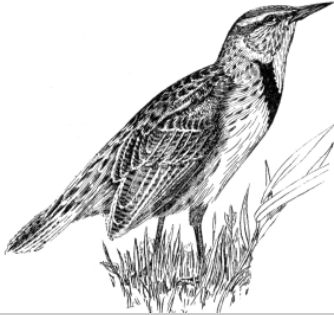


# Establishing and Managing Grasslands Naturally

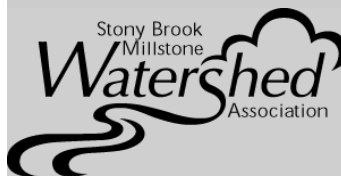


2007



## Why Grasslands Stewardship?

- Grasslands are an increasingly rare habitat in New Jersey.
- They support many threatened and endangered species, especially birds.
- Establishing and managing grasslands is essential for their conservation.



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[www.thewatershed.org](http://www.thewatershed.org)  
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## What Are Grasslands ?

### Grasslands....

- ... are open areas free of most trees and shrubs, dominated by grasses. They often also have wildflowers and other herbaceous (leafy) plants
- ... require regular disturbance to maintain this mix of plants and stop "succession" by woody plants. Without disturbance, grasslands turn into forests.
- ... include meadows, prairies, hayfields, pastures and airfields. Native grasslands, though, are just meadows of "warm-season" grasses.
- ... have declined precipitously from historical levels in New Jersey. Changing agricultural practices, increased development, and suppression of fire, flood and beavers have virtually eliminated grasslands from the landscape.

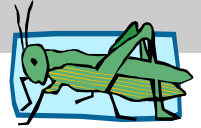
## Why Are Grasslands Important ?

1. **Grasslands support vulnerable wildlife.** Only 5% of New Jersey's land mass is grasslands, yet 41% of the state's endangered birds (and 29% of the threatened birds) are grasslands species. Grasslands provide food and nesting areas for birds as well as habitat for insects and small mammals. Bees, butterflies and other pollinating insects, many of which are declining in population, thrive in wildflower meadows.
2. **Grasslands promote groundwater recharge and protect water quality.** Large open vegetated areas allow stormwater to soak into the ground in contrast to paved and built areas that cause stormwater runoff. Native grasses have deep roots that help prevent erosion and sedimentation of waterways. Grassland plants and soils filter out pollutants, helping to keep waterways clean.
3. **Grasslands provide open space for people to enjoy.** The unique qualities of a grassland – the expansive view of the open sky, the unfiltered light and perfumed air, the shooshing of the wind in tall grass, the music of birds and insects – offer special opportunities for relaxation, contemplation, nature observation, and ecotourism.

## Why Avoid Chemical Herbicides and Pesticides?

The conventional approach to grasslands restoration includes the use of chemical herbicides and/or pesticides. But these contribute to nonpoint source pollution in waterways and in some cases are potentially toxic to the flora and fauna we are trying to support. Using mechanical disturbance and an ecosystem approach to establishing and managing grasslands is a viable alternative.

# Grasslands Stewardship: the Natural Way



## *1. Before beginning*

There are many decisions to make and factors to consider before starting a grasslands restoration. The most fundamental is to determine your **conservation objective**. Which grassland birds can/should you seek to support? The habitat you will create depends primarily on the site's acreage. Grassland birds' habitat size requirements vary considerably; the minimum would be 5-10 acres, but some birds need 150 acres or more. They also vary in their tolerance for woody plants, and preference for short/medium/tall grasses. Birds live in landscapes, not between property lines. Consider adjacent, connected or nearby grasslands in determining your goals and assessing your site. Work cooperatively with other grassland stewards for regional goals.

Then, evaluate your site's **physical characteristics**. Is it suitable for restoration? What needs to be done to achieve the habitat objective? Soils, Drainage and Topography : Is it well-drained? Is it level, sloping or undulating? Is it prone to flooding? Soil type? (Soil type affects not only vegetation suitability but also the relative difficulty you will have in working it.) Field conditions: Vegetation? (Cool-season grasses? Invasive plants? Trees/shrubs?) Prior herbicide/pesticide use?

Finally, assess your **resource needs and availability**. Accessibility: Can you get your equipment into the field? Equipment: (Do you own? Can you borrow or rent?) You will need: *Tractor* (60-70 hp is the minimum needed to carry out the site practices); *brush hog*; *heavy cutting disc*; *cultipacker*; *fine disk or disk harrow*; *drill seeder*. Manpower: allow two acres/hour for any site task; a 20-acre field = 10 person-hours. Time varies with equipment size and site roughness.

## *2. Site Preparation*

### **Site Preparation Principles**

Restoring a native warm-season grassland means planting the native warm-season grasses that grassland birds prefer (although agricultural lands may be managed for grassland birds) by removing existing non-native cool-season grasses from the site and/or ensuring that they do not invade from nearby areas. There are **two objectives** to site preparation for planting warm-season grasses. 1) to **reduce competition** from cool-season grasses (and other undesired vegetation); 2.) to **promote favorable conditions** for warm-season grasses.



The conventional way to **reduce competition** from undesired vegetation is by poisoning the plants with herbicides. The *natural way* is to use "**mechanical disturbance**": bash them up, cut them, starve them, and damage their root systems....repeatedly!

Both types of grasses require full sun but otherwise their **optimal site conditions** differ : **Warm-season grasses**: need warm (50°F) soil to germinate (May-June in central New Jersey), and for **optimal growth need temperatures of at least 85°F (Summer)**. They are very efficient Nitrogen & Potassium users so can thrive under stressful conditions and in **nutrient-poor soil**.

**Cool-season grasses**: optimal growth is under **cool, moist** conditions: spring and fall. They go dormant in hot summer months, and are heavy feeders (so need **rich soil** or fertilizers).



### **Site preparation practices:**

**Brush removal:** Use a brush hog if there is substantial woody growth (a forest cutter for anything over two inches in caliper). Disking is sufficient if there is not too much woody vegetation.

**Shallow cultivation:** Beginning as early as the soil can be worked in the spring, use a heavy disk to disturb only the top several inches. The goal is to avoid dredging up weed seed. Disturb just enough to compromise the weed root systems and tops. Continue shallow cultivation at two-week intervals throughout the growing season. Subsequent disking can be with lighter equipment such as a disk harrow or cultipacker to smooth and firm the surface.

**Plant a “nutrient-sponge”:** sow an annual crop such as corn, or small grain such as oats, to reduce the productivity of the soil and give cover to protect against winter soil loss. If planting later in the season, you will want to consider planting cereal or winter rye at 1-2 lbs per acre.

**Resume shallow cultivation** the following spring, up until planting: mid May-mid June.

**Do not use pesticides:** Pesticides harm the insects that grassland birds depend on.

### **3. Seeding**

**What to Plant.** The best species are those in grasslands near your site, if any; otherwise, from plants native to the region and appropriate for the site’s soils, hydrology and topography. The Natural Resources Conservation Service (NRCS) can assist in selecting plants, identifying seed purveyors and suggesting planting rates. Use seed as local as you can find (and afford); collecting seeds in enough volume in a pure form is problematic. A mix of wet/dry seeds may be appropriate. Plant different heights and species in a “mosaic” to create a complex habitat, promoting wildlife diversity.

**Determining rate:** Sow 8-12 lbs/acre. Seeds vary in their innate purity and germination rate. Purchase seed volume based on Pure Live Seed (PLS), discounting material that is not seed and seeds that won’t germinate. E.g., seeding with a 40 lb bag with 75%PLS at the rate of 4 lbs per acre is really at 3 lbs of pure live seed/acre. **Equipment:** Warm-season grass seeds are fluffy: gravity alone doesn’t get them into the soil. You must use a drill seeder. It deposits the seeds into the soil at the right depth and ensures soil-seed contact. Timing: plant in late spring so soil is warm enough to encourage germination.

### **4. Maintenance**

**Initial:** To give the warm-season grasses an advantage, mow the first year after planting. Mow in early spring, as the cool-season grass seeds begin to germinate and flourish. Mow close since warm-season grasses have not germinated yet. As spring progresses, maintain a mowed height of 8”-10” until the warm-season grasses begin to show evidence of growth.

**Long-term:** Warm-season grasses are **slow to establish**. The first 2-3 years, the plants establish roots. Be patient! Once established, in order to stay in the early-successional state, grasslands need regular disturbance by **burning, mowing, and/or grazing** in late winter or early spring Use rotational management (e.g. disturb a different 1/3 every year) to create a mosaic of diverse habitats and protect insects.

**Burning:** This is a preferred option: it gets rid of plant litter that can shade emerging plants; warms the soil; if done late enough in the spring, can destroy the first flush of weed growth (and birds can establish new nests if early ones are destroyed); saves fossil fuels. Check municipal regulations (some towns prohibit burns). New Jersey requires burns to be overseen and carried out by the US Forest Service. Determine, also, whether your insurance covers this practice.

**Mowing:** If weeds continue to be a problem then continue the initial regimen until a good stand of warm-season grasses has become established. After establishment, mowing may be done in a rotational fashion.

**Grazing:** Grazers’ activities foster a diverse mosaic pattern. Light grazing is beneficial, although heavy grazing may decrease plant diversity and cover, and many grazing livestock prefer cool-season grasses. Light grazing is generally compatible with nesting birds’ needs.



## Additional Resources on Grasslands Restoration



Resources for More  
Grasslands Information

### Technical assistance

**Natural Resources Conservation Service** can provide assistance on every phase of the restoration project, including site assessment, funding, seed selection and sources; equipment selection and management regimens. To find a service center in your area, see [offices.sc.egov.usda.gov/locator/app](http://offices.sc.egov.usda.gov/locator/app).

Information on funding available in New Jersey under the Farm Bill (including funding for grassland bird conservation projects and pollinator habitat conservation projects) may be found at [www.nj.nrcs.usda.gov/programs/](http://www.nj.nrcs.usda.gov/programs/).

### Selected bibliography on grassland bird conservation

**Grassland birds: an overview of threats and recommended management strategies**, Vickery, P.D., J.R. Herkert, F.L. Knopf, J. Ruth, and C.E. Keller, U. S. Geological Survey, Fort Collins Science Center, 2000. [www.birds.cornell.edu/pifcapemay/vickery.htm](http://www.birds.cornell.edu/pifcapemay/vickery.htm)

**Grassland Birds**, NRCS, US Fish & Wildlife Habitat Management Leaflet No. 8, 1999. Provides detailed habitat management information. [www.mn.nrcs.usda.gov/technical/ecs/wild/gnb.pdf](http://www.mn.nrcs.usda.gov/technical/ecs/wild/gnb.pdf)

### Selected bibliography on grassland stewardship for wildlife conservation

(note that some of these resources may include information on conventional herbicide/pesticide use )

**Grassland Birds Conservation**, MassAudubon. Includes three publications on managing large, small and agricultural lands for grassland birds. [www.massaudubon.org/Birds\\_&\\_Beyond/grassland/index.php](http://www.massaudubon.org/Birds_&_Beyond/grassland/index.php)

**Prairie Establishment Guide**, Prairie Nursery. Information on grassland establishment including site preparation using cultivation. [www.prairienursery.com/howTo/guide/prairie\\_estab\\_guide.htm](http://www.prairienursery.com/howTo/guide/prairie_estab_guide.htm)

**Early Successional Habitat Development/Management (ACRE)**, NRCS Conservation Practice Standard (Code 647 ), 2002. Technical guidance on the use of mechanical disturbance to manage early successional habitat for wildlife. [efotg.nrcs.usda.gov/references/public/IA/N647\\_04-2002.pdf](http://efotg.nrcs.usda.gov/references/public/IA/N647_04-2002.pdf)

**Maintaining and Restoring Grasslands (Managing Grasslands, Shrublands and Young Forests for Wildlife: A Guide for the Northeast, Ch. 3)**, The Northeast Upland Habitat Technical Committee—Massachusetts Division of Fisheries & Wildlife. Principles and practices for managing grasslands in the Northeast (from Maine south to West Virginia). [www.wildlife.state.nh.us/Wildlife/Northeast\\_Hab\\_Mgt\\_Guide.htm](http://www.wildlife.state.nh.us/Wildlife/Northeast_Hab_Mgt_Guide.htm) and [www.wildlife.state.nh.us/Wildlife/Northeast\\_Mgt\\_Guide/](http://www.wildlife.state.nh.us/Wildlife/Northeast_Mgt_Guide/)

### **New Jersey Audubon**

Grasslands symposium, conservation and stewardship guidance, bird surveys  
[www.njaudubon.org/Conservation/Stewardship.html](http://www.njaudubon.org/Conservation/Stewardship.html)  
[www.njaudubon.org/Conservation/PDF/GrasslandsSym.pdf](http://www.njaudubon.org/Conservation/PDF/GrasslandsSym.pdf)

### **New Jersey Department of Environmental Protection, Div. Of Fish & Wildlife :**

Landowner assistance for grasslands conservation projects  
[www.state.nj.us/dep/fgw/artwhip06.htm](http://www.state.nj.us/dep/fgw/artwhip06.htm)

### **New Jersey Wildlife Action Plan**

<http://www.state.nj.us/dep/fgw/ensp/waphome.htm>

### **Pennsylvania Wildlife Action Plan—Grassland Habitats**

[www.pgc.state.pa.us/pgc/cwp/view.asp?a=496&q=166099](http://www.pgc.state.pa.us/pgc/cwp/view.asp?a=496&q=166099)

### **Raritan Piedmont Wildlife Habitat Partnership:**

#### **Grassland Conservation Plan**

[www.conservationresourcesinc.org/rpwhp.htm](http://www.conservationresourcesinc.org/rpwhp.htm)  
[www.njaudubon.org/Conservation/PDF/FinalRPWHPPlan\\_20060915.pdf](http://www.njaudubon.org/Conservation/PDF/FinalRPWHPPlan_20060915.pdf)

### **Society for Ecological Restoration**

[www.ser.org/](http://www.ser.org/)  
Also see *Ecological Restoration*, published by the Univ. of Wisconsin Arboretum  
[www.ecologicalrestoration.info](http://www.ecologicalrestoration.info)

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