

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET**

UPLAND WILDLIFE HABITAT MANAGEMENT

(ac.)
CODE 645

This guidance is provided for implementation in South Dakota of the Conservation Practice Standard “Upland Wildlife Habitat Management.” Please refer to the standard for the definition, purpose, and conditions where this practice applies.

GENERAL CRITERIA

Identify the client’s species management goals and objectives on the SD-CPA-26. For the desired species, identify the types, amount, and distribution of habitat elements and the management actions necessary to achieve the management objectives.

The landowner shall obtain all necessary federal, state, and local permits that apply.

Habitat development and management will be based on a wildlife habitat appraisal or habitat evaluation. The appraisal or evaluation procedure shall be used to determine habitat suitability for the planning area or as an overall evaluation for the entire property or operating unit.

Wildlife habitat evaluations may be done using any of the following:

Evaluate planning area using minimum requirements for species included in Table 1.

USFWS Habitat Suitability Index Models (HSI), found at <http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiindex.htm>;

Natural Resources Conservation Service (NRCS) or other formally developed species specific models approved for use in South Dakota;

SD NRCS Wildlife Habitat Quality Rating system, found in Section 1 of the South Dakota Technical Guide.

Models and other habitat information and requirements for species not included in Table 1 may be obtained from a NRCS state or field support office biologist.

CRITERIA FOR PROVIDING HABITAT REQUIREMENTS

Provide at least the minimum habitat requirements for one or more of the species or species groups listed in Table 1; or provide habitat in accordance with an appropriate species habitat model to attain a habitat suitability index, or HSI, of at least 0.5. Persons who desire abundant wildlife populations should plan to develop much more habitat than the minimum amounts outlined in Table 1 and/or should plan for a HSI much higher than 0.5.

As indicated by the wildlife habitat evaluation, certain habitat elements may be weak or missing. For the desired species, identify the types, amount, and distribution of habitat elements and management actions necessary to achieve the management objectives.

The amount and kinds of habitat elements existing and planned, their location, and management shall be identified in a conservation plan, and documented on the SD-CPA-26.

CRITERIA FOR DEVELOPMENT AND MANAGEMENT OF WILDLIFE HABITAT

HERBACEOUS COVER ESTABLISHMENT

Tall, dense herbaceous upland cover is an important habitat component for many species in South Dakota, particularly for dense nesting cover and tall dense herbaceous winter cover. If existing native or seeded grasslands are not present in adequate quality or quantity, herbaceous cover can be established or developed using Range Planting (550), Restoration and Management of Declining Habitats (643), or the species mixes provided in Table 2. Table 2 is a list of seed mixes that will provide stands of herbaceous cover suitable for dense nesting cover and/or tall, dense herbaceous winter cover, if managed for wildlife. Seedbed preparation, seeding dates, techniques, weed control, cover crops, and management during establishment will be according to the guidance contained in Range Technical Note No. 4.

Existing stands of herbaceous cover may provide suitable habitat for the desired species with appropriate management. Proper timing and intensity of management influence the quality of cover available for habitat. Properly timed burning,

grazing or haying may be sufficient to restore degraded native plant communities that have never been broken, if there is still an existing, though repressed, native plant component or seed bank present.

MANAGEMENT OF HERBACEOUS HABITAT WITH WILDLIFE AS THE PRIMARY PURPOSE

Management to establish and maintain suitable herbaceous cover quality primarily for wildlife consists of a multiple year period of no utilization other than by wildlife, after which the herbaceous cover is periodically disturbed using prescribed burning, clipping and removing the vegetation, or grazing. This disturbance treatment will essentially eliminate the habitat for a period of time and may result in reduced population levels, lower reproduction, or even wildlife mortality during the disturbance. In order to minimize adverse impacts to wildlife, it is important to carefully consider the need for treatment, the timing of treatment and the methods used. It is generally more advisable to under manage herbaceous habitat rather than to disturb habitat too frequently. The goal of periodic habitat disturbance is to restore habitat quality with the least possible disruption of wildlife, especially during reproduction or other critical periods in the life cycle of targeted species. It is important to provide escape cover and/or replacement habitat during the period of management and habitat impacts.

Disturbance treatments should be planned to minimize the development of edge habitats that are detrimental to many native grassland bird species. Grassland areas that are smaller than 20 acres in size should generally be managed as a single unit. Predators can heavily impact wildlife populations in small areas and narrow strips of herbaceous cover.

Periodic disturbances by fire and grazing were essential in maintaining the climax plant communities in the prairies of the Northern Great Plains. Similar disturbances are needed to maintain habitat values once these prairie and similar grassland habitats are established. Without periodic disturbance, grassland plant communities begin to deteriorate. Typical signs of a deteriorating herbaceous plant community are excessive accumulation of plant residues that are reducing plant vigor, lack of seed heads, and invading species or other shifts in plant community composition. In South Dakota, excess accumulation of plant litter that forms a dense layer several inches deep is a common problem observed in unmanaged herbaceous cover. Another common problem is invasion of the plant community with smooth brome grass, Kentucky bluegrass, cheat grass or other species.

Disturbance treatments should be scheduled when litter buildup or a plant community composition shift is causing a loss of habitat quality that interferes with or reduces reproduction or survival of the desired wildlife species.

Habitat conditions can be documented by tracking the visual obstruction readings for the site, with annual readings documented using form SD-CPA-57. In this way the changes in plant community structure can be tracked to best identify when management treatments are needed. A typical sign of deteriorating herbaceous plant communities is reduced visual obstruction associated with excessive accumulations of litter and reduced plant vigor. Disturbance treatments should be scheduled when the average visual obstruction reading for the field has dropped below the minimum height required for herbaceous habitat for the species identified on the SD-CPA-26. Treatment intervals vary according to the actual weather conditions that affect the area. Such habitat management should be planned to mimic the natural frequency of climatic and ecosystem disturbance to native herbaceous cover in the planning area. The following treatment intervals are provided for use in planning:

Tall grass prairie area management intervals (MLRAs 102A, 102B, 102C, and 56): Habitat management for fully established grasslands in this part of the state typically consists of allowing the vegetation to grow for four or five years without use, and then using grazing, burning, or clipping and removal of residues to eliminate the buildup of plant litter or adjust for other identified problems with plant community characteristics or composition. Shorter or longer periods may be appropriate in some cases, depending on the particular problems at the site and the wildlife species for which management is intended. The timing and choice of treatment method will be fully documented on the form SD-CPA-58, including the species of management concern, the precise habitat conditions and problem(s), the expected impacts on the desired wildlife species and other species of concern, and how adverse impacts will be avoided or minimized.

Mixed grass prairie area management intervals (MLRA's 53B, 53C, 54, 55B, 55C, 58D, 60A, 61, 63A, 63B, 64, 65, and 66): Habitat management for fully established grasslands in this portion of the state typically consists of allowing the vegetation to grow for five to seven years without use. After that period, use grazing, burning, or clipping and removal of residues to eliminate the buildup of plant litter or adjust for other identified problems with plant community characteristics or composition. Longer or shorter periods may be appropriate in some cases, depending on the particular problems at the site and the wildlife species for which management is intended. The timing and choice of treatment method will be fully documented on the form SD-CPA-58, including the species of management concern, the precise habitat conditions and problem(s), the expected impacts on the desired wildlife species and other species or plant communities of concern, and how adverse impacts will be avoided or minimized. Burning shall not be used to manage extremely sensitive habitats, such as sagebrush steppe.

Short grass prairie area management intervals (some ecological sites in MLRA's 54, 58D, and 60A): Habitat management for fully established grasslands in this region consists of allowing the vegetation grow for 10 or more years

without use, and then using grazing, burning, or clipping and removal of residues to decrease the buildup of plant litter or adjust for identified problems with plant community characteristics or composition. The timing and choice of treatment method will be fully documented on the form SD-CPA-58, including the species of management concern, the precise habitat problem(s), the expected impacts on the desired wildlife species and other species or plant communities of concern, and how adverse impacts will be avoided or minimized. Burning shall not be used to manage extremely sensitive habitats, such as sagebrush steppe.

Techniques and time of year for management of herbaceous cover: Management to address plant community composition must be timed to adversely impact the growth of problem plants and enhance the development of the desired plant species. This level of management may require disturbance of habitat during the primary nesting season. Any management during the primary nesting season will require appropriate documentation of the environmental effects and tradeoffs on the SD-CPA-52 and the SD-CPA-58.

Grazing

Grazing will be planned to address the precise habitat problems at the site. Timing, duration, and intensity of grazing will all be considered in determining the appropriate means to address the site specific plant community problem. Refer to the standard Prescribed Grazing (528) for the requirements of writing a grazing prescription to restore the appropriate habitat conditions and requirements for the designated wildlife species.

High intensity – short duration graze: Used to minimize the duration of habitat disturbance; to remove litter with intensive hoof action; to target the grazing impact on a particular plant species in a very short time period; and to release nutrients for desired plant species.

Average intensity – short duration graze: Used to remove litter where there is no need to alter the plant community.

Low intensity – long duration graze: Remove litter but leave a mosaic of varied plant heights.

Prescribed burning

Prescribed burning is usually planned for spring dates and will often result in loss of early season nesting cover values. The need for and expected benefits of this management shall be documented on the SD-CPA-52. Refer to the conservation practice Prescribed Burning (338) for planning and implementation requirements.

Spring burns prior to May 1: Reduce excess litter and remove invading cool season plants, especially cheat grass.

Spring burns May 1 to May 20: Help reduce the invasion of Kentucky bluegrass and smooth brome grass.

Clipping and Raking: Where disturbance by fire or grazing is not possible, clipping and removal of the residues may be used instead to mimic the natural disturbance regime. Management should be timed to avoid the primary nesting season, which is May 1 through August 1. If management can be completed prior to August 15, some fall regrowth may occur to provide some winter habitat.

Chemicals: To protect forbs and legumes that benefit native pollinators and other wildlife and provide insect food sources for grassland nesting birds, spraying or other chemical control of noxious weeds shall be done on a “spot” basis. Any other applications of chemicals employed for management of herbaceous habitat will be done only if no adverse impacts to desired wildlife and special concern species are anticipated.

MANAGEMENT OF HERBACEOUS HABITAT FOR WILDLIFE AS A CO-PURPOSE

Many wildlife species occupy herbaceous cover that is managed for forage production or crop production. Wildlife may be designated as a co-purpose on such lands, where the operator is taking additional measures to manage the cover to provide wildlife habitat. Conservation measures and practices, such as riparian buffers, filter strips, field borders, prescribed grazing and conservation tillage, can contribute significantly to wildlife habitat, especially if use and management are timed to benefit wildlife. The wildlife habitat value of these areas depends on how they are managed.

These areas do not usually result in the same level of wildlife occupancy or reproduction as would be expected from herbaceous cover managed exclusively for wildlife. To provide reliable habitat, the timing and intensity of grazing periods, mowing dates, stubble height, and similar factors, shall be adjusted to provide adequate plant growth to provide the required habitats for the desired species (See Table 1), including minimum visual obstruction readings for the planned species for the planned time period of use as habitat. If minimum cover requirements cannot be met, then the field should not be recorded as having a co-purpose of wildlife. Table 3 provides a comparison of how many acres of other land uses are needed to achieve upland nesting waterfowl and pheasant reproduction that would be similar to that expected per acre of dense nesting cover that is managed with sufficient rest periods (i.e., several years) to maintain suitable habitat structure and in suitably sized blocks of cover (Kruse, Personal communication, 1985 and Solomon, Personal communication, 1985). As an example, 240 acres of pasture or range grazed after July 15 (with prescribed grazing) could

be expected to provide the same waterfowl or pheasant production that could be expected from 40 acres of appropriately managed dense nesting cover.

WOODY COVER ESTABLISHMENT

Woody cover establishment will be according to Hedgerow Planting (422), Tree Planting (612), Windbreak/Shelterbelt Establishment (380), or the following criteria for developing shrubby thickets.

Shrub thickets less than one acre in size will be established according to the following:

Select woody/shrubby species that provide food or cover for the desired wildlife species. Suggestions may be found in Table 1, habitat models or other literature for the species, or Woodland Technical Note 37.

Species selected will be appropriate for the site as determined using Woodland Tech Note 38.

Preferably, shrubs will not be arranged in rows. (Rows do not readily produce a thicket!)

Spacing between plants will be three to five feet.

WOODY COVER MANAGEMENT

Woody cover management for wildlife as the primary purpose will generally require protection from grazing, fire and clipping and removal of the understory. Specific plans to thin or otherwise manage woodland habitats for wildlife shall identify the desired wildlife species, the precise habitat requirement that is to be developed, how it will be developed, and address means to avoid any adverse impacts to either the target wildlife or other species of concern in the planning area.

CONSIDERATIONS

Consider the impacts of management, development of edge, and wildlife corridors on species impacted by habitat fragmentation.

Encourage that management of wildlife cover be scheduled under a rotational plan, so that only a portion of the area is managed in a given year. This will assure that some of the habitat is still available each season.

Consider effects of management on non-target fish, wildlife species, and threatened and endangered species.

The use of native plant materials should be encouraged.

Consider effects of movement of dissolved substances on groundwater and on downstream surface waters.

Consider effects of hazardous materials on wildlife or human use related to wildlife.

Consider effects of management actions on compliance with state and federal hunting regulations (e.g., baiting).

Consider the impact of elevated wildlife uses on adjacent lands (e.g., crop depredation).

Consider the effect of volume and rates of runoff, infiltration, evaporation, and transpiration on the water available at the site.

Consider effects on movement of sediment, and soluble and sediment attached substances carried by runoff and/or wind.

Consider impacts of human use related developments, such as recreational trails and hunting strips, on wildlife species that are sensitive to edges and habitat patch size.

PLANS AND SPECIFICATIONS

Document how habitat needs will be provided for the desired target wildlife species: desired plant species and the means of establishing and maintaining them. Specific information may be provided using appropriate job sheets or written documentation in the conservation plan.

OPERATION AND MAINTENANCE

The purpose of operation, maintenance, and management is to insure that the practice functions as intended over time.

A plan for operation and maintenance of upland wildlife habitat at a minimum shall include monitoring and management of structural and vegetative measures.

Timing of haying and livestock grazing will avoid periods when upland wildlife are nesting, fawning, etc., and will allow the establishment, development, and management of upland vegetation for the intended purpose.

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible.

REFERENCES

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TABLE 1. MINIMUM HABITAT REQUIREMENTS FOR SELECTED WILDLIFE SPECIES IN SOUTH DAKOTA

SPECIES	HOME RANGE	HABITAT NEED	HABITAT CHARACTERISTICS AND EXPLANATIONS	QUANTITY OR MANAGEMENT
Upland ground nesting waterfowl, such as Mallard, (<i>Anas platyrhynchos</i>), Gadwall, (<i>A. strepera</i>), Northern pintail, (<i>A. acuta</i>), Northern shoveler, (<i>A. clypeata</i>), Blue-winged teal, (<i>A. discors</i>), American widgeon, (<i>A. americana</i>), etc.	Using a seasonal, semi-permanent, or permanent water body as the center point, pair cover, nesting cover, and brood cover will be provided within one-half mile of the wetland edge.	Nesting Cover	Nesting cover consists of herbaceous cover that will provide new growth and/or standing residue with a visual obstruction reading of at least 8 inches from May 1 through August 1. In general the larger the block of cover the better, with 20 acre blocks considered minimal. An upland to wetland ratio of three or four acres of upland per acre of wetland is recommended.	A minimum of five units of nesting cover will be provided. There will be at least one unit of nesting cover for every acre of seasonal, semi-permanent, or permanent wetland habitat managed for pair or brood cover. See Table 3 for nesting cover unit equivalents.
		Pair habitat	Temporary or seasonal wetlands will be located within one-half mile of nesting cover.	See the practice "Wetland Wildlife Habitat Management" (644).
		Brood Habitat	A semi-permanent or permanent wetland or another semi-permanent or permanent water body will be located within one mile of the nesting cover.	See the practice "Wetland Wildlife Habitat Management" (644). Dugouts without dense surrounding emergent wetland vegetation shall not be considered as brood habitat, as there is no escape cover for the brood.
		Food	Food will be satisfied by providing the required wetlands.	Avoid use of herbicides or insecticides that could impact the food web of the wetlands in the area managed.

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SPECIES	HOME RANGE	HABITAT NEED	HABITAT CHARACTERISTICS AND EXPLANATIONS	QUANTITY OR MANAGEMENT
Ring-necked pheasant, <i>Phasianus colchicus</i>	Use winter storm cover as the center point of the home range. The average home range for pheasants includes an area with a radius of one mile. All other life requisites must be provided within that area.	Nesting cover	Nesting cover consists of herbaceous cover that will provide new growth and/ or standing residue with a visual obstruction reading of at least eight inches from May 1 through August 1. In general the larger the block of cover the better.	A minimum of 20 units of nesting cover per square mile will be provided. At least five units of nesting cover will be provided in a single block. See Table 3 for nesting cover unit equivalents. Nesting cover will be within one mile of winter storm cover.
		Winter cover – roosting, storm, and loafing	Roosting cover is provided by tall, dense herbaceous plant residues at least 10 inches in height in the fall. Wetlands with heavy, persistent emergent cover (cattails, river bulrush, etc.,) provide excellent cover conditions, as do stands of tall, warm-season grasses, such as switchgrass.	At least 10 acres of roosting cover per section are required.
			Winter storm cover is provided by dense windbreaks and large areas of heavy wetland cover. Windbreaks will have at least six rows West River and at least eight rows East River with conifers in the first row. Twin-row-high-density designs for winter storm cover will have at least four sets. Wetlands will be at least 10 acres in size with a dense stand of cattails or river bulrush.	At least one area of winter storm cover will be available within the home range.
			Loafing cover is an area of shrubby cover with 30-60 percent canopy cover. It may be a small clump planting or be included as a part of a large windbreak.	At least one area of loafing cover, at least 0.1 acres in size, will be provided per section.
		Food - winter	Winter food consists of weed seeds, waste grains, and planted food plots. The foods that provide highest food value include corn, sorghum, millet, or tame sunflowers. Soybeans may also provide food, but do not have persistent tall winter cover value. Waste grain and some other food sources are not necessarily available with heavy snow or ice.	Winter food will be available within one-quarter mile of winter cover. Use tillage systems that leave waste grain on the soil surface over winter. If natural weedy areas or livestock feeding areas are not present, plant a food plot using one or more of the grains listed.
		Food - summer	Food for nesting hens and young, up to 12 weeks of age, consists primarily of insects. Therefore, use of insecticides should be discouraged on or adjacent to nesting cover.	Avoid or minimize use of insecticides or herbicides that interfere with the food web in the area being managed.

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Ring-necked pheasant, <i>Phasianus colchicus</i> (continued)		Water	Availability of permanent open water is not crucial to survival, although pheasants are attracted to and will drink from streams, ponds, and other sources. Adequate moisture for living needs is obtained from dew, and plant and invertebrate foods in spring, summer and fall and from snow, frost and foods in winter (Trautman, 1982).	None required
		General	Pheasants are generally most successful in areas with 50 to 70 percent of the land under cultivation, 15 percent relatively undisturbed grassy cover and 15 percent woody cover.	
Sharp-tailed grouse, <i>Tympanuchus phasianellus</i>	The average home range for sharp-tailed grouse is an area around the lek (dancing ground) with a radius of about one mile.	Nesting cover	Nesting cover consists of herbaceous cover with a VOR of at least 5 inches in blocks at least 60 acres in size. Studies suggest that grazing systems that allow for one year of rest on at least one pasture each year are most productive of grouse.	Provide at least 320 acres of nesting cover per section in blocks at least 60 acres in size.
		Brood cover	Broods require shade that can be provided either by dense grass stands at least 9 inches tall, or by shrubby cover on up to 40 percent of the area.	At least five percent of the area within the home range will provide brood cover.
		Food - summer	Insects are an important part of the diet for nesting hens and young grouse.	Avoid use of insecticides or herbicides that interfere with the food web in the area being managed for grouse.
		Food-winter	Winter food may be a limiting factor in some years. Sharptails will migrate to areas with winter food available. Species important to sharptails include buffaloberry, snowberry, rose, hawthorn, Russian-olive, chokecherry, sagebrush, currant, cottonwood, aspen, plum, sumac, oak, willow, cedars, and junipers.	Provide shrubby areas with important perennial food species, or plant a food plot at least 0.5 acre in size with one or more of the following grains: corn, grain sorghum, buckwheat, barley, oats, wheat, millet
		Winter cover	Tall coarse, dense herbaceous vegetation, such as switchgrass.	Provide at least one five-acre block per section.
		Water	Not required, as they obtain sufficient moisture from foods, dew, and precipitation.	None required
Greater prairie chicken, <i>Tympanuchus cupido</i>	All life requisites will be provided within a radius of two miles	Summer cover	Herbaceous cover with a visual obstruction reading of at least 8 inches, and 40 percent canopy cover. Studies suggest that grazing systems that allow for one year of rest on at least one pasture each year are most productive of prairie chickens.	Provide at least 320 acres of nesting cover per section in blocks at least 60 acres in size.

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		Winter cover	Tall dense herbaceous cover, such as switchgrass, with a visual obstruction reading of 10 inches or more.	Provide at least one five-acre block per section.
		Food - summer	Insects are an important part of the diet for nesting hens and young prairie chickens.	Limit use of insecticides on the area under management for prairie chickens.
		Food - winter	Winter food may be a limiting factor in some years. Prairie chickens will migrate to areas with winter food available. Winter foods include natural seed sources and crops. Food plots of the following annual plants should be at least 0.5 acre in size: corn, grain sorghum, buckwheat, barley, oats, wheat, and millets.	Provide a winter food source within 0.5 mile of blocks of winter cover.
		Water	Not required, as they obtain sufficient moisture from foods, dew, and precipitation.	None required
Wild turkey, <i>Meleagris gallopavo</i>	Two square miles	Cover	Habitat should include at least 20 percent forest cover mixed with grassland and cropland, as long as roost trees are available.	Maintain forested areas and cottonwood and green ash corridor forests with trees of all age classes. Old, tall trees are necessary for roosting.
		Nest cover	Tall trees with an understory of tall herbaceous and shrubby cover, brush piles, and fallen limbs or young trees that has a visual obstruction reading of at least eight inches.	Avoid heavy grazing in woody cover, especially from March to July.
		Brood Cover	The forest and herbaceous cover interface provides brood cover if it has dense grass stands at least nine inches tall or shrubby cover on up to 40 percent of the area.	Provide 30 acres per section of herbaceous cover within 150 feet of forest/woody cover.
		Water	Consumed daily.	Available within one mile of roost sites.
		Food	Seeds, forbs, green grasses, fruits, flowers, and insects. Food plots of corn, sorghum or sunflowers should be at least five acres in size.	Avoid use of insecticides during nesting and summer. Provide a source of winter food.

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Northern bobwhite, <i>Colinus virginianus</i>	One square mile, One-quarter mile in summer The range for this species in South Dakota includes the following counties: Bon Homme Charles Mix Clay Gregory Lincoln Tripp Union Yankton	General	High interspersion of grass (30-40 percent) crop (40-60 percent), brush (5-20 percent), and trees (5-40 percent).	Provide cover with the appropriate composition of cover types.
		Nest	Herbaceous cover with open woody cover present or nearby, with a visual obstruction reading of six inches or more. Orchards, brushy fence rows, windbreaks, forest or wood lot edges, roadsides, odd areas, etc., are potential nesting areas.	Avoid disturbance of nesting areas from April through July. A minimum of 20 units of nesting cover per square mile will be provided. At least five units of nesting cover will be provided in a single block.
		Winter	Dense brush and tree cover	Provide scattered areas of dense woody cover with herbaceous or shrubby ground cover. At least 10 acres of roosting cover per section are required.
		Food – summer	Insects are important during nesting and for young birds. Seeds are also used.	Avoid use of insecticides.
		Food – winter	Seeds.	Maintain waste grain, food plots, or natural seed sources adjacent to winter cover.
		Water		None required
Gray partridge, <i>Perdix perdix</i>	One-half mile radius	Nest	Idle areas and field edges dominated by grasses with a visual obstruction reading of at least six inches.	Provide at least 30 acres per section.
		Winter	Grassy cover as required for nesting, brushy fence rows, or other brushy cover.	Provide at least 30 acres per section.
		Food – winter	Small grains and weed seeds are the primary foods of adults.	Treat croplands to maintain as much crop residue as possible over winter.
		Food- Spring, summer, and fall	The diet of partridge broods during the first six weeks includes insects, especially grasshoppers, ants, and ant eggs. Forbs, green plant parts, and insects are eaten by adult birds during spring, summer, and fall.	Avoid use of insecticides.
		Water		None required

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Pronghorn antelope, <i>Antilocapra americana</i>	5-10 square miles	Fall and winter food	Browse from shrubby cover 6 to 20 inches tall with 5 to 45 percent ground cover. Important species include sagebrush, snowberry, rabbitbrush, salt brush, and sumac.	Provide winter food areas with at least two shrub species
		Food - summer	Forbs are used year round and are the primary food in spring and summer. Important species include: dandelion, prickly lettuce, sageworts, salsify, asters, scurfpea, prairie clover, dotted gayfeather, milkvetch, sunflowers, and alfalfa.	Provide for at least five percent forb canopy cover with at least four of the preferred forb species listed above.
		Water	Antelope will use water within a three mile radius.	Provide cover along streams and around wetlands and other water bodies.
White-tailed deer, <i>Odocoileus virginianus</i> , and Mule deer, <i>Odocoileus hemionus</i>	One-to-three square miles depending on habitat quality	Food	Browse is used year round. Important species include: chokecherry, bur oak, snowberry, pine, rose, hawthorn, dogwood, sumac, plum, big sagebrush, buffaloberry, rabbitbrush, aspen, ash, juniper, grape, mountain mahogany, and bearberry. Forbs are used year round but are most important in summer. Agricultural crops are heavily used as available. Corn and sorghum are preferred and are suitable for food plots.	Provide a diversity of shrubby cover less than five feet in height. Encourage abundant fruit and nut producing species. Provide a high diversity of forbs, with at least 20 percent ground cover by forbs.
		Cover – general	Woody cover and grasslands in a variety of successional stages. Woody cover will include both shrubs and trees.	
		Winter cover	Landscapes with rolling to steep terrain, large wetlands, or creek bottoms with tall herbaceous cover, dense shrubs, and evergreens provide good winter cover	Provide a suitable wintering area within the management area.
		Fawning cover	Woody and tall herbaceous cover are used for fawning with visual obstruction ratings of eight inches or more.	Provide suitable fawning areas within the management area, with 50 acres per section, as a minimum.
		Water	Deer will use water within a three mile radius	Provide cover along streams and around wetlands and other water bodies.

TABLE 2. DENSE NESTING COVER (DNC) MIXES FOR UPLAND NESTING WILDLIFE, TALL DENSE WINTER COVER AND GENERAL PURPOSE HERBACEOUS COVER FOR AREAS MANAGED PRIMARILY FOR WILDLIFE.

EASTERN AND EAST CENTRAL TECHNICAL GUIDE AREAS AND MLRA-62

Mix Label	Species in Mix	Seeding Rate PLS Lbs/Acre	Suitable for Soils in the following Forage Suitability Groups	Approved for use as	
				DNC	Winter Cover
A	Big bluestem Indiangrass Switchgrass Green needlegrass	2 2 1 2	Subirrigated, Clayey Subsoil, Loam, Droughty Loam, Overflow	No	Yes
B	Tall wheatgrass Intermediate or Pubescent wheatgrass Alfalfa Sweetclover (optional)	5 5 2 0.5	Subirrigated, Claypan, Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Saline, Overflow	Yes	Yes
C	Intermediate or pubescent wheatgrass Alfalfa Sweetclover (optional)	8 3 0.5	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Shallow, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	Yes
D	Switchgrass Alfalfa	2.5 2	Subirrigated, Clayey Subsoil, Loam, Droughty Loam, Overflow	Yes	Yes
F	Switchgrass Green needlegrass	2.5 2	Subirrigated, Clayey Subsoil, Loam, Droughty Loam, Overflow	No	Yes
G	Big bluestem Indiangrass Switchgrass	2.5 2.5 1.5	Subirrigated, Clayey Subsoil, Loam, Droughty Loam, Overflow	No	Yes
H	Green needlegrass Western wheatgrass	3.5 6	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
I	Sideoats grama Western wheatgrass Alfalfa	3 4 2	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
J	Tall wheatgrass Western wheatgrass	11 4	Claypan, Saline	Yes	Yes
K	Tall wheatgrass	16	Saline	Yes	No
L	Western wheatgrass Green needlegrass Sideoats grama Alfalfa	5 1 1 2	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
M	Western wheatgrass Green needlegrass Alfalfa	6 1.5 2	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
N	Switchgrass	3.5	Subirrigated, Clayey Subsoil, Loam, Droughty Loam, Saline, Overflow	No	Yes

Table 2 Continued. Dense nesting cover (DNC) mixes for upland nesting wildlife, tall dense winter cover and general purpose herbaceous cover for areas managed primarily for wildlife.

WEST AND WEST CENTRAL TECHNICAL GUIDE AREAS AND MLRA-61

Mix label	Species in Mix	Seeding Rate PLS Lbs./Acre	Suitable for Soils in the following Forage Suitability Groups	Approved for use as	
				DNC	Winter Cover
A	Pubescent or intermediate wheatgrass Alfalfa	7 2.5	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey subsoil, Loam, Limey Upland, Overflow	Yes	Yes
B	Western wheatgrass Pubescent or intermediate wheatgrass Alfalfa Sweetclover (optional)	3 4 2 0.5	Subirrigated, Claypan, Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	Yes
C	Western wheatgrass Green needlegrass	5 3	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
D	Western wheatgrass Green needlegrass Sideoats grama	3.5 1.5 2.5	Subirrigated, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
E	Western wheatgrass Green needlegrass Alfalfa	5 1.5 1.5	Subirrigated, Claypan, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
F	Western wheatgrass Green needlegrass Sideoats grama Alfalfa	2.5 1 2.5 1	Subirrigated, Droughty Loam, Very Droughty Loam, Clayey Subsoil, Loam, Limey Upland, Overflow	Yes	No
G	Tall wheatgrass Western wheatgrass	8 4	Saline	Yes	Yes

TABLE 3. NESTING COVER UNIT EQUIVALENTS FOR UPLAND NESTING WATERFOWL AND PHEASANTS: ONE UNIT OF NESTING COVER IS OBTAINED BY PROVIDING THE INDICATED NUMBER OF ACRES OF THE FOLLOWING TYPES OF COVER 1/

Number of acres per nest cover unit equivalent	Kind of herbaceous cover
1	Dense nesting cover with appropriate periods of no use and periodic disturbance to maintain habitat structure. See Table 2 for a list of seed mixes that will qualify for dense nesting cover if managed for wildlife only.
3-4	Hay with first cut after July 15 and last cut before August 15
10	Winter wheat or rye (no-till)
12	Spring planted small grain (no-till)
6	Pasture or range grazed after July 15 with prescribed grazing
15	Pasture or range grazed before July 15 with prescribed grazing
3-4	Roadsides, railroad ROW, or other strip cover cut after July 15 and last cut before August 15
2-3	Unmanaged herbaceous cover (land left idle without suitable treatments to maintain habitat quality)

1/ Developed using data from nesting studies and computer models by Kruse (Personal communication, 1985) and Solomon (Personal communication 1985).