

Meadow Gardens: Grass Landscapes from Seed

Marc Pastorek

Pastorek Habitats LLC, 72322 Ingram Street, Covington, Louisiana 70435, USA

meadowmakers@gmail.com

Keywords: Grassland landscapes, grass garden landscapes, landscapes from seed, native gardens, natural garden design and management, naturalized gardens, prairie gardening in the Southern U.S., pushy perennials, seed propagation

Summary

Creating native meadow habitat gardens of perennial plant communities grown from seed has been an effective approach for developing sustainable landscape designs in city parks and open spaces. A grassland garden can easily contain fifty or more species. Optimum conditions occasionally yield as many as 15 species per square meter. Manual weeding of the garden is not recommended as this activity causes soil disturbance, which is to be kept to a minimum. Controlled burns reduce weedy species and enhance the growth of fire-tolerant (pyrogenic) species. Using seed from species that originate from similar ecological zones to your

general locality will maximize adaptability and resilience of the grassland garden landscape. It is highly desirable to have grass species that establish and compete well in the landscape. Successful seed mixes for the U.S. Gulf Coastal Region include: *Andropogon* and *Schizachirium*, along with short-statured *Panicum*, *Dicanthelium*, and *Paspalum*. Grasses are the fabric that flowering plants are woven into. Reconstructing naturalized grassland landscapes is an effective horticultural approach to managing land for biodiversity, and equally important: reconnecting people with nature.

INTRODUCTION

The art of creating native meadow habitat gardens composed of perennial plant communities grown from seed - has been an effective approach for developing sustainable landscape designs in city parks and open spaces in the central Gulf coastal region of the U.S. These grassland gardens contain numerous species of plants that have co-evolved, with a flowering phenology that lasts through the entire growing season - supporting butterflies, bees, beetles and a variety of other wildlife. The grassland gardens are permanent plantings that are nurtured through natural means, borrowing principles of natural land management - and often including the use of controlled burn or mowing annually as the main tool of the land manager (Noss, 2018).

Natural grasslands once made up a large portion of the continental U.S. (Hill and Barone, 2018). The predominant landscape in the Southeastern U.S was the natural grassland which is a fire dependent ecosystem. The North American Coastal Plain (NACP) was recognized as meeting the criteria of for the 36th global Biodiversity hotspot: more than 1500 endemic vascular plants and greater than 70 percent habitat loss - a habitat on the brink of extinction.

Historical use in the U.S of the natural meadow landscaping or at least attempts to replicate a natural grassland in the urban environment goes back at least to the 1890's when Jans Jensen was creating prairie garden landscapes. Jensen "harnessed" the natural grassland of the Midwest to design and construct "prairie rivers" in the parks of Chicago, gardens of native plant associations - that became features of his designs. Jensen realized and shared an appreciation for the artistic and scientific blend of the natural grass landscape. In the 1930's Aldo Leopold and John Curtis, biologists at the University of Wisconsin, Madison, attempted a reconstruction of native prairie using seed and plants. Their

focus was one of scientific study, of restoration and preservation (Leopold, 1949). These experiments became the foundation for the University of Wisconsin Arboretum, which features the natural plant communities of the region, using natural means to sustain them.

More recently, public park and arboretum designs have focused on using natural systems and natural mechanisms to reintroduce nature to the urban context. The work of Richard Hansen and Friedrich Stahl in their seminal book, *Perennials and the Garden Habitats*, describes the use of specific plants that persist and proliferate and make gardening easier by specifically designing for beauty and ease of maintenance (Hansen and Stahl, 1993). The Dutch garden designer Piet Oudolf has recently brought his use of highly designed grass dominant gardens to the U.S., using herbaceous perennials and grasses chosen for their ability to cover ground and suppress weeds as much as they are chosen for structure, texture, and color.

The natural grassland is one aspect that can be used to enhance biodiversity and civic enjoyment. Natural grassland gardens increase the public's knowledge and appreciation for biodiversity and the importance of preservation and conservation of the remnants of this precious habitat.

Regarding horticultural value and developing ornamental landscapes planting of prairie grasses and companion flowering plants are profoundly beautiful and remarkably dynamic (Stein, 1995; Wasowski, 2002; Werner and Christopher, 2016). They fit together as comfortably in the garden, as they do in the wild. Prairie garden landscapes propagated from seed change dramatically for the first five years; thereafter more subtly. Managing 0.4 to 2 ha (1 to 5 acre) grass garden is quite doable when it comes to grassland landscapes. The larger the project, the more ground is covered from seed and the more vignettes occur - little meadow gardens

within the larger garden.

Landscapes such as the Storm King Sculpture Gardens in New York and the Highline Park, Manhattan, N.Y. demonstrate the cutting-edge appeal of landscapes that were designed to contain masses of native grasses that form dramatic sculptural vistas of beauty and bounty.

Much of the work described here by the author was inspired by the work of Charles M. Allen and Malcolm F. Vidrine's work on prairie ecology and their attempt to re-establishing a prairie landscape in the mid 1980's in Eunice, Louisiana (Vidrine, 2010). Their work was inspired by scientific work done with earlier prairie restorations with Tall grass prairie grasslands in the Midwestern U.S. Through Allen and Vidrine's work, basic seed and planting knowledge was gained and shared. From those shared bits of knowledge, the author has honed and sharpened some of the skills - but much remains to be learned and garnered. The design potential of using the numerous species in combination is limitless.

GETTING STARTED

Urban grass landscapes typically require seeding in order to become established since the integrity of the vegetation is typically not conservative in value. Rural gardens that are herbaceous in nature, in many cases, can be transformed using no seed - but simply by reintroducing fire. Identifying the plants on site may inform you by way of indicator species, or species that are of significance botanically - typical prairie herbs and/or grasses. An experiment was initiated in the community of Carriere, Pearl River County, Mississippi in 1999 where only controlled burns were introduced on two-year rotations, on a one-acre site dominant in Bahia grass. Very few conservative species existed. The result over 20 years has been the development of a rather beautiful,

floriferous landscape. Active fire suppression is one of the leading factors in the loss of biodiversity in Southeastern U.S. (Noss, 2018)

One of the main considerations for using this design style is that it must be a sunny open area. The fewer trees in this landscape the better. Soils can vary greatly with poor clay or sandy soils, which are better candidates than those high in nutrients and organic matter. However, even rich soils can support a prairie landscape if proper preparation is taken before planting. Areas generally in urban conditions are often more difficult to establish than in areas where human impact has been minimal. Weedy exotic invasive species and a history of soil disruption are often common characteristics of the urban condition. Urban plantings need more planning and preparatory elimination of competitive species.

Preparatory tasks before planting can include tilling, applying specific herbicides and/or solarizing. The seed used to plant such a garden should be adaptable, meaning it germinates, thrives and persists for many or numerous years. Maintenance needs include the use of mowing, burning, and/or eradicating woody plant growth (Fig. 1). Typical forestry management techniques are modeled after typical herbaceous grassland management principles.



Figure 1. After a controlled burn, the ground is scorched but the perennial plants are rejuvenated.

Seed for planting projects can be purchased, but the best scenario is gathering seed from a high-quality natural area that is near your planting location. Doing this ensures seed adaptability and often yields species that are endemic to the area. Seed collections sites are good study sites as well - to observe and take in the growth dynamics over time of a natural local grassland species.

Planting can be rigidly structured or fairly loose regarding a preferred method, which depends upon the ultimate goals and growth requirements. The speed in which a prairie grassland establishes is often a major factor, as public perception is often critical and can lead to differing opinions. For this reason, the interpretive aspect of the garden is an important factor, showing the significance of reconstruction of natural grasslands to the urban environment.

Seeding can be as easy as plowing the soil and broadcasting seed and observing what happens. One should conduct different experiments with seeding within the planting area. The different results teach one the dynamics and the best practices for specific locations. In 50 experimental seed plantings established by the author on 3.2 ha (8 acres) since 1998, the resulting gardens have been particularly beneficial for establishing best management practices and observing establishment and revegetation patterns.

In gardens of high profile, where a landscape needs rapid transition, such as a city park or an impatient client is funding the work - strategies such as thorough soil preparation - repetitive plowing, herbicide applications, solarizing, heavy seeding

rate, etc., can speed the process of garden maturation.

The management of the landscape is driven by natural succession, the replacement of one plant by another. Early establishing species are limited by individual viability and germination rates and their place in the successional clock of time - how well they compete for sunlight, moisture, and root zone. Grasses and flowering plants are important components, as they colonize and create a competitive environment - putting pressure on less aggressive species, while favoring growth of others. The term 'pushy perennials' was coined to describe the aggressive nature of some grassland species. Grassland perennial herbs and grasses live a highly competitive life.

A SEASON IN THE GARDEN

During springtime (late March and early April) along the U.S. Central Gulf Coast, prairie plants emerge from winter dormancy. The height of the vegetation is less than a 30 cm (1-ft). The grassland garden seems to contain few grasses, as grasses take on a secondary roll visually until late summer; they do add color (green), texture and form (Figs. 2 and 3).

Flowering occurs in drifts and in random patterns - throughout the growing season. By June, the prairie is growing taller as the grassland is in full swing, triggered by higher temperatures. By August, the height is around 0.6 m (2-ft), and some species are even taller. Inflorescences (flowering stalks) of Bluestem grasses grow vertically and are waist-high by late September.



Figure 2. A grass garden landscape with forbs, in May, Folsom, Louisiana.



Figure 3. The same grass garden landscape in mid-June, Folsom, Louisiana.

Much of the vegetation is knee-high with flowering stalks rising above (Figs. 4, 5 and 6). By November, the mean height of the grass garden is 0.9-1.2 m (3-4 ft) and

grasses are fruiting. First-frost arrives about December 1 and all flowering and growth activity ceases. Bluestem grasses turn a golden yellow or bright red, depending on

the species (Fig. 7). The grasses are the dominant feature throughout the winter period and into January and February - when mowing or a burn can be done. This takes the vegetation down to the ground, eliminating the previous year's growth. The cycle begins anew.



Figure 4. *Eryngium yuccifolia* and honey bee in Folsom, Louisiana.



Figure 6. The Folsom, Louisiana grass garden landscape in October.



Figure 5. Buckeye butterfly larvae on False Foxglove (*Agalinus*) in October, Folsom, Louisiana.



Figure 7. A grass garden landscape dominated by Little Bluestem, in December, Mandeville, Louisiana.

CONCLUSION

A grassland garden can easily contain fifty or more species. Optimum conditions can occasionally yield as many as 15 species per square meter. Manual weeding of the garden is not recommended as this activity causes soil disturbance, which is to be kept to a minimum. The first year of growth does not yield much in the way of ornamental value. Mowing can be used sparingly to keep the planting uniform and to keep sunlight on the smallest seedling plants during the first year. The best-case scenario is to not disturb the planting at all. Just observe. If burning is included in the management program, the biomass of grasses and flowering plants should be allowed to accumulate – so there is sufficient fuel for burns after the first year and subsequent years. Burning is a natural part of the grassland environment. Fire reduces weedy species and enhances the growth of fire-tolerant (pyrogenic) species.

Using seed that originates in your general locality insures selecting suitable ecotypes for greater adaptability and resilience. Incorporate grass species that create and maintain a competitive atmosphere in the landscape, such as *Andropogon*, *Schizanthium*, short-statured *Panicum*, *Dicanthelium*, *Paspalum*. Grasses are the fabric that the flowering plants are woven into. Taller grasses such as Switch grass and Gamma grass are used sparingly as accents or dramatic elements unless the design calls for more height.

The grassland landscape is dynamic: daily and seasonally changing. Reconstructing naturalized grassland landscapes is an effective horticultural approach to managing land for biodiversity. Besides the horticultural enjoyment, grassland gardens help preserve diverse, uncommon plant species and habitats. The wildlife activity that comes with plant community reveals a whole new reason to garden. Observing the garden over a period of many years is an education unto itself. Grassland gardens bring the observer back to the historical landscape of the past - focusing on life and death as the changing of seasons. Grasslands reconnect people with the nature.

For Flowering Phenology Information

Craine J.M., Wolkovich, E.M., Gene-Towne, E., Kembel, S.W. (2012). Flowering Phenology as a Functional Trait in a Tallgrass Prairie. Flowering phenology as a functional trait in a tallgrass prairie. *New Phytol.* 193(3):673-82.

Announcing the World's 36TH Biodiversity Hotspot: The North American Coastal Plain <https://www.cepf.net/node/4422>

Noss, R.F., Platt, W.J., Sorrie, B.A., et al. (2014). How global biodiversity hotspots may go unrecognized: lessons from the North American Coastal Plain Diversity and Distributions 21: 236–244.

Table 1. A Prospective List of Species for Cajun Prairie Reconstruction^{1,2}.

¹Species recommended for the coastal plain of Louisiana (some species apply to east Texas, Mississippi, and southern and central Alabama and eastwardly along the Atlantic coast to North Carolina and beyond.

²See *Vascular Flora of the Cajun Prairie of Southwestern Louisiana* (Allen et al. 2001). Use this paper as a guide to species that will be comparable to local and regional flora lists found near a given area.

Monocots		
<i>Andropogon gerardii</i>	<i>Dicanthelium aciculare</i>	<i>Panicum dichotomiflorum</i>
<i>Andropogon glommeratus</i>	<i>Dicanthelium commutatum</i>	<i>Paspalum laeve</i>
<i>Andropogon gyrans</i>	<i>Dicanthelium dichotomum</i>	<i>Panicum laxum</i>
<i>Andropogon morhii</i>	<i>Dicanthelium scoparium</i>	<i>Panicum virgatum</i>
<i>Andropogon ternarius</i>	<i>Dicanthelium scabrusculum</i>	<i>Paspalum floridanum</i>
<i>Andropogon scoparium</i>	<i>Dichromena colorata</i>	<i>Paspalum laeve</i>
<i>Andropogon virginicus</i>	<i>Digitaria filiformis</i> var. <i>villosa</i>	<i>Paspalum praecox</i>
<i>Anthaenantia rufa</i>	<i>Eliocharis montevidensis</i>	<i>Paspalum plicatum</i>
<i>Aristida purpurascens</i>	<i>Eliocharis quadrangularis</i>	<i>Rhynchospora corniculata</i>
<i>Aristida dichotoma</i>	<i>Eragrostis elliotii</i>	<i>Rhynchospora inexpansa</i>
<i>Aristida longespica</i>	<i>Eragrostis refracta</i>	<i>Rhynchospora glaberata</i>
<i>Bothriochloa longipaniculata</i>	<i>Eragrostis spectabilis</i>	<i>Rhynchospora globularis</i>
<i>Carex glaucescens</i>	<i>Erianthus gigantea</i>	<i>Scirpus cyperinus</i>
<i>Carex vulpinoidea</i>	<i>Erianthus strictus</i>	<i>Schizachyrium scoparium</i>
<i>Cladium jamaicense</i>	<i>Eriocolon decangulare</i>	<i>Schizachyrium tenerum</i>
<i>Coelorachis cylindrica</i>	<i>Fuirena squarrosa</i>	<i>Scleria pauciflora</i>
<i>Coelorachis rugosa</i>	<i>Juncus dichotomus</i>	<i>Scleria reticularis</i>
<i>Ctenium aromaticum</i>	<i>Juncus tenuis</i>	<i>Sorgastrum nutans</i>
<i>Cyperus acuminatus</i>	<i>Juncus marginatus</i>	<i>Sporobolus junceus</i>
<i>Cyperus erythrorhizos</i>	<i>Leersia oryoides</i>	<i>Steinchisma hians</i>
<i>Cyperus haspan</i>	<i>Muhlenbergia capillaris</i>	<i>Tridens ambiguus</i>
<i>Cyperus psuedovegetus</i>	<i>Muhlenbergia capillaris</i> var. <i>expansa</i>	<i>Tridens flavus</i>
<i>Cyperus oxylepis</i>	<i>Panicum anceps</i>	<i>Tridens strictus</i>
<i>Cyperus virens</i>		<i>Tripsicum dactyloides</i>
Dicots		
<i>Agalinus fasciculata</i>	<i>Eurybia hemispherica</i>	<i>Pluchea foetida</i>
<i>Agalinus viridis</i>	<i>Euthamia leptcephala</i>	<i>Polytaenia nuttallii</i>
<i>Aletris aurea</i>	<i>Euthamia tenuifolia</i>	<i>Pycnanthemum albescens</i>
<i>Baptisia spherocarpa</i>	<i>Gailardia aestivalis</i>	<i>Pycnanthemum muticum</i>
<i>Baptisia nuttalliana</i>	<i>Gailardia aestivalis</i> var. <i>flarovirens</i>	<i>Pycnanthemum tenuifolium</i>
<i>Bigelovia nudata</i>	<i>Gnaphalium obtusifolium</i>	<i>Rhexia mariana</i>
<i>Boltonia difusa</i>	<i>Guara lindhiemeri</i>	<i>Rhexia lutea</i>
<i>Boltonia asteroides</i>	<i>Guara longiflora</i>	<i>Rhexia virginica</i>
<i>Biden aristosa</i>		<i>Ruellia humilis</i>

<i>Bidens mitis</i>	<i>Helianthus angustifolius</i>	<i>Rudbeckia hirta</i>
<i>Buchnera americana</i>	<i>Helianthus mollis</i>	<i>Rudbeckia grandiflora</i>
<i>Cicuta maculata</i>	<i>Heterotheca subaxillaris</i>	<i>Rudbeckia texana</i>
<i>Chamaecrista fasciculata</i>	<i>Hibiscus mosheutos</i>	<i>Sabatia campestris</i>
<i>Coreopsis tinctoria</i>	<i>Hibiscus grandiflorus</i>	<i>Sabatia gentianoides</i>
<i>Coreopsis lanceolata</i>	<i>Hypericum nudiflorum</i>	<i>Sabatia macrophylla</i>
<i>Coreopsis linifolia</i>	<i>Hydrolea ovata</i>	<i>Salvia azurea</i>
<i>Coreopsis tripteris</i>	<i>Hydrolea unifora</i>	<i>Scutellaria integrifolia</i>
<i>Coreopsis pubescens</i>	<i>Hyptis alata</i>	<i>Shrankia quadrivalis</i>
<i>Chrysopsis mariana</i>	<i>Kosteletzkya virginica</i>	<i>Silphium asteriscus</i>
<i>Croton monanthogynus</i>	<i>Lespedeza capitata</i>	<i>Silphium gracile</i>
<i>Croton capitatus</i>	<i>Liatris acidota</i>	<i>Silphium laciniata</i>
<i>Dalea candida</i>	<i>Liatris elegans</i>	<i>Solidago nitida</i>
<i>Desmodium paniculatum</i>	<i>Liatris spicata</i>	<i>Solidago odora</i>
<i>Echinacea pallida</i>	<i>Liatris pycnostachya</i>	<i>Solidago rugosa</i>
<i>Erigeron strigosus</i>	<i>Liatris squarrosa</i>	<i>Solidago sempervirens</i>
<i>Eryngium yuccafolium</i>	<i>Lobelia appendiculata</i>	<i>Strophostyles umbellata</i>
<i>Eryngium integrifolium</i>	<i>Lobelia floridana</i>	<i>Symphyotrichum dumosum</i>
<i>Erythrina herbacea</i>	<i>Lobelia puberula</i>	<i>Symphyotrichum concolor</i>
<i>Eupatorium album</i>	<i>Manfreda virginica</i>	<i>Symphyotrichum lateriflorus</i>
<i>Eupatorium coelestinum</i>	<i>Monarda fistulosa</i>	<i>Symphyotrichum patens</i>
<i>Eupatorium hyssopifolium</i>	<i>Monarda lindheimeri</i>	<i>Symphyotrichum praealtus</i>
<i>Eupatorium ivifolium</i>	<i>Monarda punctata</i>	<i>Tephrosia onobrychoides</i>
<i>Eupatorium perfoliatum</i>	<i>Oxypolis filiformis</i>	<i>Teucrium canadense</i>
<i>Eupatorium rotundifolium</i>	<i>Passiflora incarnata</i>	<i>Vernonia gigantea</i>
<i>Eupatorium xpinnatifidum</i>	<i>Penstemon digitalis</i>	<i>Vernonia missourica</i>
<i>Euphorbia corollata</i>	<i>Pluchea comphorata</i>	<i>Vernonia texana</i>

Literature Cited

Hansen, R. and Stahl, F. (1993). Perennials and Their Habitats. Timber Press. ISBN 10: 0881922226

Hill, J.G and Barone, J.A.(2018). Southeastern Grasslands: Biodiversity, Ecology, and Management. University of Alabama Press. ISBN 978-0-8173-1988-5

Leopold, A. (1949). Sand County Almanac: And Sketches Here and There, Oxford University Press. ISBN-10:019505928X

Noss, R. F. (2018). Fire Ecology of Florida and the Southeastern Coastal Plain. University Press of Florida. Project MUSE muse.jhu.edu/book/59025

Radford, A.E., Ahles, H.E. and Ritchie-Bel, C. (1968). Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. ISBN 978-0-8078-1087-3

Stein, S.B. (1995). Noah's Garden: Restoring the Ecology of our Own Backyards. Houghton Mifflin Harcourt. ISBN 0395709407

Vidrine, M.F. (2010). *The Cajun Prairie: A Natural History*. Cajun Prairie Habitat Preservation Society. ISBN 9780615368

Wasowski, S. (2002). *Gardening with Prairie Plants*. University of Minnesota Press. ISBN 978-0-8166-3087-5

Weaner, L. and Christopher, T. (2016). *Garden Revolution: How our Landscapes can be a Source of Environmental Change*. Workman Publishing. ISBN 9781604696165