NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

Wetland Restoration
Texas Supplement

(acre)

Code 657

This supplement is designed to provide information on the "how to" restore degraded wetland habitats. It is intended to provide basic guidance for Wetland Restoration. For information on wetland management refer to Texas Supplement, Wetland Wildlife Habitat Management (644).

This practice applies to hydric soils where the normal wetness or flooding has been altered and/or the normal plant communities have been removed or altered.

Wetland Laws: Before beginning any project, a detailed study should be conducted to determine what federal and state laws must be complied with. Some Clean Water Act Section 404 nation-wide permits apply to wetland restoration. A careful review should be made of state- and federal-listed T&E species before beginning any project.

Initial Planning: Restoration efforts can be for part of a degraded wetland or extensive areas. A conservationist must decide what type(s) of habitat are to be restored and if certain plants and animals are to be targeted. An example would be to target shallow water areas for waterfowl. Another example could be to provide habitat for "rare" species such as Wood Ibis, Black Bear or a specific plant community. A history of the wetland detailing what was present before alteration is extremely helpful.
Off site conditions sometimes have been changed to a point that does not allow for

total restoration. For example a highway may have been constructed through the watershed that reduces the original amount of runoff to wetland site.

Protecting or developing unique habitats within a wetland is often critical to the overall restoration. Motts or groups of trees in a flooded area are often rookeries used by egrets, herons and other colonial nesting birds. These trees should be protected. Created islands (microtopography) in wetlands can be planted in trees and shrubs to encourage future rookeries. Rookery sites are lacking in many areas of the state.

Construction Methods

Ridge/Swale – Ridge/Swale is the use of, or the expansion of, existing topography or the creation of wetland topography. The ridge and the swale are old channels and their adjacent highs left by streams, rivers, and oceans. The concept in wetland restoration can be used in at least three different ways. First, an existing ridge/swale can be improved by the placement of water control structure/s to allow a manager to have a greater control of vegetation growth and to manipulate the wetland for a selected wildlife species. Second, expanding the width as well as varying the depth of the channel and using the removed soil to construct wildlife islands (microtopography) can modify the existing ridge/swale. Thirdly, a wetland that has been leveled or diked can be restored with a ridge/swale complex including wildlife islands.

Microtopography – The development or restoration of relief (highs and lows) in a wetland is extremely beneficial when trying to benefit a wide range of wildlife species.

Varying the height of the ground and the depth of water within a wetland adds habitat diversity. An easy method to develop microtopography is when creating or enhancing a ridge/swale. Soil removed from the swale can be placed to form "islands" in the wetland. These islands return relief to the site while providing valuable wildlife habitat. Islands can be planted in trees, shrubs, forbs and grasses resulting in nesting and loafing areas for wildlife.

"Meandering Dikes" -- The concept of trying to emulate natural wetlands when constructing dikes for water impoundment. In the past, most dikes have been constructed in as straight a line as possible with the borrow area adjacent to fill. This is the least expensive and easiest method of construction. This type of construction leaves an unnatural look to the wetland and is a waste of good "edge" for wildlife. Meandering dikes can be constructed by varying as much as fifty feet to each side of the straight line center of the dike. The meanders of the dike must be gentle to allow vehicle traffic (if so designed) and not to pinch the toes of the dike on the inside bend. In addition, the borrow area can be moved back and forth away from the toe of the dike. This normally requires self-loading scrapers (pans) or large draglines and hoes to construct.

Restoration Wetland Types

Bottomland Hardwoods - Bottomland hardwoods are made up of trees, shrubs, forbs, and grasses adapted to wet sites.

Emergent Marshes - Emergent marshes are fresh, brackish, or saline wetlands that are generally flooded from 12 to 30 inches in depth. These marshes contain vegetation that is rooted in the soil and emerges above the water surface. Typical emergent plants include cattail, bulrush, and rice cutgrass. These sites are valuable as nesting and brood rearing habitat for wading birds such as rail, bittern, grebes, and coots. Emergent marshes are used by winter migrant waterbirds for feeding, roosting and resting

Coastal Prairie and Coastal Marsh - This complex system along the Texas Gulf Coast is a fairly narrow band that consist of fresh, brackish, to saline water regimes and wet meadows. Much of the private and public lands along the coast have been drained through the years however, the flat topography restricts water drainage. These systems have annual rainfall from 35 inches in the west (Victoria County) to 60 inches in the east (Orange County). It is the winter home to thousands of migratory birds. Wetland wildlife habitat in the coastal prairie and marsh includes activities in rice fields, grass prairies and tidal marshes.

These wetlands include switchcane /bluestem complexes and brackish marsh hay cordgrass marshes. These systems can grow a tremendous amount of foliage. Some have been converted to farmland and can be managed as typical moist-soil units.

Scrub/Shrub marshes are typified by willow, swamp privet, and water elm (planer tree) wetlands with interspersions of other soft wood species such as buttonbush, and perennial marsh vegetation. Scrub/shrub sites are transitional between emergent marshes and forested wetlands. These marshes are valuable roosting sites for birds. Birds in scrub/shrub marshes are protected from the elements during cold, windy weather. These marshes produce large amounts of invertebrates because of the tremendous amounts of decaying leaves. Seeds from plants like buttonbush provide additional food. The mature scrub/shrub wetlands should be protected from conversion to another type of wetland. Their role as a roosting site can not be overemphasized.

Gulf Coast Depressions - Depressions along the Gulf Coast range from very small shallow micro-depressions with little wildlife management potential, to large deep (1-3 feet) depressions, which are considered by many to be one of the more important wetland types in Texas. Although variable in size and quality, these herbaceous depressions function somewhat similarly. Most importantly the water source is limited to run-off from surrounding uplands and therefore, the quality of these wetlands are

greatly impacted by “off-site” landscape condition. A one-acre depression in the middle of a cropland field is of much lower quality than the same one-acre depression surrounded by range in excellent condition.

Playas - Playas collect floodwater from approximately 90% of the region they occupy. In the areas of intensive agriculture, these wetlands are the principal remaining areas of native habitat. Plowing, burning and sedimentation greatly harm playas in intensive agriculture areas. In areas of rangeland, overgrazing of playas and their watershed can be detrimental to the biodiversity of the ecosystem.

Bottomland Hardwood Planting - Much of East Texas wetlands were originally in hardwood forests. Restoration efforts should be aimed at planting converted sites in at least three primary hardwood "hard mast" (oak) tree species. Sites that overflow will usually be naturally revegetated in "soft mast" (elms, ashes, hawthorns) species. The planting of southern yellow pine (loblolly, longleaf) is an extra. Small motts of pines on mounds add diversity to the wetland while providing meaningful habitat.

Idle fields and poorly managed pastures to be restored can pose several problems in hardwood restoration. Existing vegetation can crowd out hardwood seedlings resulting in poor stands or stands dominated by aggressive, undesirable shrubs and trees. The use of site preparation chemicals is advantageous in these situations.

Native Grass/Forb/Shrub Establishment - Most wetlands outside the Texas Pineywoods and upper Texas Coast are not suited to hardwood tree establishment. Many areas, especially on drier sites, need to be established in native grasses, forbs and shrubs. Conservation Reserve Program planting guides are a good reference for choosing adapted plants. Select plants that will provide a diversity of cover and food types as well as are adapted to wet sites. The control of invasive and introduced plants can pose a problem. Bermudagrass, fescue, introduced bluestems, and other plants that have adapted to the site may require several years of control prior to planting. Control methods such as chemical treatment and disking are expensive but mandatory to ensure proper restoration.

Buffers – Wetland Protection

Protection of wetlands is often overlooked in the planning process. Affording protection is just as important in forested wetlands as it is to non-forested wetlands. Wetlands that are not protected by buffer strips may be subject to erosion, sedimentation, and pesticide contamination.

Buffers of grasses, shrubs, and trees serve to trap sediments before they can enter a wetland. These protective strips serve wildlife by providing nesting sites, fawning cover, travel corridors, feeding cover, resting cover, escape cover, and critical resting stops for migratory songbirds.

Monitoring and Maintenance

Managed wetland sites must be monitored at least yearly. Notes must be kept of the vegetation and its condition. If repairs, control of invasive plants, or modifications that are needed, they should be scheduled. The management plan must be review and revised as needed.

Common Native Herbaceous Plants that can be propagated for Wetland Wildlife

Brownseed paspalum – *Paspalum plicatulum*
Bundleflowers – *Desmanthus spp.*
Buttonbush – *Cephalanthus occidentalis*
Coontail – *Ceratophyllum demersum*
Cordgrasses – *Spartina spp*.
Duck potato (arrowheads) – *Sagittaria –spp.*
Fall panicum – *Panicum dichotomiflorum*
Giant cutgrass – *Zizaniopsis miliacea*
Joint vetches– *Aeschynomene spp.*
Ludwigias – *Ludwigia spp*.
Pondweeds – *Potamogeton spp*.
Sedges – *Carex spp*.
Sesbania – *Sesbania macrocarpa*
Smartweeds – *Polygnum spp*.
Spikerushes – *Eleocharis spp*.
Sprangletops – *Leptochloa spp*.
Switchgrass – *Panicum virgatum*
Water shield – *Brasenia schreberi*

Wild millets – *Echinocloa spp*.

REFERENCES:

Fredrickson, L. H. and F.A. Reid, F.A. 1988. Invertebrate response to wetland management.. Waterfowl Management Handbook, USDI-FWS Wildlife Leaflet 13.3.1.

Fredrickson, L.H. and T.S. Taylor. 1982. Management of seasonally flooded impoundment for wildlife. USDI-FWS Resource Publication 148.

Haukos, D.A. and L.M. Smith. 1992. Ecology of playa lakes. Waterfowl Management Handbook, USDI-FWS Wildlife Leaflet 13.3.7.

Massey, B. ____. Wetlands engineering manual. Ducks Unlimited, Southern Regional Office. 16 pp.

Nettles, D.M., ed. 1997. Waterfowl habitat management handbook for the lower Mississippi River Valley, Ducks Unlimited, Mississippi Cooperative Extensive Service, and Arkansas Game and Fish Commission. 19 pp.

APPROVAL**:**

/s/ GARY VALENTINE

State Wildlife Biologist

September 14, 2001