

Resources

Following are the six knowledge areas to study and help prepare for the *General Wildlife Knowledge* activity.

- Knowledge Area No. 1: Characteristics of the announced region
- Knowledge Area No. 2: Wildlife management concepts and terms
- Knowledge Area No. 3: Wildlife species and their habitat needs
- Knowledge Area No. 4: Interpreting wildlife habitat from aerial photos
- Knowledge Area No. 5: Food habits of wildlife species present in the region
- Knowledge Area No. 6: Wildlife habitat practices

Next are detailed descriptions of the study materials for understanding each of these knowledge areas. Note that any information presented in this section, or anywhere in the handbook, can be used in the contest.

Knowledge Area No. 1: Characteristics of the Announced Region

Each year, a contest site will be selected in one of the four regions represented in Arkansas. This region will be announced before the contest occurs. Study the characteristics of the selected region. (You do not need to study all the regions.) If possible, find a site that contains these characteristics to practice for the contest.

Eastern Deciduous Forest

Physical Description: Most of the terrain is rolling except for the Ozark Mountains, which can be steep. The average annual precipitation ranges from 35 to 70 inches and is well distributed throughout the year. Summers are hot and dry. Winters are cold.

Dominant Vegetation: The final Stage of succession usually consists of broad-leaved deciduous trees, such as various oaks and hickories, beech, blackgum, red maple, southern magnolia, American holly and winged elm. There are many lower canopy trees and deciduous shrubs that are important, including American hornbeam, hophornbeam, sassafras, eastern redbud, and flowering dogwood. Common shrubs are pawpaw, spicebush, arrow-wood, black huckleberry, blueberry, hawthorn, witch-hazel and viburnums. A wide variety of forbs are also found on the forest floor. Grasses and annual forbs are mostly limited to areas recently disturbed.

The oak-hickory forest region occupies drier areas. Drought-resistant oaks and hickories are the most common trees species. The principal oaks are white oak, northern red oak and black oak (*Q. velutina*), while bur oak (*Q. macrocarpa*), blackjack oak, shingle oak (*Q. imbricaria*) and overcup oak (*Q. lyrata*) are also common. The most important hickories are bitternut (*Carya cordiformis*) and shagbark (*C. ovata*), while shellbark (*C. laciniosa*), mockernut (*C. tomentosa*), and pignut (*C. glabra*) occur more frequently on the drier upland soils. The trees commonly found scattered throughout the stream and river valleys of the region are American elm (*Ulmus americana*), American sycamore (*Platanus occidentalis*), hackberry (*Celtis* spp.), silver maple (*Acer saccharinum*), river birch (*Betula nigra*) and eastern cottonwood (*Populus deltoides*). These riparian trees are generally fast-growing, shallow-rooted, relatively large and able to withstand repeated floodings throughout the year.

A savanna-like transition zone is formed along the western edge of the oak-hickory region where the temperate deciduous forest grades into the grasslands. Here bur oak, the most drought-resistant of all (eastern) oaks, occurs as scattered trees amongst the grassy plains.

The oak-pine region occupies an area between the hardwoods of the Ozarks and the pure pines of the southlands. Generally speaking, half of this forest is comprised of hardwoods, primarily upland oaks, while the other half is a mixture of loblolly and shortleaf pines (*P. taeda*, *P. echinata*, respectively). The dominant hardwoods are white oak, post oak, shagbark hickory, mockernut hickory, pignut hickory and sweetgum.

Farming: Large areas of this region have been cleared of trees or native grasses, forbs and shrubs for the production of crops and livestock forage. In many areas, only steep slopes, frequent floods or water associated with rivers and swamps have prevented the total clearing of forests. Depending on how croplands are managed, some species of wildlife benefit from farming.

Plant succession Stages: Stage 1 – bare ground; Stage 2 – annual forbs and grasses; Stage 3 – perennial forbs and grasses; Stage 4 – shrubs; Stage 5 – young forest; Stage 6 – mature forest.

Grassland-Tallgrass/Mixed Prairie

Physical Description: The terrain is characterized by flat to rolling plains. Average annual precipitation ranges from 20 to 40 inches. Precipitation increases from west to east and is received primarily as summer rain and winter snow. Winters are cold, summers are hot.

Dominant Vegetation: In undisturbed areas, climax vegetation (or tallgrass prairie) is typically tall grasses such as various bluestems, Indian grass and switchgrass. A variety of forbs are also found, such as sunflowers, broomweed, ragweed and lespedezas. Sedges, native plum, buttonbush, cottonwood, willow and other shrubs and trees are often present in drainages, stream courses and other moist areas.

The mixed prairie area consists of short, intermediate and tall grasses. Tall grasses dominate moist sites such as flood plains and valleys. Dry sites such as hilltops and south facing slopes are characterized by shortgrass species. Transition sites (in-between areas) consist of a mixture of tall, mixed and short grasses. In addition to the grass species mentioned previously, grama grasses and various dropseeds are found in this area. Drainages and other moist areas may have shrubs and trees such as native plum, buttonbush and cottonwood.

Within this region, there are large areas along major rivers and drainages dominated by trees and shrubs such as cottonwood, green ash, red maple, bur oak, American elm, box elder, eastern red cedar and various willows. Due to the abundant vegetation and readily available water, these sites are very attractive to wildlife.

Farming: Cultivated cropland dominates much of this region. Where precipitation is adequate or where irrigation is possible, large areas are planted into agricultural crops such as barley, wheat, milo, millet, flax, oats, mustard, corn, sunflowers and alfalfa. Where soil is fertile, the main crops are wheat, sugar beets, corn, soybeans, sorghum, edible beans 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. Recent irrigation water

management techniques have reduced the amount of wetlands and riparian vegetation associated with irrigated crops. In the past, wetlands were drained or altered in some manner so crops could be grown.

Livestock graze most of the native range except for a few locations where terrain is too rugged or water is unavailable. Native grasslands can be invaded by eastern redcedar due to fire suppression. Fire is a critical component to tallgrass prairies, and a lack of fire is the greatest threat to wildlife in this region.

Plant succession Stages: Stage 1 – bare ground; Stage 2 – annual forbs and grasses; Stage 3 – perennial grasses and forbs; Stage 4 – shrubs occur most frequently on moist sites in mid and eastern areas, also found mixed with Stage 3; Stage 5 – young woodland; Stage 6 – mature woodland. Stages 5 and 6 are found along stream and river courses. Stages 3 and 4 are commonly the final Stages of succession in this region.

Southeast Mixed and Outer Coastal Plain Forest

Physical Description: The terrain is rolling hills to mostly flat. Marshes, lakes, and swamps are numerous on the coastal plains. The average annual precipitation ranges from 40 to 60 inches. Precipitation is received throughout the year. Summers are hot and winters are mild.

Dominant Vegetation: The final successional Stage of vegetation usually consists of deciduous trees such as oak, hickory, beech, blackgum, red maple, redbay, southern magnolia, laurel oak, American holly and winged elm, or occasionally coniferous trees, such as loblolly pine. Sweet gum and cypress are dominant on moist areas. Pines such as loblolly and shortleaf are common, with planted loblolly pine widespread over much of the region. Lower-story trees can include American hornbeam, redbud, shadbush, dogwood and hawthorns.

Forbs and grasses are common understory plants. Vines such as Virginia creeper, trumpet creeper, grape, greenbriar and dewberry or shrubs such as sumac, viburnum, haw and blueberry are also common, especially in the third or fourth successional Stages. Cypress trees are dominant on moist areas.

Farming: Many wetlands along major river courses have been drained and forests cleared to grow crops such as cotton, soybeans and other grain crops. Large areas of forests have also been cleared and planted to grasses and legumes to provide forage for livestock.

Plant succession Stages: Stage 1 – bare ground; Stage 2 – annual forbs and grasses; Stage 3 – perennial grasses and forbs; Stage 4 – shrubs; Stage 5 – young woodland; Stage 6 – mature woodland, usually deciduous.

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 is often wet or covered with shallow water.

There are many different types of wetlands including beaver ponds, potholes, man-made ponds, small lakes, marshes, rivers, streams and swamps. They are found in all of the previously-mentioned regions.

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 flooded or saturated with water for extended lengths of time. 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 the substrate (bottom). Wetlands with deep permanent water typically have less emergent (above the water surface) aquatic vegetation and more floating or submerged (below 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.

Emergent aquatic vegetation includes trees, shrubs, grass and grasslike plants. Some examples of trees often found in wetlands are willows, cottonwood, oaks, various gum trees, tamarack, cypress, mangroves, red bay, black spruce, Atlantic white cedar and pond pine.

Shrubs commonly found in and adjacent to wetlands include willows, alders, bog birch, bog laurel, Labrador tea, coastal sweetbells, inkberry, sea myrtle and marsh elder.

Grass and grass-like vegetation, such as cattails, bulrushes, saltgrass, cordgrass, saw grass, sedges, arrow grass, shoal grass, eel grass and wild rice, are also examples of emergent aquatic vegetation found in wetlands.

Water lilies, pond weeds, wild celery, water milfoil, duckweeds and coontails are examples of floating and submerged aquatic vegetation.

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 and 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.

Emergent vegetation may supply nesting areas such as trees for wood ducks, grass for mallards and cattails for red-winged black birds and muskrats.

Wetlands that have stable, non-flowing water levels go through successional Stages of vegetation development similar to those found on adjacent upland areas. The open water areas fill in with silt and dead vegetation allowing emergent aquatic vegetation to become dominant. As the wetland continues to fill in, it becomes drier, allowing upland vegetation to become dominant.

Plant succession Stages: Typically succession would proceed in the following order: Stage 1 – deep water with little vegetation; Stage 2 – shallow water dominated by submerged and floating aquatic vegetation; Stage 3 – very shallow water or wet ground dominated by any variety of emergent aquatic vegetation; Stage 4 – ground becomes drier and upland vegetation similar to the surrounding area becomes dominant.

This type of succession proceeds slowly in wetlands, with large amounts of deep water or a rocky bottom. Fluctuations in water levels can cause final Stages of this succession to regress to earlier Stages. For instance, if a wetland in Stage 3 of succession is flooded with deep water for a period of time, the aquatic emergent vegetation may die, leaving a wetland in Stage 1 or 2 of succession. The extent of this regression depends on the length of time the wetland is flooded with deep water, how much the water level changes, and the extent (length of time) that the present vegetation can survive in the changed water level.

Management of water levels is an important tool in managing wetlands for wildlife habitat. The succession process described above is often not applicable to wetlands with constantly moving water, such as rivers and streams.

Urban Landscapes

Physical description: According to the United States Census Bureau, 80 percent of the American population lived in or near an urban area as of 2005. The Census Bureau defines an urban area as a large central place with a total population of at least 50,000. In addition to a sizeable human population, urban areas are characterized by residential and commercial development connected and crisscrossed by infrastructure like roads, train tracks, and utilities. Areas like neighborhood parks offer the best examples of contiguous wildlife habitat within an urban landscape.

Urban landscapes are defined broadly and can fall into one of seven categories. Any of these categories can be selected as a site for this event.

1. *Urban forests.* All of the vegetation and buildings of a city are looked upon as a single unit from the perspective of the animal's habitat requirements and overall management.
2. *Corridors.* Corridors are typically thick, brushy areas, or continuous hedges that enable wildlife to travel unseen between open areas. These contain habitat sufficient to enable wildlife to travel within a homeowner's yard or among various habitats that may be interspersed within an urban area. Corridors are often adjacent to streams that flow through urban areas and are relatively free from interruption by buildings. A tree-lined street could also be a corridor for many species of wildlife.
3. *Neighborhood parks, school grounds and golf courses.* These intermediate-sized open areas may already attract wildlife or can be managed to enhance habitat in addition to the primary users.
4. *Vacant land.* Lots without buildings and designated open space associated with a town or city can provide useful habitat. These can be large or small spaces, with or without alterations by humans.
5. *Residential areas.* Individual homes are areas where animals can be attracted by the habitat provided in a single yard or all the yards combined. The age of a residential area can be of significance to plants and for animals using the area. More established areas tend to have trees, shrubs and other vegetation that is mature and can offer benefits to wildlife.
6. *Apartment and business lots.* These areas commonly have balconies and window ledges with outside access and small grounds beneath the large buildings.

7. *Inner city.* These are characterized by tall buildings with high roof tops, ledges and little vegetation.

Dominant vegetation: Because urban areas are found in all regions of the United States, it is difficult to identify dominant vegetation that is common across all regions. However, urban regions typically contain Stage 1 in the form of bare ground and paved areas, annuals (Stage 2) and perennials (Stage 3), mostly in the form of forbs, flowers and grass, shrubs (Stage 4), and young (Stage 5) and mature (Stage 6) trees. The vegetation is as likely to be an introduced species as it is a native species. Additionally, vegetated areas are typically manipulated in a landscaped manner versus “letting nature take over” as in rural areas. Interspersion is an important concept to understand in urban areas due to the fragmented landscape from residential and commercial development.

Knowledge Area No. 2: Wildlife Management Concepts and Terms

Before evaluating wildlife habitat and making management recommendations, an understanding of fundamental concepts and terms is necessary. In this section, these concepts and terms are described in relation to the contest events. These concepts and terms should be used when justifying the selection of an aerial photo and when writing wildlife management and urban landscape plans.

Concepts

- Habitat Requirements
- Food Chains and Webs
- Featured Species
- Species Richness
- Plant Succession and Its Effect on Wildlife
- Vertical Structure (Layering)
- Arrangement and Interspersion
- Edges and Contrast
- Corridors
- Riparian Areas
- Area Sensitive Species
- Migration and Home Range
- Carrying Capacity
- Pond Dynamics and Balance
- Wildlife Damage Management

It is also important to understand and be able to define wildlife management. *Wildlife management* is both an art and a science that deals with complex interactions in the environment. It applies what is known about particular wildlife species to creating or enhancing its habitat.

Concept 1: Habitat Requirements

Wildlife species have life requirements that must be supplied by the habitat to ensure their well being. These are known as habitat requirements. The four basic habitat requirements are food, water, usable space (the area required to accommodate necessary movements of an animal – for example: breeding range, brood range, fall feeding area), and cover (shelter or protection from predators, severe weather, etc.). Each species has its own set of specific requirements.