



GRASSLANDS TECHNICAL FIELD GUIDE



This BMP Field Guide serves as a land management document providing an initial restoration toolbox. The BMPs are broad recommendations and should be viewed as starting the process for restoration. Every site is unique and it will be up to the discretion of the conservation team to implement these BMPs in the most appropriate way given the conditions.

Grassland BMP Field Guide

DEFINITIONS

Grasslands: is an overarching term for ecotypes that are dominated by grasses and other herbaceous species. Grasslands provide critical ecosystem services such as carbon storage, water capture and filtration, and food and forage for wildlife.

Prairies: are grasslands that have a diverse and dense species composition of graminoids and forbs. Prairies have little to no trees and shrubs (less than 30 percent). Due to urbanization, a significant number of prairies in East Texas and along the Gulf Coast region have been lost to development, invasive species encroachment, and improper grazing practices.

Savannas: are a type of grassland characterized by grasses, forbs, and widely spaced trees. In Houston, savannas can function as a transitional zone between woodlands/riparian zones and prairies. The canopy cover in a savanna habitat is sparse (between 30 and 50 percent), allowing for grasses and other herbaceous species to thrive.

Grassland Buffers: are managed as natural grasslands with minimal tree cover (less than 30 percent) and are mainly composed of grasses and forbs. Due to the extensive presence of heavy non-native, invasive vegetation, maintenance is lower compared to prairies. These areas are transition areas which were formally lawns and/or turf and may be restored to viable habitat at any point in the future. Grassland buffers provide fewer ecosystem services than prairies. Grassland buffers along the bayou banks are less visible and flood prone and may be managed differently from those in more visible upland areas.

Seasonal Meadows: are managed as wildflower areas, showcasing forbs in bloom during spring. They are kept at a maximum height of 30 inches during this period. After the majority of the plants lose their flowers (typically in May or June), seasonal meadows are managed as lawns. The aim is to keep undesirable species below 30 percent. The primary maintenance objective is to ensure an attractive landscape throughout the year.

PROJECT PLANNING

There are often many questions and pre-construction analyses that should be completed prior to any ground-breaking. To help with the extensive “pre” process, HPB has created a checklist:

CONSERVATION PROJECT DEVELOPMENT CHECKLIST

Use the completed record generated by Survey123 as a basis for developing your site action plan and other project documents.

DETERMINE PROJECT GOALS AND PRIORITIES

Setting specific goals for your project at the onset, can ensure work progresses linearly along an accepted trajectory.

Potential Grassland Goals and/or priorities:

- Increase plant species diversity
- Capture and reduction of stormwater runoff
- Strategically create habitat for birds, bats and/or pollinators
- Improvement of soil quality and erosion control
- Resilience to drought and temperature changes
- Maintain the historical significance of grasslands in Houston

GRASSLAND PROJECT SPECIFIC CONSIDERATIONS

Grassland establishment is highly dependent on the proper preparation of the project site. There are special considerations that must be addressed.

As part of your analysis:

HYDROLOGY

- Generate a topographic map or note on other maps specific areas of ponding and/or water collection
- Document any existing and/or potential pollution sources, urban disturbances and health hazards (on-site and adjacent)
- Identify volume of annual rainfall ([Harris County Flood Warning System \(harriscountyfws.org\)](http://harriscountyfws.org))
- **If needed**, you may use hydrological indicators for those areas of ponding [ERDC/TN WRAP-17-1 "User Guide for Automated Wetland Determination Data Sheets" \(oclc.org\)](http://erdc.tn.gov)

SOILS

- Complete your soil survey ([Web Soil Survey - Home \(usda.gov\)](https://www.usda.gov/web-soil-survey))
- Take soil sample and obtain analysis from Texas A&M AgriLife Extension Soil Lab
- Assess soil compaction (through bulk density or soil cone penetrometer measurements)
- Test soil infiltration
- Assess extent, severity, and type of erosion on-site
- Soil biodiversity may play an important role in grass establishment. Collecting a sample for this test may be necessary.
- Consider adding biochar to the soil as a supplement. Charcoal, or biochar, historically enriched grassland soils due to wildfires.

VEGETATION

- Map zones of land cover/vegetation type
- Note invasive species of interest, native communities and relative abundance of each group
- Map vegetation structure (% cover for overstory, mid-story, understory/herbaceous, litter cover, bare soil) and dominant species in each layer

OTHER PROJECT CONSIDERATIONS

It is important to note elements surrounding the site that will influence a successful restoration project. Those elements may include the following:

- Parking lots
- Problematic adjacent properties
- Stands of invasive plants
- Major roadways
- Storm drain interceptors
- Proximity to BG trails
- Proximity to other park features

The planning process should include notations of these features, their relative distance to your proposed project and the general size of these features.

Maintenance capacity and logistics should be a design and layout parameter. Elements like pathways can be used to simplify maintenance and delineation of different types of areas.

Invasive species, often with viable seedbanks lasting over a decade, [require multiple herbicide](#) applications to deplete rhizome reserves and prevent regrowth. Managing a mix of warm and cool-season invasives typically involves a year-long preparation process: initial herbicide treatments paired with shallow tillage (up to 5 inches) and a 5-inch mulch layer left for a year. This approach suppresses growth, facilitating targeted spot treatments instead of broad herbicide applications.

INSTALLATION AND MAINTENANCE

SOILS

- Submitting a soil sample could prove useful for knowing the nutrient content in existing soil; urban soils are typically depleted of vital nutrients
- Soil improvements like adding compost and especially char may be necessary to help restore the soil food web
- It may be essential to complete an infiltration study on-site to understand how easily soil absorbs water or creates runoff

SITE PREPARATION

- Invasive species control is imperative to long-term project success and achievement of desired ecological functions.
- It may be better to consider [controlled herbicide methods](#) over methods which disturb the soil. Please refer to the [HPB Integrated Pest Management \(IPM\)](#) Manual if herbicide is required.

Common Invasive Plant Species	
Scientific Name	Common Name
<i>Cynodon dactylon</i>	Bermudagrass
<i>Sorghum halepense</i>	Johnsongrass
<i>Bromus spp.</i>	Brome
<i>Bothriochloa ischaemum</i>	King Ranch Bluestem
<i>Paspalum notatum</i>	Bahia grass
<i>Verbena brasiliensis</i>	Brazilian Vervain
<i>Medicago polymorpha</i>	Burr clover
<i>Melilotus officinalis</i>	Yellow sweet clover
<i>Rapistrum rugosum</i>	Bastard cabbage
<i>Torilis arvensis</i>	Spreading hedge parsley
<i>Paspalum urvillei</i>	Vasey Grass
<i>Rumex crispus</i>	Curly dock
<i>Convolvulus arvensis</i>	Field bindweed

- Seeding: this method may be cost effective; be sure to consider [appropriate mixes](#)
- **Live planting:** Live planting is an excellent way to enhance seeding efforts and accelerate the evolution of grasslands by incorporating later successional species like little bluestem (***Schizachyrium scoparium***) and compassplant (***Silphium laciniatum***). Currently, conservation staff use live plantings as a buffer around prairie edges to prevent invasive species infiltration.

Planting Windows	
Plants	Season
Spring forbs and grass mixes	March - May
Warm season grasses	October - May*
Cool season grasses	October - mid November
Perennial forbs	October - May**
Annual Forbs	March - April
Shrubs	October - Early November and March - June
Trees	November - February***
*Best results when planted in spring. **Best results when planted in fall. ***Best to plant trees when they are dormant during the winter to avoid transplant shock. However, they can also be planted, depending on climatic conditions, in late fall and early spring if necessary. These trees will require more attention.	

- Use live plantings for areas where seeds struggle to establish, such as shady or wet zones. Plant only FAC and FACW species in the lower/wetter areas of the site. Consider shade-friendly species for understory areas. Some grassland sites will have trees and/or be adjacent to wetlands.
- Washing of installation equipment is necessary to ensure no cross-contamination
- Dig holes similar in size to the plant containers (e.g., 4-inch, 1-gallon, 3-gallon). Ensure the base of the plant is level with the surrounding ground. Use excavated soil to fill air spaces without over-compacting.
- Salvage plant pre-construction on site or from other HPB site if possible. Ensure the conservation team can pot and maintain rescued plants until they are ready to be replanted. Plants need time to rest once dug up, so consult with the Nursery Technician for logistics before starting a plant rescue project.

- Water weekly for the first couple months, but the site may need water for the first year of establishment, especially during drought conditions
- It is critical to water the site for the first 6 weeks after seeding, especially for large projects
- Remove invasives immediately to prevent establishment and/or seeding of noxious species. If possible, avoid using chemical treatments for the first year of establishment to protect native seed germination and develop a native seed bank.
- Bare spots should be addressed immediately with additional plantings and/or seeding

- Each project should have regular establishment monitoring for the first two years with the first year having a minimum of a [site visit](#) every two weeks.
- Hand removal can occur, and regular sweeps should be made during inspections to make sure undesired plants are not allowed to go to seed. [Site monitoring forms](#) can be completed to initiate these maintenance tasks.
- Any invasive, non-desired plants that are setting seed should be treated or pulled, seedheads or plants bagged, and then bags discarded. Herbicide treatment will be [need further approval by HPB](#). It is imperative that you consult the [IPM](#) for guidance on herbicide applications.
- If invasive spot treatment occurs and results in dead patches, conservation staff should remove dead material and then replant with fast growing plants. It is imperative to not leave the void unattended because urban areas are vectors for invasive species and could potentially fill the space if native seed or live plugs are not planted as soon as possible.
- Bare spots created by invasive removals **MUST** be addressed at the time of physical removal or after the REI has expired if herbicide treatment was utilized

Mowing Recommendations	
First Year of Establishment	Mow 1-3 times at 8" to allow sunlight and germination, especially in areas with aggressive native plants like sumpweed (<i>Iva annua</i>) or goldenrod sp..
Annual Mowing	Grasses can tolerate annual mowing in winter while dormant. Mowing at other times may result in loss of that year's seed and favor undesired species.
Post-Seed Ripening	Mow any time after grass seeds have ripened (December) or delay until early spring (February) before plants green up. Mow at least 4 to 6 inches high to protect bunch grasses growing from the crown.
Invasive Species Control	Mowing in mid-June to mid-July can help maintain plant diversity if invasive species are an issue.