

## Structure, Function and Role of Riparian Vegetation

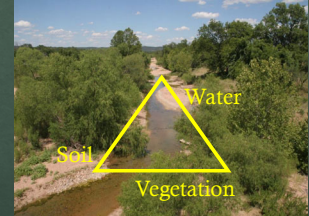


USDA - NRCS

## Proper Functioning Condition

A properly functioning riparian area will have adequate vegetation, landform, or large logs to:

- ◆ Dissipate Stream Energy
- ◆ Protect Banks/Stabilize Channel
- ◆ Reduce Erosion
- ◆ Slow velocity of floodwaters
- ◆ Sediment dropped
- ◆ Sediment trapped, and stabilized
- ◆ Build floodplains
- ◆ Provide floodwater retention
- ◆ Enlarge riparian sponge
- ◆ Improve groundwater recharge
- ◆ More water for sustained base flow



Slow Down the Water



Watershed  
vs.  
Catchment

What happens to rainfall  
when it hits the ground?

Soaks in

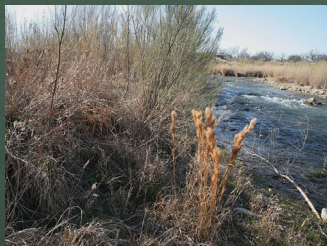
Runoff

Water  
Catchment

Water  
Shed

## In a Nutshell

- ◆ Slows Water Down
- ◆ Stabilizes soil
- ◆ Creates habitat along the way



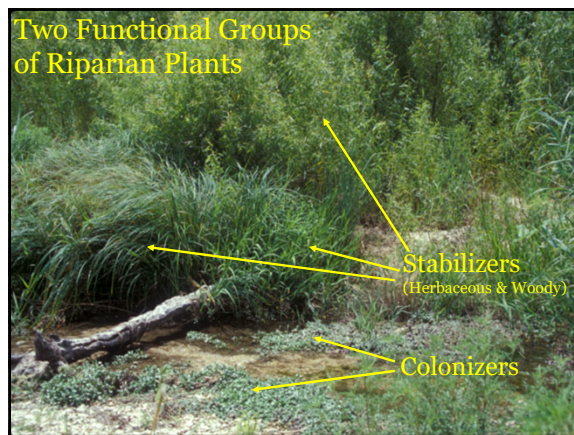
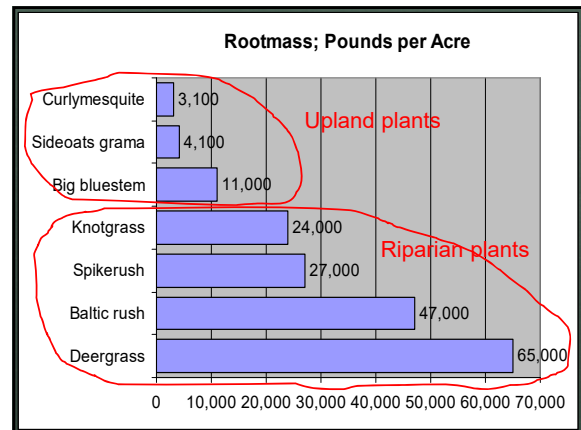
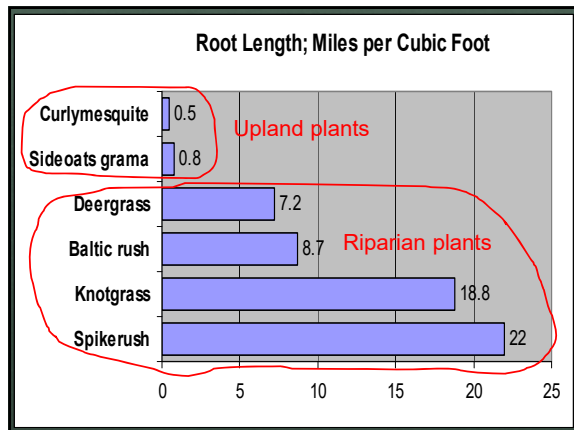
VEGETATION  
IS THE KEY

## Five General Types of Riparian Plants:

- ◆ Sedges & Rushes
- ◆ Grasses
- ◆ Forbs
- ◆ Shrubs
- ◆ Trees
- ◆ Dual Purpose:
  - Above ground slows water
  - Below ground holds the soil (riparian sponge)








## Colonizers

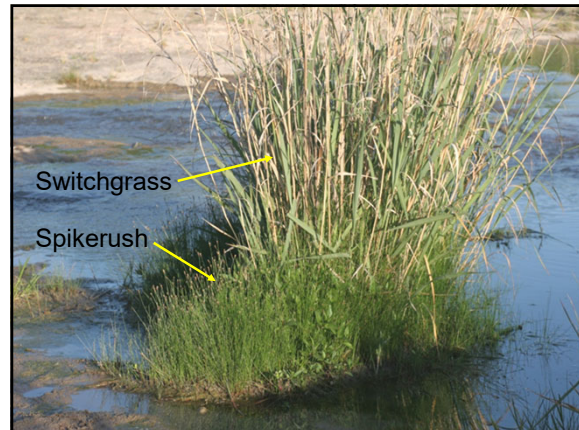
- First plants to establish in freshly deposited sediment
- Often spread rapidly by stolons or rhizomes
- Roots generally shallow and weak
- Critical to recovery






## Stabilizers

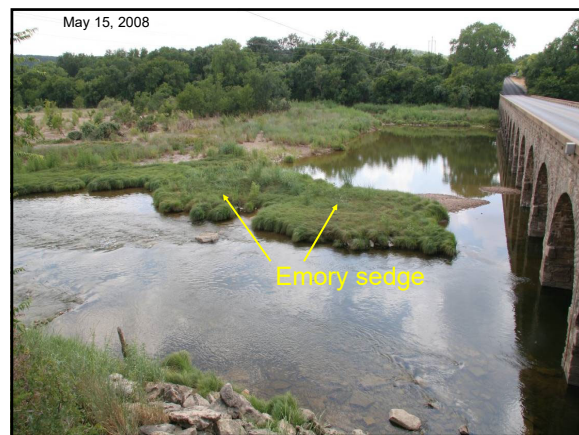
- Strong, upright, robust plants, able to withstand high energy flows
- Strong, deep, fibrous root systems, often rhizomatous
- Provide bank protection and dissipate energy
- Herbaceous and
- Woody Stabilizers



## Stability Ratings of Riparian Plants

Scale of 1 to 10

- ◆ 1 = The stability of bare ground
- ◆ 10 = The stability of anchored rock or large anchored logs
- ◆ 7 = Acceptable riparian stability for high gradient (>0.3% slope) streams
- ◆ 6 = Acceptable riparian stability for low gradient (<0.3% slope) streams







### Strongest Stabilizers

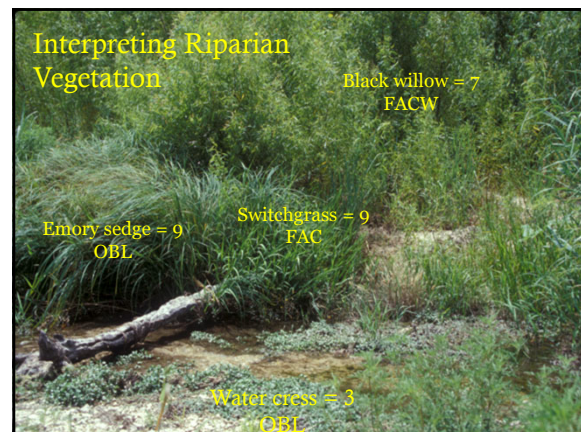
Stability Rating = 10  
Plant Combinations “Plant Communities”

- ◆ Elm – Sycamore - Willow
- ◆ Sedge – Willow
- ◆ Buttonbush – Switchgrass
- ◆ Switchgrass – Sedge – Willow

**= to strength of Anchored Rock**

### Good Riparian Vegetation = A Mixture of:

- ◆ Colonizers – 2 or more species
- ◆ Stabilizer Sedge-Grass – 2 or more species
- ◆ Stabilizer Woody – shrub & tree species



### Five Wetland Indicator Categories

- |                        |      |
|------------------------|------|
| 1. Obligate Wetland    | OBL  |
| 2. Facultative Wetland | FACW |
| 3. Facultative         | FAC  |
| 4. Facultative Upland  | FACU |
| 5. Obligate Upland     | UPL  |

### Obligate Wetland OBL

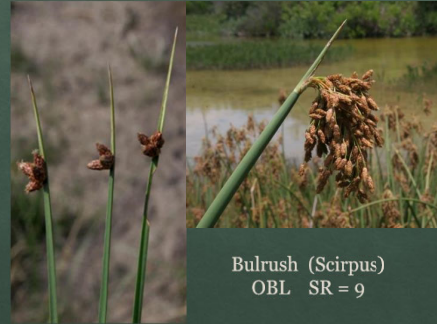
Almost always occur in  
wetlands

99% probability





Spikerush  
Colonizer/Stabilizer  
OBL; SR= 6



Bulrush (Scirpus)  
OBL SR = 9

## Facultative Wetland FACW

Usually occur in wetlands  
66-99% probability  
Occasionally occur in non-wetlands.



Bushy bluestem – Weak Stabilizer  
FACW; SR = 5/6



Black Willow *Salix*  
Colonizer/Stabilizer; FACW; SR = 7



Cottonwood *Populus*  
Stabilizer; FACW; SR = 6



Willow Baccharis  
Early Stabilizer, FACW, SR = 6



Spiny Aster  
stabilizer  
FACW-8

## Facultative FAC

Equally likely to occur in  
wetlands and non wetlands



Frogfruit – Colonizer  
FAC; SR = 4



Switchgrass  
Stabilizer, FAC, SR = 9



Eastern gammagrass *Tripsacum*  
Stabilizer, FAC, SR = 9





# Facultative Upland FACU

Usually occur in non wetlands  
66-99% probability  
Occasionally occur in wetlands.



# Obligate Upland UPL

Almost always occur in  
Non-wetlands  
99% probability



## Common Plants of Riparian Areas - Central Texas With Wetland Indicator (W) or Proposed Stability Rating (SR)

Compiled by the author

Indgen./Grasses	W	SR	Wetland	W	SR	Wetland	W	SR
Energy sedge	W	1	Water penny	W	1	Moist	W	1
Yellow flag	W	1	Water penny	W	1	Blackberry	W	1
Yellow flag	W	1	Water penny	W	1	Indigofera missouriensis	W	1
Yellow flag	W	1	Water penny	W	1	Blackberry	W	1
Yellow flag	W	1	Water penny	W	1	Arrowweed	W	1
Yellow flag	W	1	Water penny	W	1	Blackberry	W	1
Yellow flag	W	1	Water penny	W	1	Blackberry	W	1
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Yellow flag	W							



## Evaluating Riparian Vegetation / Healthy Indicators:



Multiple age classes?

Plant diversity?

Plants indicative of wet conditions?

Stabilizing root mass?

Plant vigor?

Amount of plant cover?

Source of large wood?

**Adequate amount of vegetation cover  
70% coverage of stabilizing riparian vegetation**



Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows

## Diverse Composition of Riparian-Wetland Vegetation

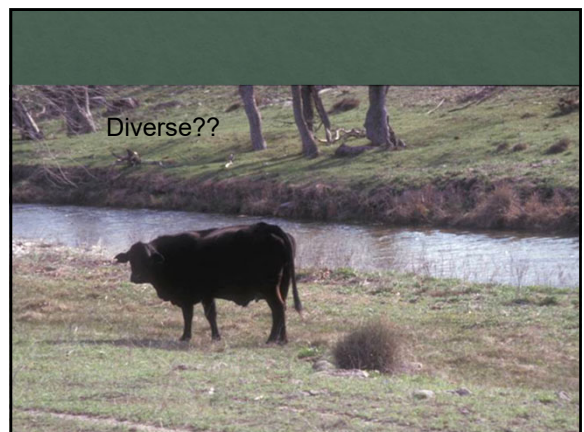
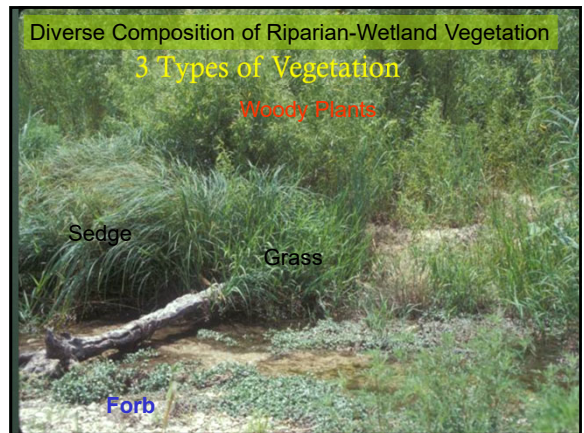
### 3 Types of Vegetation

Woody Plants

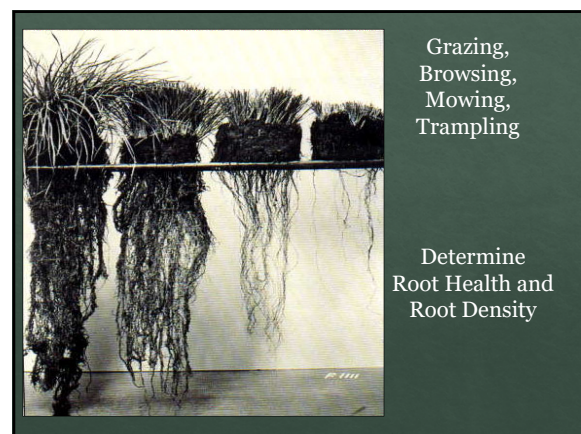
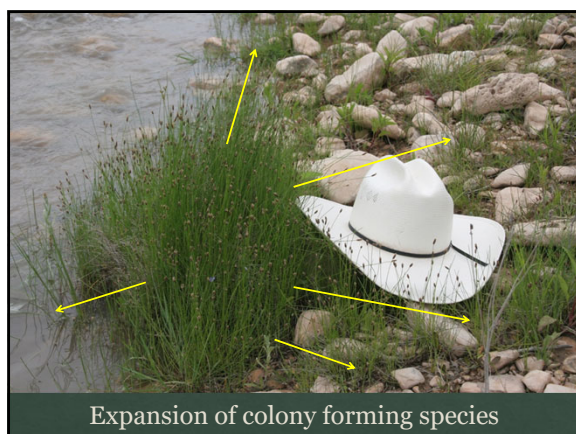
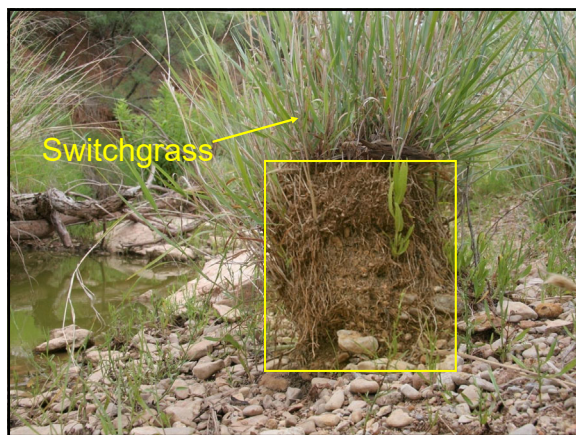
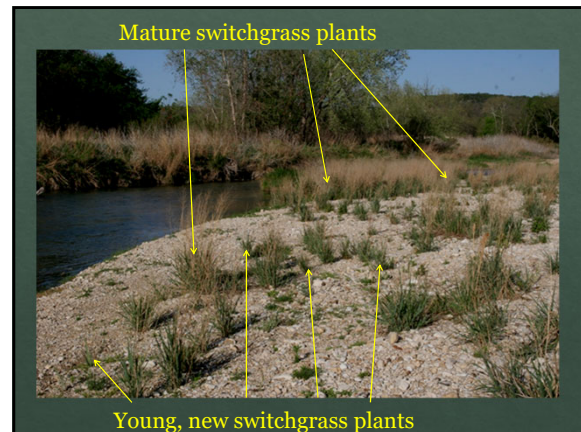
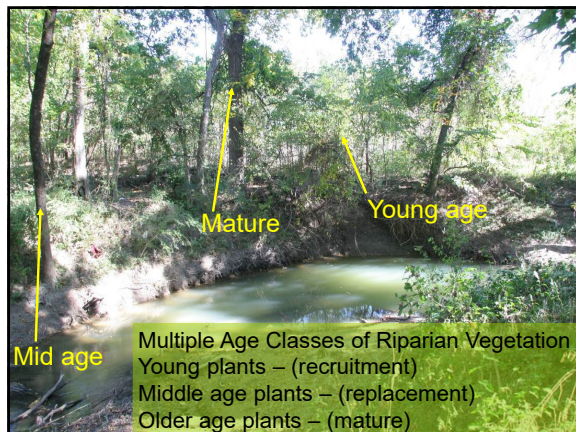
Sedge

Grass

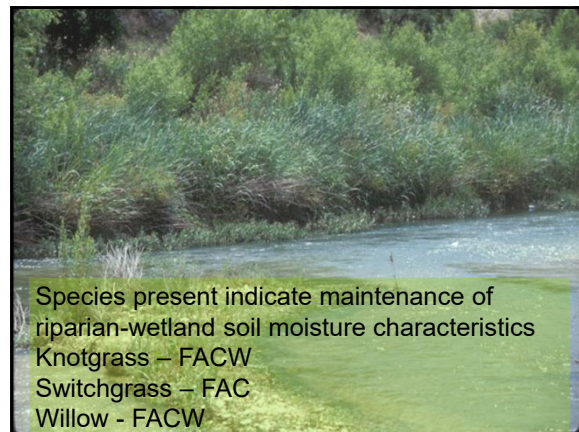
Forb





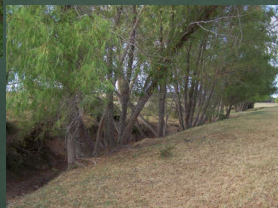








## Healthy Indicators????



## Benefits of Healthy Riparian Areas

- ◆ High quality habitat for both aquatic and riparian species
- ◆ Dissipation of flood energy and reduced downstream flood intensity and frequency
- ◆ Higher, longer-lasting and less variable baseflow between storm events
- ◆ Deposition of sediment in the floodplain, stabilizing it and maintaining downstream reservoir capacity longer
- ◆ Debris and nutrient use and filtering in the floodplain to improve water quality and dissolved oxygen levels in the aquatic system
- ◆ Riparian vegetation canopies to shade streams and reduce their temperatures, providing a food base for aquatic and riparian fauna
- ◆ Fewer invasions of exotic undesirable riparian species
- ◆ Higher biodiversity than terrestrial uplands
- ◆ "Stabilized" banks, which reduce erosion and protect ownership boundaries
- ◆ Increased economic value through wildlife, livestock, timber, and recreational enterprises
- ◆ Improved rural land aesthetics and real estate values

## How to Protect and Manage Riparian Areas:

- Creeks / Riparian Areas are special places; they deserve preferential treatment
- Remove the hindrances that inhibit natural restoration

### Farming, mowing, or spraying weeds too close to the bank



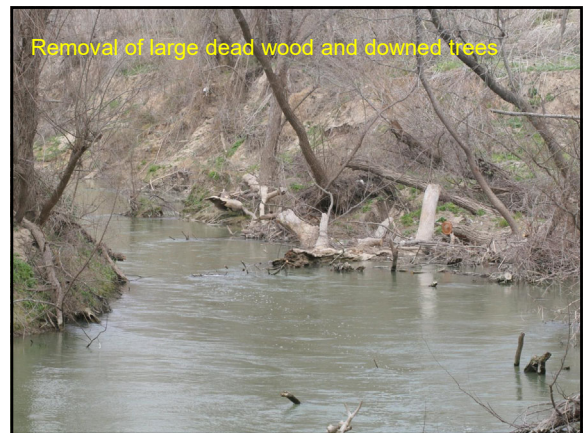
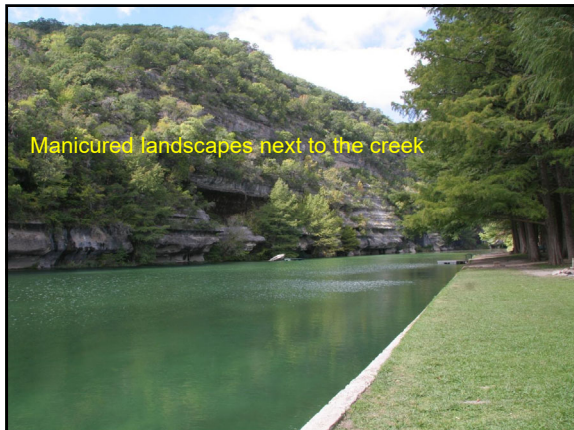
### Grazing concentrations in creek areas



### Excessive populations of deer, exotics, or feral hogs in creek areas





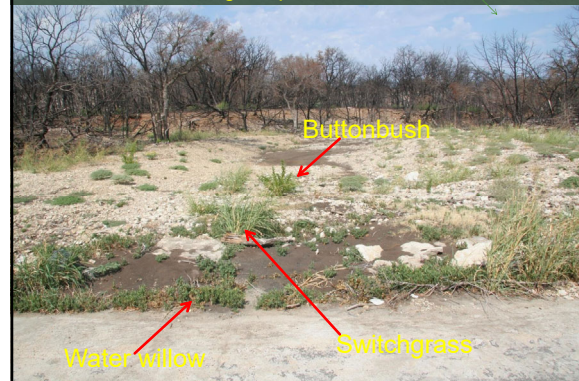




Poorly designed road crossings / bridges



Burning in riparian areas



Introduction of Invasive Exotic Plants



Introduction of Invasive Exotic Plants



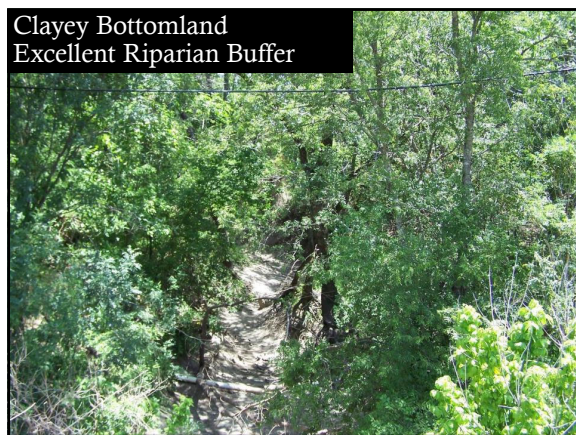
Lone line of defense is removed



Lone line of defense







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