HABITAT MANAGEMENT FOR PENNSYLVANIA RUFFED GROUSE

Young forest habitat is extremely important to an entire suite of birds and mammals with declining populations, including ruffed grouse. The objective of this document is to serve as a guide to aid land managers in managing young forest habitats for ruffed grouse. Following these basic principles will also enhance the management area for deer, bear, turkey, and a variety of declining songbirds and mammals.

The key to managing young forests for ruffed grouse is providing habitat components that meet their annual requirements. Reproduction, recruitment, and survival determine year-to-year grouse abundance, and high-quality habitat can improve all of these parameters.

Grouse typically begin using an area starting 3—5 years post-timber harvest and remain until stem exclusion begins at 15-20 years post-harvest depending on site quality (forests on better soils grow out of grouse habitat earliest due to accelerated tree growth). Landscape-level planning is required to ensure that young forest habitat remains a component on the landscape, or species will decline over time. It can take up to 10 years of site preparation before a stand is harvested, so careful planning is needed to ensure that no bottlenecks occur (i.e., areas where young stands reach stem exclusion stage yet no new stands are ready for harvest). Site planning and preparation that allows for 10% or more of a compartment to be regenerated every 15 years will ensure that young forest habitats remain on the landscape for species that require them. With this general approach, a balanced age class distribution can be achieved and maintained over the long term.

Irregular shaped timber harvests juxtaposed properly create optimal grouse habitat.

Within a stand, appropriate habitat management practices are determined by site, forest type, tree species composition, stand age, stand history, future desired condition, and the long-term objectives of the landowner/manager. There are several regeneration methods, and all are not suited for every forest type or situation. Careful consideration should be given to desired stand composition and vegetation structure before silvicultural techniques are prescribed.

In general, the greatest degree of overstory removal provides the greatest benefit to ruffed grouse. Clearcuts and two-aged stands provide excellent cover for ruffed grouse. Two-aged stands with <18 ft^2/acre of basal area (10-20 trees/ac) can provide hard mast production in a young stand, open areas for foraging, shrubs and thick saplings for cover, and territories for a variety of declining songbirds. Grouse will use these stands in every season for escape cover, foraging, nesting, drumming, and brood rearing. In the mixed mesophytic and northern hardwood forests of southwestern and northern PA, clearcutting following the appropriate shelterwood sequence regenerates numerous desirable species for ruffed grouse.

Harvested aspen stands regenerate with high stem densities favorable for grouse habitat.

In mixed oak forests, clearcutting without adequate oak regeneration will negatively impact the future oak component of the stand. Therefore, the intermediate treatment sequences outlined in oak silviculture guidelines (normally a shelterwood sequence with prescribed fire) is appropriate. With delayed harvest sequences such as shelterwoods, careful planning is especially important to ensure a young forest component remains on the landscape at all times.

Two-aged stands provide multiple needs for grouse throughout the year.

When planning at the landscape level, managers should look for opportunities to remove the overstory in nearby stands to ensure a young forest component remains on the landscape during those interim periods when relatively heavy overstory (>70 ft^2/acre of basal area) remains on shelterwood operations. For Pennsylvania forest types, SILVAH and SILVOAK provide excellent guidelines to establish advanced regeneration prior to final regeneration harvests. These guidelines include steps applicable to various scenarios encountered by forest habitat managers, aiding them in their ability to intersperse young forests across the landscape.

Non-commercial overstory removal and prescribed fire may be options to create young forest on areas of poor growth potential (i.e., low site quality oak ridge tops and barrens). Addition-

Prescribed fire can be used to create and maintain young forest habitat on ridge tops.

ally, low-quality stands that can not be economically converted to desirable species (dense birch stands in failed regeneration areas, for example) could be managed on a shortened rotation for the purpose of providing young forests.

Habitat Components

Each season brings biological changes for ruffed grouse and the habitats where they reside. While this might seem to complicate habitat management, today's practices can provide multiple habitat components in a single treatment when interspersed appropriately. Habitat managers should become aware of grouse needs through the year and employ techniques that will provide those necessary components.

Drumming

Male grouse occupy relatively small home ranges during the spring breeding season. These areas, often as small as 10–25 acres, are usually centered on several drumming sites. Commonly referred to as "drumming logs" these display platforms are about 12-18 inches high and surrounded by small diameter woody cover. Although logs are most often used, male grouse will use drumming stumps and large rocks. The keys to drumming habitat are availability of drumming platforms and dense mid-story stem cover. These conditions are most often met in 5–20 year old or older forests with a well-developed shrub layer (i.e., scrub oak, mountain laurel, rhododendron, azalea).

Drumming sites are characterized by a log or other platform surrounded by dense midstory cover of young trees and/or shrubs.

Even-aged and two-aged forest management systems are ideal for creating secure drumming habitat. In most areas, availability of drumming logs is not a limiting factor. However, if whole tree chipping is prescribed, 1–2 trees per acre should be retained and felled for drumming logs after chipping operations. Gating forest roads and retiring skid trails with broad-leaf herbaceous plants will encourage male occupation within 125 yards of these linear habitats where males can drum in close proximity to spring foraging habitats (i.e., herbaceous growth along road margins).

Mixed hardwood stands aged 40 years or older typically provide quality grouse nesting habitat.

Nesting

Grouse nests are often located at the base of a tree, stump, or log.

Contrasting with the young forests so often associated with grouse habitat, nesting often occurs in relatively open (pole and sawtimber size) forest stands with average basal area >100 ft^2/acre. These areas afford the nesting hen visibility to detect approaching predators. Grouse nests are nearly always located at the base of a standing tree, log or stump used as a "backstop" to prevent ambush from behind. In harvested areas where large trees are less available, coarse woody debris (fallen logs and snags, stumps, tree tops, and coarse slash) is important. In PA, grouse will nest in sapling stands as long as coarse debris is left in the stand. Areas with plentiful coarse woody debris and/or standing trees can encourage nesting on the site and improve nest success.

In a landscape context, interspersing harvests among older forest stands places nesting habitat in close proximity to quality brood habitat. The less distance a brood hen has to move her chicks, the greater their likelihood of survival. Ideally, high quality nesting habitat should be within 200—300 yards of high quality brood habitat.

A rich herbaceous layer and midstory stems are key grouse brood habitat components.

Brood-rearing

Habitat management that enhances brood survival may have greater benefit to grouse populations than any other action. Brood habitat is an important factor in grouse

populations because juvenile survival influences an area's population growth potential. Chick mortality is highest during the first two weeks after hatching, due primarily to predation and exposure. Where broods have quality habitat, survival rates are higher.

Herbaceous groundcover, invertebrates, and high midstory stem density (brambles, shrubs, saplings) are key brood habitat components. Fifty to seventy percent groundcover in herbaceous forbs and some fern, with a high midstory stem density, provides chick hiding cover and invertebrate foods. Spiders, ants, bees, flies and caterpillars also seek refuge in the herbaceous layer and woody stems, providing chicks the high protein food source they need to survive.

A closed canopy stand the summer following an April prescribed fire. Abundant herbaceous understory provides cover and invertebrates.

Quality grouse brood habitat conditions occur where openings in the forest canopy encourage herbaceous plant growth and woody stem regeneration. The importance of young forest habitat and canopy gaps to grouse broods cannot be overstated. Forest management and prescribed fire can be used to create and maintain these conditions in Pennsylvania. Moist bottomlands, hollows, and riparian corridors with a high percentage of forb cover (not grass) are also preferred brood sites.

In maturing (>30 years), mixed hardwood stands with closed canopies, prescribed burning can create the diverse understory communities favored by grouse broods. Burning will kill some of the fire-sensitive trees creating small canopy gaps. This increased sunlight and available nutrients released from the humus layer stimulate herbaceous growth.

Forest roads dominated by perennial cool-season grasses, like this one planted with orchard grass, prevent chicks from escaping predators due to the dense vegetation structure. They also harbor fewer invertebrates compared to forb-dominated roads.

On forest roads and permanent clearings, eliminating perennial cool season grasses and maintaining forb communities through minimal maintenance should be a priority. Removing the "sod-forming" grasses improves chick mobility and provides greater insect food sources. Adult grouse do not use larger herbaceous clearings or fields and broods only use their periphery; therefore, land managers should concentrate herbaceous improvements on forest roads and small (less than 1/2 acre) landings and similar openings.

Fall-Winter

Winter survival depends on thick cover and diverse food sources. Ideal cover conditions most often occur in 5–20 year-old forest habitats with high stem density. Food resources necessary for grouse to survive winter in good condition for spring breeding include buds and twigs, hard mast, dried soft mast, and herbaceous plants. The most frequently encountered foods in PA grouse crops during late winter (a critical period of food shortage) are ferns, grapes, aspen buds, cherry and blueberry buds, twigs and fruit, hard mast, and the fruits and seeds of greenbrier. These food-producing plants may not be the dominant vegetation in a stand, but they are vitally important.

The best conditions for overwinter survival are provided where forest age classes are well interspersed on the landscape and where stands contain diverse food sources. The goal is to provide young forest components (dense woody stem cover, soft mast, herbaceous plants) with older forest components (hard mast, birch and cherry buds) within a relatively small area.

Special considerations

In addition to forest management practices, specific attention to a few targeted management actions can improve ruffed grouse habitat dramatically.

Spring seeps. Even during periods of deep snow, these areas are often snow-free. Reducing canopy cover to approximately 50 percent around spring seeps allows increased light into the site and can promote herbaceous groundcover and shrub growth, which produces many fruits and seeds eaten by grouse in mid-winter.

Seeps and seasonal wetlands can provide herbaceous foods and soft mast, even during winter.

Where soft-mast producing trees and shrubs do not exist near seeps, they can be planted. Shrubs such as hawthorn and crabapple have been successfully established around spring seeps after thinning the surrounding canopy trees. Shade tolerant species such as dogwood and serviceberry can be planted in shaded sites. When stands containing seeps are regenerated by timber harvest, some trees surrounding the seep (1/4 – 1 acre, depending on the site) should be left uncut to provide habitat diversity and partial shading to protect the seep from excessive solar radiation.

Old homesteads. These may support relatively high stem densities and often hold grouse, especially if old fruit trees remain. Thinning around ("daylighting") existing fruit trees, pruning excess limbs, and fertilizing stimulates increased fruit production. Planting additional soft mast-producers on these sites and maintaining them as wildlife orchards benefit ruffed grouse and other wildlife. Suitable species could include apples, crabapples, dogwood, hawthorn,

serviceberry, and elderberry. Periodic removal of invading trees will maintain these high-quality shrub/old field habitats over time. Removal of overstory trees to release remnant suppressed shrubs will help restore habitats that have been neglected.

Old homesteads often contain good cover and fruit-producing trees.

Grapes. Grapevines should not only be retained, but promoted when possible. Grapevines are often found on moist sites, often in a narrow cove just above or below a forest road. These sites can be improved by thinning non-desirable trees and allowing sunlight into the site to stimulate additional groundcover and stem density and improve conditions for foraging grouse. Grapevine growth is not necessarily desirable to foresters and loggers as they can make timber harvest more difficult. If grapevine growth is so excessive it poses a danger, then the tree(s) should be left standing. If the tree(s) supporting grapevines is not desirable for grouse, then it can be killed and left standing.

Aspen. Not only does aspen provide high stem density cover when young, but older aspen trees afford high-protein buds valued as a winter food. Due to its importance to ruffed grouse, aspen stands and remnant clones should be promoted and retained where they occur. Interestingly, the most effective method to do this is through cutting. Aspen does not compete well when among northern hardwoods past about 40 years of age. Instead of allowing clones to die out of mixed stands, managers should regenerate these stands allowing aspen to persist. For small individual clones, cutting all standing mature aspen plus all other trees out to 1 ½-2 tree lengths will encourage renewal of aspen clones. Winter cutting is recommended when managing aspen, as root systems are sensitive to soil disturbance and compaction.

Aspen stands harvested to maintain this component on the landscape.

In the upper midwest where large continuous stands of aspen occur, aspen is often cut in a "checkerboard" pattern with 5 —15-acre blocks to intersperse age classes. However, because most Pennsylvania aspen stands are less than 15 acres in total size, they can't be divided in this manner. Where aspen occurs in Pennsylvania, managers should focus on short-rotation management to provide a continual, well-interspersed

Excellent fall-winter habitat in a 10 year-old young forest stand.

class of young woody stems (5-20 years old) on the landscape at all times. Managers may also notice aspen saplings creeping into herbaceous openings. Ceasing to mow these areas will allow the clones to expand.

Thermal cover. Ruffed grouse snow-roost during periods when powdery snow accumulates to a depth of 10 or more inches. Where this prolonged snow cover is lacking, dense hardwood saplings, young oaks that retain leaves, mountain laurel thickets, and conifers provide thermal cover. Retaining or planting thick patches of shrubs and/or conifers can be important where snow conditions are inadequate and other thermal cover is lacking.

Forest Roads. These linear openings provide increased habitat interspersion, high-quality forage, and attractive brood habitat. Newly created logging roads can be planted with 50 lbs/ acre of wheat (if planting in fall) or oats (if planting in spring, summer), 8 lbs/ acre of crimson clover, 2-4 lbs/ acre of white or ladino clover, and 2 lbs/ acre of trefoil. Planting should be accompanied by the appropriate amount of lime and fertilizer as determined by a soil test. On forest roads that were once reclaimed with non-native, perennial cool-season grasses (orchardgrass, bluegrass, fescue) an herbicide treatment of *Poast®* will selectively kill the grass but not harm forbs that are present. Often, the original planting mix contained clover which is still present in the seed bank. Once released from the grass cover, these clovers often respond and re-occupy the site. Roads should be managed with a minimal maintenance approach that only prescribes treatments to knock back tree growth in the road and along its margins. This may include mowing every other or every third year or spot herbicide application.

Pennsylvania grouse need diverse food resources throughout the seasons.

Stand Diversity. A grouse hen's reproductive potential is largely determined by her fitness during spring breeding season. Maintaining a diversity of food-bearing species in a stand while providing a diversity of age classes across the landscape should be a manager's over-arching goal when managing ruffed grouse. A study of 732 grouse crops collected in PA in January found items from 63 different plant species. This highlights the importance of "minor" stand components in grouse diets and in grouse habitat management. Stand diversity is especially important on sites lacking hard mast producers, and in years of low to moderate mast production. On sites dominated by just a few mast-producing species, managers should

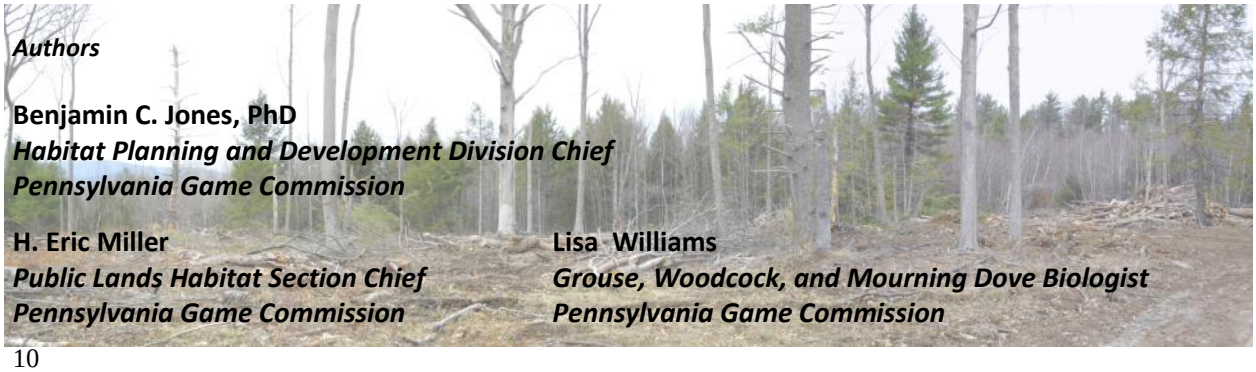
work to increase the diversity of the forage base to provide a buffer against mast failure. A variety of trees, shrubs, and vines that produce hard and soft mast should be retained and encouraged (or planted if absent) during management activities. In oak-dominated stands, retaining the strongest mast producers and using TSI activities to improve their yield is also beneficial.

Limiting disturbance. Repeat disturbance from hunting pressure or vehicle traffic causes grouse to enlarge their home ranges and/or to shift away from preferred habitats and into more marginal habitats. This can result in lower adult and chick survival. In areas managed specifically for ruffed grouse, closing roads from mid-December through late June will provide road access to hunters during most hunting seasons while minimizing grouse disturbance during the crucial wintering and breeding periods.

Where road closures are not feasible, managers can divide management areas into "refuge" and "recreational" areas for planning purposes. Refuge areas are sites that receive habitat management but are located > 440 yds (quarter mile) from a road or other recreational access point. Recreation areas are sites that receive grouse-focused habitat management within 440 yds (quarter mile) of a road or access point. The placement of both refuge and recreation areas will provide high quality habitat across the landscape, provide high-quality hunting experiences for grouse hunters, and minimize disturbance to core grouse populations in the area. Refuge areas can be considered "production" areas, since they can serve as source populations for nearby recreation areas.

Summary

Habitat management for ruffed grouse should include a diversity of forest management techniques designed to provide grouse food and cover in close proximity. In Pennsylvania, twigs and buds, leaves, soft mast, and hard mast are important food items. Stands with high midstory stem density are important to grouse in all seasons. Herbaceous, broad-leaved plants or forbs should be established on forest roads and retired skid trails, with a 2 —3 year maintenance mowing cycle. The *location, proximity, and design* of management units with respect to seasonal habitat requirements determine the success of grouse management programs. Providing diverse young forest in sufficient amount and in an adequate arrangement on the landscape will make an area as attractive as possible for grouse.



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