Lesson 4: Wildlife Management

Managed grasslands have room for both wildlife and livestock. Both depend on grasslands to be in good condition to supply their needs. Modern management practices can improve most Missouri grasslands enough that both livestock production and wildlife habitat will increase.

Wildlife in Missouri's Grasslands

Many kinds of wildlife use grasslands, and each has different needs at different times. Some animals depend entirely on grasslands for all their needs. Greater prairie chickens, upland sandpipers, and meadowlarks are so adapted to grasslands, they can live virtually nowhere else. They require large open grasslands to survive. Rabbits, quail, and pheasants depend on grasslands extensively for food and cover but also need other habitat, like brushy cover. Deer and turkeys use grasslands when available but can survive in other habitats if grasslands are not within their range. Some amphibians require seasonal wetlands within a grassland, while some reptiles need rocky outcrops. A well-managed grassland will result in healthy streams and ponds for fish habitat. All these different types of wildlife depend on the people managing the land to maintain habitats for their survival.

Wildlife Needs

While the specific needs of each type of wildlife vary, the three basic components that determine wildlife habitats are water, food, and cover, as discussed in Lesson 4 of Unit 1.

Water – Missouri has plentiful rainfall, many rivers and streams, and plants that produce succulent foliage and fruits, all of which are natural sources of water for wildlife. Additional water sources can benefit wildlife, especially during drought. For example, farm ponds are common throughout the state. Water supplies developed for livestock are generally adequate for wildlife, with a few precautions. Water tanks accessible to wildlife should have a way for small animals to escape. It also helps to provide access points and perches so animals can get to water safely.

A bigger concern is controlling livestock so they do not damage water supplies. Unlimited access to streams and ponds allows animals to congregate and destroy bank vegetation, cause erosion, degrade water quality, and spread disease. Producers should restrict livestock to certain points of access where damage will be reduced and rotate between locations so no part of the shoreline is overused. A better option is to provide separate watering facilities supplied by a pond or stream but away from these sensitive areas. Stock watering tanks below dams and mechanical and solar watering devices improve the availability and quality of water for livestock and allow the pond or stream to be fenced off. Assistance and cost sharing may be available through the Natural Resources Conservation Service (NRCS) and the Missouri Department of Conservation (MDC).

Food – The grassland food chain begins with forage plants that produce green browse and seeds and provide a home for insects. Quail, prairie chickens, and pheasants require seeds in their diet. Insects are a major part of the diet of many birds and mammals, especially young game birds. Rabbits eat vegetative parts of grasses, legumes, and forbs.

A single pasture or grassland over-utilized by livestock may not have enough forage and seed for wildlife, but wildlife are not restricted to that area. This makes land next to a pasture critical to the carrying capacity for wildlife. Leaving a few rows of grain sorghum, corn, or sunflowers along the edges of nearby crop fields can provide standing grain. One-acre grain food plots can be planted in odd areas and left standing for wildlife. Grassy areas along the edges of fields, fencerows, waterways, roads, terraces, and dams, along with pastures being rested, can be allowed to go to seed. All these areas should be protected from livestock grazing.

Producers should arrange to supply food for wildlife during winter. Fall plowing buries seeds and crop residues and should be avoided whenever possible. Snow and ice can also bury foods, so leaving standing seed heads of grasses and grains can be beneficial to wildlife. Fruits of trees and shrubs are also very important to wildlife survival during winter.

Cover – The need for cover varies with the wildlife species and season. Cover is important for protection, nesting, and roosting. Food must be near suitable cover, and wildlife should be able to walk through good cover to their feeding grounds. Wildlife use four types of cover: soft cover, shrubby cover, hard cover, and escape cover.

Soft cover is the nonwoody growth of grasses, legumes, and forbs. This cover needs to be at least 8 inches tall to be of value to most wildlife. Grassland birds depend greatly on soft cover. They need a canopy of grasses and forbs overhead to hide from predators and shield them from harsh weather; they also need open spaces between plants at ground level where they can scurry around finding seeds and insects. Native warm-season grasses provide the best soft cover. As bunchgrasses, they have the perfect combination of an overhead canopy with openings below for travel lanes. Most cool-season grasses are sod-forming grasses that lack these lanes.

Shrubby cover consists of woody brush and shrubs with multiple stems growing from a common base that are generally less than 20 feet tall. It provides shelter and concealment for many animals. When growing close together in a thicket, it also supplies escape and nesting cover. Shrubby cover produces browse for deer along with seeds and fruits for other wildlife.

Hard cover consists of trees and shrubs 20 or more feet tall. This type of cover is beneficial for deer, turkey, and many songbirds. Seeds, fruits, nuts, and acorns are important foods provided by hard cover.

Escape cover is especially dense shrubby or hard cover where wildlife can escape predators. For example, a rabbit or quail would use it to get away from foxes, coyotes, and hawks. This dense "brush" is often found in areas next to grasslands and should always be protected from grazing. If escape cover is scarce, producers can construct brush piles from limbs left from firewood cuttings or from the thinning of trees along the grassland edge to reduce competition from shading.

Producers should manage the shrubby, hard, and escape cover on their land. The cover in woody draws, brushy fencerows, and adjacent woodlands should be protected and fenced to prevent grazing. Where woody or shrubby cover is lacking, planting may be needed. Seedlings are available through the MDC's state nursery for a nominal charge. Occasionally, good wildlife management will require the removal of woody vegetation when woody plants are invading grasslands. Their removal improves the overall balance of the grassland habitat for specific wildlife needs.

Factors Affecting the Value of Grasslands for Wildlife

The characteristics of a grassland affect what kind of food and cover it provides. To manage a grassland for any particular wildlife species means creating the habitat that most closely meets that animal's needs. Another approach to managing grasslands is to create a diverse habitat that will meet the needs of a variety of wildlife. Four factors usually determine how valuable a grassland is for wildlife—the type of grassland, composition of the grassland, use of the grassland, and size of the grassland or pasture unit.

Type of grassland – Each species of grass has its own growth characteristics. Depending on their abundance in the grass stand, the plant species that are present will influence the habitat provided for wildlife.

Cool-season pastures are dominated by nonnative, sod-forming grasses such as tall fescue, Kentucky bluegrass, and bromegrass. These grasses are often harvested for hay at the height of the nesting season, which creates problems for ground-nesting birds like bobwhite quail.

Native warm-season pastures are dominated by native bunchgrasses such as big bluestem, indiangrass, sideoats gramma, little bluestem, and switchgrass. Although warm-season grasses have a shorter growing season, they use water and soil nutrients more efficiently than other grasses. They generally provide better food and cover when properly managed. They are not ready for haying until midsummer, when most ground-nesting wildlife have produced their broods.

Native grasslands (remnant prairies) are dominated by a mixture of native warm-season grasses with a good

complement of native legumes and forbs. The plant species may number into the hundreds, attracting many species of wildlife. In west, central, and north-central Missouri, remnant prairies are vital to the survival of the prairie chicken.

Plant composition – Grasses are the main plants in a grassland, but a variety of plants generally makes the grassland more productive and improves wildlife habitat. A mixture of vegetation improves the quality of cover and the available food supply. Two or more grasses generally provide a more rounded diet for livestock and wildlife. Legumes and forbs that produce seeds are also a very important part of the diet of many wildlife species. Flowering plants are important to insects, which in turn are needed for pollination and seed production. A diversity of plants attracts insects important in the food chain supporting wildlife. The more types of broadleaf and seed-producing plants there are, the more value a field has for wildlife. If too many of these plants are removed, the number of animals the area can support will also be reduced.

Size of the grassland – To provide suitable habitat, food, cover, and water must all be found in an area that a particular species can use. Depending on its size, a grassland may or may not support certain kinds of wildlife, since different species require grasslands of different sizes. A 100-acre grassland can support many butterflies on just a partial acre if it has an abundance of their preferred flowers and food plants. A collared lizard occupies a small area in a glade, but an entire population of lizards needs 10 acres or more. A covey (small flock) of quail will range over 20 to 40 acres to meet their needs; a grassland 100 acres in size will be more valuable to them if it is broken up by woody draws, fencerows, edges, and crop fields. Deer may range over an area twice that size or larger and can do quite well if bordering areas have plenty of woody and brushy areas. Prairie chickens require a nearly pure grassland with few trees and shrubs interrupting the landscape and would fare better if neighboring fields were also primarily grassland.

Use of the grassland – When and how grass is harvested is probably the most critical factor affecting the value of a grassland for both wildlife and livestock. Haying removes food and cover in one sudden operation. Grazing removes vegetation more slowly; the rate at which it is removed depends on the grazing period and stocking rate, or number of livestock on the grassland.

Grassland Management Practices

Management is necessary to keep grasslands productive. When left idle for too long, grasslands lose productivity as ground litter builds up and woody species invade. Management practices include grazing, haying, fertilizing, overseeding with legumes, irrigation, reestablishing native warm-season grasses and forbs, and prescribed burning.

Grazing – Overall, cool-season grasses can be grazed shorter than warm-season grasses, which gave early grassland managers the misconception that cool-season grasses are more productive and better for forage operations. In reality, they were simply managing warm-season grasses improperly. The most productive grassland operations today feature warm-season grasses in many of their pastures.

Of the two types of grazing, continuous grazing is less beneficial for wildlife than rotational grazing. Grazing intensity is hard to control under continuous grazing. Even when stocking is correct, animals may seriously overgraze certain areas before moving to others and thus eliminate the palatable plants that are the most valuable for wildlife. It also leads to soil erosion, decreases wildlife food and cover, and disturbs birds during nesting. Rotational grazing allows managers to move livestock when necessary to maintain the grassland. It gives the valuable palatable plants a resting period in which to grow and multiply. This type of grazing gradually results in increased livestock production, reduced soil erosion, conservation of water and soil nutrients, and improved wildlife food and cover.

The timing of grazing is critical to wildlife, and rotational grazing allows it to be timed to benefit both livestock and wildlife. Livestock can disturb birds during courtship and trample their nests. Grazing can also remove the top growth before most plants have gone to seed. Producers can schedule prime nesting areas for rest periods when wildlife need them. They can arrange to have livestock graze next to nesting areas so chicks will have access

to open ground with a different mix of foods next to good soft cover. Paddocks next to woody cover or other wintering grounds can be scheduled for grazing early in the season so they can regrow cover and seed to help wildlife through the winter.

A moderate grazing intensity is the most beneficial level of grazing for wildlife. In heavy grazing, little vegetation is left for wildlife cover or food, while light grazing can leave dense forage that hinders the movement of small wildlife like game birds. Moderate grazing provides adequate food and cover. Grazing at this level opens travel lanes between plants and creates some bare ground for seed gathering and dusting areas (areas where birds can stir up dust to get rid of mites).

Mechanical harvesting – Many of the same considerations for grazing apply to mechanical harvesting. The main difference is vegetation is removed in one operation. Such sudden changes in habitat are hard on wildlife. On the positive side, the equipment is more precisely controlled than livestock.

Grassland managers can adjust location, timing, and mowing height to leave enough food and cover as needed. To reduce the impact of haying, the recommended practice is that the outer 30 feet of hay fields be left standing or be cut later. Another beneficial practice is to have a balance of warm- and cool-season pastures with different harvest dates so areas of food and cover are always available for wildlife. Staggering haying schedules so harvest takes place over a longer period can also benefit wildlife.

Fertilizing – Only well-managed pastures benefit from fertilizer and liming. If grasslands are overgrazed or otherwise in poor condition, weeds will be the first to benefit from using fertilizer. Fertilizing can help wildlife if it increases grassland production and improves the nutritional quality of their food, but only if other management practices leave enough food and cover. Native grasslands do not usually benefit from fertilizing. In a healthy native plant community, fertilizer acts as a foreign disturbance that can change plant composition and allow weeds to take over.

Overseeding with Legumes – In pastures, seeding with legumes helps wildlife by adding diversity to the types of food and cover available. Legumes should not be added to native grasslands because these areas already contain legumes and forbs more suitable to the site. Overseeding may disrupt the composition of the natural community and could introduce weeds. Overseeding is described in more detail in the next lesson.

Irrigation – Irrigated pasture is not widely used in Missouri, though it may become more common as the economics of intensive forage production continue to develop. Irrigation should benefit wildlife as an additional source of water, especially in times of drought. It could harm wildlife if production required irrigating during critical times such as the nesting season, while small chicks are in the field, or when it might make wildlife more susceptible to weather extremes. This seems unlikely in Missouri, but all factors should be considered in planning any management practice to make sure it is truly beneficial to the overall grassland operation.

Reestablishing native warm-season grasses – Most of Missouri's grasslands have been converted to fescue or a mixture of cool-season grasses with fescue dominating. Landowners can improve seasonal forage production and help wildlife by converting a portion of this cool-season pasture to native warm-season grasses. These grasses are the plants to which the wildlife have adapted, and they are best at fulfilling most needs for food and cover.

Prescribed burning – Prescribed burning is being recognize as a prime tool in maintaining native warm-season grasslands. It helps in maintaining a vigorous grassland community; for example, it can maintain or increase the native legumes used by wildlife. Training, advance planning, and extreme care are needed to use fire safely. A more detailed discussion of the use of prescribed burning is given in Lesson 5.

Evaluating Existing Wildlife Habitat

The first step in incorporating wildlife management into a grassland management plan is to assess the grassland to figure out its usefulness for rabbits and quail. Several factors must be examined when looking at wildlife habitat

to decide how it can be improved for these species. The criteria used to evaluate grasslands may be different for other species.

Extent of the border – The border refers to herbaceous, grassy, or woody (brush, windbreaks, hedgerows, etc.) strips of vegetation between habitat types. The strip must be a minimum of 5 feet in width to be of value to wildlife. To evaluate a border, the vegetation change must exist within the fenced area of the grassland being evaluated. Habitat components in adjacent fields will be evaluated separately within that field.

Percent of field covered by winter or escape cover – Winter and escape cover is very important to the survival of rabbits and quail. It includes dense brushy cover, brush piles, fallen logs, etc. To be of value, the cover must be dense enough that a human would have great difficulty walking through it, and a coyote or fox would be unable to catch a rabbit that ran into it.

Percent canopy coverage of shrubs and herbaceous vegetation 6 to 18 inches tall – Canopy cover provides protection from birds of prey (or aerial cover) while allowing easy movement through the vegetation. It consists of shrubs and weedy plants that are from 6 to 18 inches tall, or around knee high. The ideal range of canopy cover for quail and rabbits would be between 26 and 75 percent. When canopy coverage is less than 25 percent or more than 75 percent, the area is considered less attractive to upland wildlife, especially rabbits and quail. For example, an area with more than 75 percent coverage may be difficult for them to walk through.

Grazing pressure – The height of the grass or forage is a critical factor for wildlife such as rabbits and quail. During the growing season, quail may use the field edges for nesting but will be forced to move to other sites if the livestock graze plants to less than 8 inches. Quail nests can also be trampled and destroyed by livestock in pasture units with heavy grazing.

Light grazing may result in tall forage being present on the unit during most of the year. Too much forage could be present for rabbit and quail. Very dense grassy vegetation, especially fescue, can restrict the ability of young quail to range away from the nest.

Moderate grazing refers mainly to a cool-season pasture and is defined as leaving 3 to 6 inches of growth during the winter. For native warm-season grasses, only 50 percent of the year's growth should be removed through grazing. These grasses should not be grazed to a height of less than 8 inches. Livestock should never be allowed to "winter" on any native warm-season grassland.

If a cool-season grass pasture has a history of heavy grazing, all grazing should be deferred during the growing season to improve the vigor of the grass stand. Deferment will also improve plant composition. After a period of rest, the stand can be grazed, but it should be monitored closely to avoid the removal of too much of the forage.

Percent of ground covered or shaded by legumes – Legumes are an important plant group for both wildlife and livestock. They include alfalfa, clovers, tick trefoil, Korean lespedeza, partridge pea, lead plant, hop clover, and many others. Wildlife use both the seeds and the vegetative parts of legumes. These plants are also important in removing nitrogen from the air and fixing it in the soil for use by other plants, including grasses and forbs. Insects that make up a high percentage of the diet of quail and songbirds can also be found on these plants. Rabbits and quail find grazing units with less than 5 percent or more than 50 percent of the ground covered by legumes to be less attractive than when the ground cover ranges between 6 and 50 percent.

Plant composition – A field that is more than 90 percent tall fescue is not beneficial to wildlife. The stem density at ground level would be too thick to be attractive to wildlife. Most species would avoid an area for nesting and other purposes when fescue approaches 40 percent of the plant composition.

Pastures with mixed cool-season grasses are common in Missouri, but legumes do not make up enough of the plant population in these pastures to be attractive to wildlife. The grasses could include a mixture of orchardgrass, fescue, and bluegrass.

In some pastures, cool-season grasses are dominant, with legumes making up only a small percentage of the composition. The dominant grass could be tall fescue, orchardgrass, timothy, etc.

Areas with cool-season grass and 26 to 60 percent legumes are usually considered to be cool-season/legume pasture. These grasses could be a mixture of fescue, orchardgrass, and bluegrass, with legumes such as clovers and lespedezas. This forage system is probably the most widely used system in Missouri. The grass and legume mixture is attractive to insects that make up nearly the entire diet of young quail chicks that have just left the nest in search of food.

Pastures where legumes are dominant are excellent for turkey poults, quail chicks, and many songbirds, which can easily move through the vegetation in search of insects and succulent plants for food. Deer, rabbits, groundhogs, and small rodents also find these areas attractive as a source of food and cover.

A grassland in which native warm-season grasses are dominant provides an excellent habitat for most wildlife species when managed for other necessary habitat components as well. These grasses provide a cool, moist summer environment and a warm, dry winter environment. They are compatible with the legumes, sedges, and seed-producing forbs, which are used as browse by wildlife species. Insects, which are important in the diet of many wildlife species, thrive in the native bunchgrasses and feed mainly on the legumes and forbs. A mixture of broadleaf plants and grasses provide the diversity required by ground-nesting birds such as quail and many songbirds. It should be noted that not all introduced (nonnative) warm-season grasses provide an attractive habitat after they have become established. They most often form a dense sod that eliminates or restricts wildlife movement.

Distance from center of field to edge of nearest crop field – Studies show that crop fields are an important part of the habitat of bobwhite quail. If a minimum amount of pesticides is used, soil disturbance produces ragweed and other seed-producing plants that are important quail foods. Crop residues (waste grain) left on the soil surface after harvest can be an important source of food during the winter.

Studies also show that a large number of bobwhite quail nests are found within 50 to 150 feet of bare ground. If bare ground, such as crop field, is next to a properly managed grassland, the chance of a pair of quail successfully hatching and rearing their brood of young chicks is greatly increased.

When evaluating a grassland, the distance from the center of the grazing unit or paddock to the edge of the nearest crop field should be estimated. A crop field that is more than 500 feet from the center of the grassland unit is considered to be of no value to upland wildlife like rabbit and quail. A crop field with no fall tillage that is found less than 250 feet from the center of the pasture is considered to be of the highest value.

Percent of grazing unit that is within 250 feet of dense woody cover or ungrazed woodland – Generally, the larger the field, the less value it has for wildlife. Quail use the field edge where other habitat types, especially escape cover, are available. Studies show that quail rarely move farther than one-eighth of a mile (660 ft.) between habitat components. Cottontail rabbits require habitat components that are even closer together—250 feet. The interior of a very large grassland grazing unit would therefore be used very little by these wildlife species.

In evaluating the grassland, the percent of the field that is located within 250 feet of concealment cover, ungrazed woodland, or dense woody cover should be estimated. Generally, this area represents that portion of a pasture or hay field that quail and rabbits will use during average seasonal conditions.

Management Plans for Rabbits and Quail

Just as producers can make plans for managing livestock on a grassland, they can also make plans for the wildlife that live there. Management plans for wildlife can be designed to benefit any species. Usually, they are written for rabbits and quail. One reason is that both rabbits and quail are popular game animals. They also require

a relatively small acreage, so good wildlife management plans can be written for both large and small farms. A more important reason is that the habitat needs of these species are similar to those of a variety of other species. Rabbits and quail are referred to as indicator species because if a habitat benefits them, many other species will prosper. They can therefore indicate the usefulness of a grassland for wildlife.

Summary

Producers can manage grasslands to accommodate the needs of livestock and many different kinds of wildlife. The basic requirements for wildlife habitat are water, food, and cover. Four characteristics of grasslands affect how they meet these requirements: type of grassland, plant composition, use, and size. Producers need to take these characteristics and the needs of wildlife into account when carrying out grassland management practices like grazing and haying. As they develop a grassland management plan, they need to look at the quality of the grassland for wildlife to decide where improvements can be made. Producers may also adopt wildlife management plans to manage their grassland for a particular species.

Credits

Pitts, David E. *Private Land Wildlife Management for Missouri Landowners*. Jefferson City: Missouri Department of Conservation, Wildlife Division, 1991.