

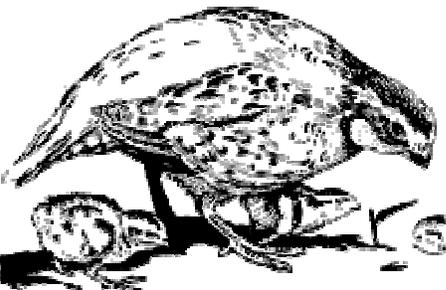
2007 Society for Range Management

&

Tall Timbers Research Station & Land
Conservancy

Field Day Information Packet

Thanks for your participation!



Northern Bobwhite Research Highlights

James A. Martin

The following results originate from 4 years of research on numerous private and public properties throughout south-central Florida. This research is still in progress and these results are preliminary, but they do show some relationships between habitat conditions, management, habitat types and bobwhite abundance. In the future we will provide a more in-depth analysis regarding how bobwhite populations respond to various other types of management scenarios.

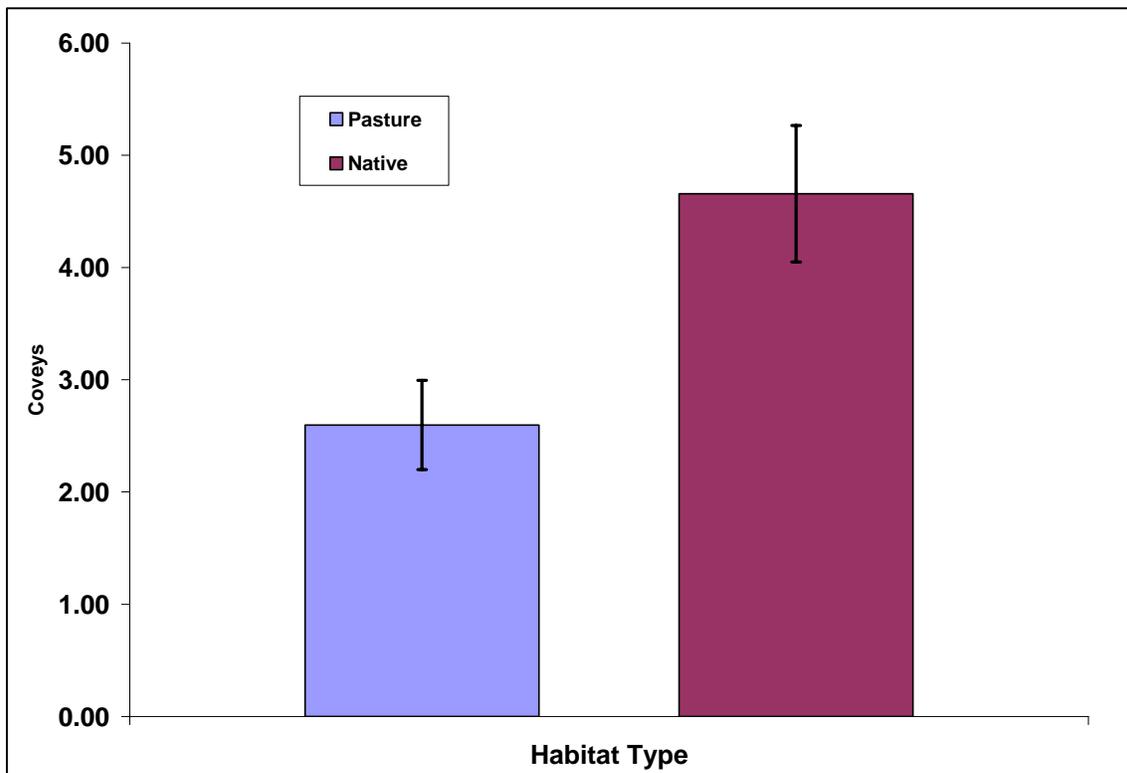


Figure 1. Difference in bobwhite abundance between native habitats and pastureland.

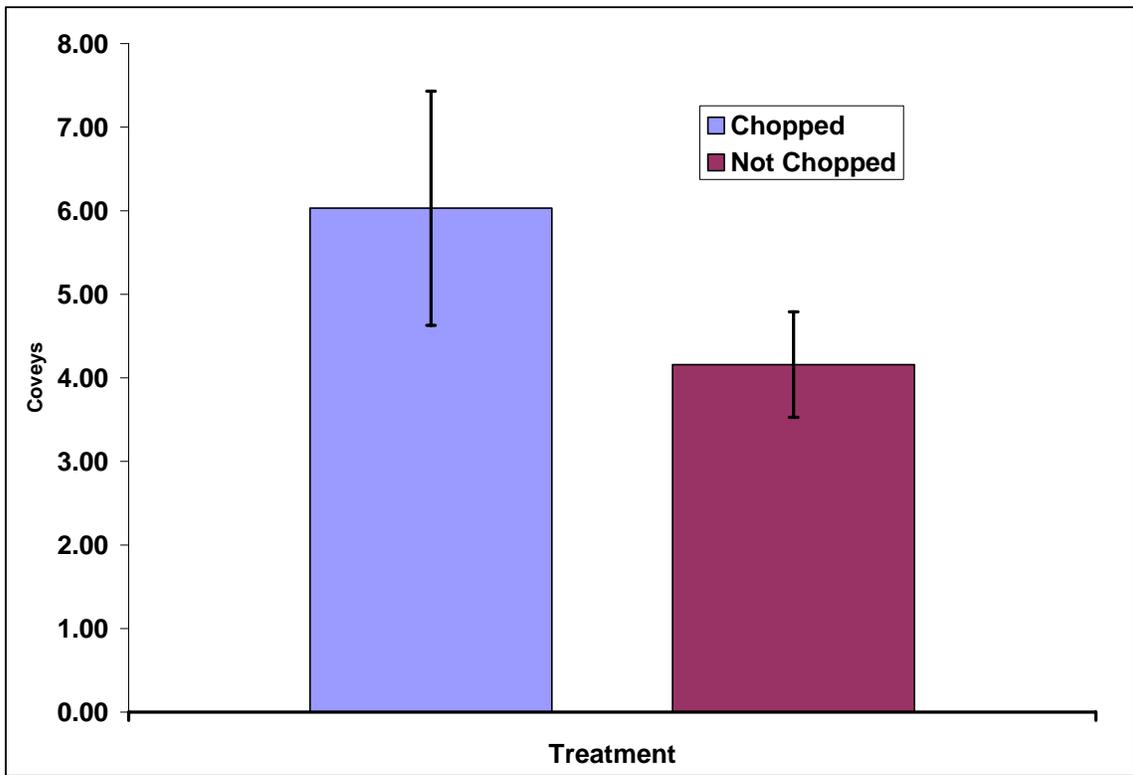


Figure 2. Difference in relative abundance between sites that were roller-chopped and not roller-chopped.

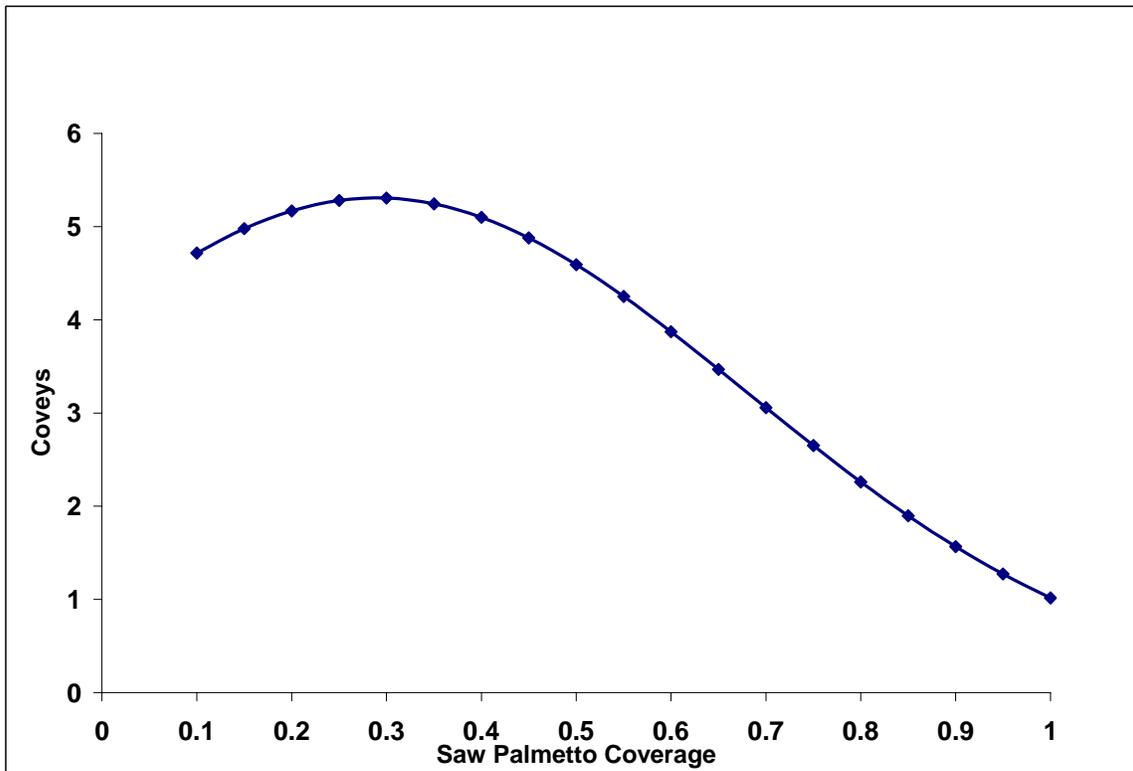


Figure 3. Relationship between bobwhite relative abundance and saw palmetto coverage.

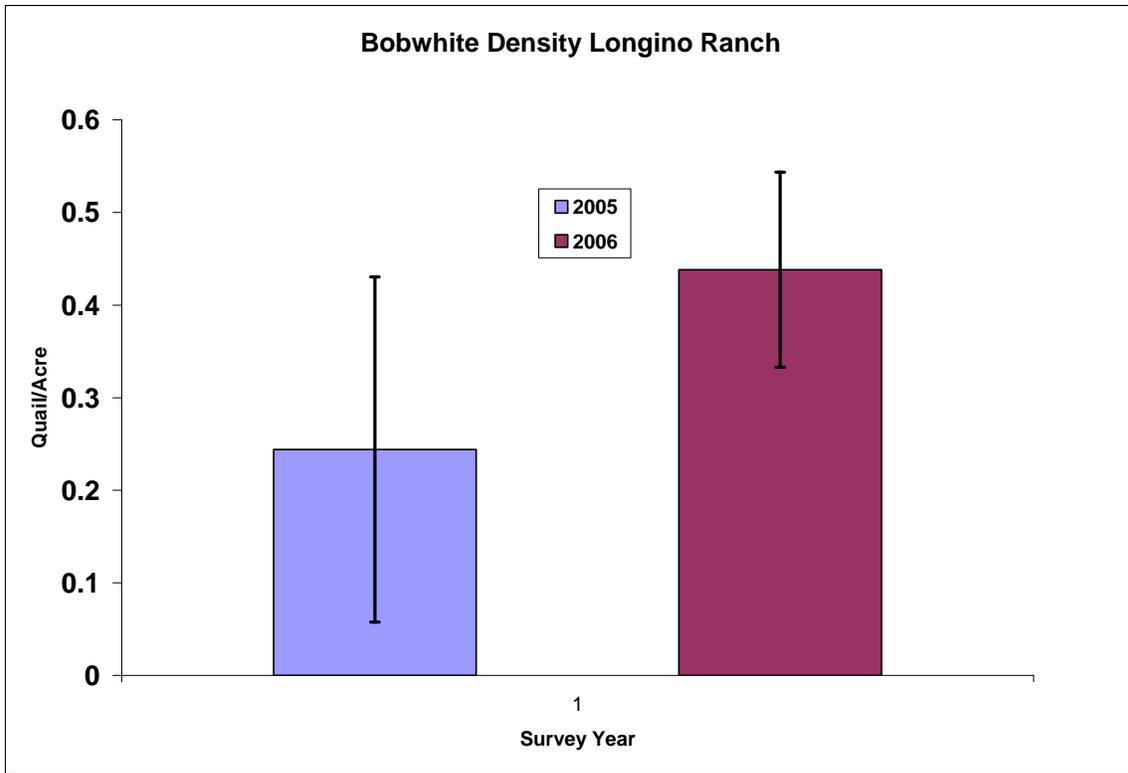


Figure 4. Example of bobwhite density increase from a south Florida ranch using EQIP management practices.

The following tables are results from a study we conducted using radio-tagged bobwhites. We analyzed bobwhite habitat use across the 2x4 Ranch. The habitats were ranked by their preference shown by bobwhites (e.g. a rank of 1 is the most preferred habitat).

Table 1. Simplified ranking matrix^a comparing the proportional habitat use within 100% MCP home ranges with proportions of total available habitat types for 2x4 Ranch, 2004 & 2005.

Habitat type	Habitat type								Rank ^b
	Fallow	Improved Pasture	Other	Semi-improved	Un-improved	Wet Area	Woody	Young Grove	
Fallow	.	+++	+++	+++	+	+++	+++	+++	1
Improved Pasture	---	.	-	-	---	---	+++	-	7
Other	---	+	.	-	---	---	+++	+	5
Semi-improved	---	+	+	.	---	-	+++	+	4
Un-improved	--	+++	+++	+++	.	+	+++	+++	2
Wet Area	---	+++	+++	+	-	.	+++	+++	3
Woody	---	---	---	---	---	---	.	---	8
Young Grove	---	+	-	-	---	---	+++	.	6

Table 2. Simplified ranking matrix^a comparing the proportions of radio locations for each bird in each habitat type with the birds 100% minimum convex polygon home range for 2004 & 2005.

Habitat type	Habitat type						Rank
	Fallow	Improved Pasture	Semi-improved	Un-improved	Wet Area	Young Grove	
Fallow	.	+++	+++	+++	+++	+++	1
Improved Pasture	---	.	-	-	+++	-	5
Semi-improved	---	+	.	-	+++	---	4
Un-improved	---	+	+	.	+++	-	3
Wet Area	---	---	---	---	.	---	6
Young Grove	---	+	+++	+	+++	.	2

A Brief Guide to Bobwhite Quail Management for South Florida

- 1) Define your management objectives:
 - a) Objectives will be constrained by financial and logistical factors
 - b) The habitats present on a property will affect management options
 - c) Be realistic in what you can accomplish and the results you expect

- 2) Bobwhite management on pastureland is possible but difficult
 - a) Managing in these habitats require the creation of edge and fallow type areas such as fencerows that offer refuge for bobwhites
 - b) Bobwhites use large expansive pastures sparingly, rarely moving away from ditch banks and pasture edges
 - c) Creation of brooding areas consisting of weedy plant species would be beneficial
 - d) Rotation or deferment type grazing is best for bobwhites in pastures

- 3) Dry prairie and Flatwoods are the most suitable quail habitats
 - a) These habitats are maintained by frequent burning
 - i) A 2-3 year frequency is recommended on most sites but will depend on soils and cattle grazing
 - ii) Cattle grazing may extend fire frequency intervals longer than optimal for bobwhites
 - iii) Season of burning can have large ramifications for plant communities in the long term
 - iv) Varying season of burn on native habitats will be beneficial for bobwhite populations
 - v) In certain situations, where saw palmetto coverage has exceeded >50%, roller chopping may become a feasible short-term tool
 - vi) However, roller chopping should be applied with caution especially in periods of low soil moisture

- 4) Common misconceptions regarding bobwhite management in south Florida
 - i) Seasonal discing is not a viable management option because most weedy species do not respond favorably to deep soil disturbance
 - ii) Releasing pen-reared bobwhites is not a viable population recovery tactic, most sites in this region have high enough baseline populations to build upon

Bobwhite habitat management requires long term commitment and maintenance of favorable conditions. Even under good habitat conditions populations fluctuate annually, but recover with sustained management. Habitat management has proven to work in south Florida with several properties showing increased population numbers by 50% or more in a matter of 2 years.

Grassland Songbird Research Highlights

Adam B. Butler

The following figures represent highlights from 2 years of research on resident and migrant birds that utilize native rangeland in south Florida. We focused on 4 species, two of which were residents – Bachman’s sparrow and Eastern meadowlark, and two were migrants that utilize south Florida as wintering grounds – grasshopper sparrow and sedge wren. Similar to bobwhites, all of these species have exhibited steep population declines over the last fifty years, both nationally and within southern Florida.

We found that generally, management for bobwhites promotes quality habitat for these species. Both of the residents responded negatively to high levels of palmetto coverage (Figure 1). Bird response to management activities, such as burning and chopping, varied by species (Figure 2). Bachman’s sparrows responded favorably to management activities, while Eastern meadowlark response seemed negligible. Many of the migrant, over-wintering grassland birds, such as grasshopper sparrow, showed stronger response to management activities than did the resident species. Migrant grasshopper sparrows seemed highly dependent on burned areas (Figure 3). Sedge wrens were most abundant in areas with thick coverage of bunch grasses.

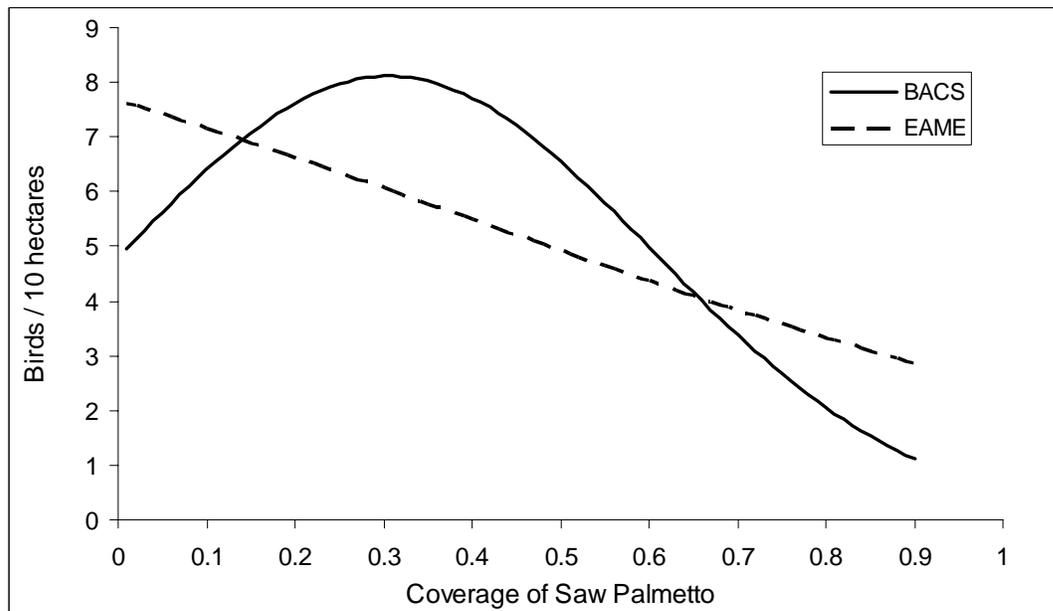


Figure 1. Predicted response of Bachman’s sparrow and Eastern meadowlark to increases in coverage by saw palmetto.

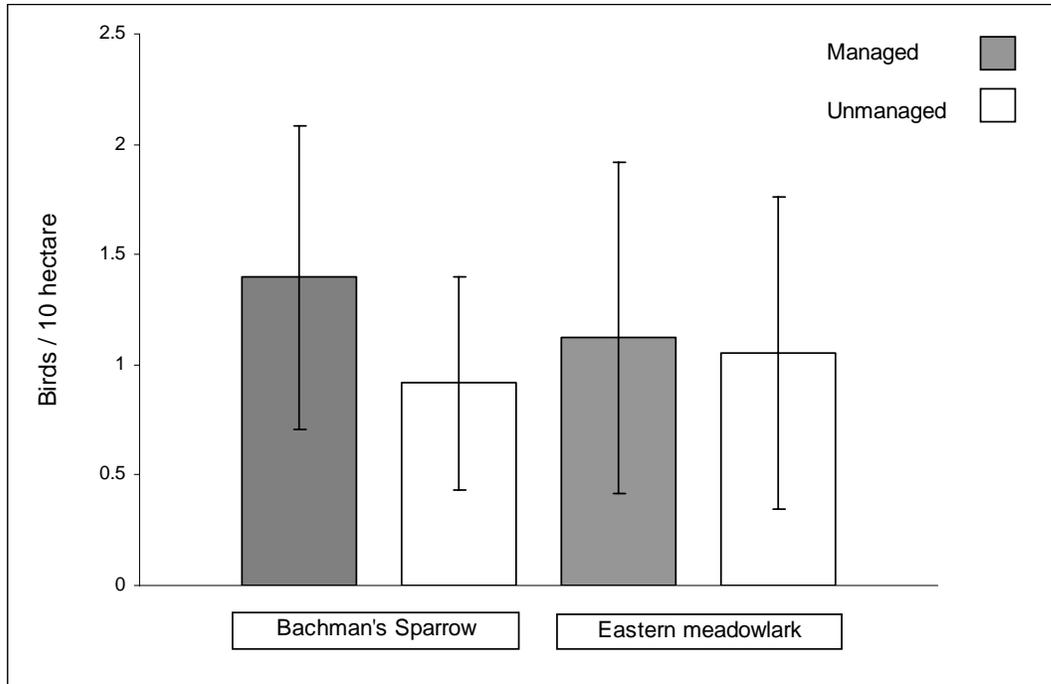


Figure 2. Density of Bachman's sparrows and Eastern meadowlarks in areas that had been burned and/or chopped within the previous 2 years, and areas that had received neither burning nor chopping within the previous 2 years.

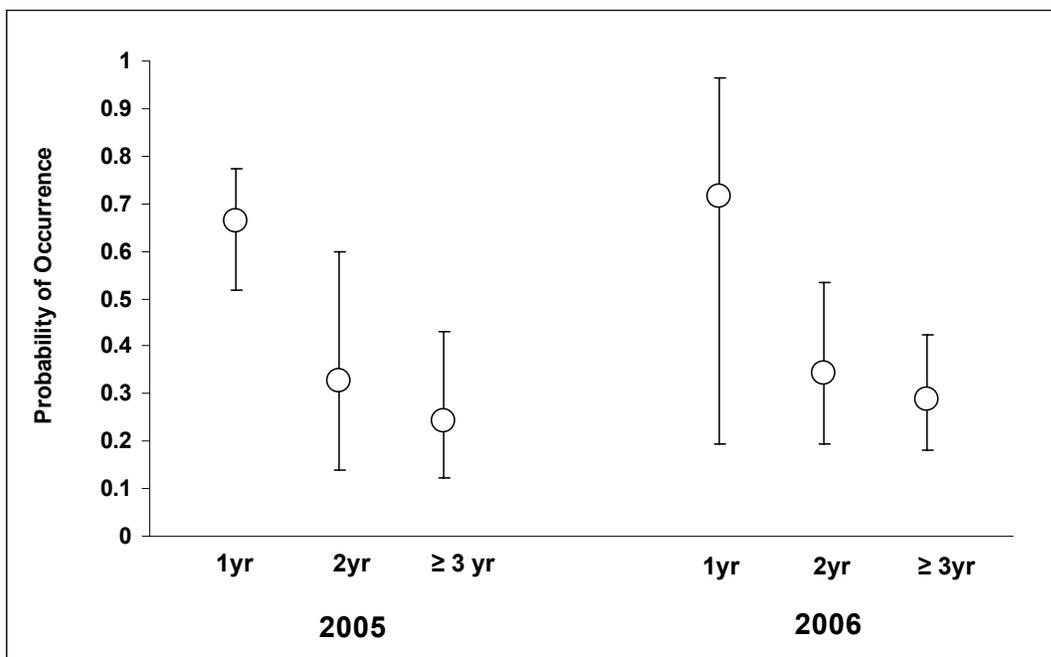


Figure 3. Probability of encountering over-wintering grasshopper sparrows on transects within three different aged burns.



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Direct Seeding Native Groundcover and Upland Restoration

We have been restoring ecosystems including scrub, sandhill, flatwoods, seepage slopes, and wet prairies since 1985 and have seeded sites from 5 acres to 400 acres since 1994. Our services include consultation, site preparation, seed harvesting, direct seeding, planting, and maintenance.



Palmetto, grasses, and silver-leaved aster in fall several years after seeding



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Seeding Native Groundcover as an Alternative to Sod

Florida's natural upland communities have groundcovers that are a mix of many bunch grasses, sedges, and wildflowers. These native groundcovers can serve as natural open space in public areas as an alternative to sod. They can also help to tie together the remaining wetland areas of a development, golf course, or corporate buildings to the rest of the landscape and bring the human community in closer relationship to the natural community.

Although prairie mixes have been seeded in the Midwest and West for several decades, we did not know that wiregrass, the primary grass in our uplands, produced viable seed until grasses were burned during the growing season in the Southeast. The Natives, Inc. produced some of the first seedlings in 1989 and have been investigating techniques for seeding wiregrass and other grasses, sedges, and wildflowers ever since. In addition to developing harvesting and seeding techniques, we have also investigated ways to prepare seeding sites and to maintain them after seeding to reduce weeds and non-native aggressive species.

With these years of experience we can offer services from consulting or guiding your processes to enacting every phase of establishment including site preparation, seed harvest, seeding, and maintenance.



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Description of Techniques for Seeding Native Groundcover

Site Preparation

The objective of the site preparation is to eliminate all existing exotic vegetation and to prepare the site to a seedbed ready condition. Much of the seedbank may persist which may include many native species and exotic species. It is necessary to start this work by no later than late spring or early summer on sites with existing sod. If the site is very wet in the summer or has much torpedo, bermuda, or cogon grass it is very important to start site preparation the fall before seeding in order to have a successful project.

The grass layer and other vegetation should be at a low and uniform height for good contact with herbicide. The site is mown at a 7-10 inch height, or, it is mown shorter and time is allowed for regrowth if it is too tall.

The site is then herbicided with a broadcast application of glyphosate over all areas. Boom sprays are used in larger areas and a single nozzle spray is used along edges if necessary.

The site is then checked for vegetation that needs to be resprayed and touch-up applications are applied as needed. Areas that have a cover of torpedo grass (*Panicum repens*) or Bermuda grass (*Cynodon dactylon*) which need a more intense site preparation are sprayed several times at a higher rate and are not disked until they are well controlled.

The site is then disked with a deep disk, and followed by shallower disking as needed to reduce vegetative matter until the site is seedbed ready. Rolling with a water-filled roller to level and firm the soil follows the last disking. This will also help retain moisture in the soil. Wetter areas may not be disked as frequently or rolled. Touch up applications of herbicide is applied as needed, but not closer than one month before seeding.

In drier areas, there is a possibility of bahia grass reseeding, especially if the area has not been mown or grazed and seed heads have been allowed to mature. We then finish disking and rolling in August, allow the bahia and other seeds to germinate, and herbicide one month before seeding.

Seed Collection and Seeding

Three different methods for harvesting and three methods for seeding may be used and are described below.

Native seed is harvested from a donor site that was prepared by a late spring-early summer burning. Arrangements for a donor site need to be made early enough so that it can have a growing season burn to encourage seed production by wiregrass and other associated species. The donor sites are central Florida flatwoods or dry prairie habitats that have a healthy and diverse grass, sedge, and wildflower component.

Hand Collection Several visits are made to the donor site before and during mechanical harvesting begins to hand collect species that ripen earlier and/or are shorter than the harvesting level. Key species include but are not limited to lopsided indiagrass (*Sorghastrum secundum*), beaked panicum (*Panicum anceps*), Elliott's lovegrass (*Eragrostis elliottii*), coastal lovegrass (*Eragrostis virginica*) and forbs such as tickseed (*Coreopsis leavenworthii*). Some wet prairie species are added to supplement seeding on wet edges. Descriptions of seed mixes for various zones are described under "Native Seed Mixes". All hand collected seed is kept dried and/or stored until site seeding begins.

The key species for collection in these systems is wiregrass (*Aristida stricta*), and it has a very narrow optimal harvest window, which usually begins around November 10 and may run as late as December 10. Any unusual weather events can shorten this window on either end, so the site is monitored for seed readiness as well as potential seed germination beginning in late October.

Green Silage Cutter Mechanical harvesting is done with a green silage cutter with 17 foot wide cutting blades. The harvester cuts material at heights that can be raised and lowered during operation to get a maximum of seed with as little chaff as possible. Usually material above 16-18 inches high is harvested. The material is then collected by screw, slightly chopped, and blown into the attached wagon. When the wagon is full, it is disconnected from the harvester and attached to a truck cab for transport to the seeding site. Another wagon is attached to the harvester for continuous operation.

The seed is hauled to the site by the truck cabs and dumped on the harvest site. Since green material is usually present in the chaff there is a danger that the seed and chaff could overheat if left in a high pile, so the seed is spread by a front end loader and pitch forked if necessary to a depth of about 12 inches until that load is broadcast on the site. Material is seeded within a few days of harvest.

Prior to seeding, all hand collected seed is weighed, and measured out into bag lots to accommodate one load each of seeding mix which covers approximately one acre. Each bag lot is formulated to include species that are appropriate for a specific wetness zone.

Modified Sod Sprigger Seeder The seeding machine for material harvested with the green silage cutter is a modified sod sprigger that has been used on similar seeding projects. The sod sprigger consists of a wagon with a moving bed that pushes the material forward into rotating prongs that pull the seeding material over an opening in the bottom of the wagon. Positioned in front of the sod sprigger is a cultipacker that creates elongated shallow dibbles in the soil for the seed to fall into, and behind the sprigger are culters and rollers for covering the seed and firming the ground. A front-end loader will load the material onto the wagon of the modified sod sprigger and additional bagged hand-collected seed will be scattered over the wagon load.

Flail Vac Harvester The alternate harvesting method is the Flail Vac harvester that harvests by brushing mature seed into a collecting bin. This is used for collecting lopsided indiagrass seed, and may be used in the general harvest as well.

Seed collected with a Flail Vac can be dried and stored for a short period of time, but is seeded as early as possible to take advantage of optimal germination times for many aster and buckwheat species and the lower drying potential in winter.

Grasslander Seeder Seed may also be sown using a Grasslander seeder that is able to seed fluffy and chaffy seed.

Hydromulch Seeding Areas with a slope greater than 4 to 1 will probably need to be seeded with a hydro-mulching system.

Seed mixes are tailored to the zones on the site according to the predicted moisture levels.

Seeding Timeline Seeding events are usually timed from mid November to the end of January for best results. During this time period the frequent cold fronts are often preceded by light rains that keep the soil surface moist and evaporation is low. Many seed can germinate and establish before the spring drought period between March and June. It is also the time that many species, especially in the aster and buckwheat families, will germinate. Seed that is sown later is not likely to germinate at all and diversity is lost. Many grasses and sedges will germinate later but should be supported with an irrigation system until the rainy season begins. We are able to arrange for cold storage of seed collected the previous season and seed it the following fall, beginning as early as October.

If sites are prepared during construction when it is not a suitable time to seed, they can be seeded with a temporary grass cover such as brown-top millet to prevent erosion and weed establishment. The cover crop is then disked in before seeding begins.

Maintenance

Following the direct-seeding of the site, we evaluate progress, germination of seed, and make recommendations for maintenance procedures and exotic species control.

Bermuda and torpedo grass are exceptionally difficult to eradicate, even with extra intensive site preparation. Both species have a very deep rhizome system with a relatively large biomass. They also spread very rapidly and can cover large areas in a short time and out-compete the seeded native species. It usually takes several years of very active management. Spot spraying these species on a continuing basis as they continue to re-emerge is the best control available so far.

On some sites dogfennel (*Eupatorium capillifolium*), which is a native perennial pioneering species, emerges in large numbers. Though most other species can germinate with dogfennel, its rapid growth and large size may cause it to out-compete other more desirable species. Although after 3 or 4 years, dogfennel begins to die off or be reduced in size, on public sites, it may be necessary to control it the first year by herbicide.

If bahia grass or natal grass should germinate from seed, or otherwise need further control, the areas where it occurs may be over-sprayed with imazapic at a rate that will not be detrimental to the co-existing native species. This is done in the late spring or early summer following seeding.

The species causing the most interference with good development are grasses such as bahia grass, bermuda grass, torpedo grass, natal grass, and cogon grass. They also spread rapidly and persist even with good competition. Good site preparation helps to eliminate these problem species.

Some weedy species may be prevalent the first few years. Though they will disappear with good competition, their presence could make the area unsightly during this time. Occasional mowing will make the site more attractive. The periods of bloom and seeding by native species are considered when determining the timing and frequency of mowing.

The native seed is slow to develop and establish good cover. The first several months most of the green may be seedlings from the seed bank. The wetter the site, the more quickly the site is covered in green, and the fewer the weed seeds in the soil seedbank or other remaining vegetation, the more quickly the site establishes with native grasses and wildflowers.

Timeline for Direct Seeding Upland Groundcover

May yr 1-Jul yr. 1	Burn donor site
May-Nov yr. 1	Hand-collect species for each seeding zone
May-Nov yr. 1	Prepare seeding site with necessary steps as each site requires: herbicide, disk, and roll. May need to begin site preparation the fall before if many problem species are present
Mid-Nov to end Jan yr 2	Seed harvesting, preparing, transporting and seeding. Seeding can occur as early as October if seed is harvested and put in cold storage the previous year. It may also be seeded as late as the end of March if irrigation is available, but there will be some loss of diversity, especially of some of the wildflowers that only germinate in the winter. See notes above.
Jan yr 2- Jan yr 7	Monitor for maintenance needs and perform maintenance which may include herbicide applications and timely mowing
May yr 3+ - Jul yr 3+	Prescribe burn seeded areas when site is able to carry a fire if the site is in an area where fire is permitted, otherwise maintain by timely mowing



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Native seed mixes

Each year we harvest many species of native seed with mechanical harvesters called Flail Vacs and add additional hand collected species to create mixes for general sales as the seed is available.

The seed mixes cost approximately \$650 for enough mix to seed one acre. This is wild harvested seed and does not have a germination or purity test. The costs also vary according to the harvest year.

The seed from the Flail Vac and hand harvest can be sown using a Grasslander seeder that is able to seed fluffy and chaffy seed or it can be blown with a hay blower and rolled. Most other seeding machines do not work with this seed mix.

The seeding rate should be 50 seed or more per square foot.

Seed mixes should be tailored to the zones on the site according to the predicted moisture levels. In addition to the mixes listed below, we can also hand collect additional wet prairie species to add to the wettest mix described below.

The wettest mixes can include the following species as well as any other appropriate species collected in the flatwoods, dry prairie, or wet prairie:

SCIENTIFIC NAME	COMMON NAME
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	Chalky bluestem
<i>Andropogon glomeratus</i>	Bluestem
<i>Andropogon virginicus</i>	Bluestem
<i>Andropogon virginicus</i> var. <i>glauca</i>	Chalky bluestem
<i>Aristida stricta</i>	Wiregrass
<i>Coreopsis floridana</i>	Florida tickseed
<i>Coreopsis leavenworthii</i>	Leavenworth's tickseed
<i>Eragrostis elliotti</i>	Elliott's lovegrass
<i>Helianthus angustifolius</i>	Swamp sunflower
<i>Helianthus radula</i>	Rayless sunflower
<i>Liatris spicata</i>	Dense blazing star

<i>Panicum anceps</i>	Beaked panicum
<i>Panicum longifolium</i>	Panicgrass
<i>Panicum rigidulum</i>	Redtop panicum
<i>Rhexia spp.</i>	Meadow beauty
<i>Rhynchospora spp.</i>	Beaksedges
<i>Rudbeckia hirta</i>	Black-eyed susan
<i>Saccharum giganteum</i>	Giant plume grass
<i>Solidago fistulosa</i>	Pinebarren goldenrod
<i>Xyris sp.</i>	Yellow-eyed grass

The mesic seed mixes can include the following species as well as any other appropriate species collected in the flatwoods or dry prairie:

SCIENTIFIC NAME	COMMON NAME
<i>Andropogon brachystachyus</i>	Short-spike bluestem
<i>Andropogon glomeratus</i>	Bluestem
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	Chalky bluestem
<i>Andropogon ternarius</i>	Splitbeard bluestem
<i>Andropogon virginicus</i>	Bluestem
<i>Andropogon virginicus</i> var. <i>glauca</i>	Chalky bluestem
<i>Aristida stricta</i>	Wiregrass
<i>Coreopsis leavenworthii</i>	Leavenworth's goldenrod
<i>Elephantopus elatus</i>	Elephant's foot
<i>Eragrostis elliotti</i>	Elliott's lovegrass
<i>Eragrostis spectabilis</i>	Purple lovegrass
<i>Eragrostis virginica</i>	Coastal lovegrass
<i>Liatris sp.</i>	Blazing star
<i>Panicum anceps</i>	Beaked panicum
<i>Pityopsis graminifolia</i> var. <i>tracyi</i>	Grass-leaved aster
<i>Rudbeckia hirta</i>	Black-eyed susan
<i>Solidago sp.</i>	Goldenrod
<i>Sorghastrum secundum</i>	Lopsided indiagrass

The xeric or driest mixes can include the following species as well as any other appropriate species collected in the flatwoods, dry prairie, scrub, or sandhill:

SCIENTIFIC NAME	COMMON NAME
<i>Andropogon ternarius</i>	Splitbeard bluestem
<i>Andropogon virginicus</i>	Bluestem
<i>Aristida stricta</i>	Wiregrass
<i>Balduina angustifolia</i>	Yellow buttons
<i>Elephantopus elatus</i>	Elephant's foot

<i>Eragrostis elliotti</i>	Elliott's lovegrass
<i>Eragrostis spectabilis</i>	Purple lovegrass
<i>Palafoxia feayi</i>	Palafoxia
<i>Liatris sp., L. laevigata, L. gracilis</i>	Blazing star
<i>Panicum anceps</i>	Beaked panicum
<i>Pityopsis graminifolia var. tracyi</i>	Grass-leaved aster
<i>Polygonella polygama</i>	October flower
<i>Polygonella robusta</i>	Sandhill wireweed
<i>Rudbeckia hirta</i>	Black-eyed susan
<i>Solidago chapmanii</i>	Chapman's goldenrod
<i>Sorghastrum secundum</i>	Lopsided indiagrass

Bobwhite and Range Management

Field Day Evaluation Form

Tall Timbers Research Station
Society for Range Management
&
USDA-NRCS/MSU Bobwhite Restoration Project

As part of our continuing effort to improve dissemination of research results from USDA-funded studies to resource professionals and the general public, we request your assistance in evaluating the usefulness of this Field Day. Please take the time to fill out this questionnaire. Your input is greatly appreciated and will be used to improve future events. Thank you.

What agency do you work for? _____

What are the primary responsibilities of your position? _____

How did you learn of this Field Day? _____

Was the format of the Field Day suitable (topics covered, sites visited, timing, etc.)? Yes No

Will the information presented in the Field Day be useful to you in your work? Yes No

By what other means would you like to receive information about the results of this study (circle all that apply)?

Workshops

newsletters

Internet (email)

CDROM

Fact Sheets

Other: _____

Please rank the overall value of this workshop in increasing your knowledge of the topic presented:

(low) 1 2 3 4 5 (high)

Would you like TTRS/SRM and USDA-NRCS to hold more of these events? Yes No

Do you have any suggestions on how we can improve this Field Day? _____

Are there any other topics that should have been covered? _____

Do you have any other comments? (Use back of form for additional space) _____

Funding and Support provided by:

USDA-NRCS Bobwhite Restoration Project

Tall Timbers Research Station and Land Conservancy

Escape Ranch

Barbara Carlton & Family

University of Georgia Warnell School of Forestry and Natural Resources

Ona Range Cattle Research and Education Center