



RUFFED GROUSE (*Bonasa umbellus*)

Fish and Wildlife Habitat Management Guide Sheet

Natural Resources Conservation Service (NRCS) - Minnesota



GENERAL INFORMATION

The ruffed grouse (*Bonasa umbellus*) is a bird of the northern woodlands in North America. It lives in 38 states and 13 Canadian provinces. The ruffed grouse is Minnesota's foremost game bird, and is most common in the forested northern, central and southeastern portions of the state (Fig. 1). A resident bird of aspen dominated forests, this 1 to 1 3/4 pound bird is well known for its courtship drumming and its explosive take-off when flushed from cover.

Ruffed grouse population levels are dynamic and change continually in a given year and from year to year. Food, cover, weather, and predation are all factors that influence the life--and death--of grouse. The population of Minnesota's ruffed grouse is largely dependent on proper management of forests that are at least 25% aspen. Hazel, birch, oak, and alder are also important to ruffed grouse.

LIFE CYCLE

Trees alone do not guarantee the presence of this forest bird. Breeding, nesting and brooding cover and food for the winter are basic to grouse survival. The male also needs a well-protected area for drumming. Ruffed grouse populations are cyclic and numbers change dramatically from year to year, with a population peak occurring about every 10 years. Good grouse habitat can support as many as one bird every four acres in a peak year but only one bird per 40 acres in a down year. The causes of this natural phenomenon are not completely understood. It may be a combination of variation in weather, quantity and quality of food, and predation. Although we cannot control these natural cycles, quality habitat will support more numbers of birds regardless of the overall population trend.

Ruffed grouse don't migrate and usually spend their entire life in an area less than 40 acres. Adult males establish territories as small as 6 to 10 acres and hens range over the territories of 2 to 3 males during the winter.

FOOD

Aspen trees provide the most important year-round sources of food for ruffed grouse in the form of green leaves, flower buds and catkins. In most winters, the flower buds of aspen are the most important grouse food. When grouse do not have access to this food, winter catkins of hazel, birch and willow will be consumed. Green leaves or clover, wild strawberry and acorns also provide important seasonal food.

COVER

The best cover for ruffed grouse occurs in aspen stands regenerating from fire, windstorms or clear cut logging. Grouse prefer medium densities of slender woody stems rising vertically from the ground to give them protection from predators. Intermediate aged trees (10 to 25 years old)



Fig. 1 Ruffed grouse range

provide this necessary breeding and drumming cover.

In southeastern Minnesota, where oak forests are more prominent and aspen is a lesser component, cover should be provided by managing oak stands to create dense 5-15 foot tall cover.

Forests dominated by conifers are undesirable grouse habitat because pines, spruce and balsam fir provide effective screening for preying owls and goshawks.

SEASONAL HABITAT REQUIREMENTS

Spring

Ruffed grouse males begin their spring ritual in late March or early April. They beat the air with their wings to create the hollow-sounding thump or "drum" slowly at first, and then progressively more rapidly. Although they drum throughout the year, drumming activity peaks in April and May, when daylight reaches a certain length. This is when the males advertise their territories to other males and attempt to attract females for breeding.



A male grouse chooses a drumming site that has certain characteristics. The most obvious is a large log, stump or stone that serves as a drumming stage. Such a stage places the drummer six inches or more above the forest floor and improves his visibility and perhaps the distance from which his drumming can be heard. There is often one or more mature male aspen trees within site of the drumming log. The best drumming habitat has a lot of vertical cover created by a dense stand of 1-3 inch diameter aspen saplings, and very little horizontal cover. Often the stage is surrounded by hazelnut (*Corylus americana*), dogwood (*Cornus spp.*), willow (*Salix spp.*), or other shrubs. The heavy vertical cover created by saplings and shrubs and the lack of horizontal cover provide excellent protection against predators. Avian hunters, such as great-horned owls (*Bubo virginianus*) or goshawks (*Accipiter gentilis*),

have trouble flying through a dense stand of saplings, while the lack of horizontal ground cover allows the grouse to detect approaching mammalian predators or other grouse. Proper cover improves the chances of ruffed grouse survival.

The drumming male mates with several females. Hens prefer to nest where they can see well over a 50-60 foot radius. Each hen incubates her eggs and raises the chicks on her own. She usually chooses a nesting site in medium-aged woods, often within the vicinity of a drumming male. The nest is little more than a shallow bowl in the ground, often at the base of a large tree. It is lined with whatever material is available, such as dried leaves, and some of her own feathers.

The hens lay from 9 to 14 eggs. An average clutch has 11 of the whitish or buff-brown eggs. It takes 17 days to produce an average-sized clutch, and the hens incubate their eggs for 23 or 24 days.

During the nesting season, the adults eat high-energy foods, such as the emerging leaves and catkins of aspen trees. They also eat the young forbs of the forest floor. Incubating hens leave their nests in the early morning and again in the evening for brief visits to feeding areas, although they become less inclined to leave their nests later in the incubation period or during periods of inclement weather.

The eggs hatch in late May or early June. The young hatch at the same time because the female waited until laying the last egg before starting to incubate and begin development of the chicks. After a few hours the newly hatched chicks are dry and the hen leads her brood away from the nest toward a stand of sapling aspen for food and protective cover. Grouse chicks are precocial; that is, they hatch at a well-developed stage and do not have to spend time growing in the nest.

Summer

For the next 8 to 12 weeks the hen leads her chicks around an area that may vary from 10 to 40 acres in size. If a predator threatens her young, she will try to distract it by feigning an injury. Each brood has its own territory, although some intermixing of broods does occur. The brood area is usually a stand of mixed hardwoods or an alder (*Alnus rugosa*) thicket. In central Minnesota grouse broods use upland stands of aspen and alder intensively. The brood hen prefers areas that are sheltered but free of a lot of ground debris, such as fallen or cut trees, so that the young can move freely. An upland stand of aspen that is up to 15 years old can provide brood cover. Such stands often have a thick understory layer of ferns, especially bracken fern (*Pteridium aquilinum*), and this provides cover and at the same time allows the chicks to move freely among the stems.



Summer is a time of rapid development for ruffed grouse chicks. The young birds grow fast, and molt and produce a whole new set of feathers. This requires a large amount of energy. For this reason, the chicks' diet consists of up to 90% animal matter, primarily insects and other invertebrates. This diet also provides a lot of protein. Insects are abundant in moist areas, such as alder thickets, and these areas stay cool during hot summer months.

By mid-summer the chicks are well developed. They are noticeably larger and their natal plumage is almost completely replaced. There are also noticeably fewer of them alive. Numbers of ruffed grouse chicks decline naturally throughout the summer, especially when the birds are still very young. At this stage of life they are susceptible to many kinds of mortality: rainy, cold

weather; predators; and accidents. By August an average brood that started out as 11 eggs may have only 6 remaining young. The ruffed grouse is one species that makes a big initial "investment" by producing 11 eggs to ensure that some of the chicks will make it through the critical summer period and through the winter to breed the following spring.

In late August and early September, the remaining chicks are virtually identical in size and coloration to the adults. The young grouse are now less inclined to stick together in a tight brood, and they go wandering off to various areas in the brood territory. Brood members often get back together or join with individuals from different broods.

Fall

By early fall the berry crops have ripened, and a variety of plants are heavy with seeds and nuts. The birds feed on wild raspberries, blueberries, grapes and cherries; the fruit of dogwoods, viburnums and hawthorn; acorns; the seeds of sedges and clover; and the leaves of aspens, buttercup, alder and others. At this time of year, ruffed grouse are true generalists in their diet.

The birds can be found in habitats associated with these food-producing plants. Aspen woods, alder thickets and stands of mixed hardwoods support grouse. After the broods have broken up in late summer, the young birds enter a period of dispersal in early fall. They leave their old brood territories and wander into new areas. The birds often travel alone or they may join other juveniles from the same or a different brood and wander with them. Juvenile females typically travel 3-4 times further from the brood area than juvenile males. The average distance traveled is 1 to 2 miles, some birds have been known to move over 10 miles.

While traveling across the countryside, the young and inexperienced birds often find themselves in areas that do not offer much protection. They may wander into fields or open woodlands where there is very little shrub cover. Because of their movement in unknown habitats that offer little protective cover, the dispersing grouse are especially vulnerable to predators. Great-horned owls and goshawks feed on ruffed grouse, and red fox (*Vulpes fulva*) take a few. Predators and their young eat ruffed grouse all year, but there are always enough survivors to breed in the spring.

By the time late fall arrives, the grouse that are still alive have survived the summer, intense predation and fall dispersal. The juveniles are now fully grown and wear the plumage of adults. Many young males have established a drumming territory in their first fall, and some of the juvenile hens are now roosting in a spot where they will later hatch a clutch of eggs.

At this time of year, grouse change their diet. Now that the variety and abundance of late summer and early fall foods have diminished, the birds leave their generalist eating habits behind to become specialists on tree buds. The buds of certain trees are usually available for the remainder of the year and are high in protein and certain minerals. Grouse eat aspen buds, especially of male trees that are 10 to 20 years old, or other dense brushy cover in association with mature aspen. This includes the buds of willow, hazel, birch (*Betula spp.*), apple (*Malus spp.*), maple (*Acer spp.*), ironwood (*Ostrya virginiana*) and others. They also eat fruits and mast, such as dogwood berries and acorns, when available. Ruffed grouse will also be attracted to sunny edges (trails, openings) to feed on greens such as clover, forbs, and berries.

Winter

A number of things have happened to prepare the grouse for the cold. In late fall, feathers began to grow on their legs so that now the tarsi are fully feathered. This helps to conserve body heat. At the same time, fleshy comblike projections along the edges of their toes, called pectinations, have developed to help the birds walk on soft snow or to roost for the night on a branch in some protected thicket. And, as already mentioned, the birds have switched to a diet of buds and twigs. In southeastern Minnesota, south and southwest facing slopes are preferred wintering areas, and sumac, hazel and red cedar provide food and cover.



Ruffed grouse spend the winter months trying to keep warm, well fed and out of the way of predators. In the mornings, the birds leave their nightly roosting spot, which may be a young stand of conifers or a woodlot that is protected from the wind, to feed in a nearby stand of trees. They often form small feeding aggregations of up to 10 birds. Each bird fills its crop with buds and twigs and then returns to its roost to digest its meal in safety. The birds repeat the foraging expedition in the afternoon before settling in for the evening. With full crops, they digest food throughout the winter night. The digestive action increases their metabolism, which in turn produces body heat to help keep them warm.

Ruffed grouse usually roost in a protected wooded area, but when there is over 10 inches of soft powdery snow, they dive or burrow into a snowbank and spend the night there. A snow burrow is considerably warmer than a tree roost. There can be as much as a 45-degree difference in Centigrade temperature between the air and a burrow. A grouse may stay beneath the snow for a few days if the weather is especially severe. Ruffed grouse in snow burrows are often more susceptible to predation than birds roosting in trees.

Woodland Management

Ruffed grouse thrive in a dynamic forest ecosystem subject to periodic disturbance. The best grouse habitat is created when a forest with aspen is burned or clear-cut every 40 to 50 years in small, dispersed patches. Good ruffed grouse habitat provides a combination of food and cover (young and old aspen stands) within a small area of 5-15 acres.

Optimum ruffed grouse habitat should include:

- Brushy areas and young aspen stands to provide cover and supply summer and fall foods,
- Mature aspen stands with an understory of hazel or ironwood that provide food in fall, winter and spring,
- Dense sapling aspen stands to provide brood cover.

To maximize ruffed grouse densities, you should provide all of their annual habitat needs within 6-10 acres. A mix of aspen age classes is best achieved through a series of small clear-cuts by commercial timber harvest or cutting firewood in small blocks. Nearly all trees within the cut boundaries must be removed to allow full sunlight for regeneration.

If you own a large tract of forested land, you should consider it as a collection of 10 acre blocks and try to provide the proper mix of habitat within each block.

If your land has less than 20 acres of aspen, birch, or oak, cooperate with your neighbors or adjacent public land foresters, to work out a plan to improve grouse densities. If you meet these habitat requirements within a 10 acre area, one breeding pair of ruffed grouse should be able to reside on the area and rear a brood.

Aspen Management

The best way to improve ruffed grouse habitat is through aspen management. Aspen and mixed stands of aspen/hardwood or aspen/conifers should be managed to maximize grouse densities. The ideal way to obtain maximum aspen regeneration is to clear-cut, exposing the ground to sunlight, which stimulates suckering from the roots of cut trees. Once aspen is established on a site, it will persist for hundreds of years if burned, broken down or cut periodically. Harvesting during the winter usually provides the best aspen regeneration. In an unmanaged aspen forest, other trees such as balsam fir or red maple, of less value as grouse habitat, will take over the forest.

Aspen Cutting Methods

A 40-year harvest or cutting rotation of aspen is the goal for management of ruffed grouse habitat. Aspen harvesting should be scheduled as the current age and condition of the timber dictate. Habitat goals can still be achieved with small block cuts harvested every 5-7 years. High quality aspen that is in good condition may allow harvest beyond 70 years of age. The key is to schedule harvesting before the aspen becomes too old to re-sprout.

Four typical management methods are recommended for aspen stands (see below). Method #1: with a 40 acre tract, four 2 1/2 acre blocks could be logged as a 10 acre timber sale or firewood cut every 10-15 years. Method #2: another method is to cut one quarter of the aspen stand in 2 1/2 – 10 acre blocks, then an additional quarter every 10 years. These two methods can eventually produce maximum fall densities. Methods #3, #4 are recommended for stands over 50 years old which require an accelerated 10-20 year cutting rotation, consult the MDNR Area Wildlife Manager for additional recommendations.

Oak Management

Oaks are more predominant than aspen in the hardwood forests of southeastern Minnesota. These mixed oak-hickory woodlands have a high potential for improving habitat for grouse. A mosaic of 1-10 acre regenerating cuts dominated by 5-15 foot tall oak or aspen saplings adjacent to mature timber provides the best year-round grouse habitat. The potential of a woodland to support ruffed grouse is reduced if maples, basswood, or conifers are allowed to dominate.

The goal is to maintain or perpetuate the oak or mixed oak woodlands by active management. Oak management is influenced by the quality, condition and age of the timber; the amount of oak reproduction (saplings) and other trees or shrubs that are present; soil type and the topography and the size of your oak woodland and whether the oak is scattered throughout the stand or grows in clumps. Stands less than 10 acres in size are managed differently than larger woodlands. After oaks reach 90-100 years of age they will not sprout as vigorously, making it difficult to regenerate old stands.

There are two timber harvest methods that will produce young saplings to provide the mix of food and cover required by ruffed grouse. The option you use depends upon whether there is already oak regeneration in the stand and the age and condition of the trees. Do not harvest oaks without professional advice ... to do so invites regeneration failure.

Shelterwood Cuts

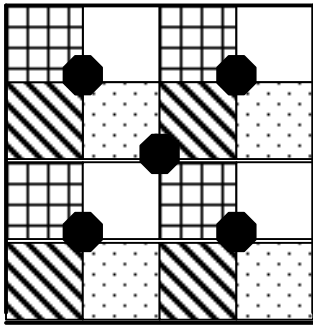
Where oak seedlings are not present, a series of partial cuttings or thinnings are applied to the woodland to open the canopy and allow acorn germination. Up to 40 percent of the canopy should be removed to encourage seedling growth. When saplings reach the proper size, in about 5 years, a final clear-cut removes the remaining canopy.

Clear-cuts

Small, scattered 5-20 acre blocks should be cut in oak woodlands at or near maturity, if adequate oak saplings are present. Cutting patterns similar to those for aspen should be used, harvesting 10 to 15 percent of the stand every 5-10 years. Reserve 3 to 6 trees/acre in a clear-cut for acorn production. Clumps of oak or aspen saplings more than 3 feet tall should be left standing in clear-cuts.

In some oak stands, competition with other trees will cause oak regeneration failure.

Aspen Management (from MNDNR, 1989)



they will provide far more grouse than unmanaged woodlands.

● Expected center for ruffed grouse breeding activity following management:

□ New harvest.

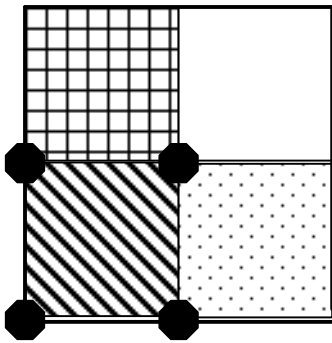
▣ Sapling stands from 4-15 years old for brood cover.

▤ Aspen 6-25 years old for fall and spring cover.

▨ Older aspen 25+ for winter food and nesting cover.

Method #1

With a 40-acre tract, four 2 1/2 acre blocks could be logged as a 10-acre timber sale every 10-15 years, or you could cut the blocks as firewood. This method can eventually produce maximum fall densities of 1 grouse per acre, four times the densities found on unmanaged timberlands.



Method #2

Another method is to cut one quarter of the aspen stand in 2 1/2 -10 acre blocks, then cut an additional quarter every two years.

Method #3

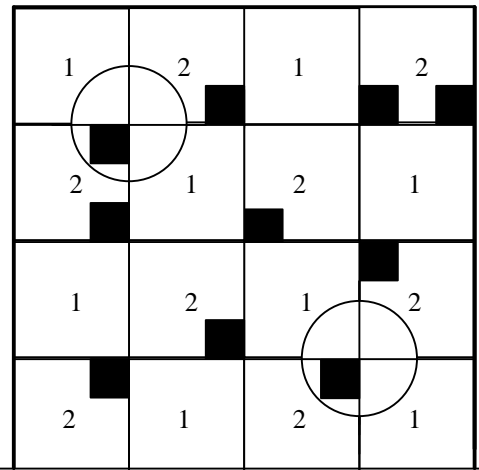
If your stand of aspen is mature (50-60 years) harvest it in 10-20 acre blocks in 2-4 timber sales at least 5 years apart. Reserving islands of mature male aspen from harvest during the last sale will reduce the length of time the tract will be without a winter food supply for grouse

■ Uncut reserve clump

1 = Cutting block cut during the first sale entry.

2 = Cutting block cut during second sale entry.

○ Circle indicates activity center



Method #4

If the stand is over-mature (60 years or older and in poor condition), cut almost all of the tract now, but reserve islands or strips of mature male aspen uncut for every 10 acres harvested as a winter food source. Although these larger cuts will not produce as high of a grouse density as method #1,



SUMMARY OF MANAGEMENT RECOMMENDATIONS

Management treatment should address the habitat components that are determined to be limiting ruffed grouse habitat potential. For evaluation purposes, select among the possible actions listed below to improve habitat quality or availability of each habitat component determined to be limiting.

1. Identify each 20-40 acre parcel that has aspen or can be managed to produce aspen. Make a forest management plan that will create several blocks of three different tree age classes. Best ruffed grouse conditions will exist if an equal mixture of young trees (<15 years old); intermediate aged trees (15-30 years old); and mature trees (30-40 years old) is present on the tract.
2. Harvest trees in blocks of 2-10 acres in size. If aspen age and conditions preclude small cuts, leave 1/2-acre islands or 70-100 foot wide strips of male aspen uncut for every 10 acres harvested. Where possible, burn slash and litter after harvest operations.
3. Reserve strips of mature aspen along bog and marsh edges, or other areas with brushy cover.
4. The managed area should have some trails and openings, because ruffed grouse often use such openings. Seed and maintain grasses and legumes on these areas for spring and fall food sources.
5. Do not plant conifers in forest tracts managed for ruffed grouse.
6. If a diversity of wildlife is desired, leave 2-6 scattered individual wildlife trees (standing, dead or dying hardwoods) for dens, cavities perches and feeding sites. Plant seed and fruit-producing native shrubs along forest edges.

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