avoids edges.

- Proper livestock management would include leaving some residual vegetation for nesting habitat and only grazing areas lightly to moderately during nesting season.
- Plant or maintain grasses in large areas.
- Controlled (prescribed) burning and brush chopping (mowing) can be used as alternatives to grazing for rejuvenating old, less productive grasslands and pastures.
- Delay harvest and mowing of grass in areas such as roadsides, ditches, and grass hay fields until mid-summer.

**Water:** Obtain necessary water from diet.



### **Greater Prairie Chicken**

#### **Distinguishing Characteristics:**

- Heavy-bodied, chicken-like, L=14"
- Short heavy bill with mandible decurved
- Short rounded blackish tail
- Brown striped body plumage

#### **General Habitat Preference:**

Unbroken blocks (160 acres minimum) of vegetation in stage 3 of plant succession that is relatively free of shrubs. Flat to gently rolling terrain with some mixing of cropland. Croplands are not necessary, but can furnish important foods, especially in the northern part of the United States.

#### **Habitat Requirements:**

**Food:** Prairie chickens primarily eat seeds, grains, herbaceous greens and insects in season. During the first few weeks after hatching the young are dependent on insects. All necessary food can be found in grasslands. Management of grasslands as explained under "Cover" will supply ample food.

- Eliminate fall tillage of grain stubble on croplands adjacent to areas in stage 3 of plant succession.
- Unharvested grain and small annual food plots can attract prairie chickens. If adequate grasslands are present, these practices are not necessary for survival.
- Lightly disturb small areas or strips with a disc in large expanses of grassland to encourage annuals and insects.

**Cover:** Thick, tall grass cover is used for nesting and winter cover. If not periodically disturbed, grasses often become too thick and are less valuable for nesting cover. Require sites with short vegetation that offer good visibility for breeding displays. Prairie chickens gather on these sites in the spring where males display in front of females to win a mate. These areas are called "booming grounds."

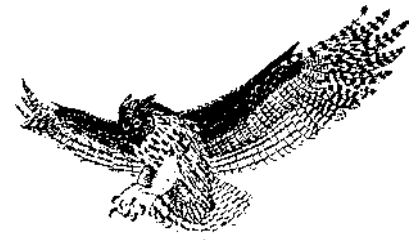
- Livestock grazing should be managed to provide nesting and winter cover. Grass should be a minimum of 6 inches tall in the fall when grazing is finished. Some areas of grass should be left ungrazed during the nesting season (May through June).
- Controlled (prescribed) burning every 3 to 5 years, can be used to improve plant vigor and reduce excessive buildup of old vegetation.
- Mowing can be used to revert succession to stage 3.
- Plant large fields of grasses, legumes and forbs. When possible, use a mixture of grass species that are native to the area.
- Delay tillage of cropfields in spring.
- Utilize conservation tillage methods on croplands.
- Delay harvest of hay until after nesting and brood rearing season.

**Water:** Do not need water on a regular basis. Obtain necessary water from their diet.

## **Great Horned Owl**

### **Distinguishing Characteristics:**

- L=20", W=55"
- Large-headed, short-necked bird of prey
- Large, yellow eyes and ear tufts, facial disk present
- Underside patterned with narrow horizontal bars



### **General Habitat Preference:**

These birds are found in many habitat types including open prairie ravines, city parks, and heavily wooded areas.

### **Habitat Requirements:**

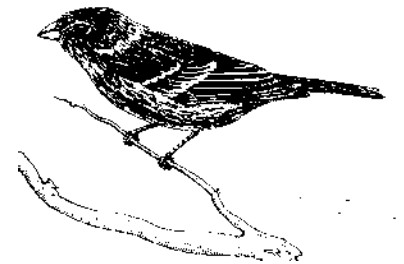
**Food:** Great horned owls feed on most rodents, medium-sized birds, snakes, fish, and large arthropods. Food taken varies with prey availability.

**Cover:** Cavity nester. Nesting sites may include a tree cavity, a hole or crevice in a cliff or riverbank, or an abandoned structure. May also nest in large abandoned stick nests of a squirrel or bird.

## **House Finch**

### **Distinguishing Characteristics:**

- L=5.25"
- Heavy conical bill
- Sides streaked with brown
- Male with red plumage on top of head, breast and rump



### **General Habitat Preference:**

Found in a wide variety of urban sites that have trees, shrubs, and some open areas. Not as abundant in inner cities. This species is considered a pest around fruit crops, especially grapes. Can become a nuisance and management objectives may be to reduce quality and quantity of available habitat.

### **Habitat Requirements:**

**Food:** Soft fruits, buds and weed seeds. In the warm season eat some insects.

- Use artificial feeders of all types. Millet and sunflower seeds are favorites.

**Cover:** Nesting sites on low branches of trees, on branches of bushes, in natural cavities, in old holes excavated by woodpeckers, and any projection or ledge found on houses or other buildings. Prefer to place nest from 5 to 7 feet above the ground. Nest is built of weed stems, small branches and leaves.

- Plant shrubs adjacent to open areas for nesting and hiding cover.

**Water:** Require water daily in warm seasons.

- Birdbaths and pans of water can be provided, or a low area in the yard can be filled with water. Try not to place water in areas where cats and other pets can catch the birds.



### **House Sparrow**

#### **Distinguishing Characteristics:**

- L=5.25"
- Bold, buff-colored eyeline
- Streaked back
- Unstreaked, buffy-gray breast
- Male with black throat and bill, white cheeks

#### **General Habitat Preference:**

This introduced species is found near people, around farmsteads, and in a wide variety of urban categories that have buildings, trees, shrubs and some open areas. *Compete with native birds for habitat requirements. Can become a nuisance and health concern by nesting on buildings. Management objectives may be to reduce the quality and quantity of available habitat.*

#### **Habitat Requirements:**

**Food:** Eat a variety of insects, fruits, buds and weed seeds.

- Will use artificial feeders of all types. Millet and finely cracked corn are favorites.

**Cover:** Nest in bird houses on low branches of trees, on bushes, in natural cavities, in old holes excavated by woodpeckers, and on any projection or ledge it can find on buildings or other structures. Prefer to place nest at least 10 feet above the ground. Nest is built of weed stems, small branches, leaves and many other items.

- Plant shrubs adjacent to open areas for nesting and hiding cover.

**Water:** Require water daily in warm seasons.

- Birdbaths and pans of water can be provided, or a low area in the yard can be filled with water. Try not to place water in areas where cats and other pets can catch the birds.

### **House Wren**

#### **Distinguishing Characteristics:**

- L=4.25"
- Slender bill
- Barred tail cocked upward
- Topside unstreaked brown
- Underside light in color

#### **General Habitat Preference:**

In urban setting, prefer older residential areas with large shrubs and trees.

#### **Habitat Requirements:**

**Food:** Spiders, grasshoppers, crickets, beetles, caterpillars, ants, bees, ticks and millipedes. Artificial feeders are not usually used.

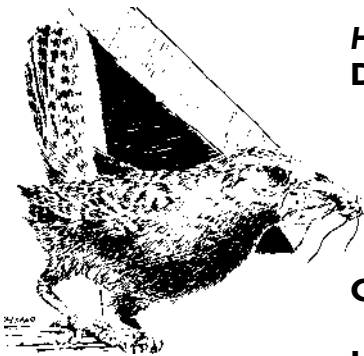
- Plant and maintain shrubs and trees.
- Use insecticides only when necessary. Carefully follow instructions on the label.

**Cover:** Nest in natural cavities in trees, old buildings and other structures. Will use artificial nest boxes.

- Plant and maintain shrubs and trees.
- Provide nest boxes where adequate nesting sites are lacking. Boxes should be placed high on a tree trunk or under the eaves of a house. The hole should be small (1" to 1<sup>1</sup>/<sub>4</sub>") to keep out house sparrows, starlings, and other birds.
- Do not disturb nests found on houses and buildings unless they are causing a problem.

*For specifics on nest box design and placement, visit the local Cooperative Extension office or state wildlife agency.*

**Water:** Obtain necessary water from diet. Do not need to drink water.



## **Mallard (Breeding Habitat)**

### **Distinguishing Characteristics:**

- Duck—L=16", W=36"
- White bordered, purple-blue colored speculum
- Female mottled brown in color
- Breeding male with green head, white neck stripe, and rust-colored breast

### **General Habitat Preference:**

Nest in tall forbs and grassy vegetation, or in shrubby cover. Need some open water with associated emergent aquatic vegetation (stages 2 and 3 of wetland succession) to raise young.

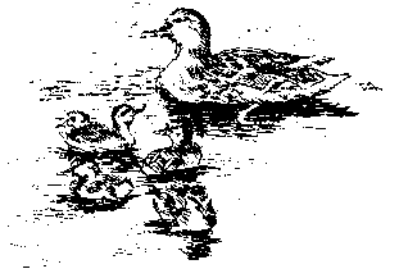
### **Habitat Requirements:**

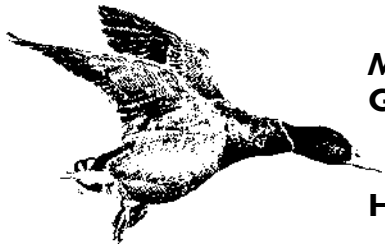
**Food:** Aquatic plants and insects are common foods. Ducklings eat mostly aquatic insects. Most food is associated with wetlands.

- In areas without wetlands, build and maintain ponds and reservoirs with gently sloping banks or re-establish old wetlands.
- Construct small dikes to provide temporary open water areas mixed with aquatic emergent vegetation through the breeding season.
- Provide some shallow water areas (less than 2 feet deep) adjacent to deep water where emergent and submergent vegetation can grow.
- Unharvested grain and grain stubble that has not been tilled can provide high energy food needed by nesting hens.

**Cover:** Nest in grass and forbs (sometimes nest under shrubs) preferably within 1/2 mile of a wetland that provides open water with some adjacent emergent aquatic vegetation. After ducklings hatch they use open water and adjacent emergent aquatic vegetation for protection from predators. Ideally, wetlands will have a minimum of 50 percent open water and 10 to 20 percent emergent vegetation. Cover can be created with practices described under Food.

- Water developments constructed for wildlife and livestock drinking such as dug outs and catchment ponds often are used to raise broods.
- Control water levels to create some deep water areas (more than 2 feet deep) where emergent vegetation won't grow, and manage the vegetation in wetlands (stage 2). Water control structures are useful for this purpose.
- Control (prescribe) burn, rotary mow or use livestock grazing to rejuvenate dense, stagnant vegetation in nesting areas.
- Burn or mow every 3 to 5 years in spring before nesting begins. These practices can be used to increase or maintain proper water and vegetation interspersions in wetlands.
- Plant grass and forbs (legumes) within 1/2 mile of wetlands that meet the above criteria.
- Livestock grazing should be managed to provide areas with tall, healthy, herbaceous vegetation that is not disturbed during the nesting season.
- Delay mowing. Adjacent to wetlands, harvest hay and crops after the nesting season.
- Place artificial nesting structures in appropriate areas.
- Provide shallow water areas, islands and peninsulas.
- Install predator proof fencing to protect likely nesting areas.
- Utilize strip cropping that include grass or legume strips which are suitable for nesting.
- Implement the use of conservation tillage methods.





### ***Mallard (Winter Habitat)***

#### **General Habitat Preference:**

Wetlands with open water, harvested grain crops, and riparian areas with open water.

#### **Habitat Requirements:**

**Food:** Preferred foods include waste grain from agriculture, aquatic plants and invertebrates. Mallards will fly long distances to feed. However, the closer the food is to cover the more valuable it is.

- Provide waste grain in winter by not tilling grain fields in the fall.
- Leave some grain unharvested.
- Implement conservation tillage methods, and strip cropping that include high energy row crops (corn or milo).
- Use small dikes to flood grain fields, planted food plots, and oak woodlands in winter.
- Build ponds and reservoirs with some shallow water (less than 2 feet deep) where aquatic vegetation can grow, islands and peninsulas.
- Manipulate water levels to allow vegetation to develop in the spring and summer that can be inundated in the fall.

**Cover:** Rest on open water bodies such as streams, rivers, and warm-water sloughs that are not frequently disturbed. Also rest on the ice in the middle of lakes.

- Build ponds, reservoirs and warm-water sloughs.
- Water developments constructed for livestock drinking such as dugouts and catchment ponds also are used for resting.
- Keep human disturbance to a minimum.

**Water:** Use water as described above.

### ***Mourning Dove***

#### **Distinguishing Characteristics:**

- Slim body, L=10.5"
- Small head, short legs, long tapering tail
- General color of the bird is grayish

#### **General Habitat Preference:**

Stages 2 and 3 of plant succession with some shrubs and trees nearby. Often use agriculture areas for feeding.

#### **Habitat Requirements:**

**Food:** Waste grain from cropland and a variety of grass and forb seeds.

- Do not till in fall after harvest of small grain crops. Leave waste grain available.
- Plant annual food plots in areas lacking grain. Early planted sunflowers are especially attractive.
- Brush chop small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 vegetation.
- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large areas of stage 5 and 6 woodland.
- Control burn small areas (40 acres maximum, 10 to 20 acres preferred) in large areas of stage 4 and 5 of plant succession.
- Livestock grazing can be used to keep some areas in stage 2 and 3 vegetation.
- Discing can be used to increase annuals used by doves and to create the sparsely vegetated areas preferred as feeding areas.

**Cover:** Prefer tall shrubs and trees for nesting and loafing. Nests are made of twigs placed on branches of shrubs or trees. Nests also are placed on ground.

- Plant shrubs and trees in large areas of stage 2 and 3 of plant succession, or in agricultural areas having few trees or shrubs. Plant on field borders, along fence rows, or any other idle land area.

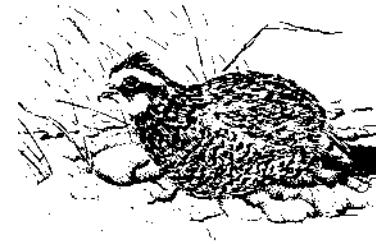


- Mourning doves often construct loose, flimsy nests. High winds and rainstorms often destroy many of them. To provide secure nesting sites, wire cone nesting structures can be placed where tree limbs fork 6 to 15 feet above the ground. This practice is most useful in regions where high winds and large open areas are common.  
**Water:** Require water daily. Prefer shorelines and banks without vegetation.
- Where water is limited or absent, development of water sources is desirable, these include: catchment ponds, guzzlers, windmills and spring developments.

### **Northern Bobwhite**

#### **Distinguishing Characteristics:**

- Heavy-bodied, L=8"
- Short heavy bill with mandible decurved
- Short rounded wings
- Reddish-brown body, gray tail
- Male with white throat and eyeline, female with buff throat and eyeline



#### **General Habitat Preference:**

Stages 2, 3, and 4 of plant succession highly interspersed. Ideally, habitat components are made up of 1/4 grassland, 1/2 cropland, 1/8 shrub cover, and 1/8 woodland.

#### **Habitat Requirements:**

**Food:** Young quail eat mostly insects. Adult quail eat a variety of seeds, green vegetation (mostly forbs), insects and small grains.

- Plant 1 acre annual food plots in areas with too little cropland. One plot per 15 acres maximum.
- Leave some grain unharvested.
- Eliminate fall tillage so that waste grains can be used as a food source.
- Plant 1 acre perennial food plots in areas with too little permanent food and cover. Again, 1 plot per 15 acres maximum.
- Clear-cut small areas (small 10 acre patches or strips) in large expanses of stage 5 and 6 woodland.
- Selective-cut stage 6 woodland.
- Brush chop small areas (10 acres or less) in large expanses of stage 3 and 4 vegetation.
- Use spring controlled burning in stage 3 of succession to maintain this community and to enhance the benefit of it to quail. Burning also can be used to revert stage 4 to stage 3.
- Disk small areas in large expanses of stage 3 and 4 to encourage annual forbs and grasses used by bobwhite.
- Livestock grazing should avoid using planted food plots. Ample amounts of herbaceous vegetation used for food by quail should be left in appropriate areas. This is especially important in riparian areas. Livestock grazing also can be used to revert or maintain vegetative succession in stages 2 and 3.

**Cover:** Thick shrubs for hiding and roosting cover.

- Plant shrubs in areas where cover is scarce — planting shrubs in clumps about 100 yards apart works well for quail.
- Use root pruning to discourage the removal of hedgerows.
- Construct brush piles.
- Manage livestock grazing to maintain dense shrub and herbaceous cover. Again, this is important in riparian areas.
- Delay harvest of hay until after peak of nesting (mid-June).
- Plant native grass in areas lacking adequate quality nesting cover.
- Delay spring tillage until after nesting season.
- Use strip cropping and conservation tillage methods.

**Water:** Require water regularly in warm seasons.



### **Northern Cardinal**

#### **Distinguishing Characteristics:**

- L=8", W=11"
- Males are bright red with a pointed crest and a black face and throat; females are buff brown with some red on the crest, wings and tail. Both sexes have a stout red bill.

#### **General Habitat Preference:**

Stages 4, 5 and 6 of plant succession. Use woodland edges, thickets, suburban parks and back yards where there are trees and shrubs. Nest in dense shrubbery, low trees, and tangles, but often sing from tall perches. Throughout the year, they need a reliable food source and, in winter, evergreens or similar plants for protection from winter winds and cold.

#### **Habitat Requirements:**

**Food:** Fruits, seeds, and insects. Small fruits, weed seeds, and grains make up the largest portion of diet. Invertebrates such as caterpillars, grasshoppers, true bugs, and beetles are eaten in the summer. Throughout the year, cardinals need a reliable food source, which may include fruit-bearing trees or shrubs and various seed-bearing plants. Plants that provide a winter food source are especially important and undoubtedly winter feeding stations are helpful especially in more northern areas.

- Cardinals readily come to feeders. They prefer sunflower seeds of all types but also eat cracked corn, millet, unsalted nut meats, various fruits such as raisins, and sometimes suet (hard beef fat). Cardinals usually prefer feeding on the ground, but come to elevated feeders, bird tables, or window trays.

**Cover:** Shrub plantings can provide fruit for food as well as nesting sites. Trees often provide food and sometimes nesting places. Choose varieties and combinations that provide food and cover throughout the year. Examples include dogwood, hackberry, crabapple, cherry, cotoneaster, dogwood and others. For winter, dense evergreens such as red cedar or pines are needed for protection from winter winds and cold.

**Water:** Bird baths or pans with water can be helpful. Avoid areas where cats can hide to catch the birds.

### **Northern Flicker**

#### **Distinguishing Characteristics:**

- Jay-sized woodpecker, L=10.5"
- Brown back
- Black breast crescent
- White rump and yellow, or red, under wings and tail visible during flight
- Buff underside with black spots

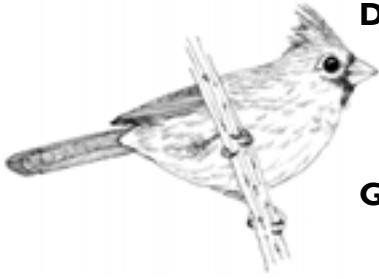
#### **General Habitat Preference:**

Open areas in stages 2 and 3 of plant succession interspersed with areas of stages 5 and 6 of plant succession. Often found in riparian and urban areas. Prefer older urban residential areas with large trees, golf courses and parks.

#### **Habitat Requirements:**

**Food:** Ants are a favorite and over 50 percent of the diet is insects. Also eat seeds, fruits, and berries, including poison ivy. Usually feed in open areas.

- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 5 and 6 forests.
- Selective-cut timber management in stages 5 and 6 of plant succession.



- Artificial feeders are used in urban areas. Prefer suet feeders fastened to tree trunks.
- Mow, graze or control burn small areas to maintain the open areas preferred by the flicker.
- Use root pruning to discourage the removal of hedgerows.
 

**Cover:** Holes are excavated in trees for nesting. Use softwood trees like poplar, cottonwood and willow. Prefer old mature trees that show signs of dying or rotting. In treeless areas will nest in posts, holes in banks, and holes in houses and structures. Maintain some large mature and standing dead trees when harvesting timber (not applicable with clear-cuts as wind will probably blow single trees down).
- In large expanses without trees, plant softwood trees.
 

**Water:** Not much is known about daily water requirements. Probably obtain sufficient water from diet.

**Special:** European starlings often take over flicker holes for their own nests.

### **Northern Harrier**

#### **General Habitat Preferences:**

Stages 3 and 4. This species typically inhabits sloughs, wet meadows, fresh or salt water marshes, swamps, prairies and plains. It generally roosts on the ground or perches on low objects such as fence posts or tree stumps.

#### **Habitat Requirements:**

- Install perching poles.
 

**Food:** Mammals, birds, amphibians, reptiles, insects, and fishes. The northern harrier eats mostly small mammals and hunts for food while on the wing over fields, marshes, and meadows. Brush chop, chain, or roller beat small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 (shrub) vegetation. Control burn small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 (shrub) vegetation. Livestock grazing management should leave enough herbaceous canopy to support insects and small rodents.

**Cover:** Open country with herbaceous or low woody vegetation for concealing nests. The northern harrier nests on the ground in tall grass or on a sedge tussock, willow clump or over water on a stick foundation. Plant grass or legumes.

**Water:** They obtain necessary water from diet.

### **Redhead**

#### **Distinguishing Characteristics:**

- Large, diving duck—L=14.5", W=33"
- Male has a large, round, reddish head, light colored bill, dark breast, and light underparts
- Female has a round, plain head, bluish bill, and lacks facial markings

#### **General Habitat Preference:**

Stage 2 wetlands for most activities. Usually nest in emergent aquatic vegetation associated with stage 3 wetlands that are adjacent to stage 2 wetlands.

#### **Habitat Requirements:**

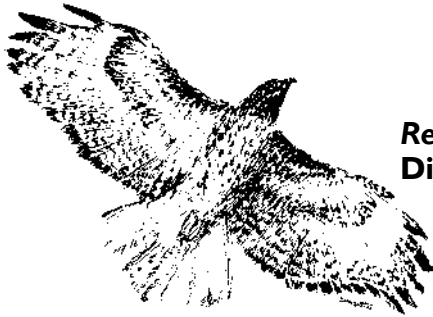
**Food:** Eat primarily aquatic invertebrates (mollusks, snails, crustaceans) during late spring and early summer, especially young ducks. During rest of year prefer aquatic plants such as pond weeds, muskgrass, bulrush seeds, wild celery, water lily seeds and coontail.



- Control water levels with water control structures to promote growth of tall emergent aquatic vegetation (stage 3 wetland) adjacent to stage 2 wetlands with an abundance of floating and submerged vegetation (water depth 3 to 5 feet).
- Build ponds/wetlands with a minimum size of 1 surface acre of water, and manage water levels to provide habitat similar to that described above.
- Construct small dikes to temporarily flood areas dominated by tall emergent vegetation during the nesting season.
 

**Cover:** Build nests out of emergent aquatic vegetation. Nests usually are placed above water or very near shore in dense vegetation that provides concealment.
- Control water levels to promote growth of tall emergent aquatic vegetation. Strive for wetlands comprised of 50 percent stage 3 wetland interspersed with 50 percent stage 2 wetland.
- Manage livestock grazing to maintain tall emergent aquatic vegetation adjacent to water. Prolonged protection of nesting areas from disturbances such as grazing and fire can result in deterioration of the vegetation. Intense grazing of such areas every 3 to 5 years (after nesting season) often rejuvenates the vegetation. Usually only one-third to one-half of the nesting area should be treated during any one year.
- Controlled (prescribed) burning every 3 to 5 years and brush chopping (mowing) can be used to rejuvenate deteriorated vegetation (see livestock grazing).
- Install predator-proof fencing in areas likely to provide nesting.
- Create areas with shallow water where water level manipulation cannot provide the emergent vegetation needed by this species for nesting.
 

**Water:** Require water as described above.



### **Red-Tailed Hawk**

#### **Distinguishing Characteristics:**

- Thick-bodied—L=18", W=48"
- Broad rounded wings
- Dark belly stripe
- Broad, fanned tail reddish above, lighter red below

#### **General Habitat Preference:**

Open areas (stages 2 and 3 of plant succession) interspersed with trees (stages 4, 5, and 6, of plant succession). Single trees in open areas often are utilized.

#### **Habitat Requirements:**

**Food:** Small mammals such as ground squirrels, rabbits, and mice are the major food items. Some birds and snakes also are eaten.

- Manage livestock grazing to maintain some areas with an adequate herbaceous ground layer for small mammals to live in.
- Control (prescribe) burn or brush chop small areas (40 acres maximum) in large expanses of stage 4 vegetation. Burning and brush chopping also can be used to rejuvenate stage 3 vegetation and improve small mammal habitat.
- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4, 5, and 6 woodlands.

**Cover:** Nests are usually built 30 to 90 feet above the ground in the crotch or fork of a tree. Will nest less frequently on cliffs.

- Plant trees where trees are not present (irrigate if necessary).
- Maintain large mature trees in areas where trees are not plentiful.
- Use root pruning to discourage the removal of hedgerows.

**Water:** Obtain necessary water from diet.

## Red-winged Blackbird

### Distinguishing Characteristics:

- L=7.25"
- Males have red shoulders, rest of bird mostly black
- Females resemble large, striped sparrows

### General Habitat Preference:

Stage 2 or 3 wetlands dominated with emergent aquatic vegetation.

*This species can be a pest in agricultural areas where they may damage crops. In such situations management objectives may be to reduce the quality and quantity of habitat. It often is more appropriate to manage for this species in urban wetlands and other areas where crop damage is not common.*

### Habitat Requirements:

**Food:** Use waste grain and seeds of annual forbs in fall, winter and early spring. Eat a variety of insects in the summer. Many of the insects used for food are associated with tall emergent aquatic vegetation such as cattails, bulrushes, marsh grass, and a variety of shrubs and trees.

- Control water levels with water control structures and small dikes to provide shallow water where emergent vegetation can grow.
- Leave grain unharvested and eliminate fall tillage.
- Construct ponds and wetlands with shallow water (less than 2 feet deep) where tall emergent aquatic vegetation will develop.
- Livestock grazing adjacent to and/or in wetlands should be managed to maintain cattails, shrubs and trees.
- Controlled (prescribed) burning and brush chopping (mowing) every 3 to 5 years can be used to rejuvenate old, decadent emergent aquatic vegetation.
- Provide shallow water areas, islands and peninsulas.

**Cover:** Nest close to the ground or water in dense clumps of emergent aquatic or other herbaceous vegetation. Often roost (rest) in the same areas or in nearby trees and shrubs.

- The practices listed under food also could be used to manage cover.
- Plant trees and shrubs adjacent to wetlands and ponds (not on the dike or dam).
- Use root pruning to discourage the removal of hedgerows.

**Water:** Visit areas associated with water.



## Ring-necked Pheasant

### Distinguishing Characteristics:

- Heavy-bodied, chicken-like, L=27"
- Short heavy bill with mandible decurved
- Long pointed tail
- Short round wings, bare legs
- Male brightly colored

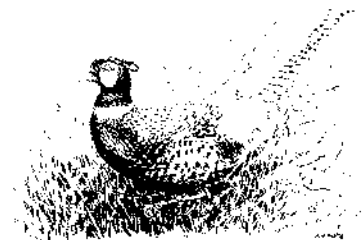
### General Habitat Preferences:

Stage 2 and 3 of plant succession interspersed with croplands used for growing grain crops.

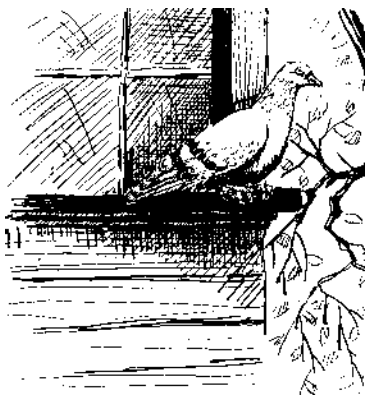
### Habitat Requirements:

**Food:** Waste grain is a preferred food when available. Weed seeds, green forbs and insects also are used, especially during late spring and early summer.

- Need grain for food. Do not fall till.
- Leave strips of unharvested grain adjacent to cover areas.
- Disc strips in large expanses of stage 3 succession to encourage the development of annual and early successional forbs.



- Maintain areas of stage 2 vegetation for food in the spring. Don't burn, mow, or spray weeds along ditches, roadsides, and other idle land areas until after nesting season.
  - Plant annual food plots in areas where grain crops are scarce.  
**Cover:** Use herbaceous cover for nesting (tall grass and forbs are preferred). Hay fields are attractive for nesting, but harvesting during the nesting period often destroys nests. Also nest in growing small grain crops and small grain stubble (wheat, barley and oats) left standing from crops of previous year. Use tall dense herbaceous cover that is not filled with wind blown snow for resting and winter survival. Tall emergent aquatic vegetation associated with wetlands is often used for cover in winter. To be valuable for winter survival and nesting cover, areas of herbaceous cover should be at least 1 acre in size and at least 25 to 30 feet wide. Although not necessary for survival, pheasants use shrubs, trees, and other woody vegetation for hiding and loafing. In general, all cover vegetation should be in close proximity (1/2 mile or less) to grain fields.
  - For winter and nesting cover, plant or maintain areas of tall grasses and forbs (irrigate if necessary) adjacent to grain fields so such areas will not be disturbed by harvesting or other human activities.
  - For winter cover, plant moderately-sized trees and shrubs or dense warm season grass areas on idle lands adjacent to grain fields (irrigate if necessary).
  - Control (prescribe) burn, or use livestock grazing to rejuvenate dense stagnant vegetation in nesting areas. Burn or mow every 3 to 5 years in late winter before nesting begins.
  - Do not till standing small grain stubble. Delay harvest of hay until after nesting season, if possible.
  - Manage livestock grazing. Do not graze cover areas during nesting season. Allow vegetation to regrow after grazing so cover will be available the following winter and nesting season.
  - Construct ponds and/or wetlands to provide tall emergent aquatic vegetation for winter cover.
  - Control water levels and provide shallow water to encourage the growth of tall emergent aquatic vegetation.
  - Use root pruning to discourage the removal of hedges.
  - Use strip cropping and conservation tillage methods.
- Water:** Use in warm seasons when available. It is usually not a limiting factor.



### **Rock Dove (Pigeon)**

#### **Distinguishing Characteristics:**

- L=11"
- Small head, short legs
- Pointed wings
- White rump, dark tail edge
- Most often found in small flocks of 5 to 25 individuals
- Colors vary from pure white to nearly black, but most individuals are slate gray or blue

#### **General Habitat Preference:**

In urban areas prefer large buildings and nearby parks and open areas. *In some areas rock doves become so numerous that their droppings, eggs, and feathers are considered a nuisance and health concern. In such situations the management objectives may be to reduce the quality and quantity of available habitat. However, in the inner cities where there are few wildlife species, management may include providing for the only wildlife that exists.*

### **Habitat Requirements:**

**Food:** Forage on the ground. Prefer waste grain and weed seeds. In urban areas often live mostly on human handouts.

- Artificial feeding. Small grains, millet, and sunflower seeds can be spread on the ground preferably in parks and vacant lots, or on roof tops of buildings.

**Cover:** Nest on window ledges, roof tops, bridges, artificial nest structures and similar sites.

**Water:** Require water frequently in warm seasons. Usually can fly far enough to find water.

### **Ruby-throated Hummingbird**

#### **Distinguishing Characteristics:**

- Small—L=3"
- Long slender bill
- Rapid wingbeats
- Iridescent red throat patch on males
- Body of males is iridescent green and the female is dull gray in color



#### **General Habitat Preference:**

Found in or near mixed woodlands and forests rich in flowering plants. Prefer stages 5 and 6 of plant succession mixed with areas in stages 2, 3 and 4. In urban setting, prefer areas with large trees and nearby flowering plants.

### **Habitat Requirements:**

**Food:** Nectar from flowers and insects found on flowers. Hummingbirds require high energy foods. Nectar is high in sugars that supply the needed energy. Insects are an important source of protein.

- Plant flowers. Hummingbirds seem to be attracted to the color red. Some preferred flowers are petunias, gladiolus, nasturtiums, begonias, morningglory, evening primrose, columbine, and cardinal flower.
- Plant flowering shrubs and trees. Favorites are coralberry, lilac, flowering dogwood, Rose of Sharon, and various fruit trees.
- They use artificial feeders filled with “nectar” solutions, which can be purchased or easily made. Mix one part granulated white sugar (common table variety) with four parts water (e.g., 1/4 cup sugar and one cup water). Boil the water, dissolve the sugar, then allow to cool before filling the feeder. Refrigerate unused portions until needed. Change the mix every few days and clean the feeder each time. Avoid using honey in the mix because it is more likely to spoil and have harmful molds. Red food coloring is not needed but a red tip or plastic flower on the feeding spout helps.
- Use pesticides only when necessary and avoid insecticides around flowers where hummingbirds might be foraging for insects.
- To help attract small insects eaten by hummingbirds, hang an over-ripe banana peel or cantaloupe near the feeder; a mesh produce sack makes a convenient feeder.

**Cover:** Construct small nests on tree branches, usually 5 to 20 feet above the ground. Occasionally build nests in secluded areas on houses and buildings. Nest is made out of leafy materials and spider silk.

- Plant and maintain trees. Trees with rough bark are preferred.
- Do not disturb nests. For specifics on artificial feeder design and placement visit the local Cooperative Extension office or state wildlife agency.

**Water:** Obtain necessary water from diet. Do not need to drink water.



## **Sharp-tailed Grouse**

### **Distinguishing Characteristics:**

- Heavy-bodied, L=15"
- Short heavy bill with mandible decurved
- Narrow pointed white-edged tail
- Mottled teardrop-shaped body feathers
- Light underside

### **General Habitat Preference:**

Stages 2, 3 and 4 of plant succession interspersed. Habitat components made up of two-thirds grassland and one-third shrubs and small trees. Cropland is not required, but if present can supply important foods. A mix of grassland, hayland, cropland, and areas of shrubs and trees provide good habitat for sharp-tailed grouse.

### **Habitat Requirements:**

**Food:** Young grouse eat insects and small seeds. Adults eat a variety of leaves, buds, seeds and grains. Buds of shrubs and small trees are the most important food in the winter.

- Plant small groups of shrubs in natural draws and idle land areas. This will provide cover as well as important winter food.
- Brush chop blocks within large expanses of stage 4 succession to revert portions to stage 3.
- Disc strips within large blocks of grasslands that lack areas of stage 2 succession.
- Control burn grasslands to increase rangeland plant vigor and to improve the availability of insects and seeds.
- Minimize fall tillage of grain crop stubble to provide valuable winter food.
- Areas of grain may be left unharvested or annual food plots can be planted to provide winter food.
- Delay spring tillage.

**Cover:** Grouse nest on the ground in grass or sparse shrub cover. They use thick shrubs and tall herbaceous vegetation for cover in the winter. Tall dense vegetation associated with wetlands also is used for winter cover. Avoid overgrazing of rangelands. Require bare or grassy ridges and natural rises that offer good visibility for breeding displays. Grouse gather on these sites in the spring where males dance in front of females to win a mate. These areas are called "dancing grounds." Maintain areas of thick grass and shrub cover within 1/2 mile of dancing grounds.

- Livestock grazing managed to maintain grass vigor. Delay grazing and harvest on portions of grasslands to provide tall undisturbed cover during the critical nesting season (May through June).
- Plant large fields of grass and legumes in areas with too little grassland.
- Delay harvest of hay crops until after the nesting season.
- Construct (and maintain) ponds and/or wetlands with tall emergent aquatic vegetation.
- Develop shallow water areas in existing ponds and wetlands to encourage the growth of tall emergent aquatic vegetation.
- In existing wetlands, control water levels with water control structures to encourage the growth of tall emergent aquatic vegetation.
- Implement conservation tillage methods.

**Water:** Do not need to drink water on a regular basis. Obtain necessary water from diet.

## Wild Turkey

### Distinguishing Characteristics:

- Large and heavy-bodied, L=34"
- Similar to barnyard turkey, but thinner
- Tail tip can be rust colored, white, or variations in between.

### General Habitat Preference:

One-half to three-fourths of range in stages 5 and 6 of plant succession interspersed with areas in stages 3 and 4 of plant succession.

### Habitat Requirements:

**Food:** Forage mostly on the ground for herbaceous plant seeds, nuts, acorns and insects. Will use waste grain from croplands if adjacent to woodlands.

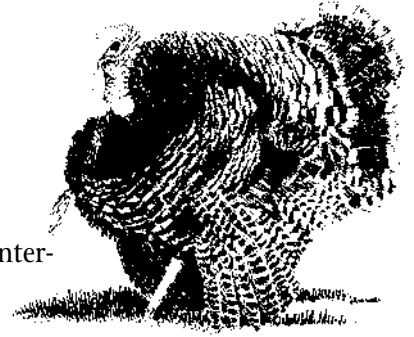
- Brush chop or disc small areas to maintain some stage 3 or 4 vegetation.
- Control (prescribed) burn every 3 to 5 years in stage 4 vegetation.
- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 5 and 6 woodland.
- Selective-cut forests in large areas of stage 6 woodland.
- Plant several perennial food plots and small (1 to 10 acre) fields to grasses and legumes in large expanses of stages 4, 5 and 6 vegetation, and in any other areas where food is limited.
- Plant mast trees.
- Eliminate fall tillage of grain crops, especially adjacent to woodlands.
- Leave small areas of grain crops unharvested.
- Plant annual food plots near woodlands.
- Livestock grazing management should leave some forbs and grasses available for food. This is especially important in riparian areas and may include the development of livestock watering facilities on adjacent uplands to discourage congregation in and overuse of these areas.

**Cover:** Nest is shallow depression on ground lined with leaves and grass that is well concealed in thick shrubs or woodlands. Usually nest within 1/4 mile of available water. Roost in trees or tall shrubs at night.

- In some areas will use artificial roost structures.
- Maintain a significant component of vegetation in stages 5 and 6 of succession, especially near streams.
- Plant trees and shrubs where cover is sparse.
- Livestock grazing management should leave thick herbaceous cover for nesting. Spring grazing can be detrimental to nesting habitat, especially in riparian areas.
- Delay harvest of hay crops until after the nesting season.
- Use root pruning to discourage the removal of hedgerows.

**Water:** Require water frequently. Usually will not travel over 1/4 to 1/2 mile for water.

- Where water is limited or absent, development of water sources is desirable, this could include: catchment ponds, guzzlers, windmills or spring developments







## Wood Duck

### Distinguishing Characteristics:

- L=13.5", W=28"
- Large head, short neck
- Long crest feathers
- Tail squarish
- Female with white eye ring
- Male brightly colored when not in eclipse plumage

### General Habitat Preference:

Stage 5 woodlands flooded with water, and open water adjacent to stage 5 and 6 woodlands. Or, stage 3 wetlands dominated by trees adjacent to stage 2 wetlands.

### Habitat Requirements:

**Food:** Fruits and nuts of woody plants, some grain, seeds of water lily and other aquatic plants, and insects. Insects and spiders are used extensively by young wood ducks.

- During late fall and winter, temporarily flood grain crops and stage 5 deciduous woodlands that have mast trees, such as oaks. Natural flooding may occur, or small dikes and water control structures may be employed.
- Eliminate fall tillage operations in areas near wetlands.
- Leave small areas of cropland that are near wetlands and open water unharvested.
- Plant mast trees adjacent to wetlands or in areas that can be temporarily flooded.
- In woodlands that can be flooded, selective cutting is desirable to improve mast production.
- Construct ponds and/or wetlands and provide shallow water areas where aquatic emergent vegetation can grow.
- Limit or exclude grazing from riparian areas.
- Plant grass or legumes near brood rearing areas to provide insects for young ducks.

**Cover:** Nest in cavities in trees of flooded woodlands or adjacent to water. Use stage 2 and 3 wetlands with an abundance of aquatic vegetation to raise young.

- Nest boxes can be provided if adequate nest sites are limited. Be sure to use predator guards on nest box posts or trees used to support boxes, or use predator proof fencing around areas where boxes have been placed.
- Plant trees for future nesting sites.
- Construct ponds and wetlands. Provide shallow water areas where aquatic emergent vegetation can grow.
- Control water level to provide open shallow water areas (stage 2 wetlands) adjacent to areas dominated by emergent aquatic (stage 3 wetlands) vegetation.
- Protect hollow trees that may be potential nest sites.
- Predator proof fencing can be employed to reduce nest destruction.
- Construct small dikes for temporary flooding of woodlands or areas near woodlands

*For specifics on nest box design and placement, visit the local Cooperative Extension office or state wildlife agency.*

**Water:** Require water as described above.

## Mammals

The following descriptions of mammals will include approximate length, height or weight and width measurements to help the participant learn to identify and compare the different species. Length will be abbreviated as “L,” weight will be abbreviated as “Wt.,” and height will be abbreviated as “Ht.” Length is measured from the head to the end of the tail, and height is measured from the ground to the shoulder.

### Beaver

#### Distinguishing Characteristics:

- L=34-54", Wt=26 to 90 lbs.
- Large heavy-bodied rodent
- Large bright incisor teeth
- Large black scaled tail horizontally flattened
- Hind feet large with webbed toes
- Lead-gray underfur with dark brown guard hairs



#### General Habitat Preference:

Riparian areas in stages 4 and 5 of plant succession, and wetlands that have permanent water with a variety of shrubs and trees adjacent to the water.

*Note: In some areas beaver are a nuisance. They can cut down trees that people want to save, dam up ditches and streams in undesirable places, and take crops that are planted nearby. As a result, it may be desirable to reduce the quality and quantity of available habitat.*

#### Habitat Requirements:

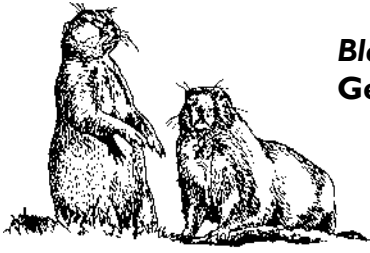
**Food:** Primarily the bark and wood of shrubs and trees, also some forbs and grasses. Store shrub and tree cuttings in caches (underwater piles of branches) for use during the winter. \*Plant willows, other shrubs and deciduous trees near water that can be used by beaver. If beaver are already in the area, new plantings will need protection or the beaver temporarily removed while plantings become established.

- Livestock grazing should be managed so that shrubs and trees are maintained adjacent to waters that may be used by beaver. This may include developing livestock watering facilities in upland areas to discourage congregation in and overuse of riparian areas.
- Control beaver populations. Harvest more or less. Beaver can become too numerous and eat all available shrubs and trees. To prevent this from happening it may be necessary to periodically remove some beaver.

**Cover:** Beaver construct lodges from sticks and mud or dig burrows in banks of streams and rivers. Beaver prefer slow-moving or still water with a constant water level. Will build dams from tree branches, shrubs, and mud to form ponds which stabilize water levels, slow water movement and provide shelter beneath the ice in winter.

- Protect and maintain beaver dams. When beavers construct dams in places that cause problems for people, removal of the beaver is usually the best solution. If the dam is destroyed and the beaver remain, they will usually rebuild the dam.
- Provide dam building material such as pre-cut logs and branches in areas where such materials are scarce.

**Water:** Water requirements are discussed under cover requirements. Should be of sufficient depth (5 feet) to allow free movement under the ice in winter.



## **Black-tailed Prairie Dog**

### **General Habitat Preferences:**

The black-tailed prairie dog is the most widely distributed of the North American prairie dogs. Prairie dogs occupied up to 700 million acres of western grasslands in the early 1900s. The largest prairie dog colony on record, in Texas, measured nearly 25,000 sq. miles. Since 1900 prairie dog populations have been reduced by as much as 98% in some areas and eliminated in others. Today about 2 million acres of prairie dog colonies remain in North America.

### **Habitat Requirements:**

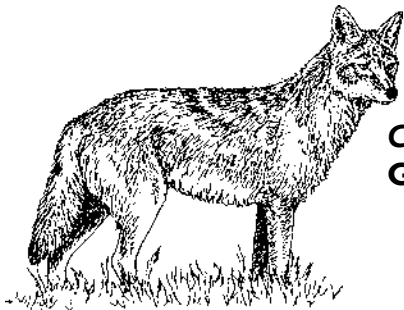
- The black-tailed prairie dog lives in densely populated colonies (20-35 per acre). They live in grassland (stage 3) or sparse shrubland (stage 4) habitats. They often establish colonies near intermittent streams, water impoundments, homestead sites, and windmills. They do not tolerate tall vegetation well and avoid brush and timbered areas.
- In tall and mixed-grass rangelands, prairie dogs have a difficult time establishing a colony unless large grazing animals (bison or livestock) have closely grazed the vegetation (livestock grazing management).

**Food:** Prairie dogs are active above ground only during the day and spend most of their time foraging for green grasses and forbs (plant grass and legumes).

- Chaining/roller beating can set back succession to a grass/forb community suitable for prairie dogs.
- Brush chopping/mowing can set back succession to a grass/forb community suitable for prairie dogs.
- Root plowing can set back succession to a grass/forb community suitable for prairie dogs (used only in Texas).
- Controlled (prescribed) burning can set back succession to a grass/forb community suitable for prairie dogs.
- Wildlife damage control techniques such as toxicants (toxic baits) and fumigants that are registered for use in prairie dog control are effective in greatly reducing numbers. Shooting can moderately reduce numbers of prairie dogs.

**Cover:** Prairie dogs have very limited cover requirements. They essentially clear areas of vegetation and use their burrows as escape cover. Dense vegetation will hinder prairie dog establishment.

**Water:** Apparently prairie dog diets provide adequate water for their needs.



## **Coyote**

### **General Habitat Preference:**

Coyotes are found throughout the continental United States. Coyotes have also been observed in large cities and urban areas. Stages 2, 3 and 4 are primary coyote habitats, particularly grasslands and areas where timberlands have been cleared for agriculture. They may occasionally be seen in woodlands. Coyotes den in a wide variety of places, including brush-covered slopes, steep banks, rock ledges, tickets, and hollow logs. Coyotes may be active throughout the day but tend to be more active during the early morning and around sunset. Coyotes may live in packs, alone, or in mated pairs.

## Habitat Requirements:

**Food:** Coyotes eat poultry, rodents, persimmons, songbirds, cattle, rabbits, deer, woodchuck, goats, and watermelon. Livestock and wild ungulates (deer, elk, pronghorn) are represented in coyote stomachs PRIMARILY as carrion. However, in some cases, coyotes have been shown to prey heavily on deer and pronghorn fawns; limiting reproductive success. In 16 studies, coyotes were responsible for 82% of all sheep losses that were due to predators, but it is important to stress that only a few flocks typically showed sizeable losses. Often it is individuals that cause large livestock losses and control of that individual is warranted. It is also important to consider that coyote predation is not the major cause of loss in many cases.

- Timber harvest using small clear-cuts can increase prey abundance.

**Cover:** Manage livestock grazing so that adequate cover for prey is retained. Plant shrubs where cover is sparse.

**Water:** Water requirements for coyotes are not well documented. Much of their water requirements should be met in their diet.

*Special: In some instances the predatory habits of the coyote can be a problem for wildlife managers and livestock producers; therefore wildlife damage management may be necessary.*

## Eastern Cottontail

### Distinguishing Characteristics:

- L=14 to 19 inches, Wt.=2 to 3.25 lbs.
- Front feet with 5 toes, back feet with 4
- Tops of forefeet more buffy than legs
- Cottony white tail
- Grayish-brown in color

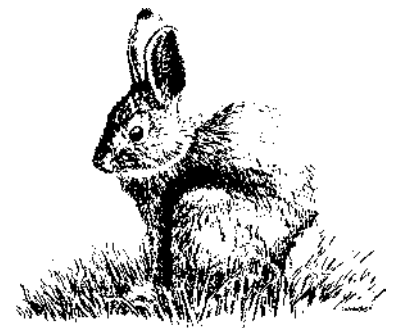
### General Habitat Preference:

Stages 3 and 4 of plant succession. Ideally, habitat components made up of one-third grassland, one-third cropland, and one-third shrub cover all interspersed together. Also use parks, golf courses and stream corridors in urban areas.

### Habitat Requirements:

**Food:** A variety of forbs and grasses are eaten from spring through fall. In winter often eat bark of shrubs and trees. Will eat grain when green foliage is unavailable.

- Plant 1/4 to 1 acre annual food crops (grain sorghum is good) in areas with too little cropland. One plot per 15 acres maximum.
- Plant 1 acre perennial food crops (grass and clover) in areas with too little grass land. Again, 1 plot per 15 acres maximum.
- Brush chopping and controlled (prescribed) burns can be used to maintain or rejuvenate small areas of stage 3 and 4 vegetation.
- Clear-cut small areas (10 acres maximum) in large expanses of stage 5 and 6 woodlands.
- Livestock grazing management should avoid use of food and cover plots, and leave ample amounts of herbaceous vegetation in other areas used by cottontails for food and cover.
- Discing stage 3 vegetation will promote the development of annual forbs that are used by the cottontail for food and cover.



- Leaving grain unharvested will provide emergency winter foods, this is most important during severe winters.
- Use strip cropping that includes a legume strip.  
**Cover:** Use thick shrub or herbaceous vegetation for hiding and resting cover.
- Plant shrubs in large areas of stage 2 and 3 of plant succession, or in agricultural areas having few trees or shrubs. Plant along field borders, fence rows, or other idle land areas. This also is appropriate for open areas in urban settings.
- Provide brush piles where additional cover is needed.
- Eliminate fall tillage, crop stubble can be important winter cover.
- When possible delay spring tillage in fields that have dense crop or weed residues. Often, the cottontail will nest in such areas.
- Delay harvest of hay crops until after the bulk of rabbit nesting has occurred.
- Plant grass (warm season native grass is preferred) and legumes in areas that lack this cover type.
- Implement conservation tillage methods.
- Use root pruning to discourage the removal of hedgerows.  
**Water:** Obtain necessary water from diet.



### **Fox Squirrel**

#### **Distinguishing Characteristics:**

- L=19 to 29", Wt.= 1 to 3 lbs.
- Erect, tapering ears
- Long bushy tail tipped with orange hair
- Dense grizzled fur, reddish underside. In some areas black individuals are common.

#### **General Habitat Preference:**

Stages 5 and 6 of plant succession with interspersed small openings (stages 2 and 3 of plant succession). Riparian areas are important. They also use urban areas with lots of trees, as well as hedgerows.

#### **Habitat Requirements:**

**Food:** Spend much time foraging on the ground. Feed on a variety of nuts, acorns, seeds, mushrooms, bird eggs and corn.

- Selective-cut timber management in large expanses of stage 5 and 6 woodlands. Leave 3 to 4 den trees and several other mature trees per acre.
- Clear-cut small patches (less than 5 acres) in large expanses of stage 6 woodland.
- Bush hog and controlled (prescribed) burns can be used to maintain small areas in stage 3 and 4 vegetation.
- Plant mast-producing trees along fence rows, adjacent to streams, or in other idle land areas. When possible, locate plantings adjacent to existing croplands.
- Leave some grain unharvested in croplands or establish annual food plots planted to corn or milo adjacent to woodlands.
- Maintain deciduous tree corridors along streams.
- Leave some crop residue untilled in the fall, especially near woodlands.
- In urban areas, corn or sunflower seeds can be spread out under trees used by squirrels or placed in artificial feeders.

**Cover:** Nest in cavities of trees or build a nest 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 are scarce, will use nest boxes.

- Need 3 to 4 den trees or suitable nest boxes per acre. Nest boxes are most beneficial in stage 5 woodlands and urban areas lacking den sites.
  - Plant trees in large areas of stages 2, 3 and 4 vegetation (irrigate if necessary).
  - Restrict livestock grazing in riparian areas to maintain large deciduous trees and provide adequate herbaceous vegetation.
  - Use root pruning to discourage the removal of hedgerows.
- Water:** In warm seasons need water daily.
- In urban areas provide a pool or pan of water if other sources are not available.

## **Mink**

### **Distinguishing Characteristics:**

- L=20 to 27", Wt.=1.25 to 3.25 lbs.
- Long slender body, short legs
- Moderately long bushy tail shading to black at tip
- Rich dark brown in color, underside slightly lighter
- White patch on chin



### **General Habitat Preference:**

Prefer habitat associated with stream and river banks and the shores of a variety of wetlands.

### **Habitat Requirements:**

**Food:** Muskrats, rabbits, mice, waterfowl, fish and crayfish are all used for food depending on availability. Most food is found in close association of dense vegetation along the shores of wetlands.

- Manage livestock grazing to maintain healthy vegetation along the banks and shores of streams, rivers and other wetlands. This includes the development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas.
- Controlled (prescribed) burns and rotary mowing can be used to rejuvenate old decadent wetland vegetation that in turn can improve the habitat for the animals mink use for food.
- Control water levels with water control structures to promote the growth of emergent aquatic vegetation adjacent to open water.
- Ponds and wetlands can be constructed with shallow water areas where emergent aquatic vegetation can grow.
- Provide shallow water areas in ponds and wetlands where emergent vegetation can grow.
- Small dikes can be used to temporarily flood areas which can improve habitat for animals mink use for food.

**Cover:** Use dens made in log jams, under tree roots, old muskrat burrows and rock piles. The availability of den sites is considered to be a key factor in determining how many mink use an area. Areas with lots of trees and shrubs and limited livestock grazing near shorelines usually have more potential den sites. The practices discussed under "**Food**" can also improve cover.

**Water:** Mink are found in association with water.



### **Mule Deer**

#### **Distinguishing Characteristics:**

- Ht.= 3 to 3.5 ft., Wt.= 100 to 300 lbs.
- Large ears
- Antlers with Y-shaped forks (normally only males have antlers)
- Reddish to grayish brown in color, underside whitish
- Gray-white rump patch

#### **General Habitat Preference:**

Stages 3 and 4 of plant succession.

#### **Habitat Requirements:**

**Food:** Varies with season and availability. This species eats brush (browse), grass, forbs, and will use agricultural crops when available. They tend to eat more browse than grass or forbs.

- Control burn small areas (10 to 40 acres preferred) in large expanses of stage 4 and 5 vegetation.
- Brush chop small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 4 vegetation. Do not do this in areas of deep snow if shrubs are the only available food in winter.
- Plant fields to grasses and legumes.
- Livestock grazing should be managed so that some herbaceous and shrub vegetation remains available for deer. This may include the development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas.
- Eliminate fall tillage.
- Leave 1/2 to 2 acre blocks of unharvested grain.

**Cover:** Will use tall thick shrubs, forests and land features such as rock outcrops, cliffs and ravines.

- Manage for 50 percent stage 5 and 6 vegetation intermingled with stage 3 and 4 vegetation.
- Restrict livestock grazing from riparian areas to maintain shrubs and trees.
- Plant willows and other trees.
- Time the harvest of hay until after the fawns are mature enough to avoid equipment.

**Water:** Need nearly daily during summer months, but in winter need only snow when available. Will travel up to 2 miles for water, but prefer within 1 mile.

- Where water is limited or absent, development of water sources is desirable: guzzlers, catchment ponds, windmills, spring developments.



### **Muskrat**

#### **Distinguishing Characteristics:**

- L=16 to 25", Wt.=1.25 to 4 lbs.
- Large head with small eyes and ears
- Hind feet large and partly webbed
- Scaly tail
- Musk gland at tail base
- Black guard hairs throughout dense waterproof fur
- Blackish-brown in color with paler sides
- White throat with grayish underside

#### **General Habitat Preference:**

Stages 2 and 3 wetlands interspersed together.

## Habitat Requirements:

**Food:** Eat the roots, tubers, and green vegetation of emergent aquatic vegetation such as cattails and bulrushes.

- Manage livestock grazing to maintain healthy vegetation along the banks and shores of streams, rivers and other wetlands. This may include the development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas.
- Controlled (prescribed) burns and rotary mowing can be used to rejuvenate old, decadent wetland vegetation.
- Control water levels with water control structures. Provide areas in wetlands with water less than 2 feet deep where cattails and bulrushes can grow. Up to 80 percent of a wetland should be able to grow such vegetation.
- Ponds and wetlands can be constructed with shallow water areas where emergent aquatic vegetation can grow.
- Provide shallow water areas in existing ponds and wetlands where emergent vegetation can grow.
- Small dikes can be used to temporarily flood areas to promote the growth of cattails and bulrushes.

**Cover:** Muskrats build lodges (out of bulrushes and cattails) within dense growths of cattails and bulrushes. Rest on open shorelines, floating logs, or on tops of lodges. Also make dens in banks.

- Practices under “**Food**” can provide areas for lodges.
- Construct ponds with shallow water areas to support emergent vegetation.
- Floating logs and rafts can be placed in open water areas. They should be anchored to the bottom.

**Water:** Need water of sufficient depth (4 feet) or flowing water that allows free movement under ice during the winter. During warm seasons, prefer water 1 to 2 feet deep, with around 20 percent of the wetland comprised of open water free of emergent aquatic vegetation. Again, controlling the water level when possible can be a beneficial management practice.

## Pronghorn

### Distinguishing Characteristics:

- Ht. = 3 ft., Wt. = 75 to 130 lbs.
- Small, resemble deer
- Coarse, brittle hair with air cells for insulation
- Black pronged horns, both sexes have horns (female’s are much smaller than the male’s), horn sheath is shed annually
- Reddish-brown to tan colored body
- White rump-patch, neck and underbelly
- Dark muzzle with white cheeks

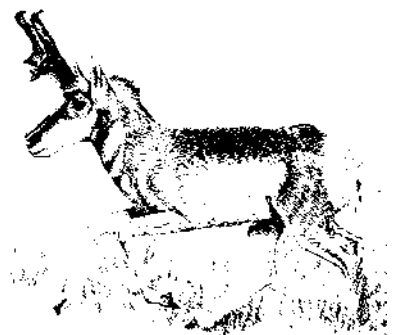
### General Habitat Preference:

Stages 3 and 4 of plant succession interspersed with each other. Fifty percent of the habitat in each stage is desired.

### Habitat Requirements:

**Food:** A variety of forbs and shrubs. Diet varies with season. Shrubs are heavily utilized in the winter, while forbs are used mostly in the spring and summer.

- Control burn areas in large expanses of stage 4 shrub land, especially in areas where shrubs are dominating. Maintain 50 percent of range in stage 4 of plant succession.





- Brush chop (mow) areas in large expanses of stage 4 shrub land.
  - Livestock grazing management may be needed to avoid grazing parts of the range in the spring and summer. Can rotate areas to be excluded from grazing each year. This type of grazing system often is called “rest-rotation.” A disadvantage is that the amount of fence often needed for livestock control can have adverse effects on pronghorn. Fencing should be kept to a minimum. When built, there should be a minimum of 16 inches between the ground and the bottom wire which should be smooth. The top wire should not be over 42 inches above the ground.
  - Maintain large blocks of rangeland within cropland.
  - Plant fields of grasses and legumes in large expanses of stage 4 vegetation, or in areas of extensive cropland acreage.
- Cover:** Need flat to rolling terrain that allows pronghorn to see long distances.
- Time the harvest of hay until after the fawns are mature enough to avoid equipment.
- Water:** Need water frequently. Will travel up to 4 miles for water, however, available water within 2 miles is desirable. Use snow if available.
- Where water is limited or absent, development of water sources is desirable, such as catchment ponds, dugouts, windmills and spring developments.



### **Raccoon**

#### **Distinguishing Characteristics:**

- L = 26 to 38", Wt. = 7 to 25 lbs.
- Thick-bodied, short-legged
- Toes with long recurved claws
- Fur black and white-speckled with light underside
- Eyes and cheeks covered with black fur mask
- Long, furry, ringed (alternating black and gray bands) tail tipped in black

#### **General Habitat Preference:**

Most abundant near water, riparian areas and lands adjacent to wetlands. Also found in urban areas. Prefer areas interspersed with different successional stages. Riparian areas in stages 5 and 6 of plant succession are ideal.

*Raccoons can become pests in urban areas and in wetlands where waterfowl nesting is important. In such instances, the management objectives may be to make the habitat less suitable for raccoons.*

#### **Habitat Requirements:**

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

- Manage livestock grazing to maintain healthy vegetation along the banks and shores of streams, rivers and other wetlands. This may include the development of livestock watering facilities in uplands to discourage congregation and overuse of riparian areas.
- Controlled (prescribed) burns and rotary mowing can be used to rejuvenate old decadent wetland vegetation. These practices can be used to revert succession from stages 5 and 6 vegetation to stages 2, 3 and 4.
- Control water levels with water control structures. Provide areas in wetland with water less than 2 feet deep where aquatic emergent vegetation can grow.
- Ponds and wetlands can be constructed with shallow water areas where emergent aquatic vegetation can grow.

- Provide shallow water areas in existing ponds and wetlands where emergent aquatic vegetation can grow.
- Leave small areas of grain crops unharvested adjacent to woodlands.
- Plant annual food plots to milo or corn.
- Clear-cut small areas (40 acres maximum, 10 to 20 acres preferred) in large expanses of stage 5 and 6 vegetation.
- Selective-cut timber management.
- Construct small dikes to temporarily flood fields near woodlands.
- Eliminate fall tillage.

**Cover:** Nest and rest during the day in natural tree cavities, dens in the ground, under brush and junk piles, in old abandoned buildings, and rocky cliffs and ledges. Raccoons will use artificial nest boxes.

- Plant and maintain large deciduous trees especially in riparian areas and areas adjacent to wetlands.
- Use root pruning to discourage the removal of hedgerows.

**Water:** Require water frequently during warm seasons.

- Build ponds or wetlands.
- Provide pools of water in urban areas.

### **White-tailed Deer**

#### **Distinguishing Characteristics:**

- L = 54 to 78", Wt. = 100 to 300 lbs.
- Light-bodied
- The antlers have one main beam on each side that reaches up then forward, 3 to 6 points usually project upward from each beam. Females normally lack antlers.
- Tail white on underside and around outside edge on top
- Overall color reddish in summer, blue-gray in winter



#### **General Habitat Preference:**

Stages 3,4, and 5 of plant succession all interspersed together. *White-tailed deer have the potential to cause problems in urban areas, agricultural croplands, orchards or nurseries and vegetable farms. In some cases, it may be desirable to make the habitat less suitable for deer.*

#### **Habitat Requirements:**

**Food:** A variety of shrubs, forbs, grasses and waste grain. Acorns and nuts are favorite foods. Will utilize agricultural crops.

- Clear-cut small areas (10 to 40 acres preferred) in large expanses of stage 5 and 6 woodland.
- Selective-cut timber management of stage 5 and 6 woodlands.
- Plant several 1 acre perennial food plots of grass and clover in large expanses of stage 5 and 6 woodlands.
- Plant annual food plots to grain.
- Plant mast trees and shrubs that bear fruit or large seeds.
- Leave small areas of cropland adjacent to woodlands unharvested.
- Eliminate fall tillage of grain crop residue adjacent to woodlands.
- Plant fields to grasses and legumes in large expanses of stage 4, 5 and 6 vegetation.

- Controlled burning periodically in stage 3 and 4 vegetation.
- Brush chop and control burn small areas to maintain stage 3 and 4 vegetation.
- Manage livestock grazing to leave some forbs, grasses, shrubs, and trees available for food and cover. May include the development of livestock watering facilities in upland areas to discourage congregation of livestock and overuse in riparian areas.
- Control deer populations. Harvest less/harvest more management is essential. In some cases deer may become so abundant that agricultural or horticultural crops may be damaged above landowner tolerances. Population reductions can only be accomplished by the removal of does (females).

**Cover:** Use woodlands and tall shrubs for hiding and travel cover. Also use tall emergent aquatic vegetation for cover.

- Construct new wetlands or ponds and/or develop shallow water areas in existing ponds and wetlands where large areas of tall emergent aquatic vegetation can grow.
- Control water levels with water control structures, or use small dikes to temporarily flood areas to encourage the growth of tall emergent aquatic vegetation.
- Plant trees and shrubs in ravines, along field borders, and other idle land areas.
- Time the harvest of hay and if possible delay spring tillage until after the fawns are mature enough to avoid equipment.
- Utilize root pruning to discourage the removal of hedgerows.

**Water:** Drink water when it is available, but can go for long periods without it.

## Other Species (Amphibians, Fish and Butterflies)

### *Largemouth Bass and Bluegill*

#### **Distinguishing Largemouth Bass Characteristics:**

- Large predatory sunfish
- Large mouth—upper jaw extends beyond eye when mouth is closed
- Back greenish, belly white, dark band along side

#### **Distinguishing Bluegill Characteristics:**

- Deep bodied sunfish
- Small mouth
- Blue-black gill cover flap

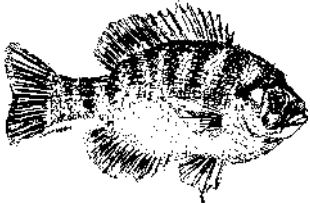
#### **General Habitat Preference:**

Ponds, lakes and slow moving rivers.

#### **Habitat Requirements:**

**Food:** Young bass eat insects in their aquatic stages and other invertebrates that depend on phytoplankton for food. Adult bass eat other small fish such as bluegill and a variety of minnows, tadpoles and crayfish. Bluegill eat a variety of insects, small minnows and crayfish.

- Construct ponds.
- Maintain a green color in pond water (green enough that a white disk cannot be seen 15 inches deep). The color is caused by phytoplankton (microscopic plant life).
- In clear water, fertilizer may be added to increase phytoplankton.
- A bass to bluegill ratio of 3 to 6 pounds of bluegill to one pound of bass is considered a good fish population balance.
- Determine pond balance using a minnow seine.
- Harvest more or fewer bluegill depending on seine sample results.
- Harvest more or fewer bass.
- Remove existing fish and restock pond.



- Prevent or clear up muddy water (brown or gray color). Muddy water blocks sunlight needed in producing phytoplankton.
- Manage livestock grazing to maintain thick herbaceous vegetation surrounding pond and in watershed that drains into pond. Develop livestock watering facilities away from pond or allow access to only a small area of pond.
- Reseed watershed.

**Cover:** Are often found near submerged rocks, shrubs, and near aquatic vegetation where small fish (used for food) hide.

- Artificial reefs constructed of rock piles, sections of plastic or cement pipe ( a minimum of 6 inches in diameter and 18 inches long), and brush piles (sunk with weight) can be used for additional cover. These practices are recommended for ponds larger than 10 surface acres in size. Aquatic vegetation can become too abundant (over 30 percent of water surface covered).
- Deepening the pond edges to 2 feet deep or more discourages aquatic vegetation growth.

**Water:** Require an adequate quantity and quality of water.

- Stop pond leaks if and when they occur.
- Repair spillway if needed.
- Diversion ditches can be used to ensure an adequate water supply.
- Remove trees from dike or dam portion of pond. Fish need water of a certain quality. Some of the basic requirements are: dissolved oxygen—minimum of 5 parts per million (ppm); carbon dioxide—should not exceed 20 ppm; pH should range between 7.0 and 9.0; and water temperature should reach at least 70°F sometime during the summer (1 foot below surface in shade).
- Test the water to see if it meets requirements.
- Aerate pond to increase oxygen and decrease carbon dioxide.
- Lime ponds to increase pH if below 7.0.

#### Notes:

1. The thousands of permanent wetlands and lakes as well as dugouts and small impoundments that have been developed throughout the Great Plains may offer excellent opportunities for creating bass/bluegill fisheries.
2. Maintain pond edges with a 2:1 side slope. This allows for the development of a ring of edge vegetation to provide escape and reproductive cover as well as a natural filter to remove excess nutrients and other potential contaminants from agricultural or upland runoff.
3. An adequate water supply is required for water quality and maximum depth to prevent winter and summer kills. A 15-foot minimum depth is appropriate, but it may be better to have 20-foot depths giving a 5-foot drought buffer.

### **Bullfrog**

#### **Distinguishing Characteristics:**

- Large, L=5-8"
- Rounded snout
- Moist skin
- Legs with dark bands
- Primarily uniform green, olive or brown, underside white or yellowish

#### **General Habitat Preference:**

Inhabit permanent bodies of standing or slow-moving water. Prefer shorelines with dense vegetation (Stages 2 and 3 of wetland succession), adjacent to shallow open water areas dominated by floating and submerged aquatic vegetation. All habitat requirements often are found in and around a single pond.



### **Habitat Requirements:**

**Food:** Major components of the diet are snails, insects, crayfish, other frogs, fish, reptiles, and occasionally small mammals and birds.

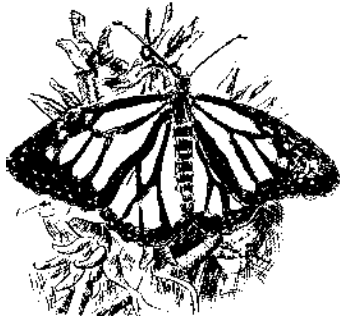
**Cover:** Use dense emergent aquatic and upland herbaceous vegetation adjacent to water for hiding and foraging.

- Construct ponds and wetlands with shallow water areas.
- Control water levels with water control structures to encourage the growth of emergent aquatic vegetation adjacent to open water.
- Provide shallow water areas in existing ponds and wetlands.
- Manage livestock grazing to maintain dense vegetative cover on shores and banks adjacent to water. Limit livestock watering access to only a small area of the wetland or develop an alternate watering facility outside the wetland.

**Water:** Need stable water levels for hibernation and egg development.

- Control water level (minimize water level after growth of vegetation). When possible maintain a constant water level.

**Special:** Prefer a soft mud bottom under unfrozen water for hibernation.



### **Butterflies**

#### **Distinguishing Characteristics:**

- Insect (6 legs)
- Wings very large compared to body
- Wings brightly colored and patterned

#### **General Habitat Preference:**

Butterflies are found in many places where there are flowers for nectar and other plants needed for reproduction (egg-laying). In urban areas they are found in gardens, yards, and parks planted with shrubs and flowers that attract butterflies. Often lay eggs on a specific kind of plant.

### **Habitat Requirements:**

**Food:** Usually consist of sweet liquids such as nectar from flowers.

- Plant and maintain bushes and flowers that attract butterflies. Some examples are aster, verbena, zinnia, marigold, lilac, bush cinquefoil, and butterfly plant. A diverse variety of native wildflowers generally will benefit more species and will have flowering throughout the growing season.
- Plant and maintain specific types of plants for butterflies to lay eggs on. Some examples are chokecherry and cottonwood for tiger swallowtails; hollyhock and sunflower for painted lady; and clover for clouded sulfur butterflies. Again, a diverse variety of native plants generally will benefit more species.
- Rooftop and balcony gardens planted with some of the plants mentioned above may attract butterflies.

**Cover:** Need shelter from wind. Plant the above in areas sheltered from the wind.

**Water:** Some butterflies can be seen collecting on moist sand or mud around water puddles.

- Providing an area with water puddles may attract groups of these butterflies.

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# Wildlife Management Practices (WMP's)

Now that you know the habitat needs of some of the more common wildlife species, here's how to provide those needs. When you learn how to provide needs of wildlife through habitat management, you will know about the basic options used by wildlife managers.



## 1. Artificial Feeders

### General Description:

Used primarily to feed birds in backyards or near homes but not normally recommended for other areas. A wide variety of feeder designs, methods, and different foods exist. Sunflower seeds and white proso millet are universal favorites. Some species prefer to eat suet rather than seeds. Some prefer to eat on the ground rather than in a tree or on an artificial balcony. For details on different designs, visit the Cooperative Extension office or the state wildlife agency.

## 2. Brush Chopping (Mowing)

### General Description:

Involves mowing dense vegetation (including fairly large trees or shrubs) with a large rotary mower mounted behind a tractor. Mowing should be done outside the primary nesting season to avoid destruction of nests.

### Effect on Habitat:

- Helps keep vegetative succession in stage 2 or 3. Sometimes reverts succession from stage 4 to stage 3, or may prevent stage 4 from becoming stage 5.
- Reduces competition of brush and weeds allowing grass and forbs more light, which accelerates growth.
- Maintains low shrub growth by increasing suckering. Useful at the edge between field and woodland.
- In grass-clover plots, helps keep vegetation low enough for use by some wildlife species such as doves and turkeys and upland game bird broods.
- In wetlands can be used to increase interspersion by reducing vegetative cover and to prevent over-abundance of cottonwoods and willows.



## 3. Brush Piles (Terrestrial)

*[In this manual, brush piles for fish habitat are listed with WMP #17 "Ponds, Artificial Reefs"]*

### General Description:

Brush piles can be made from saplings or tree branches available from rejuvenated windbreaks, shelterbelts, clear cutting operations, etc. For best results, piles should be at



least 3 to 5 feet high, and 15 feet in diameter to prevent rapid breakdown. Use large materials for the brush pile base, and place lighter, smaller sized materials on top. This design structure, incorporating the less dense base, will allow grass and weeds to grow, creating more food and cover for wildlife.

**Effect on Habitat:**

Particularly useful for small game in areas with little cover, especially in areas with little cover but plenty of food such as corn, soybean, grain sorghum and small grain fields. Useful at the edge between fields and woodlands.

#### 4. Controlled (Prescribed) Burning

**General Description:**

Burning should follow a prescribed plan that depends upon the objectives desired. A hot fire is needed to suppress undesirable woody species in grasslands. A cool fire (under cool, moist, low-wind conditions) is desired to reduce damage to woody species. If removal or suppression of introduced cool season grasses is the goal, a mid- to late April burn under dry, warm breezy conditions may be necessary. Generally, burn in the early spring (before April 1 if possible) so ground nesting wildlife are not destroyed. Burn only with close supervision of wildlife or range professionals.



**Effect on Habitat:**

**General Effects of Controlled Burning:**

- Reduces brush, improves vigor and quality of grasses.
- Releases nutrients in soil.
- Reduces mulch build up so seed can reach mineral soil.
- Scarifies (breaks down outside coating) of some seeds so they can germinate.
- Rejuvenates grass and herbaceous cover stands improving nesting and feeding cover.
- Removes excessive dead vegetation (litter) which permits improved mobility for small ground dwelling wildlife such as quail.
- Controls weedy forbs and grasses and in some cases, promotes weed growth which is beneficial.

**Effects of Annual Burning:**

- Encourages stage 2 to progress to stage 3.
- In stage 3, helps keep vegetative succession in stage 3.
- In stage 4, causes succession to revert back to stage 3.

**Effects of Burning at 3 to 5 Year Intervals:**

- In stage 3, helps keep vegetative succession in stage 3.
- Can make brushy growth more dense due to abundant sprouting of shrubs.
- Improves ground nesting by allowing residual nest building materials to remain in the years between treatments.

*[Note: Ground nesting success is generally best during the second and third years following a controlled burn, but this success generally drops thereafter. By burning a portion of the area each spring, and rotating the location of the area burned, a greater proportion of the unit is in ideal condition for nesting each year with respect to the burning schedule. If an entire area is burned once every third year, then once every third year nesting success will be lowered.]*





## 5. Discing

### General Description:

Areas in successional stages 2, 3, and 4 can be disc'd to promote the growth of annual and perennial forbs and grasses. Discing should not be used on native virgin prairie because there is so little left; here use fire and grazing instead.

### Effect on Habitat:

- Keeps vegetative succession in stage 2.
- Promotes the growth of annual forbs that some wildlife prefer for food and cover.
- In stage 3, causes succession to revert toward stage 2.
- In stage 4, causes succession to revert toward stages 3 or 2.
- Can be used to decrease vegetative cover and increase inter-spersion in wetlands (during dry periods).



## 6. Grain, Leave Unharvested

### General Description:

Strips or blocks of grain crops can be left unharvested. Grain is especially valuable when left adjacent to herbaceous, shrub or tree cover. Size of plot depends on the presence of other food stuffs, type of crops, and the types of wildlife that is intended to use this grain.

### Effect on Habitat:

Provides a food source for many species of wildlife.



## 7. Harvest Less Game or Fish

### General Description:

#### *Bass:*

Needed when seine sample of pond reveals these situations:

- Most bluegill are same size and show poor body condition.
- Bass few, large, and in good condition.
- Many minnows or crayfish (prey abundant).
- No recent bluegill hatch.

#### *Bluegill:*

Needed when seine sample of pond reveals these situations:

- Many recently hatched bluegill.
- Very few medium-sized bluegill.
- Bass less than 1 pound in poor body condition.
- No young bass.

#### *Game Birds and Mammals:*

Helpful when there is a high proportion of young animals in the bag and hunting success is low. May apply to local situations, but usually not needed for small animal management in general.



## 8. Harvest More Game or Fish

### General Description:

#### *Bass:*

Needed when seine sample of pond reveals these situations:

- Many recently hatched bluegill.
- Very few medium-sized bluegill.
- Bass less than 1 pound in poor body condition.

- No young bass (may indicate a stunted bass population)  
Increase bass harvest cautiously. Spread the harvest over the entire summer, and don't exceed 25 bass per acre.

*Bluegill:*

Needed when seine sample of pond reveals these situations:

- Most bluegill are the same size and show poor body condition.
- Bass few, large, and in good condition.
- Many minnows or crayfish (prey abundant).
- No recent bluegill hatch

*Game Birds and Mammals:*

Helpful when animals show signs of exceeding habitat carrying capacity, such as:

- Disease.
- Destruction of habitat by crowded animals.
- Poor body condition.
- Excessive fighting.
- Few young animals in bag.
- Higher percentage of older animals than young in fall population (indicates poor reproduction possibly due to inadequate nutrition, poor nesting success, higher predator population, poor brood success). If high population levels and deteriorating habitat is resulting in increased depredation, thinning the population will improve the situation.

*May apply to local situations, but not needed for small animal management in general.*

## 9. Harvest Timing (Hay or crops)

### General Description:

Delaying mowing or haying during the nesting season for upland game and waterfowl and the deer fawning season can reduce nest destruction and increase the number of hens and broods that survive. It also increases average clutch size and reduces the number of fawns killed. Mowing should be delayed until after July 15 with later dates for the more northern region. However, mowing should occur shortly after this date to permit sufficient regrowth to provide cover for the winter and for the subsequent year's nesting (or fawning), except in alfalfa fields which can be hayed until September 1.

## 10. Livestock Grazing Management

### General Description:

A practice for managing the use of vegetation by livestock. Can be used to manipulate successional stages to benefit wildlife (e.g., maintain open areas in woodlands). This practice also includes livestock exclusion when necessary.

### Some General Principles Are:

*Proper Grazing Use:*

On native rangelands do not graze more than 50 percent of the yearly growth of vegetation preferred by livestock.



*Timing:*

Avoid grazing areas during periods when wildlife and/or vegetation is vulnerable to damage. For example—intensive spring grazing can reduce cover needed by ground-nesting wildlife.

*Intensity:*

Relates to how many livestock are on a given area at any one time. Many livestock on an area is high intensity, few livestock is low intensity. High intensity grazing should be for shorter periods of time or all the vegetation will be used. High intensity grazing increases the chance that ground nests will be trampled, and should not be used in important nesting areas during the nesting season.

*Rotation:*

Livestock should be moved from an area before vegetation is over-used. The vegetation is allowed to recuperate (rest) before it is grazed again.

**Tools:**

Fencing, water developments, salting, and herding are the most common methods used to control livestock grazing. Whenever livestock grazing management is recommended, it is implied that the necessary tools will be available. Some information on these tools follows.

*Fencing:*

Useful to protect food plots, ponds, woodlands, wetlands, riparian areas, etc., from livestock. Often necessary for managing livestock grazing (such as rotating areas being grazed, controlling access to water, etc.).

Fencing may interfere with movement of certain wildlife, such as pronghorns. They should be recommended only when necessary and designed to allow movement of wildlife where this is a problem.

The top wire should be a maximum of 42 inches above the ground (allows some wildlife to jump over) and the bottom wire should be a minimum of 16 inches above the ground (allows some wildlife to go under).

*Water Developments:*

Can be used to distribute livestock grazing. The more watering places available, the less likely livestock will concentrate in one area, and the more flexibility one has in managing livestock. Alternative water sources often are essential when developing grazing systems that permit occasional rest during the growing season.

Catchment ponds, dugouts, windmills, and spring developments discussed under WMP #39 (Water Development for Wildlife) are also used to develop water for livestock.

*Salting:*

Locating salting areas away from watering places and occasionally moving locations can be used to encourage uniform distribution of livestock.

*Herding:*

Using horseback or other means to move animals is useful for achieving proper distribution of grazing animals. Used to discourage congregation of animals in attractive areas for long periods of time.

**Effect on Habitat:**

- Used to ensure livestock grazing does not over-utilize vegetation that is also used by wildlife.
- If properly managed, livestock grazing usually is not harmful to wildlife habitat and in many instances, is used to improve wildlife habitat. Some grazing practices can benefit both wildlife and grass stands for livestock production.
- Changes in grazing management are recommended only when it is evident that livestock use is damaging wildlife habitat or is needed to improve the habitat for selected wildlife species.
- Periodic grazing of vegetation (cattail) choked wetlands can improve water and vegetation interspersion.

## 11. Nesting Boxes/Structures

### General Description:

The particular design and placement of nesting structures and boxes often determines which wildlife species will use the structure. Contact a Cooperative Extension educator, wildlife specialist, or state wildlife agency for specific designs of nest boxes and other artificial nesting structures.

#### *Boxes:*

Some bird species nest in natural tree cavities. If natural cavities are not available, artificial cavities (nest boxes) can be used. Each species needs a certain kind of cavity (diameter hole, depth, area, etc.), in a certain location (field, woods, water, etc.), and at a certain height (4 feet to 20 feet high).

#### *Structures:*

Other species such as the mallard and Canada geese will use artificial nest structures. In wetlands or ponds dominated by open water and lacking islands or peninsulas, floating, or platform type nest structures will encourage such nesting.

### Effect on Habitat

#### *In Woods:*

Boxes are especially useful in planted woodlands where trees are not old enough to produce cavities (Stage 5).

#### *In Open Areas (Stages 2, 3 and 4):*

Always useful unless an abundance of nesting cavities already exists, such as hollow fence posts, isolated den trees, etc.

#### *In Wetlands:*

Provides secure nesting sites which may be lacking on adjacent uplands.

## 12. Plant Flowers

### General Description:

This practice is useful in urban or residential sites, and wild-flower mixes are now commonly used in rural grasslands, prairie restorations, and other landscapes. Many flowers attract wildlife, especially hummingbirds and butterflies. Species that are suited to Kansas and Nebraska include salvia, butterfly milkweed, gay-feathers, and prairie flower mixes. Butterflies also need native plants for larval habitat (a place to lay eggs), usually specific plants for each species. For example, Monarch butterflies lay eggs on milkweed plants.



### 13. Plant Food Plots (1 to 10 Acre)

#### General Description:

In regions of moderate to heavy snowfall, plots should be square in shape (1 acre = 208 feet x 208 feet) and located at edges between two or more kinds of habitat (such as between woodland and hayfield). However, where snowfall amounts are light, linear shaped plots will add edge and be beneficial for a larger area. Plots are best if located next to high quality, natural cover such as shrubs, or native prairie, and should be planted in early spring to ensure maturity. They must be protected from cattle or other livestock. Again, remember in regions of heavy snow, the food plots should be square in shape and located near and downwind of cover. Larger plots are generally better for wildlife. Plots with various vegetation heights and with some plants that fall over and others that stand erect, will produce both food and cover for a variety of species.

#### Effect on Habitat:

##### *Annual Food Plots:*

Useful in areas of natural plant succession, where agricultural crops (corn, soybeans, grain sorghum, small grains, etc.) are scarce or not available. A minimum one plot per 160 acres would be preferred. Plots should not be so extensive as to significantly reduce natural habitat such as native range, etc. Most often for small game, the nesting and brooding habitat is more important than a food plot.



### 14. Plant Grass, Forbs, and Legumes

#### General Description:

Smaller fields are useful for wildlife in wooded or cultivated areas with very little acreage in stages 3 and 4 of succession. Larger fields are useful in areas with little acreage in hayfields or pastures as winter escape, nesting, and roosting cover for upland game, waterfowl and many other wildlife. Eighty acres per section in 10 to 40 acre square blocks is considered adequate.

Planting strips of grass along crop field borders is also desirable if these strips are of sufficient width so not to create easy nest location by predators.

The preferred species is a mixture of native, warm season grasses such as big bluestem, Indiangrass, little bluestem, switchgrass, sideoats gramma, etc. Native forbs and legumes should be included with the grass. These could include bundleflower, Maximilian sunflower, patridgepea, prairie clover, and roundhead lespedeza. Alfalfa, although not a native, is another commonly used legume in CRP grass plantings. For early-nesting birds, a mix of cool season grasses and forbs will provide nesting cover needed early in the nesting season.



## 15. Plant Mast Trees

### General Description:

Mast means seed or fruit (usually nuts) produced by a tree. Often mast provides food for wildlife. For the purpose of this handbook, mast trees are defined as those trees that produce an annual crop of acorns or other nuts. Plant mast trees in early spring while they are still dormant.

For specifics about what, when and how to plant, see your local Cooperative Extension educator, Natural Resources Conservation Service office, forester or the state wildlife agency.

### Effect on Habitat:

Especially useful for deer, squirrels, turkey, and wood ducks in areas with little available mast, such as large expanses of farmland, pine woodland, field borders, urban areas, etc.

## 16. Plant Trees and Shrubs

### General Description:

When properly located, trees and shrubs can benefit many species of wildlife. Be aware, however, that many grassland species avoid trees.

Fruiting shrubs and small evergreen trees are especially good for urban areas, fencerows, hedgerows, odd-areas, property boundary markers, and other idle land plantings. It may also be desirable to plant large trees and willows in some areas.

In dry regions, irrigation, weed control or moisture barrier fabric often is needed to grow shrubs and trees.

In large open areas, multi-row plantings of trees and shrubs are beneficial, especially if planted adjacent to tall herbaceous cover or a good food source. It is best to plant shrubs and trees in the early spring when they are still dormant.

For specific information, check with your local Natural Resources Conservation Service, State, or Extension office, forester, or state wildlife agency.

### Effect on Habitat:

A practice generally recommended for deer, squirrels and woodland songbirds. Useful along fences in areas where field borders (such as fencerows) are scarce. They serve as travel lands for wildlife to move safely across open fields between two areas of cover. Trees are useful along the edges between fields and woodlands and around farm homesteads. They can be a valuable practice to restore or improve riparian areas.

## 17. Ponds, Artificial Reefs (Aquatic Brush Piles)

### General Description:

Christmas trees, hardwood trees, or other materials, fastened together and weighted down can be submerged in suitable areas.

This practice is recommended for ponds or lakes that are larger than 10 acres. In smaller bodies of water artificial reefs may allow prey fish (bluegill, etc.) to be overly successful at avoiding predators. This can lead to an overabundance of prey fish that are in poor condition. Structures may be placed on the ice during winter and allowed to sink.



Be cautious about the thickness of the ice. If placement on ice is not possible, then the reefs may be placed using large boats.

**Effect on Habitat:**

Provides escape cover. Concentrates fish which improves angler success. Provides substrate for production of fish food (aquatic, invertebrates, etc.).

## 18. Ponds, Clear Muddy Water

**General Description:**

You can clear muddy water in many ways:

- Developing and maintaining vegetative filter strips 30 to 99 (or wider) feet wide around water areas. This is your first and best line of defense. Some vegetation along the shoreline in water is also desirable to reduce wind/wave induced turbidity.
- Broadcast agricultural gypsum on the pond surface at the rate of 12 to 25 pounds per 100 cubic feet of water (500 to 1000 pounds per acre-foot of water).
- Broadcast hydrated lime on the pond surface at 20 to 40 pounds per acre-foot of water.
- Broadcast agricultural limestone on the pond surface at the rate of 500 to 1000 pounds per surface acre.
- Sometimes bullheads or carp can keep sediments in suspension. In this case, it may be necessary to remove all fish and rehabilitate the pond.
- Too much shallow and windswept area can cause problems, especially if the pond has a clay bottom.
- Water level manipulation (see WPM #40).

**Effect on Habitat:**

Removes silt and algae in the water allowing sunlight to reach phytoplankton. This reactivates the first step in the pond food chain. At the same time, erosion of the watershed (which caused the muddy water) can be stopped by using WMP #24.

## 19. Ponds, Construction

**General Description:**

This practice should be recommended for creating new ponds and wetlands with permanent water.

Dams and dikes can be used in natural drainages to create ponds and wetlands with *permanent* water for use by fish and wildlife.

*When this practice is recommended, it is implied that adequate water control structures will be included so these structures should not be an additional recommendation.*



## 20. Ponds, Deepen Edges

### General Description:

To re-slope pond edges for bass/bluegill fisheries, draw the water down, let banks dry out and use a bulldozer or tractor with blade to cut to a depth of 4 to 5 feet. Pond edges should be re-sloped to create a 3 to 1 side slope, allowing for the creation of a mixed zone of vegetation. Soil removed from the edge can be piled around the bank, or used to construct nesting islands. (See WMP #27)

### Effect on Habitat

Creates the needed mix of rooted aquatic (water) vegetation around the edge of a pond, yet restricts the vegetation to levels that permit human recreational use.



## 21. Ponds, Diversion Ditch

### General Description:

Diversion ditches should be constructed to adjust the amount of water that enters the pond and exits the spillway (i.e. water can be diverted into or away from a pond). When there is too much water, a portion is diverted around the pond through the diversion ditch. When there is too little water, the diversion can be used to increase the watershed of the pond.

### Effect on Habitat:

Needed around ponds with too much water flowing through them, as too much water dilutes and wastes nutrients. Also useful for ponds with insufficient watershed to add more water. (Note: too much outflow can cause problems with loss of desirable fish over spillway and may threaten dikes and other structures).



## 22. Ponds, Remove Trees Near Dike

### General Description:

Roots of trees growing on the dam will loosen the soil compaction and cause leaks. Trees of all sizes should be removed immediately when growing anywhere on the dam. Trees growing around the pond will reduce the water level. Also, some species (such as muskrat) prefer clean banks for loafing sites.

This practice is needed anytime trees occur on the dam, or when trees occur around more than one-third of the remaining pond bank. Some nearby trees are desirable for wood ducks but need not occupy more than one-third the pond bank.

### Effect on Habitat:

Needed to prevent lowered water level, improve the pond's ability to hold water, and clean pond banks for use by doves. Fallen trees partially submersed in water make great fish attractors. (See WMP #17).







## 23. Ponds, Repair Spillway

### General Description:

Needed if spillway in existing dam or dike is eroding or otherwise damaged, keeping the pond water level too low.

### Effect on Habitat:

Helps maintain pond water supply and reduces the chance of the dam washing away during heavy rains.

*(Note: If pond was built without a spillway, one should be constructed).*

## 24. Ponds, Reseed Watershed/Filterstrips

### Effect on Habitat:

This is one method of reducing erosion in the watershed. It reduces silt in pond water and allows sunlight to reach phytoplankton. It improves water quality and also can provide nesting, brooding and winter cover areas for other wildlife. For methods and plant materials, refer to WMP #'s 14, 15 and 16.

## 25. Ponds, Restock

### General Description:

Restocking of ponds should only be done as a last resort. The supplies of fish for such restocking are limited. If you must restock, do so only after all fish in the pond are removed, either by draining pond or applying the chemical rotenone. Apply rotenone according to label directions.

Rotenone kills fish by interfering with the gills' ability to use oxygen in the water. It is applied as a liquid or powder during early fall. Bluegill fingerlings are then stocked in the late fall, and bass fingerlings are stocked the following June. Advice on stocking rates can be obtained from local fisheries biologists, and will vary with the type of pond, pond fertility, size of fish to be stocked, etc. Most often the recommended fingerling stocking rates will be 500 bluegills and 100 bass per surface acre. As many as 100 channel catfish fingerlings per acre may also be stocked at the same time as the bluegills. (Note: The use of rotenone requires a state permit.)

### Effect on Habitat:

The techniques of draining or rotenoning ponds allow unbalanced fish populations to be removed and new ones started with an exact ratio of bass to bluegills. Needed in ponds with extremely unbalanced fish populations indicated by:

- Overabundance of small, stunted bluegills
- Few hard-to-catch fish of usable size
- Presence of undesired fish such as carp, shad, crappies, green sunfish or bullheads

## 26. Ponds, Stop Leaks

### General Description:

Leaks in constructed ponds may be stopped with bentonite at 100 pounds per 100 square feet; distribute at 16 to 20 pounds per 100 square feet; tetrasodium pyrophosphate at 2 tons per acre; or soda ash at 5 tons per acre spread over the pond surface. In severe cases, plastic sheeting may be used.

### Effect on Habitat:

Maintains pond water supply.

## 27. Ponds, Provide Shallow Water, Islands, Peninsulas

### General Description:

To increase emergent aquatic vegetation and/or provide islands and peninsulas for wildlife. This practice can only be recommended for existing ponds and wetlands. *Not recommended for areas with moving water such as rivers and streams.*

Draw the water down, let the area dry out, and use a bulldozer or tractor with a blade and front end loader. Soil can be gathered from nearby sources or pond/wetland bottom and used to build islands, peninsulas, and shallow water areas (less than 2 feet deep). *Areas above the water line that are disturbed by this activity should be smoothed and planted to grass and legumes.*

Developing wildlife water areas or wetlands can supply winter cover for resident wildlife in addition to providing valuable feeding, nesting and brooding areas for waterfowl. Retention dams and stock dams with gently sloping sides can also provide excellent wildlife water areas. To maximize wildlife benefits, these developments should be 1 to 4 acres in size with 40 percent of the surface water area less than 2 feet deep.



## 28. Predator-proof Fencing:

### General Description

Building and maintaining predator-proof fencing around small areas can increase nest success by reducing net losses of birds caused by predators such as mink, raccoons, skunks and foxes. This fencing covers only small areas, however, and is expensive to erect and maintain. One beneficial use in some areas is protecting nesting colonies of threatened or endangered birds such as least terns or piping plovers.

### Effect of Habitat:

Fencing does not directly effect habitat, but can be utilized to help manage wildlife populations.



## 29. Riparian Buffers

### General Description:

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

### Effect on Habitat:

- Provides shade for summer cooling and cover in the stream or wetland.
- Provides corridors for wildlife to move from one habitat to another.
- Slows overland flow of water and helps maintain water quality.

- Provides structural diversity both adjacent to and within the stream. As trees die then fall into the stream, the large woody debris helps create pools and riffles and provides cover for fish and other aquatic life.
- Leaves, stems, branches, and large woody debris fall into streams providing nutrition and habitat for aquatic insects, a major food source for fish and amphibians.
- Insects from the trees fall into the stream and provide a food source for fish, amphibians, and other aquatic life.
- Tree roots provide soil and streambank stability.

*Note that this is a distinctly different practice from corridors. If an area needs corridors, that will need to be checked in addition to this practice.*

### 30. Root Pruning

#### General Description:

Root pruning is a procedure that eliminates moisture and nutrient competition between wooded areas, especially hedgerows or other wooded border plantings, and adjacent cropfields. Often the wooded borders are the only permanent habitat in heavily cropped areas. Because of moisture stress, crops immediately adjacent (at times up to 100 feet out into the field) to wooded borders have reduced yields compared to other parts of the same field. Often, landowners are inclined to have these borders and other wooded areas removed due to loss of production to moisture stress. Root pruning (often called root plowing) severs the tree roots that extend into the cropfield and eliminates the competition. This allows similar production right up to the pruned root line, while allowing the wooded border to remain providing wildlife cover and other benefits. The pruning is accomplished by a heavily built, single shank implement that is pulled by a farm tractor along the woods or hedgerow being treated. *This is a different practice from that described in the national manual called “root plowing.”*

#### Effect on Habitat:

Because the crops being grown along the wooded area remain productive, the landowner is less prone to clear the area, and the hedgerow or other wooded area remains intact to continue to provide wildlife benefits. Of course, if the wooded border is removed, all its wildlife values are lost. Forbs, grasses, and other plants also suffer from the trees sapping moisture. Using root pruning allows these plants better growth and production, thus increasing wildlife benefit.

### 31. Small Dikes for Temporary Flooding

#### General Description:

Only recommend this practice in existing wetlands or potential waterfowl feeding and nesting areas when appropriate.

Small dikes are used to temporarily flood (usually in the fall) feeding and nesting areas for waterfowl. Grain fields, Japanese millet plantings, and stage 5 and 6 hardwood woodlands (called green tree



reservoir when managed in this fashion) are examples of feeding areas flooded to attract waterfowl. Temporary flooding also is used to improve existing wetlands as nesting habitat for some wildlife such as the redhead, and to control the growth of aquatic vegetation.

*When this practice is recommended it is implied that adequate water control structures will be included and should not be an additional recommendation.*

## 32. Stripcropping

### General Description:

Growing wind-resisting crops in strips alternating with row crops or fallow. Strips are planted perpendicular to prevailing wind direction during peak erosion season. Strips can be a perennial vegetation such as switchgrass or annual row crops.

### Effect on Habitat:

#### *Perennial stripcropping:*

Useful in areas of intensive farming (corn, soybeans, grain sorghum, small grains, etc.) especially where brushy field borders are scarce. Useful in most areas with absence of stage 3 succession.



## 33. Survey, Fish (pond) or Wildlife

### General Description:

Wildlife biologists and managers frequently use surveys to evaluate and monitor wildlife populations. Results indicate management needs such as “Harvest less/Harvest more” and can show how fish and wildlife populations respond to management actions, changes in the landscape, disease, or other factors.

#### *Fish Surveys*

Population balance (proper numbers of predator and prey fish) is first established in a farm fish pond by stocking the correct number of fish. After the first year, check fish pond balance during early summer by using a 1/8-inch mesh minnow seine 15 feet long and 3 feet deep. Seine at intervals around the pond by anchoring one end at the bank, pulling the seine straight out from the bank to its full length, and then sweeping in an arc back to the bank. Four to five seine sweeps in an average pond is usually enough. When seining, it is important to quickly record information about the fish and get them back into the water — seconds count.

Balance is determined by comparing age groups, condition, and numbers of bass and bluegill caught in the seine and from fishing records. Recent reproduction of both bass and bluegill in the seine indicate that the fish population is balanced. Trout do not often reproduce in ponds, so overall health of the fish is used as an indicator of pond balance. Fish caught by hook-and-line can be evaluated on body condition (fat, skinny, size of head in relation to body, etc.). Evidence of disease is a good indicator of pond imbalance.



Unwanted species (bullheads, etc.) may also be caught in the seine or when fishing, indicating that the pond may need to be renovated (poisoned or drained to remove all fish so that it can be restocked with favored species).

#### ***Wildlife Surveys***

Monitoring of wildlife for trends of increasing or decreasing populations or body weights of animals is important for land managers. Data on quail, white-tailed deer, breeding birds, turkey, and many other species are routinely collected by wildlife biologists using methods such as roadside counts, call counts, check stations, transects, and questionnaires. These data are then used to prescribe future harvesting or land management strategies.



### **34. Tillage, Delay in Spring**

#### **General Description:**

Stubble of small grain (wheat, barley, and oats) can be left standing until after the nesting season on fallow ground. Fallow ground is cropland that is left to rest (no crop planted) for a growing season.

#### **Effect on Habitat:**

Provides undisturbed nesting cover for many species of birds, as well as some grain for wildlife food. Often, annual forbs are associated with fallow ground. These annuals produce seed that is eaten by wildlife and support populations of insects that are essential to most young birds' diets.



### **35. Tillage, Implement Conservation Tillage on Cropland**

#### **General Description:**

Conservation tillage practices afford increased soil erosion control benefits while providing food and cover for wildlife. Some practices include minimum tillage, no-till, ridge till, mulch till and strip till. Usually at least 30 percent of the soil surface is covered with residue after planting. Conservation tillage systems should contain high residue producing crops, cover crops, waste grains, etc., to provide sufficient food and cover for wildlife.

#### **Effect on Habitat:**

Cropfield nesting is generally greatly enhanced in areas using these techniques. Water quality is improved by reducing soil erosion.

### 36. Tillage, Eliminate Fall Tillage of Harvested Crop Stubble

#### General Description:

Avoiding crop tillage practices such as moldboard plowing or disking after the crop is harvested and prior to the nesting season. Such practices greatly increase wind and water erosion potential and may eliminate habitat for most wildlife species.

#### Effect on Habitat:

Provides additional food and cover sources for migrating or wintering wildlife.



### 37. Timber Harvest, Clear Cut

#### General Description:

A type of timber management where all trees are harvested at the same time on a tract of land. Different tracts are cut each year and rotated over an area like a checkerboard. In general, tracts should not be over 40 acres in size, and often tracts as small as 10 to 20 acres are preferred. They should be long and narrow with irregular shapes. The increased sprouting of shrubs, grasses, and forbs that result from sunlight reaching the forest floor is beneficial to several wildlife species. Many wildlife species also prefer the edge between forest and openings created by such cuts.

This practice can be harmful to wildlife species that need woodlands to supply all of their habitat requirements such as woodpeckers. But again, if harvested tracts are not too large and there are sufficient amounts of surrounding forest, these species should remain. Clear cut is very beneficial for those species preferring successional stages 2, 3 and 4 (quail, rabbits, etc.).

#### Effect on Habitat:

- Useful in large forested areas with very little acreage in stages 2, 3 and 4 of succession. Reverts stages 5 and 6 to 2, 3, and 4, with more emphasis on stage 4.
- At least 3 to 4 den and/or large mature trees per acre should be left in areas protected from tree toppling winds.



### 38. Timber Harvest, Selective Cut

#### General Description:

Also called “all-aged management.” Only selected trees are cut, a few at a time. Stands managed in this manner have trees of all ages.

This benefits many different species of wildlife. Animals preferring stages 2, 3, and 4 of succession benefit from the sprouting of shrubs, grasses, and forbs where individual trees were cut, yet mature trees are present for those species which prefer stages 5 and 6.

#### Effect on Habitat:

- Stimulates shrub, grass, and forb understory production in woodlands due to removal of large tree crowns, which would otherwise cause shading.



- Also stimulates growth of mast-producing and other surrounding trees.
- At least 3 to 4 den trees per acre should be maintained. These may be mature trees, or large dead snags.



### 39. Water Developments for Wildlife

#### General Description:

You can provide drinking water for wildlife and livestock in several ways. Think about shallow areas for birds and gradual, non-slippery slopes so that wildlife, especially small animals, can get in and out without drowning.

Designs are available through state wildlife agencies and other sources.

- *Guzzlers*: Built by covering an area with an apron of fiberglass or some other material that sheds rain. The water is collected in a storage tank and slowly released into a trough from which wildlife can drink.
- *Dugouts*: Large, earthen catchment basins (built with bulldozers, backhoes, or draglines) designed to collect water for use by livestock and wildlife for drinking. They can be designed to collect run-off water from precipitation, or in areas with a high water table, can be filled by ground water. Side slopes should be gentle to provide easy access to the water for wildlife. Are also often used by waterfowl for resting and brood habitat.
- *Catchment Ponds*: Earthen dikes are constructed to retain water (usually run-off water from precipitation) in natural drainage areas. Placement of the dike is critical to avoid damage by floods, and also have the ability to collect sufficient water. Also used by waterfowl for resting and brood habitat.
- *Windmills*: A well is drilled in the ground and the windmill is used to pump water out of the ground and into a watering trough. The trough should be designed so wildlife can use it without danger of drowning.
- *Spring Developments*: Water seeping out of the ground or near the ground surface is collected in perforated pipe and put in a watering trough. This practice is feasible only in areas that have springs.
- *Birdbaths and Backyard Ponds*: Small ponds can be constructed in backyards and other urban areas to provide water for a variety of wildlife. Birdbaths also are useful for providing water in urban settings.

## 40. Water Level Manipulation (Water Control Structures)

### General Description:

By adjusting the water levels of a marsh, pond, or wetland up and down a manager can influence the vegetation in shallow parts of these areas. This often is used by waterfowl managers to produce vegetation such as smartweeds, wild millet, or other waterfowl food plants for the fall migration to attract ducks. Fisheries managers also use water level manipulation (WLM) to reduce overabundant bluegill population or to reduce predation of desired spawns. The timing of the draw-down (dewatering) and the inundation (reflood) will dictate the resulting effect of the management. Water is added to a system from an upstream reservoir, pumping, precipitation, etc. Water is removed or maintained at a desired level via a water control structure, such as a tube or spillway made from steel, concrete, wood, or plastic. Water control structures usually are combined with dams and shallow dikes for water control.

WLM is also effective in increasing water clarity (reducing muddy water), and can be of value to reduce invasion of willow and cottonwoods.

*Recommend only when inadequate structures are present on an existing dam or dike.*

*For specific designs on such structures see the local Natural Resources Conservation Service or state wildlife agency.*

### Effects on Fisheries:

- Dewatering (lowering levels) is done in the late summer or early fall to crowd forage fish (such as bluegill) out of hiding into the remaining deeper areas of the pond. The predators are then more efficient in reducing the populations.
- Water levels are maintained low until the early spring to allow vegetation to develop on the exposed areas.
- In spring the water levels are raised, inundating the vegetation that has developed. This vegetation provides the substrate and nutrients necessary for the production of zooplankton. The zooplankton will be the food source for newly-hatched insects that along with the zooplankton, will be the food source for newly spawned fish.

### Effects on Waterfowl:

- Dates of inundation influence the vegetative response. Early drawdowns favor millets and nutsedges. Late spring drawdowns enhance smartweed growth.
- Complete dewatering is permissible, however, this will sacrifice all fish. Also, most vegetation that is more than 2 feet under the water surface after inundation (reflooding) will be of little use to surface feeding ducks.
- The vegetation should be inundated (reflooded) to coincide somewhat with the waterfowl migration.





# Wildlife Management Practices Summary

Following is a summary of wildlife management practices (WMP's) commonly used for selected wildlife species. Which practices to use in each management situation will vary.

No.	Management Practices	Wildlife That May Be Judged																				
		American Kestrel	Beaver	Bluebird (Eastern or Western)	Brown Thrasher	Bullfrog	Canada Goose (Breeding)	Eastern Cottontail	Grasshopper Sparrow	Greater Prairie Chicken	Fox Squirrel	Largemouth Bass and Bluegill	Mallard (Breeding)	Mallard (Winter)	Mink	Mourning Dove	Mule Deer	Muskrat	Northern Bobwhite	Pronghorn	Raccoon	Redhead
1	Artificial Feeders									X												
2	Bush Chopping (mowing)	X		X	X		X	X	X	X		X		X	X	X	X	X	X	X	X	X
3	Brush Piles (Terrestrial)							X										X				
4	Controlled (Prescribed) Burning	X		X	X		X	X	X	X		X		X	X	X	X	X	X	X	X	X
5	Discing							X	X						X			X				
6	Grain, Leave Unharvested							X		X	X		X	X		X	X		X		X	
7	Harvest Less		X			X		X		X	X	X		X	X	X	X	X	X	X	X	X
8	Harvest More		X			X		X		X	X	X		X	X	X	X	X	X	X	X	X
9	Harvest Timing (hay or crops)							X	X	X			X			X		X	X			
10	Livestock Grazing Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	Nesting Boxes/Structures	X		X			X			X		X			X							
12	Plant Flowers																					
13	Plant Food Plots							X		X	X				X			X		X		
14	Plant Grass, Forbes and Legumes	X					X	X	X	X			X			X		X	X			X
15	Plant Mast Trees									X												
16	Plant Trees and Shrubs	X	X	X	X			X		X					X	X		X		X		
17	Ponds, Artificial Reefs										X											
18	Ponds, Clear Muddy Water										X											
19	Ponds, Construction		X			X	X				X	X	X	X	X		X				X	X
20	Ponds, Deepen Edges										X											
21	Ponds, Diversion Ditch		X			X	X				X	X	X	X	X		X				X	X
22	Ponds, Remove Trees Near Dike					X	X				X	X	X	X	X		X				X	X
23	Ponds, Repair Spillway					X	X				X	X	X	X	X		X				X	X
24	Ponds, Reseed Watershed										X											
25	Ponds, Restock										X											
26	Ponds, Stop Leaks					X	X				X	X	X	X	X		X				X	X
27	Ponds, Provide Shallow Water, Islands, Peninsulas					X	X					X	X	X	X		X				X	X
28	Predator Proof Fencing						X					X										X
29	Riparian Buffers		X			X	X				X	X			X			X			X	X
30	Root Pruning				X			X		X					X		X				X	
31	Small Dikes for Temporary Flooding						X					X	X	X			X				X	X
32	Stripcropping							X				X	X		X			X				
33	Survey Fish (Pond) or Wildlife	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	Tillage, Delay in Spring						X		X			X						X				
35	Tillage, Implement Conservation Tillage Methods							X		X		X	X					X				
36	Tillage, Eliminate in Fall						X		X	X		X	X		X	X		X			X	
37	Timber Harvest, Clear Cut			X	X					X					X			X				
38	Timber Harvest, Selective Cut			X	X					X								X			X	
39	Water Development for Wildlife									X		X	X		X	X			X	X		
40	Water Level Manipulation					X	X				X	X	X	X	X		X				X	

No.	Management Practices	Wildlife That May Be Judged						Species Judged Only in Urban Section*													
		Red-tailed Hawk	Red-winged Blackbird	Ring-necked Pheasant	Sharp-tailed Grouse	White-tailed Deer	Wild Turkey	Wood Duck	American Robin	Butterflies	Common Nighthawk	Eastern Screech Owl	Frogs	House Finch	House Sparrow	House Wren	Northern Cardinal	Northern Flicker	Rock Dove (Pigeon)	Ruby-throated Hummingbird	Starling (European)
1	Artificial Feeders													X	X		X	X	X	X	X
2	Bush Chopping (mowing)	X	X	X	X	X	X														
3	Brush Piles (Terrestrial)																				
4	Controlled Prescribed Burning	X	X	X	X	X	X														
5	Discing			X	X																
6	Grain, Leave unharvested		X	X	X	X	X														
7	Harvest Less			X	X	X	X	X													
8	Harvest More			X	X	X	X	X													
9	Harvest Timing (hay or crops)			X	X	X	X														
10	Livestock Grazing Management		X	X	X	X	X	X													
11	Nesting Boxes/Structures	X						X	X		X				X		X				X
12	Plant Flowers									X									X		
13	Plant Food Plots			X	X	X	X									X					
14	Plant Grass, Forbes and Legumes			X	X	X	X	X													
15	Plant Mast Trees					X	X	X													
16	Plant Trees and Shrubs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	Ponds, Artificial Reefs																				
18	Ponds, Clear Muddy Water																				
19	Ponds, Construction		X	X	X	X		X				X									
20	Ponds, Deepen Edges																				
21	Ponds, Diversion Ditch							X				X									
22	Ponds, Remove Trees Near Dike		X	X	X	X		X													
23	Ponds, Repair Spillway		X	X	X	X		X				X									
24	Ponds, Reseed Watershed																				
25	Ponds, Restock																				
26	Ponds, Stop Leaks		X	X	X	X		X				X									
27	Ponds, Provide Shallow Water, Islands, Peninsulas		X	X	X	X		X				X									
28	Predator Proof Fencing							X													
29	Riparian Buffers		X					X													
30	Root Pruning	X	X			X	X														
31	Small Dikes for Temporary Flooding		X					X													
32	Stripcropping			X																	
33	Survey Fish (Pond) or Wildlife	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	Tillage, Delay in Spring			X	X	X															
35	Tillage, Implement Conservation Tillage Methods			X	X																
36	Tillage, Eliminate in Fall		X	X	X	X	X	X													
37	Timber Harvest, Clear Cut	X				X															
38	Timber Harvest, Selective Cut							X													
39	Water Development for Wildlife					X			X	X			X	X		X	X				X
40	Water Level Manipulation		X	X	X	X		X				X									

\*The eastern cottontail, fox squirrel, and raccoon can be judged in urban and rural sections.



## Contest Activities

### IDENTIFYING COMMON WILDLIFE FOODS

Wildlife food habits have received intense scrutiny over the years. It is an essential element in achieving a good understanding of wildlife. By knowing what foods wildlife eat, we are in a position to alter that environment so as to influence or control animal populations.

A key element in the use of any kind of food by wildlife is availability when foods are abundant. Animals may have a preference for certain items. Those food items may be limited by the range of the plant, and by the season.

It is useful to examine the relative differences between species or groups of species, such as carnivores versus herbivores. Most species of wildlife are opportunists. They consume what is available and easy to obtain. Please use the list of wildlife foods as a general guide. Individual animal food habits may differ somewhat.

Pages 73 to 76 have a list and tables of foods commonly eaten by certain wildlife species or groups. The list is not entirely complete as most species of wildlife occasionally eat unusual things if they happen upon them by chance. All species in a certain wildlife group do not eat all foods listed for that wildlife group. For example, all turtles do not eat fruit. Some species eat fruit and not mussels, and others eat mussels and not fruit. Likewise, wildlife does not eat all species in a certain food group. For example, deer do not eat tender twigs and leaves from all trees and shrubs—only certain species.

*For purposes of judging, if any species in a wildlife group commonly eats any species in a food group, the food group should be marked for that wildlife group.*

An example of the scorecard for **Activity I** can be found on page 77. This activity is **worth 20 points.**

In a judging event, each food item shown is assigned a number. The participant marks an “X” in the appropriate box for each wildlife group that may eat the numbered food item. During an event, food items may be shown to contestants with pictures, plant parts, growing plants, or mounted specimens and/or live animals.

#### **Example:**

The judge has brought a persimmon tagged with the number 7. This would be classified as fruit, so the appropriate box for each wildlife group that eats fruit should be marked with an “X” in the column numbered 7. Boxes for bluebirds, deer, foxes, marten, quail, rabbits, sparrows, squirrels, thrashers, turkeys, turtles and woodpeckers should be marked. To verify, check the tables on pages 75 and 76. All species of turtles do not eat fruit. But remember, if any species of turtle eats fruit, column 7 should be marked for turtles.

### LIST OF WILDLIFE FOODS

Species	Food it Eats
<b>Bass</b>	Fish, frogs and salamanders, turtles, snakes, crayfish, insects, earthworms, small mammals, spiders, snails
<b>Bats</b>	Insects, fruit
<b>Beaver</b>	Bark, twigs and leaves, forbs, aquatic plants (roots), buds
<b>Bluebirds</b>	Seeds, fruit, insects, earthworms, spiders
<b>Bluegill</b>	Insects, earthworms, spiders, eggs, crayfish, fish
<b>Butterflies</b>	Nectar from flowers, fruit
<b>Deer</b>	Tender leaves and twigs, buds, nuts, lichens, ferns, forbs, fruit, mushrooms (fungi), grain, grass, bark, aquatic plants, sumac (seeds)

<b>Species</b>	<b>Food it Eats</b>
<b>Doves</b>	Grain, seeds
<b>Ducks</b>	Nuts, grain, insects, seeds, aquatic plants (seeds, leaves, bulbs, and tubers), snails, crayfish, frogs and salamanders, earthworms, fish, fruit and berries
<b>Foxes</b>	Insects, carrion, birds, fruit, small mammals (rats, mice and rabbits), crayfish, eggs, frogs and salamanders, lizards, snakes, earthworms
<b>Frogs</b>	Insects, earthworms, spiders, crayfish, snails, other frogs, turtles, snakes
<b>Grouse</b>	Leaves and twigs, buds, insects, seeds, forbs, fruit, grain, grass, nuts, spiders, earthworms
<b>Hawks</b>	Insects, frogs and salamanders, snakes, lizards, birds, crayfish, small mammals (rats, mice, rabbits, squirrels) carrion, fish
<b>Lizards</b>	Insects, spiders, other lizards, snakes, scorpions, birds, eggs, snails, small mammals (mice)
<b>Mink</b>	Small mammals, birds, fish, crayfish, insects, eggs, frogs and salamanders
<b>Moles</b>	Insects, earthworms, snails, centipedes and millipedes
<b>Otter</b>	Fish, crayfish, birds, frogs, salamanders, mussels, small mammals, eggs
<b>Owls</b>	Birds, insects, snakes, small mammals (mice, rats, rabbits, shrews, moles, opossums, foxes, lizards)
<b>Pronghorn</b>	Leaves and twigs, buds, forbs, grass, grain
<b>Quail</b>	Forbs, fruit, grain, insects, seeds, nuts, spiders, earthworms
<b>Rabbits</b>	Forbs, fruit, bark, grain, buds, grass, leaves and twigs, seeds
<b>Salamanders</b>	Earthworms, snails, insects, centipedes, millipedes
<b>Shrews</b>	Insects, snails, earthworms, salamanders, small mammals (mice), frogs
<b>Snakes</b>	Insects, birds, eggs, other snakes, fish, frogs, earthworms, small mammals (mice, rats), turtles, crayfish
<b>Sparrows</b>	Insects, seeds, spiders, forbs, buds, fruit, earthworms
<b>Squirrels</b>	Nuts, seeds, buds, mushrooms, fruit, grain, bark, eggs, leaves and twigs, grain
<b>Thrashers</b>	Seeds, insects, spiders, fruit, earthworms
<b>Trout</b>	Insects, snails, crayfish, small fish, earthworms, spiders, eggs
<b>Turkeys</b>	Nuts, tubers, forbs, seeds, insects, fruit, snails, centipedes and millipedes, grain, spiders, buds, grass, leaves and twigs, mushrooms, earthworms
<b>Turtles</b>	Aquatic plants, carrion, crayfish, fish, forbs, fruit and berries, insects, mussels, spiders, birds (ducklings)
<b>Wapiti (Elk)</b>	Grass, leaves and twigs, buds, forbs, bark, mushrooms, fruit, grain, tubers
<b>Warblers</b>	Insects, spiders, earthworms
<b>Woodpeckers</b>	Insects, fruit, spiders, seeds, grain, nuts
<b>Wrens</b>	Spiders, insects, earthworms, centipedes and millipedes

## Definitions of Somewhat Confusing Food Category Descriptions

**Grains:** Are to be cereal grains and include wheat, oats, rye, barley, rice, and corn. Anything else is considered a miscellaneous seed (with exception: fruits and berries and nuts).

**Mammals:** Any mammal, regardless of size, fits into this category. A photograph, live animal, museum mount specimen, or any part thereof represents an animal in this category.

**Carrion:** Should not be confused with the category mammal, birds, etc. This is defined as stinking, rotten, flesh. For example, if a bird bone (hollow) is present, then it represents the bird category, not carrion. When judging carrion, if the item has maggots (insect larvae) in it, it is still considered as carrion.

**Eggs:** Vertebrate eggs (mammals, birds, reptiles, amphibians, fish) are considered in this category. Invertebrate eggs (spiders, insects, etc.) represent the category of animal and the adult invertebrate.

**Fruit and Berries:** To include soft, fleshy, pulp-covered seed (see nut and seed category definition).

**Nuts:** This category includes hard mast (walnuts, hickory nuts, acorns, beechnuts, pecan, hazel nuts, almonds, etc.)

**Tuber:** Includes chufa, potato.

**Nectar:** Will be represented by flowers presented by themselves (no other plant parts) or honey (processed nectar).

**Forbs:** Can be shown with a flower part as part of the plant.

**Aquatic Plants** include the following genera:

algae - various genera

American lotus - *Nelumbo lutea*

arrowhead/duck potato - *Sagittaria* spp.

big duckweed - *Spirodela* spp.

bladderwort - *Utricularia* spp.

bulrush - *Scirpus* spp.

burreed - *Sparganium* spp.

cattail - *Typha* spp.

coontail - *Ceratophyllum* spp.

cordgrass - *Spartina* spp.

duckweed - *Lemna* spp.

floating heart - *Nymphoides* spp.

naiads - *Najas* spp.

pond weed - *Potamogeton* spp.

rushes - *Juncus* spp.

sedges - *Carex* spp.

smartweed - *Polygonum* spp.

spikerush - *Eleocharis* spp.

waterlily - *Nymphaea* spp.

watermeal - *Wolffia* spp.

watermilfoil - *Myriophyllum* spp.

water primrose - *Ludwigia* spp.

waterweed - *Elodea* spp.

<b>Wildlife</b>	<b>Wildlife Foods</b>	Aquatic Plants	Bark	Birds	Buds	Carrion	Centipedes and Millipedes	Crayfish	Earthworms	Eggs (vertebrate)	Ferns	Fish	Forbs (greens)	Frogs and Salamanders	Fruit and Berries	Grains	Grass	Insects
Bass				X				X	X			X		X				X
Bats															X			X
Beaver	X	X			X								X					
Bluebirds									X						X			X
Bluegill								X	X			X						X
Butterflies															X			
Deer	X	X			X						X		X		X	X	X	
Doves																X		
Ducks	X							X	X			X		X	X	X		X
Foxes				X		X		X	X	X				X	X			X
Frogs								X	X					X				X
Grouse					X				X				X		X	X	X	X
Hawks				X		X		X				X		X				X
Lizards				X						X								X
Mink				X				X		X		X		X				X
Moles							X		X									X
Otter				X				X		X		X		X				
Owls				X														X
Pronghorn					X								X				X	
Quail									X				X		X	X		X
Rabbits			X		X								X		X	X	X	
Salamanders							X		X									X
Shrews									X					X				X
Snakes				X				X	X	X		X		X				X
Sparrows					X				X				X		X			X
Squirrels			X		X					X					X	X		X
Thrashers									X						X			X
Trout								X	X	X		X						X
Turkeys					X		X		X				X		X	X	X	X
Turtles	X			X		X		X				X	X		X			X
Wapiti (Elk)			X		X								X		X	X	X	
Warblers									X									X
Woodpeckers															X	X		X
Wrens							X		X									X

<b>Wildlife</b>	<b>Wildlife Foods</b>	Leaves and Twigs	Lichens	Lizards	Mammals (Small)	Mushrooms (Fungi)	Mussels	Nectar From Flowers	Nuts (including acorns)	Scorpions	Seeds	Snails	Snakes	Spiders	Tubers	Turtles
Bass					X							X	X	X		X
Bats																
Beaver		X														
Bluebirds											X			X		
Bluegill														X		
Butterflies								X								
Deer		X	X			X			X		X					
Doves											X					
Ducks									X		X	X			X	
Foxes				X	X								X			
Frogs											X	X	X	X		X
Grouse		X							X		X			X		
Hawks				X	X								X			
Lizards				X	X					X		X	X	X		
Mink					X											
Moles												X				
Otter					X		X									
Owls				X	X								X			
Pronghorn		X														
Quail									X		X			X		
Rabbits		X									X					
Salamanders												X				
Shrews					X							X				
Snakes					X								X			X
Sparrows											X			X		
Squirrels		X				X			X		X					
Thrashers											X			X		
Trout												X		X		
Turkeys		X				X			X		X	X	X	X	X	
Turtles							X							X		
Wapiti (Elk)		X				X									X	
Warblers														X		
Woodpeckers									X		X			X		
Wrens														X		



**SCORECARD**  
**Wildlife**  
**Foods**  
 (20 points)

\_\_\_\_\_  
 Name

\_\_\_\_\_  
 Team name

*Instructions:* For each wildlife species below, mark an “X” in the appropriate box for all food items shown which may occur in its diet. Some wildlife species will not eat any of the food items shown.

	Food Items									
Wildlife	1	2	3	4	5	6	7	8	9	10
Bass										
Bats										
Beaver										
Bluebirds										
Bluegill										
Butterflies										
Deer										
Doves										
Ducks										
Foxes										
Frogs										
Grouse										
Hawks										
Lizards										
Mink										
Moles										
Otter										
Owls										
Pronghorn										
Quail										
Rabbits										
Salamanders										
Shrews										
Snakes										
Sparrows										
Squirrels										
Thrashers										
Trout										
Turkeys										
Turtles										
Wapiti (Elk)										
Warblers										
Woodpeckers										
Wrens										
Number Answered										
Number Correct										

Score = [(total correct – total incorrect) / total possible correct] x 20

Score \_\_\_\_\_

Total Answered \_\_\_\_\_

Total Correct \_\_\_\_\_

Total Incorrect \_\_\_\_\_



## ACTIVITY 2

### INTERPRETING WILDLIFE HABITAT FROM AERIAL PHOTOGRAPHS

This activity is divided into two parts and is used only for rural areas. The wildlife species and aerial photographs used in evaluating habitat vary for each region, but the procedures are the same. This section is an example of how this exercise is conducted.

**Activity II-A, worth 20 points**, involves using aerial photographs to judge the quality of an area of land for different wildlife species. An example of the scorecard that is used for this part of Activity II is shown on page 81. The contestant is given a list of wildlife species and then must rank each photograph in relation to habitat needs of these species. The species can be written on the scorecard in the space provided. The photographs are ranked by number from left to right starting with the best for each species on the scorecard. Consider only the area that is outlined. Do not consider surrounding areas. Rank the photographs one species at a time. Then mark an “X” in the box that corresponds to the rankings you gave the photos. Only one box should be marked under each wildlife species. This part is scored using a Hormel system (briefly explained in the scoring section) to take into account similarities in photographs. The Hormel scoring system is somewhat complicated. Extension educators familiar with livestock judging can give you further explanation of the system.

When looking at aerial photos, imagine how the countryside would look if you were a bird flying over it. If you have flown in an airplane, you know how it looks. The way a bird or pilot sees land is the way it appears on an aerial photograph. For example, a silo appears round, buildings look like squares or rectangles, woods are rough, and fields are smooth.

When viewing aerial photographs, hold them so that shadows of objects fall toward the reader. Otherwise, valleys appear as ridges and vice versa. All objects are small, but you can determine what they are by comparing their size with the size of a known object. Other things that help are tone (shade of gray), shape and shadow. The length of shadow indicates the height of an object. The tone varies with the seasons of the year, so it’s important to know the season when aerial photographs were made.

Most photographs used in judging events are made by the U.S. Government, and the date made is usually in the upper left hand corner. The scale of such photos can vary, but often either 4 or 8 inches on the map equals 1 mile on the ground.

**Activity II-B is worth 10 points** and involves an oral presentation before a judge, demonstrating a basic understanding of aerial photographs and how to read them. Each participant is required to give oral reasons to a judge for one or more species used in Activity II-A. Participants are told which species in advance so they can make notes while studying the photographs. Oral reasons are limited to five minutes for all species. Reasons should include the order of selection and why the order was chosen. Practice photographs and examples on how to rank them for various wildlife species begin on pages 74 and 76.

#### **Example—Interpreting Aerial Photographs**

Using four aerial photographs found on pages 83 and 84, let’s learn how to complete this part of the scorecard. The written reasons given in the examples illustrate why rankings differ for various species.

For American kestrels, the areas would be ranked **2, 3, 4, 1**. These birds prefer large, open areas in stages 2 and 3 of plant succession interspersed with areas in stages 4, 5 and 6 of plant succession. Area 2 fits this well. Area 3 also supplies this type of habitat, but has less area in stage 2 or 3 of plant succession and is rated lower than area 2. Area 4 has large open areas, but has little interspersed of other plant succession stages and is ranked third. Area 1 has no open areas and thus is ranked last.

Brown thrashers would prefer the areas in the order of **3, 2, 1, 4**. Thrashers prefer dense shrub thickets. Area 3 supplies the greatest amount of this type of habitat. Area 2 has more area in stage 4 of plant succession than either area 1 or 4. Areas 1 and 4 are difficult to judge. In this instance, we would assume there is more shrub cover associated with the woodland area in Area 1 than what is shown in Area 4.

Bluebirds would prefer the areas in the order **4, 2, 3, 1**. They like to nest in tree cavities adjacent to open fields and prefer open fields for feeding.

Doves also would prefer the areas in the order **4, 2, 3, 1**. Since doves prefer open fields for feeding, this rating order is based on the amount of open fields available.

For cottontails, the area should be rated **2, 3, 4, 1**. Area 2 is preferred because it has nearly the proper ratios of habitat components for rabbits (one-third grassland, one-third cropland, and one-third shrub cover), and they are well interspersed (mixed together). Area 3 doesn't have enough grass or cropland and too much cover, but it has more habitat variety than area 4. Area 4 is lacking interspersed but has more habitat diversity (different kinds of habitat) than Area 1.

These areas would be rated **1, 3, 2, 4** for gray squirrels, hairy woodpeckers, and ovenbirds. This is based simply on the amount of stage 5 and 6 deciduous woodland available.

For bobwhite quail, the areas would be ranked **2, 3, 4, 1**, the same as for cottontails. The reasons are similar in this case. However, in some judging instances, areas may be rated differently for quail and rabbits. For example, quail do not need quite as much shrub cover as do rabbits.

Raccoons would prefer the areas in order **3, 4, 2, 1**. Areas 3 and 4 both have streams which attract raccoons. Area 3 is ranked ahead of 4 because it has more shrubs and trees along the stream. Area 2 is ranked ahead of Area 1 because of the interspersed areas in different successional stages.

For ruffed grouse, the areas would be ranked **3, 1, 2, 4**. Ruffed grouse need successional stages 4, 5 and 6 interspersed together. Area 3 supplies the greatest amount of this type of habitat. Area 1 lacks interspersed, but has more stage 5 and 6 vegetation than either 2 or 4. Area 2 is ranked ahead of Area 4 because of the amount of stage 4, 5 and 6 vegetation.

For turkeys, the areas would be listed **3, 2, 1, 4**. According to the Wildlife Species section, turkeys need one-fourth to one-half of their range open, and one-half to three-fourths mature woodland. Area 3 is preferred because it has roughly one-half the area in mature woodlands, and nearly one-fourth the area is open. Area 2 is second, as it has both open areas and mature woodland. However, it does not meet the mature woodland requirement as well as area 3. Area 1 is ranked third because it has more timber than area 4, and more cover in general. Due to the absence of woodland, it is doubtful if Area 4 could support a turkey population.

For deer the area would be rated **3, 2, 1, 4**. Deer prefer woodland areas interspersed with areas in various stages of succession. Area 3 fits this well; it includes 3 stages. Area 3 is ranked ahead of 2 because it has more successional stages and interspersed of the various stages. Area 2 is selected over area 1 because of the variety of succession it offers. Area 4 is too open, so Area 1 is picked third and 4 last.

Wood ducks would prefer the order **3, 4, 1, 2**. Area 3 has ponds and better cover along its streams than Area 4. Because Areas 1 and 2 have no ponds or streams, there is no difference between them; therefore, a minimum cut of 1 will be used.

Bass and bluegill would prefer the areas in the order of **3, 4, 1, 2**. Only Area 3 has ponds. Areas 3 and 4 have streams, so they are preferred over Areas 1 and 2.

## INTERSPERSION

As discussed in the *Concepts* section, many wildlife species prefer areas with high interspersion of lands in different successional stages. Others need low interspersion or large areas of one habitat type. It is important to consider the amount of interspersion when ranking aerial photographs. One way of measuring the amount of interspersion of an area is to apply the “interspersion index” principle. This can be done using aerial photographs by counting the number of times the habitat changes along an imaginary north-south line across the widest part of the area—then along the widest east-west line. Next, add these two numbers together to get an interspersion index value. Compare this value with the other three areas to be judged. The higher the value, the better for quail, rabbits, and other wildlife species that like areas with high interspersion. The interspersion indexes for the four areas shown on the aerial photographs are:

Area:	Interspersion Index:
3	18
2	13
4	4
1	0

### Examples—Organizing Oral Reasons

**EXAMPLE #1:** I placed this class of aerial photos for grasshopper sparrow habitat 1-2-3-4. I placed 1 over 2 because 1 had more grassland (stage 3 of plant succession) and fewer shrubs than 2. I grant that 2 showed dense grass with abundant litter, but 1 had larger blocks of grassland which is important for area-sensitive species.

Going to the middle pair, I placed 2 over 3 because 2 showed fewer edges and less trees. I admit 3 was primarily all grassland, but was in stage 4 of plant succession which is shrubs going to a young woodland.

I placed 3 over 4 in my bottom pair because 3 had more grassland and less cropland and woodland. I realize 4 would produce more insects, but 3 could be rejuvenated into a more productive grassland.

However, I placed 4 last because it was almost entirely cropland and mature woodland. For these reasons I placed this class of aerial photos for grasshopper sparrow habitat 1-2-3-4.

**EXAMPLE #2:** I placed this class of aerial photos for white-tailed deer habitat 2-3-4-1. Starting the class, I placed 2 over 3 because of the high interspersion index provided in area 2. I grant that 3 had good interspersion of stages 3 and 4 plant selection but very little cover in stage 5 or young woodland.

Going to the middle pair, I placed 3 over 4 because 3 had better interspersion and fewer large crop fields. I admit 4 showed good vertical structure with a herbaceous layer for food as well as true canopy for cover.

I placed 4 over 1 in my bottom pair because 4 had a better mix of agricultural croplands, rangeland and woodlands.

However, I placed 1 last because the area was almost entirely cropland with one narrow corridor connecting them to the river. The river was excellent habitat, but was outside the area to be judged and could not be considered.

For these reasons, I placed this class of aerial photos for white-tailed deer habitat 2-3-4-1.

ACTIVITY  
**2**

**SCORECARD**  
**Habitat**  
**Evaluation**  
**of Aerial**  
**Photographs**  
(20 points)

\_\_\_\_\_  
Name

\_\_\_\_\_  
Team name

**Activity 2A Instructions:** For each species, rank the areas outlined for their habitat value. Mark an "X" in the box with the appropriate ranking for each species. DO NOT consider potential of the area only its present quality. DO NOT consider surrounding areas only areas outlined.

**Wildlife Species**

				1	2	3	4	5	6	7	8
<b>Ranking</b>											
1	2	3	4								
1	2	4	3								
1	3	2	4								
1	3	4	2								
1	4	2	3								
1	4	3	2								
2	1	3	4								
2	1	4	3								
2	3	1	4								
2	3	4	1								
2	4	1	3								
2	4	3	1								
3	1	2	4								
3	1	4	2								
3	2	1	4								
3	2	4	1								
3	4	1	2								
3	4	2	1								
4	1	2	3								
4	1	3	2								
4	2	1	3								
4	2	3	1								
4	3	1	2								
4	3	2	1								
Score											

Score Activity 2A \_\_\_\_\_

**Oral Reason—  
Aerial Photography**  
(10 points)

**Activity 2B Instructions:** For one or more of the species used in activity 2A, you will be required to give reasons why you chose the order of photographs. This is a suggested score sheet for judging oral reasons.

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

Team: \_\_\_\_\_ Species: \_\_\_\_\_

Logic:	0	.5	1	1.5	2
Presentation:	0	.5	1	1.5	2
Knowledge of Species:	0	.5	1	1.5	2
Use of Wildlife Terms and Concepts:	0	.5	1	1.5	2
Poise and Appearance:	0	.5	1	1.5	2

Total Score (sum of circled items above) \_\_\_\_\_

Score Activity 2B \_\_\_\_\_

**Total Score Activity 2** \_\_\_\_\_

## Aerial Photos

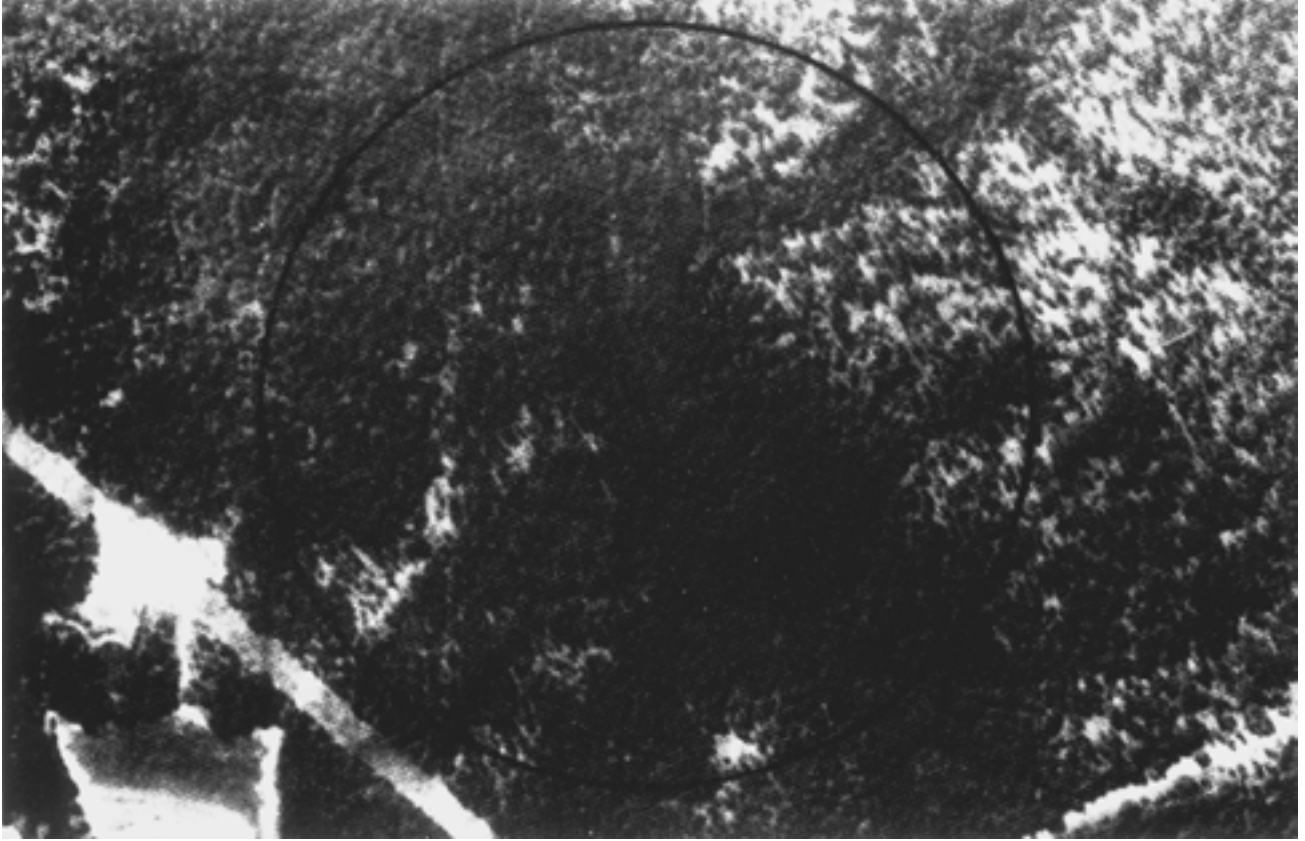


Photo 1 — Area 1

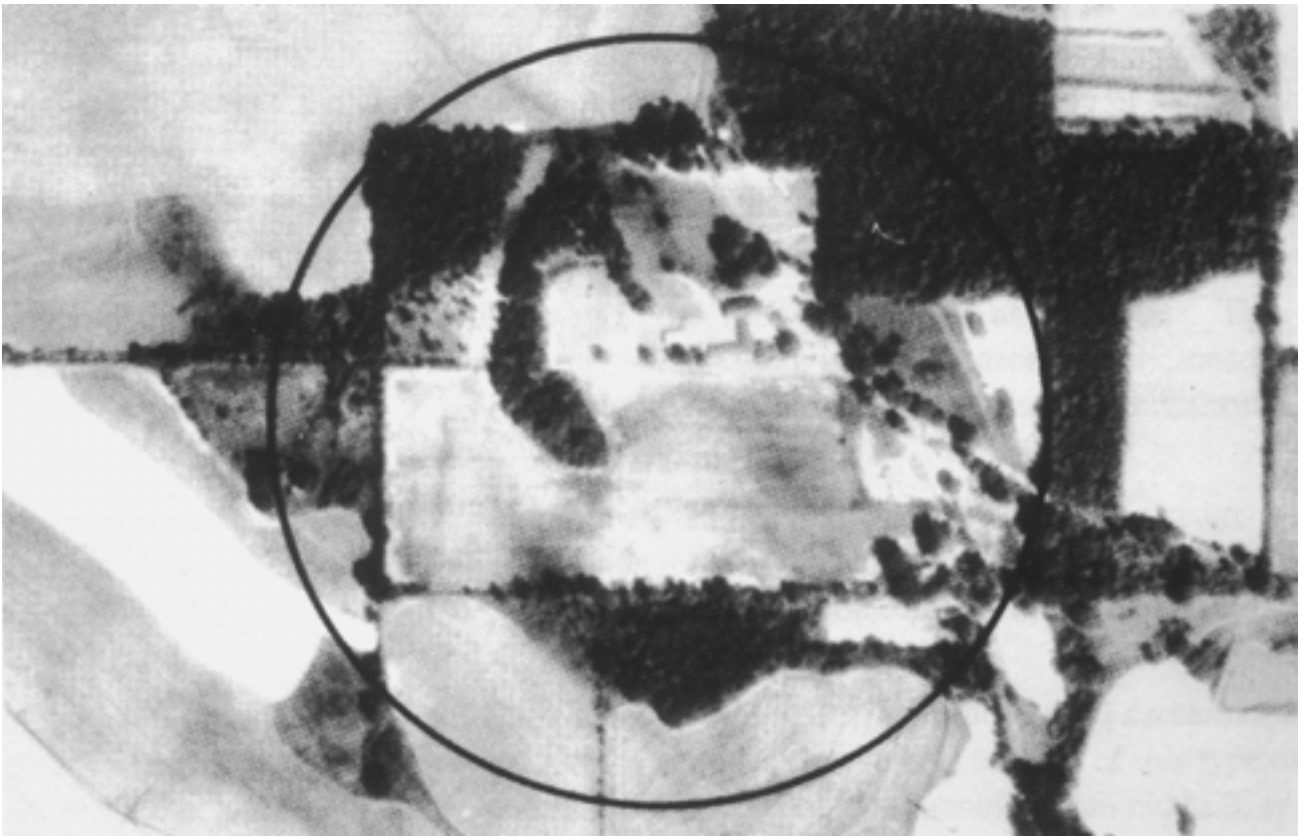


Photo 2 — Area 2

## Aerial Photos

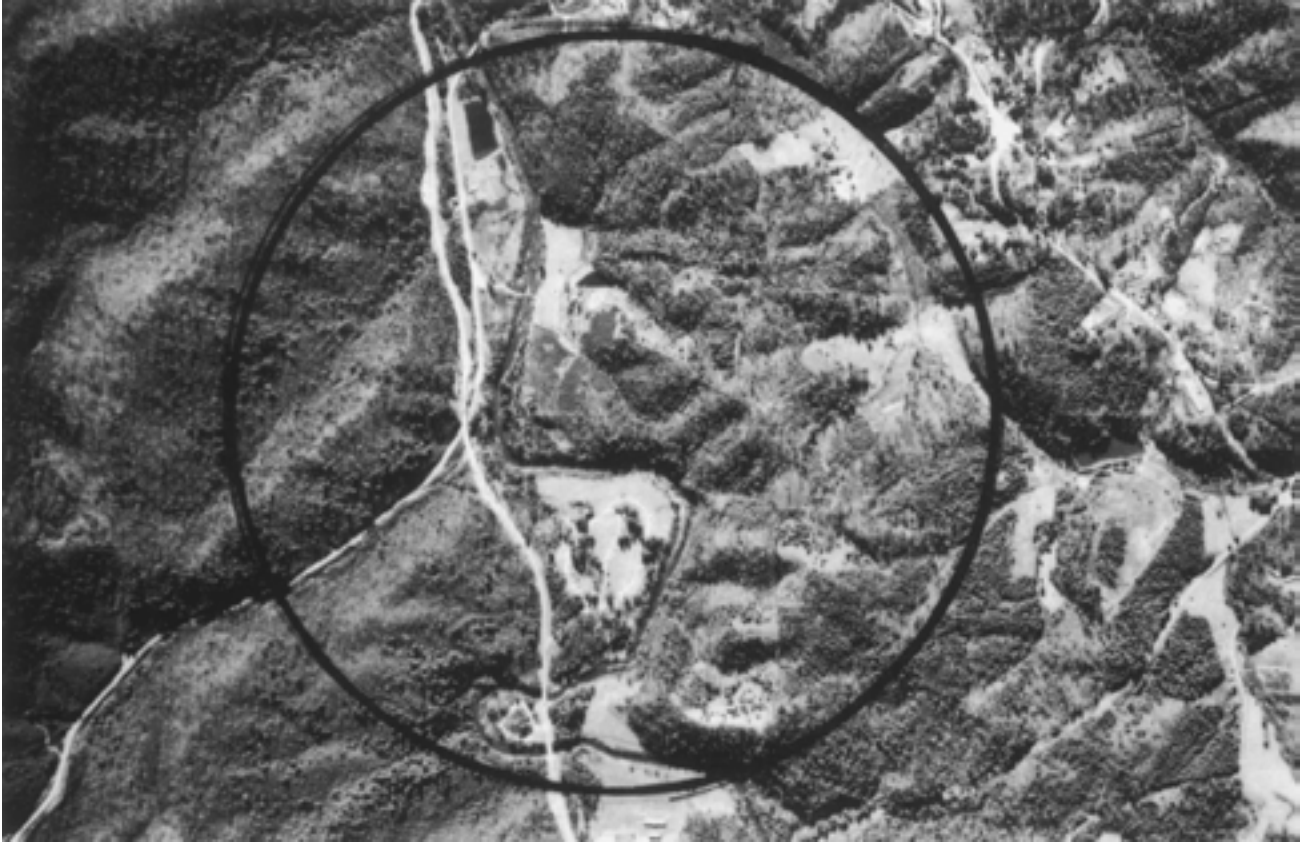


Photo 1 — Area 1



Photo 2 — Area 2



## ACTIVITY 3

### ON-SITE HABITAT MANAGEMENT RECOMMENDATIONS

**Activity III, worth 30 points**, addresses the prescription of *Wildlife Management Practices (WMP's)* necessary to improve an area for each of the wildlife species listed. A blank scorecard is shown on page 87. Space is provided to write in the species and practices (with corresponding numbers) recommended for judging. Only practices that are appropriate for the specific contest being administered should be written in the spaces provided.

Leaders and participants will be informed of the region(s) and species that will be used for any national contest well in advance of the event. The area(s) may be shown to the judging team by an on-site visit or with a series of pictures.

The scorecard for Activity III is completed using information found on the table on pages 70-71 and from the *Wildlife Species* and *Wildlife Management Practice* sections. The appropriate box for all WMP's that would improve the area for each species listed on the scorecard should be marked with an "X."

Consider each species separately. For example, WMP's for deer would not be the same as those for bluebirds. Prescribe only the appropriate practices that have been listed as applicable for the species. These practices are found in the *Wildlife Species* section.

This activity can be used in both urban and rural areas. Any of the practices can be used in both areas.

Cost or other land management objectives should not be considered.

Assume that all species listed on the scorecard are present in the area. Also, it must be assumed that the area is large enough to support all listed species.

For the activity, you are shown a tract of land and given a list of species (up to eight). For each species given, you are to select which management practices would have merit on that particular tract. You will note from the *WMP Summary* chart (pages 70-71) each species has only certain practices that are applicable. If a practice for a specific species is not marked on the WMP Summary chart, *never* use that practice for the purposes of the contest. For example: if you were given the Northern Bobwhite you should not select the practice Pond Construction, because it is not one of the practices listed that can be used with the bobwhite. Do not select this practice even if you think that a pond would be a benefit to quail on this tract. Or, you would not want to select *Ponds, Determine Balance* for anything but largemouth bass and bluegill.

As a contestant you are expected to know which practices go with each species. Then for each of those practices, you decide if it has merit for the particular given tract; merely a yes or no choice. All the other practices should not be considered and should be left blank. Because there are more blanks than "X's" on the chart, it is very doubtful that someone, just guessing, would get a very good score. The odds are that without good knowledge of the chart you would be better off leaving a blank than making a selection.

When selecting practices, choose those that are not already being applied. The activity is for you to determine how to alter the area to improve the conditions for each of the species given to you. For example: you should not select *Plant Food Plots* if there are already food plots established, unless you believe there should be food plots planted in addition to those already present.



*Harvest More* and *Harvest Less* are directly opposite one another. They should not both be selected unless you are provided information that would indicate a need to harvest more of one sex or age class and less of another. From just looking at the land, it would be impossible for you to determine harvest regimes. So unless you are given information such as age or sex ratios, prior harvest information, or population estimates, always leave these *Harvest More/Less* blank. Also, because harvest is referring to consumptive use of the species (i.e. hunting, trapping, or fishing), you should not select either of these for non-game species. It makes no sense to *Harvest Less* or *Harvest More* screech owls.

*Timber Harvest, Clear Cut* and *Timber Harvest, Selective Cut* are conflicting management strategies that normally should not be used together. However, there could be clear cut spots or strips within a selectively cut area, or a portion of a woods could be clear cut while another is cut selectively. Do not assume that because you selected one of this pair the other is automatically excluded. But most of the time both practices are not used for the same area.

You will note that for most species that have *Ponds, Construction*, all the pond maintenance practices are also checked. This may help you to remember what practices go with what species. It is assumed that when a pond is constructed, it needs to be maintained. Check pond maintenance practices only for existing ponds, and only for those practices not already being applied. The pond maintenance practices are *Ponds, Diversion Ditch; Ponds, Remove Trees Near Dike; Ponds, Repair Spillway; and Ponds, Stop Leaks*.

The comments given here are merely suggestions on how to learn the material for Activity III, as well as some hints on how to improve your score. You or your leader may have other ideas or learning methods, and you should feel free to use them.



**SCORECARD**  
**On-Site**  
**Habitat**  
**Recommendations**  
 (30 points)

\_\_\_\_\_  
 Name

\_\_\_\_\_  
 Team name

**Wildlife Species**

	1	2	3	4	5	6	7	8
Artificial Feeders								
Brush Piles (Terrestrial)								
Rotary Mowing or Shredding								
Controlled Prescribed Burning								
Discing								
Grain, Leave unharvested								
Harvest Less								
Harvest More								
Harvest Timing								
Livestock Grazing Management								
Nesting Boxes/Structures								
Plant Flowers								
Plant Food Plots								
Plant Grass, Forbs and Legumes								
Plant Mast Trees								
Plant Trees and Shrubs								
Ponds, Artificial Reefs								
Ponds, Clear Muddy Water								
Ponds, Construction								
Ponds, Deepen Edges								
Ponds, Diversion Ditch								
Ponds, Remove Trees Near Dike								
Ponds, Repair Spillway								
Ponds, Reseed Watershed/Filterstrips								
Ponds, Restock								
Ponds, Stop Leaks								
Ponds, Provide Shallow Water, Islands, Peninsulas								
Predator Proof Fencing								
Riparian Buffer								
Root Pruning								
Small Dikes for Temporary Flooding								
Stripcropping								
Survey Fish (Pond) or Wildlife								
Tillage, Delay in Spring								
Tillage, Implement Conservation Tillage								
Tillage, Eliminate in Fall								
Timber Harvest, Clear Cut								
Timber Harvest, Selective Cut								
Water Development for Wildlife								
Water Level Manipulation								
Number Answered								
Number Correct								

Score = [(total correct – total incorrect) / total possible correct] x 30

Total Answered \_\_\_\_\_

Total Correct \_\_\_\_\_

Total Incorrect \_\_\_\_\_

Score \_\_\_\_\_



## ACTIVITY 4

### RURAL WILDLIFE MANAGEMENT PLAN

**Activity IV is a team effort and is worth 30 points.**

Referring to the same tract of land used in Activity III, participants make written recommendations based on the objectives of the landowner as stated on the Field Condition Sheet. As a team, they interpret the objectives, state which wildlife management practices are to be used and how the practices positively or negatively affect the designated species, and tell where these practices can be applied.

No more than one side of a sheet of paper may be used.

An example of a landowner's objectives might be: "I want to manage for both white-tailed deer and bluebirds." We would then identify those management practices that could be used to benefit both deer and bluebirds and discuss where compromises might be necessary. **Field Condition Sheet:**

The Field Condition Sheet will contain the following information:

1. Landowner's objectives;
2. Aerial photograph or sketch map of the property;
3. Definition of property boundaries, size of tract;
4. Population conditions for some of the species;
5. Special considerations, which can include costs.

If any of the above are omitted, they are not considered by event organizers to be important to the development of the wildlife management plan.

### SAMPLE FIELD CONDITION SHEET

#### ***Landowner's Objectives:***

Mr. and Mrs. Robert Boles have acquired a 71-acre tract in rural Elk County, Kansas. Knowing your team has a vast knowledge of wildlife management, they have contacted you for assistance and hope that you'll be able to develop a wildlife management plan for their land. The Boles are stable in their income, so expenses are not a major problem so long as they are justifiable.

Mrs. Boles is a retired high school biology teacher who has spent most of her life in the Flint Hills. She has a keen interest in the prairie ecosystem, particularly the grassland fauna such as the grasshopper sparrow.

Mr. Boles farmed all his life, but has outside business interests. He hopes that through management he will be able to increase the number of bobwhites on this tract. Recently, Bob has taken up hunting turkeys and would like to attract huntable numbers of this gamebird to the tract as well.

Both Mr. and Mrs. Boles enjoy fishing, especially with their grandchildren. Therefore, they would like to provide bluegill fishing for the children. Even though bluegill fishing is most important, an occasional largemouth bass would be nice.

#### ***Definition of Property Boundaries, Size of Tract:***

The tract is 71 acres in size. It is located in the southern half of Section 13, Township 29 South, Range 12 East. The tract has irregular boundaries. It is bounded by a graveled field access road on the north, and barbed wire fence on the south and west sides. The county road marks the east property boundary. There is a pond located on the property that is roughly 1.1 acres in size.

***Population Conditions for some of the Species:***

Of the quail harvested off the tract last season, 13 were males and 10 were females. Of the females, 6 were young of the year and 4 were adults. Of the males, 7 were young of the year, while 6 were adults. However, doves shot over the pond were 87.5 percent juveniles (21 of 24). Deer are frequently seen on the tract. The buck taken by Mr. Boles last December was in poor body condition, but sported a fine rack.

The pond has hundreds of very small bluegill and other sunfish. Bass are very large, but few have been caught. The channel catfish in the pond are in good condition, but difficult to catch.

***Special Considerations:***

The soils on the tract are mostly Steedman Stony Loam (80 percent) with some Eram Silty Clay Loam (20 percent). Soil pH averages 6.8.



ACTIVITY  
5

## URBAN LANDSCAPES AND BACKYARD HABITAT PLANS

**Activity V, worth 30 points**, is a team effort. It involves evaluating habitats in urban areas, and developing a management map and justification sheet for the recommendations. It should be done in the field, but if inclement weather or other circumstances warrant, the activity may be done indoors using slides or other visual aids.

### **Introduction:**

Most people live in urban areas with intensively managed landscapes around home environments. Rural homes and many in urban areas have backyards that can be managed for wildlife habitats and family enjoyment. This phase of the handbook enables participants to work near the home to evaluate landscapes.

Species that adapt to human development are selected for this exercise. Habitat requirements provided by the environment are still basic to wildlife survival. Habitat requirements are supplied by vertical layers of short, intermediate, and tall plants as well as by buildings in the area. The horizontal arrangement of vegetation and/or buildings and the different layers (height) determine which wildlife species might prefer the area. Corridors that enable movement of animals between the different areas are also important features of horizontal arrangement. Remember, buildings in urban areas also serve as places to roost, nest, and hide for some wildlife species. Excluding house sparrows, pigeons (rock doves), or European starlings from buildings, eaves, etc., is management to remove habitat for these species that are often pests around buildings. Leaving an unused chimney open may benefit desirable chimney swifts.

### **The Activity:**

This is a timed team event. All phases of the exercise must be completed and handed to the judges within the time specified (usually about 1 hour).

### **Equipment Needed Includes:**

Compass, acetate sheets, marking pens (not permanent), grid paper, blank paper, and clipboard.

Teams are to develop a wildlife management plan for an assigned urban or backyard area.

### **The Goals:**

The goals for the contest are to manage four or five wildlife species on one or more of the urban areas listed on page 18, such as urban forests, corridors, etc. The inner city area is not a good choice for a wildlife plan because there are few options for management. You must work under the environmental conditions of the contest area. At the time of the competition, contest organizers indicate the needs of the landowner for using the area. You should know from information provided at this time whether the wildlife in question is found seasonally or year-round in the area, and you should make management decisions accordingly.

### **The Products:**

The products from this phase of the contest will be a management map with plantings or other management practices drawn to scale, and written justifications about each team's management decisions. The map shall be constructed on one sheet of paper or acetate, oriented to the site, with features of the landscape drawn to scale including your management alterations. Each change you make to the existing landscape should be justified in writing using simple statements about the benefits of proposed management for the wildlife being considered, and how it relates to the landowner's objectives. Any

major landscape features left unaltered should also be explained. The judges will not assume you know whether a habitat is acceptable for wildlife in the present state unless you tell them in your written justifications.

### **Species:**

Events will use appropriate species from the following list:

- |                        |                               |
|------------------------|-------------------------------|
| 1. American robin      | 9. House finch                |
| 2. Butterflies         | 10. House sparrow             |
| 3. Common nighthawk    | 11. House wren                |
| 4. Eastern cottontail* | 12. Ruby-throated hummingbird |
| 5. Eastern screech owl | 13. Northern cardinal         |
| 6. European starling   | 14. Northern flicker          |
| 7. Fox squirrel*       | 15. Raccoon*                  |
| 8. Frogs               | 16. Rock dove (pigeon)        |

\*The cottontail, fox squirrel, and raccoon can be judged in both urban and rural.

### **Landowner Objectives:**

Participants are to make recommendations based on the objectives of the landowner as stated on the Field Condition Sheet. No more than one side of a sheet of paper may be used for your written justifications.

An example of a landowner's objectives might be: "I would like to have flickers, cottontails and robins in the park."

### **Field Condition Sheet:**

The Field Condition Sheet contains the following information:

1. Landowner's objectives;
2. Sketch map of property boundaries and structures that already exist;
3. Scale of sketch map;
4. Special considerations—e.g., do wildlife species use the area only during certain seasons.

If any of the above are omitted, they are not important to the development of the urban wildlife habitat management plan.

### **Practice Pages:**

The example pages that follow on pages 93-95 illustrate a well designed backyard habitat. The plan is drawn to scale and includes a legend to show property boundaries and structures.

Page 95 is an example of what a finished management plan map for the hypothetical yard might look like. Remember, it is unlikely that areas used in the national or other events will be similar to this hypothetical yard, and the practices illustrated in the example may not be applicable.

Page 92 is an example of field condition sheet information (to be supplied to the participant at time of event) and written reasons (the participant must complete during the event) for the completed practice management map.

Determine the correct map scale by looking at the size of the area being evaluated. For instance, when a large area such as a park is being drawn, the scale may be as small as 1 square of the grid sheet equals 50 feet. For a small area like a backyard, it may be as large as 1 square equals 1 foot.

The size of existing features in the habitat can be determined by measuring with a tape, pacing off distances, or visual estimation. The most accurate method is measuring with a tape. Features recommended to improve the existing habitat should also be drawn to scale.

Attention to where planned features are placed in relation to existing features is important. For example, young trees planted too close to buildings can cause problems with building maintenance. In addition, the tree will not grow as well when planted too close to buildings or other trees.

## EXAMPLE—URBAN ACTIVITY

Participants receive field condition information similar to the following sample. Also given is an example of how to write reasons for the hypothetical management plan shown on the previous page. Remember this is only an example. Reasons written for other situations would likely be much different and could be more descriptive than those shown here.

### FIELD CONDITION SHEET

**Area:** Residential

**Species to Manage:** American robins, fox squirrels, frogs, hummingbirds, northern flickers.

**Landowner Objectives:** Provide some habitat for all of the species listed. Ensure that the pond is visible from the house and safe for children.

### WRITTEN REASONS EXAMPLE

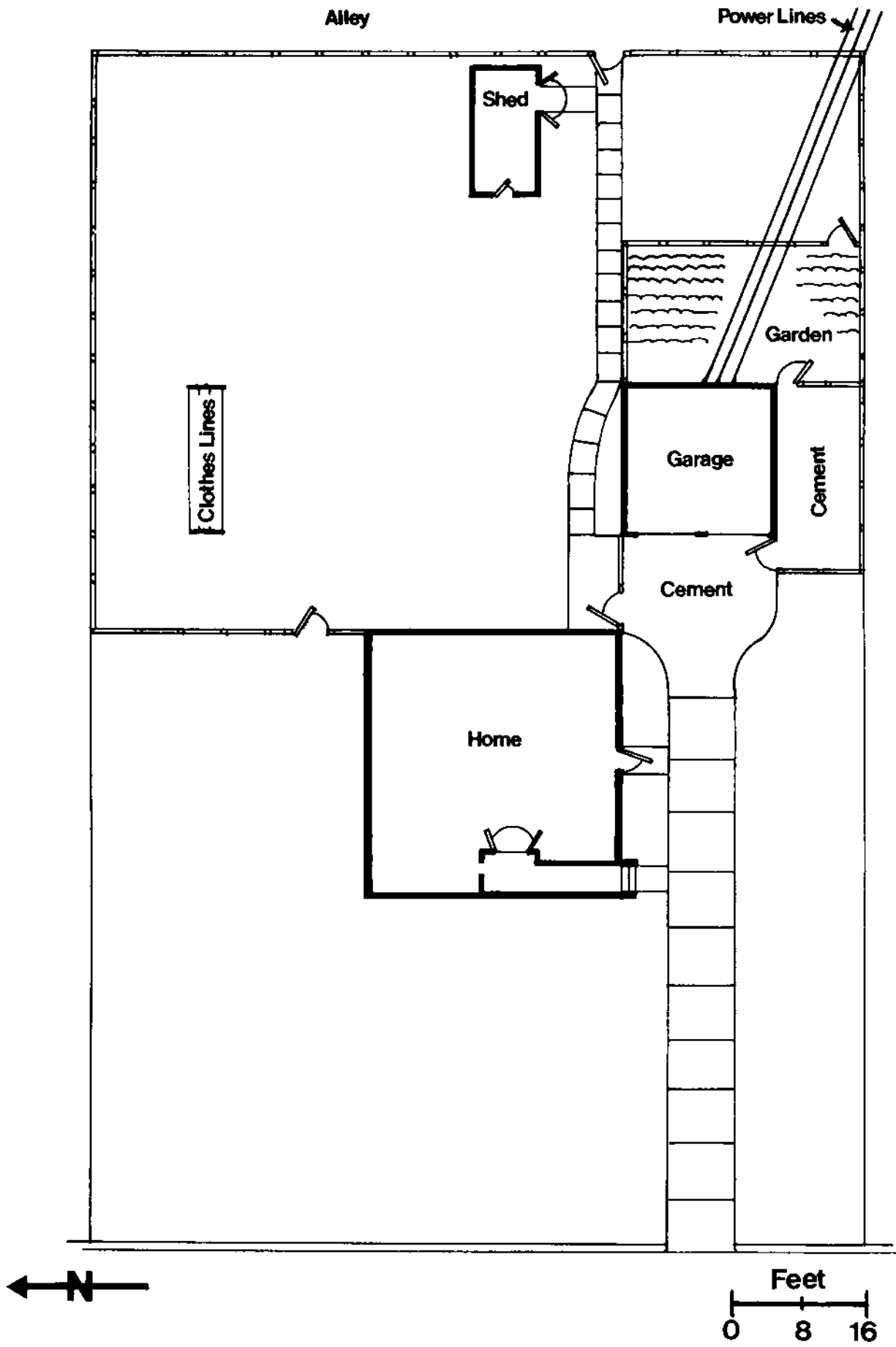
**American Robins:** Plant deciduous and small evergreen trees for nesting habitat. Maintain open areas of grass for summer foraging. Plant fruit and berry producing shrubs for fall and winter food. Construct small pond for water. Open water is available but an additional bird bath in the front yard will attract robins.

**Fox Squirrels:** Plant mast and other trees for future food and cover. Put up nesting boxes when large deciduous trees planted in the front yard grow to sufficient size. Pond to supply water during the summer months. Due to the lack of large deciduous trees, it may be over 10 years before this yard is sufficient squirrel habitat.

**Frogs:** Construct small pond. Allow tall, dense herbaceous vegetation to grow along southwest shore of pond to provide cover. To improve safety for children, the pond water level is not to be over 1<sup>1</sup>/<sub>2</sub> feet deep. This is not deep enough for frogs to survive in the winter. Drain pond in the fall, and capture and release all frogs into neighboring ponds that have sufficient water depth.

**Hummingbirds:** Include flowers such as red petunias and begonias in flower gardens in the front and back yards. Plant flowering shrubs such as Rose of Sharon and dogwood. The planned tree and shrub plantings should provide sufficient nesting habitat. Locate an artificial feeder filled with sugar water near the house.

**Northern flickers:** Plant softwood trees for future nesting sites. Place a nesting box on the shed in backyard to provide nesting habitat until trees become large and old enough. Locate a suet feeder as shown on plan map. When the evergreen tree in the backyard attains sufficient size, strap the suet feeder to the tree trunk.

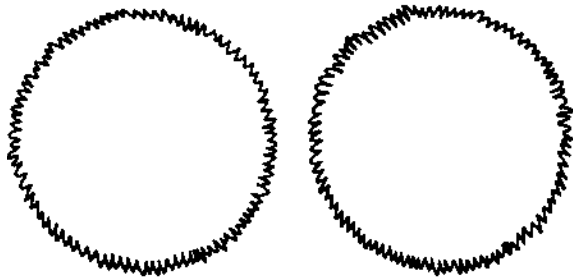




Herbaceous  
Vegetation  
{ Flowers & Etc. }



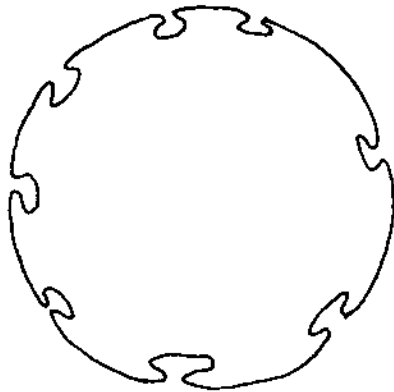
2 to 4ft. H



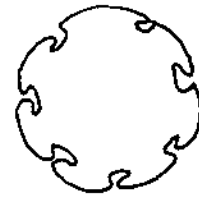
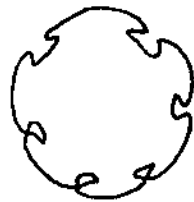
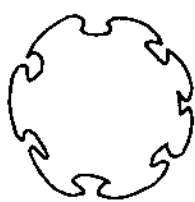
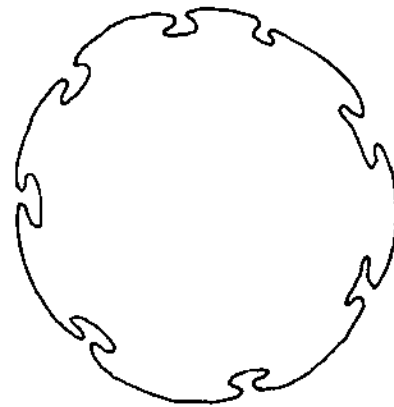
Large Evergreens  
75ft.H x 20ft.W



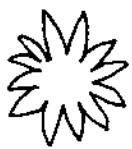
Small Evergreens  
25ft.H x 10ft.W



Large Deciduous  
75ft.H x 30ft.W



Small Deciduous  
20ft.H x 15ft.W

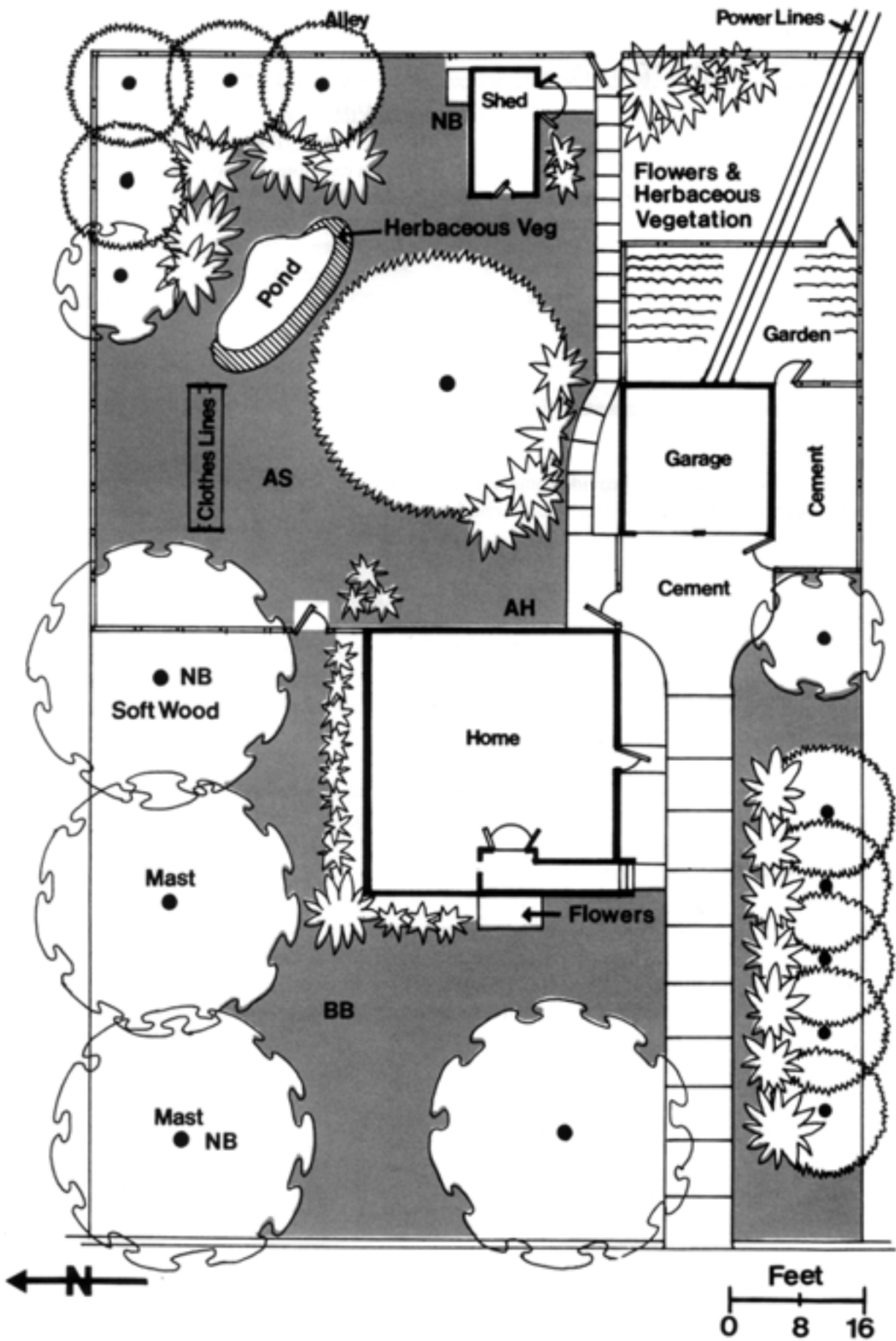


Large Shrubs  
10ft.H x 10ft.W



Small Shrubs  
5ft.H x 5ft.W

AF- Artificial Feeders for Seeds    BB- Bird Baths    NB- Nest Boxes    AS- Artificial Feeders -Suet  
AH- Artificial Feeders -Hummingbirds



ACTIVITY  
**6**

Optional  
**WILDLIFE LIFE LIST**

As a supplemental activity, think about starting a wildlife life list. On the list below, write the date when you first identify each species in the wild. Over time you will develop a great record of all the different wildlife species that you have observed.

List may include all wildlife.

- |                                 |                               |                                      |
|---------------------------------|-------------------------------|--------------------------------------|
| American Bittern _____          | Eastern Screech Owl _____     | Prairie Rattlesnake _____            |
| American Coot _____             | Elk (Wapiti) _____            | Prairie Vole _____                   |
| American Kestrel _____          | European Starling _____       | Pronghorn _____                      |
| American Pintail _____          | Ferruginous Hawk _____        | Raccoon _____                        |
| American Robin _____            | Golden Eagle _____            | Red Fox _____                        |
| American Woodcock _____         | Grasshopper Sparrow _____     | Redhead _____                        |
| Badger _____                    | Gray Myotis _____             | Redbellied Woodpecker _____          |
| Bald Eagle _____                | Great Blue Heron _____        | Red-headed Woodpecker _____          |
| Barred Owl _____                | Great Egrets _____            | Redtailed Hawk _____                 |
| Beaver _____                    | Great Horned Owl _____        | Ringnecked Pheasant _____            |
| Belted Kingfisher _____         | Great-tailed Grackle _____    | Rock Dove _____                      |
| Bison _____                     | Greater Prairie Chicken _____ | Ross' Geese _____                    |
| Black Rat Snake _____           | Greater Roadrunner _____      | Ruby Throated Hummingbird _____      |
| Blackcapped Chickadee _____     | Green Wing Teal _____         | Ruffed Grouse _____                  |
| Black-footed Ferret _____       | Grizzly Bear _____            | Sage Grouse _____                    |
| Black-tailed Jackrabbit _____   | House Finch _____             | Sandhill Crane _____                 |
| Black-tailed Prairie Dog _____  | Killdeer _____                | Scaled Quail _____                   |
| Blue Jay _____                  | Largemouth Bass _____         | Sharp-tailed Grouse _____            |
| Bluegill _____                  | Lesser Prairie Chicken _____  | Snow Geese _____                     |
| Bobcat _____                    | Lesser Snow Goose _____       | Southern Flying Squirrel _____       |
| Brown-headed Cowbird _____      | Loggerhead Shrike _____       | Spoonbills _____                     |
| Gopher Snake _____              | Mallard _____                 | Spotted Skunk _____                  |
| Bullfrog _____                  | Massasauga _____              | Striped Skunk _____                  |
| Canada Geese _____              | Milk Snake _____              | Swift Fox _____                      |
| Cattle Egrets _____             | Mountain Lion _____           | Thirteen-lined Ground Squirrel _____ |
| Channel Catfish _____           | Mourning Doves _____          | Tiger Salamander _____               |
| Common Carp _____               | Mule Deer _____               | Tiger Swallowtail Butterfly _____    |
| Common Garter Snake _____       | Muskrat _____                 | Timber Rattlesnake _____             |
| Common Nighthawk _____          | Northern Bobwhite _____       | Treefrog _____                       |
| Common Snipe _____              | Northern Shovelers _____      | Tufted Titmouse _____                |
| Copperhead _____                | Northern Spotted Owl _____    | Upland Sandpiper _____               |
| Coyote _____                    | Opossum _____                 | Wapiti (Elk) _____                   |
| Desert Cottontail Rabbit _____  | Osprey _____                  | Western Slender Glass Lizard _____   |
| Dickcissel _____                | Paddlefish _____              | Western Worm Snake _____             |
| Eastern Bluebird _____          | Pintails _____                | White-fronted Goose _____            |
| Eastern Cottontail Rabbit _____ | Plains Leopard Frog _____     | White-tailed Deer _____              |
| Eastern Fox Squirrel _____      | Prairie Chickens _____        | Wild Turkey _____                    |
| Eastern Gray Squirrel _____     | Prairie Dog _____             | Wood Duck _____                      |
| Eastern Gray Treefrog _____     | Prairie Falcon _____          | Woodchuck _____                      |
| Eastern Meadowlark _____        | Prairie Kingsnake _____       | Yellow-bellied sapsucker _____       |
|                                 |                               | Yellow Jacket _____                  |

Other species observed:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## SCORING THE CONTEST

### Each activity is scored as follows:

**Activity I: Wildlife Foods (20 points):** The score for this part is based on the formula  $[C - I/T] \times 20$ , where C = the number of correct answers on the contestant's scorecard; I = the number of incorrect answers on the scorecard; and T = total number of correct answers on the scorecard of the official or judge. Every blank or block space is considered correct. Count every block to get total possible correct (350). If a contestant marks a blank or block that is not supposed to be marked, it is counted as *wrong*. Likewise, if a contestant *does not* mark a blank or block that is supposed to be marked, it is counted as *wrong*. For example, a contestant has 300 answers that are correct and 50 that are incorrect. The judges determine there are 350 possible correct answers, so the contestant's score on this part would be  $[(300 - 50)/350] \times 20 = 14.29$ . What we have done is create a proportion of the official correct answers that the contestant has listed, and then multiply that by 20, the total number of points allocated for this part.

**Activity II-A: Aerial Photography Interpretation, Placing (20 points).** This part involves the correct placing of habitat from aerial photographs for each of the listed wildlife species. The Hormel computing slide is used to score this part of the scorecard. The judge determines the official order of photographs for each of the species, then establishes, by number, the margin (cuts) of difference between each of the three pairs of photographs. These numbers represent the penalties for switching the top, middle, and bottom pairs. The Hormel slide penalizes a contestant by the amount of the margin between the two photographs involved, for each incorrect decision. Once a total score for this part is computed with the Hormel slide, the score is multiplied by 0.4 because the maximum total points for a perfect score for Activity II-A is 20, and the Hormel scale is based on a perfect score of 50.

**Activity II-B: Aerial Photograph Interpretation, Oral Reasons (10 points):** This activity is worth 10 points and is judged by officials. The contestant's oral reasons are judged based on logic, photo interpretation, knowledge of the species, use of wildlife terms and concepts and presentation, poise and appearance. A contestant gives oral reasons to a group of judges on why he/she ranked the aerial photographs for the species indicated. The reasons should be short and concise. Contestants are given one or two species to consider. Even when an incorrect order for the photographs is selected, it is possible to score well by giving logical and concise reasons. Contestants, when explaining reasons for their choices to the judges should:

- Remove headgear
- Not be chewing gum or tobacco
- Identify themselves and the species they are addressing
- Make eye contact with each judge, smile, and be enthusiastic
- Stand up straight and not cross their legs
- Not read verbatim from notes (but occasionally referring to notes is all right)
- State reasons in terms of concepts presented in the State manual, stages of succession for area and habitat requirements of the species of interest
- Summarize at the end of each species presented, be restating the order of selection.

**Activity III: On-Site Habitat Management Recommendations (30 points):** The score is calculated the same way as in Activity I, except the total number of points is 30,  $[C - I/T] \times 30$ .

**Activity IV: Wildlife Management Plan (30 points):** The wildlife management plan is a team effort and is scored by the judges. Judges look for how well the contestants perceive the needs of the landowner, which WMP's they use, and how well the contestants make compromises for the species the landowner wants to manage. The highest possible score is 30 points. No more than one side of a sheet of paper may be used. As a team, participants will interpret the objectives, state which wildlife management practices are to be used, and tell where and why the practices are to be applied.

## **I. Plan Background (3 points)**

Participants will be given a field condition sheet. They will need to identify the species to be managed and develop specific objectives for each species.

### **A. Includes species to be managed (1 point)**

For correctly identifying the species the team is awarded 1 point. After the species are identified, the team would develop specific management objectives. In order to qualify as an objective, it must be measurable. Just to say you are going to manage for elk and grouse is not enough. Wildlife managers manage wildlife populations so that they increase, decrease, or maintain existing levels. They typically do this by managing the habitat.

### **B. Management objectives (2 points)**

The management objectives should meet the needs of the landowner's objectives and be stated in the plan.

## **II. Plan Development (12 points)**

### **A. Habitat Assessment (4 points)**

To begin developing the plan, the manager must know the basic habitat of the species and explain the condition for each species. For example, for grouse, the area has adequate food but the nesting cover is lacking.

### **B. Wildlife Management Practices (8 points)**

Once an assessment is made, the wildlife manager develops a list of management practices that could be implemented to achieve the desired condition. The team must generate a list that is specific for the given area.

## **III. Plan Implementation (12 points)**

In the phase of the planning process, wildlife managers identify where, when, and how each management practice will be applied, and the effect it will have on the habitat. Similarly, for each species identified, teams must provide this information. For example, for elk, controlled burning will be used on a rotational basis to annually create 2 open areas (< 10 acres in size) in large expanses of stage 5/6 succession to create forage for elk. This statement identifies where, when, how, and why. A similar statement must be provided for the other practices selected for each species to be managed.

## **IV. Plan Evaluation (3 points)**

This is an important part of management plans which is often overlooked, wildlife managers will never know if their plan was successful without doing some type of monitoring to determine what affect the habitat improvements have had on the populations to be managed. An example might be to monitor the number of elk sightings, signs of counts on a regular basis to provide evidence of success of the plan.

**Activity V. Urban Landscape and Backyard Habitat Plan (30 points):** This activity is scored in the same manner as Activity IV. The urban wildlife management plan is scored by the judges. Judges look for how well the contestants perceive the needs of the landowner, which WMP's they use, if the features drawn on the sketch map are accurate and logical, and how well they can make compromises for the species the landowner wants to manage. The highest possible score on this activity is 30 points.

**Team score:** The team score is calculated by adding Activities I, II, and III for each contestant and dropping the low individual score (if there are four members on the team). The three remaining scores are added and the team scores for Activities IV and V are added to create the total team score. A maximum score would be 300 points.

# Glossary

**aerate:** to supply or expose water with air to increase dissolved oxygen and release harmful gases.

**annual:** a plant species that completes its life cycle in one growing season.

**arid:** dry, receives little precipitation.

**biological diversity or biodiversity:** refers to the number of different species present within a given area. High diversity means many different species present in a given area.

**broadleaf:** a plant with wide blade leaves, such as an oak or cottonwood. Seeds are born from flowering parts in contrast to conifers which bear seeds in cones.

**brood:** the young birds hatched from a single clutch, usually laid by a single female.

**butte:** a hill that rises abruptly from the surroundings. The sides are steeply sloped or with cliffs, and the top is nearly flat.

**cacti:** plants adapted to dry conditions. Often store water in leaves and other parts of the plant. Usually have small leaves and thorns.

**canopy cover:** the amount of ground covered by the branches, leaves, and stems of plants. Can specify as herbaceous, shrubs, tree, or all canopy cover. Expressed as a percentage.

**canyon:** a deep, narrow gap or cleft in the earth caused historically by running water or glaciers.

**carrion:** stinking, rotten flesh.

**carrying capacity:** the maximum number of organisms an environment can sustain before degradation of the environment occurs.

**clutch:** eggs that have been laid by a bird or reptile in one nesting attempt.

**coastal plain:** large, nearly level areas of land near ocean shores.

**competition:** indirect or direct interaction that occurs when two or more species in a given area use the same resources.

**congregate:** when animals group together in an area.

**conifer:** usually refers to evergreen, needleleaf trees that bear their seeds in cones. Spruces, pines, and firs are examples.

**cover:** vegetation and other land features that provide areas for wildlife to hide, sleep, feed, and reproduce.

**crown-sprout:** The ability of some plants to regrow after plant materials above ground is removed by fire or other disturbances.

**cultivate:** tilling or working the soil for the purpose of growing crops and other desired plants.

**decadent:** declining in health and/or productivity.

**deciduous:** plants that shed their leaves annually. Usually trees and shrubs.

**dense:** thick, or crowded closely together.

**density:** number of organisms per unit area.

**detrimental:** gave harmful effects.

**dew:** water droplets condensed from the air onto cool surfaces such as leaves. Usually occurs at night.

**dominant:** a plant or animal species that is most noticeable and common in an area. Often are a controlling force in the community where they occur.

**drought:** the lack of normal precipitation for an extended period of time. A long period with little or no rain.

**ecosystem:** all the organisms of an area (such as prairie, pond, forest) along with the physical environment in which they live.

**edge:** where two different types of habitat or vegetation meet.

**egg:** for the purpose of the contest, eggs shall be classified as a vertebrate (reptile, amphibian, fish, bird) egg. Invertebrate eggs (spiders, insects) represent the adult invertebrate category.

**endangered species:** a species that is in danger of becoming extinct.

**environment:** the surroundings that affect the growth and development of an organism. The surroundings of an organism, including other plants, animals, climate and location.

**evergreen:** plants that do not lose all their leaves at one time. Usually conifer trees, but also some broadleaf trees such as live oak.

**excavate:** to make a cavity or hole. To hollow out.

**exclusion:** keeping something out of an area.

**fertile:** rich in material needed to support plant growth.

**fluctuate:** to vary, or rise and fall irregularly.

**forage:** refers to the vegetation eaten by animals.

**forb:** low-growing herbaceous plants, both annuals and perennials. Can be shown with a flower as part of a plant. Sometimes referred to as weeds.

**fruit:** fleshy fruit and berries.

**glaciation:** the action of huge masses of moving ice formed from packed snow.

**glean:** to gather food in a systematic manner with a minimum of waste and unnecessary effort.

**grain:** cereal grains for human consumption (includes wheat, oats, rye, barley, rice, corn; all other commercially grown crops are considered seeds except for fruits or mast species).

**grass:** relatively short plants (less than 4 to 5 feet) typically having long narrow leaves and hollow, jointed stems. Flowers are inconspicuous and often in clusters.

**ground litter:** layer of the forest floor consisting of decaying organic matter such as leaves, branches, and dead plants.

**habitat:** the place where an organism normally lives and finds needs of food, water, space and cover.

**hardwood:** deciduous or broadleaf trees.

**herbaceous:** all grasses and forbs having soft rather than woody stems, including flowers and plants called weeds.

**herbicide:** chemicals used to control the growth of or kill undesired plants.

**insecticide:** chemicals used to control insects.

**interior basin:** land areas that are generally bowl-shaped and surrounded by hills and mountains. Usually drained by one river system and isolated from ocean influence by mountains and hills.

**interspersion:** a term used to describe a mixture of different habitat types or successional stages in a given area.

**invertebrate:** animals lacking a backbone. Some examples are insects, spiders, mollusks, and crustaceans.

**irrigate:** to supply cropland, parks, yards, etc., with water through the use of diversions, ditches, pipes, or hoses.

**legume:** plants that bear seeds in a pod. Typically have characteristics that allow them to improve the fertility of the soil. Some examples are alfalfa, clover, soybeans, and peas.

**limiting factor:** the component of a species habitat that currently is in short supply and is the factor most limiting to population increase.

**manipulate:** manage or influence to achieve desired results.

**mast:** woody fruits such as acorns, seeds, and nuts.

**migration:** periodic movements between different places during different seasons of the year.

**moldboard plow:** a type of plow that turns the soil completely upside down, burying all crop remains underneath. Does not leave crop residue on ground surface.

**mortality:** the number of deaths in a population in proportion to the total population.

**natality:** the number of offspring per female over a given time period, often expressed per 100 females per year.

**nectar:** for purposes of the contest, will be represented by flowers presented by themselves (no other plant parts) or honey (processed nectar).

**nutrients:** chemicals required for plants and animals to grow and exist.

**nuts:** includes walnuts, hickory nuts, acorns, beech nuts, hazel nuts, almonds.

**peninsula:** a long, narrow projection of land into water.

**perennial:** a plant that lives for several years. Having a life span of more than two years.

**pesticide:** any substance or mixture used to control or destroy pests including plants and insects.

**phytoplankton:** microscopic floating and suspended aquatic plants. Are the first step of the food chain in many aquatic systems.

**pioneer species:** the first plant species that appear during the initial phase of succession.

**plateau:** an elevated, relatively level expanse of land. Sometimes called tableland.

**playa:** the level area at the bottom of a closed basin that is often covered with water from rain runoff and snow melt.

**regenerate:** to replace lost or damaged parts with new tissue.

**rejuvenate:** to stimulate and return to youthful health and vigor.

**riparian:** on or near the bank of water areas. The land area that is influenced by the adjacent water.

**secluded:** removed or screened from view of other areas or disturbances.

**sedge:** grass-like plant with long-narrow leaves, stems are round. Many species like wet areas.

**seed:** the propagative part of the plant, but for the purpose of the contest, it is not fleshy, is not a nut or acorn, and is not a cereal or small grain.

**shrub:** plants with woody stems that are usually less than 12 feet tall. Often have many main stems rather than one main stem (trunk).

**slash:** the residue left on the ground after trees are harvested.

**slope:** the degree that the land surface is inclined.

**softwood:** usually refers to coniferous trees. Some deciduous trees such as aspen also have relatively soft wood.

**species:** animals and plants that are the same and successfully reproduce the same kind of plant or animal.

**species richness:** the number of different species within a particular group (example, birds) within a given habitat or area.

**stagnant:** sluggish, not producing to potential.

**subclimax:** a stage in succession that is short of the climax stage, but further development is inhibited by some factor(s) other than climate.

**succession:** the orderly changes in community composition through time.

**succulent:** having thick fleshy leaves that conserve moisture.

**terrain:** the character or topography of the land.

**transitional:** the process of changing from one form to another.

**tree:** a plant that is usually more than 12 feet tall and has a single main woody stem with a distinct crown of leaves.

**tuber:** a swollen, fleshy, starchy end of an underground side shoot or stem, distinguished by their eyes, which sprout into plants with shoots and roots. Chufa and potatoes are examples; peanuts are not tubers.

**undulating:** a regular rising and falling or side to side motion.

**valley:** an elongated lowland between mountains, hills, or other upland areas that often has a river or stream running through it.

**vigor:** in plants and animals refers to the capacity for strong growth and high survival.

**waste water:** the water that runs off cropland, parks, yards, etc. during irrigation.

**zooplankton:** microscopic animals that float/swim in water. Consume phytoplankton and are an important part of the aquatic food chain.





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