NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD AND SPECIFICATIONS

UPLAND WILDLIFE HABITAT MANAGEMENT

(acre)

Code 645

DEFINITION

Provide and manage upland habitats and connectivity within the landscape for wildlife.

PURPOSE

Treating upland wildlife habitat concerns identified during the conservation planning process that enable movement, or provide shelter, cover, and food in proper amounts, locations and times to sustain wild animals that inhabit uplands during a portion of their life cycle.

CONDITIONS WHERE PRACTICE APPLIES

Land where the decision maker has identified an objective for conserving a wild animal species, guild, suite, or ecosystem.

Land within the range of targeted wildlife species and capable of supporting the desired habitat.

CRITERIA

General Criteria Applicable to all Purposes

Habitat development and management, necessary to achieve the purpose(s), shall be based on use of the Wildlife Habitat Appraisal Guides (WHAG) – Community Models or the individual species guidesheets depending upon the needs and objectives of the landowner. The appraisal is used to determine an index for individual fields/evaluation units, or an evaluation for the entire property or operating unit (farm).

WHAG evaluations must result in an index of at least 0.5 for the field, habitat community, evaluation unit, or farm. Recommendations selected by the producer for development and management should achieve this minimum level of scoring on the appropriate model. If the "home range" Missouri Bobwhite Quail (BWQ) Habitat Appraisal Guide is used no limiting factor rating score will be less than 50% (5 points) of the optimum within a home range no larger than 40 acres.

Application of this practice shall remove or reduce limiting factor(s) in their order of significance as indicated by results of the habitat evaluation. For the desired natural community or selected wildlife species, identify the types, amount, and distribution of habitat elements and management actions necessary to achieve the management objectives and detail them in a management plan.

Plant materials specifications shall include only high quality and adapted species.

Native plant materials will be used whenever possible. The use of native species will avoid problems associated with non-adapted and invasive plants.

Site preparation, planting dates, and planting methods shall optimize vegetation survival and growth.

Equipment travel, grazing, haying and other disturbance to habitat shall be restricted during critical periods such as nesting, brood rearing, fawning, etc. Exceptions may be made during the period of establishment and for management activities to maintain the health of the plant community

and to control noxious and invasive weeds.

Control of regulated noxious weeds and other invasive plants shall be specified on a "spot" basis where practical to protect forbs and legumes that benefit native pollinators and other wildlife and provide insect food sources for grassland nesting birds.

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

Any habitat management technique will ensure that the soil loss is within tolerable limit (T).

Permanent Vegetative Cover (Grasses, Legumes, Forbs) –

Development

High quality nest and brood cover for grassland wildlife species are critically needed cover types for upland wildlife in Missouri. *Native plants and communities are encouraged since they are well-adapted to sites, less invasive, and likely to provide quality habitat without long term maintenance.* However, due to cost, availability, and landscape position, native plants may not be feasible in all situations.

CONSERVATION COVER (327), RESTORATION and MNGT. of DECLINING HABITATS (643), JS-BIOL-32 Glade, Prairie, and Savanna establishment Job Sheet or JS-Agron25 (seed rate) will be used to develop cover for wildlife (new seeding or interseeding). Planting rates and mixes will be based on the landowners desired vegetation composition after establishment. Planting mixes under (327) for wildlife will contain multiple species (at least 3 with each one comprising at least 15% of the mix and with an added forbs/legume mix (if selected) counting as one specie) with 60 percent or more of species having a good or excellent wildlife rating to achieve specific results. Seed mixtures will not contain species with a poor wildlife rating in Table 2 of (327).

If bobwhite quail is the featured species or associated grassland birds of open nesting and brood rearing areas see Table 1 and 2 of this standard.

When wildlife habitat is the primary objective, soil tests and fertility/nutrient additions are not required by this practice for seeding or interseeding. Evaluate the site conditions and landowner objectives to determine if soil test and fertility/nutrient addition are needed. Other standards referenced are for seeding mixes/rates and methods, not fertility/nutrient addition requirements. Diverse open herbaceous stands with a mix of annual and perennial vegetation provide suitable niches for many wildlife species. Increased fertility leads to a more rapid closing of both ground and canopy cover.

Where wildlife habitat development is the producer's primary objective and will occur only on NHEL soil mapping units or on HEL soil mapping units where concentrated flow is not a concern, CONSERVATION COVER (327) seeding rates may be multiplied by a factor of 0.75. This reduced rate will provide for a more "open" stand and allow for other annual plant growth. Erosion rates must remain within tolerable limit (T) after treatment. Gully erosion must also be controlled by proper treatment.

It is recommended to consider the eradication of undesirable plant species. This eradication is often necessary to provide suitable conditions for grassland development. When 25% of the canopy coverage is undesirable vegetation then control should be initiated. Recommendations are found in CONSERVATION COVER (327), PASTURE and HAYLAND PLANTING (512), PEST MANAGEMENT (595), or JS-BIOL-30 Controlling Undesirable Species Job Sheet.

Interseeding of legumes and forbs into existing grass stands can provide a needed food source and add plant diversity to attract beneficial insect populations. Interseeding is best accomplished after a disturbance practice in an existing vegetation stand. CONSERVATION COVER (327), RESTORATION and MNGT. of DECLINING HABITATS (643), JS-BIOL-20 Native Forb and Non-Native Legume Interseeding Job Sheet,

or JS-Agron25 (seed rate) will be used for appropriate seeding mixtures/techniques.

Management

Used alone or in combination with other techniques, mechanical methods can successfully manipulate successional stages of habitat. See EARLY SUCCESSIONAL HABITAT DEVELOPMENT/MANAGEMENT (647) or RESTORATION and MNGT. of DECLINING HABITATS (643) for additional information.

Light disking (2-4" deep resulting in 30-70% bare ground) of existing stands may be necessary to increase the amount of open ground and encourage a diverse plant community of annual and perennial plants. Disk between July 15 and April 30. Late summer/fall disking tends to favor broadleaves; spring disking tends to favor weedy grasses. Avoid disking in areas where concentrated flow is a concern. Alternate disked strips (less than or equal to 75' wide) with buffer strips (2 times the disked width) across the field on contour/cross-slope. Rotate the disked strips across the field. Other disking patterns can be used (within soil erosion limits) and will be limited to not more than one-third of the acreage treated in a year. See JS-BIOL-24 Light Disking Job Sheet.

Mowing is not an acceptable method for maintaining permanent wildlife habitat since it greatly decreases plant diversity, and reduces residual cover available for the following nesting season.

Mowing is only allowed in conjunction with other management methods/practices or to aid in vegetation establishment. Mowing is only allowed immediately prior to the application of the management method/practice and is limited to the acres on which the management method/practice is applied or as specified for stand establishment.

Use PRESCRIBED GRAZING (528) to manipulate plant succession, reduce ground litter, and provide dusting areas. Livestock can be beneficial to maintaining the quality of herbaceous cover and controlling undesirable plants when *managed in accordance with a grazing plan with wildlife habitat management as the primary objective*. This technique requires close management supervision to assure that wildlife habitat objectives are met as the primary concern. Haying (applied according to wildlife management plan) can also be conducted to maintain or improve vegetation structure and composition so as to improve the desired wildlife habitat. Also see JS-BIOL-31 Managing Native Hay Prairies.

Timing of haying and grazing will avoid peak periods of wildlife nesting (May 1-July15) and allow the establishment, development, and management of vegetation for the intended wildlife purpose.

Use PRESCRIBED BURNING (338) to remove excess litter. Controlled fire can allow germination of seed bearing annuals, increase plant species diversity, control unwanted woody cover, and open up the stand for movement of small animals and birds. See JS-BIOL-15 Prescribed Burning for Wildlife Job Sheet and Patch Burn Grazing Information Sheet.

For greatest wildlife benefit native warm season grasses should only be burned between July 15 and March 15. *Prescribed burning beyond March 15 for wildlife management purposes will be based on recommendation of NRCS or MDC wildlife planner.* Late summer or early fall burns in native warm season grass encourage the forb component of herbaceous stands resulting in better and more diverse habitat.

Cool season grasses may be burned only between March 15 and May 1. *Prescribed burning beyond May 1 for wildlife management purposes will be based on recommendation of NRCS or MDC wildlife planner.*

Use selected herbicides to manipulate plant succession and improve habitat diversity. Careful planning and care in application are required in the use of chemicals to improve existing habitat. Native warm season grasses may be sprayed in May and June. Cool-season grasses may be sprayed March 15 – May 15 or October 1 – December 1. To be effective herbicides must be applied when grasses are actively growing, which may result

in a narrowing of these dates based on annual weather conditions. Apply in strips totaling no more than one third of the field in any one year. Selection of a product should be based on several factors including product effectiveness, non-target species impacts, toxicological risks, and off-site movement of chemicals. See PEST MANAGEMENT (595) and JS-BIOL-26 Strip Herbicide Application Job Sheet for recommendations and precautions

Permanent Vegetative Cover (Trees and Shrubs) –

Development

Species recommendations will be based on landowner objectives and site potential. Planting trees and shrubs has the potential of adversely affecting non-target species. Careful consideration is to be given when planting trees and taller shrubs in the historic prairie region of the state. Soils and site potential should guide the plant species selected. Refer to eFOTG - Section II G.1 Native Vegetation List for Missouri Soils.

Woody plantings will follow the criteria and guidelines in HEDGEROW PLANTING (422), TREE/SHRUB ESTABLISHMENT (612), or WINDBREAK/SHELTERBELT ESTABLISHMENT (380). These standards provide guidelines for clump and block plantings and reinforcement of existing woody cover. Also see JS-MO612 Tree and Shrub Establishment Conservation Practice Job Sheet.

Where dense woody cover is lacking, but necessary to meet species objectives, area(s) comprising 0.1-0.25 acre native shrub planting should be planted in each 5-40 acres of habitat that lacks woody cover. Plant these areas at 5X5' spacing for greatest wildlife benefit. An increased number of shrub plantings may be needed based on specific wildlife objectives. See JS-BIOL-19 Quail Covey Headquarters Wildlife Job Sheet.

Bobwhite Quail Covey Headquarters

- Quail covey headquarters are small tree/shrub seedlings planted in a clump planting at least 30 X 50 ft. at 5 X 5 ft. spacing within the clump planting (77 plants). Use no weed mat (spreading of shrubs is desired). Perennial herbaceous vegetation control is required. See TREE/SHRUB ESTABLISHMENT (612) for planting methods, etc. The number and location of covey headquarters will be based on landowner's objectives and/or the use of the BWQ limiting factor model. Headquarters areas provide optimum benefits when planted next to bare ground and diverse herbaceous cover.

- Container grown shrubs – plant shrubs on a 7 X 7 spacing in a 30 X 50 ft. area (40 plants). Use no weed mat (spreading of shrubs is desired) and provide starter fertilizer. Herbaceous vegetation control is required. See TREE/SHRUB ESTABLISHMENT (612) for planting methods, etc.

- Downed tree structure – 30 X 50 ft. area. This is a temporary source of woody cover. Each downed tree structure should have at least 3 downed trees of a minimum 20' height and well branched. These structures are intended to be "open" for quail use so trees should not be packed together in a brush pile. Recommend oak, hickory, Osage orange, or cedar. Downed tree structures need to be placed on bare ground or on areas where perennial herbaceous vegetation is controlled. The number and location of downed tree structures will be based on landowner's objectives. See JS-BIOL-21 Downed Tree Structure Job Sheet.

- Edge feathered areas (30' X 50') can also meet the covey headquarter requirement. See the Edge Habitat section below.

Species to plant – gray dogwood, roughleaf dogwood, blackberry, fragrant sumac, American plum, Chickasaw plum, hazelnut, witch hazel, false indigo bush, elderberry, coralberry, chokecherry, nannyberry, and shrub lespedeza (see Biology Tech Note No. 16 for seeding and management

recommendations for shrub lespedeza). If deer damage is a concern, the following species are recommended – false indigo bush, aromatic sumac, and blackberry. If other species are planted in areas of high deer populations use deer damage protection techniques. Consult your local USDA office. *Native plant materials should always be considered for use first where high quality natural communities exist.*

Management

Manipulation of woody tree and shrub stands to achieve early successional plant composition encourages re-growth and regeneration (suckering) of palatable and nutritious vegetation beneficial to large mammals. Browse management also increases plant diversity, which supports a variety of other species. Browse management can be accomplished by mechanical (shearing, hand-cutting, etc), or prescribed burning.

In wooded settings where landowner wishes to maximize habitat diversity, encourage old growth trees (greater than 80 years or 16 inches diameter breast height (dbh) or deferring timber activities to maximize wildlife values on at least 10 percent of the forested area.

Removal of competition will provide sunlight and growing space necessary for full crown development by the target species. FOREST STAND IMPROVEMENT (666) will be used for recommendations on thinning extent and techniques. See JS-BIOL-14 Forest Stand Improvement for Wildlife Job Sheet.

Preservation of wildlife trees (den trees and snags) serves many purposes for forest wildlife species. The goal is to leave or establish 7 snag and 7 den trees greater than 6 inches dbh/acre. Ideally, leaving 1 snag tree greater than 20 inches dbh, 4 snag trees 10 to 20 inches dbh, and 4 snag trees 6 to 10 inches dbh per acre provide an optimal mix. Preservation of one den tree greater than 20 inches dbh/acre is recommended.

Artificial nest structures can provide nesting opportunities for cavity or roost nesting birds. Design, specifications, and construction shall be consistent with plans included in the Missouri Department of Conservation publication “Woodworking for Wildlife”, or other designs specified by a technical wildlife agency.

Forest openings provide open space necessary for young birds to sun themselves, provide singing grounds, and a steady food supply. Openings of 1 to 3 acres are typically desirable. Woodland sites less than 40 acres in size generally will not benefit from openings. Likewise, caution should be exercised when proposing openings in woodland sites larger than 250 contiguous acres. Openings in this situation may lead to habitat fragmentation for non-target interior nesting species and increased predation. See JS-BIOL-16 Permanent Forest Openings for Wildlife Job Sheet and JS-BIOL-27 Temporary Forest Openings for Wildlife Job Sheet.

A number of well-scattered openings are more beneficial than a single large opening of comparable size. South facing slopes are preferred since these areas tend to remain free of snow for a longer time in the spring and fall. If woody vegetation encroachment comprises more than 10 percent of existing openings, woody vegetation will be controlled to help maintain desired vegetative components. Methods typically include a combination of mechanical, chemical, or prescribed burning practices.

USE EXCLUSION (472) and FENCE (382) should be used to prevent improper use of wooded areas by livestock.

Brushpiles can be developed with the material left from forest stand improvement or opening development. The number and location will be dictated by the objectives of the land user and recommendations based on WHAG model guidesheets.

Grassland/Brushland Development and Management

Apply this component to develop and maintain brushland/grassland habitats in prairie, transition (savanna), and forest areas. Glade and Savanna communities are included within this component. See EARLY SUCCESSIONAL HABITAT DEVELOPMENT/MANAGEMENT (647) or RESTORATION and MNGT. of DECLINING HABITATS (643) or the following information

sheets – Savanna, Glade, and Prairie for additional information. Also see JS-BIOL-32 Glade, Prairie, and Savanna Herbaceous Establishment Job Sheet.

Mechanical methods (chainsaw, burn, disk, shear/clipper, or use of dozer) used alone or in combination with other techniques can successfully manipulate successional stages of habitat. Bulldozer use is the least desirable method. Dozer and heavy machinery (clipper) are not an acceptable method for glade restoration.

Woody cover control becomes critical in planning areas to restore prairie/savanna/glade. Cut stumps should be treated to prevent sprouting. Amount of woody cover removal will be based on soil and site conditions. End product for: (1) *glade* restoration is 0-30% woody canopy evenly distributed across the site; (2) *savanna* restoration is 10-50% woody canopy evenly distributed across the site; and (3) *prairie* restoration should have no more than 10% woody canopy remaining. See JS-BIOL-23 Woody Cover Control – Prairie/Glade/Savanna Job Sheet.

Other management recommendations will be found under the preceding Management section under Permanent Vegetative Cover (Grasses, Legumes, and Forbs).

Edge Habitat -

Development/Management

High-quality edge is a wide band of plants that gradually change from one cover type to another. See FIELD BORDER (386) for information on herbaceous borders in crop fields. A minimum of 30 feet of edge is required to prevent excessive predation on wildlife using these transitional areas. Similar edges can be created in pasture/hay land by excluding livestock or leaving borders unmowed during the nesting season. See JS-BIOL-22 Woody Cover Control – Fencelines/Woody Draws, or JS-BIOL-18 Edge Feathering Job Sheet.

Woody root pruning can be used to prevent encroachment of woody material into cropfield edges. Root pruning is used to maintain crop yields adjacent to woody fencerows or wooded fields. Root pruning on a 3 to 5 year interval prevents crop yield reduction. See TREE/ SHRUB PRUNING (660) for further guidelines.

When edges are created in an area that is grazed, the edge will be fenced to exclude livestock unless it is included in a grazing plan to protect the wildlife value of the developed edge.

Planting shrubs/small trees at the edge of the field can create Woodland Edge. HEDGEROW PLANTING (422), TREE/SHRUB ESTABLISHMENT (612), or WINDBREAK/SHELTERBELT ESTABLISHMENT (380) provides species, planting guidelines and rows/plant numbers to be planted.

A *cutback border or edge feathering* (minimum of 30 feet wide) can also be created along a woodland edge or existing tree line/hedgerow. This creates a transitional zone of shrubs, vines and herbaceous vegetation between cropland and grassland and the overstory canopy along a wooded edge. The regrowth and sprouting that result will provide benefits for 5 to 10 years. Cut stumps may be allowed to sprout or stump treated depending on woody species selection objectives. Ideally, cut trees will be left where they fall, or piled loosely. The extent and number of cutback borders will depend on landowner's management objectives. See JS-BIOL-18 Edge Feathering Job Sheet.

To maintain maximum values in the cutback border, the area should be re-treated when at least 50 percent of the vegetation in the border exceeds 15 feet tall. *Edge habitat provides optimum benefits when located next to bare ground and diverse herbaceous cover.*

Edges can be allowed to *revert to native plants* if invasion by non-desirable plants will not be a problem. Plowing and disking the designated border can speed the plant succession process. This technique will only be used on non-erosive slopes.

Conversion of existing sod may also be necessary to provide the proper seedbed. Recommendations are found in CONSERVATION COVER (327), PASTURE and HAYLAND PLANTING (512), or PEST MANAGEMENT (595).

CONSERVATION COVER (327) or RESTORATION and MNGT. of DECLINING HABITATS (643) will be used to develop *herbaceous edges* for wildlife. Planting mixes under (327) for wildlife will contain multiple species (at least 3 with each one comprising at least 15% of the mix and with an added forbs/legume mix(if selected) counting as one specie) with 60 percent or more of species having a good or excellent wildlife rating to achieve specific results. Seed mixtures will not contain species with a poor wildlife rating in Table 2 of (327). Existing herbaceous borders will require renovating if the percentage of species rated poor exceeds 25% of the plant community.

Developed edges must be maintained in a condition to meet the owner's objectives. Herbaceous borders should be treated to control woody vegetation.

Artificial nest structures can provide nesting opportunities. Design, specifications, and construction shall be consistent with plans included in the Missouri Department of Conservation publication "Woodworking for Wildlife", or other designs specified by a technical wildlife agency.

Crop field Management

Many conservation practices provide high quality habitat components in cropfields. Introduction of cover types and plant diversity add to increased habitat values.

CONSERVATION CROP ROTATION (328), RESIDUE MANAGEMENT (329 & 344-346), CONTOUR BUFFER STRIPS (332) and CROSSWIND practices (589B & C) can all provide positive habitat values. FIELD BORDER (386) and GRASSED WATERWAYS (412) can introduce a valuable grassland component into cropfield situations when beneficial species and management are used.

Reduced/eliminated chemical use will allow significant growth of annual plants, thus enhancing the cropfield values for wildlife.

WHAG model guidesheets should be consulted for appropriate cropland recommendations for wildlife.

Leave unharvested grain strips along edges of adjacent other cover types. Strips should be at least 30 feet wide and at least one-quarter acre in size. Unharvested grain will be protected from livestock grazing.

Wildlife Food Plots

Many wildlife species depend on and prefer native weed seeds and wild fruits for winter food. However, additional high-quality food can be provided in the form of green browse or standing grain food plots. The location and spacing will be based on information from the WHAG model guide sheets. Locate food plots whenever possible next to low growing woody cover and diverse herbaceous cover to provide optimum benefits. No more that 4 acres of grain food plots and/or green browse combined are needed per each 40 acres.

See JS-BIOL-25 Food Plots Job Sheet.

Grain Plots

The minimum size of a grain food plot is one-quarter acre (about 12,000-sq. ft.). Grain food plots over 4 contiguous acres are not needed. Plots should be at least 30 feet wide. As a rule, one grain plot for every 40 acres of farmland is a minimum.

Greatest food diversity occurs when each year one-half of the grain food plots are planted with the other half allowed to grow annual plants. Rotate this sequence the following year.

Grain food plots should be located adjacent to winter cover on the upwind side. This will reduce snow drifting into critical winter cover. Brushpiles or downed tree structures can be constructed adjacent to food plots to provide winter cover. Food plots should be located on the least erosive areas of each field. Soil loss must be within tolerable limit (T). Adequate vegetative cover must be developed and maintained to provide both wildlife and erosion control benefits. If food plots are relocated or discontinued, the site will be re-seeded based on this standard.

Plots may be located on slopes greater than 5 percent provided soil losses do not exceed tolerable limit (T). Plots planted on the contour are recommended.

Weed control is not required as the presence of some weeds such as foxtail and ragweed actually benefit wildlife by providing higher

protein and greater number of seeds than domestic grains.

Food plots will be protected from livestock grazing.

Plantings shall be seeded at proper time to ensure maturity of food plants.

Annual Food Plants and Seeding Rates:

Sorghum seeds are rich in energy, persistent on the plant, and usually available to wildlife when snow or ice covers other seeds. If only one grain is to be planted, grain sorghum (milo) will give the best results. Plant grain sorghum at the rate of 16 pounds per acre if broadcast, 10 pounds per acre if drilled and 5 pounds per acre if row planted. Other recommended single species and broadcast seeding rates: corn 15 lbs./ac, sunflowers 8 lbs./ac, oats 50 lbs./ac, wheat 50 lbs./ac, buckwheat 40 lbs./ac, and millets 20 lbs./ac (these rates can be reduced by 50% if drilled or row planted). "Bobwhite" trailing soybeans are an example of a food plant selected for specific wildlife benefit and can be used in annual food plots – use 6# PLS for solid seeding rate and 4# PLS in mixtures.

Grain Mixtures are:	Pounds per Acre:
1. Grain Sorghum	8
Soybeans	12
2. Grain Sorghum	8
Soybeans	8
German Millet	2
3. Grain Sorghum	12
Sunflowers	8
4. Grain Sorghum	8
Corn	8

Perennial Food Plot for Bobwhite Quail

Desmodium species provide an excellent perennial food source for Bobwhite Quail. Use a 5 pound PLS/acre seeding rate to produce an excellent cover and food source.

Green Browse Food Plots

Green browse food plot should be at least one acre. Plots should be located on non-erosive areas. Soil loss must be within tolerable limit (T).

The site should be open, tillable and next to suitable cover. Place the plot at least 50 feet from any woodland edge to reduce competition from trees and allow sunlight to reach the planting. A buffer strip of perennial weeds and woody shrubs should be encouraged to develop over time between the browse plot and the timber.

Seed 30 pounds per acre wheat and 1 pound of timothy per acre in the fall (Sept – early Oct). At this seeding time overseed one-half the plot with 2 pounds per acre of ladino clover and 2 pounds per acre of red clover. The following spring (January - March) the other one-half of the food plot should be over-seeded with 10 pounds per acre of lespedeza (Korean, Kobe, Marion, Summit or a mix of these).

An alternate seed mix is 30 pounds per acre wheat, 5 pounds per acre Alfalfa, and 2 pounds per acre red clover.

Green browse plots can be mowed annually. Mowing can be done March 15 to May 1, or July 15 – September 30 (preferred) to encourage vegetative diversity. If mowing after mid-April through May 1, one must weigh the benefits of vegetative diversity gains versus impacts on ground nesting wildlife. Mow no more than one-half of the plot every year. Rotate mowed strips across the plot every year.

Renovate and re-establish plots every 3 to 4 years.

CONSIDERATIONS

This standard does not attempt to list all possible habitat development and management practices. An NRCS Biologist/Wildlife Conservationist or MDC Biologist may recommend other practices for application.

All land uses provide habitat for wildlife, but there is a great variability in the quality (condition) of the land to support wildlife. A land use may provide one or more of the habitat elements necessary for a particular species during specific seasons of the year.

Wildlife population control (hunting or trapping to reduce numbers) is the responsibility of state and federal wildlife agencies.

Landowners will be required to follow appropriate state and federal guidelines.

Vegetative management recommendations can be directed towards habitat gains while still maintaining the intent of protecting the soil resource.

Consider that manipulations of habitat may impact more than the desired kinds of wildlife. These possible effects shall be evaluated and taken into consideration during the planning process.

This practice may be used to promote the conservation of declining species, including threatened and endangered species.

Consider the problems of habitat fragmentation when using this practice. Consideration needs to be given for the wildlife species of interest.

Consider habitat linkages and habitat corridors when developing upland wildlife habitat.

Proper 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.

Guidance for the desired end product for habitat quality for individual species is found in the Missouri Wildlife Habitat Appraisal Guides – Species or Community models.

Drinking water for wildlife is not an over-riding concern in Missouri due to the numerous lakes/ponds and streams. However supplemental water may sometimes be needed. See WILDLIFE WATERING FACILITY (648) and JS-BIOL-28 Wildlife Watering Facility for further information.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for each site. Plans and specifications shall be recorded using approved specification sheets, job sheets, technical notes, or narrative documentation in the conservation plan, or other acceptable documentation.

NRCS staff is encouraged to work closely with the NRCS Biologist/ Wildlife Conservationist or MDC Biologist in developing site specific plans and specifications. All documents developed are to specify the requirements for installing the practice, such as the kind, amount or quantity of materials to be used, or the timing or sequence of installation activities.

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. Actions will be carried out to ensure this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation) such as prescribed fire, disking, or mowing, and repair and upkeep of the practice (maintenance) such as replacement of vegetative component as needed.

REFERENCES

1. Missouri NRCS Job Sheets –

   JS-BIOL

   JS-WOOD

   Habitat Information Sheets- eFOTG

2. Woodworking for Wildlife – MDC Wildlife Division

3. Wildlife Management for Landowners – MDC Wildlife Division

4. MDC Guidesheets for Timber and Wildlife Benefits on Private Land – MDC Forestry Division

5. Missouri NRCS Biology Technical Notes

6. “On the Edge” – A Guide to Managing Land for Bobwhite Quail - MDC

INTERNET SITES –

www.conservation.state.mo.us

http://extension.missouri.edu/explore/agguides/wildlife/index.htm

HTTP://COVEYHEADQUARTERS.COM/

TABLE 1 – RECOMMENDED SEEDING MIXES AND RATES FOR BOBWHITE QUAIL AND RELATED GRASSLAND SPECIES

- **Use in areas where concentrated flow erosion is not a concern**
  (soil test and fertility/nutrient additions are not required)

Little Bluestem	2.7 lbs PLS/ac
Sideoats Grama	1.4 lbs PLS/ac
Plus	3.0 lbs PLS/ac approved native forbs - include a minimum of ten forb species in mix:

  - o with at least 20 PLS seeds/square foot of mix
  - o with no single species to exceed 15% of the mix (3 PLS seeds/square foot of mix)
  - o mix having no more than 15% annual/biennials combined (3 PLS seeds/square foot of mix)
  - o see Table 2 (Forbs 1/2006) for approved forb listing
  - o to encourage the forb component of the seeding mix (an important quail habitat item) it is STRONGLY encouraged to seed the grass/forb mix during the dormant season (11/15-3/31)

- **Use in areas where concentrated flow is a concern**
  (soil test and fertility/nutrient additions are not required)

Little Bluestem	2.7 lbs PLS/ac
Sideoats Grama	1.4 lbs PLS/ac
Alfalfa	2.0 lbs PLS/ac
Plus	3.0 lbs PLS/ac approved native forbs - include a minimum of ten forb species in mix:

  - o with at least 20 PLS seeds/square foot of mix
  - o with no single species to exceed 15% of the mix (3 PLS seeds/square foot of mix)
  - o mix having no more than 15% annual/biennials combined (3 PLS seeds/square foot of mix)
  - o see Table 2 (Forbs 1/2006) for approved forb listing
  - o to encourage the forb component of the seeding mix (an important quail habitat item) it is STRONGLY encouraged to seed the grass/forb mix during the dormant season (11/15-3/31)

- **Use only in wet areas on sites of pasture suitability groups WLB, WCB, WCU, and WtP**
  (soil test and fertility/nutrient additions are not required)

  Switchgrass 3.4 lbs PLS/ac

  Plus 3.0 lbs PLS/ac approved native forbs - include a minimum of ten forb species in mix:

  - with at least 20 PLS seeds/square foot of mix
  - with no single species to exceed 15% of the mix (3 PLS seeds/square foot of mix)
  - mix having no more than 15% annual/biennials combined (3 PLS seeds/square foot of mix)
  - see attached sheet (Forbs 1/2006) for approved forb listing
  - to encourage the forb component of the seeding mix (an important quail habitat item) it is STRONGLY encouraged to seed the grass/forb mix during the dormant season (11/15-3/31)

TABLE 2 – FORBS FOR USE IN TABLE 1 MIXES.

Common Name	Scientific Name	Habitat Type *	Pure Stand PLS lbs.** (20 seeds/square foot)
FORBS			
Yarrow	*Achillea millefolium*	MP	0.3
Leadplant	*Amorpha canescens*	S, DP, MP	4.5
Meadow anemone	*Anemone canadensis*	WP	9.1
Purple milkweed	*Asclepias purpurascens*	S	10.6
Marsh milkweed	*Asclepias incarnata*	WP	1.2
Butterfly milkweed	*Asclepias tuberosa*	S, MP, G	12.4
Sky blue aster	*Aster azureus*	S	0.9
Smooth aster	*Aster laevis*	S	1.1
New England aster	*Aster novae-angliae*	WP	0.7
Aromatic aster	*Aster oblongifolius*	DP, MP, G	1.1
Willow aster	*Aster praealtus*	WP	0.5
Silky aster	*Aster sericeus*	DP	2
White wild indigo	*Baptisia alba*	S, DP, MP, WP, G	32
Blue wild indigo	*Baptisia australis*	DP, G	34
Cream wild indigo	*Baptisia bracteata*	DP, MP, G	38.9
Beggar tick **(A)**	*Bidens frondosa*	WP	6.7
Purple poppy mallow	*Callirhoe involucrata*	DP	1.4
Partridge pea **(A)**	*Cassia fasciculata*	S, DP, MP, G	17.4
Indian paintbrush **(A)**	*Castilleja coccinea*	DP, MP, G	2.7
New Jersey tea	*Ceanothus americanus*	S, DP, MP	7.9
Coreopsis	*Coreopsis lanceolata*	DP, MP, G	3.9
Finger/Prairie Coreopsis	*Coreopsis palmata*	S, DP, MP	4.3
Plains coreopsis	*Coreopsis tinctoria*	G	0.3
Tickseed coreopsis	*Coreopsis tripteris*	S, MP, WP, G	0.5
Rattlebox	*Crotalaria sagittalis*	DP	12.1
White prairie clover	*Dalea candida*	DP, MP, G	3.1
Purple prairie clover	*Dalea purpurea*	S, DP, MP, G	2.9
Illinois bundle flower	*Desmanthus illinoensis*	MP, WP	7.3
Showy tick trefoil	*Desmodium canadense*	S, DP, MP, WP	9.9
Beggar's lice	*Desmodium canescens*	S, DP, MP	19.4
Shooting star	*Dodecatheon meadia*	S, G	0.7
Pale purple coneflower	*Echinacea pallida*	S, DP, MP, G	8.2
Purple coneflower	*Echinacea purpurea*	S, MP, WP	7.5
Rattlesnake master	*Eryngium yuccifolium*	S, MP, G	4.9
Boneset	*Eupatorium perfoliatum*	WP	0.3
Flowering spurge	*Euphorbia corollata*	S, DP, MP	5.4
Sawtooth sunflower	*Helianthus grosseserratus*	DP, MP, WP	1.4
Ashy Sunflower	*Helianthus mollis*	DP, MP	7.8
Western sunflower	*Helianthus occidentalis*	DP, MP, G	4.2
Woodland sunflower	*Helianthus strumosus*	S	7.6
Ox-eye/false sunflower	*Heliopsis helianthoides*	S, G	7.5
Alum root	*Heuchera richardsonii*	G	0.1
Blue flag	*Iris virginica shrevei*	WP	54.1

Common Name	Scientific Name	Habitat Type *	Pure Stand PLS lbs.** (20 seeds/square foot)
Roundhead lespedeza	*Lespedeza capitata*	S, DP, MP	3.2
Rough blazing star	*Liatris aspera*	DP, G	4.6
Blazing star	*Liatris pycnostachya*	DP, MP, WP	7.3
Cardinal flower	*Lobelia cardinalis*	WP	0.1
Blue lobelia	*Lobelia siphilitica*	WP	0.1
Bergamot	*Monarda fistulosa*	S, MP, WP, G	0.7
Missouri Primrose	*Oenothera missouriensis*	G	10.9
Wild quinine	*Parthenium integrifolium*	S, DP, MP, G	7.8
Lousewort/Wood betony	*Pedicularis canadensis*	DP, MP	2.2
Beardtongue	*Penstemon digitalis*	DP, MP, WP	2.2
White prairie clover	*Petalostemon candidum*	S	2.1
Obedient plant	*Physostegia virginiana*	S, MP, WP	2.2
Prairie cinquefoil	*Potentilla arguta*	DP, MP	0.2
Slender mountain mint	*Pycnanthemum tenuifolium*	S, DP, MP, WP, G	0.1
Mountain mint	*Pycnanthemum virginianum*	WP	0.5
Prairie coneflower	*Ratibida columnifera*	DP, MP, G	1.2
Gray-head coneflower	*Ratibida pinnata*	S, DP, MP, G	0.9
Prairie rose	*Rosa setigera*	MP	17.4
Black-eyed Susan **(B)**	*Rudbeckia hirta*	S, DP, MP, G	0.6
Sweet coneflower	*Rudbeckia subtomentosa*	MP, WP	1.3
Brown-eyed Susan	*Rudbeckia triloba*	WP	1.6
Wild petunia	*Ruellia humilis*	DP, G	5.8
Pitchers sage	*Salvia azurea*	DP, MP, G	2.9
Maryland senna	*Senna marilandica*	S, MP, WP	42.5
Royal catchfly	*Silene regia*	MP	2.4
Rosinweed	*Silphium integrifolium*	S, DP, MP, G	39
Compass Plant	*Silphium laciniatum*	DP, MP, G	82.3
Cup plant	*Silphium perfoliatum*	WP	39
Prairie dock	*Silphium terebinthinaceum*	S, DP, MP, WP, G	54.5
Blue-eyed grass	*Sisyrinchium campestre*	DP	0.1
Gray goldenrod	*Solidago nemoralis*	S, DP, MP	1
Riddell's goldenrod	*Solidago riddellii*	WP	0.6
Rigid/Stiff goldenrod	*Solidago rigida*	S, DP, MP, WP	0.4
Showy goldenrod	*Solidago speciosa*	S, MP	0.05
Goat's rue	*Tephrosia virginiana*	S, DP, MP	21.8
Ohio spiderwort	*Tradescantia ohiensis*	MP, WP	6.8
Blue vervain	*Verbena hastata*	WP	8.7
Ironweed	*Vernonia missurica*	MP, WP	2.3
Culver's root	*Veronicastrum virginicum*	WP	0.1
Golden alexander	*Zizia aurea*	S, MP, WP, G	4.9

* S = Savanna, DP = Dry Prairie, MP = Mesic Prarie, WP = Wet Prairie, G = Glade
** Numbers are rounded to nearest 0.1 for ease in computation of PLS pounds needed in mix.

A = Annual
B = Biennial