Bottom Land Deposition and Head Cutting: Natchez Trace State Park

Craig Harris, Caleb Gulley, David Thomas
MLRA 16-7 Soil Survey Office USDA - Natural Resources Conservation Service

Head Cutting Stream

Head Cutting is an erosional feature of some intermittent and perennial streams where an abrupt vertical drop in the stream bed occurs, resembling a very short cliff or bluff.

Past

- Intermittent drain experienced large volume of deposition coincidental to the advent of mechanized agriculture.
- State Park established, deposition stabilized.
- Head cutting occurring as intermittent stream seeks to return to the previous surface level.

Present

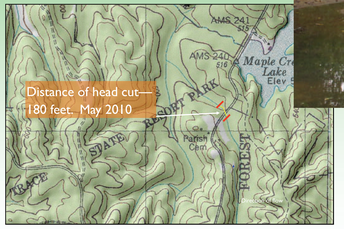
- Head cutting is visible as a sharp vertical drop in stream level.
- Erosion beneath the mat of hardwood roots of trees lining the higher, shallower main channel. This is called a "tunneling head cut."

During one event in May 2010, the Park received approximately 10 inches of rain in a 17 hour period and the head cut moved approximately 180 feet upstream.

Head cutting crosses road, damaging bridge as it continues upstream—May 2010

Results of Head Cutting

Material formerly stored in flood plain is relocated further downstream due to head cutting. Hydrology, and consequently timber management, may be affected by continued deposition in the floodplain.



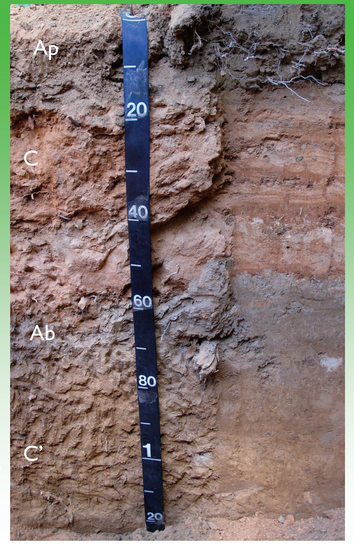
New Material

- Sediment accumulated rapidly since the advent of mechanized agriculture.
- Sandy or loamy textures derived largely from subsoil sediment washed from gullied uplands.

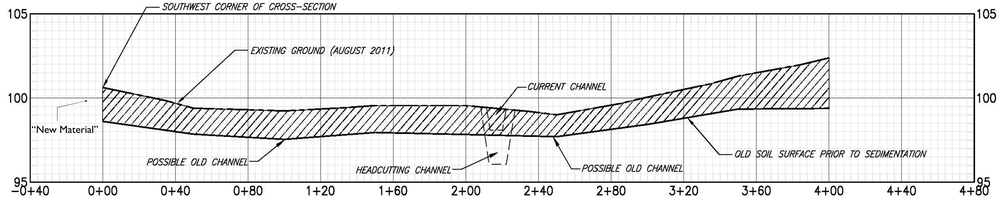
Buried Soil

- Sediment accumulated slowly with stable uplands prior to modern agriculture
- Silty textures derived largely from loess from undisturbed upland surface horizons.

Profile Above Head Cutting



Comparison of Current Surface and Previous Surface in Cross Section of Intermittent Stream



CROSS-SECTION SOIL SURFACE

- Borings taken at 40' intervals perpendicular to flow of stream.
- Observations made of depth to buried A horizon, abrupt textural change, or change in redox features to mark contact with older deposition.
- Current channel is cut 18 inches or less into recent deposition; head cutting channel is cut well into older deposition.
- Indicators for older deposition are less definitive in central portion of floodplain, masked by stream channel movement.

20 0 20 40 60
Scale in Feet

		Date
Designed	PINSON	08/2011
Drawn	PINSON	08/2011
Checked	HARRIS	08/2011
Approved		

CENTRAL STATES FOREST SOILS WORKSHOP
SEDIMENTATION TESTIMONY
CARROLL COUNTY, TENNESSEE
NATCHEZ TRACE STATE PARK

NRCS Natural Resources Conservation Service, United States Department of Agriculture

File No.
Drawing No.
Sheet 1 of 1

The USDA is an Equal Opportunity Provider and Employer

USDA NRCS Natural Resources Conservation Service
The University of Tennessee Martin