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The Sabal

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Plant Species for Wetland Enhancement and Slope Stabilization at Estero Llano Grande State Park

by Chris Hathcock

It's been over five years since Ducks Unlimited, Inc. excavated four shallow depressions and installed 1,500 feet of underground concrete pipelines in a 30-acre former agricultural field just north of Llano Grande Lake (part of the Arroyo Colorado) in Weslaco. Part of the World Birding Center Project and what is now Estero Llano Grande State Park, the project transformed the homogeneous grassy field into a mosaic of moist-soil to shallowly flooded wetlands with intermittent uplands.

The 13 acres of newly created marshes in the old farm field compliment 10 acres of wetlands nestled further inside the park, including 5 acres of drainage ditches, the 3.5-acre "Alligator Lake", and a 1.5-acre created marsh. Additionally, the park borders 46 acres of Llano Grande Lake.

Up to this point, the only wetland plants that have been introduced to the park are the sprawling water-primrose (*Ludwigia peploides*) and floating Mexican and blue water-lilies (*Nymphea* spp.) near the deck of the Visitor Center. The rest of the park's lush wetland vegetation (31 species; see Table 1) arrived on its own from surrounding wetlands. This will soon change, however, since Texas Parks and Wildlife Department (TPWD) has identified two projects, one slated to begin this fall and another in the planning stages, involving targeted introductions of selected wetland plant species to meet goals in habitat management, water quality, and erosion control.

Enhancement of Created Wetlands

A major management goal for the created wetlands is to increase the richness and abundance of desirable wetland plant species. Doing so will provide food, cover, and nesting sites for a greater diversity of wetland birds. It

will also help improve water quality and control the proliferation of coastal cattail (*Typha domingensis*; a robust native emergent species) and hydrilla (*Hydrilla verticillata*; an exotic submergent species), two aggressive wetland plants at the site. Both of these species are considered to have low value to wildlife and tend to dominate their respective niches to the exclusion of other plant species.

So how do we achieve the desired diversity? Unlike plants commonly used in landscapes, most native wetland species cannot be found in large quantities at commercial nurseries. Therefore, plants will be grown from seeds and plugs in one of the wetland pools (the 5-acre Dowitcher Pond) and then dispersed throughout the other three. By dedicating a single pool for propagating plants, water levels of between 0" and 6" can be controlled independently of levels in other pools. This is important, since optimal germination and growth of plantings can only be achieved through appropriate water depths and timing of floods and draw-downs.

We selected 17 species for inclusion in the plant-propagation plan. Selection was based primarily on each plant species' ability to improve water quality and provide food and cover for birds and other wildlife. Other considerations were species' hardiness, ability to occupy niches not filled by existing desirable plants, and availability. Only species native to Hidalgo and/or Cameron County were considered for propagation.

Of the 17 species chosen, 9 already occur at the park (see Table 1). The 8 additional species that will be propagated include soft-stem bulrush (*Scheonoplectus tabernaemontani*), narrow-leaf arrowhead (*Sagittaria longiloba*), American germander (*Teucrium canadense*), Runyon's water-willow (*Justicia runyonii*), three-square bulrush (*Schoenoplectus pungens*), knotted spike-rush (*Eleocharis interstincta*), primrose willow (*Ludwigia octovalvis*), and long-leaf mud-plantain (*Heteranthera limosa*). Seeds and/or plugs for most species will be obtained from wetlands at other TPWD properties in the region. Species for which we could not find natural sources will be obtained from local nurseries and/or the USDA Plant Materials Center in Kingsville.

Slope Stabilization

Local drainage districts are tasked with maintaining obstruction-free channels to quickly convey excess water during flood events. Therefore, vegetation growing on top of the banks and on the slopes is regularly mowed to prevent it from hampering water velocity. Woody growth in particular is kept to a minimum because it slows the water more than does herbaceous vegetation and has a greater potential to clog the ditch by becoming dislodged or dropping limbs. Likewise, tall emergent wetland plants like cattail and giant bulrush growing in moist to flooded conditions at the bottom of the ditch are removed when it is deemed that they will restrict water flow.

Plants in these ditches serve important functions, however. Roots of plants growing on top of and on slopes of banks hold soil to help reduce bank erosion and sedimentation of waterways. Wetland plants in the bottom of the ditch remove pollutants from and oxygenate the water. Furthermore, plants growing in and along ditches can provide valuable wildlife habitat.

The slope-stabilization project will investigate 1) techniques for and benefits of using selected native plant species in local drainage ditches and other waterways and 2) the degree to which these selected plant species restrict water flow. It involves evaluation of up to six "bioengineering" techniques, in which live plants are used in combination with logs, rip-rap, erosion cloth, and other inert materials, throughout a half-mile of drainage ditch running through the park.

A study will be conducted to see how well these techniques control erosion, reduce sediment loads from the ditch into the Arroyo Colorado, and improve overall water quality in the ditch. The study will also determine a "roughness coefficient" for each species used. Roughness is a measure of how much the particular vegetation slows the velocity of water flowing through the channel. The taller, denser, and woodier the plant is, the more it will slow water velocity and the higher will be its roughness coefficient.

Up to five plant species will be chosen for each of three zones of the ditch channel (bottom, water margin, and slope). Species will be selected based primarily on 1) their compatibility with the particular zone's growing conditions, 2) their potential to control erosion,

and 3) their likelihood of having a relatively low roughness coefficient. Some of the potential plant species for this project are pictured, with captions indicating reasons for their consideration.

Status of Projects/Contributors

Ground preparation (chiseling and discing the soil) in the plant-propagation cell for the wetland enhancement project is scheduled to begin in December 2007. TPWD is currently seeking funding for the ditch stabilization project.

TPWD is working with Alan Plummer Associates, Inc., an environmental and water-resources engineering firm, in designing and implementing both of these projects. Loretta Mokry and Tim Noak are the firm's lead coordinators. TPWD staff working toward the successful implementation of these projects include Martha García (Park Manager) and staff at Estero Llano Grande State Park; Kay Jenkins, State Parks Regional Natural Resource Coordinator; and myself.

In addition to improving the quality of wetland habitat at the park, it is hoped that these projects will serve as models for practical ways that cities, drainage districts, schools, private landowners, and others in the LRGV can use native plants in wetlands.

Table 1. Wetland-Plant Species Documented at Estero Llano Grande State Park between January 2003 and September 2007 (categorized by maximum water-depth tolerances; * = species selected for propagation)

Transitional – seasonally flooded

GRASSES

Echinochloa sp. (barnyard grass)
Eriochloa punctata (Louisiana cupgrass)
Leptochloa nealleyi (Neally sprangletop)
Paspalum notatum (bahiagrass)

FORBS

Ammania coccinea (toothcup)
Echinodorus berteroi (burhead)
Eclipta prostrata (yerba de tago)
Eustoma exaltatum (bluebell gentian)
Phyla fruticosa (frog-fruit)
Phyla nodiflora (frog-fruit)
Rumex crispus (curly-leaf dock)

SHRUBS

Lycium carolinianum (Carolina wolfberry)

Shallow – seasonally flooded to permanently flooded to 15 cm

Bacopa monnieri (water hyssop)*
Bulboschoenus maritimus (alkali bulrush)
Cyperus acuminatus (taper-tip flatsedge)*
Cyperus articulatus (joint-stem flatsedge)*
Cyperus odoratus (fragrant flatsedge)*
Cyperus rotundus (purple nut-grass)
Cyperus strigosus (straw-colored flatsedge)
Cyperus virens (green flatsedge)*
Eleocharis parvula (dwarf spikerush)*
Ludwigia peploides (water primrose)
Marsilea vestita (water clover)*
Pluchea purpurascens (salt-marsh fleabane)
Polygonum pennsylvanicum (pink smartweed)

Mid-Depths – 15 to 50 cm water depths

Eleocharis cellulosa (Gulfcoast spikerush)

Deep – 50 to 100 cm water depths

TALL EMERGENT

Schoenoplectus californicus (giant bulrush)*
Typha domingensis (coastal cattail)

ROOTED FLOATING

Nymphaea elegans (blue water lily)*
Nymphaea mexicana (yellow water lily)

ROOTED SUBMERGENT

Chara spp. (muskgrass)
Heteranthera dubia (water stargrass)
Hydrilla verticillata (hydrilla)

Chris Hathcock is the Secretary of the NPP Board of Directors and Habitat Restoration Coordinator for Texas Parks and Wildlife Department, State Parks Division in the Lower Rio Grande Valley.

Left: Like giant bulrush (*Schoenoplectus californicus*), which currently occurs in dense, 8-feet-tall stands at the bottom of the park's drainage ditch, alkali bulrush (*Bulboschoenus maritimus*; pictured) improves water quality and provides seeds for puddle ducks. Alkali bulrush will allow better drainage, however, since it does not form dense colonies and attains a height of only 3 feet.

Right: With its creeping stems and roots, low growth form, and flexible petioles, sombrerillo (*Hydrocotyle bonariensis*) is a great choice for erosion control at the water's margin inside the drainage ditch.

Left: Though a woody plant, Carolina wolfberry (*Lycium carolinianum*) is low-growing and has thin, flexible stems; it would therefore impede water-flow less than would taller and more erect shrubs. Additionally, its deeper root system holds lower soil layers better than do roots of grasses and other herbaceous species.

Right: Bluebell gentian (*Eustoma exaltatum*) was frequently encountered during our searches last spring for potential sources of wetland plants.

Nature Happenings Lower Rio Grande Valley, Texas

For a comprehensive calendar of Nature Happenings go to RGV Nature Coalition at www.rgvnaturecoalition.org Scroll down to and click on Nature Events Calendar on right side

Sabal Palm Grove Sanctuary— Saturday, October 20, 2007: Wonders of Nature Festival Call (956) 541-8034. Or go to www.tx.audubon.org/centers/sabal

Edinburg Scenic Wetlands and World Birding Center — Bird Walks and Nature tours. Native Plant Landscaping. 714 Raul Longoria Rd., Edinburg, TX (956) 381-9922.

Quinta Mazatlan - McAllen Wing of the World Birding Center— 600 Sunset Ave., McAllen, TX. Call Colleen Hook (956) 688-3370 for scheduled events

Bentsen Rio Grande Valley State Park WBC offers butterfly walks, bird walks, dragonfly walks, nature tours. Call 956-584-9156 for details and times.

Bentsen Palm Village Texas Wildscape Demonstration Site, the largest Certified Wildscape in Texas offers self-guided tours, 2500 South Bentsen Palm Drive, Mission, TX 78572 (by Bentsen State Park) Contact: Lori Rhodes 830-708-4254 lori@mlrhodes.com

The Sabal is the Newsletter of the Native Plant Project and conveys information on the native habitat, and environment of the Lower Rio Grande Valley Texas. Co-editors: Gene Lester and Eleanor Mosimann. You are invited to submit articles for *The Sabal.* They can be brief or long. Articles may be edited for length and clarity. Black and white line drawings -- and colored photos or drawings -- with or without accompanying text are encouraged. We will acknowledge all submissions. Please send them, preferable in electronic form - either Word or WordPerfect - to: Native Plant Project, P.O. Box 2742, San Juan, TX 78589 or contact **Gene Lester @ 956-425-4005, or g-el1951@sbcglobal.net**

See *The Sabal* and our 5 handbooks on our website:
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Native Plant Project Annual Membership Application Form

___Regular $15 per year ___ Contributing $35 per year ____ Lifelong $250 one time fee per individual. Members are advised of meetings, field trips, and other activities through *The Sabal*. Dues are paid on a calendar year basis. Send checks to Native Plant Project, P.O. Box 2742, San Juan, Texas 78589.

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Comments/ suggestions/ speaker recommendations should be sent to: Native Plant Project, P.O. Box 2742, San Juan, TX 78589 or contact G. Lester (956)-425-4005; g-el1951@sbcglobal.net

Native Plant Project Meetings – Novemberber 27, 2007. **Board meeting** at 6:30 p.m.; G**eneral meeting** at 7:30 p.m. **Mike Heep** of Heep's Nursery in Harlingen will present a program identifying the Valley's native grasses. This is a confusing subject for most of us. Mike's long experience as native plant specialist and teacher makes him the perfect speaker on this difficult subject.

Board and General Meetings 2007:

September 25
October 23
November 27

Board and General Meetings 2008:

January 22 April 22 September 23
February 26 May 27 October 28
March 25 November 25

SUMMARY OF THE MINUTES OF THE BOARD MEETING - Octoberber 23, 2007

Lester reported that the Sabal newsletter no longer will be stapled before mailing due to a restriction by the postal service against exposed staples*. It was suggested that we might look into 11" x 16" folded format in the future. Wessling reported that 167 plants were sold at the Mission Butterfly Festival. Mosimann scheduled booth attendance for the upcoming Harlingen Birding Festival. *Editor's Note: We sincerely apology for this inconvenience.

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