

A photograph of a forest stream. The water is calm, reflecting the surrounding trees and foliage. The banks are covered in green vegetation and fallen leaves. In the background, a group of people is standing on the right bank, looking at something in their hands. The overall scene is peaceful and natural.

Understanding Creeks and Rivers

Texas Riparian and
Stream Ecosystem
Workshop




Introduction to Riparian Principles





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





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



Understanding Creeks / Rivers / Riparian Areas

Creek and River Myths and Misperceptions:

1. Floods are bad
2. Droughts are bad
3. Vertical cut-banks are bad
4. Removal of riparian trees is a good way to increase streamflow
5. Rivers should be wide and straight
6. Large wood clogs creeks and should be removed
7. People must fix damaged creeks

What is a Riparian Area?



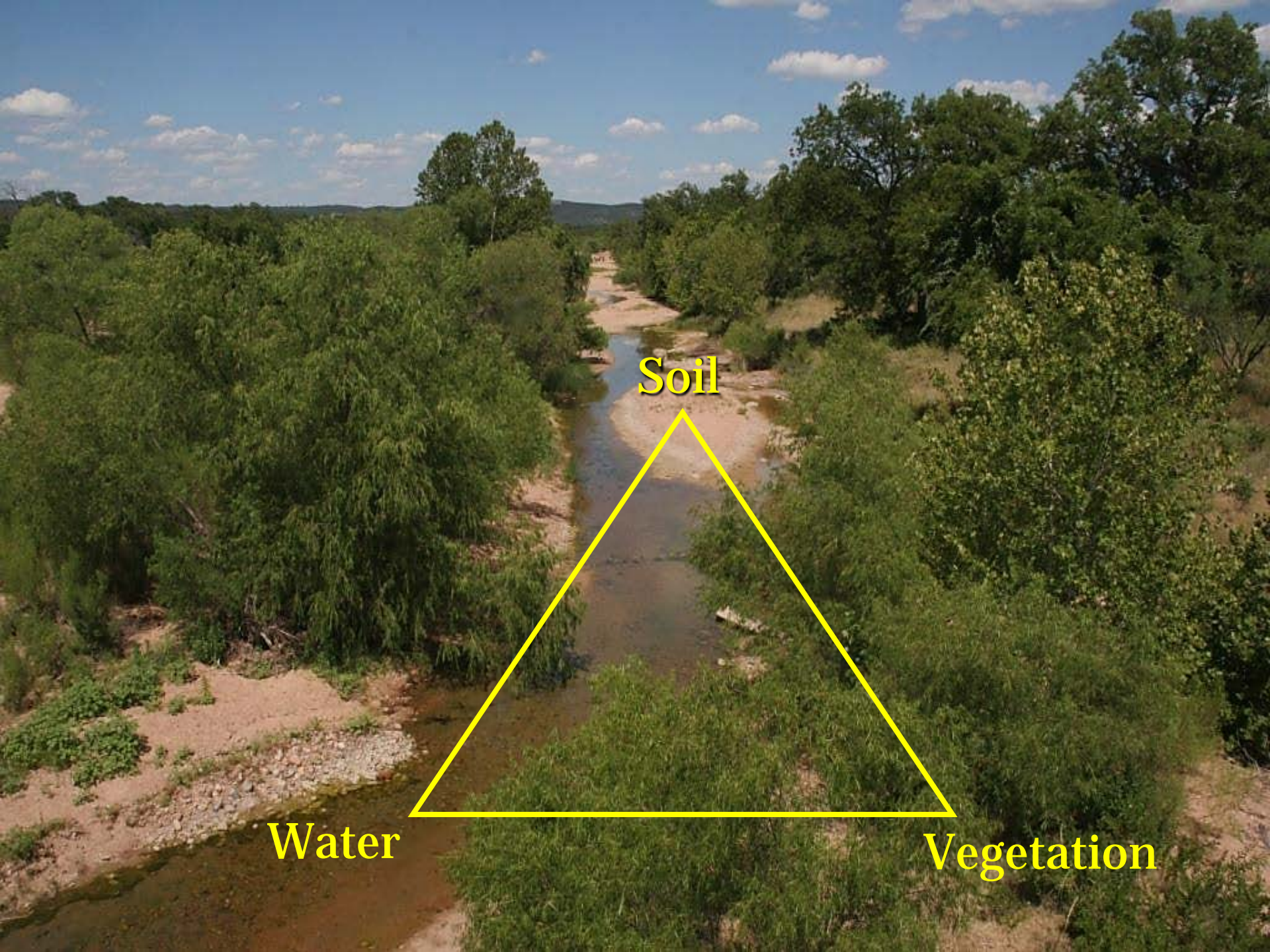












Soil

Water

Vegetation



What is a properly functioning riparian area?



Properly Functioning Riparian Area

Adequate vegetation, landform or large woody material to:

- Dissipate stream energy
- Stabilize banks
- Reduce erosion
- Trap sediment
- Build / enlarge floodplain
- Store water
- Floodwater retention
- Groundwater recharge
- Sustain baseflow

- Water quality
- Water quantity
- Forage
- Aquatic habitat
- Wildlife habitat
- Recreational value
- Aesthetic beauty

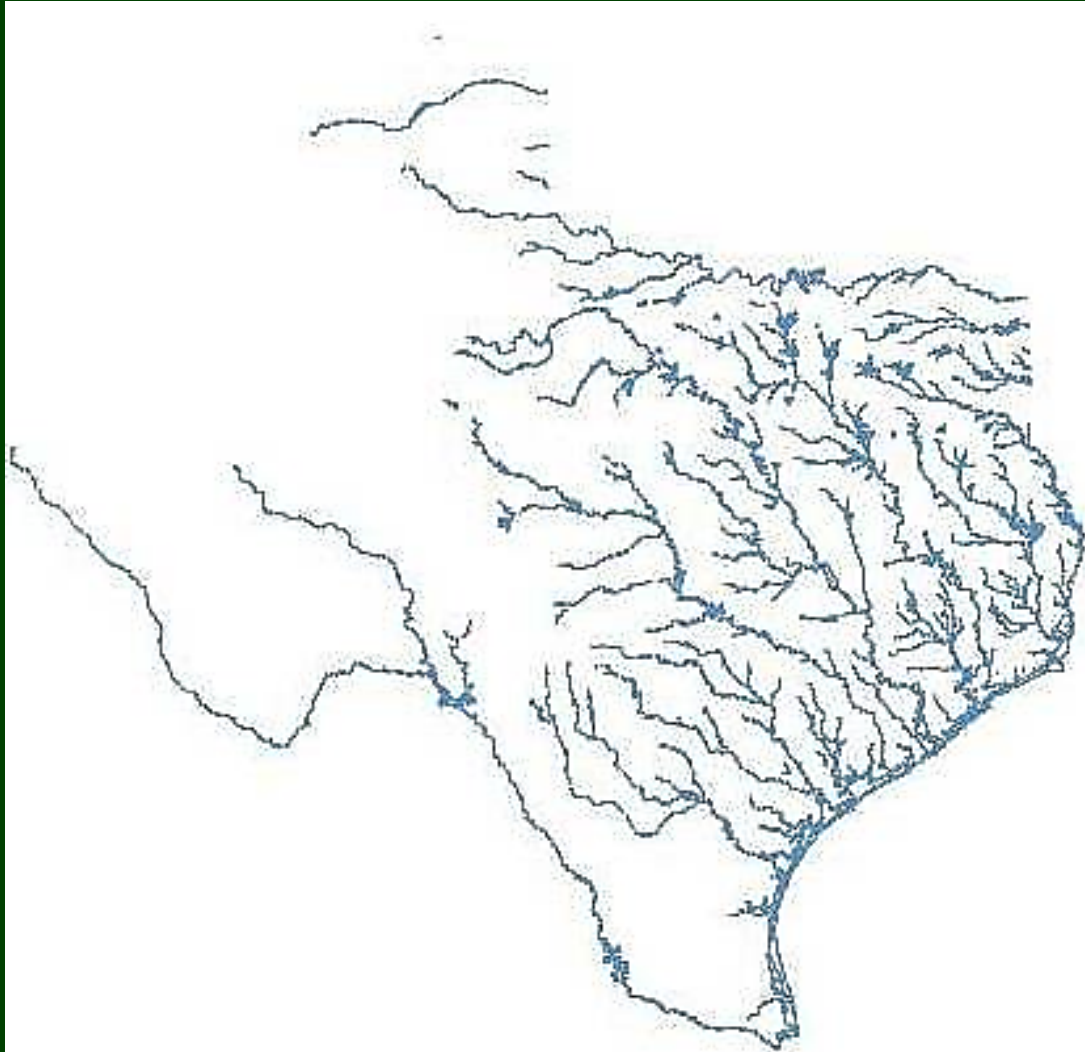
Physical Function



Values



Texas has some severe water challenges



Common “Solutions” to Water Shortages

Dams / Reservoirs
Dredging
Wells / Pipelines
Interbasin Transfers
Desalinization
Brush Control
Water Conservation

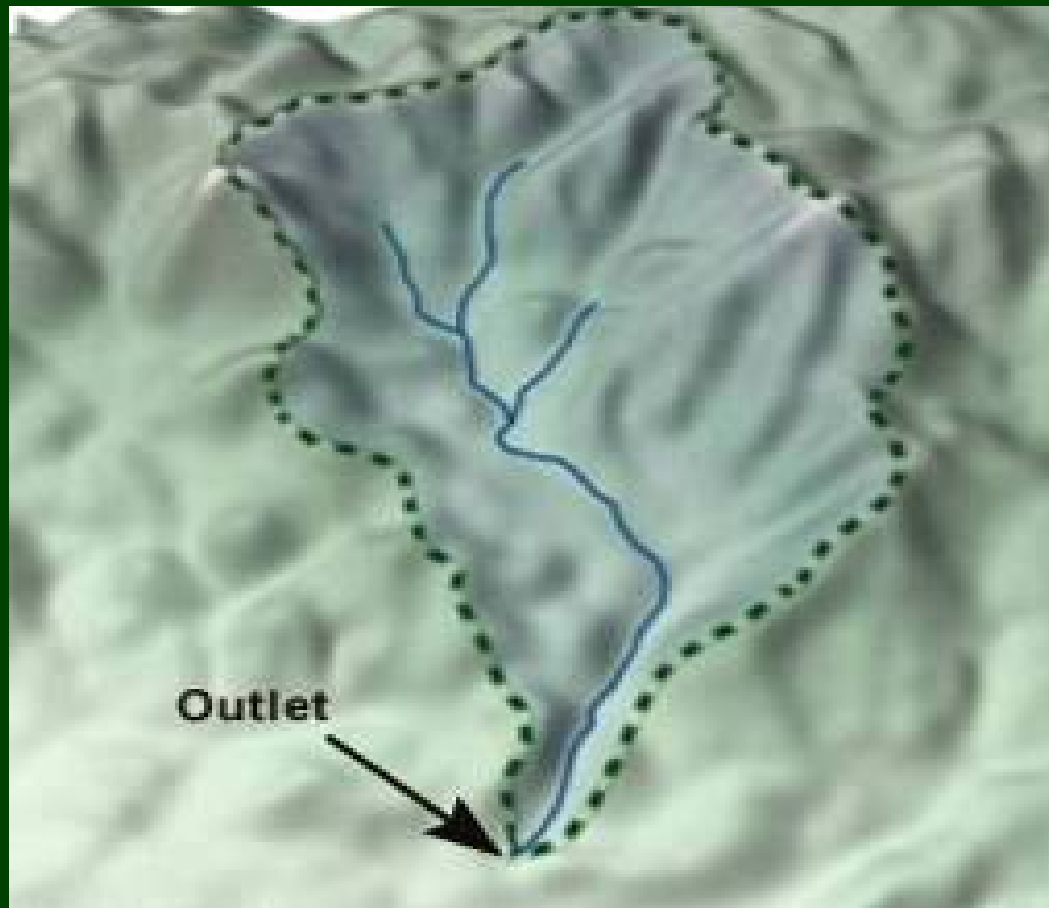
**An Overlooked
Opportunity**



**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 grassy field with some dry, brown grass on the left and greener grass on the right. A wooden fence made of vertical posts runs across the middle ground. In the background, there are several bare, leafless trees under a pale 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



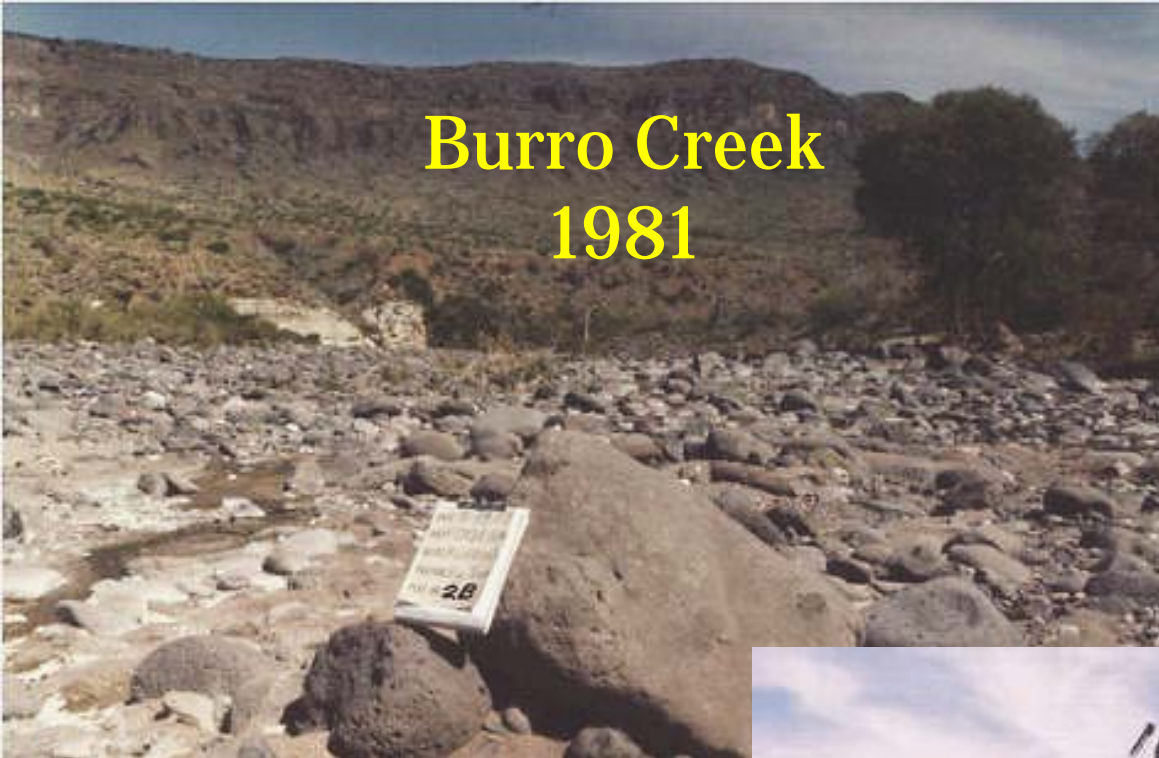


**Keeping Water on
the Land Longer**

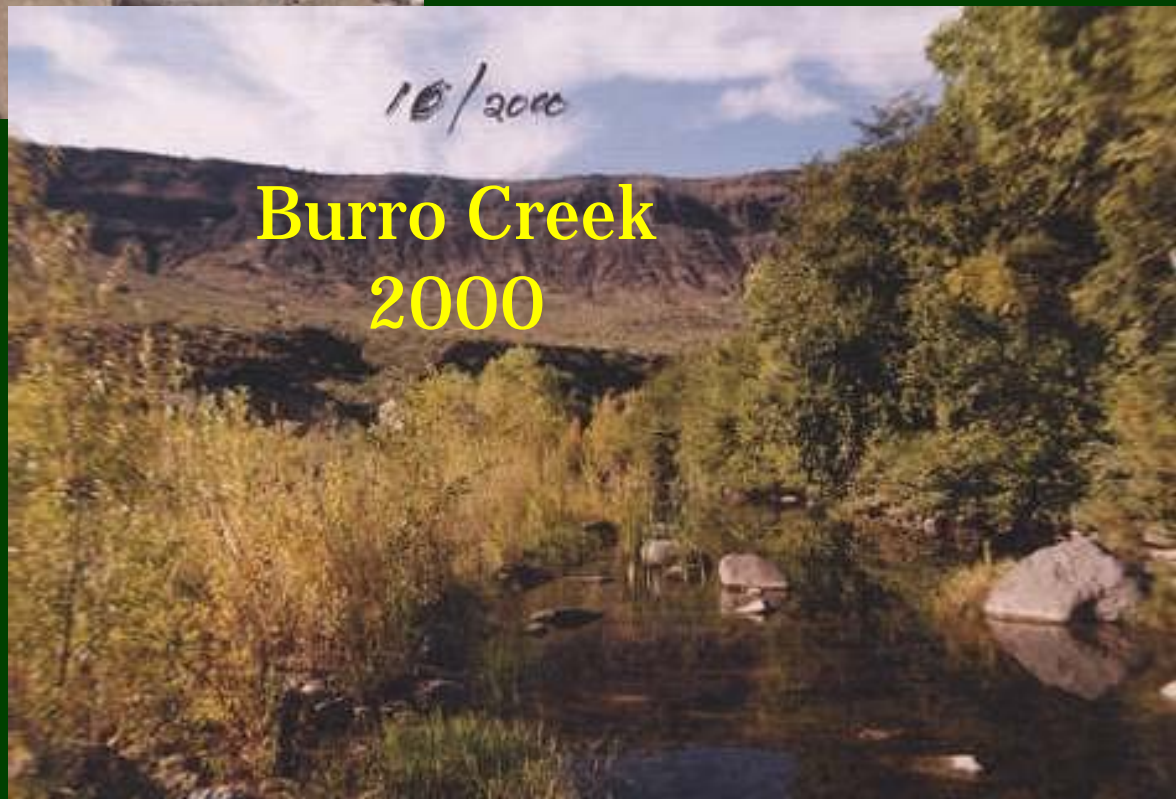


“Riparian Sponge”

Burro Creek 1981

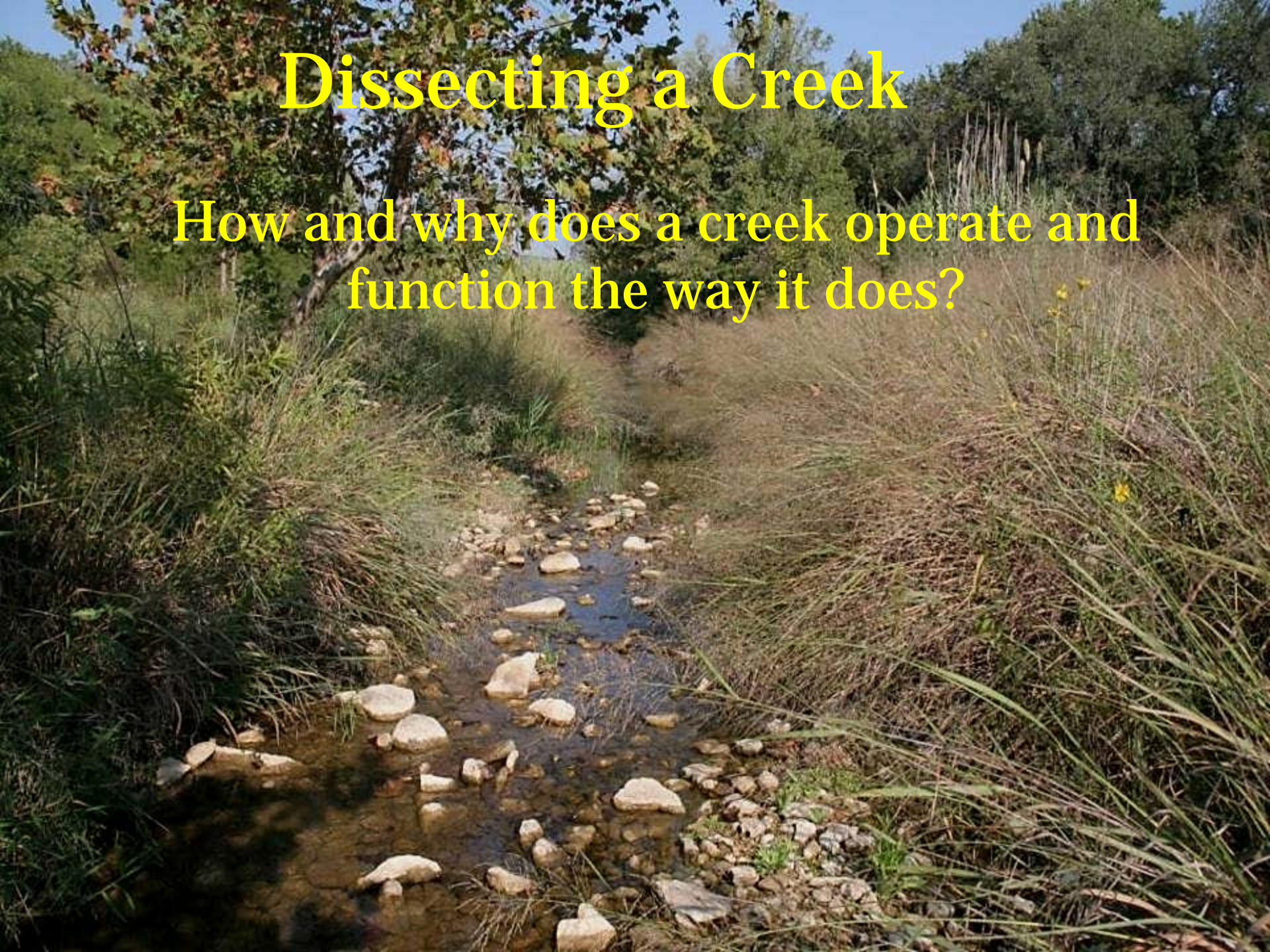


Burro Creek 2000



Dissecting a Creek

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

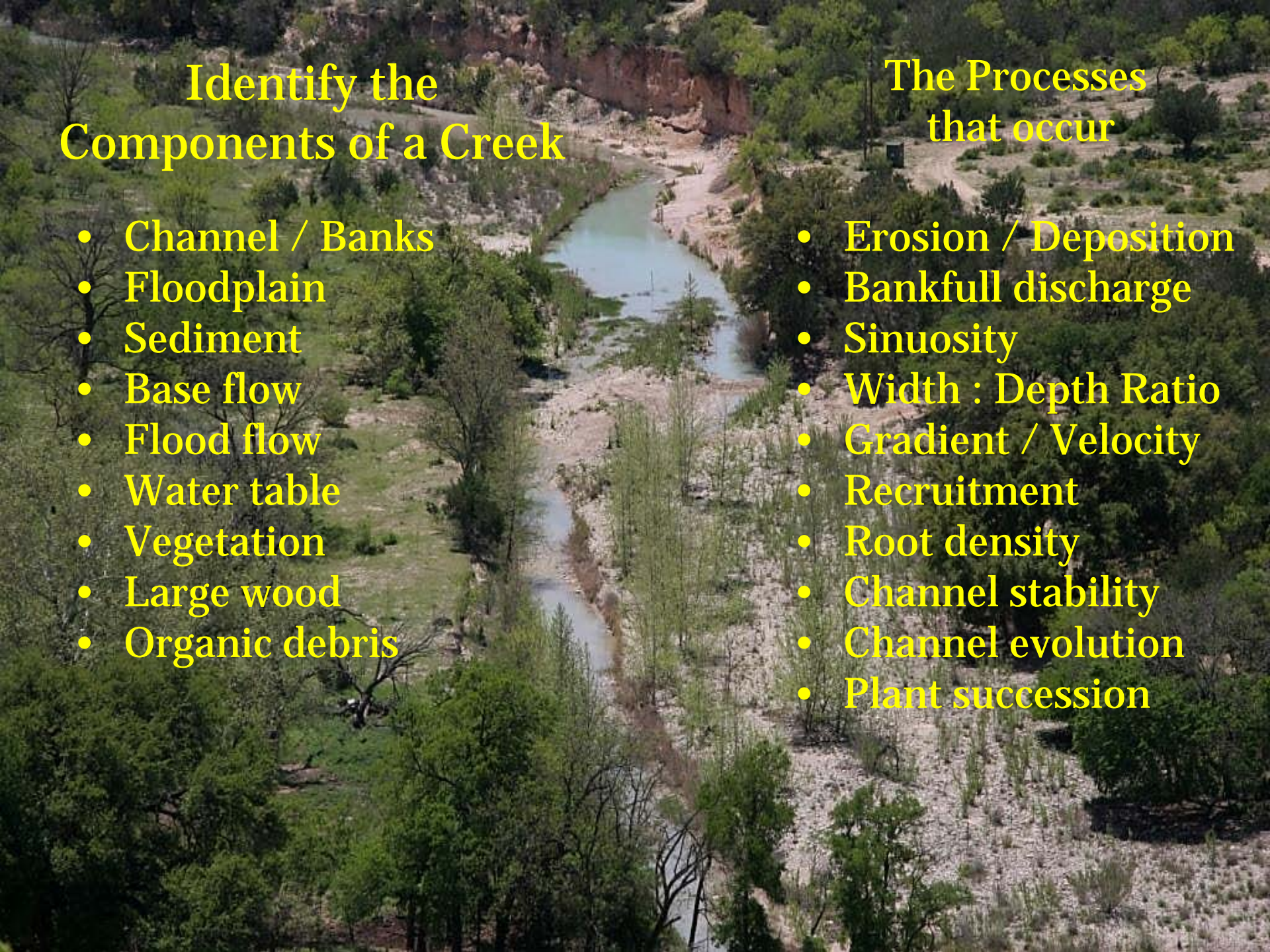


Identify the Components of a Creek

- 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

Poor vegetation

Wet riparian area (sponge) = 4 acres / mile

Water storage = 1.5 ac ft / mile

Bank erosion = 12,500 feet



A Change in Grazing Management

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

1985 – Present: Short term grazing during
late winter to improve
riparian vegetation



1983



1986



June 1987



Aug 1987



1988



1993



Feb 1996



April 1996



Oct 1996

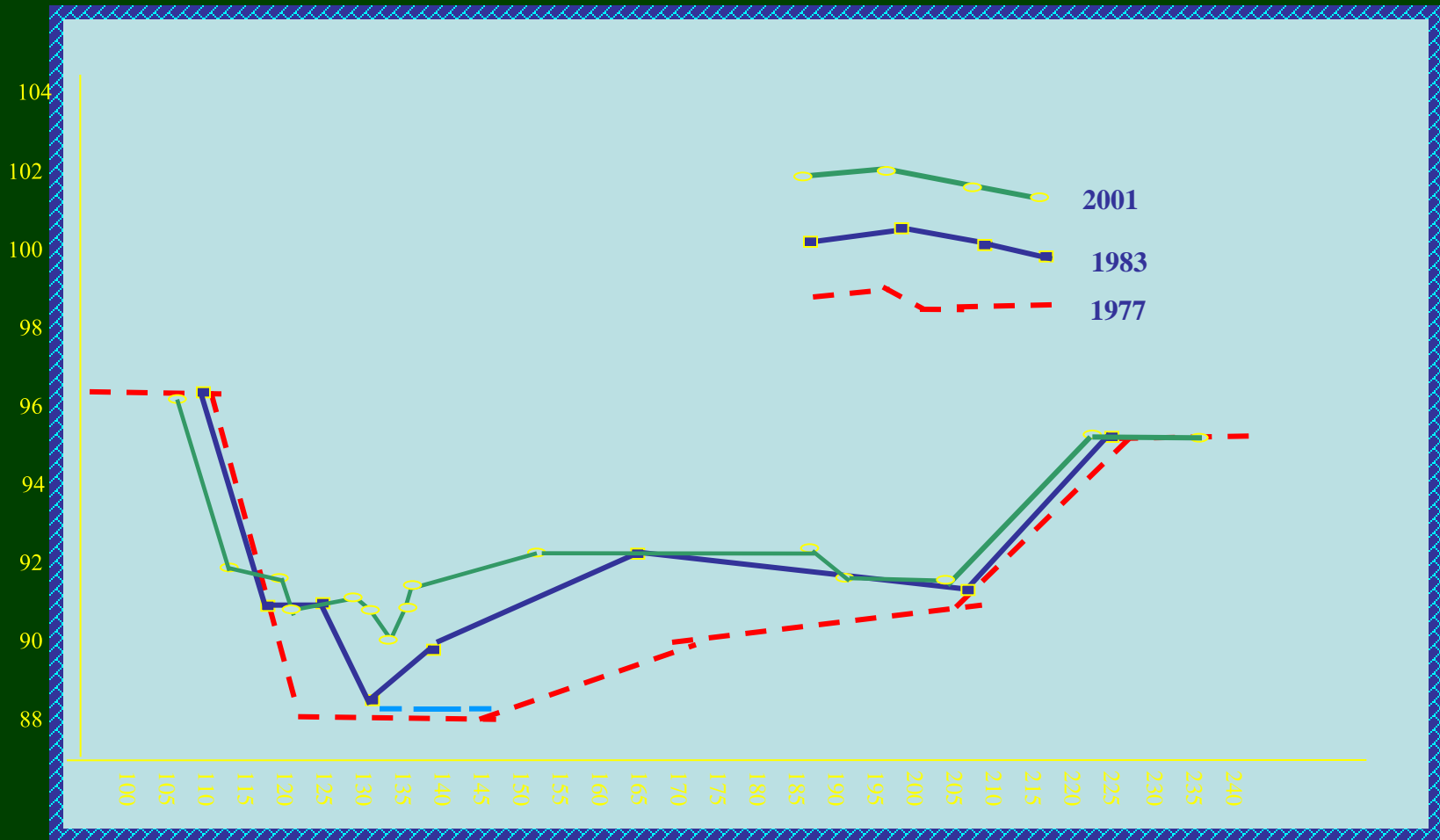


2001

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

2001



- Sediment Captured = 7400 CY/Mile
- Riparian “Sponge” Increased to 12 Ac/Mile
- Water Storage : Net gain of 4.9 ac ft /mile
- Perennial flow; prime fish habitat
- 10x Increase in livestock forage
- Bank erosion reduced to 100 feet



10 Years of Management

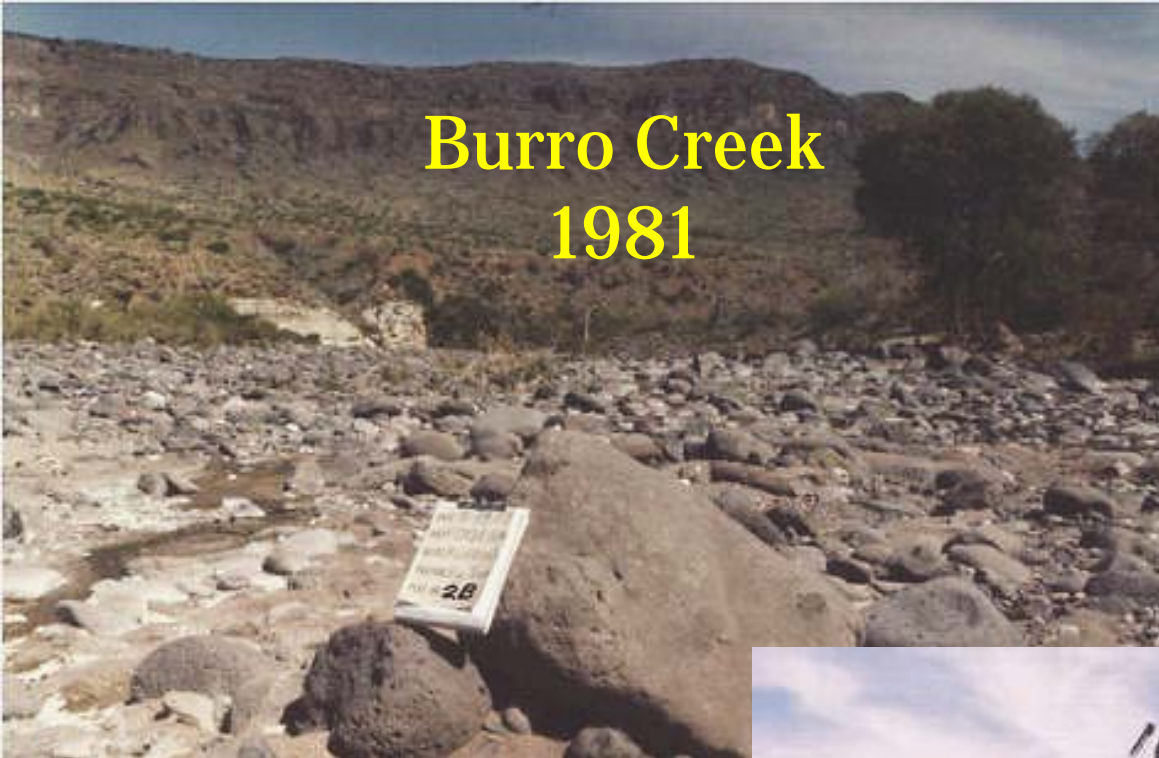


1977

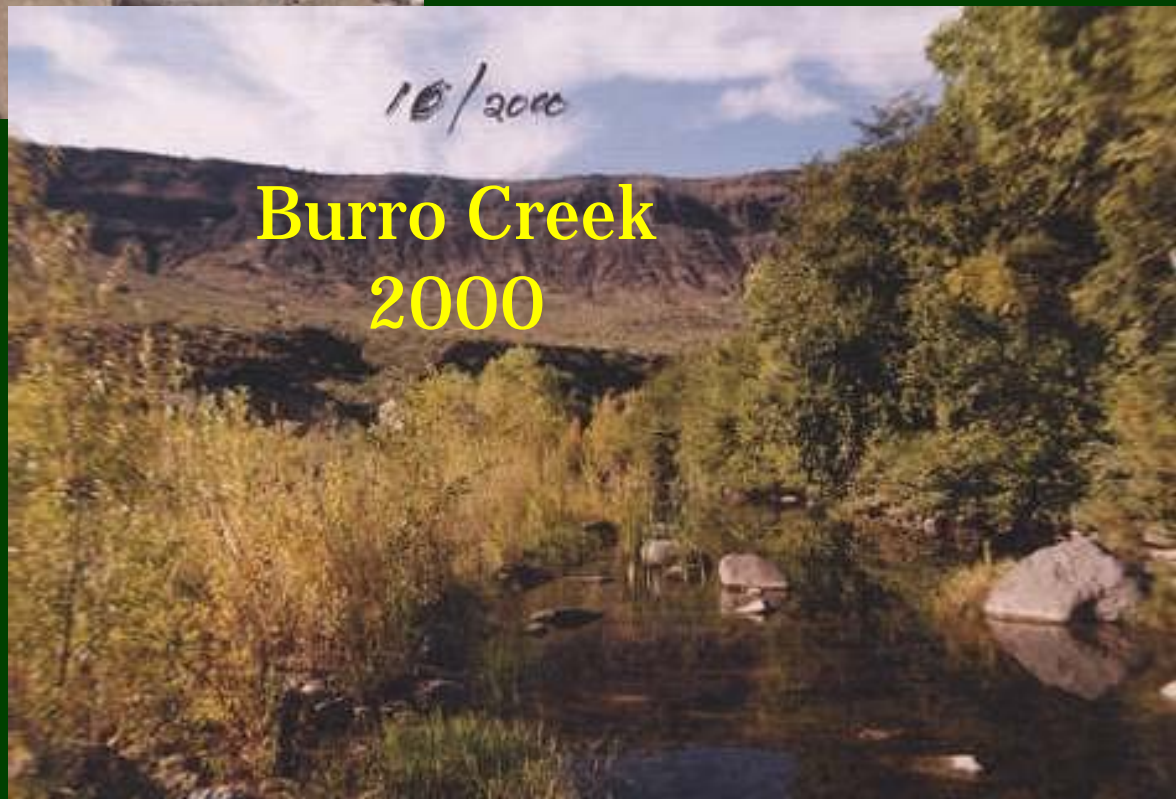
1986



Burro Creek 1981



Burro Creek 2000



Nueces River

A photograph of the Nueces River in 2007. The river is wide and shallow, with a rocky bed visible. The left bank is covered in dense, dry brush and trees. The right bank is a flat, open field. In the background, there are rolling hills under a cloudy sky.

2007

A photograph of the Nueces River in 2012. The river is narrower and deeper, with a rocky bed visible. The left bank is covered in dense, green brush and trees. The right bank is a flat, open field. In the background, there are rolling hills under a blue sky with white clouds.

2012

2012 04 08





A white bucket hat is placed on a dark, sandy 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 written in yellow at the bottom center of the image.

Catch sediment









How to Maintain or Restore Riparian Areas:

- Creeks / Riparian Areas are special places; they need preferential treatment
- Address the barriers which hinder natural recovery and restoration

Hindrances to Healthy / Functional Riparian Areas:

- Farming too close to the bank
- Mowing, spraying close to the creek
- Manicured landscapes next to the creek
- Chronic grazing concentrations in creek areas
- Excessive deer, exotics, hogs in creek areas
- Burning in riparian area
- Removal of large dead wood
- Artificial manipulation of banks / sediment
- Excessive vehicle traffic in creek area
- Poorly designed road crossings / bridges
- Excessive recreational foot traffic in creek area
- Excessive alluvial pumping or other withdrawals







Why is all of
this so
important?

You are the water
managers of Texas

