
JIM RATHERT

Landowner's Guide to Ruffed Grouse Habitat Management in Missouri

Reina M. Tyl – Resource Scientist, Missouri Department of Conservation

Ruffed Grouse Distribution, Population Status, and Ecology

Ruffed grouse are the most widely distributed gallinaceous bird (birds belonging to the scientific order Galliformes, which is made up of ground-feeding, heavy-bodied, chicken-like birds, including turkey, quail, greater prairie chicken, and pheasant) in North America, but are common only where extensive forest tracts dominate the landscape. In Missouri and other states that make up the Central Hardwood Region (Figure 1), grouse occupy mixed-mesophytic and oak-hickory forests.

Grouse populations have exhibited a steady decline throughout the Central Hardwood Region due to habitat loss and degradation. The key to recovering and sustaining grouse populations in Missouri and elsewhere is the creation of young forest habitat.

Mixed-mesophytic – A forest featuring a mix of trees adapted to a moderately moist environment. Examples of mesophytic tree species found in Missouri include American beech, tulip tree, and sugar maple.

Home Range Size

Although the geographic range of grouse is extensive, their home ranges are relatively small. Annual home ranges of adult female grouse are generally less than 100 acres and can be as small as 25 acres in high-quality habitats. The adult male's annual home range varies from about 12–50 acres. Juvenile grouse have larger home ranges than adults, sometimes exceeding 250 acres. During years of low mast availability, adult grouse can more than double their winter home range size.

Figure 1: Central Hardwood Region of the United States.

During spring, male grouse establish territories around one or more drumming logs. Drumming sites are typically located on upper slopes within or adjacent to patches of young forest and offer good visibility at ground level with dense overhead cover. Female grouse typically establish spring nests in mature forests with open understories, often next to a tree or fallen log.

Habitat

Grouse are young forest habitat specialists, where high woody stem densities of forest regeneration and herbaceous vegetation provide food and cover. Although the geographic range of grouse is extensive, key structural habitat components are similar wherever the species is found.

Regenerating forest stands are used by grouse for up to 25 years following a disturbance (e.g., timber harvest), however, the highest quality habitat occurs from 5–15 years post-disturbance. Grouse do not readily use areas of forest regeneration during the first four years following a disturbance due most likely to an insufficient amount of cover. Quality habitat for the species include young, even-aged deciduous stands that typically support more than 8,000 woody stems per acre. In Missouri, areas containing as little as 4,000 stems per acre of woody vegetation that is at least 3 feet tall appear to be suitable habitat for grouse.

Spring

During spring, male grouse establish territories around one or more drumming logs within their home range. Male grouse perch on fallen logs and make a low-pitched drumming sound by opening and closing their wings rapidly. By performing this drumming display, male grouse assert their presence in the area and attract female grouse to their territory for mating. Drumming sites are typically located on upper slopes within or adjacent to patches of young forest and offer good visibility at ground level with dense overhead cover. Grouse typically drum on logs that are 20–40 feet long and that allow the birds to be 9–15 inches above the ground.

Unlike the males, which select dense, young, regenerating forests as drumming sites, female grouse typically establish spring nests in mature forests with open understories, often next to a tree or fallen log. Given the prevalence of mature hardwood forests, it is unlikely that nesting habitat is a limiting factor for grouse.

During spring, adult grouse feed readily on the leaves of herbaceous plants. American hophornbeam is another important spring food item for grouse in Missouri. In contrast to adults, young grouse broods forage primarily for invertebrates in areas with well-developed understories. Preferred brood habitat ranges from young regenerating forest stands to forested stands with developed canopies and abundant ground cover. Lowland areas along streams also provide important foraging habitat for grouse broods.

Summer

As grouse broods age, they shift from using moist forested areas to young forest habitats with greater vertical structure on drier upland sites. Leaves of herbaceous plants are the dominant food item for grouse during summer, although soft mast (i.e., wild grapes, blackberries, and raspberries) can comprise a substantial percentage of the summer diet as well.

Fall

Young grouse disperse from their natal range during early fall. Juvenile female grouse disperse about 3 miles while male grouse disperse about 1 mile. Grouse feed heavily on hard and soft mast (i.e., wild grapes, acorns, and the fruit of multiflora rose) during fall.

Winter

During winter, grouse forage extensively in mesic bottomlands where herbaceous plants and soft mast are most abundant. Acorns, multiflora rose fruit, and catkins of American hophornbeam are readily consumed by grouse in Missouri during winter.

Grouse typically roost on upper slopes in or under eastern red cedar trees during winter to conserve energy. During years of low hard mast availability, grouse home ranges increase considerably in size, which may lead to increased predation risk. In addition to increased predation risk, mast failures may be a limiting factor in the southern portion of their range.

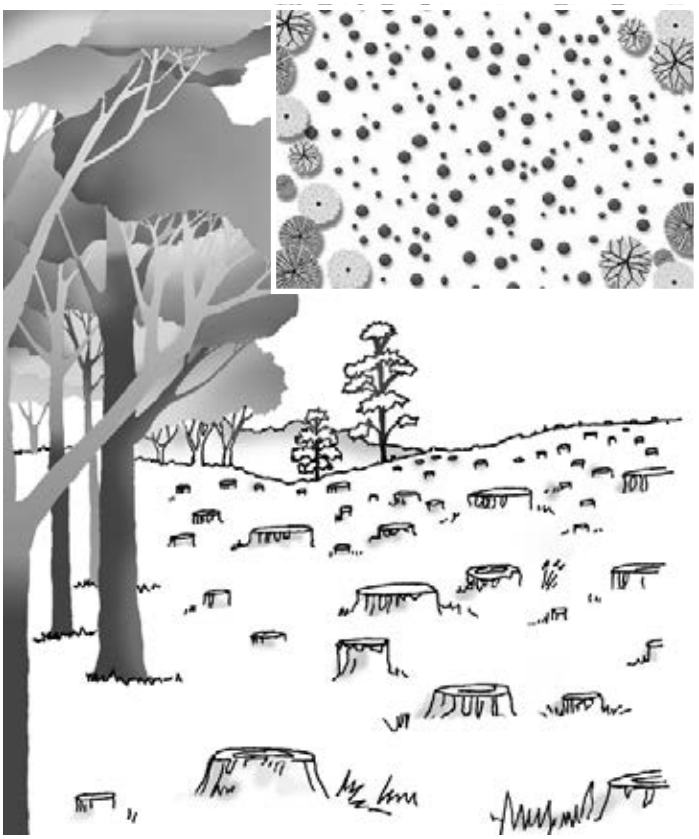
Managing Habitat for Ruffed Grouse

As with managing habitat for any wildlife species, it is always advisable to have a plan; grouse are no exception. MDC private land conservationists (PLC) work with private landowners to help them meet their habitat management goals. Contacting a PLC is a great first step in managing a property for grouse or any wildlife species. PLCs can identify the areas on your property most suitable for grouse habitat management and provide specific management recommendations.

In their southern range, grouse habitat management should focus on creating a good interspersion of young forests, winter food, and brood cover. Because the major sources of forest disturbance (e.g., wildfires) no longer operate at the frequency or scale that they once did, commercial timber harvests and other proactive habitat management practices need to be implemented on a regular basis to ensure a continuous supply of quality young forest habitat for grouse.

Although regenerating forests are used by grouse for up to 25 years, the highest quality habitat occurs when regenerating stands are 5–15 years old. Due to the relatively short window where quality habitat is available, efforts to create grouse habitat must occur regularly through time. To sustain grouse populations, it is critical to maintain as much of the landscape in young forest as possible within the limits of what is sustainable in the long-term.

Forest regeneration methods can be classified into two broad categories: even-aged and uneven-aged management. As the name suggests, even-aged management consists of removing all trees in a stand in one or two harvests, resulting in a forest that has one dominant age-class. In contrast, uneven-aged management involves removing only a smaller percentage of trees during a harvest, resulting in three or more age-classes of trees that vary in diameter and height. Because oak trees are generally intolerant of shade, it takes considerable disturbance of the forest canopy to stimulate their growth. As such, where the management objective is to regenerate oaks, even-aged management has been widely-accepted as the most appropriate method.

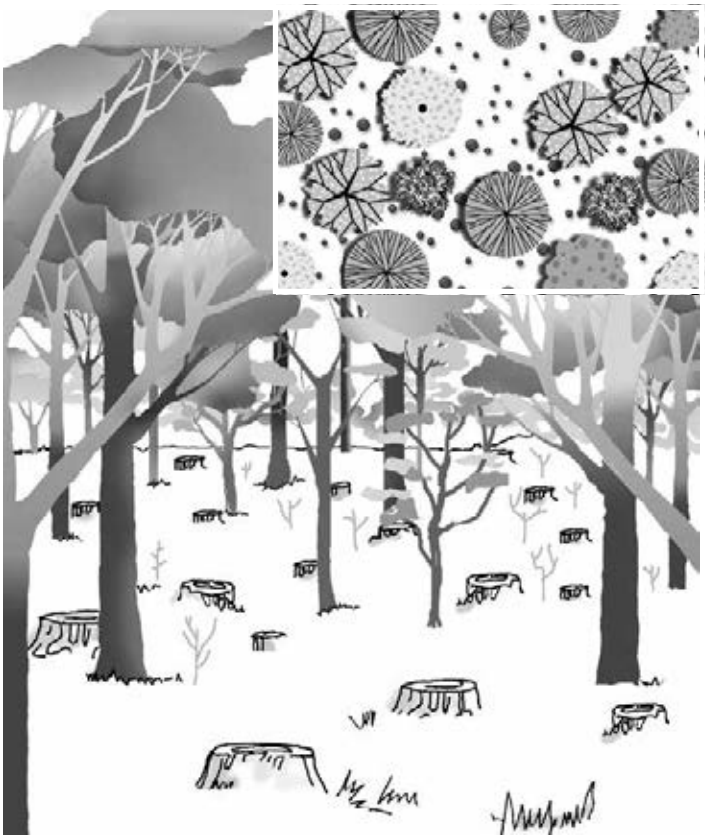


Regeneration harvests (also known as clearcutting) removes all the trees in the stand and is used when an even-aged forest is the objective. See overhead view, above right.

Shelterwood Harvests

Even-aged forest regeneration methods, such as shelterwood harvests, are the most appropriate methods for creating grouse habitat because the abundant sunlight resulting from canopy removal results in high densities of shrubs and tree seedlings in the regenerating stand. Although regeneration harvests (also known as clearcutting) have been recommended for creating grouse habitat in their northern range, research conducted in the Appalachians suggests that leaving a few trees in the stand at the time of harvest is more beneficial for grouse in their southern range. By leaving some high-quality mast producing trees in a stand during a harvest, cover and food are provided for grouse in the same location.

Another benefit of the shelterwood method of harvest is that it can be used where there isn't a considerable amount of existing oak regeneration under the forest canopy. It is especially useful in regenerating oaks on moist sites because it controls the density of the stand near the end of the rotation when accumulating oak regeneration is important. This ensures the resulting stand will be dominated by desirable trees and not by shade-tolerant competitors (e.g., sugar maple). One way to increase the amount



In the shelterwood method, a new stand is established under the partial shade of older trees that provide cover and food for grouse. See overhead view, above right.

The temporary forest opening method harvests small groups of trees resembling miniature clearcuts, which produces high quality grouse habitat. See overhead view, above right.

of advanced oak regeneration is to use prescribed fire to kill shade tolerant trees that may be competing with oak saplings; see Prescribed Burning section on the following page for additional information.

The number of trees left behind during a shelterwood harvest has important implications on development of the future stand and to the quality of habitat it provides for grouse. Leaving more than 20 square feet per acre of residual basal area can significantly reduce regenerating stem densities and should not be maintained where the focus is on grouse habitat. This equates to leaving about 16, 15-inch diameter trees per acre. Healthy trees with the greatest potential to produce mast should be left behind during a harvest. Leaving a variety of both red and white oaks during a harvest is essential for maintaining hard mast diversity.

Although smaller areas of forest regeneration can be beneficial to grouse, regenerating forest stands should generally be at least two acres in size. This minimizes shading from trees in adjacent stands. Larger openings (more than 10 acres) are likely more beneficial for grouse and other early-successional forest wildlife because there is less edge per unit area. When possible, smaller cuts should be oriented north to south to reduce shading and increase development of regenerating vegetation. Although the most vigorous response will occur in areas with north and east slopes and in bottomlands, vegetative and structural diversity can be maximized by distributing cuts across a variety of slope aspects.

Temporary Forest Openings

Although not a substitute for larger areas of forest regeneration created by shelterwood harvesting, creation of temporary forest openings (TFOs) is another great way that landowners can provide high quality grouse habitat. Creation of TFOs is similar to shelterwood harvesting, but typically done on a smaller scale. In areas where larger stands of trees are not ready for a commercial harvest, creation of TFOs can be a great way to increase interspersion of cover within mature forests. By creating pockets of young forest habitat, TFOs facilitate movement of grouse through mature forests, which otherwise do not provide suitable amounts of cover.

TFOs as small as a quarter-acre can be beneficial to grouse, but larger openings are likely more beneficial. Unlike shelterwood harvesting, it is important to ensure that advanced oak regeneration exists before creating TFOs. This helps ensure that oak remains a dominant component of the forest canopy. In addition to serving as pockets of cover for adult grouse, TFOs can also serve as brood-rearing habitat, especially if located on mesic sites (e.g., along bottomland areas adjacent to streams). As with any forest management that occurs adjacent to riparian areas, great care should be taken to avoid adversely affecting stream integrity. When creating habitat in these areas, girdling trees rather than felling them is a good approach to create habitat while minimizing soil disturbance.

Recommended distances between TFOs range from about ⅒ to ¼ mile. As with shelterwood harvests, creating TFOs on a variety of slope aspects will maximize vegetative diversity. Those located on north or east facing slopes are likely to be most beneficial for grouse. Because male grouse usually establish territories on ridges or upper slopes during the breeding season, TFOs in these areas are likely to be readily used.

Prescribed Burning

Oaks are a fire-adapted species that have many characteristics that allow them to be resilient to fire. Oaks have relatively thick bark and the ability to re-sprout rapidly following fire, allowing them to outcompete less fire-tolerant species. As such, low-intensity prescribed burning is a great way to improve the quality of oak forests for grouse. Burning young forest stands can improve these areas for grouse broods by reducing coarse woody debris and shade-tolerant species, and by increasing insect numbers following the burn. Managers should create a mosaic of burned areas by burning different portions of an area on a 1–4-year rotation. Prescribed burns should generally be conducted during late winter, when they reduce damage to dormant vegetation, maximize reduction in leaf litter, and minimize disturbance of grouse nesting activities.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Old Fields and Herbaceous Openings

Row crop agriculture and pasturelands are not preferred by grouse, but if open fields are abandoned, the process of succession greatly improves the suitability of these areas. As open areas lay idle, woody species eventually colonize these areas. At this stage, these areas are typically referred to as old fields. Key components of old fields, as it relates specifically to grouse, include woody cover, fruit-bearing shrubs and vines, and patches of herbaceous cover.

For those who would like to create old field habitat from abandoned open lands, development of these areas can be accelerated by spring or fall plowing or disking. Plowing or disking these areas at a low depth helps to break up the thick humus layer and interwoven root systems and to expose the mineral soil.

If landowners desire to maintain old fields on their property, management will need to occur to set back succession. Managers can improve suitability of old field habitat for grouse by felling pole-sized or larger trees, using prescribed fire, and mowing or cutting. Tree removal should be done rather sparingly because if too much canopy is removed, grasses and forbs will dominate the understory. Maintaining the woody component of these areas is critical as it provides important cover and food (i.e., soft mast).

Although old fields are important grouse habitat, maintaining small openings with herbaceous vegetation can provide resources for grouse if managed properly. These sites, which can be small openings in the forest canopy or the edges of infrequently traveled woods roads, can provide food for grouse during fall and winter and can serve as brood habitat if security cover is nearby.

For those interested in creating herbaceous openings for grouse, woods road borders can be sown with perennial clovers along with an annual grass or cereal grain like winter wheat or oats. Annual mowing will help to maintain the legume component in the openings, and periodic reseeding and lime and fertilizer application will be necessary over time.

Other Forms of Habitat Management

Timber Stand Improvement

Timber stand improvement (TSI), or forest thinning, is a commonly used forest management tool consisting of cutting poor quality trees, making available valuable resources for higher valued species. Depending on the species composition of the stand and other factors, the number of trees removed during TSI can vary greatly. Where a large percentage of the forest canopy is removed, TSI can be beneficial for grouse by improving habitat quality in stands located between areas managed with even-aged methods (e.g., shelterwood harvest). Timber stand improvement, however, does not typically involve removal of enough trees to create quality grouse habitat and should not be viewed as a substitute for shelterwood harvesting or creation of TFOs.

Management of Eastern Red Cedar

Although many wildlife habitat management prescriptions in Missouri involve reducing prevalence of eastern red cedar, leaving small patches of cedar can protect grouse from inclement winter weather. Because snow depths in Missouri are rarely sufficient to allow snow roosting, winter can be a challenging time of year for grouse. In Missouri, grouse prefer to roost in the canopies of cedar trees during winter because the tree limbs provide thermal cover. Landowners might consider leaving small clusters of cedars along ridge tops where grouse prefer to winter roost.

Management for Soft Mast

Soft mast is an important food item for grouse. During timber harvests, managers should favor trees and shrubs such as black gum, sassafras, cherry, wild plum, hawthorn, dogwood, briar, grape, serviceberry, blueberry, huckleberry, blackberry, raspberry, poison ivy, holly, and crabapple. To favor these species, managers can release canopy trees, conduct understory prescribed burns, or plant soft mast producers. Catkins, buds, and seeds of the American hophornbeam make this tree an important food source for grouse throughout the year. Therefore, this tree should be retained in the forest understory, while being careful to balance its benefit to grouse with its impact on oak regeneration.

Summary

Ruffed grouse are a species of conservation concern in Missouri whose ability to persist will depend on creation of young forest habitats. Although juvenile grouse can disperse up to three miles, after establishing a permanent home range, grouse typically spend their lives within a 100-acre area. During spring, male grouse select the thickest young forest habitat available and drum on fallen logs to attract females. Although female grouse nest in mature forests, they take their broods to areas with well-developed understories shortly after they hatch. These areas are typically located in young regenerating forests or in mature forests with sufficient ground cover and insect abundance. During spring, leaves of herbaceous plants are important foods for adult grouse, and are also consumed in summer along with soft mast. During fall and winter, grouse feed on hard and soft mast and roost on upper slopes to conserve energy.

Young, regenerating deciduous forests that are 5–15 years old are the preferred habitat for grouse and are the single most important habitat that landowners can provide. Given the relatively short window that forests serve as quality grouse habitat, commercial timber harvests and other proactive habitat management practices must be implemented regularly. Ideally, an area managed for grouse would have about one quarter of the forested area that is less than 25 years-of-age at any given time.

The best way to create young forest habitat for grouse is by conducting a shelterwood harvest or by creating TFOs where no more than 20 square feet per acre of basal area is retained. These cuts should be at least two acres in size and should ideally be located within ¼ mile of one another. Managers should conduct prescribed burning in these areas during late winter on a 1- to 4-year rotation. In addition to young regenerating forests, old fields can also provide food and cover for grouse. Spring or fall plowing or disking can be used to accelerate development of these areas, and felling pole-sized or larger trees, using prescribed fire, and mowing and cutting brush are tools for their maintenance. To provide winter food, woods road borders can be sown with perennial clovers and a cereal grain.

Timber stand improvement can be used to improve the quality of habitat in stands located between areas managed with even-aged methods (e.g., shelterwood harvest). Although eastern red cedar trees are typically removed during forest thinning in Missouri, leaving small patches of this species can provide thermal cover for grouse during winter, especially if located near ridge tops. Soft mast of sassafras, wild plum, hawthorn, dogwood, and grape, are important food items for grouse; therefore, these species should be retained during timber harvests or forest thinning. A good interspersion of young forests, winter food, and brood cover will satisfy the needs of grouse throughout the year and help to ensure that this species remains an important component of Missouri's landscape.

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