

NATURAL RESOURCES CONSERVATION SERVICE

UPLAND WILDLIFE HABITAT MANAGEMENT

UPLAND GAME BIRD HABITAT DESIGN PROCEDURES

(645DP)

Upland Wildlife Habitat Management shall be planned and applied in accordance with the 645 standard detailed in Section IV of the Field Office Technical Guide (FOTG). This document describes the definition, purpose, and conditions where Upland Wildlife Habitat Management applies, as well as criteria, considerations, and operation and maintenance for developing site-specific plans.

This design procedure provides information on habitat for targeted upland game birds including Northern bobwhite quail, Plains sharp-tailed grouse, and greater prairie chicken. These habitat parameters are also suitable for ring-necked pheasant throughout its range in Nebraska.



Photo by Ritch Nelson, NRCS, Nebraska, 2004

1. Size, Interspersion, and Juxtaposition Requirements

a. General Concepts

- **Sculptured Seeding:** The use of “sculptured seedings” is one approach to create patches of different habitat types within a habitat unit. The intent is to design a seed mixture to closely match the site capability of “micro-sites” in the habitat unit. For example, one mixture consisting of plant species that prefer moist, fertile soils can be used on low lying portions of the unit while a mixture of drought-tolerant species is planted on upland areas.
- **Breaks or Divisions:** Another approach to create patches of different habitat types within a habitat unit is to dissect uniform seedings with vegetated firebreaks, food plots, or other landuses (i.e. cropland, hayland, etc.). These corridors must be a minimum of 100 feet wide to provide adequate separation and create “edge” between habitat types.

b. Northern Bobwhite Quail

- Recommended minimum size of a habitat unit is 5 acres. If multiple habitat units in close proximity (1/2 mile) are used, the recommended average size of the patches is 5 acres. The average width of all habitat units must be 100 feet or greater.
- Each habitat unit (or combination of habitat units in close proximity) must consist of multiple patches which provide different habitat requirements (i.e. nesting cover, brood-rearing cover, etc.). As the habitat unit size increases, additional patches of at least one acre are required as outlined below:
 1. < 10 acres – 2 or more patches
 2. 10 - < 20 acres – 4 or more patches
 3. 20 - < 40 acres – 6 or more patches
 4. 40 – 80+ acres – 8 or more patches
- Specific habitat types are required to meet the life requisites of Northern bobwhite quail. Three habitat types; nesting cover, brood-rearing cover, and shrub thickets for escape cover; are required to be developed or must be present immediately adjacent to the habitat unit. Other habitat types can be added. The inclusion of food plots should be deemed necessary by a wildlife biologist. The amount of each habitat type recommended for optimal bobwhite quail habitat is noted below:
 1. Nesting Cover: 25% to 50% of the total habitat unit(s)

2. Brood-rearing Cover: 35% to 70% of the total habitat unit(s)
3. Shrub Thickets: One 30' x 50' thicket for every 5 acres of habitat unit
4. Winter Cover: 0% to 10% of the total habitat unit(s)
5. Food Plots: 0% to 5% of the total habitat unit(s)

c. Plains Sharp-tailed Grouse

- Recommended minimum size of a habitat unit is 5 acres. If multiple habitat units in close proximity (1/2 mile) are used, the recommended average size of the patches is 5 acres. The average width of all habitat units must be 100 feet or greater.
- Each habitat unit (or combination of habitat units in close proximity) must consist of multiple patches which provide different habitat requirements (i.e. nesting cover, brood-rearing cover, etc.). As the habitat unit size increases, additional patches of at least one acre are required as outlined below:
 1. < 40 acres – 2 or more patches
 2. 40 – 80+ acres – 4 or more patches

Note: This patch size criteria should only be used on sites within the primary range of Plains sharp-tailed grouse and outside of the primary range for Northern bobwhite quail.
- Specific habitat types are required to meet the life requisites of Plains sharp-tailed grouse. Three habitat types; nesting cover, brood-rearing cover, and shrub thickets; are required to be developed or must be present immediately adjacent to the habitat unit. Other habitat types can be added. The inclusion of food plots should be deemed necessary by a wildlife biologist. The amount of each habitat type recommended for optimal sharp-tailed grouse habitat is noted below:
 1. Nesting Cover: 35% to 70% of the total habitat unit(s)
 2. Brood-rearing Cover: 25% to 50% of the total habitat unit(s)
 3. Shrub Thickets: One 30' x 50' thicket for every 5 acres of habitat unit
 4. Winter Cover: 0% to 5% of the total habitat unit(s)
 5. Food Plots: 0% to 5% of the total habitat unit(s)

d. Greater Prairie Chicken

- Recommended minimum size of a habitat unit is 40 acres of contiguous grassland.
- Each habitat unit (or combination of habitat units in close proximity) must consist of multiple patches which provide different habitat requirements (i.e. nesting cover, brood-rearing cover, etc.). As the habitat unit size increases, additional patches of at least one acre are required as outlined below:
 1. < 40 acres – 2 or more patches
 2. 40 - < 80 acres – 4 or more patches
 3. 80 - < 120 acres – 6 or more patches
 4. 120 – 160+ acres – 8 or more patches
- Specific habitat types are required to meet the life requisites of greater prairie chicken. Three habitat types; nesting cover, brood-rearing cover, and shrub thickets; are required to be developed or must be present immediately adjacent to the habitat unit. Other habitat types can be added. The inclusion of food plots should be deemed necessary by a wildlife biologist. The amount of each habitat type recommended for optimal prairie chicken habitat is noted below:
 1. Nesting Cover: 35% to 70% of the total habitat unit
 2. Brood-rearing Cover: 25% to 50% of the total habitat unit
 3. Shrub Thickets: One 30' x 50' thicket for every 20 acres of habitat unit (shorter species recommended and avoid possible lek sites)
 4. Winter Cover: 0% to 5% of the total habitat unit
 5. Food Plots: 0% to 5% of the total habitat unit

2. Herbaceous Seeding Criteria

- a. Refer to *Herbaceous Vegetation Design Procedures (550 DP)* located at FOTG, Section IV, A. Conservation Practices, Range Planting (550) for guidance on installing herbaceous seedings for upland wildlife habitat. Additional requirements for different habitat types suitable to each targeted upland game bird species are noted below.
- b. General Requirements for All Herbaceous Seedings
 - A minimum of ten species (grasses, forbs, and legumes) must be used in all herbaceous seedings, except as outlined below for single purpose seedings, to provide adequate diversity for quality habitat.
 - Winter cover, vegetative firebreaks, and other single purpose seedings that make up a small percentage of the habitat unit, must have a minimum of three species in the mix.
 - All grasses used in herbaceous seedings must be native and adapted to the site. Adapted native forbs and non-aggressive, introduced legumes are acceptable for use in herbaceous seedings.
- c. Species Composition and Seeding Rates for Brood-Rearing Cover – (all species)
 - Forbs and/or legumes must approximate 66% of the total mix (by PLS/Ft²).
 - Minimum seeding rate for all species combined is 10 PLS/Ft² and generally, seeding rates above 25 PLS/Ft² are unnecessary. Small areas of concentrated flow may be double seeded to reduce erosion.
- d. Species Composition and Seeding Rates for Winter Cover – (all species)
 - A minimum of 75% of the total mix (by PLS/Ft²) will consist of tall warm-season grass species that are adapted to the site (i.e. big bluestem, switchgrass, Indiangrass, Eastern gama, prairie sandreed, prairie cordgrass, etc.).
 - Tall and aggressive forbs or legumes are recommended to be included in the mix (i.e. maximilian sunflower, sweet clover, etc.).
 - Minimum seeding rate for all species combined is 15 PLS/Ft²; maximum is 30 PLS/Ft² unless desired for a different purpose (i.e. filter strip).
- e. Species Composition and Seeding Rates for Nesting Cover
 - Northern Bobwhite Quail
 1. No more than 50% of the total mix (by PLS/Ft²) will be comprised of grasses.
 2. A minimum of 50% of the grasses (by PLS/Ft²) will consist of bunch grass species (i.e. little bluestem, Canada wildrye, etc.)
 3. A minimum of 25% of the grasses (by PLS/Ft²) will consist of cool-season species (i.e. western wheatgrass, Canada wildrye, etc.)
 4. Minimum seeding rate for all species combined is 15 PLS/Ft²; maximum is 30 PLS/Ft²
 - Plains Sharp-tailed Grouse
 1. Grasses should be representative of the native plant community found on the appropriate prairie type or applicable ecological site (Refer to Restoration and Management of Declining Habitats - Prairie Design Procedures (643DPa) or Range Planting Specification (550S), Tables 1-9 for more information)
 2. A minimum of 33% of the total mix (by PLS/Ft²) will consist of forbs/legumes
 3. Minimum seeding rate for all species combined is 15 PLS/Ft²; maximum is 30 PLS/Ft²
 - Greater Prairie Chicken
 1. In the Tallgrass Prairie Region (all counties bisected by NE Highway 14 and farther east), a minimum of 75% of the grasses (by PLS/Ft²) must be low to mid-range

height (for example: little bluestem, sideoats grama, blue grama, Canada wildrye, Virginia wildrye, western wheatgrass, green needlegrass, prairie Junegrass, and similar species)

2. In the Tallgrass Prairie Region, switchgrass cannot comprise more than 5% of the grass
3. In all other parts of the state, grasses should be representative of the native plant community found on the appropriate prairie type or applicable ecological site (Refer to Restoration and Management of Declining Habitats - Prairie Design Procedures (643DPa) or Range Planting Specification (550S), Tables 1-9 for more information)
4. For all parts of the state, a minimum of 33% of the total mix (by PLS/Ft²) will consist of forbs/legumes
5. Minimum seeding rate for all species combined is 15 PLS/Ft²; maximum is 30 PLS/Ft²

3. Shrub Thickets and Woody Cover Criteria

a. Refer to *Tree/Shrub Planting Procedures Guide (380 TPP)* located at FOTG, Section IV, A. Conservation Practices, Windbreak/Shelterbelt Establishment (380) for guidance on installing shrub thickets for wildlife. Additional requirements are noted below.

b. General Requirements for All Shrub Plantings

- All shrub thickets which are newly established will be a minimum of 30' wide by 50' long.
- Only native shrub species adapted to site conditions may be used. Refer to FOTG, Section II, Windbreak Interpretations, Conservation Tree and Shrub Groups for additional information.
- All shrubs will be planted at a density of 1 plant for every 10 square feet (except as noted below) to expedite the establishment of a thicket with a closed canopy overstory. A survival rate of 70% over the first three growing seasons is required as outlined in Nebraska Forestry Technical Note #63.

Exception: A planting density of 1 plant for every 15 square feet is permitted provided that a survival rate of 80%, as outlined for multi-row windbreaks in Forestry Technical Note #63, is maintained AND management (mechanical or chemical treatment) is applied to prevent encroachment by perennial grasses during the first three growing seasons.

Direct Seeding: The use of direct seeding is permitted to establish shrub thickets. Refer to Section X in the *Tree/Shrub Planting Procedures Guide (380 TPP)* for details.

c. General Guidance for Shrub Species Selection by Upland Game Bird:

- Northern Bobwhite Quail: Tall, dense species which readily root sucker to form overhead canopy including American plum, chokecherry, elderberry, dogwood spp., etc.
- Plains Sharp-Tailed Grouse: Hardy species adapted to harsh site conditions typical within range of sharp-tailed grouse including skunkbush sumac, sandcherry, buffaloberry, currant spp., etc.
- Greater Prairie Chicken: Short species which will not deter use by prairie chicken including woods rose, snowberry spp., etc. Note: Locate plantings away from hilltops and broad flat areas to avoid impact to possible breeding ground sites.

d. Edge Feathering Technique:

A technique called "edge feathering" can be used to provide immediate habitat benefits for upland game birds. Taller trees growing in fence lines, wooded draws, and along the border of woodlands are cut and allowed to fall into loose piles. This provides escape cover for bobwhite quail and removes visual barriers for prairie chickens. The following guidelines should be used:

- Target undesirable tree species that readily establish in odd areas (i.e. Siberian elm). Avoid cutting tree species that provide important habitat for other wildlife species such as (i.e. oaks).

- Remove sod-bound grasses such as smooth brome by mechanical or chemical methods prior to tree cutting activity. Bare ground and annual weeds within the brush pile will provide added benefits.

7. Plans and Specifications

- a. A Wildlife Development and Management Plan (NE-CPA-14) may be used to document the objectives, target species, habitat types, and associated planning sheets for the habitat unit. Consult with a wildlife biologist, as needed, for assistance with developing the wildlife plan.
- b. Use NE-CPA-8 Job Sheet for Grass Seedings to document practice designs, certification, and other requirements as noted in Herbaceous Vegetation Design Procedures, (550 DP). Renovations or upgrades of existing grass stands are often complex and variable due to multiple factors impacting the current condition and the numerous techniques which may be used to enhance the site. Consultation with an experienced resource professional is necessary to develop the plan.
- c. Use NE-CPA-15 Tree and Shrub Planting Plan or NE-CPA-15B Tree and Shrub Establishment – Direct Seeding Job Sheet to document practice designs, certification, and other requirements as noted in Tree/Shrub Planting Procedures Guide (380 TPP).

9. Protection and Management During Establishment

- a. Weed control methods must be selective to avoid impacts to desired plants. Forbs, both seeded and non-noxious, volunteer weeds, are a critical component of habitat for upland game birds and provide habitat values that are beneficial to many other wildlife species. Spot treatment of target weeds is necessary to preserve the integrity of the habitat unit.
- b. Prescribed burns and light grazing events for a short duration (less than 2 weeks) may be incorporated after one full growing season is completed in order to manipulate cover levels and species diversity within the herbaceous seedings.
- c. Shrub thickets should be protected from significant disturbances such as prescribed burning or livestock grazing during the first three growing seasons. Once well established it is not necessary to exclude prescribed burning or short-term grazing events from shrub thickets.

10. Established Stand Management

- a. Management activities should be intended to maintain or improve species diversity, prevent establishment or spread of non-native plants, set back or accelerate succession to influence the grass to forbs ratio within the stand, and periodically remove excessive litter to increase plant vigor. Refer to Early Successional Habitat Development and Management (647) for additional information.
- b. Bobwhite quail require more bare ground and open space than sharp-tailed grouse or prairie chickens which may require more frequent management treatments using more aggressive methods such as tillage or chemical applications.
- c. For sharp-tailed grouse and prairie chickens, management practices that mimic natural disturbances (grazing, burning, and rest) are preferred. It is beneficial to incorporate these practices in combination. For example, the “patch burn-graze” technique is a possible method to use them in combination. Refer to Prescribed Grazing (528) and Prescribed Burning (338) for additional information.
- d. Management of nesting cover for greater prairie chickens in the Tallgrass Prairie Region should be designed to provide for an open stand of mid-range height plants. Residual growth from the previous year is important to the success of prairie chicken nest sites.
- e. Haying or mowing is an acceptable practice when used periodically and in combination with other techniques. Timing of haying operations should be altered from year to year. The primary nesting

period (May 1 to July 15) should be avoided unless the timing is critical to the success of a management activity designed to maintain the desired habitat type.

11. Monitoring and Evaluation

- a. The following planning sheets can be used to assess current, planned, and applied habitat development and management practices for the targeted upland game bird species. Habitat elements that are the most deficient can be prioritized for treatment based on applicable scores.
- [Planning Sheet 23](#) – Northern Bobwhite Quail Habitat Evaluation Tool
 - [Planning Sheet 24](#) – Greater Prairie Chicken Habitat Evaluation Tool
 - [Planning Sheet 25](#) – Plains Sharp-Tailed Grouse Habitat Evaluation Tool

SUPPORTING REFERENCES

NRCS Conservation Practice Standard, Early Successional Habitat Development/Management, Code 647:
<http://efotg.nrcs.usda.gov/references/public/NE/NE647.pdf>

NRCS Conservation Practice Standard, Prescribed Burning, Code 338:
<http://efotg.nrcs.usda.gov/references/public/NE/NE338.pdf>

NRCS Conservation Practice Standard, Prescribed Grazing, Code 528:
<http://efotg.nrcs.usda.gov/references/public/NE/NE528.pdf>

NRCS Conservation Practice Standard, Upland Wildlife Habitat Management, Code 645:
<http://efotg.nrcs.usda.gov/references/public/NE/NE645.pdf>

NRCS Nebraska Conservation Planning Form, Job Sheet For Grass Seeding, NE-CPA-8:
[http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-8\(grass_seeding_jobsheet\).pdf](http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-8(grass_seeding_jobsheet).pdf)

NRCS Nebraska Conservation Planning Form, Tree and Shrub Establishment – Direct Seeding Job Sheet, NE-CPA-15B: [http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-15B\(Direct_Seeding\).pdf](http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-15B(Direct_Seeding).pdf)

NRCS Nebraska Conservation Planning Form, Tree and Shrub Planting Plan, NE-CPA-15:
[http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-15\(Tree_Shrub_Plntg_Plan\).pdf](http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-15(Tree_Shrub_Plntg_Plan).pdf)

NRCS Nebraska Conservation Planning Form, Wildlife Development and Management Plan, NE-CPA-14:
[http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-14\(Planning_Wildlife_Areas\).pdf](http://efotg.nrcs.usda.gov/references/public/NE/NE-CPA-14(Planning_Wildlife_Areas).pdf)

NRCS Nebraska Herbaceous Vegetation Design Procedures (550 DP):
<http://efotg.nrcs.usda.gov/references/public/NE/NE550DP.pdf>

NRCS Nebraska Range Planting Specification (550S):
<http://efotg.nrcs.usda.gov/references/public/NE/NE550s.pdf>

NRCS Nebraska Restoration and Management of Declining Habitats - Prairie Design Procedures (643DPa):
<http://efotg.nrcs.usda.gov/references/public/NE/NE643DPa.pdf>

NRCS Nebraska Tree and Shrub Planting Procedures Guide (380TPP):
<http://efotg.nrcs.usda.gov/references/public/NE/NE380tpp.pdf>