



**Nueces Riparian Network  
Landowner's Workshop  
May, 2010**





Do you appreciate healthy  
creeks and rivers?







**What are the values you  
appreciate about healthy  
creeks and riparian areas?**





# Creek / River / Riparian Values

- Fisherman
- Livestock rancher
- Game manager / hunter
- Downstream communities
- Downstream farmer
- Canoeist
- Birdwatcher
- Prospective land buyer







**Clean Reliable Supply of Water  
Abundant Livestock Forage  
Fish and Wildlife Habitat  
Natural Beauty/Recreation**



A photograph of a river or creek. In the foreground, a large, weathered log lies horizontally in the water, partially submerged. To its right, another log is propped up vertically. The water is calm with gentle ripples. The background shows a line of bare trees on the left bank and a grassy hill on the right under a blue sky with scattered white clouds.

# **Understanding Creeks / Rivers / Riparian Areas**



# What is a Riparian Area?









A photograph of a small, shallow stream flowing through a riparian area. The stream is filled with numerous smooth, light-colored rocks of various sizes. The water is clear and reflects the sky. The banks are covered with tall, dry grasses and green shrubs. The background shows more trees and a clear blue sky with some light clouds.

How can riparian areas  
be maintained?



How can riparian areas  
be restored?







# How does riparian restoration happen?

## RIPARIAN AREA MANAGEMENT

TR 1737-15 1998

*A User Guide to Assessing Proper  
Functioning Condition and  
the Supporting Science for Lotic Areas*



U.S. Department of the Interior  
Bureau of Land Management



U.S. Department of Agriculture  
Forest Service

USDA NRCS

U.S. Department of Agriculture  
Natural Resources Conservation Service





*"Restoration will not happen by regulation, changes in the law, more money, or any of the normal bureaucratic approaches.*

*It will only occur through the integration of ecological, economic, and social factors, and participation of affected interests."*

Wayne Elmore





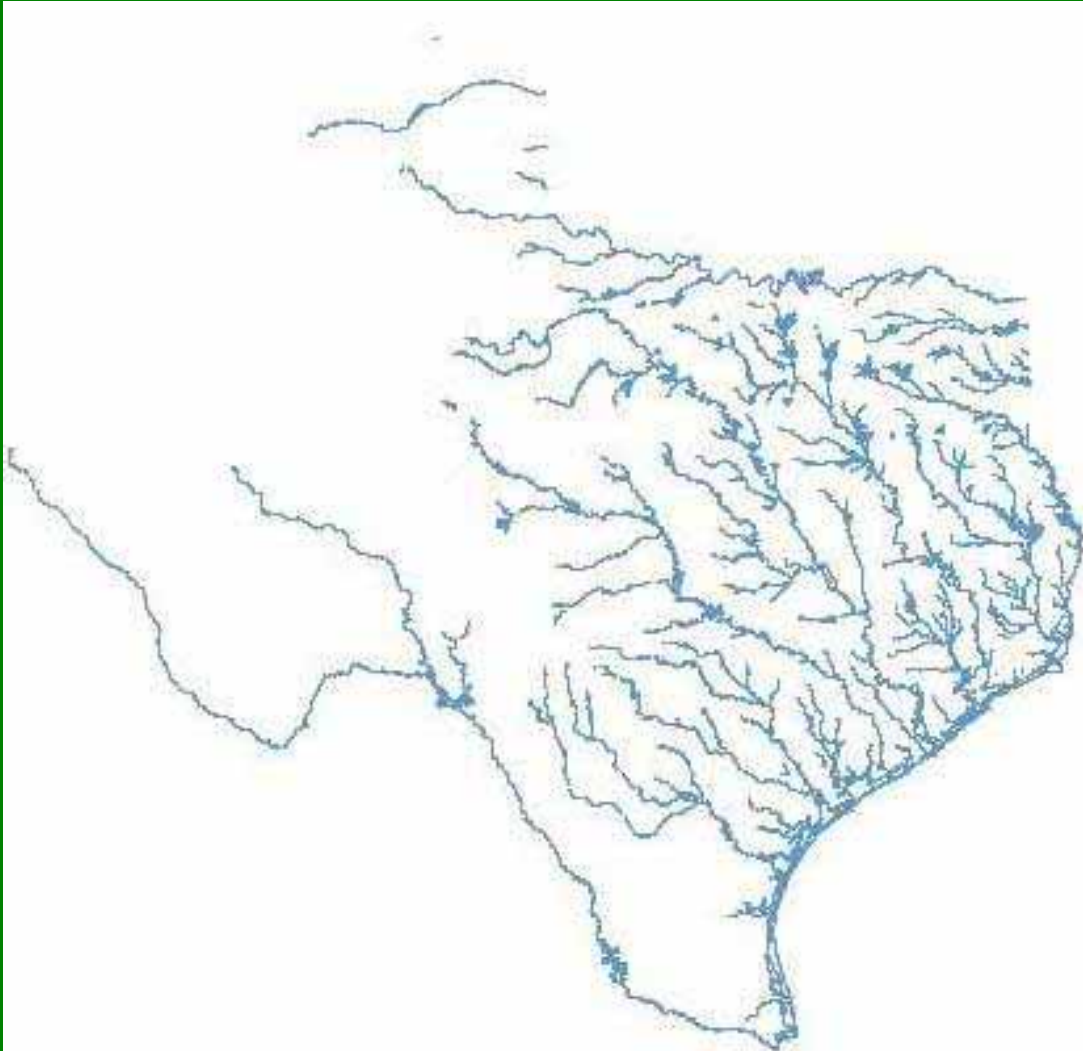
Why is all of  
this so  
important?

You are the water  
managers of Texas





# Texas has some severe water challenges



## Common “Solutions” to Water Shortages

Dams / Reservoirs

Dredging

Wells

Pipelines / Canals

Desalinization

Inter-basin transfers

**An Overlooked  
Opportunity**



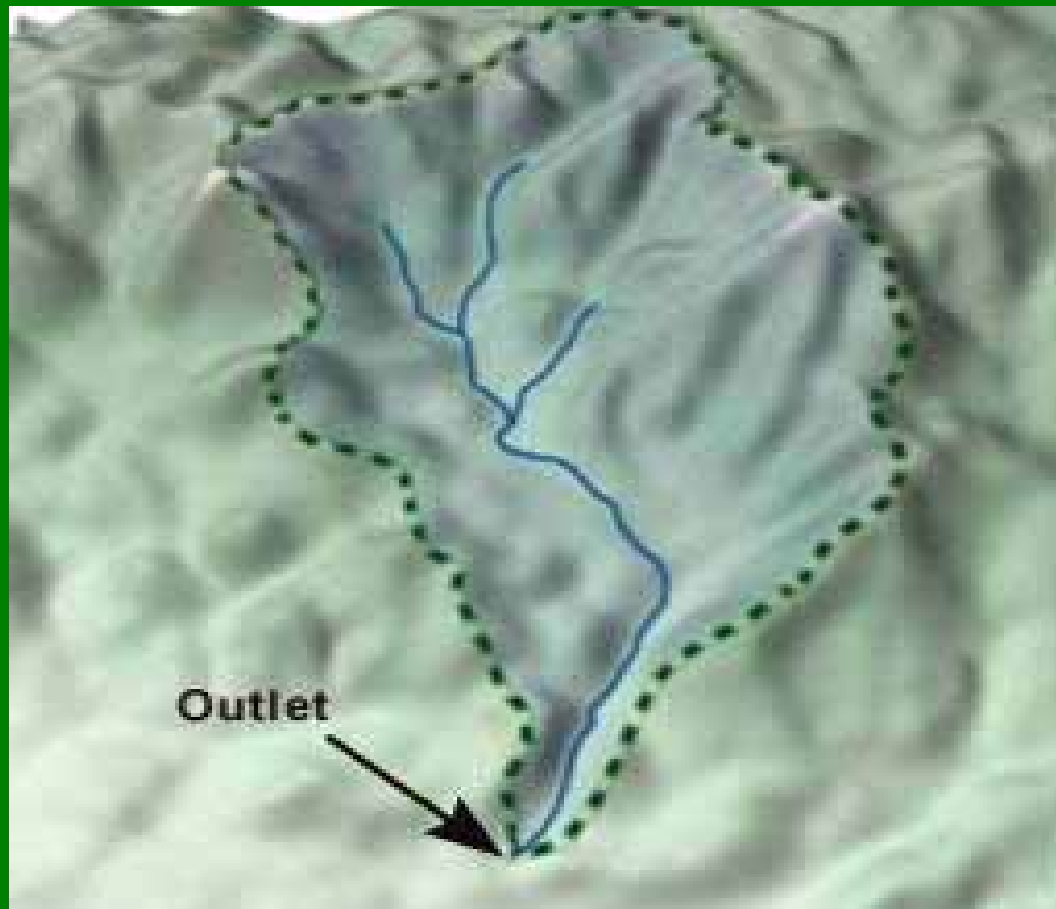


**What happens to rainfall  
when it hits the ground?**

**Soaks in**

**Runoff**





Watershed  
vs.  
Catchment











A photograph of a rural landscape. In the foreground, there is a fence made of wooden posts and wire, with some posts leaning. The ground is covered in dry, brownish grass and some green patches. In the background, there are several bare trees and a hazy sky. The text "Water Shed" is overlaid in the upper right, and "Water Catchment" is overlaid in the lower left.

Water Shed

Water Catchment







# An Overlooked Opportunity



Catching the water

Storing the water  
in the land





# Keeping Water on the Land Longer



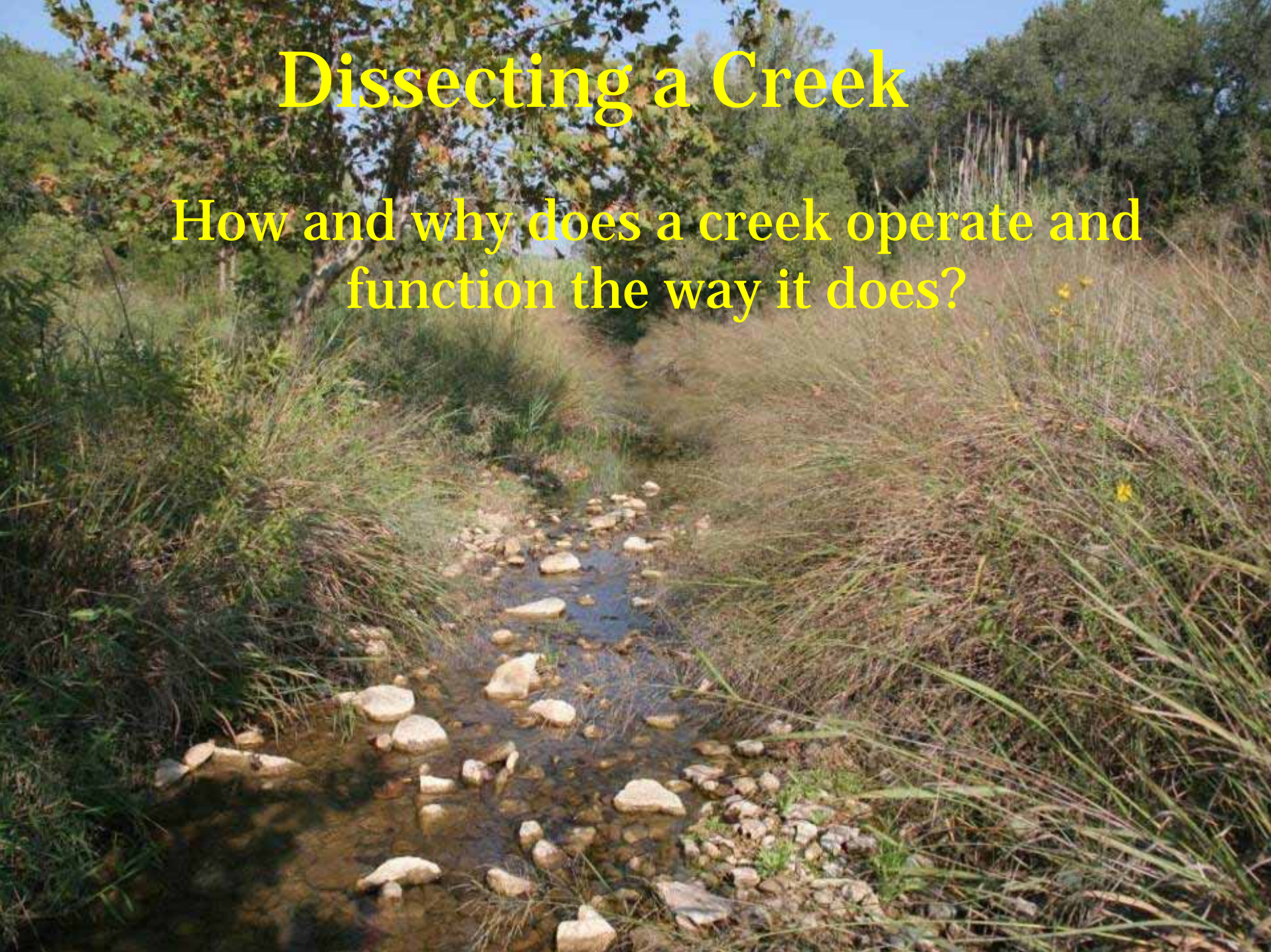
“Riparian Sponge”





# Dissecting a Creek

How and why does a creek operate and function the way it does?





## Identify the Components of a Creek

- Channel / Banks
- Floodplain
- Sediment
- Base flow
- Flood flow
- Water table
- Vegetation
- Large wood
- Organic debris

## The Processes that occur

- Erosion / Deposition
- Bankfull discharge
- Sinuosity
- Width : Depth Ratio
- Gradient / Velocity
- Recruitment
- Root density
- Channel stability
- Channel evolution
- Plant succession

















# Fixing the Creek









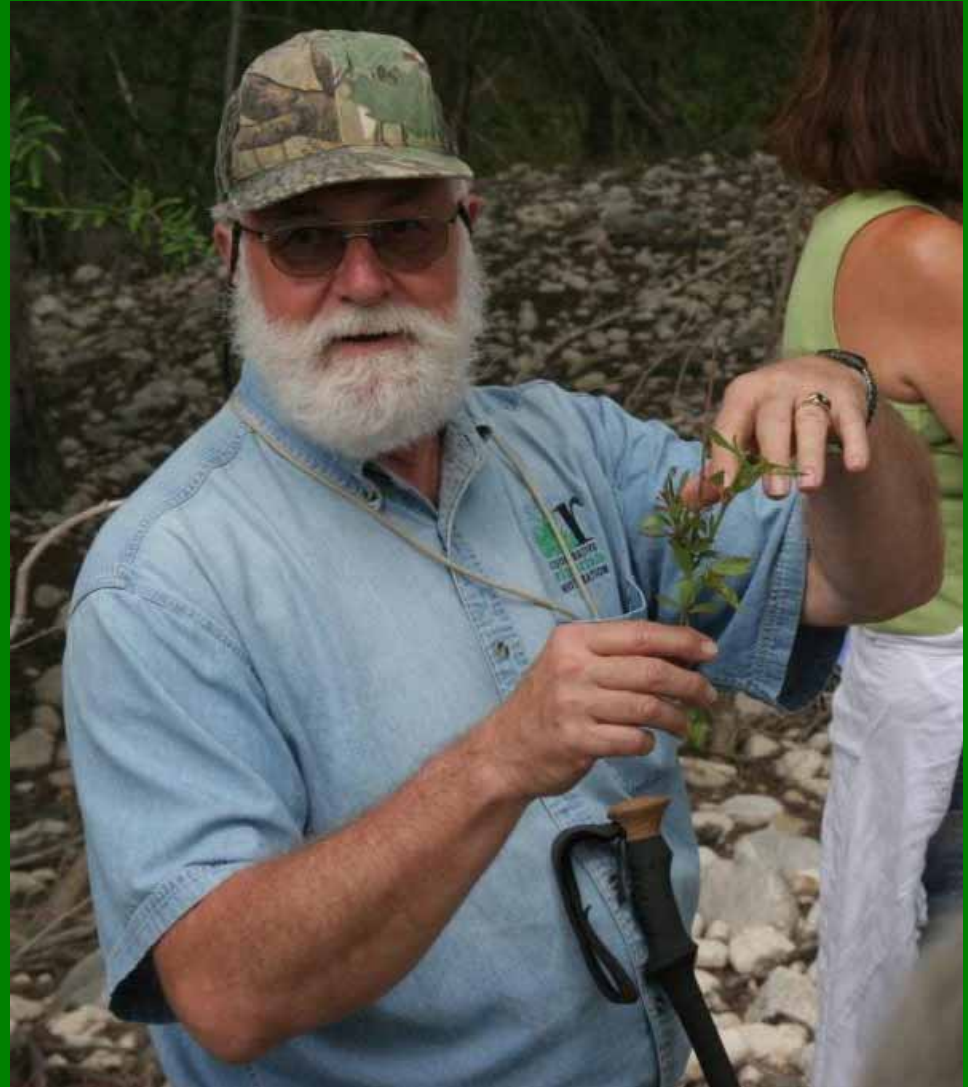




# Bear Creek – Riparian Restoration

Central Oregon  
3500' Elevation  
12" Precipitation

Wayne Elmore,  
National Riparian Service Team  
Full Stream Consulting







1977



Intermittent flow – No fish

Accelerated erosion - Sediment loss

100 years of poor grazing management = Poor vegetation

Wet riparian area (sponge) = 4 acres / mile

Water storage = 1.5 ac ft / mile

Bank erosion = 12,500 feet



1977



# A Change in Grazing Management

1977 – 1984: No grazing / Reduced grazing  
to jump-start recovery

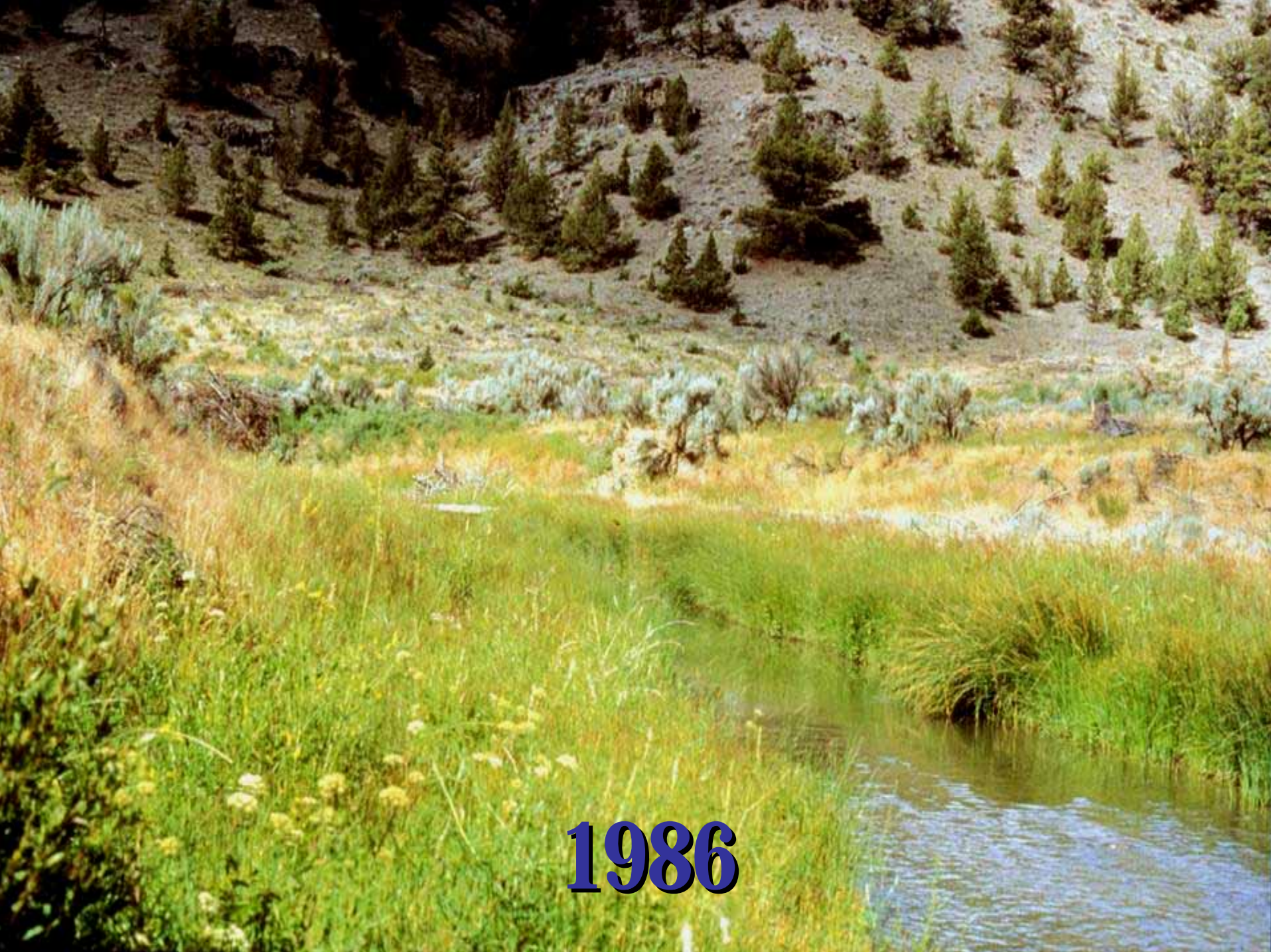
1985 – Present: Rotational grazing during  
late winter to maintain  
adequate riparian vegetation





**1983**





1986





**June 1987**





**Aug 1987**





1988





1993





**Feb 1996**





**April 1996**





**Oct 1996**





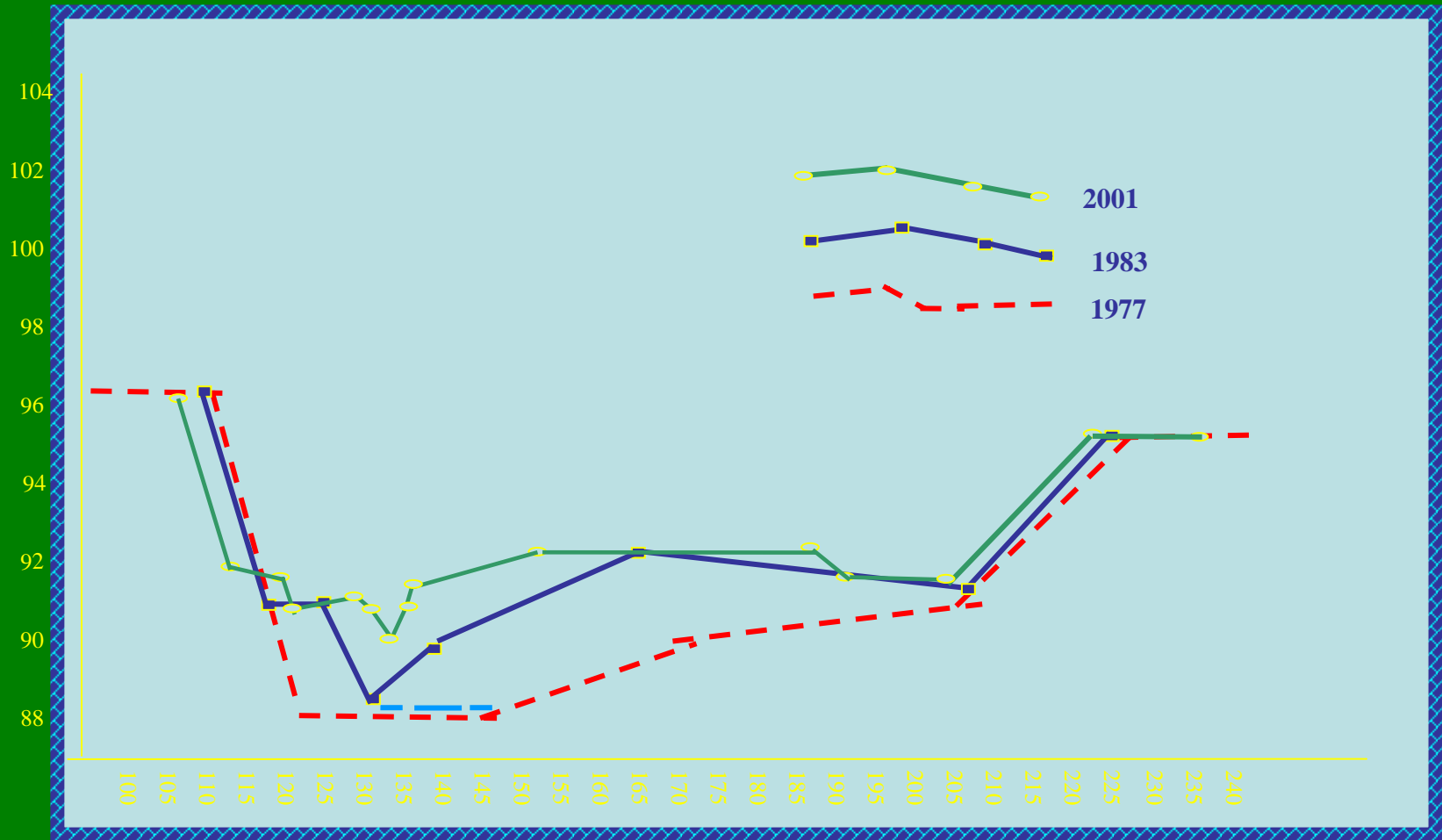
**2001**

7 10 01



# Bear Creek : Change In Channel Profile (1977 - 2001)

**2001**





- Sediment Captured = 7400 CY/Mile
- Riparian “Sponge” = 12 Ac/Mile
- Water Storage = 2,100,000 Gal/Mile  
(net gain of 4.9 ac ft of storage/mile)
- Perennial flow; prime aquatic habitat
- 10x Increase in livestock forage
- Bank erosion = 100 feet





# 10 Years of Management



1977

1986









# Riparian Restoration Process







## 2008 Riparian Workshops







**Sky Lewey**  
**Director, Resource Protection & Education**  
**Nueces River Authority**





























What's the Difference?



Trap sediment

Store Water









A white bucket hat is placed on a dark, moist, silty surface. Several clumps of green and brown grass are scattered around the hat. The hat's shadow is cast to the left. The text "Catch sediment" is overlaid in yellow at the bottom center.

Catch sediment















# Vegetation is the Key to Healthy Creeks and Riparian Areas







**Rootmass = Stability?**





Switchgrass





















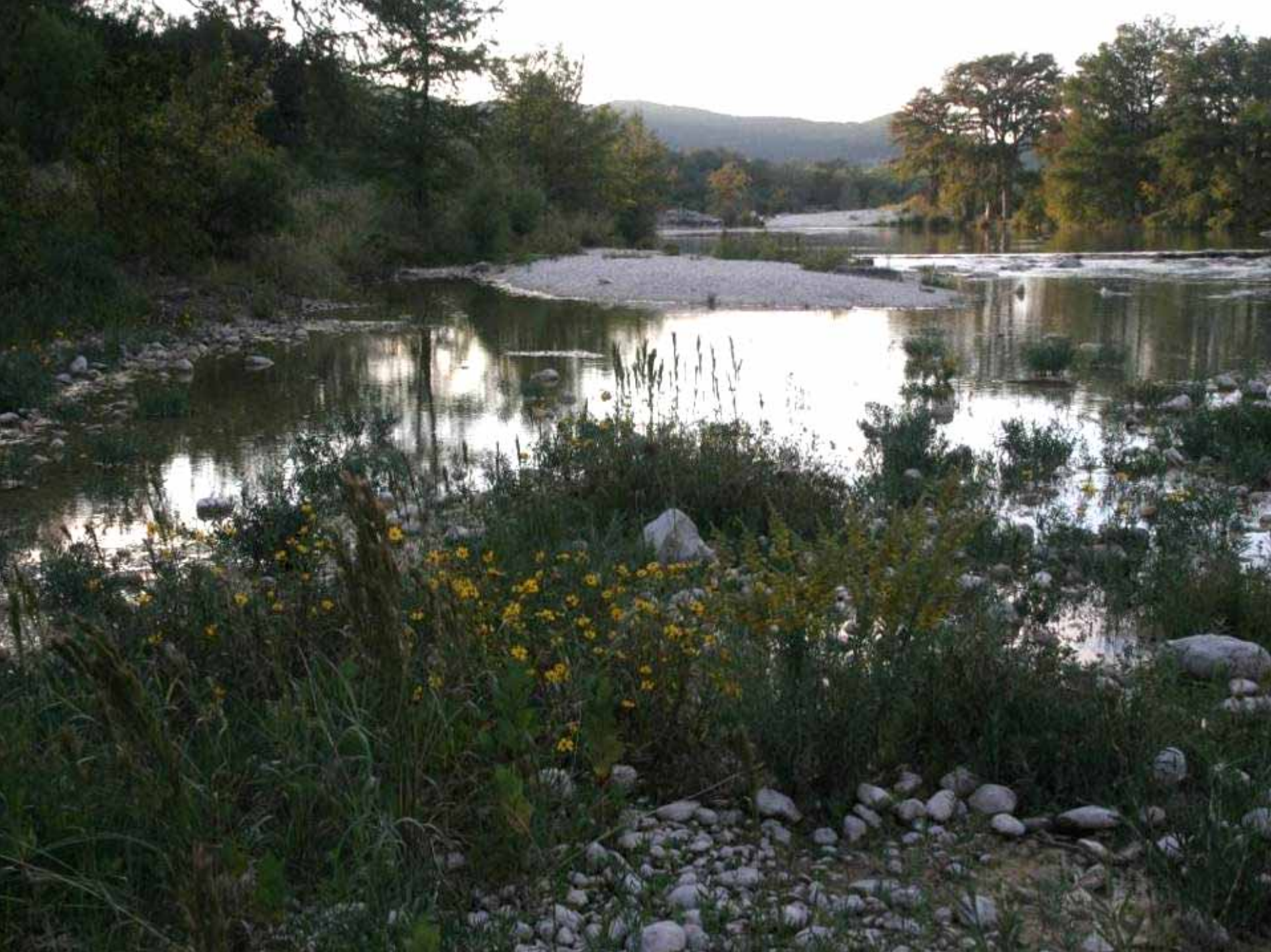




















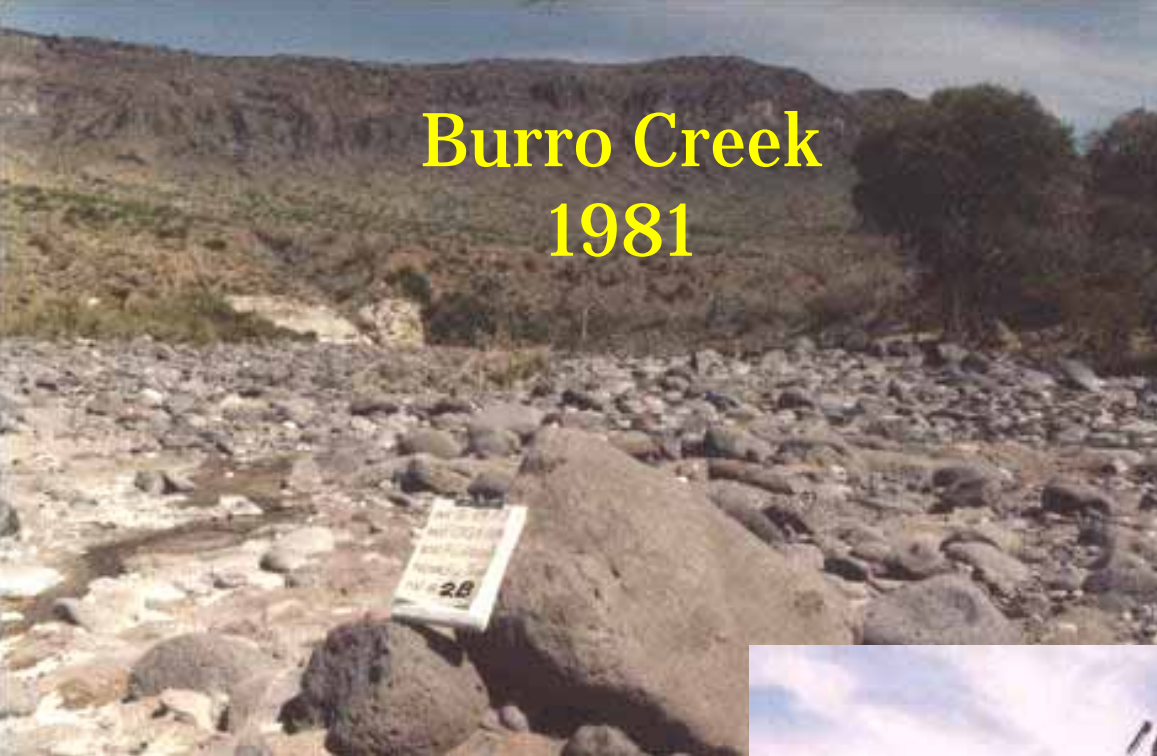
**Muddy Creek**  
**1986**

**Muddy Creek**  
**1996**

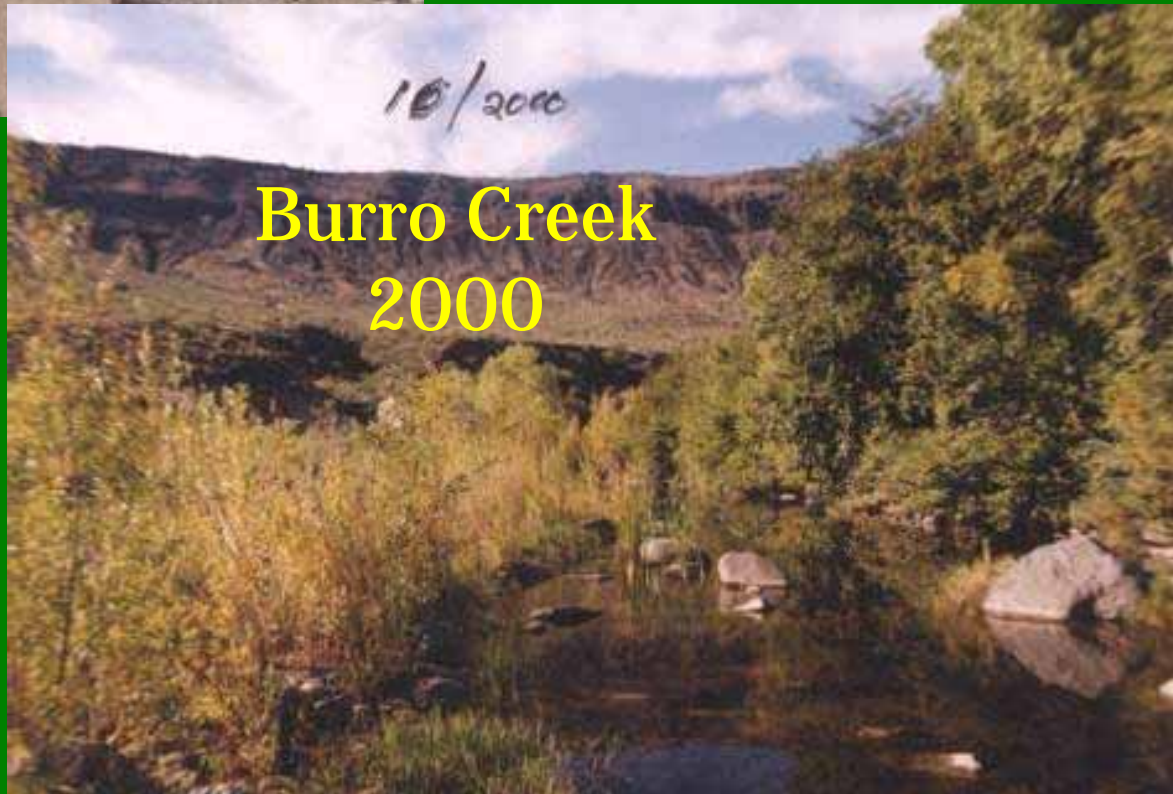




# Burro Creek 1981



# Burro Creek 2000







1976



1978

## Texas Creek, Colorado



1987



# PFC does not mean...

## “Perfectly Functioning Condition”









A photograph of a dry, hilly landscape. The foreground is filled with tall, dry, yellowish-brown grass. In the middle ground, there are several small, green shrubs and bushes. The background shows a line of denser green trees under a clear blue sky. The overall scene suggests a dry, arid environment.

*“Saving the water and the soil must start  
where the first raindrop falls”*

Lyndon B. Johnson, 1947



A photograph of a herd of cattle grazing in a field of tall, dry grass. In the background, there is a hill covered in dense green trees and shrubs. The sky is clear and blue. The text is overlaid on the bottom right of the image.

**Large tracts in native vegetation  
Private ownership  
Good stewardship  
Economically sustainable**



Do you have  
love, respect  
and  
admiration  
for the land ?







**Sky Lewey**  
**Director, Resource Protection & Education**  
**Nueces River Authority**





**2 – 3 Hours in the Field**





How well do  
you understand  
your land?











# Proper Functioning Condition

Adequate vegetation, landform or large woody material to:

- Dissipate stream energy
- Stabilize banks
- Reduce erosion
- Filter sediment
- Capture bedload
- Aid floodplain development
- Floodwater retention
- Groundwater recharge
- Sustain baseflow

- Increased water quality & quantity
- Forage
- Aquatic habitat
- Wildlife habitat
- Recreational value
- Aesthetic beauty

Physical Function



Values



# A Healthy / Functional Creek Has Adequate Vegetation:

- Protects banks from excess erosion

- Dissipates energy and slows the velocity of floodwater

- Sediment dropped

- Sediment trapped and stabilized

- Builds floodplain

- Water storage in banks and floodplain

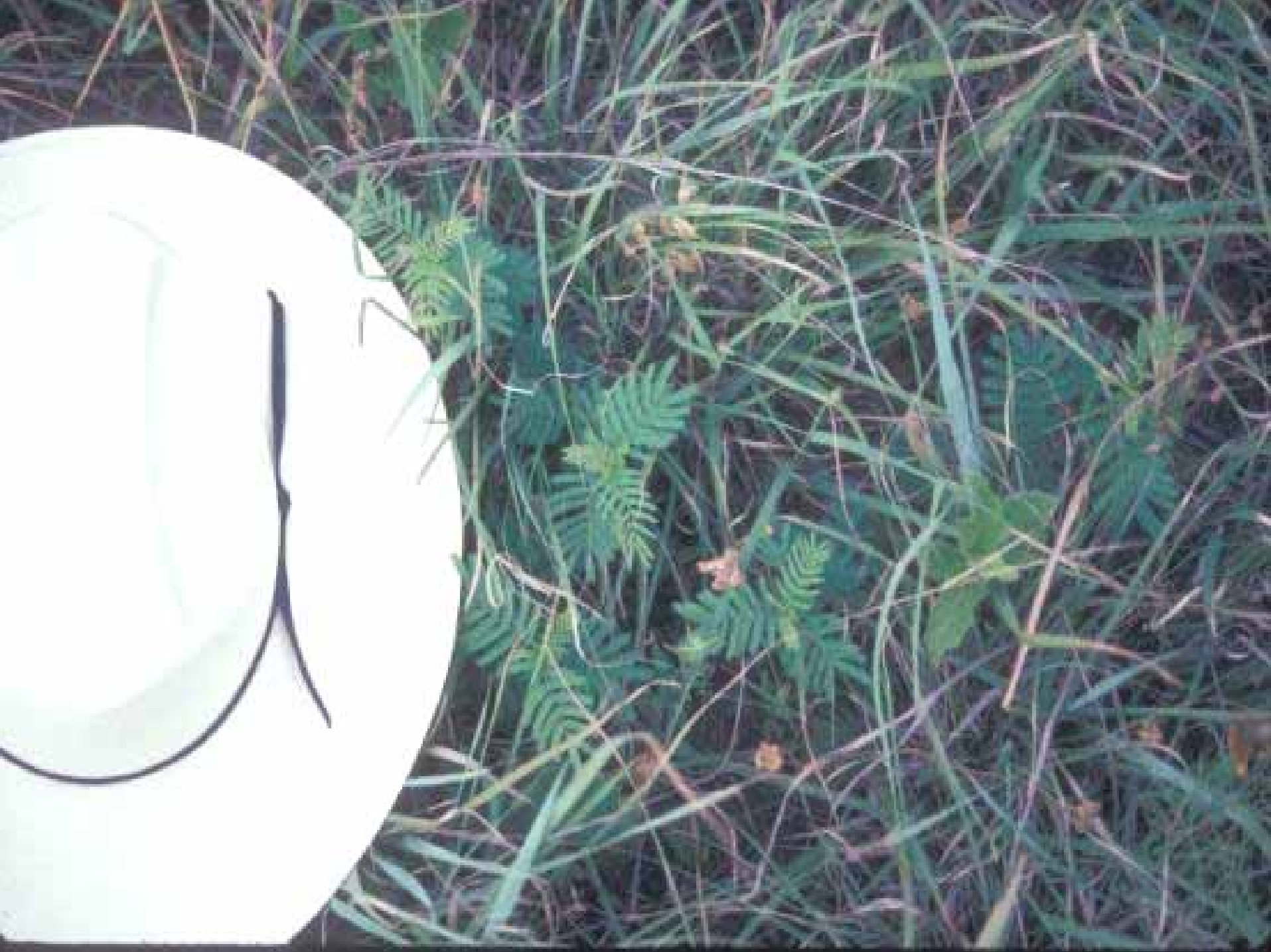
- Base-flow is sustained over time

- Increased groundwater recharge

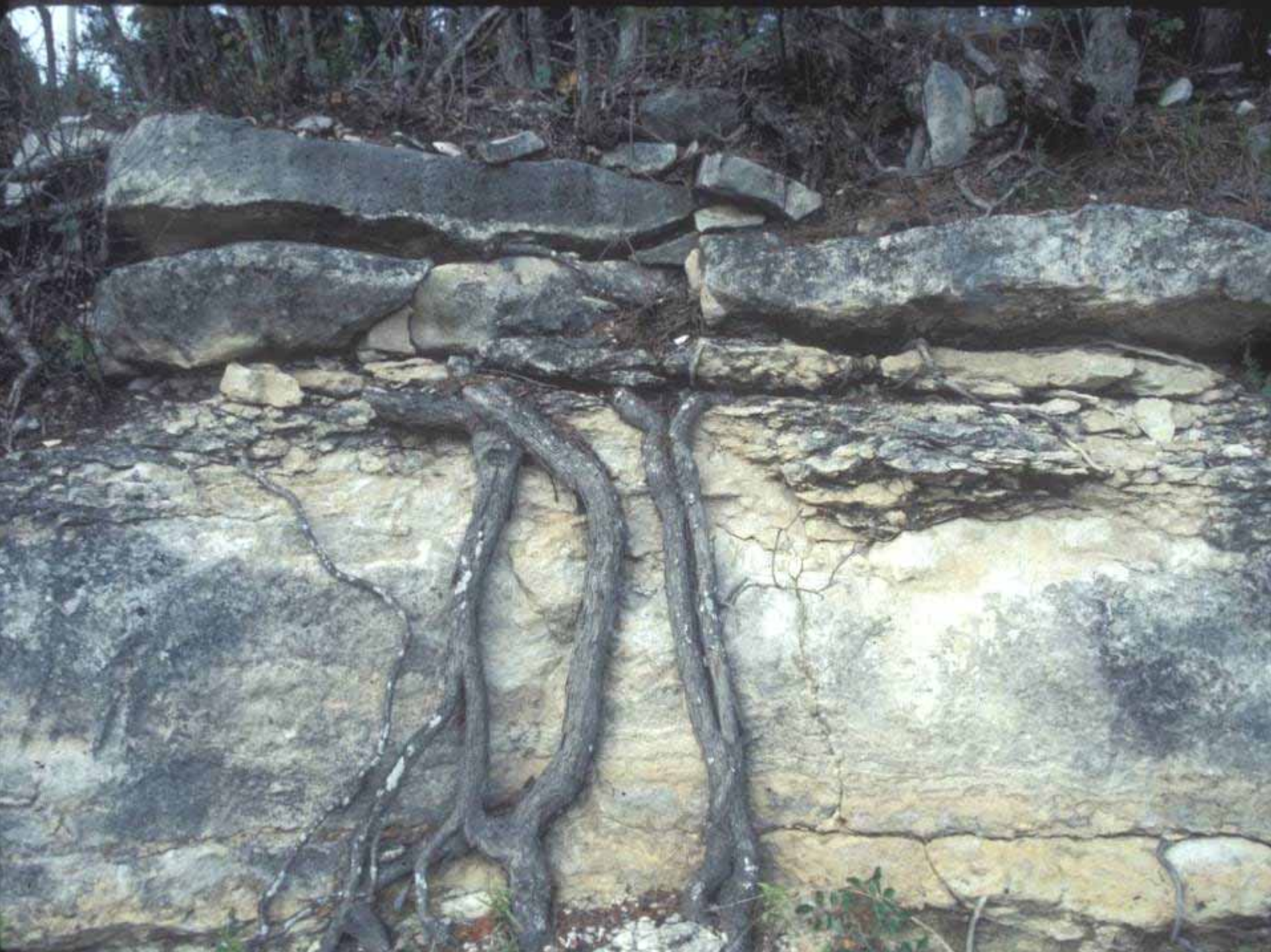




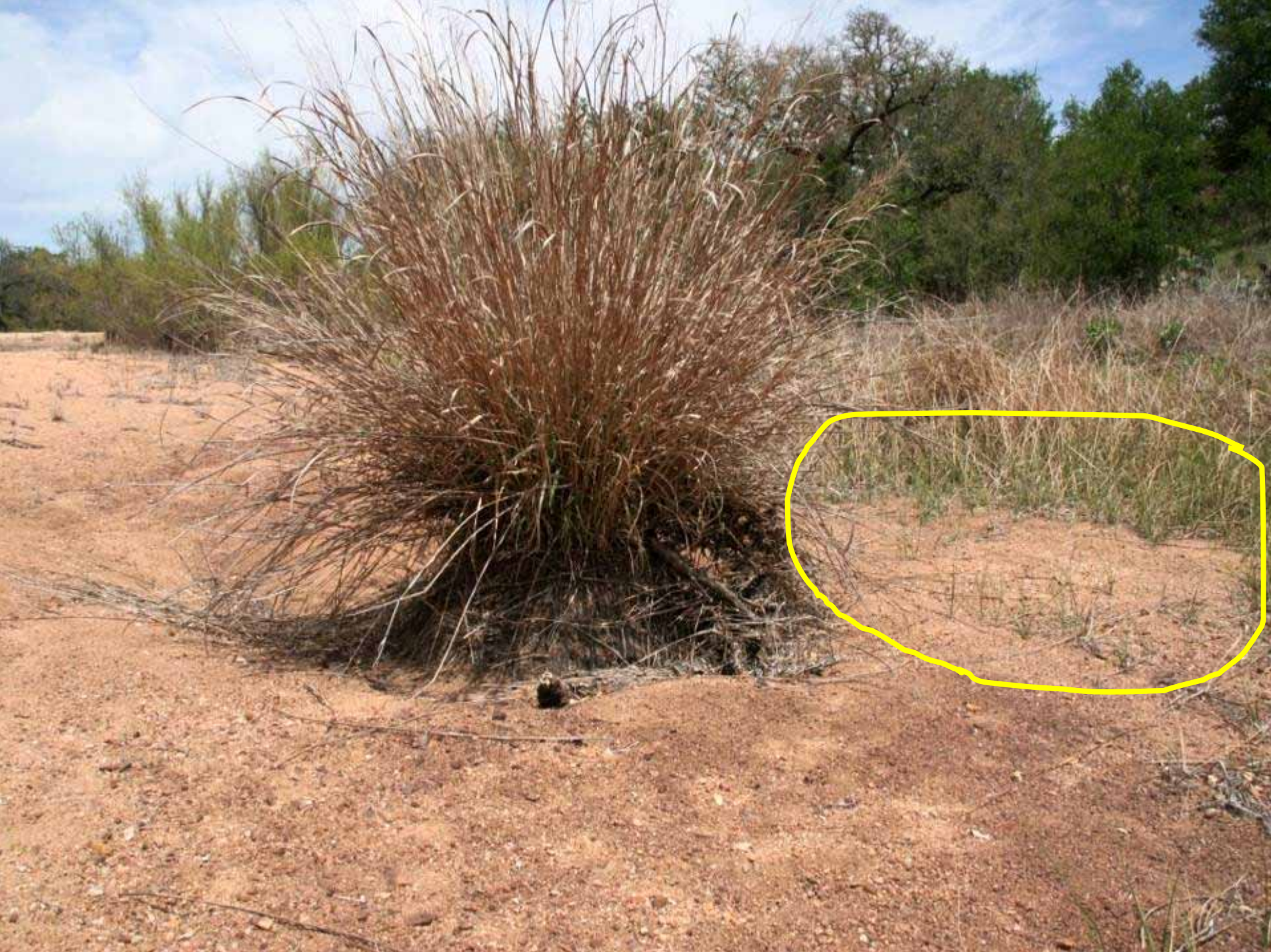
































## 2008 Workshops



10 Workshops 194 People  
138 Landowners; 387,000 Acres  
56 Natural Resource Professionals



# Understanding Creeks and Rivers

