



WETLAND 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.

Wetland BMP Field Guide

DEFINITIONS

Wetlands are defined by an inundation of water which then influences the soils and vegetation. The most common HPB wetlands are shallow, mid-sized depressions with a subtle dip ranging from 6" to 2' in depth. These ephemeral wetlands will alternate between wet or dry time periods, yet the soils remain moist to sustain the anerobic conditions. Also called **bio-swale**, **wetland swales**, or **swale**. Additionally, given the proximity of Bayou Greenways to our bayous, HPB may restore or maintain adjacent **tidal wetlands**, areas periodically flooded based on a tidal regime with vegetation tolerant of both inundation and exposed conditions.

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 Wetland Goals and/or priorities:

- Stormwater capture/storage
- Stormwater treatment (water quality improvement)
- Address existing ponding or erosional conditions (i.e. Thomas Bell Foster)
- Meet grant requirements
- Habitat connectivity

WETLAND PROJECT SPECIFIC CONSIDERATIONS

Because wetlands are determined by their hydrology, plant composition and soil specificity, there are special considerations that must be addressed.

As part of your analysis:

HYDROLOGY

- Map existing streams, wetlands, shorelines, noting current overland flow direction if possible
- 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 and health hazards (on-site and adjacent)
- Identify volume of annual rainfall ([Harris County Flood Warning System \(harriscountyfws.org\)](http://harriscountyfws.org))
- Hydrological indicators (**i.e. water/ponding present, aquatic (obligate or fac-wet) vegetation, algal mats**) [ERDC/TN WRAP-17-1 "User Guide for Automated Wetland Determination Data Sheets" \(oclc.org\)](#)

SOILS

- Complete your soil survey ([Web Soil Survey - Home \(usda.gov\)](http://websoilsurvey.sc.egov.usda.gov))
- Take soil sample and obtain analysis from Texas A&M AgriLife Extension Soil Lab
- Note soil texture (high clay content is required for wetlands, sandy soils will not hold water sufficiently)
- Assess soil compaction (through bulk density or soil cone penetrometer measurements)
- Test soil infiltration
- Assess extent, severity, and type of erosion on-site
- Check for evidence of hydric soil (pull a soil profile and check soil color)

VEGETATION

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

Common Wetland Indicator Plant Species	
Scientific Name	Common Name
<i>Phyla nodiflora</i>	Texas frogfruit
<i>Cyperus entrerianus</i>	Deep rooted sedge
<i>Carex spp</i>	Sedges
<i>Eleocharis spp</i>	Rushes
<i>Alternanthera philoxeroides</i>	Alligator weed

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
- 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.

By doing minimal grading, a wetland zone can be created at or near interceptors or storm outlets where the water will stand for longer times and the plants will benefit from the additional water.

Grading should be done with wide angles, gently, sweeping curves. The water will be further filtered before it enters the drain, the soil profile, or is evaporated.

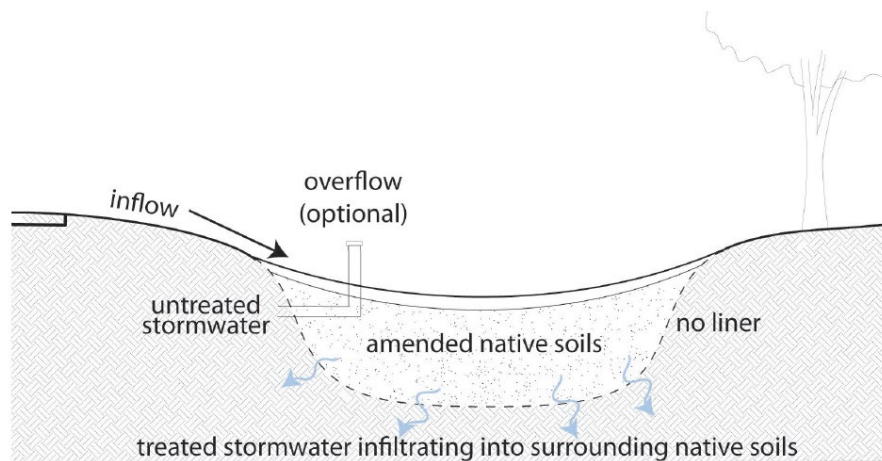


Figure 1. Bio-swale schematic (Blackland Collaborative)

INSTALLATION AND MAINTENANCE

SOILS

- Submitting a soil sample for wetlands is not as critical as it is for the other habitat types, but could prove useful for knowing the nutrient content in existing soil
- Though a soil sample could provide information regarding texture and it is important to look at the soil profile in the field to assess if it is anaerobic. Using a Munsell color chart will provide critical information.
- Percentages of Clay versus Sand will be important for water retention. A high percentage of sand will increase drainage and undermine the needed hydrology for the site.

SITE PREPARATION

- Invasive species control is imperative to project success. Include integrating herbicides, tillage, adequate depth mulching, and, depending upon timeline/approval, prescribed fire
- Primary removal method: grading the site, scraping off the vegetation, and digging deeper into the soil profile
- Wetland sites, that will not be graded or have vegetation removed, will require multiple treatments with herbicide to suppress vigorous stands. Please refer to the [HPB Integrated Pest Management \(IPM\) Manual](#) if herbicide is required.

Common Invasive Wetland Plant Species	
Scientific Name	Common Name
<i>Hydrilla verticillate</i>	Hydrilla
<i>Rottboellia cochinchinensis</i>	Itchgrass
<i>Alternanthera philoxeroides</i>	Alligator weed
<i>Salvinia molesta</i>	Giant salvinia
<i>Myriophyllum aquaticum</i>	Parrotfeather milfoil
<i>Cyperus entrerianus</i>	Deep rooted sedge
<i>Colocasia esculenta</i>	Elephant ears
<i>Typha</i>	Cattail
<i>Ambrosia trifida</i>	Giant ragweed

- There may be a need to add a small/thin layer of compost if grading was significantly deeper into nutrient-poor clays. However, this practice is not common.
- Only utilize deep tilling to loosen soil if it is absolutely necessary, deep tilling or cultivation will pull up dormant invasive seed bank. In addition, wetland require native clay soils to hold water.
- Mulch topdressing can help reduce erosion but not required, if mulch is added, only lay about 1"-3" of mulch
- Deep or excessive grading will require soil additions.

INSTALLATION

- Seeding: Not the primary planting application given the amount of moisture. If seeding is done, do so in the intermittent shelf at the edge of the inundation zone to upland edge. Species that would be used are species that recruit heavily such as: Southern Cutgrass (*Leersia hexandra*), Bushy bluestem (*Andropogon glomeratus*), Longspike tridens (*Tridens strictus*), Nealley's sprangletop (*Leptochloa nealleyi*)
- [Planting window: Late September to May](#)
- Planting zones: grouped by moisture requirements (wetland, transition, upland)
- Planting density: cluster method (1 plant species in clusters of 10-20, 5' away another cluster of a different species), site should be at least 70% covered
- Salvage plant pre-construction on site or from other HPB site if possible

ESTABLISHMENT

- Water every other day to weekly for the first couple months but may need water for the first year in extreme drought conditions
- Remove invasives immediately to prevent establishment and/or seeding in newly installed wetland
- Growth should occur within the first three weeks of establishment
- Bare spots should be addressed immediately with additional plantings
- 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

MAINTENANCE/MONITORING

- 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.
- Any plants that are setting seed should be treated or pulled, seedheads or plants bagged, and then bags discarded. [Herbicide treatment](#) of Wetland plant material will be need further approval by HPB.
- 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.
- Undesired woody growth should be removed. Nature prevented sapling establishment with wildfire and high intensity grazing.