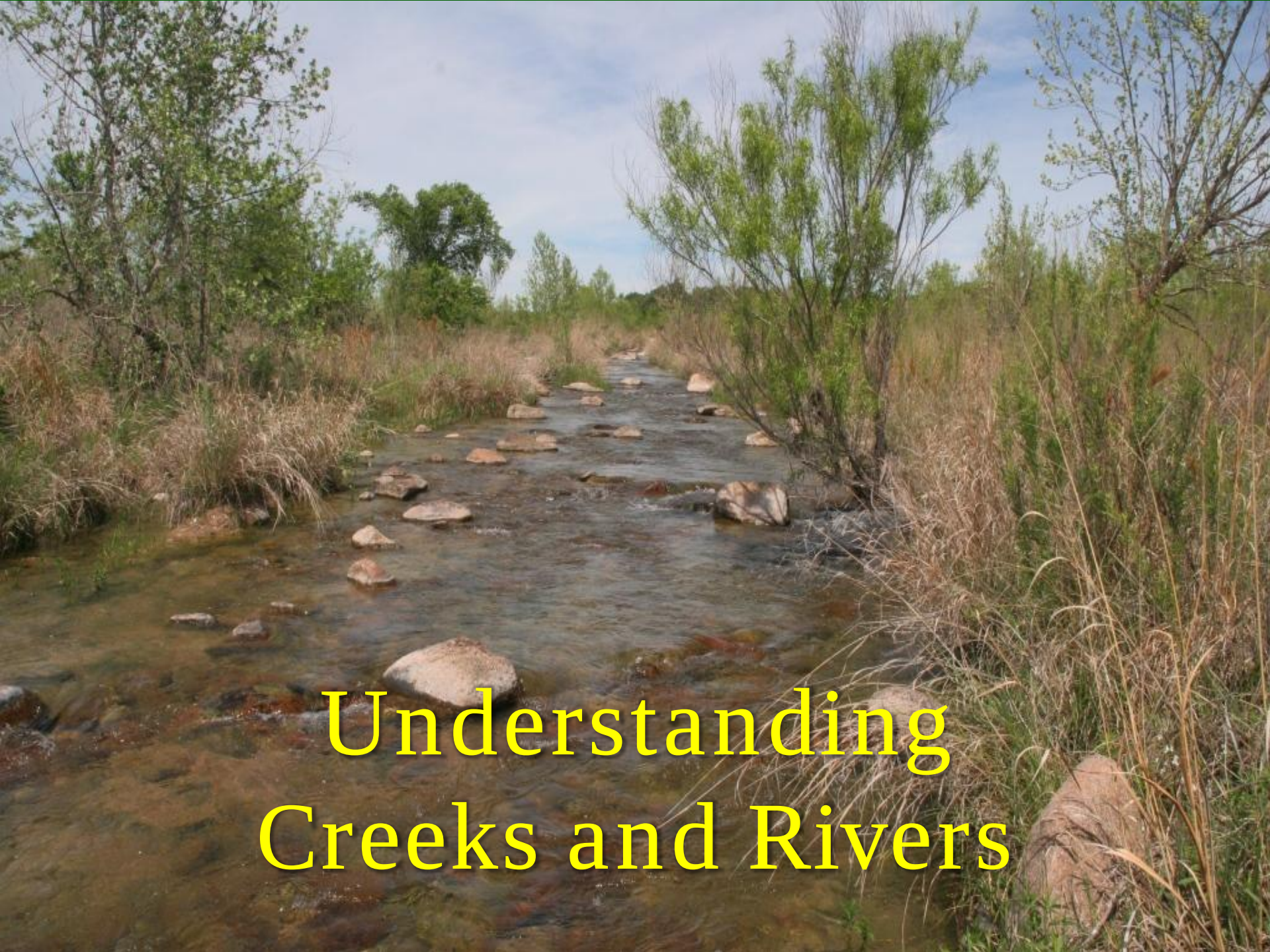

Understanding
Creeks and Rivers

Introduction to Riparian Principles

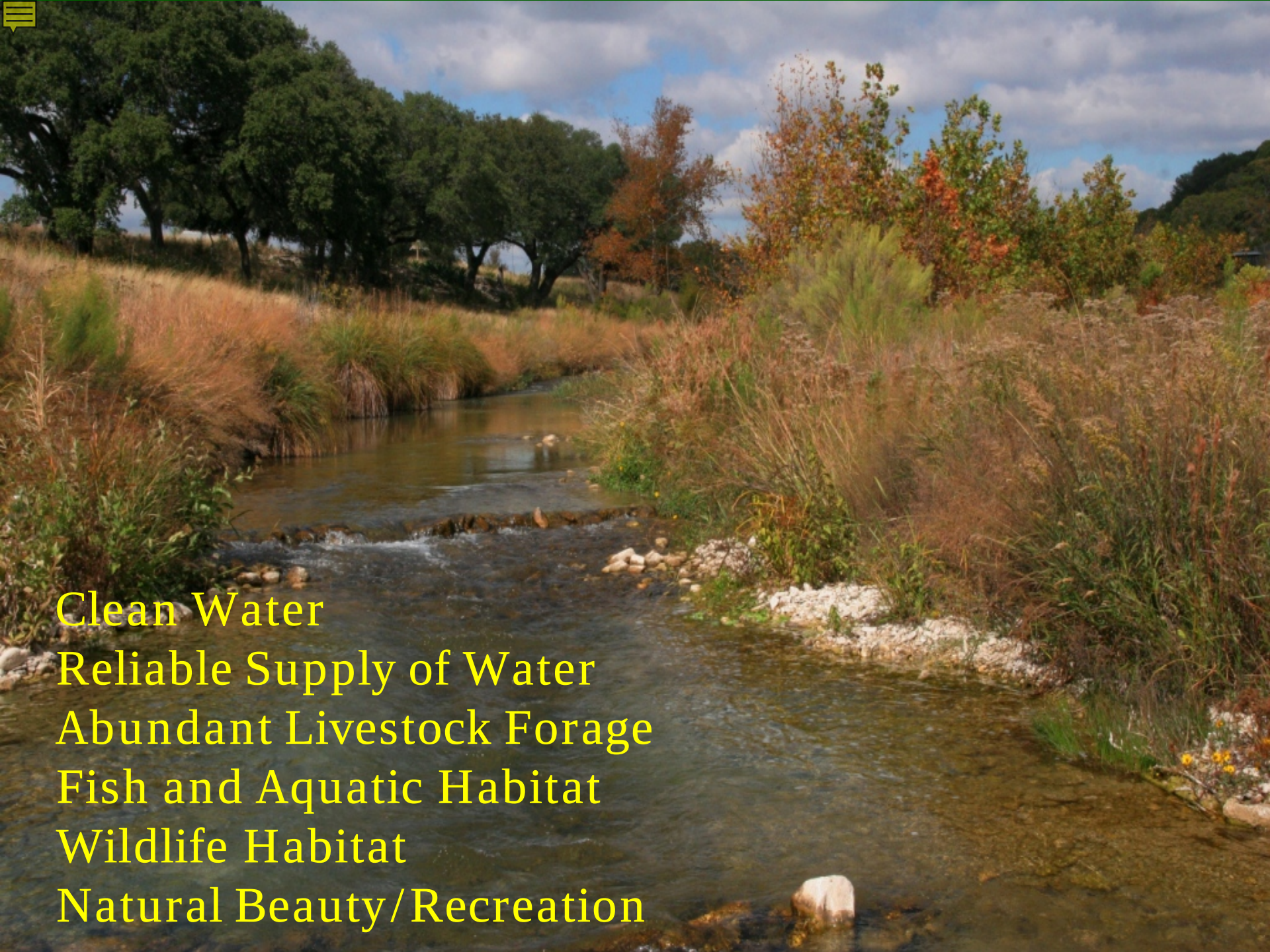
Creek and River Misperceptions:

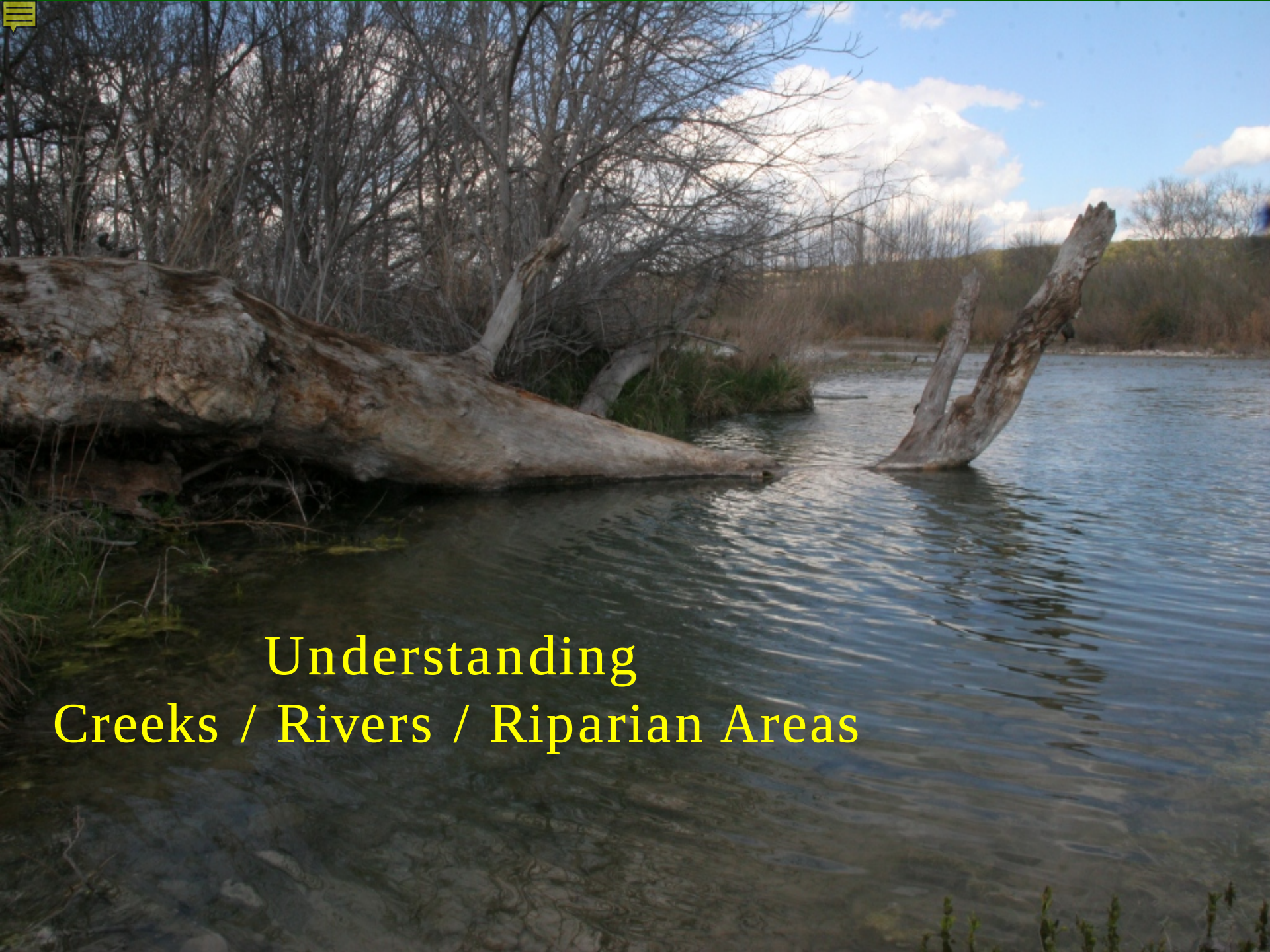
1. Floods are bad
2. Droughts are bad
3. Vertically eroding cut-banks are bad
4. Removal of riparian trees is a good way to increase streamflow
5. Rivers should be wide and straight
6. Large wood clogs creeks and should be removed
7. People must fix damaged creeks


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

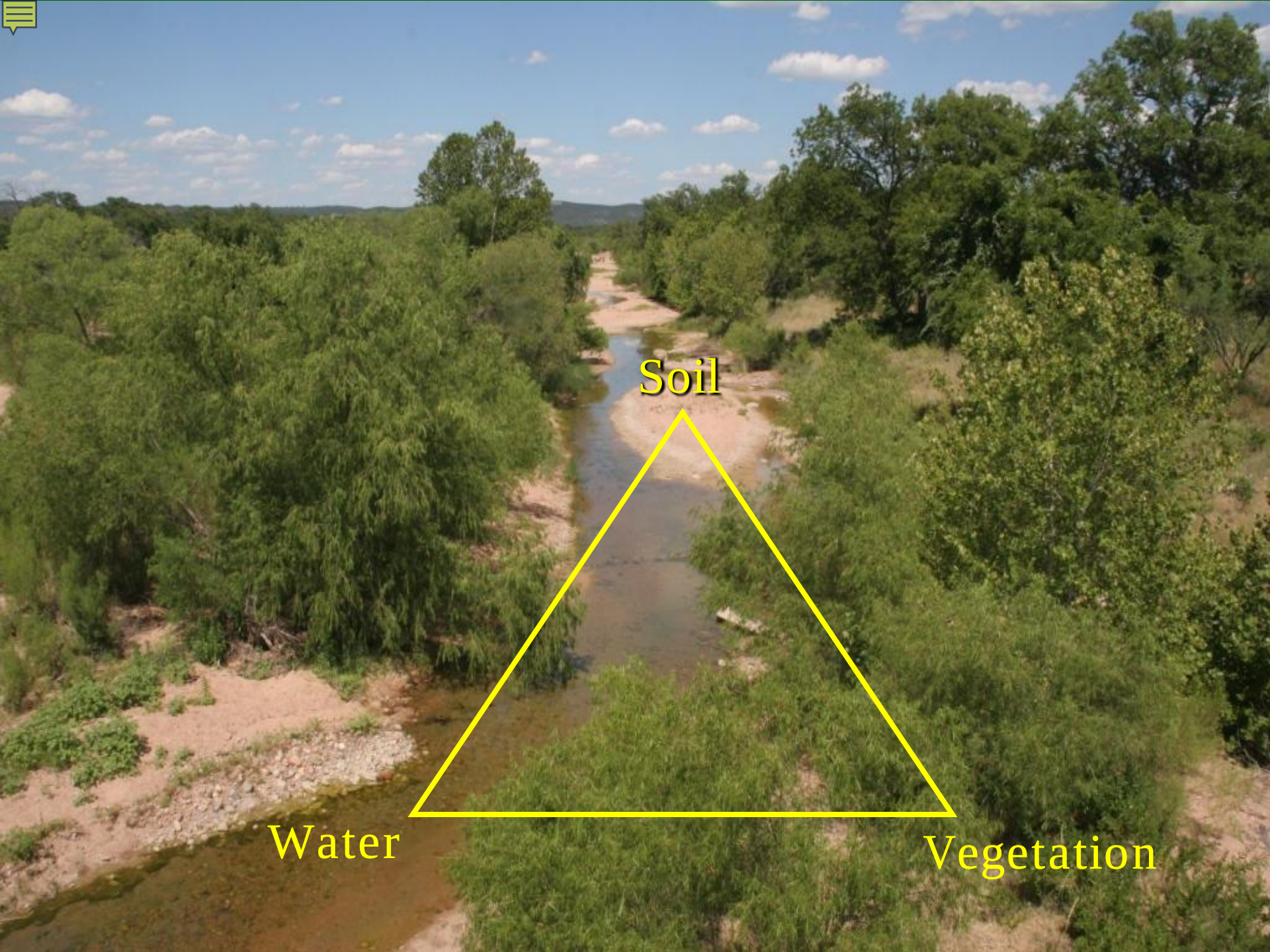
Creek / River / Riparian Values

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


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


Understanding
Creeks / Rivers / Riparian Areas

What is a Riparian Area?


Soil
Water
Vegetation


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**

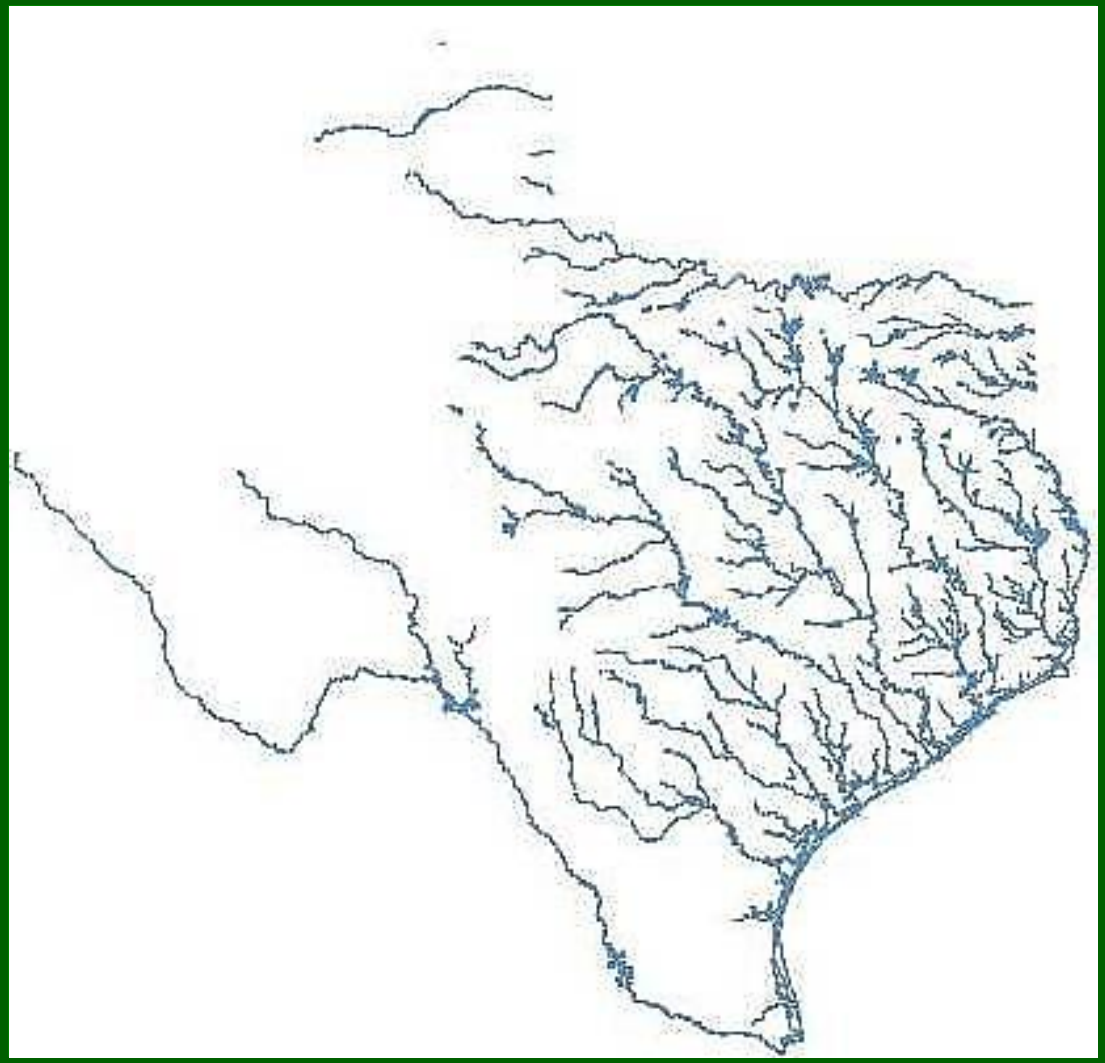

How can riparian areas
be maintained?


How can riparian areas
be restored?

Why is all of this so important?

<u>You</u> are the water managers of Texas

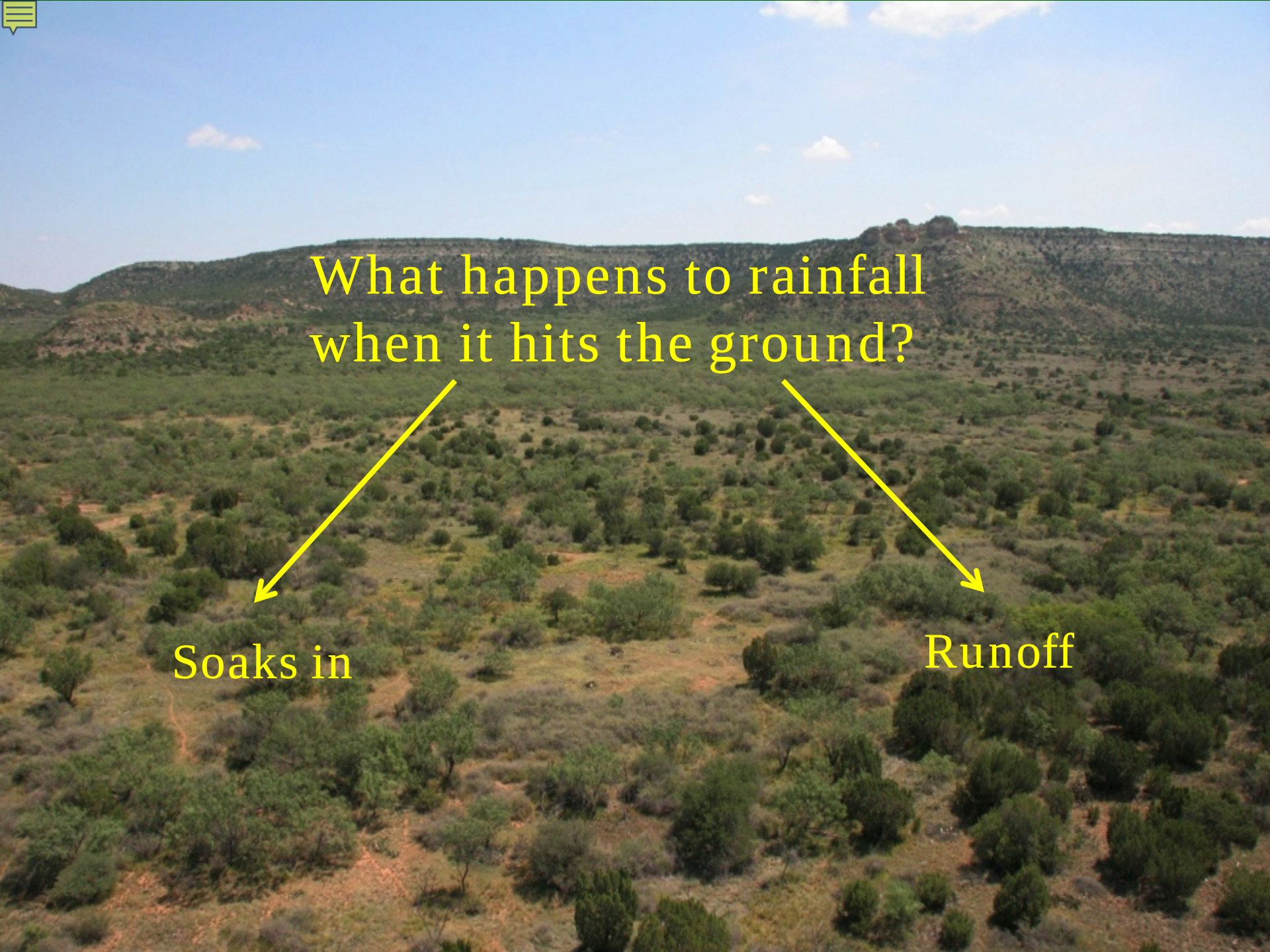
Texas has some severe water challenges

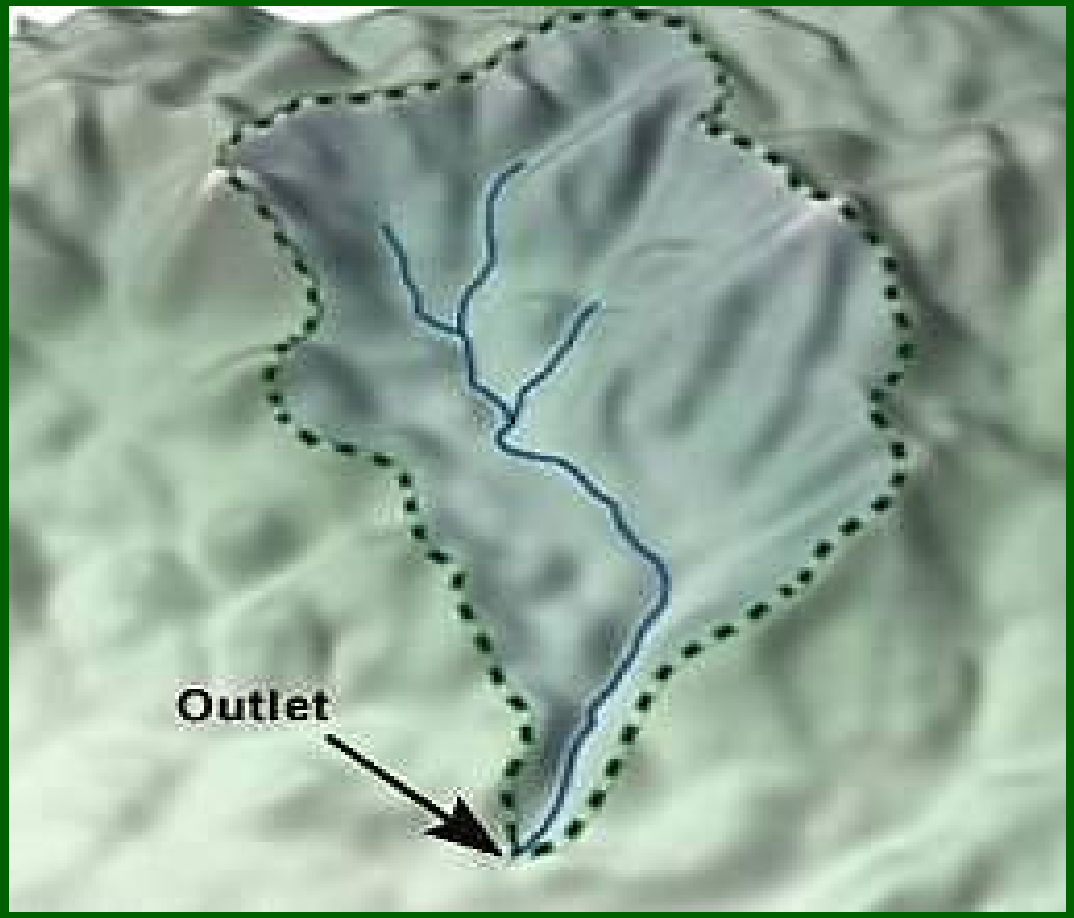


Common "Solutions" to Water Crisis

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

An Overlooked Opportunity


What happens to rainfall when it hits the ground?
Soaks in
Runoff



Watershed

vs.

Catchment


Water Shed
Water Catchment

An Overlooked Opportunity

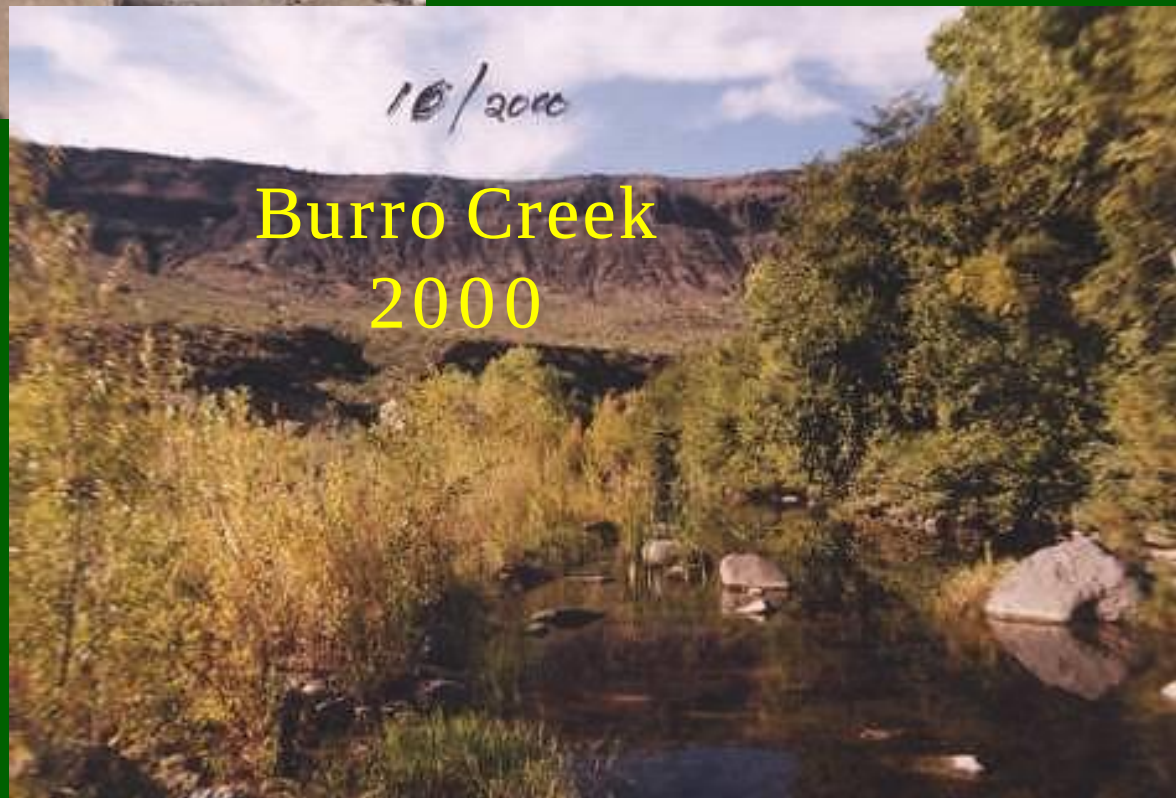
Catching the water

Storing the water in the land

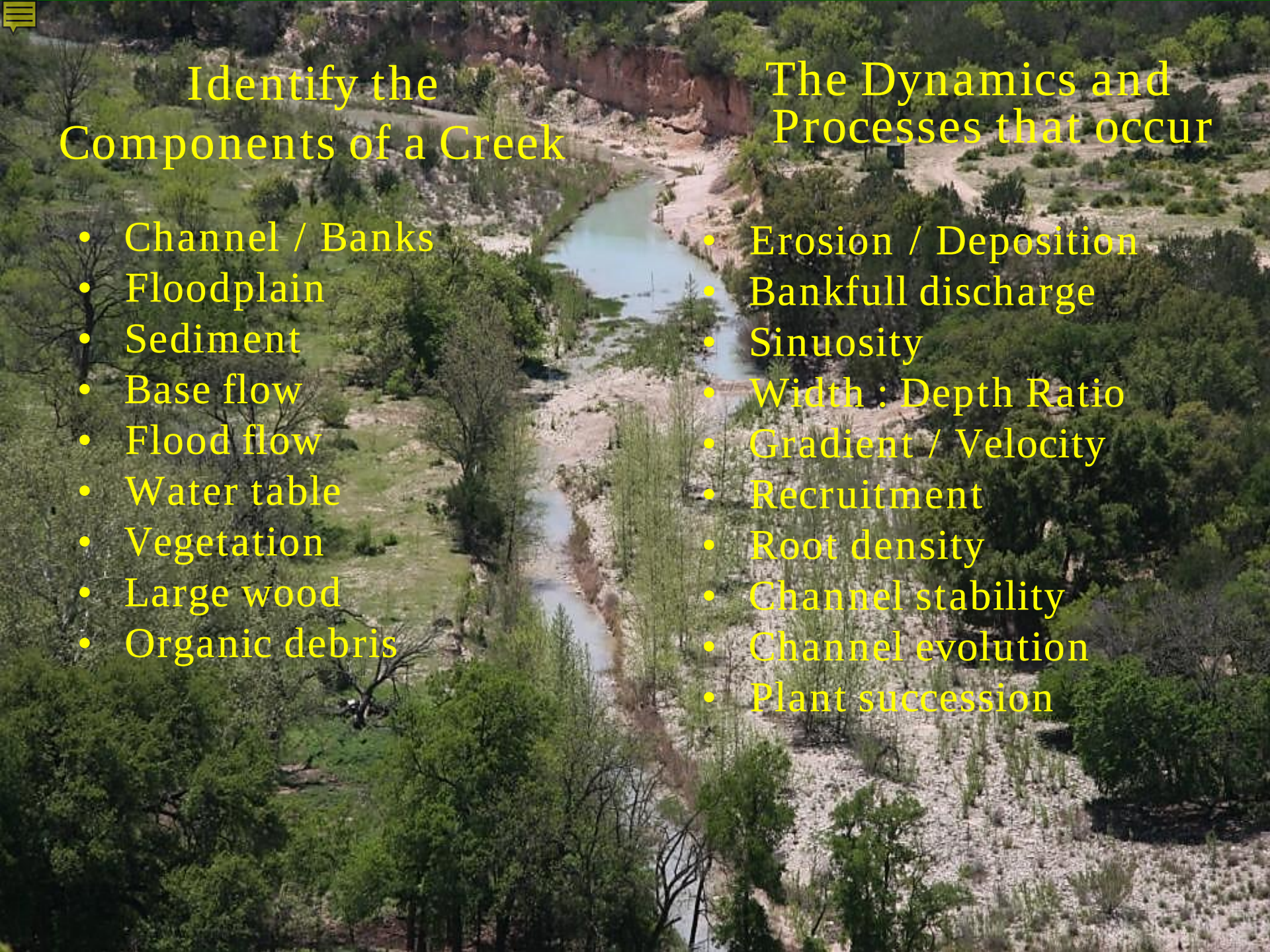
Keeping Water on the Land Longer

“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

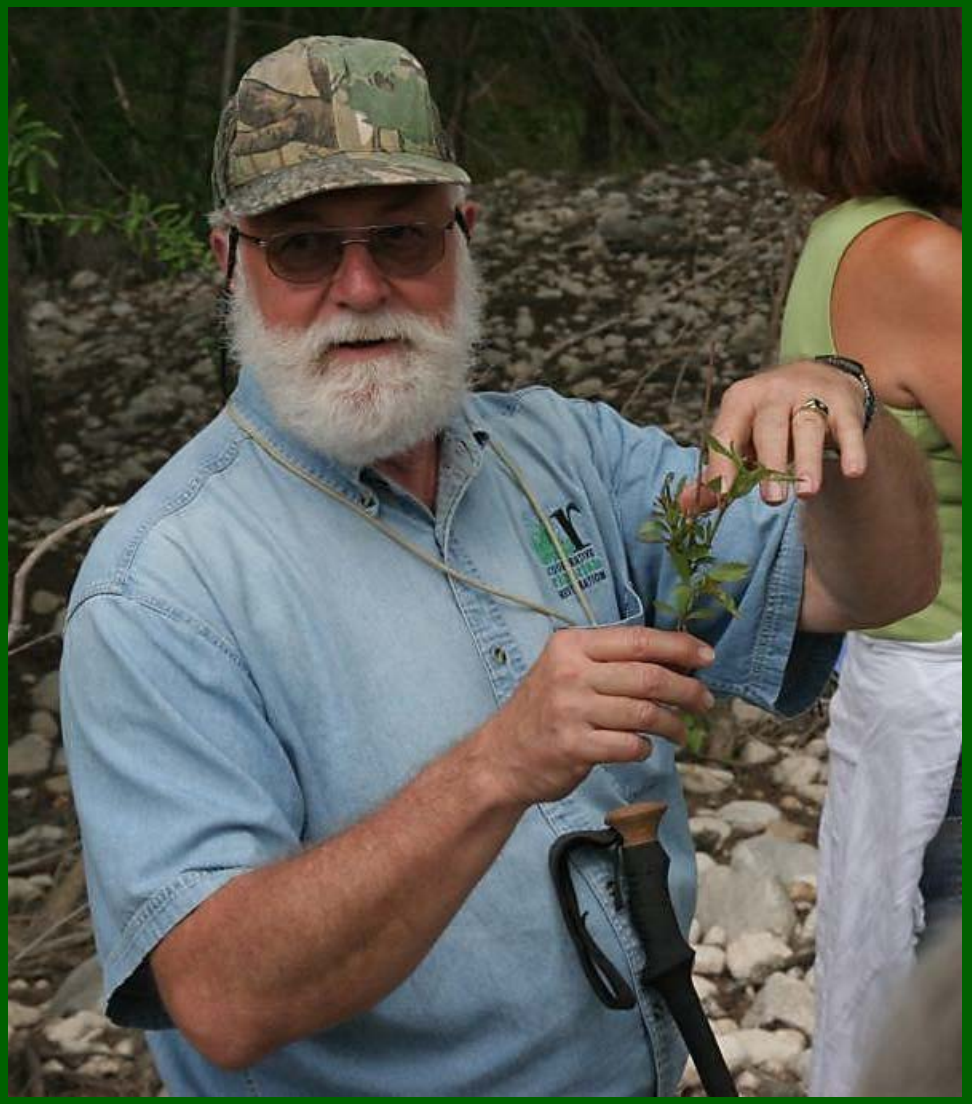
The Dynamics and Processes that occur

- 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

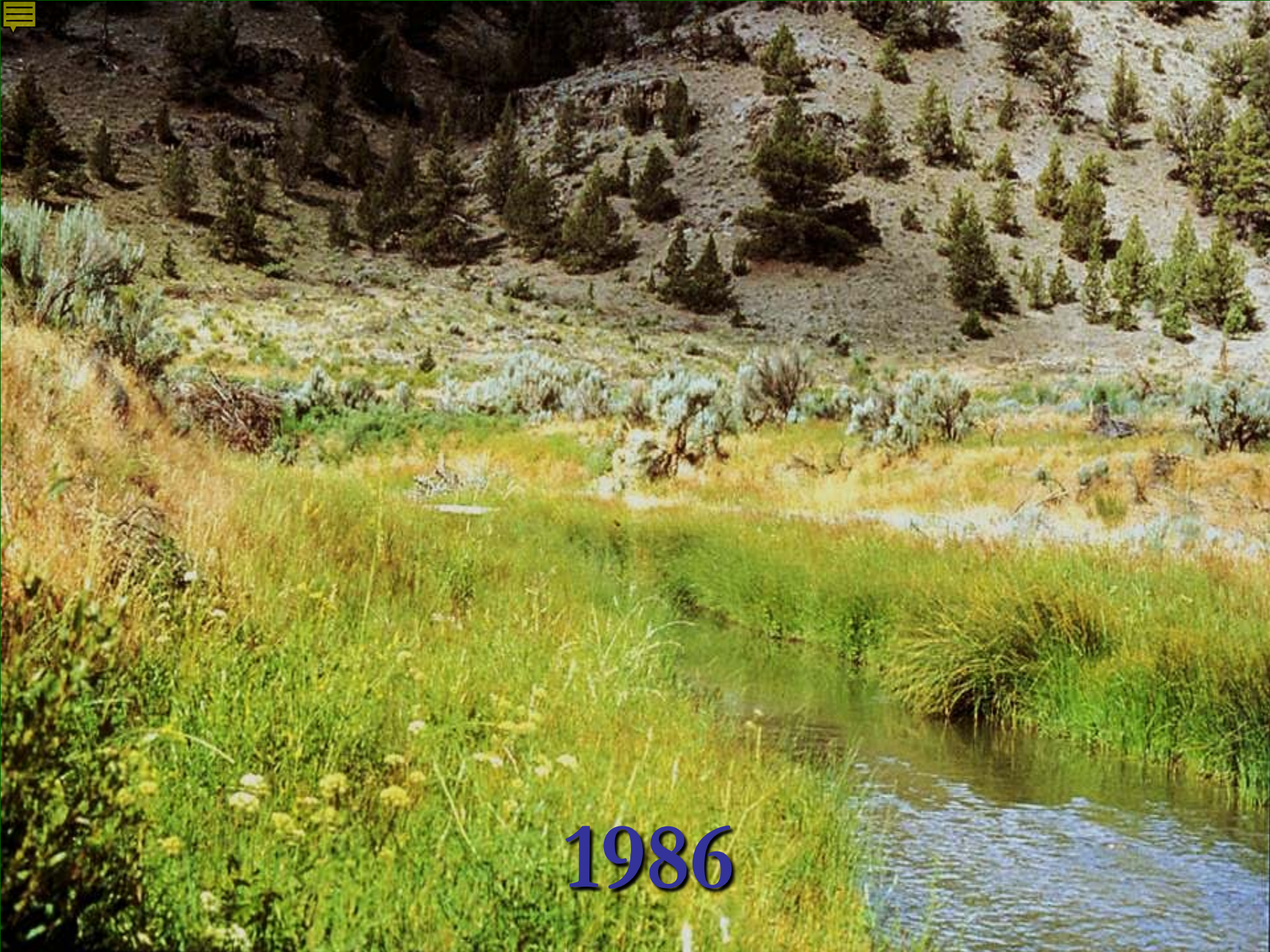
Intermittent flow – No fish
Accelerated erosion - Sediment loss
100 years of poor grazing management = Poor vegetation
Wet riparian area (sponge) = 4 acres / mile
Water storage = 1.5 ac ft / mile
Bank erosion = 12,500 feet

A Change in Grazing Management

1977 – 1984: Limited 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

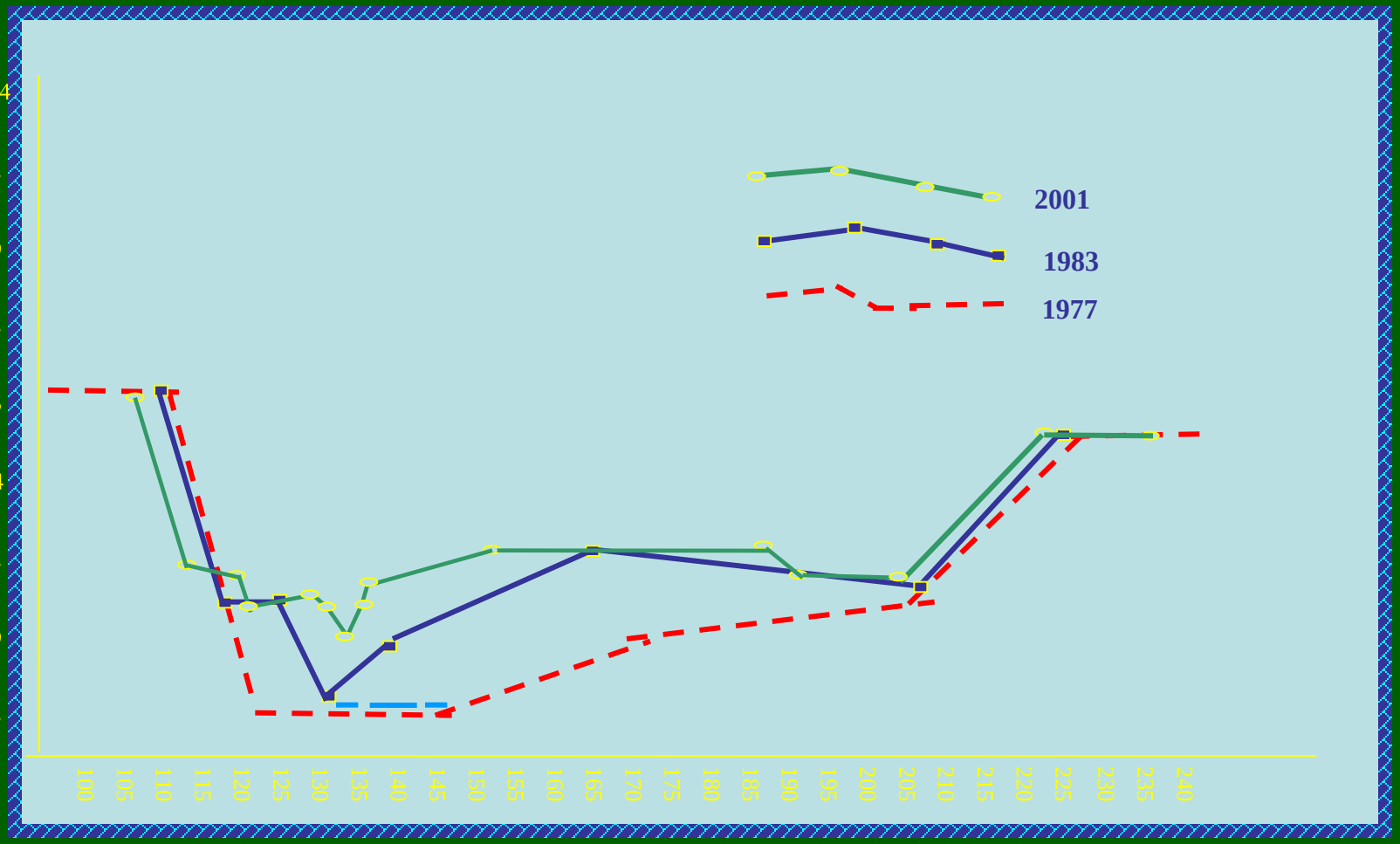

Feb 1996


April 1996


Oct 1996

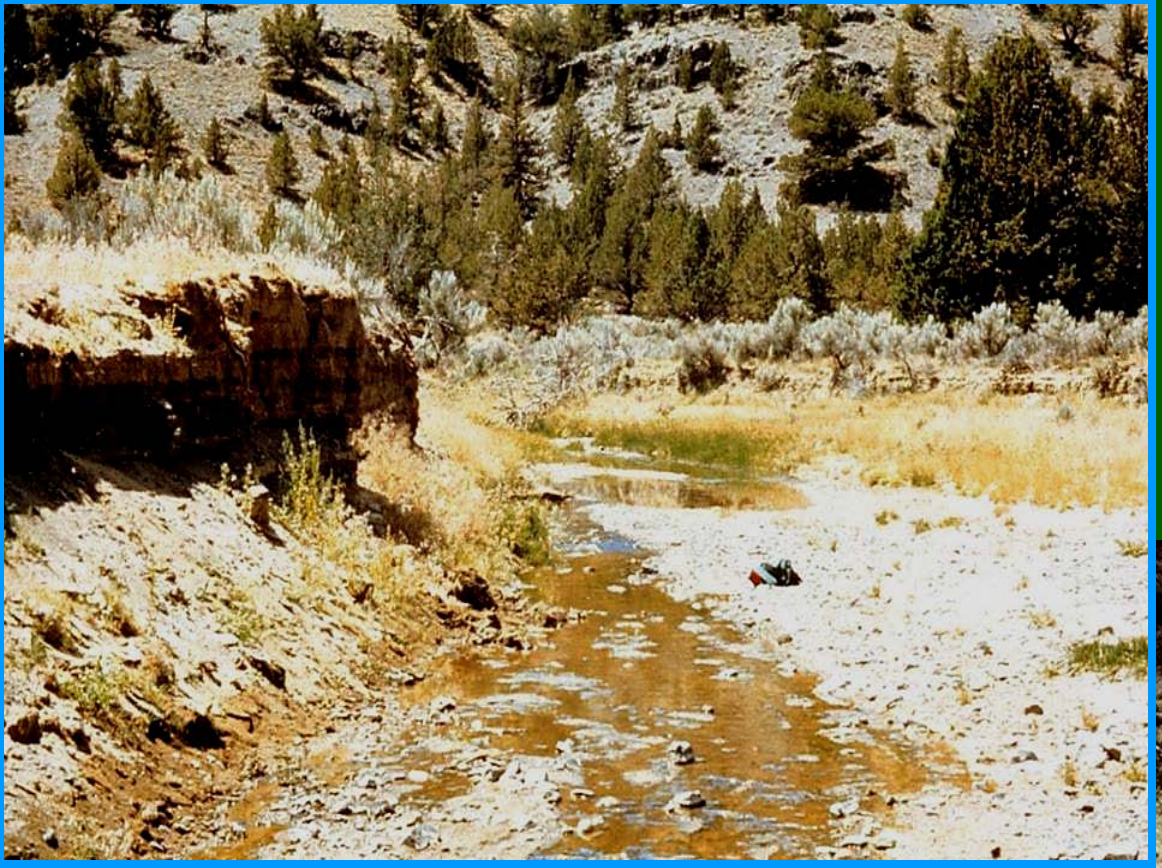

2001

Bear Creek : Change In Channel Profile (1977 - 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


Catch sediment

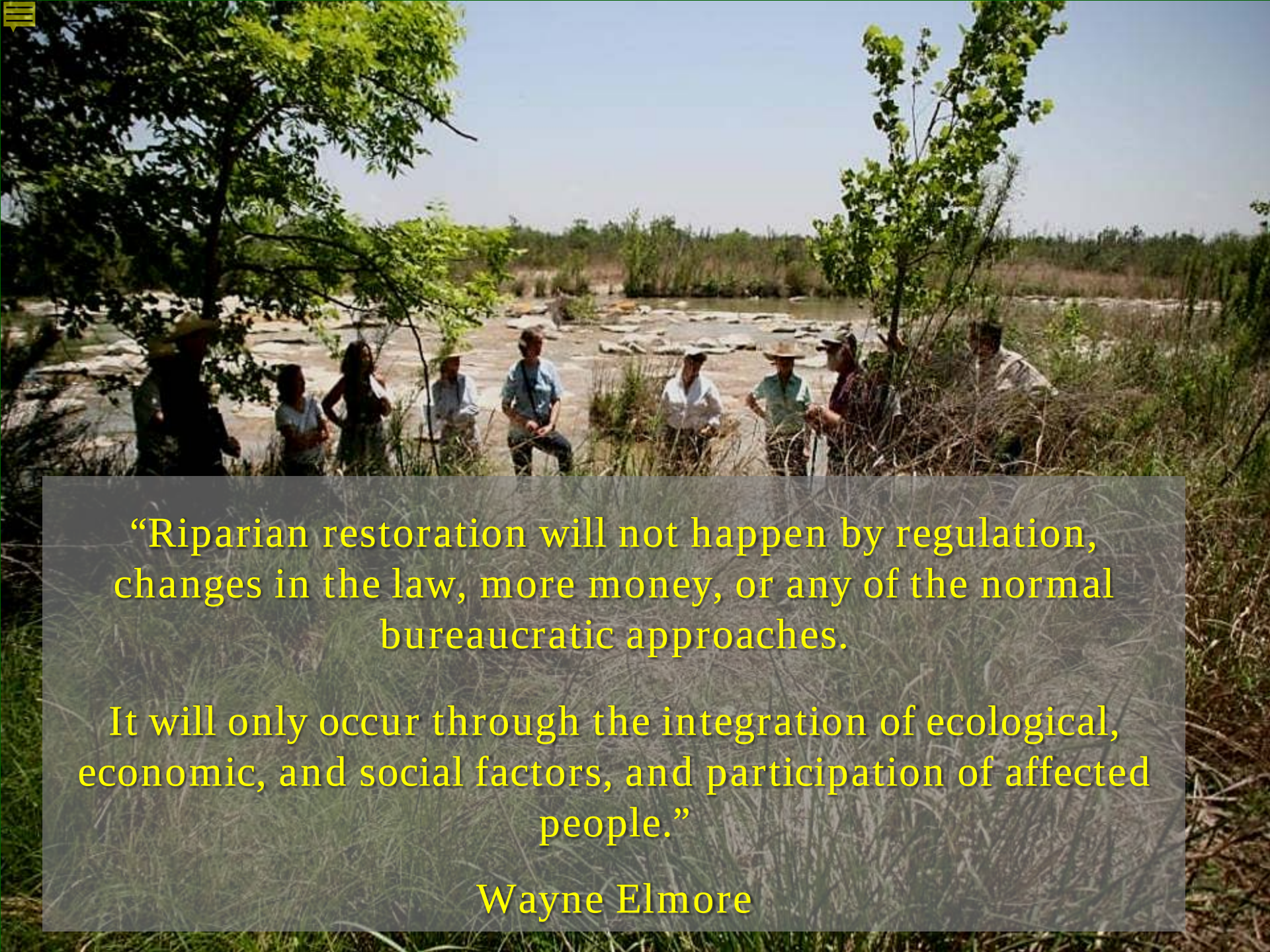
How to Maintain or Restore Riparian Areas:

- Creeks / Riparian Areas are special places; they need preferential treatment
- Address the hindrance that is inhibiting natural 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

Growing Riparian Awareness and Understanding



"Riparian 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 people."

Wayne Elmore