Your Remarkable Riparian

A field guide to riparian plants within the Nueces River Basin of Texas

A publication of the Nueces River Authority

From the Managing Editor:

Our goal for this guide is to cultivate awareness of native riparian vegetation and appreciation for its role in proper riparian function. Within the Nueces River Basin, we identified hundreds of plants growing in riparian areas. Some have yet to have their role discovered or described. Some may be only temporary pioneers blazing the trail to recovery following a disturbance. Others are simply placeholders, holding things together until conditions improve. They may be upland plants, marching into riparian territory, offering us a clue that the area has been altered, de-watered, down-cut or over-pumped. Still, any vegetation is better for riparian function than none. In a way, all plants contribute something to the riparian system and tell a story we need to learn to read.

This user-friendly guide introduces the most commonly observed riparian vegetation in the Edwards Plateau and Rio Grande Plains. However, most of the plants presented herein occur in riparian areas all across Texas, including the Cross Timbers, Trans-Pecos and Rolling Plains. The riparian principles described apply to all creeks and rivers. We've included images and details on plants that truly provide the heavy-lifting when it comes to holding and cleaning water within the riparian landscape.

This field guide is a tool that you can refer to again and again. Keep it on the dashboard, take it to the creek or leave it on the kitchen table so you can consult it regularly. It's up to you to learn to read your riparian areas and determine if they're gaining or losing function. With this knowledge and appreciation, you can successfully assess and monitor your riparian areas and help manage them in ways that conserve and enhance their function.

Thank you to Steve Nelle and Bill Carr who graciously provided their unmatched plant knowledge, field experience and un-wilting patience to pull the content of this book together. Ginger Webb offered interesting information about medicinal values. Mary Kate Rogers conjured up creative graphics to illustrate complex and commonly misunderstood concepts. Jew-Lee Lann made our Web site support happen seamlessly. Karen Ford and Kevin Greenblat found a beautiful, functional way to present the information within these pages. Wayne Elmore and Janice Staats from the National Riparian Service Team taught us all something about riparian function. And most importantly, The Meadows Foundation, The Dixon Water Foundation, Stewards of the Nueces, Texas Wildlife Association Foundation, and Texas Coalition–Grazing Lands Conservation Initiative, United States Department of Agriculture–Natural Resources Conservation Service invested generous financial support.

Use, learn and enjoy!

Sky Jones–Lewey
Resource Protection and Education Director
Nueces River Authority

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Sky Jones-Lewey, Managing Editor

Since ancient times the springs, creeks, rivers, aquifers and bays of the Nueces River Basin have been the lifeblood of a dry region—providing irrigation for thirsty crops, drinking water for growing populations, and a place to cool off on a hot day. These water resources were magnets for native civilizations, the selected sites for Spanish missions, watering holes for mustangs and longhorns, and continue to be a life-giving refuge for fish and wildlife.

Clean abundant water in the Nueces Basin depends on an amazing natural system of tributary streams, creeks and riparian land that subtly works its magic—filtering, storing and releasing this precious resource. The transitional band of vegetation that occurs between waterways, large and small, and the upland regions marks the critical riparian landscape. This zone is where water, soil and vegetation interact. The plants within this system help determine its proper function—holding soil, and holding and cleaning water. Healthy riparian lands will determine the amount and quality of water in our rivers, bays and groundwater aquifers in the future.

In the Nueces Basin, riparian areas are some of the most productive pieces of land. They can be reliable producers of forage, shelter and water, and a critical buffer during drought or flood. Knowing the functional values of individual riparian plants is an important part of understandng creek and river dynamics.

The Nueces Basin

From the Edwards Plateau to the Gulf of Mexico, Rocksprings to Corpus Christi, 235 miles long and 115 miles wide, the Nueces River Basin encompasses large parts of the Texas Hill Country, Brush Country and Coastal Plains. The river basin includes many miles of *ephemeral*, *seasonal* and *perennial* creeks and tributary streams. When flanked by healthy-functioning riparian land, these streams present a unique opportunity to enhance stream flow, water quality, groundwater recharge, and wildlife and fish habitat.

Ephemeral – flows only in direct response to storm runoff

Seasonal – flows occasionally and often has sustained flow for extended periods of time; enjoys a temporary connection to groundwater

Perennial – flows most of the time, except during severe drought; enjoys a continuous connection to groundwater

Function Produces Value

A healthy riparian system dissipates floodwater energy. It filters sediment and stabilizes soil on banks and within channels. This complex system depends on specialized plants to recharge ground water and keep rivers flowing during dry times. Working together as a community, riparian plants hold stream banks together and cradle streambeds up above the water table. When the riparian system is functioning, it produces clean, flowing streams—the essence of all of the things we value in the Nueces River Basin—natural beauty, ecological benefits, recreational resources, livestock forage and drinking water.

Healthy functioning riparian areas may seem unkept, overgrown or shaggy. They are not widely understood and often under-appreciated.

"A riparian area that is functioning properly will support a heavy stand of densely-rooted vegetation. Riparian plant species have different rooting characteristics than upland plants. Root systems of riparian plants are often stronger and denser than upland species. A strong interconnected root mass is one of the critical factors in maintaining bank and channel stability. In functioning condition, the riparian 'root basket' can act like a cradle holding the streambed above the bedrock and protecting the banks."

Steve Nelle, Wildlife Biologist with Natural Resource Conservation Service and riparian advocate.

Disfunctional is Damaging

Signs that a riparian system is not functioning include exposed soil or gravel on banks and in the floodplain, a wide channel with shallow water, increased flood flows and excessive erosion often resulting in stream bank collapse. Lack of shade or over-hanging vegetation are other signs of a degraded riparian system, as are the noticeable absence of large wood or downed trees. The result is the loss of fish and wildlife habitat and the dominance of non-native invasive plants and/or upland species. Riparian function can be impaired by human activity, especially when banks are heavily manicured, mowed or grazed short, graded or even paved.

Wetness Indicators

Within this guide, a Wetness Indicator (WI) is assigned to each plant according to the degree of soil moisture needed and tolerated by the plant. This rating is based on Region 6 USFWS, Wetland Plant List. There are five categories:

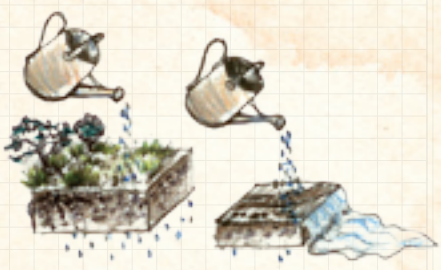
OBL – Obligate Wetland Plants
almost always found in very wet locations

FACW – Facultative Wetland Plants
usually found in wet locations

FAC – Facultative Plants
found equally in wet and non-wet locations

FACU – Facultative Upland Plants
usually found in non-wet locations

UPL – Obligate Upland Plants
almost always found in non-wet locations



Think of your riparian area as a sponge collecting, storing and slowly releasing water. Compaction or disturbance of the soil that makes up the sponge can inhibit this key function.

An abundance of OBL and FACW plants indicates that the riparian area is storing water, has a high water table, and stays wet for much of the year. This is referred to as the "riparian sponge." A riparian area lacking OBL and FACW plants indicates that the riparian area is not storing water very effectively and can be a sign of water table decline.

Stability Rating

A Stability Rating (SR) is assigned to each plant in this guide according to its observed ability to withstand the erosive forces of water. The rating scale is one to ten where SR 1 is equal to bare ground, and SR 10 is equal to the stability of anchored rock. SR 6-7 is considered the minimum necessary for adequate bank stability. The stability rating of individual plants is multiplied when they have the ability to grow as interconnected colonies.

Functional Plant Groups

Colonizer plants spread quickly and put down a mat of new roots by stolons or rhizomes. These plants grow fast and trap sediments creating niches for deeper-rooted plants to take hold. Colonizers usually grow right at the water's edge or even out into the water. Early stage colonizers are week-rooted; their main function is to spread as quickly as possible, but they are critical to the recovery of riparian areas. Late stage colonizers have stronger roots but do not grow as quickly. They provide a combination of colonizer and stabilizer functions.

Some Early Stage Colonizers:

COMMON NAME	WI	SR
Water primrose	OBL	3
Watercress	OBL	3
Smooth bidens	OBL	5
Water hyssop	OBL	3
Pennywort	OBL	3
Mint	FACW	3
Frogfruit	FAC	4

Some Late Stage Colonizers with Moderate Stability Rating:

Spikerushes (most)	OBL	6
Flat sedge	OBL	6
Knotgrass	FACW	6

Stabilizer plants are taller, upright plants with strong, dense root mass. Both woody and herbaceous, they are slower to establish, but once established, they are much stronger and more permanent. Most stabilizer plants also have large stout top growth, which helps to dissipate the energy of floodwater. When the velocity of flowing water is retarded, sediments are dropped and trapped in the vegetation and become incorporated into the bank or floodplain. Woody stabilizer plants function as 'riparian rebar' because of their larger root diameter and ability to interlace with fibrous herbaceous roots. When left in place, fallen trees can become lodged in the streambed and bank and continue to provide valuable stability indefinitely. This is a primary way that floodplains are developed and channels repaired.

Some Herbaceous Stabilizer Plants:

Emory sedge	OBL	9
Sawgrass	OBL	9
Switchgrass	FAC	9
Eastern gamagrass	FAC	9
Big sacaton	FAC	9

Common reed	FACW	9
Gulf cordgrass	FACW	9
Lindheimer muhly	FAC	7
Water willow	OBL	7
Spiny aster	FACW	8

Some Woody Stabilizer Plants:

Bald cypress	OBL	9
Buttonbush	OBL	8
Black willow	FACW	7
Arroyo willow	FACW	7
Sandbar willow	FACW	7

Gravel Bar Pioneers live where others can't. In the upper Nueces region, large destabilized gravel deposits *(bed load)* are characteristic on many creek and river segments. The lack of shade, soil and subsequent poor water-holding capacity make gravel bars a harsh environment for plant growth. Plants that grow on these large barren gravel deposits are special. They are pioneers, mostly FAC and UPL plants, with a mix of colonizers and stabilizer functions. They aide in preparing more favorable conditions for other riparian plants to grow.

Gravel Bar Pioneers:

Roosevelt baccharis	FAC	6
Sycamore	FAC	6
Lindheimer indigo	FAC	5
Little walnut	FAC	6
Desert willow	FACU	6
Gravel bar brickellbush	UPL	5

Non-Plant Features and Tell-Tale Signs (Stream Morphology)

Over time, streams process bed load (gravel in the headwaters and sand or silt in the lower country) into stable channels and banks. Upland clearing, especially on steep slopes, can increase runoff and generate excessive bed load. Mechanical manipulation of riverbeds or clearing of riverbanks can mobilize more bed load than the stream can quickly or easily process. When the riparian plant community is degraded, it is practically impossible for the stream to stabilize the additional bed load. Streams struggling to process excessive bed load often react by widening and becoming braided.

Bed load includes gravel or other sediments washed in from uplands or dislodged from banks when stability is compromised.

A **Braided channel** consists of a network of small channels separated by small and often temporary islands called braid bars.

Erosion and Deposition are two powerful opposing forces at work in a stream. All is well if neither is winning too much ground. Erosion and deposition are in balance when eroded bank material is being deposited not far downstream, building a new or expanded point bar and helping create sinuosity. Mid-channel deposition signals an imbalance, possibly excessive bed loading. When erosion and deposition are out of balance, the stream will swing, squirm and down-cut until eventually, the two forces reach equilibrium by building new flood plains and new channels. A combination of living plants and large downed wood can slow and catch sediment helping to inhibit erosion and stabilize channels.

A **Point bar** is a depositional feature of streams. Point bars are found in abundance in mature or meandering streams. They are crescent-shaped and located on the inside of a stream bend.

Sinuosity is a measure of the wiggle or meander of a stream channel. Increasing sinuosity also increases length and results in energy dissipation. In the absence of proper functioning riparian areas, with plenty of plants and logs to dissipate flood energy, streams will excessively erode their stream banks or bed in order to dissipate that energy.

Our Choices Influence the Riparian System

Riparian areas have attracted people for centuries. Flanked by healthy functioning riparian areas, many creeks and rivers have remained pristine and flowing, others have lost their natural functions and fallen prey to water quality problems, over-pumping, over-grazing and overuse. Abusive recreation and thoughtless mechanical manipulation by well-meaning but uninformed individuals have become far too commonplace. Regardless of their health, Nueces Basin streams are being asked to provide water and recreation to more and more people. This may not be possible unless people can come to understand and preserve the remarkable riparian function that produces the resources they require and treasure.

Heavily disturbed riparian plant communities, especially where the water table has been lowered or flows interrupted, may not recover in our lifetime. But most are extremely resilient and can recover as long as they have time, rest and an abundance of water. With knowledge, we can make informed choices to prevent unnecessary disturbance and help nurture riparian communities back to a healthy, functioning state.

Paved or caliche covered riparian areas, or those dominated by barren gravel bars with sparse vegetation, do not function properly.

Consider a better way - set parking areas away from riverbanks and leave a fringe of riparian vegetation intact.

Clearing for recreation sites can result in the loss of understory vegetation and riparian function, but it doesn't have to.

Consider a better way - rotate recreation sites and leave zones of understory intact.

Livestock and wildlife can damage riparian areas when allowed continuous access to them.

Consider a better way - flash or rotational grazing or temporary exclusion of grazing animals can allow for plant recovery.

A knowledge and understanding of riparian function can lead to informed decision-making and good land stewardship. Riparian health hinges on a relationship between vegetation (plants), hydrology (water) and geology (soil); these are the gears of a functioning riparian machine. The interaction between plants, water and soil determines the amount and quality of water in our rivers, bays and groundwater aquifers now and for the future.

Funding for this guide and the Nueces Riparian Network Project comes from The Dixon Water Foundation, The Meadows Foundation, Stewards of the Nueces, Texas Wildlife Association Foundation and Texas Coalition-Grazing Lands Conservation Initiative, United States Department of Agriculture-Natural Resources Conservation Service.
For more information and an ever-expanding list of plants found in riparian areas of the Nueces River Basin, go to: **www.nueces-ra.org**