



Stream Reclamation

A good practice just got better

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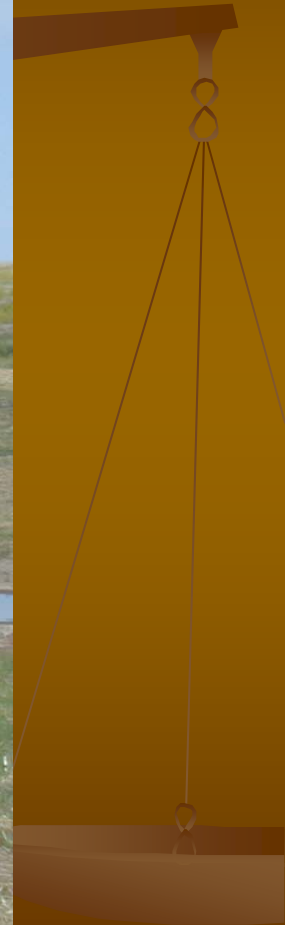
Stream Reclamation

What is it, what are the benefits,
and how do we know it works?

Cottonwood Creek...in need of Reclamation



Cottonwood Creek after Reclamation

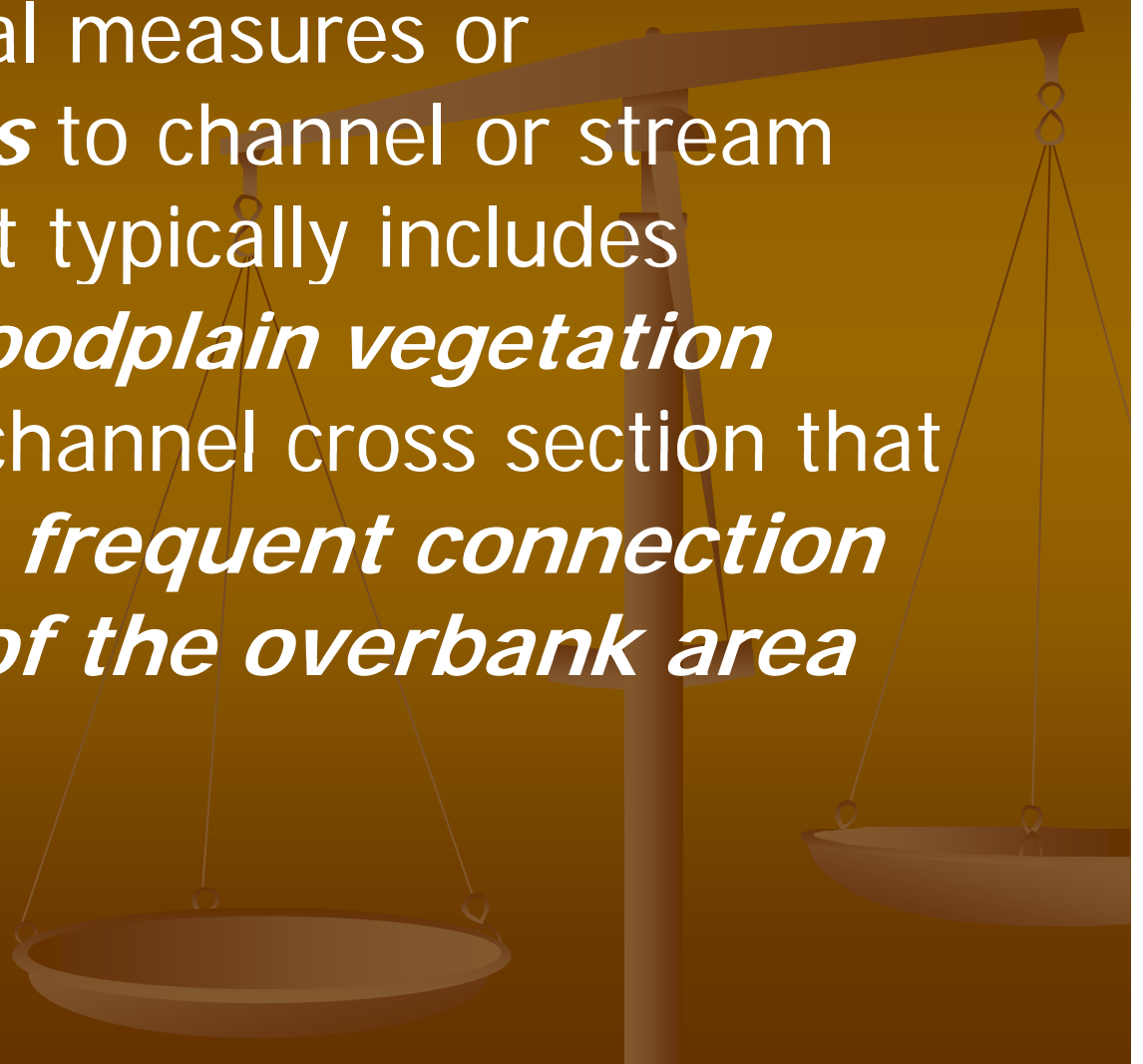


Cottonwood Creek later



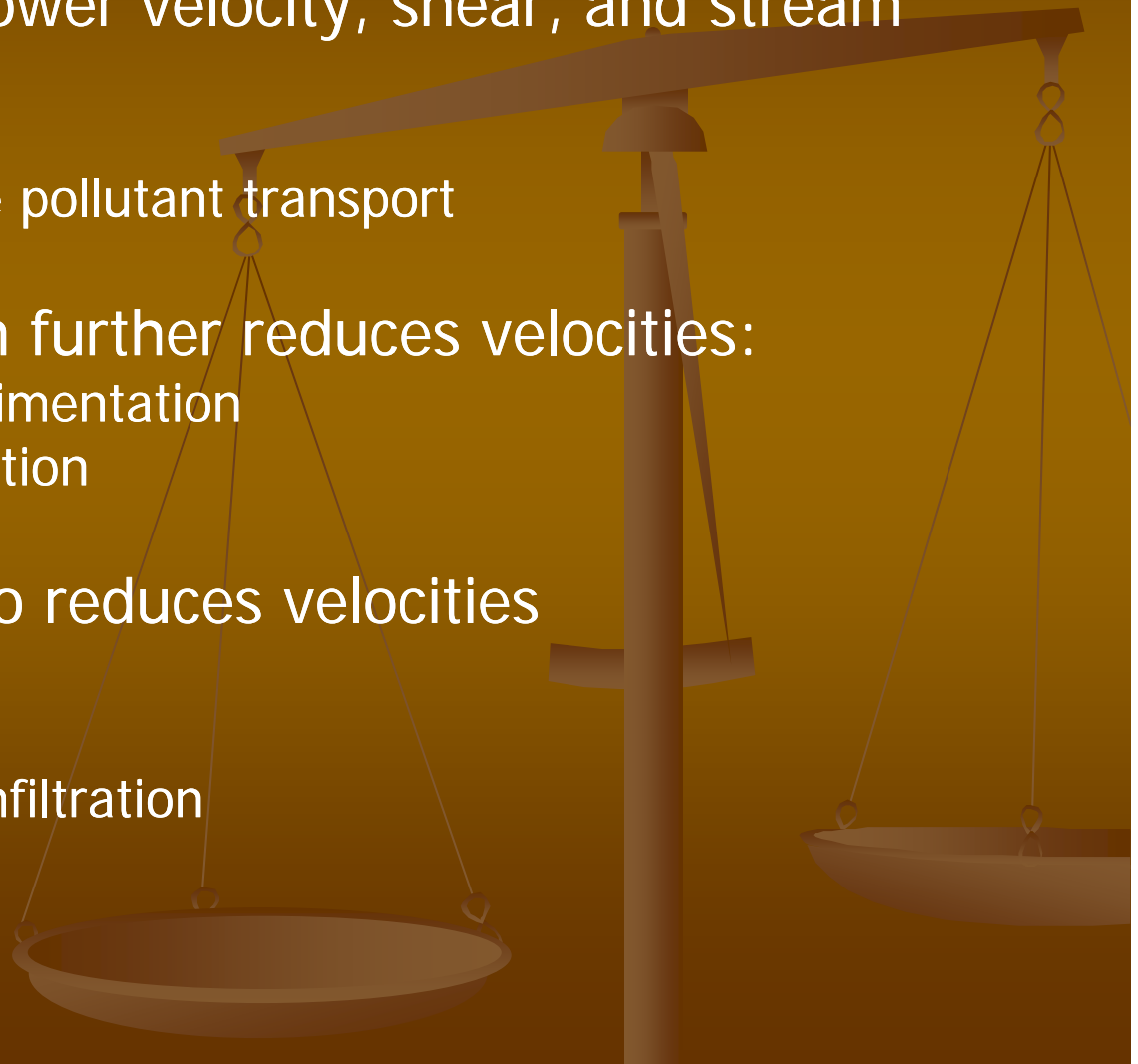
CR 72.2 Guidance Document Stream Reclamation

- means additional measures or *enhancements* to channel or stream stabilization that typically includes *riparian and floodplain vegetation* planting and a channel cross section that results in *more frequent connection and flooding of the overbank area*



What are the WQ benefits of Reclamation?

- Channel area has lower velocity, shear, and stream power:
 1. Reduced erosion
 2. Reduced particulate pollutant transport
- Riparian Vegetation further reduces velocities:
 1. Promotes more sedimentation
 2. More pollutant filtration
- Floodplain Area also reduces velocities
 1. More sedimentation
 2. More filtration
 3. Can also promote infiltration





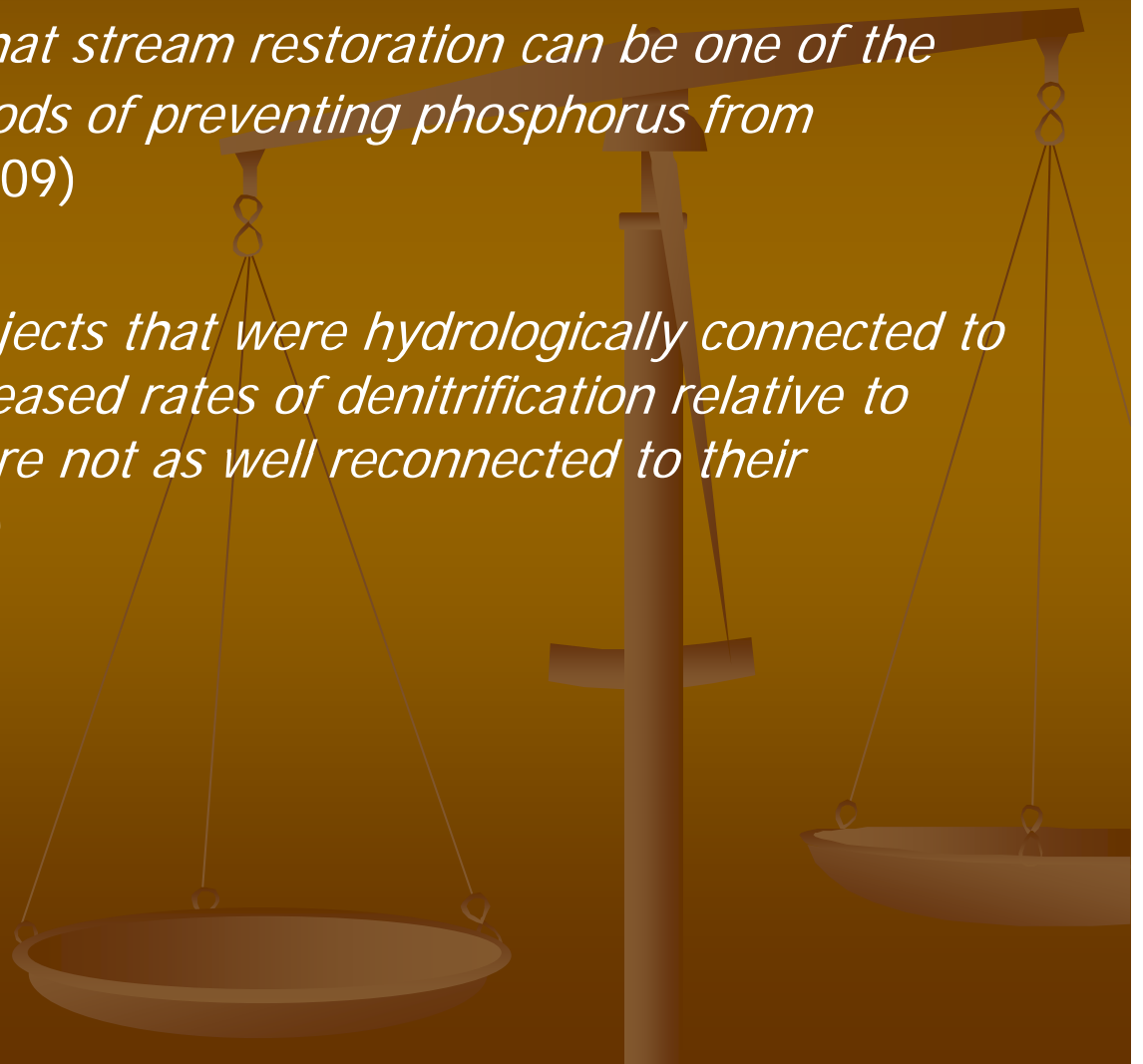
How do we know stream reclamation works?

Action plan of choice
Technical Analysis
Monitoring Data

Action Plan of Choice

Example Findings

- *" This study has shown that stream restoration can be one of the most cost-effective methods of preventing phosphorus from entering lakes. " (Dove 2009)*
- *" ...stream restoration projects that were hydrologically connected to their floodplains had increased rates of denitrification relative to restored streams that were not as well reconnected to their floodplains. " (Berg 2009)*



Other Experiences

- Ward Branch, Springfield Mo 2009
- Stroubles Creek, Virginia Tech 2006
- P in sediment = 400 mg/kg vrs 1200 mg/kg

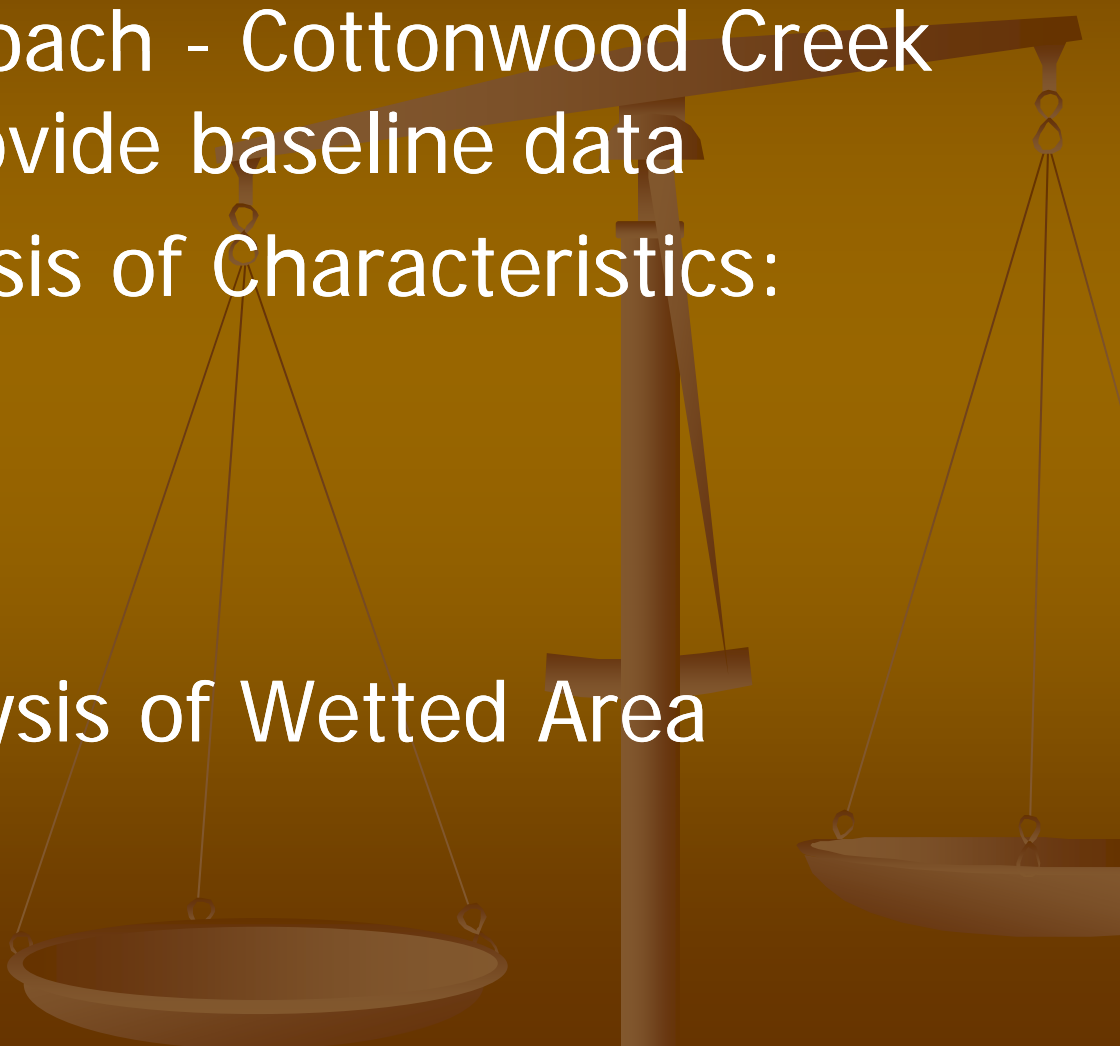
Item	Ward Branch	Cottonwood	Stroubles Creek
Interest Rate Adjusted Annual Cost per Pound P Removal	\$188	\$165 to \$617	\$317



Technical Analysis

Using Channel Hydraulics and a
Comparative Approach

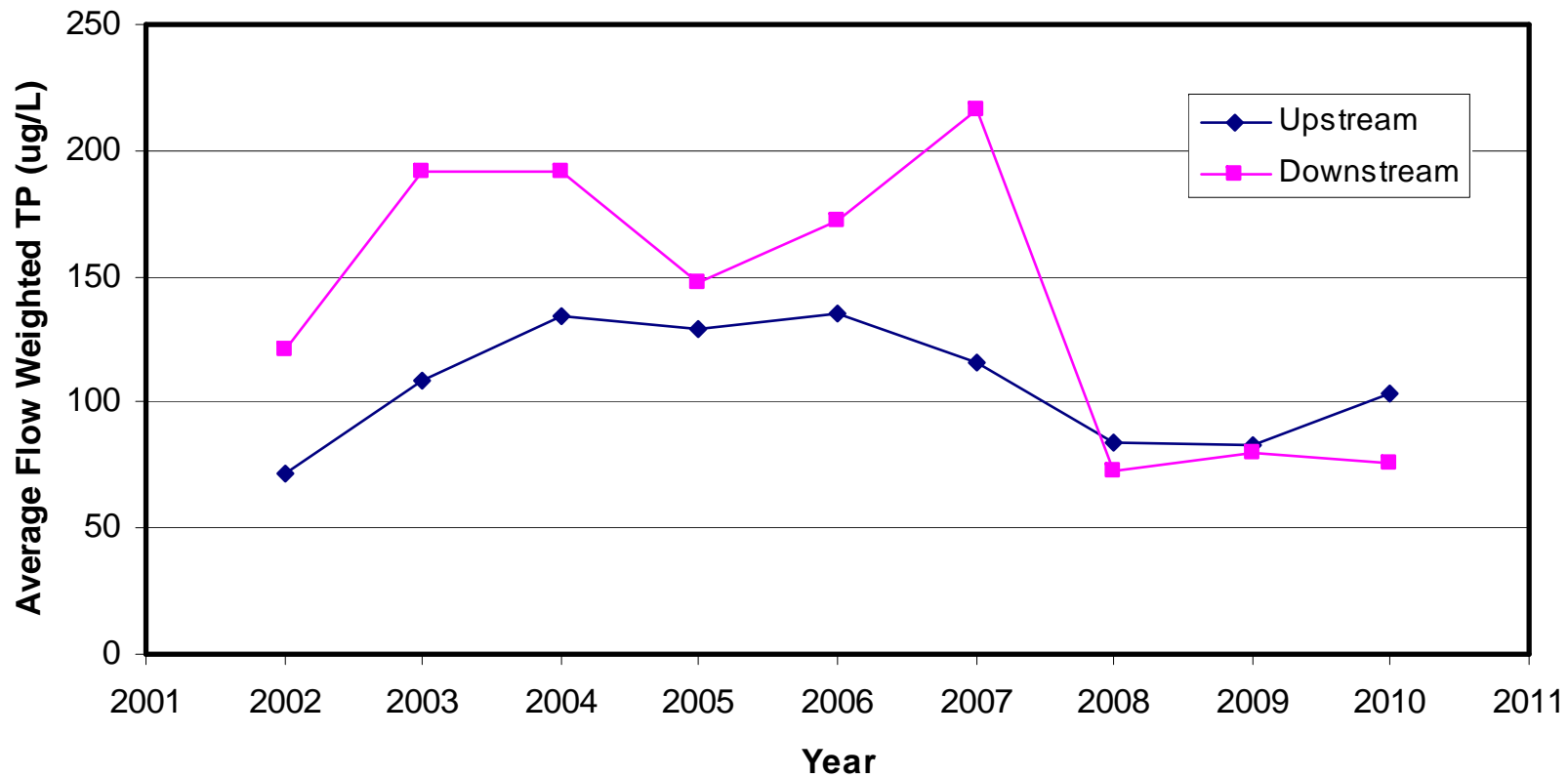
Using Hydraulic Characteristics to Quantify Water Quality Benefits

- Reference Approach - Cottonwood Creek Reclamation provide baseline data
 - Statistical Analysis of Characteristics:
 - Velocity (fps)
 - Shear (lbs/sf)
 - Power (lbs-f/s)
 - Probability analysis of Wetted Area
- 

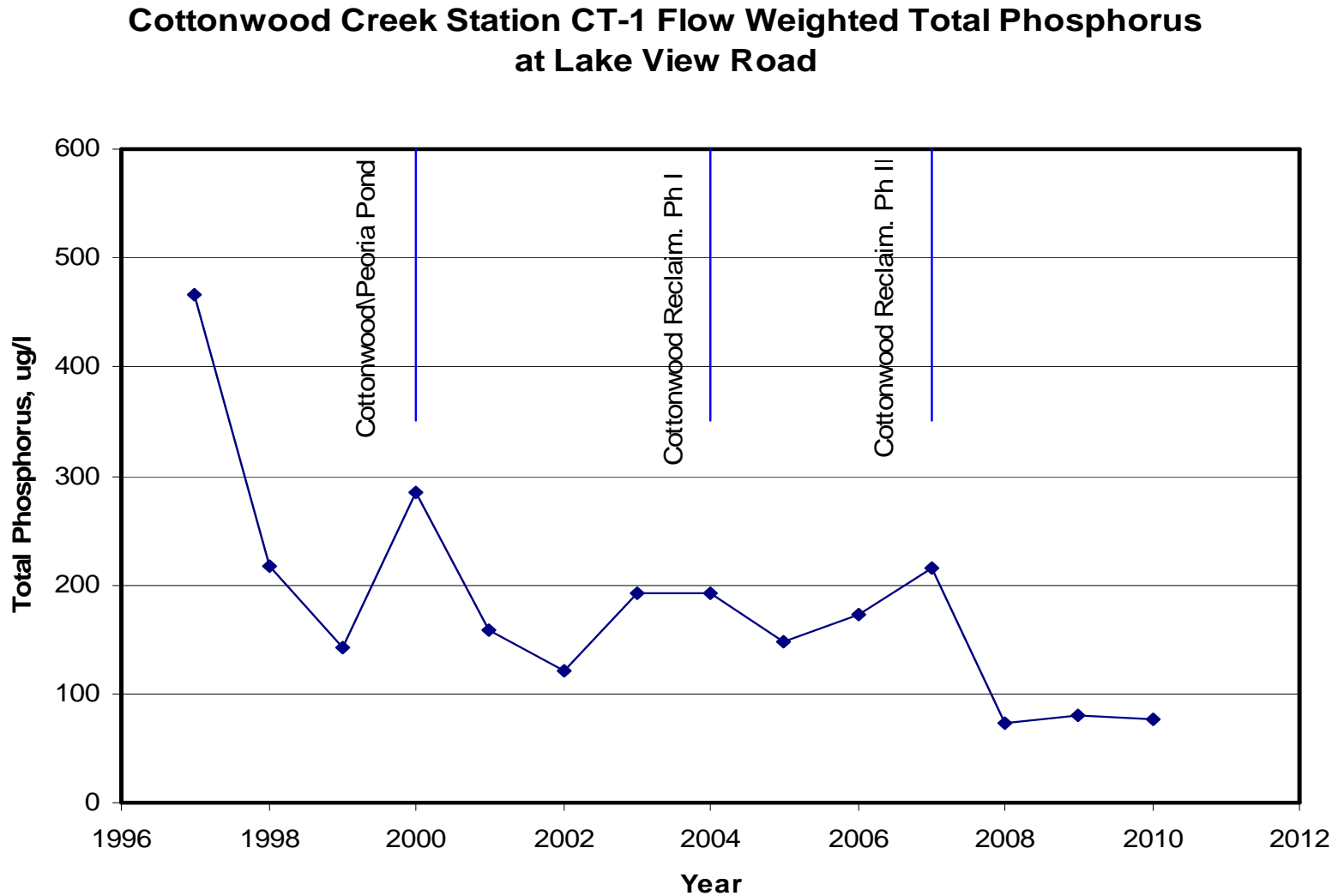
Cottonwood Creek

The new baseline

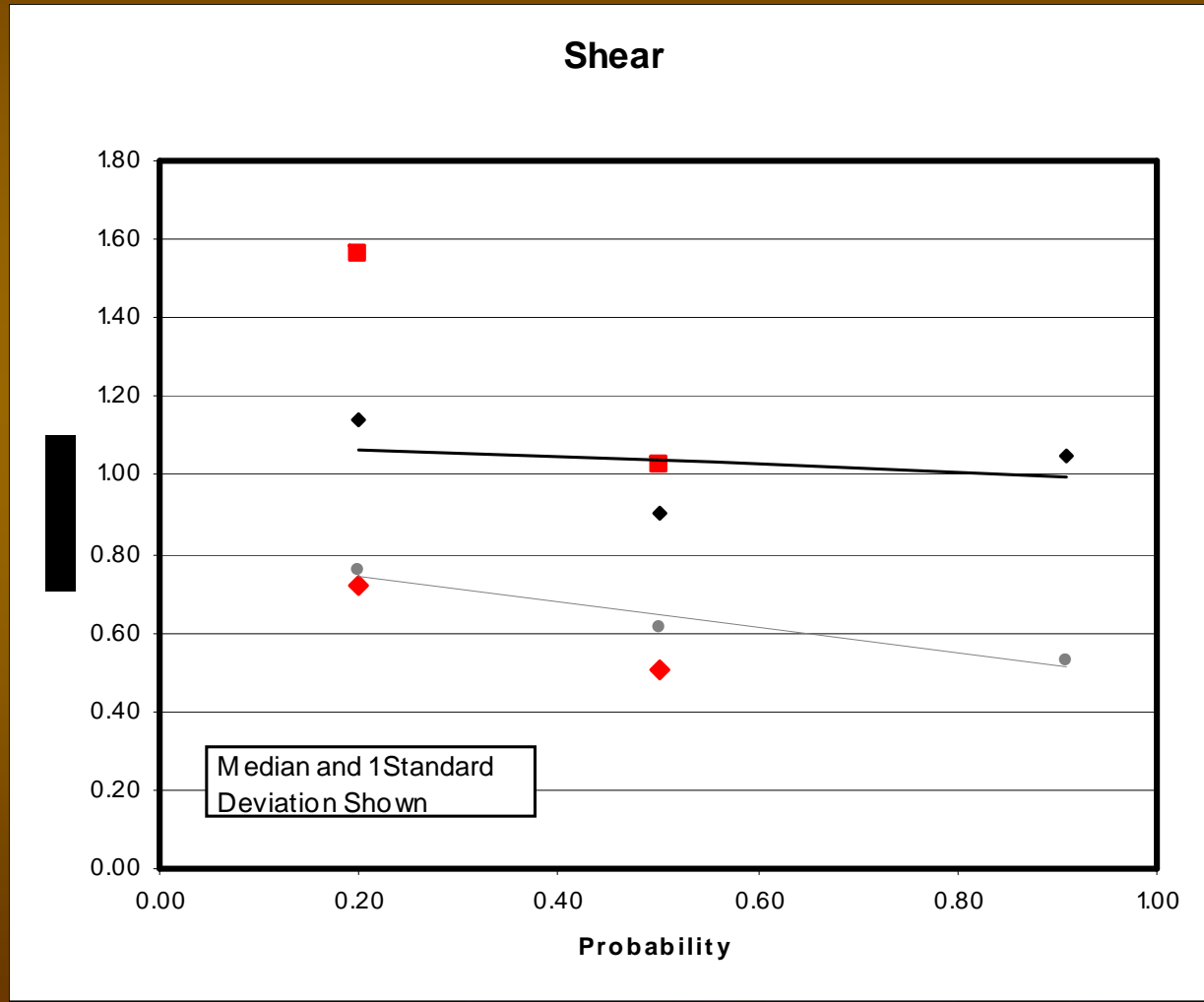
TP Comparison U/S to D/S Cottonwood Creek



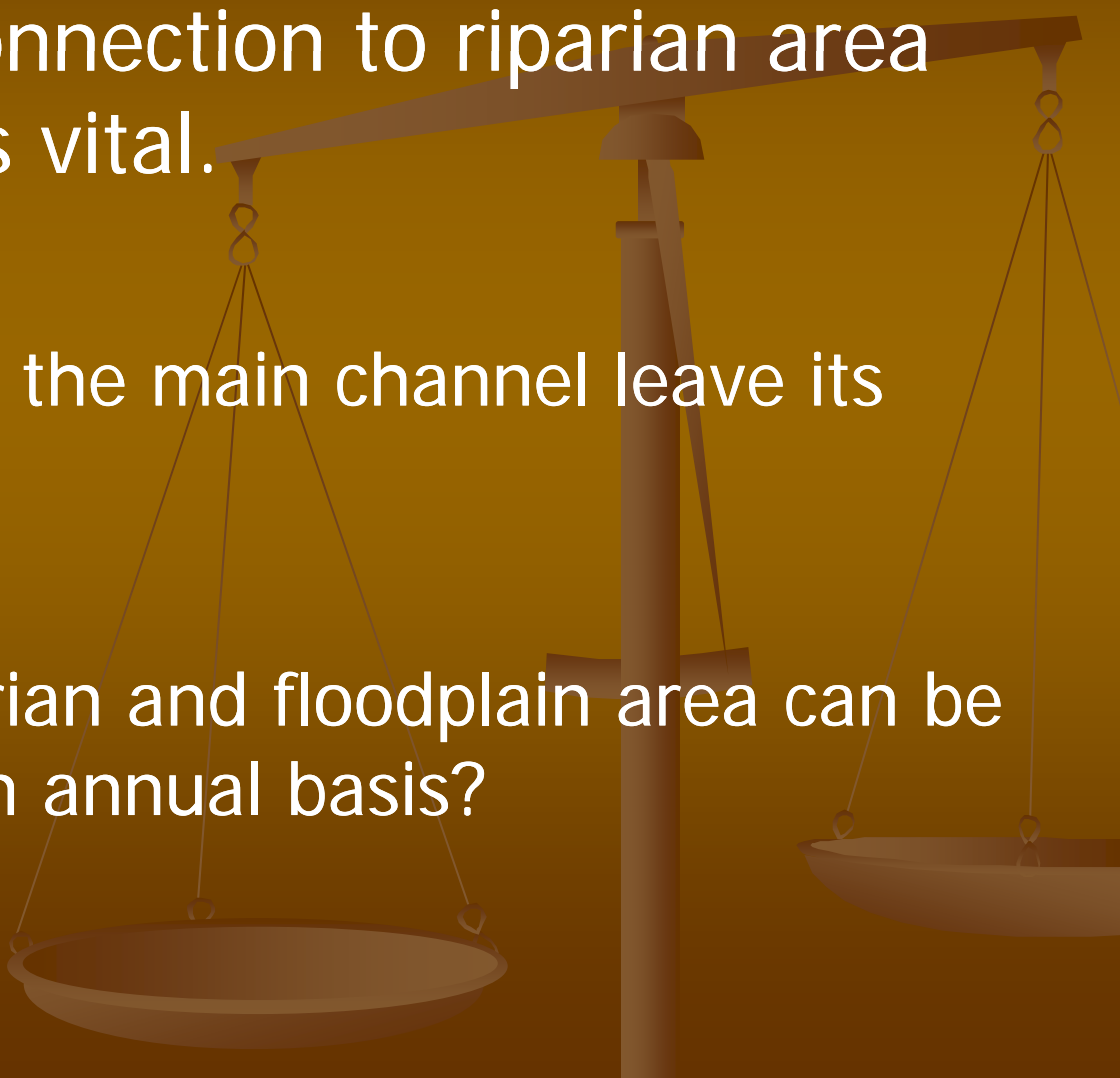
Cottonwood Creek Data History



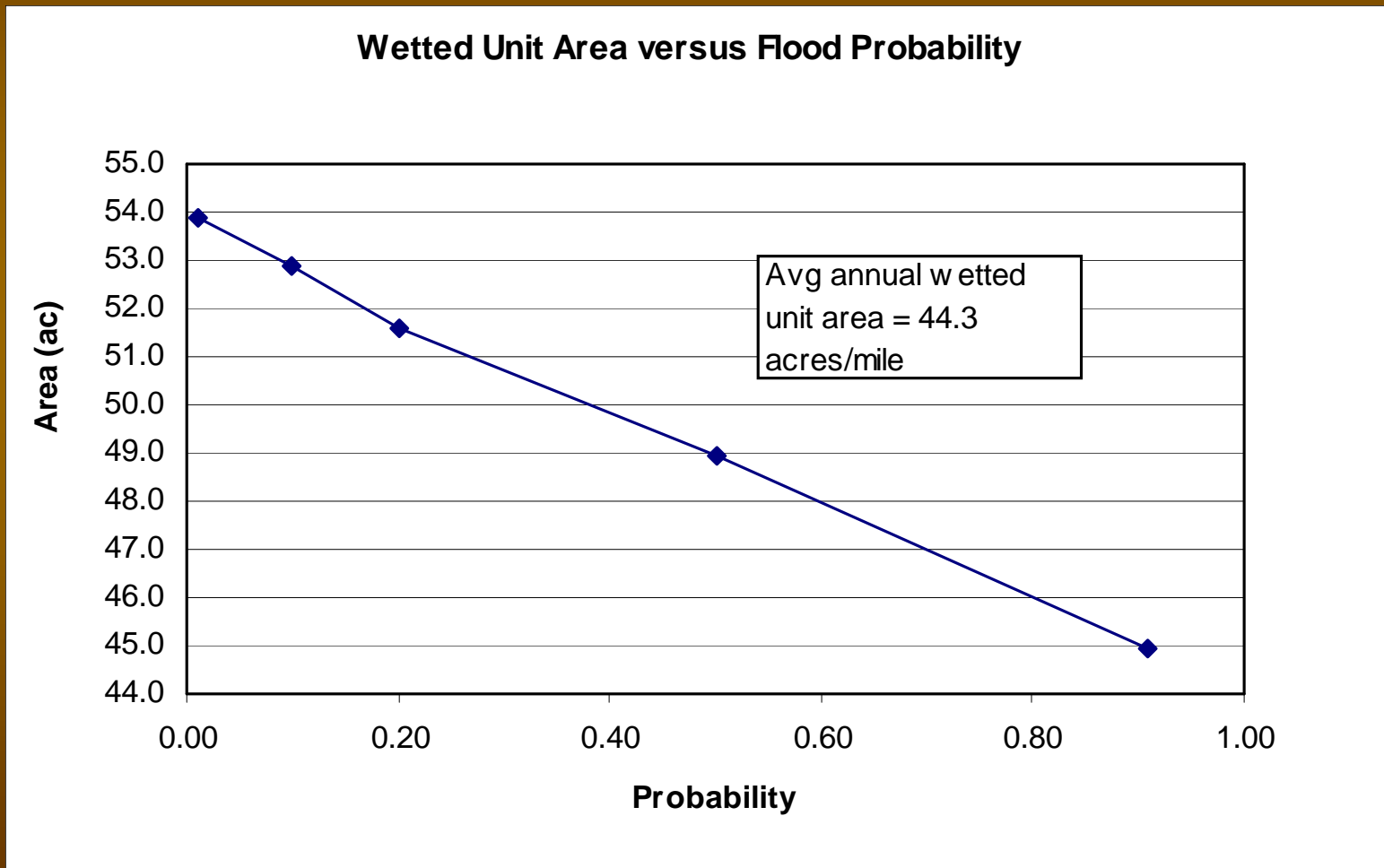
Lower shear means less sediment transport.



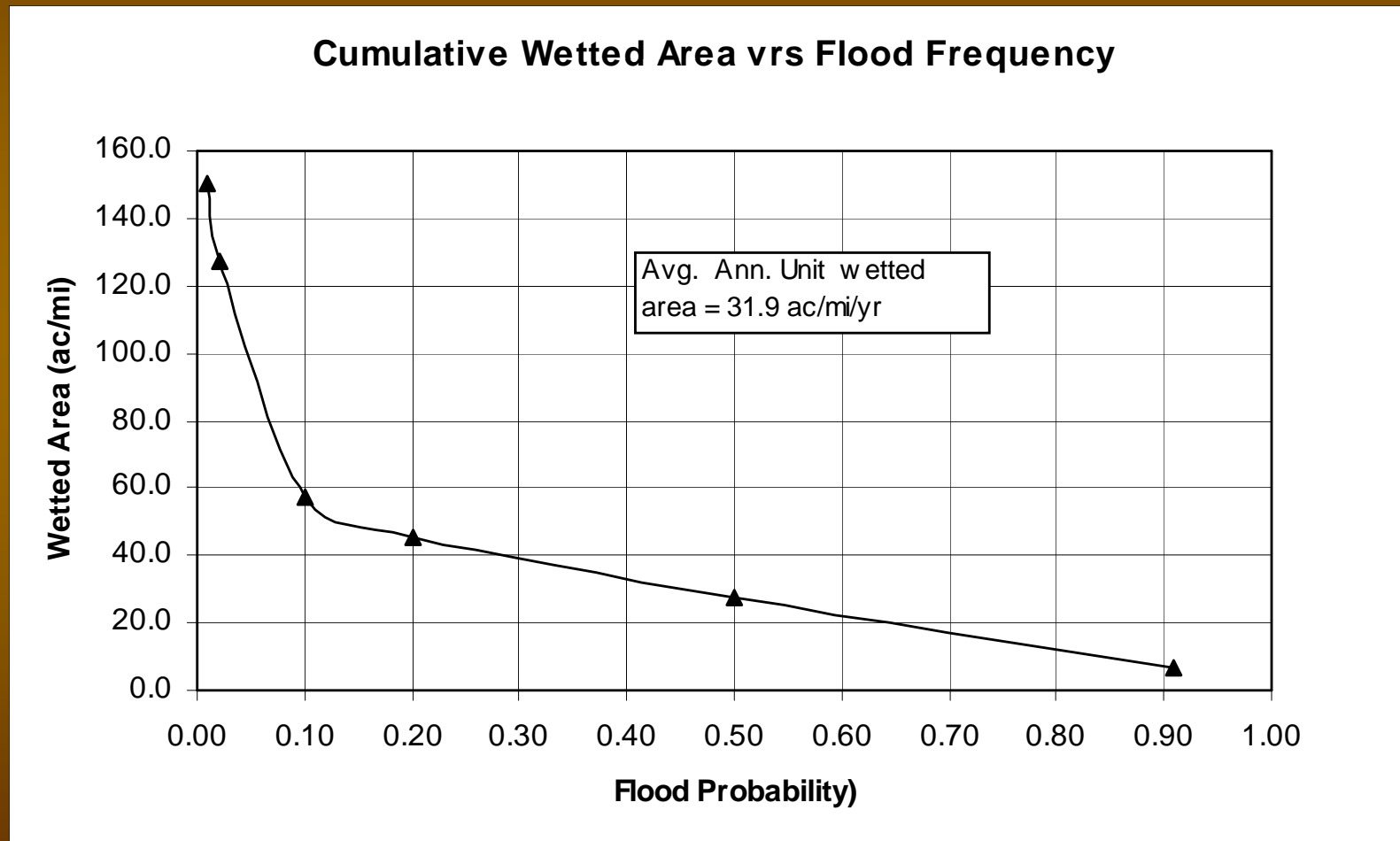
More Technical Analysis Wetted Area

- Main channel connection to riparian area and floodplain is vital.
 - How often does the main channel leave its banks?
 - How much riparian and floodplain area can be inundated on an annual basis?
- 

Does a straight line represent the best the project can achieve?



Shape of the curve tells a story



What have we learned and
what's next?



Stream Reclamation – The Right Thing to Do.

- Water quality benefits of stream reclamation supported by:
 - Literature
 - Authority data
 - Technical Analysis
- Cottonwood Creek has become Authority baseline for comparison
- Authority published report in 2011



Parting Shot

- If we do a good job you can't see it.
- Bill.Ruzzo@comcast.net

