

NATIVE GRASSLAND RESTORATION GUIDE

In BERMUDAGRASS & BAHIAGRASS SYSTEMS



[Note: Landowners should not employ these practices in lieu of working with trained and experienced professionals or without first developing a set of restoration management plans and management goals.]

I. ASSESSMENT AND PLANNING

Step 1. Define your short and long-term goals. Be specific.

Step 2. Collect baseline data

- a. Aerial imagery (<http://www.tnris.state.tx.us>), topographical maps, soil data, and local plant communities (<http://websoilsurvey.nrcs.usda.gov>).
- b. Vegetative coverage and plant diversity
 - i. Identify plant communities. See <http://www.hmrtexas.org> for plant identification specialists and literature on identifying plant species. Local resource specialist can also assist with plant and plant community identification.



Figure 1. Little bluestem. This is a key native warm-season bunch grass (wildlife cover) that was once wide spread throughout much of Texas and beyond. This species is now absent from much of its range.

- ii. Create permanent photo points – photos taken at the same point and same direction annually. Late winter (February-March) is a good time since this is the period when habitat is typically most deficient. (http://txspace.tamu.edu/bitstreamhandle/1969.1/87857/pdf_983.pdf?sequence=1).
- iii. **Walk vegetation transects—walk 145 foot transects, about 50 steps, with your arms spread to the side. Count each bunch grass that falls beneath your spread arms. Multiply this number by 100 to get an estimate of the number of bunch grasses per acre. The more transects you walk the more accurate your survey will be. Walk transects annually to assess changes over time.**



Figure 2. Annual photo points (same location/same direction) is a quick reference to identify herbaceous response to management activities.

- iv. Survey wildlife species of concern. (e.g. grassland birds) Breeding bird surveys (May-July) can be conducted to census quail and grassland birds simultaneously. Flush counts (November) and morning covey call counts (October) can be utilized where quail are present. See the following for more information on survey techniques:
<http://websoilsurvey.nrcs.usda.gov> – soil surveys containing site specific soil and plant data.
<http://agrillifebookstore.org> – publications on census techniques
<http://teamquail.tamu.edu> – census techniques
<http://www.pwrc.usgs.gov/BBS/> - Breeding bird surveys. Historic local and statewide survey data and survey technique.
<http://www.thayerbirding.com> – birding software (bird calls)
- v. Identify primary causes for habitat deficiency

Step 3. Consider the feasibility of achieving your goals in terms of resources and time.

Step 4. Use the above information to create a detailed restoration plan. See <http://www.hmrtexas.org> for organizations that can develop management plans and provide technical/financial assistance and other information.

II. NATIVE GRASSLAND RESTORATION TECHNIQUES

Action 1. **Deferment**--Postpone grazing, mowing/haying/tilling for one or more years (if identified as a key factor impacting management goals)

- a. Reasons for deferment
 - i. Better identify plant species by allowing seeds/plants to emerge and produce seed.
 - ii. Allow plants to reach proper maturity for herbicide application
 - iii. Create enough fuel for prescribed burn
- b. Reevaluate plant community following each growing season deferment to determine:
 - i. Area dominated by native grasses
 - ii. Area dominated by exotic grasses
 - iii. Area composed of a mixture of native and exotic grasses
 - iv. Area dominated by weeds.
 - v. Presence of invasive woody species

Action 2. **Natural Re-vegetation**—This is a management option to eliminate the need to plant when a good native seed bank exists. Other actions, such as prescribed burns or herbicide applications, are often required.



Figure 3. Natural re-vegetation of native grasses often occurs following grazing season deferments. Simple maintenance including periodic grazing, prescribed fire, or dormant season mowing can be utilized to revive native grasses.

Action 3. **Herbicide Application**--Apply herbicide for the specific situation. Herbicide is typically applied in late spring and follow-up treatments in late summer are often necessary.

- a. Area dominated by bermudagrass, bahiagrass or bermudagrass/bahiagrass combination.
 - i. Create a uniform herbaceous layer 4-6 inches tall by mowing, grazing, or utilizing a prescription burn to prepare for herbicide application.
 - ii. Apply 4 quarts of Glyphosate (RoundUp) with 41% active ingredient per acre in sandy soils. Increase the amount of herbicide to 5-6 quarts per acre in clay soils.
- b. Combination of Bermudagrass and native grasses.
 - i. **If natives emerge in bermudagrass pastures, discontinue fertilizer and weed control to allow natives to mature.**
 - ii. Allow natives to eventually outcompete exotics by utilizing partial growing season grazing and/or spot treatments of Glyphosate (utilize rates above)
 - iii. Alternative: Cut losses and follow the practices identified above (Step 3-a,i,ii)
- c. Combination of Bahiagrass and native grasses.
 - i. During the month of May, treat area with 0.3-0.4 ounces of Metsulfuron methyl (Cimarron) per acre (follow recommendations listed on the herbicide label). Do not treat during drought conditions. http://www2.dupont.com/Land_Management/en_US/assets/downloads/pdfs/Pasture_Rangeland/K-14592.pdf
 - ii. Cut losses and follow the practices identified above (Action 3. a,i,ii)
- d. Control competing weeds
 - i. Treat restored areas with Metsulfuron methyl (Cimarron) or 2-4-D to reduce competition with native grasses
 - ii. Only treat areas with mature (5 leaf stage) native grasses. Young grasses may be injured by herbicide applications.

Action 4. Seed bed preparation

- a. Areas being restored by broadcasting native seed or native seed hay, or areas that have been under an active crop production regime and have recently consisted of bare ground.
 - i. Disk thoroughly to bare ground.
 - ii. Smooth and pack seed bed before and after spreading/drilling seed.
 - iii. If cool-season annuals emerge following a warm-season herbicide application, reduce the height of cool-season annuals (graze or mow) to 4-6 inches and treat with 1 quart of Glyphosate per acre. Disk the area to bare ground or drill seed into the dead thatch.
- b. Areas where cover crops are needed to improve soil fertility/organic content or reduce the risk of erosion
 - i. Plant legumes or cereal crops (not cereal rye) in late fall or plant annuals, like soybeans, cowpeas, grain sorghum or forage sorghum, in early spring
 - ii. Multiple plantings over several seasons may be required depending on soil fertility
 - iii. Prior to planting native seed, graze or mow cover crop to 4-6 inches
 - iv. Treat invasives with herbicide (see Action items 3 and 4,a,iii) in spring prior to planting. Prepare seed bed for planting native seed (Action 4, a).

Action 5. Planting native grass and forbs

- a. Planting seed with a no-till drill (Required: native grass seed hopper and press wheels).
 - i. Drill native grass seed mixes at a minimum rate of 7-12lbs Pure Live Seed (pls) per acre (20-40 seeds per square foot). Higher rates per acre may be utilized.
 - ii. If the area was previously dominated by exotics plant directly into dead thatch or stubble in area previously treated by herbicide.
 - iii. Allow 1-3 years for natives to emerge



Figure 4. No-till seed drills with specialized hoppers for planting fluffy native grass seed such as this Truax allow for planting without necessarily having to prepare seed beds. Reducing soil disturbance reduces the risk of stimulating early successional invaders and invasive exotics plants.

- b. Spreading bales of native grass hay/forbs
 - i. Cut native hay while key native seed species are fully mature.
 - ii. Allow hay to cure prior to baling (do not windrow hay).
 - iii. Spread 40-50 square bales/acre of locally harvested hay evenly across prepared soil (bale buster expedites spreading process).
 - iv. Press hay into bare ground to create adequate seed-soil contact (cultipackers, rollers, or hoof action/cattle trampling)
- c. Broadcasting seed
 - i. Broadcast native seed at a rate of 15-20lbs (40-60 seeds per square foot) pls per acre.
 - ii. Press broadcasted seed to bare ground to create adequate seed-soil contact (cultipackers, rollers, or hoof action/cattle trampling)
- d. Timeframe - The best time to plant native seed can vary from year to year depending on environmental variables. Droughts and rainy periods are difficult to predict.
 - i. Avoid planting during historic growing season drought periods of July and August
 - ii. Successful plantings have taken place in fall (October), late winter (February-March), and early spring (April-May) time periods.
 - iii. Base planting on site specific requirements (financial constraints, biological constraints)
 - iv. Take as much time as possible to get it right the first time. Nothing is more valuable than proper planning and execution.



Figure 5. Bail busters help to expedite the spread of native grass hay. This process also adds beneficial humus to the soil adding to fertility and increasing the soil's potential to hold moisture.

Action 6. **Monitor activities.**

- a. Monitor vegetative response and key wildlife response to management activities.
- b. Continue to collect photo points and census wildlife annually to accurately assess response and declare success or failure based on baseline data and previously established management goals.



Figure 6. Native grasses mixed with bahiagrass. Natives will often emerge within fields dominated by exotic grasses following several growing season deferments. This type of response to deferment may lead to changes in management objectives

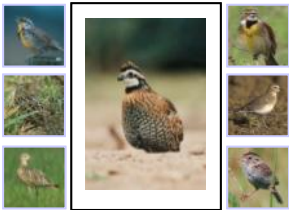


Figure 7. Several monitoring techniques exist for monitoring bobwhite quail. Breeding bird surveys (spring whistle county) can be utilized to monitor a number of grassland species. This is beneficial in areas where quail numbers are limited to the extent and monitoring is not feasible.

NOTES: Native grassland restoration is a long process (1-3 years) that requires PATIENCE on the part of the land manager. A lack of patience is a quick path to failure. Once the grassland is restored, proper maintenance of the restored area is required. Managers should define tiers of success as a part of their short and long-term goals and define management activities to maintain the restored site.

Re-establishing native grasses requires an adaptive management style. Pronounced changes brought upon by deferments and herbicide treatments require more frequent actions. Finally, managers must adapt to constantly changing techniques brought about by technology and research.

Web Links:

- <http://www.hmrtexas.org> – one stop shop for natural resource links
- <http://www.tnris.state.tx.us> – imagery, topographic maps, and other base map information.
- <http://websoilsurvey.nrcs.usda.gov> – soil surveys provide site specific soil and plant data.
- <http://agriflifebookstore.org> – publications on census techniques
- <http://teamquail.tamu.edu> – census techniques
- <http://www.pwrc.usgs.gov/BBS/> - Local and statewide surveys data (baseline).
- <http://www.thayerbirding.com> – birding software (bird calls)
- http://txspace.tamu.edu/bitstream/handle/1969.1/87857/pdf_983.pdf?sequence=1—Photo points
- http://www2.dupont.com/Land_Management/en_US/assets/downloads/pdfs/Pasture_Rangeland/K14592.pdf— Cimarron Plus applications and rates