



**Belews Creek Innovative
Streambank Stabilization
Seminar and Hands-On
Construction Workshop
April 10 – 12, 2012
(A Dave Derrick USACE Project)**

**Bank stabilization project funded
through an EPA 319 Implementation
grant obtained by Belews Creek
Watershed Partnership-
a citizen based non-profit organization**



Missouri Department
of Natural Resources

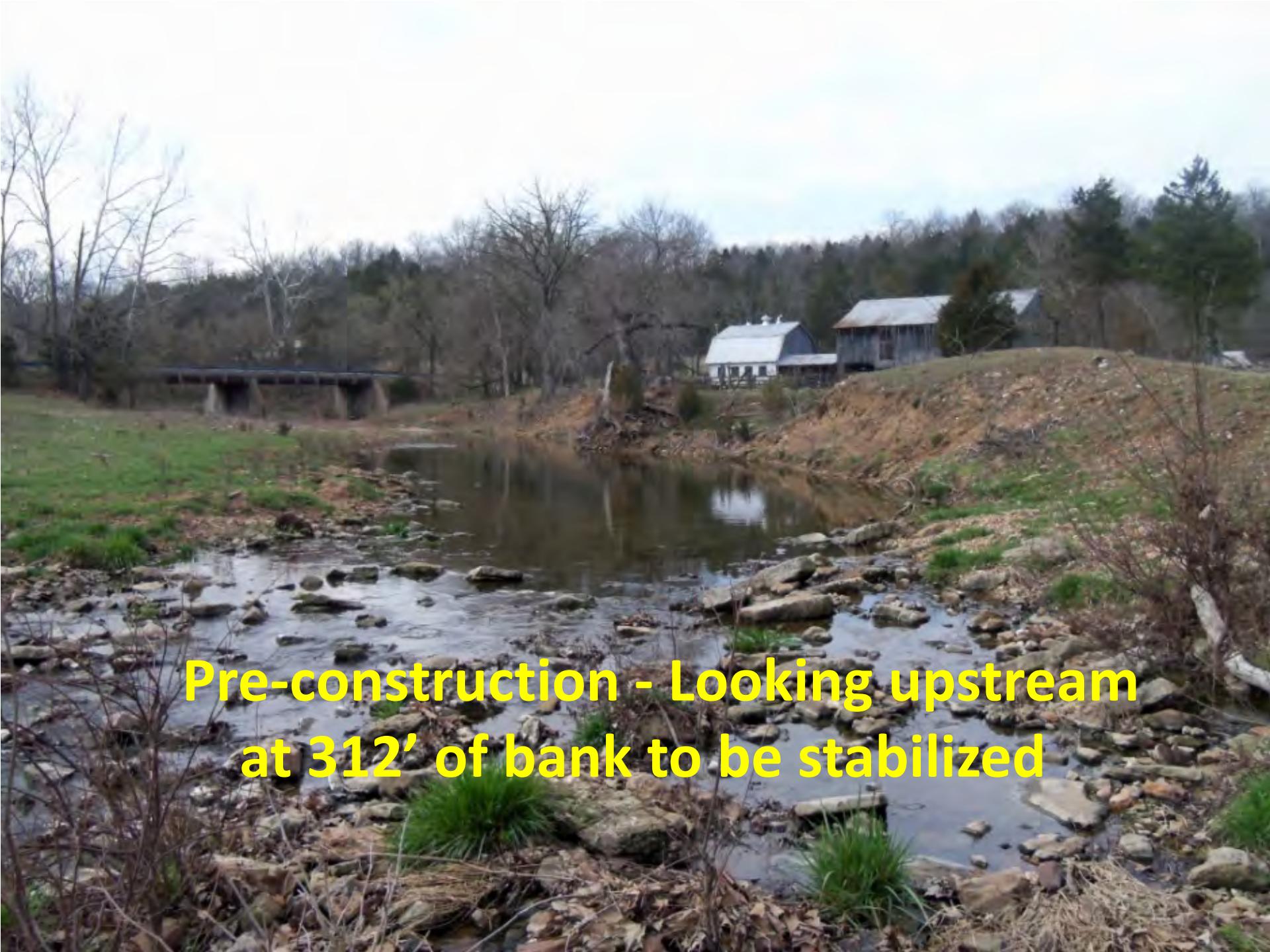
This project is funded by the US EPA Region 7
through the Missouri Department of Natural
Resources under Section 319 of the Clean
Water Act.



**Pre-Construction Bank Conditions
Looking Downstream –
312' in 1st portion of project**





A photograph of a rocky stream bed looking upstream towards a white barn and a blue building.

Pre-construction - Looking upstream
at 312' of bank to be stabilized



Looking downstream – 2nd Portion
600' of bank to be stabilized





Materials Used on project

**Boulders – up to 3 tons
Used for bendway weirs
and traffic control stones**



**400# and 800# self adjusting and
self filtering Stone -
Used for keys and LPSTP**



**Cedar trees with root wad attached –
Used for locked logs**

Live siltation

Willows cuttings – 3,100

Bare root dogwoods (1,000 each):

Gray, Roughleaf, and Silky

Bare root (25 each): Sycamore, Black Walnut, White Oak, Tulip Tree, Bald Cypress, Black Cherry, and Swamp white oak

RPM (Root Production Method): (10 each): Sycamore, Black Walnut, Tulip Tree, Bald Cypress, and Swamp white oak



Seminar at Hillsboro Civic Center



Start of Construction

Layout of key to tie into bridge



Trench for key







Live siltation (willows) placed in key



Stone added



A man wearing a hard hat and an orange safety vest stands on a grassy bank, looking towards the right. He is positioned near a black fence post and some bare branches in the foreground.

Three people are standing on a wooden bridge. From left to right: a woman in a yellow vest, a man in a grey shirt and blue jeans, and a man in a yellow vest. They appear to be observing the scene below.

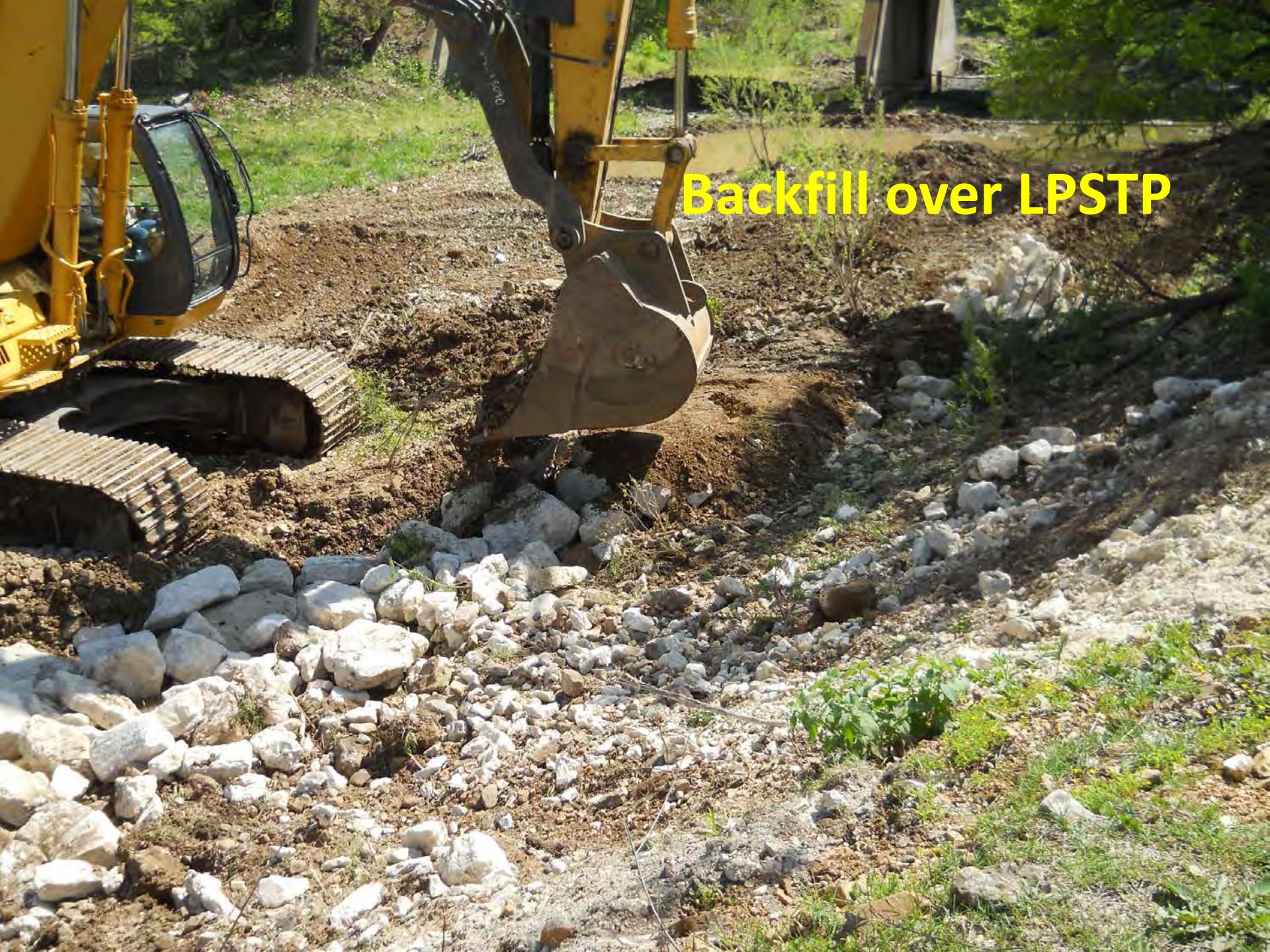


Key back-filled



Start of Longitudinal Peak Stone Toe Protection (LPSTP)





Backfill over LPSTP

Willows planted behind LPSTP





Backfill over willows and LPSTP



Cedars used for locked logs





Placing Cedars



A photograph of a riverbank under construction. A yellow excavator is positioned on the bank, and several workers in safety vests and hard hats are standing nearby. A large pile of white bags, likely sandbags, is stacked on the bank. The ground is a mix of dirt and rocks, and a body of water is visible in the bottom right corner.

Locked logs with root wad tied into LPSTP



Trench for keying into existing bank



Willows and stone placed in trench



Trench backfilled

Dave Derrick determining angle
for bendway weirs





Placing stone for bendway weirs

A photograph of a riverbank under construction. In the foreground, a rocky weir structure is being built across the water. Two workers in high-visibility vests and hard hats are on the bank near the structure. In the background, a bridge spans the river, and a large barn with several cows is visible on a grassy hillside. The sky is clear and blue.

Bendway weirs



Planting riparian corridor





Second portion of project



Trench for key



**Willows and stone placed in key
with Single Stone Bendway Weirs
(Traffic Control) along creek bank**



Backfill placed over key





**Willows planted between keys
along waters edge**



**Planting willows and dogwoods
“the easy way”**





**Planting dogwoods in “smiley face”
Placed where gully drains into stream**





Armoring eroded bank and tree



**Sloping bank for key and
single stone bendway weirs**



DEERE

Hertz
Equipment Rental

246-23-5040

330C LC



Key across road at end of first portion



A photograph of a river scene. In the foreground, the water is shallow and reflects the surrounding trees. A stone wall, consisting of large white and grey rocks, runs along the right bank. The background features a bridge over the river, a white barn with a red roof, and a dark wooden building. The sky is overcast.

Looking US - stone work complete





Looking DS at completed stone work

**One day after stone work completed
following an 1 ½" rain**





One week after stone work completed











**One week after stone work completed—
planting of remaining willows and dogwoods**









Electric fencing restricts cattle crossing to
area between fence and bridge



Electric fencing keeps cattle out of stream



Electric fencing installed to cattle crossing
under Highway BB

Belews Creek Watershed Partnership banner and sign on post behind





Four weeks after completion
following a 3" rain





Job Well Done and the creek
doing what Dave told it to do!!

Costs for this bank stabilization project:

Stone	\$19,923
(57 T boulders, 416 T 800#, 597 T 400#)	
Equipment Operator	\$ 7,490
Equipment rental	\$ 2,751
Trees (MDC)	\$ 3,181
(Keeling)	\$ 642
Civic Center	\$ 150
Portable toilet	\$ 100
Total	\$34,237