The National Wild Pheasant Conservation Plan

Pheasant Habitat Management Recommendations for Grasslands

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Grassland Management

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Status

As described in the introduction, early settlers quickly realized the rich soils beneath the prairies were excellent for crop production and put John Deere's moldboard plow to work converting prairie to cropland. Conversion of grassland to cropland continues today and in some areas the rate of conversion appears to be accelerating due to advances in agricultural technology (hybrid seed, equipment) and increased demand for grains (U.S. GAO 2007, Stubbs 2007).

In addition to the direct loss of grasslands, remaining grasslands are not exposed to the same disturbance regimes under which they evolved. Periodic and varying degrees of fire and grazing intensity by wild ungulates historically maintained high species and structural diversity on native prairie. Although grazing systems are increasing in popularity, season-long grazing of pastureland, which causes declines in species and structural diversity, remains common. The introduction of aggressive exotic cool season grasses such as smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), and cheatgrass (*B. tectorum)* have also degraded remaining native grasslands. Their aggressive early season growth can quickly out-compete later growing native warm-season grasses and forbs and cause substantial declines in species diversity. This problem can be locally compounded when grazing regimes do not focus grazing pressure early in the growing season when these exotic plants are growing most rapidly. Even native grasses such western wheatgrass (*Pascopyrum smithii*) can become aggressive and degrade habitat in southern states under certain grazing regimes.

In addition to the changes in grassland composition caused by changes in disturbance regime and exotic species, some grasslands have been impacted by conversion to tame pastureland or hayland. Tame pastures and hayland typically consist of near monotypic stands of exotic grass and/or forage valuable forbs for livestock grazing or forage harvest. Haylands that consist of primarily grass are typically harvested annually while fields with primarily forbs such as alfalfa may be harvested 3-4 times annually.

While many grasslands are now managed for livestock or forage production, some grasslands are planted and/or managed specifically for wildlife. Many of the grasslands managed specifically for wildlife

occur on state or federal lands or private land enrolled in federal conservation programs. Specifically, many acres of private cropland have been converted to perennial vegetation through conservation programs such as the Conservation Reserve Program (CRP). The CRP was initially authorized by the Food Security Act of the 1985 Farm Bill and as many as 39 million acres of mainly cropland have been temporarily converted to primarily grassland or "planted cover" for 10-15 year contracts. We define planted cover as perennial herbaceous vegetation planted with the purpose of providing habitat for wildlife such as upland game birds. Many of the original plantings consisted of 1-2 native or exotic grasses and 1-2 native or exotic forbs. Although the original intention of the CRP was primarily intended to conserve soil on marginal croplands, the benefits to wildlife have been dramatic especially for upland nesting birds. In fact, the conservation community recognizes CRP as the single most important wildlife habitat program in the country. Changes in policy have improved the habitat provided by CRP by the encouragement of increased use of diverse native plantings and requirements of periodic management to maintain diversity and productivity of established plantings. Currently, CRP is administered with a national cap of 24 million acres.

Grasslands as Pheasant Habitat

Pheasant densities increase as the proportion of grass in the landscape increases (Haroldson et al. 2006, Nielsen et al. 2008), up to a maximum of about 50% grass (Kimball et al. 1956, Wagner 1965, Trautman 1982, Johnsgard 1999). While it is true that initial conversions of grassland to cropland created a mosaic of habitats necessary for successful pheasant introductions, few landscapes exist in which additional conversion would benefit pheasants. The quantity and quality of grasslands which function primarily as nesting and brood-rearing habitat represent the major limiting factor for wild ring-necked pheasant populations across their current North American range. Although conservation of habitats necessary for all pheasant life cycle needs is important, management of grasslands is certainly critical.

The value of grasslands as nesting and brood-rearing habitat for pheasants varies by grassland type, management regimes, and landscape attributes. Pheasants seek out and initiate nests primarily in grasslands shortly after spring green up. Residual vegetation is important and grasslands with more residual cover are often selected, especially for initial nests before current year growth provides sufficient cover for concealment. Pheasants usually select and exhibit high nest success in large blocks (≥40 acres) of grass, but nest success and site selection are further improved in landscapes with grassland in several large blocks compared to concentrating cover in a single block (Clark et al. 1999). Hens with successful clutches lead chicks to areas with high forb abundance where insects are available to meet the high protein diet requirements of the rapidly growing young birds. Ideal brood-rearing habitat provides aerial concealment from predators, allows adequate movement at ground level, and contain abundant insects which are produced mostly by broad-leafed plants. Grasslands without proper management frequently fall short of providing ide-al brood-rearing habitat.

Planted Cover

Per unit area, more pheasants are produced from planted herbaceous cover than any other habitat. Pheasants that nest in planted cover typically have higher nest success than those nesting in other habitats because of the excellent concealment this habitat provides as a result of limited and care-fully timed disturbance. While this cover is extremely important, not all planted cover has equal value to pheasants. Differences in habitat structure (vegetation height-density, litter depth and cover, residual vegetation cover, and forb abundance [Sample and Mossman 1997]), which is influenced by plant species composition and management, dictates the overall value as pheasant nesting and brood-rearing habitat. Grass habitats should provide residual cover or new growth when hens begin nesting (about

April 15 in the upper Midwest) and remain undisturbed until most re-nesting in completed (about August 1).

The use of warm-season versus cool-season grasses is a common discriminating feature among planted covers. Both types exhibit specific advantages as pheasant habitat. The aggressive early season growth of cool-season grasses supplement the concealment provided by residual grass which can provide excellent nesting habitat. Some cool-season grasses such as smooth brome and Kentucky bluegrass tend to become flattened beneath snow which reduces the value of residual cover as nesting habitat. Other cool season grasses such as intermediate (*Thinopyrum intermedium*) and tall wheatgrass (*T. ponticum*) retain their structure better and provide better nesting cover. Most warm-season grasses retain structure even when inundated under heavy snow, while some Old World bluestem grasses (*Bothrichloa* spp.) are an exception. When desirable species of warm or cool season grasses are established, both are very valuable to pheasants as nesting habitat.

Planted cover with an open understory and abundant forbs provide ideal brood habitat for pheasants. Without periodic management, the value of planted cover as brood habitat declines. When planted cover is left idle for multiple years, grasses become dominant and thick thatch inundates the understory. This results in poor habitat quality characterized by reduced nest success and brood survival (Matthews 2009, but also see Eggebo et al. 2003). The frequency and type of management required to maintain quality brood habitat varies by vegetation type and region. Specific management activities aimed at improving brood habitat include haying, grazing, burning, disking, inter-seeding, chemical suppression and combinations of these activities.

Grazing Lands

Native and non-native grasslands utilized primarily for grazing can provide nesting and brood-rearing habitat for pheasants. Because these lands are typically utilized annually for cattle grazing, the amount of residual vegetation available as nesting or brood-rearing habitat varies spatially and temporally. Highly utilized pastures which feature very little residual vegetation that could function as concealment cover for nesting or brood-rearing have little value to pheasants.

In eastern states, pastures tend to be scarce, small, isolated, and highly utilized by cattle and are not considered a particularly important contributor to regional pheasant production. In western states, pastures tend to be larger, incur lower rates of utilization, and are often a component of a larger operation which can result in more intensively managed grazing regimes. Pastures are considered an important contributor to pheasant production in many western states.

Specific management of grazing regimes dictates the value of pastures as nesting and brood-rearing habitat for pheasants. The traditional season-long grazing system exposes pasture vegetation to grazing during most of the growing season. When pastures experience similar season-long grazing pressure year after year, species diversity and structural heterogeneity decline. Declines in forb diversity reduce the value of pastures as brood habitat as fewer insects are produced. Additionally, diverse grasslands typically provide higher quality habitat than low diversity stands that can form after repetitive season-long grazing. While strategically stocked season-long pastures may provide enough residual cover to be considered valuable to nesting pheasants, pastures subject to other grazing strategies likely provide far superior habitat.

Rotational grazing systems utilize multiple paddocks with each paddock subject to regular and systematic grazing treatments with the intent of increasing quality and quantity of forage across the

entire system. Because the grazing regime within each paddock varies seasonally and yearly, species diversity is maintained among forage species. Although the primary focus of rotational grazing systems is to increase forage production across the system, high quality pheasant nesting and brood-rearing habitat can be maintained by carefully controlling the timing and intensity of grazing. While every paddock may not provide ideal habitat every year, all paddocks may provide good habitat during some years. Because rotational grazing can encourage persistence of a diverse suite of forbs, pastures under well managed systems can provide particularly useful brood habitat. Although specific grazing systems will not be discussed here, in general, pastures that are subject to well designed grazing systems will benefit pheasants while concurrently increasing forage production.

Hayland

Hay fields can be attractive to pheasants for nesting and brood-rearing, but their success while using these fields is variable. Timing of haying operations in relation to pheasant reproductive chronology influences success. Haying operations destroy nests and can cause chick mortality if they are not mobile enough to avoid machinery. Hay fields provide decent nesting and brood-rearing habitat when haying is delayed until after the primary nesting season.

Grass hay fields likely contribute more to pheasant production than popular brad-leafed hay fields such as alfalfa because of later haying dates. Warm season grass hay fields are harvested late in the growing season which may make them quite valuable to nesting pheasants. Cool season grasses grown for hay do boast early season growth which can provide excellent concealment for nesting pheasants, although hay dates are generally earlier than for warm season stands. Grass hay fields likely provide better nesting habitat if adequate stubble height is left during harvest, or if fall growth produces residual cover for the following nesting season. The value of grass hay fields for brood-rearing likely depends on the amount of broad-leafed plants and subsequent insect production.

Broad-leafed hay fields such as alfalfa represent very attractive nesting habitat, although success is usually low. These fields are usually harvested multiple times per season with the first cut occur-ring within or near the peak nesting season. Alfalfa fields can provide excellent brooding habitat, but again, direct chick mortality can occur if they are not mobile enough to avoid machinery during haying operations.

Specific Problems

- Conversion of grasslands to cropland has reduced the amount of nesting and brood-rearing habitat available to pheasants throughout their range. In some regions such as the northern Great Plains, conversion of grasslands, primarily native prairie, to cropland is still occurring at astonishing rates (Stubbs 2007). Millions of acres of cropland were temporarily converted to grass through the CRP, but the future of this program is uncertain. Pheasants would benefit from any effort to restore and/or maintain grasslands on the landscape.

- Invasive species such as smooth brome, Kentucky bluegrass, cheatgrass, old world bluestem species, and tall fescue have reduced the quality of many remaining grasslands as nesting and brood-rearing habitat. These invasive plants lack ideal structure for nesting and because they can become monocultures their value as brood-rearing habitat is minimal. It was common practice to use some (smooth brome and old world bluestem species) of these invasive plants in plated cover plantings such as for land enrolled in the CRP. When subject to periodic management (haying, grazing, burning) there is some value as nesting or brood-rearing habitat

- Many planted cover fields have been subject to infrequent or inadequate management and their value as nesting and/or brood-rearing habitat has declined. Periodic management promotes species diversity, healthy plant growth, and an open understory which is an important component of brood habitat. Woody encroachment can also be controlled with periodic management such as prescribed fire. While the ideal technique varies by type of vegetation and desired out-come; prescribed fire, haying, grazing, disking, interseeding, and chemical application are all proven and effective management options to improve grasslands as pheasant nesting and brood-rearing habitat.

- Improper grazing has reduced the value of some grazing lands as nesting or brood-rearing habitat. Over utilized pastures do not provide adequate concealment for nesting pheasants. Additionally, pastures subject to season-long grazing typically lose species diversity and structural heterogeneity further reducing their value to nesting or brood-rearing pheasants.

- Hay dates for popular tame forages species such as smooth brome and alfalfa typically occur during the primary nesting season which results in destroyed nests. Native grasses are typically hayed later in the summer which increases nest and chick survival in those hay fields.

Grassland Recommendations and Opportunities

The quantity and quality of grasslands available in agricultural landscapes represent the major limiting resource for pheasant populations. Opportunities exist to improve the quality and maintain quantity of grasslands to improve pheasant nesting and brood-rearing habitat, such as discouraging the conversion of existing grasslands to cropland and non-agricultural uses.

Planted Cover Establishment

Planted cover provides critical nesting and brood rearing habitat for pheasants. While pheasants will use a variety of grassland types, we provide specific recommendations to maximize pheasant production from newly established planted cover such as land enrolled in the CRP.

1. Diverse warm or cool season native grass and forb mixes provide excellent nesting and brood rearing habitat. Seed mixes should include substantial amounts of forbs to enhance brood rearing habitat.

2. Tame mixes such as dense nesting cover which is comprised of tall and/or intermediate wheat-grass, sweet-clover (*Melilotus officinalis*), and alfalfa (*Medicago falcate*) is a tried and true economical alternative, although sweet-clover can be invasive in eastern and some midwestern states; in these states, Korean lespedeza (*Kummerowia stipulacea*) can be a less aggressive alternative. The use of exotics such as smooth brome, Kentucky bluegrass, and tall fescue is discouraged.

3. Planted cover is most valuable to pheasants when in an early successional state because of the seeds and insects produced from broad leafed plants and annual grasses. While methods exist to quickly establish perennial grass and selected forbs by using pre-emergent herbicides such as Plateau ®, the quality and duration of early successional habitat is reduced. When establishing planted cover into clean seedbeds (low risk of noxious weed outbreaks), the use of pre-emergent chemicals may not be necessary to establish the grass stand, and the quality and duration of early succession-al habitat can be maximized. When competition from weeds may reduce the chance of establishing planted cover, the use of a pre-emergent chemical such as Plateau ® is recommended.

4. Planted cover should be established in blocks rather than in linear patches to increase nest success. Blocks of at least 40 acres are recommended, but 80-160 acre blocks are ideal.

5. Planted cover should be periodically managed as to maintain a forb component, remove thatch build up, and to maintain an open understory which is important for brooding hens.

Planted Cover Management

Proper management of planted cover is important to maintain the intended value to pheasants. Grasslands left idle for too long can accumulate excess plant litter which can reduce productivity, growth, vigor and diversity of planted cover. The following management techniques are recommended to maintain the intended value of planted cover such as land enrolled in the CRP as nesting and brood-rearing habitat for pheasants. The ideal frequency of management will depend on the rate of plant succession which is regulated by climate and stand type.

Haying - Periodic haying of planted cover removes excess litter build up and encourages fresh vegetation growth. Haying can encourage forb growth because litter is removed from the soil surface, but other management techniques incur more soil disturbance and encourage better forb growth. This management technique is easily accomplished and does not require complex planning to complete. Haying should be delayed until after the primary nesting season to protect nesting hens. This practice is particularly popular among warm season plantings because the hay is still valuable as forage after the primary nesting season. However, cool-season grass plantings also benefit from periodic haying.

Grazing – Prescribed grazing is a valuable tool managers can use to accomplish several planted cover management objectives. Like haying, grazing removes excess plant litter but the hoof action from livestock provides soil disturbance which encourages important forb growth. High intensity short duration grazing is a great way to quickly remove excess plant material and disturb the sur-face soil which sets the stage for healthy and diverse plant growth. Timing, intensity, and frequency of grazing will again depend on stand type and climate. Grazing can also be an effective way to encourage or discourage growth of specific vegetation types. For instance, encroachment of exotic cool season grasses into warm season plantings is a common problem. Intense grazing during the cool season grass growing season can shift the plant community towards the desirable warm sea-son grasses.

Prescribed burning – Prescribed fire is an excellent management method to maintain healthy native plant communities. Periodic burning closely simulates the natural disturbance that our native plants are adapted to. The result can be a diverse suite of grasses and forbs which provide ideal nesting and brood-rearing habitat for pheasants. When timed appropriately, prescribed fire can reduce exotic cool season grass and woody encroachment into native warm season stands. While late spring burnings are effective at reducing cool season grass encroachment, some pheasant nests will inadvertently be destroyed. It is assumed the long-term benefits of late spring burns outweigh the short-term detriments. While prescribed fire can quickly accomplish management objectives, detailed planning is necessary to safely and effectively burn fields.

Disking – Disking is an aggressive management technique used to promote early successional habitat which is important for pheasant broods. Disking is usually used in conjunction with a vegetation removal practice such as haying, grazing, or burning which eases the disking process. During this management technique, the top 2-4 inches of soil are disturbed by one or two passes with a field disk. The aggressive soil disturbance promotes the growth of annual broad leafed plants while temporarily suppressing the growth of the perennial grasses. When executed properly, a broad-leafed plant community emerges

with an open understory which provides ideal brooding habitat for pheasants. As natural plant succession occurs, the stand will eventually convert back to a grass dominated community. It is popular to treat portions of a field in a strip formation with disking. While this method can deliver big results, managers should be aware of potential erosion issues and noxious weed outbreaks.

Inter-seeding – inter-seeding forbs into established grasslands is an excellent way to boost forb abundance and increase the value of planted cover as brood habitat. This practice is usually used in conjunction with a vegetation removal practice such as haying, grazing, burning or after disking. We recommend using a mixture of forbs with bloom dates that encompass the entire brood rearing season for maximum benefit to pheasants.

Herbicide treatment – Under certain circumstances, herbicides can be useful to achieve specific management goals. For instance, low doses of non-selective herbicides can be used to suppress grass growth prior to inter-seeding forbs so the survival and persistence of the valuable forbs is enhanced and extended. Chemical treatments can also be used to suppress or kill encroaching exotic cool season grasses in warm season grass stands. The chemical can be applied during spring when cool season grasses are actively growing and warm season grasses are dormant. This method is usually more effective when used in conjunction with a vegetative removal practice such as haying, burning, or grazing so the chemical can be applied easily to new growth. In the southern Great Plains biologists have had success applying herbicide (Round-Up) to cool season grass (smooth brome and western wheatgrass) invasions in the late fall during a periodic warming event (generally > 60° F) immediately after the first or second hard freeze.

Grazing Lands Management

1. Promote the use of grazing systems which increase forage production for livestock while concurrently providing adequate nesting and brood rearing habitat for pheasants. To provide nesting habitat, 10" of residual vegetation is recommended. Grazing systems which provide 10" of residual vegetation in at least some paddocks during some years are recommended.

2. Native grasslands should be grazed in a manner that growth of exotic *grasses is discouraged*. For pastures invaded by exotic cool season grasses, aggressive early season grazing may be needed to promote the growth of native warm season grasses. Non-selective herbicides can also be used to suppress/kill exotic cool season grasses when native grasses are still dormant, but some native forbs could also be killed.

3. Encourage the use of native grass and forb species when land is converted from other uses to grazing land.

4. Discourage annual burning of grazing lands as no residual cover is available for nesting pheasants.

Hayland Management

1. We recommend use of warm season grasses for grass hay because hay dates are usually after the primary nesting season for pheasants.

2. When hay is cut during the brood rearing season, we recommend that producers start in the middle of the field and work towards the outside. This will encourage hens with broods to move out of the field during the haying operation and will reduce chick mortality.

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