

NATURAL RESOURCES CONSERVATION SERVICE  
SPECIFICATION GUIDELINES

**EARLY SUCCESSIONAL HABITAT DEVELOPMENT/MANAGEMENT  
(Code 647)**

**GENERAL SPECIFICATIONS**

Plans and specifications for early successional habitat development and management shall be prepared for each site or management unit according to the USDA, NRCS-MA Conservation Practice Standard No 647, Criteria, Considerations, and Operation and Maintenance. They shall be recorded on specification sheets or job sheets.

**GRASSLAND**

**Description**

Grassland can be either human created and maintained (such as hayfields and pastures), or a naturally occurring community occurring on droughty, low nutrient soils, typically near the ocean (such as sandplain grassland). Grasslands are dominated by graminoids, but may contain various forbs.

**Importance**

Grasslands are an important habitat element for a variety of wildlife, including migratory songbirds, various species of waterfowl, raptors, large and small mammals, turtles, snakes, butterflies and other species of insects. Due to the reduction of grassland habitat in the northeast, grassland nesting bird species (such as Eastern Meadowlark, Grasshopper Sparrow, Vesper Sparrow and Upland Sandpiper) are experiencing significant population declines.

**Locations to Target**

**1. Existing large grassland areas** - Results from surveys conducted by Massachusetts Audubon Society indicated that areas with important concentrations of grassland habitat and abundance of grassland birds include the Connecticut River valley and northeastern Massachusetts. Other large grassland areas of importance to grassland birds include locations such as airports and military installations. Efforts to restore or

enhance grassland habitat within these areas is encouraged.

- 2. Open landscapes** – Focus on sites located within a ½ mile of other grassland habitats such as pastures, hay fields and wet meadows. Small, isolated parcels of grasslands in landscapes that are heavily wooded have limited potential to support grassland birds.
- 3. Recently abandoned sites** – In general, do not try to reclaim grassland on sites that are >10 years post-abandonment. The cost can be prohibitive and the results may be less than satisfactory. Dry, gravelly sites with limited woody encroachment may be an exception.

**Restoration/Management Strategies**

- 1. Grassland size** - In order to support an array of grassland dependent bird species within an area, contiguous blocks of grassland at least 100 acres in size provide the greatest potential. Where 100 acre tracts or larger are unavailable, prioritization should be given to sites at least 20 acres in size. On isolated patches smaller than 5 acres, manage for shrub habitat rather than grassland because shrub dependent wildlife species are generally not as area sensitive as grassland species. On sites from 5 to 20 acres in size, consider the surrounding landscape to determine if grassland habitat should be the focus.
- 2. Grassland shape** - Consider ways to minimize the grassland edge to area ratio by favoring circular or square plots rather than long, linear plots (i.e., less than 600 feet wide) due to the increased rates of nest predation on narrow plots. Also, avoid establishing grasslands with very irregular borders as this also increases the edge to area ratio.

- 3. Consolidate grassland patches –** Connected or unified grassland blocks provide increased habitat, reduce edge effects and can result in increased wildlife species diversity. Larger grassland blocks can be created by concentrating efforts near existing grasslands or open wetlands. Consideration should also be given to consolidation of adjacent grassland fields through the elimination of hedgerows or tree lines in areas where open land occupies a considerable amount of the surrounding landscape.
- 4. Soften edges between habitats -** Where grassland directly borders a forest edge, consider softening the hard edge by creating

shrub habitat at least 30 feet in width (see cutback border). “Hard” grassland/forest edges increase the rates of predation and nest parasitism on grassland birds.

- 5. Vegetation -** Grasslands will be managed to achieve the proper mix of grass, forb and bare soil cover for the targeted wildlife species or community. Bunch grasses rather than sod forming grasses should be the focus (dense stands of sod forming grasses can hinder bird movement in their search for food). While all grassland dependent birds rely on herbaceous cover for nesting or foraging, there are many differences in cover requirements among individual species (Table 1, Figures 1 and 2).

**Table 1: Habitat Preferences of Grassland Dependent Birds**

Species	Preferred Grassland Growth Form			Avoids woody vegetation <sub>1</sub>	Min. Area acres if known	Other
	Short <12”	Medium <24”	Tall >24”			
<b>American Kestrel</b>	x					Open fields containing widely scattered trees (or utility poles) for perch sites, cavity nester
<b>Barn Owl</b>			x			Dense grasslands with substantial levels of plant litter, cavity nester – will utilize nest boxes/outbuildings
<b>Bobolink</b>		x		x	5–10	Prefer older fields with a mosaic of grasses, sedges, and scattered forbs
<b>Eastern Meadowlark</b>		x			15–20	Prefer areas w/ good grass and litter cover & scattered tall forbs/shrubs for perch sites
<b>Grasshopper Sparrow</b>	x			x	30	Prefer dry moderately open grasslands with patchy bare ground, minimal litter
<b>Henslow’s sparrow</b>		x	x	x	>10	Prefer damp areas in tall grass fields, likes thatch
<b>Northern Bobwhite</b>		x	x		20-40	Prefer a diversity of early successional habitats adjacent to one another (grasslands, hedgerows, open woodlands)
<b>Northern Harrier</b>			x	x	>100	Prefer marshy meadows, old fields, wet grasslands
<b>Savanna Sparrow</b>	x	x		x	20-40	Prefer dense ground vegetation and some litter; may favor damp soil grasslands
<b>Short Eared Owl</b>		x		x	>100	Nests in dense grass and forbs
<b>Upland Sandpiper</b>	x	x		x	150	Prefer short patchy grasses & areas of bare ground
<b>Vesper sparrow</b>	x				<10	Prefer dry sparse grasslands w/ scattered shrubs and bare patches

<sub>1</sub> while species marked avoid areas with woody vegetation, most can tolerate some woody vegetation within areas dominated by grassland.

Figure 1: Grassland bird species vegetation height and density preferences based on studies in Illinois and Missouri (by Herkert et al)

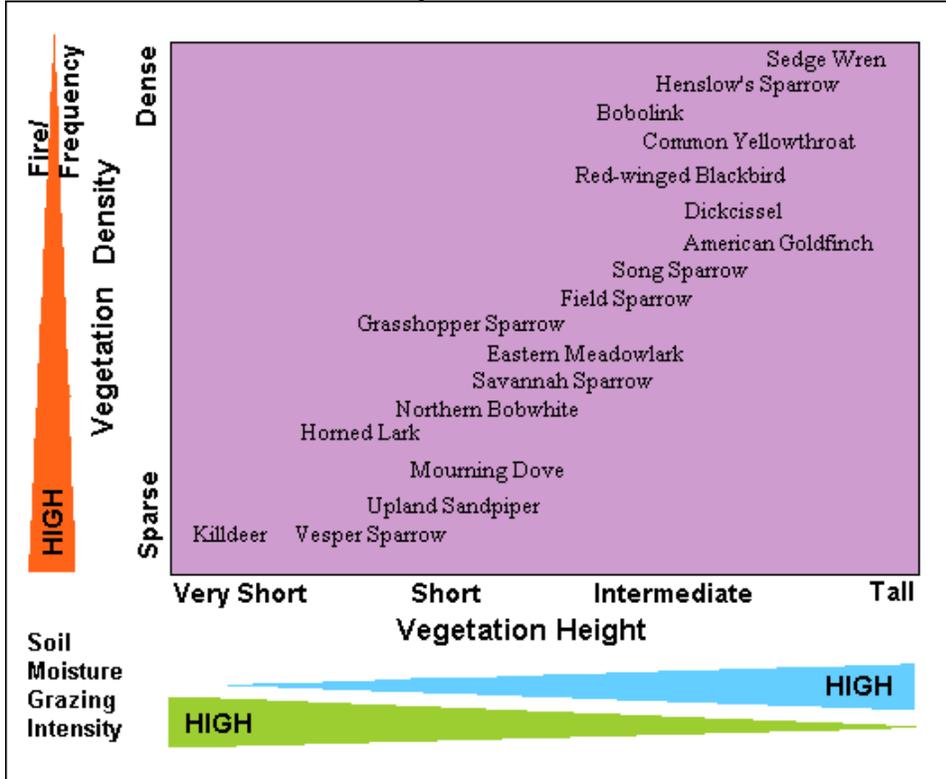
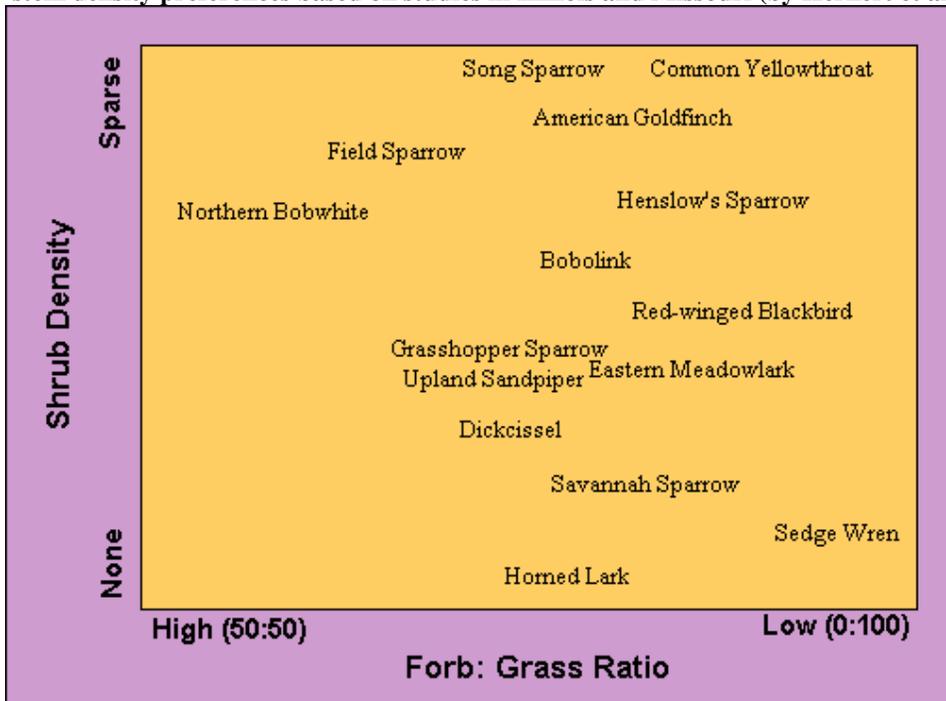


Figure 2: Grassland bird species forb abundance and low growing, less than 3 feet, woody stem density preferences based on studies in Illinois and Missouri (by Herkert et al)



**Restoration/Management Activities** – Grassland habitat may be developed or maintained by one or a combination of the following methods:

1. **Chemicals** - Herbicides may be used to manipulate plant succession, control brush, reduce plant competition, control exotic invasive plant species and improve habitat diversity. Careful planning and application are required when using chemicals to improve existing habitat. Product selection shall be based on: (a) product effectiveness, (b) non-target species impacts, (c) toxicological risks, and (d) off-site movement of chemicals. As required by federal law, chemicals are to be applied only for uses listed on the container label and all label directions and precautions must be followed. When using chemicals to control invasive species, practice standard Pest Management (595) must be followed.
2. **Light disking** - Dense sod or vegetation is detrimental to wildlife feeding and movement and can be improved by light disking. Light disking enhances habitat quality by releasing sod-bound grasses, reducing residue, creating bare ground, stimulating the growth of annuals, which are prolific seed producers, (providing seed-eating birds and mammals with abundant food resources) and increasing insect populations. Do not perform light disking on sites where invasive plant species are present unless invasive species are controlled prior to disking. In addition, light disking in areas which have never been plowed is strongly discouraged.

*(A) Frequency*

- Disking should be conducted on a 2 to 3 year rotation, meaning 1/2 to 1/3 of the field is disked each year in a strip pattern. Strip disking creates a mosaic of plant communities from 1 to 3 years old, depending on the rotation.
- Divide the field into strips from 30 to 75 feet wide. In the first year disk every other strip or every 3<sup>rd</sup> strip (2-year and 3-year rotation, respectively). Disked strips will be separated from each other by an area of undisturbed vegetation either as wide or twice as wide as the disked strip (2-year and 3-year rotation, respectively).
- In the second year, disk a new strip of similar width in the adjacent undisked area, leaving the previously disked strips undisturbed.

- In the third year, the remaining undisked strips are done (3-year rotation) or the strips done in year one are done again (2-year rotation).

*(B) Disking Intensity*

- The disking should be 2 to 4 inches deep and leave 50 percent residue remaining on the ground surface. Disking intensity can be altered by adjusting the depth of the disk and/or the number of passes. In general, the more intensively the site is disked, the less residual perennial grass remains and the greater the annual plant component.
- To reduce soil erosion, strips should be planned across the slope or on the contour. Slopes greater than 5 percent should not be disked.

*(C) Timing of Disking*

- Disking can be done from fall through early spring. Do not disk during the primary nesting season of April 15 to August 1.
3. **Liming** - Grasses grow best at a soil pH of 5.5, legumes prefer a soil pH of 6.0. To maintain the health and vigor of the grassland, periodic applications of lime may be applied according to soil test recommendations. If a soil test is not feasible, lime can be applied at the rates specified below.

Soil Texture	Tons Lime/Acre
Clay, clay loam, and highly organic soil	3
Sandy loam, loam and silt loam	2
Loamy sand, sand	1

When surface applying lime, apply no more than 1 ton per acre per application and no more than 2 tons per acre per year. In situations where soil pH is extremely low and a large amount of lime is recommended, apply the lime over 2 to 3 years with annual applications. If seeding is proposed and the soil is extremely acid, apply part of the lime at least 6 months before seeding.

Established warm season grass stands may not need additional lime applications.

#### 4. Mowing

If grassland birds are using the site, do not mow during the primary grassland bird nesting season of April 15 to August 1 and adjust the mower head so that you are cutting, at a minimum, no shorter than 7 inches. If turtles may be utilizing the site, refrain from mowing until September 15 and raise the mower head to 12 inches, if possible. On sites with abundant forbs that provide pollinator habitat, restrict mowing to November through mid-March. This allows the grasses and forbs to seed out, reinforcing the seeding and providing a food and nectar source to a variety of wildlife and pollinators. Exceptions to these mowing dates may be allowed when necessary to maintain the health of the plant community.

Annual mowing is discouraged because it decreases structural plant diversity and reduces residual cover available for the following nesting season. Where woody plant encroachment is not a problem, mow every three years or, on larger grasslands (i.e., >50 acres), practice rotational mowing so that no more than 1/3 to 1/2 of the field is cut in any given year.

Warm season grasses do not need to be mown as frequently as cool season grass fields to control shrub invasion; so a three to four year schedule is probably adequate.

To prevent thatch buildup, residues should be thoroughly shredded or haying can be done.

5. **Prescribed burning** - Burning can be used to manage the plant community and reduce vegetative litter which can hinder movement of small animals and birds. Prescribed burning is especially effective at maintaining warm season grass stands. Conduct prescribed burns on grasslands managed for breeding bird habitat in early spring (March to early April) or late fall. A spring burn is preferred as it retains the grasses over winter, thus providing winter cover. When possible, burn large grasslands in a rotation of 20 to 30 percent annually in order to provide more structural diversity and potentially attract more diverse bird species.

Prescribed burning shall be conducted by certified individuals following an approved burn plan. Practice standard Prescribed Burning (338) must be followed.

6. **Prescribed grazing** - Prescribed grazing may be utilized as a management tool to manipulate plant succession. Graze the site at a light rate, allowing at least 50% or more of the vegetation cover to be maintained at an average height of 10 inches all summer, with the remaining vegetative cover grazed no shorter than 4 inches. This could provide habitat for grassland bird species preferring intermediate vegetation height and density requirements.

The preferred grazing practice is to use a rotational system where some paddocks are grazed and others are left idle. The field should be managed so that 1/3 of the acreage is left idle, 1/3 is lightly grazed and 1/3 is moderately grazed. Ideally, the idle paddock will be located so that it is surrounded by other paddocks rather than trees or buildings. The lightly grazed paddock should be managed so that 50% or more of the vegetative cover is maintained at a minimum of 10 inches all summer with the remainder grazed no shorter than 4 inches. The moderately grazed paddock should be managed so that 30% or more of the vegetative cover is maintained at a minimum of 10 inches all summer with the remainder is grazed no shorter than 4 inches.

Grazing should only be used as a management tool where the land user fully understands the principles and methodologies of a rotation system and has demonstrated a high level of management skill. An approved grazing plan is required.

#### 7. Seeding

Seeding can be used to establish new stands or enhance existing stands. When establishing grass stands by seeding, the seed mix and rate shall be based on site conditions and habitat preferences of targeted species.

Select a mix of tall and short growing grasses to provide enough density for good nesting habitat. Plantings shall include at least 3 species and should

consist predominantly of bunch grasses. Tall fescue and reed canary grass shall not be planted.

Both cool season and warm season grasses provide wildlife habitat. Cool season stands are valued as wildlife cover because they are easy to establish and provide cover early in the season. The disadvantages are that they lose vigor over time and mat down under rain, snow and wind. Warm season grasses provide excellent wildlife habitat because they hold up better under the elements, thus providing winter cover. Although they can take 3 or more years to establish, warm season grasses are better adapted to drought conditions and low fertility soils than cool season grasses and generally retain the stand diversity longer than cool season grasses.

Soil type and target wildlife species should determine what kinds of grasses to plant. Table 2 provides some specific seeding mixes while Table 3 provides information on various grasses and legumes that can be used for grassland plantings.

The inclusion of forbs and legumes in grassland plantings improves the structural diversity of the stand and increases the invertebrate abundance. The inclusion of forbs can also improve the stand for various pollinators such as butterflies, moths and bees.

8. **Cut-back borders** – Cut-back borders are used to create a softer edge between field/forest edges. To create a cut-back border from an area having predominantly tall growing tree species, cut trees greater than 2 inches diameter. Retain native fruit bearing shrubs, vines and small trees. The increased sunlight will produce a flush of new growth and many of the trees species will quickly sprout at the stump – forming a brush border in one to two years.

Cut back borders will be a minimum of 30 feet in width and soil disturbance shall be minimized. If invasive species are present, they must be controlled because the increased sunlight to the area could dramatically increase their growth.

Re-apply the practice when trees in the woodland edge become large enough to shade more than 60 percent of the area. Cutting back a portion of the edge each year will provide increased structural diversity and allow for retention of some habitat.

Table 2: Seed Mixes for Grassland Bird Habitat		
Location	Species	Rates lbs/ac
Well drained site	Canada Wild Rye	4
	Timothy	2
	White Clover	6
Well drained site	Timothy	1
	Orchard Grass	1
	Alfalfa	5
Well to somewhat poorly drained site	Orchard Grass	4
	Timothy	2
	Red Clover	8
Well drained to somewhat poorly drained site	Deer Tongue	2
	Switchgrass	8
	Tick Trefoil	1
Well to poorly drained site	Orchard Grass	4
	Red Top	2
	White Clover	6
Well to poorly drained site	Virginia Wild Rye	3
	Orchard Grass	3
	White Clover	6
Dry to well drained site	Big Bluestem	2
	Little Bluestem	2
	Indian Grass	3
	Switchgrass	1

9. **Shrub/Tree Removal** – Cut or remove trees to create open views which are critical to whether grasslands birds will use a site.
  - Hedgerows dominated by woody species taller than 10 feet and wider than 15 feet can fragment grasslands, reducing the probability of attracting area-sensitive species.
  - Hedgerow removal can create a larger grassland, however, careful consideration should be given to other wildlife species which might be negatively impacted.
  - Cut trees low enough so that the stumps will not be a mowing hazard. If trees are dense or >6 inches dbh, mowing immediately following restoration may not be realistic. In this case, alternatives in order of preference are:

1) transition the area to grassland by allowing a period of 2-10 years of regeneration. Stumps will partially decay during this time period which will then allow the use of a mulching mower;  
 2) grind stumps in place to permit immediate mowing; 3) although typically not cost-effective, whole stumps including roots may be removed and the disturbed area seeded.

- Woody material cut during reclamation should be removed from site. If a brontosaurus, hydro-axe or similar equipment is used to cut the woody material, the site may need to be burned, raked or treated in some way so that the wood chips do not hinder herbaceous growth. Disk the area after treatment, as needed.

**Table 3: Grasses and Legumes Recommended For Grassland Bird Habitat**

Species	Scientific Name	Recommended Cultivars	Native	Warm/Cool	Ht. Avg.	Characteristics
<b>Alfalfa</b>	<i>Medicago sativa</i>	Common	No	Cool	1-2'	Well drained, fertile soils
<b>Bluestem, Big</b>	<i>Andropogon gerardii</i>	Niagara	Yes	Warm	5-7'	Dry, medium to low fertility soils; sun
<b>Bluestem, Little</b>	<i>Schizachyrium scoparium</i>	Aldous, Blaze or CT ecotype	Yes	Warm	2-3'	Dry, medium to low fertility soils; sun
<b>Broom-Sedge</b>	<i>Andropogon virginicus</i>	Common	Yes	Warm	2-5'	Dry, sterile soils; sun
<b>Bushclover, Hairy</b>	<i>Lespedeza hirta</i>	Common	Yes	Warm	2-4'	Open, sterile, sandy sites
<b>Bushclover, Roundhead</b>	<i>Lespedeza capitata</i>	Common	Yes	Warm	2-4'	Dry, sandy soils
<b>Clover, Red</b>	<i>Trifolium pratense</i>	Common	No	Cool	3-4'	Well drained soils
<b>Clover, White</b>	<i>Trifolium repens</i>	Common	No	Cool	10"	Moist soils, sun-part sun
<b>Deertongue Grass</b>	<i>Dicanthelium clandestinum</i>	Tioga	Yes	Warm	3'	Low fertility sites, dry to moist, sun to partial shade
<b>Indian grass</b>	<i>Sorghastrum nutans</i>	Rumsey	Yes	Warm	3-5'	Dry to moist soils; sun
<b>Orchardgrass</b>	<i>Dactylis glomerata</i>	Any forage variety	No	Cool	2-3'	Dry to moist soils; sun
<b>Red Top</b>	<i>Agrostis alba</i>	Streaker or Fireball	No	Cool	3'	Dry to wet soils; sun
<b>Rye, Canada Wild</b>	<i>Elymus canadensis</i>	Common	Yes	Cool	3-6'	Dry to moist soils; sun to partial shade
<b>Rye, Riverbank Wild</b>	<i>Elymus riparius</i>	Common	Yes	Cool	3-5'	Moist to wet sites, partial shade
<b>Rye, Virginia Wild</b>	<i>Elymus virginicus</i>	Common	Yes	Cool	4-5'	Suited to wet sites, can tolerate shade
<b>Partridge Pea</b>	<i>Chamaecrista fasciculata</i>	Common	Yes	Warm	3'	Dry to moist soils, open sites, reseeding annual
<b>Switchgrass</b>	<i>Panicum virgatum</i>	Shelter	Yes	Warm	3-5'	Dry to moist soils; sun or partial sun
<b>Timothy</b>	<i>Phleum pratense</i>	Common	No	Cool	2-3'	Dry to wet soils; sun
<b>Trefoil, Showy-Tick</b>	<i>Desmodium canadense</i>	Common	Yes	Cool	2-4'	Dry, open sites

### **Applicable Laws and Regulations**

Under the Massachusetts Wetlands Protections Act, work in and near jurisdictional resource areas including wetlands and perennial streams may require a permit from the local Conservation Commission and Department of Environmental Protection.

USDA-NRCS. 2005. Light disking to enhance early successional wildlife habitat in grasslands and old fields: wildlife benefits and erosion potential. Technical note. 9 pp. URL: <http://www.nrcs.usda.gov/technical/ECS/databas e/technotes.html>

### **REFERENCES**

Dechant, J.A., M.L. Sondreal, D.H. Johnson, L.D. Igl, C.M. Goldade, A.L. Zimmerman, and B.R. Euliss. 1999 (revised 2001). Effects of management practices on grassland birds: Bobolink. Northern Prairie Wildlife Research Center, Jamestown, ND. 24pp.

Detmers, R. and K.V. Rosenberg. 2000. Partners in flight bird conservation plan for the southern New England physiographic area 09 (version 1.0). 51pp.

Herkert, J.R., R.E. Szafoni, V.M. Kleen, and J. E. Schwegman. 1993. Habitat establishment, enhancement and management for forest and grassland birds in Illinois. Division of Natural Heritage, Illinois Department of Conservation, Natural Heritage Publication #1, Springfield, IL. Northern Prairie Wildlife Research Center online. URL: <http://www.npwrc.usgs.gov/resource/birds/manbook/index.htm>

Jones, A.L. and P.D. Vickery. Undated, ca. 1997. Conserving grassland birds: Managing large grasslands. Massachusetts Audubon Society, Lincoln, MA. 17pp.

Northeast Upland Habitat Technical Committee. 2006. Managing grasslands, shrublands, and young forest habitats for wildlife – a guide for the northeast. 104pp.

USDA NRCS WHMI and WHC. 1999. Grassland birds. Fish and wildlife habitat management leaflet no. 8. 12 pp. URL: <http://www.whmi.nrcs.usda.gov/technical/leaflet.htm>