



RIPARIAN 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.

Riparian BMP Field Guide

DEFINITIONS

Riparian areas are lands that occur along watercourses and water bodies. They are distinctly different from surrounding lands because of unique soil and vegetation characteristics strongly influenced by water. **Riparian Buffers** are vegetated zones adjacent to streams and wetlands that represent a best management practice (BMP) for controlling nutrients entering water bodies. Buffer width is positively related to effectiveness in cleansing water. This habitat type is one of our primary types along the Bayou Greenway system. **Bottomland Hardwoods** are also an important type of riparian community which often occupy the first and second terraces of river floodplains, low areas, seepages, and areas along river or creek channels. Hydrology is primarily responsible for the development of these bottomland forests. Bottomland forests require presence of water; floodwater periodically or permanently inundates the soil and can create anaerobic 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 at the onset of your project, can ensure work progresses linearly along an accepted trajectory.

Potential Riparian Goals and/or priorities:

- Increase Plant species diversity
- Reduce erosion to neighboring streams/bayous and/or increase bank stability
- Address existing ponding or other erosional conditions (i.e. Thomas Bell Foster)

- Filtration of sediments and/or pollutants
- Indirectly support aquatic community health

RIPARIAN PROJECT SPECIFIC CONSIDERATIONS

Because riparian areas, similar to 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 a soil survey ([Web Soil Survey - Home \(usda.gov\)](http://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)

- Map zones of land cover/vegetation type – focus on major grouping of canopy trees and understory groups
- 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
- Identify riparian indicator species

Common Wetland Indicator Plant Species	
Scientific Name	Common Name
<i>Salix nigra</i>	Black willow
<i>Quercus nigra</i>	Water oak
<i>Platanus occidentalis</i>	American sycamore
<i>Vitis spp.</i>	Grapevine
<i>Ipomoea spp.</i>	Morning glory

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.

Grading and reshaping within riparian zones must be carefully considered, as these areas may already be prone to erosion. Earthwork, without careful consideration, may further contribute to erosional issues.

INSTALLATION AND MAINTENANCE

SOILS

- Submitting a soil sample could prove useful for knowing the nutrient content in existing soil
- Soil improvements like adding compost and 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 project success. Include integrating herbicides, tillage, adequate depth mulching, and, depending upon timeline/approval, prescribed fire
- It may be better to consider controlled herbicide methods over methods which disturb the soil. Riparian areas are more readily subject to tidal influence and potential erosion, making them sensitive to soil disturbance. Please refer to the [HPB Integrated Pest Management \(IPM\) Manual](#) if herbicide is required.

Common Invasive Riparian Plant Species	
Scientific Name	Common Name
<i>Rottboellia cochinchinensis</i>	Itchgrass
<i>Alternanthera philoxeroides</i>	Alligator weed
<i>Panicum maximum</i>	Guinea grass
<i>Cyperus entrerianus</i>	Deep rooted sedge
<i>Colocasia esculenta</i>	Elephant ears
<i>Typha</i>	Cattail
<i>Ambrosia trifida</i>	Giant ragweed

- Mulch topdressing can help reduce erosion but not required, if mulch is added, only lay about 1"-3" of mulch

INSTALLATION

- Seeding: this method may be cost effective; be sure to consider [appropriate mixes](#)
- [Live planting](#): Planting in the riparian edge and floodplain terrace can be challenging due to fluctuating water levels and high flow events. These dynamic processes can create variability that dramatically affect planting success. Because of this, planting within the riparian edge should focus on stream stabilization rather than aesthetics.
- Planting window for trees and shrubs: October to early November through February
- Planting zones: grouped by moisture requirements and light regime; Plants with flexible stems and rhizomatous root spread should be located from the shoreline into the top of the riparian shoreline. Small to medium shrubs should also be included along the bank and into the riparian edge. Large tree species, shrubs and upland herbaceous species should be planted on the top of the riparian edge and in the floodplain terrace.
- Planting density: incorporate drifts of plants spaced 1' - 2' on center in grid. The number of plants incorporated per site should vary according to the site's scale, but for example a 16' x 16' space could incorporate 81 1-gallon plants at 2' on center grid spacing.
- Salvage plant pre-construction on site or from other HPB site if possible

ESTABLISHMENT

- Trees and shrubs, like most plantings, should be watered the day they are planted
- Water weekly for the first couple months but may need water for the first to two years of establishment, especially in drought conditions
- After the two-year establishment period the trees should be watered as needed. Trees generally will require anywhere between 5-10 gallons of water per inch in diameter. At each watering, thoroughly saturate the soil around each tree and ensure proper soil moisture at least 6" below grade.
- Remove invasives immediately to prevent establishment and/or seeding of noxious species
- Bare spots should be addressed immediately with additional plantings

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. [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](#).
- 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