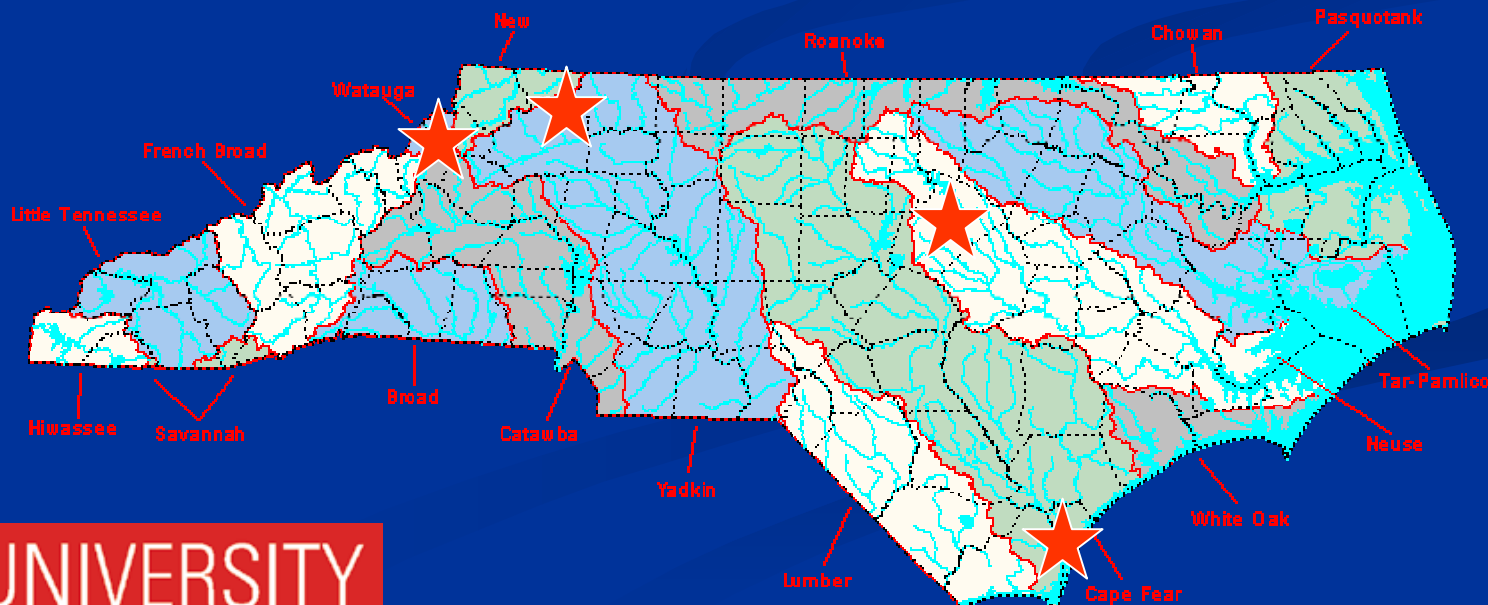


# North Carolina Stream Restoration: *Educational Successes and Lessons Learned*



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# The Solutions (*old thinking*):

- Rip rap, gabions, kudzu, concrete, riparian car-doors





# The Solutions (*new thinking*):

- Natural Channel Design: *Restoring stream form & functions*





# Stream Restoration

The application of engineering, geologic, and biological principles to improve natural stream functions, considering current and future watershed conditions.

## Stream Functions:

1. Transport water & sediment
2. Habitat (aquatic & terrestrial)
3. Recreation
4. Aesthetics



# Components of Successful Projects

1. Adjust stream channel size and shape
2. Connect the channel and floodplain
3. Add in-stream structures
4. Stabilize streambanks
5. Enhance riparian vegetation





# Worley Creek

*Watauga Co, NC*

DA = 0.5 mi<sup>2</sup>

Length = 1,500 ft

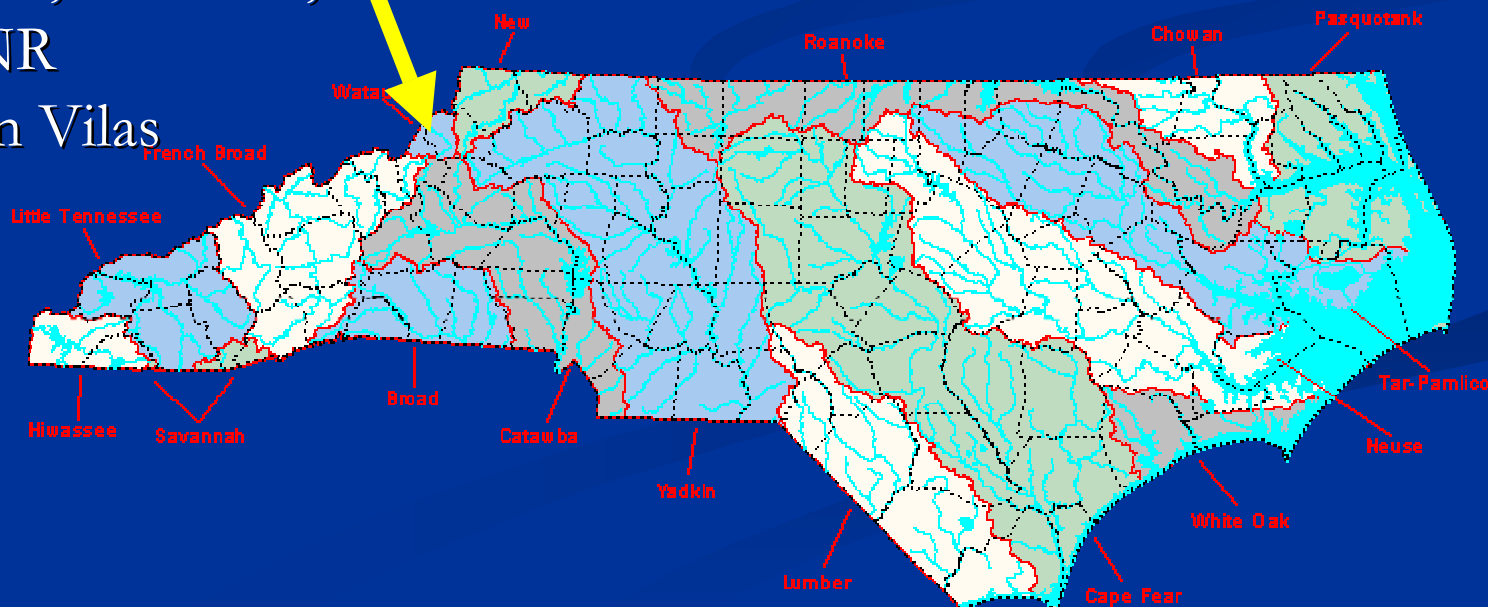
BHR > 2; K < 1.1

Completed 4/00

Const Cost = \$50,000

Funding: NRCS, CWMTF,  
EPA, NCDENR

Designer: John Vilas



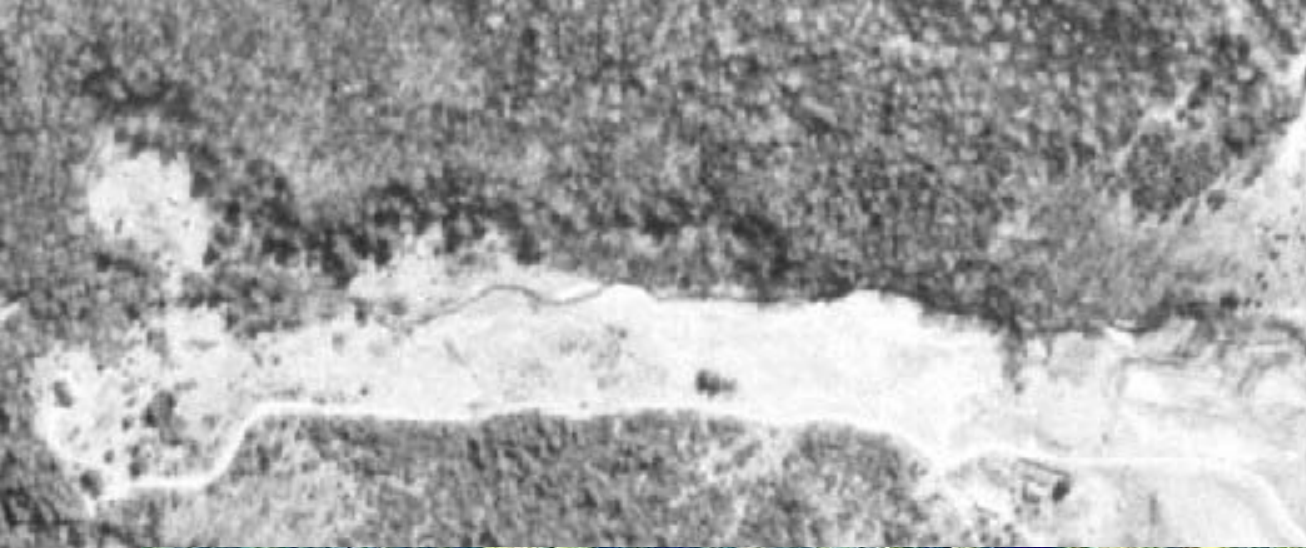














# East Prong Roaring River

*Stone Mountain State Park*  
*Wilkes & Alleghany Cos, NC*



DA = 20 mi<sup>2</sup>

Length = 10,000 ft

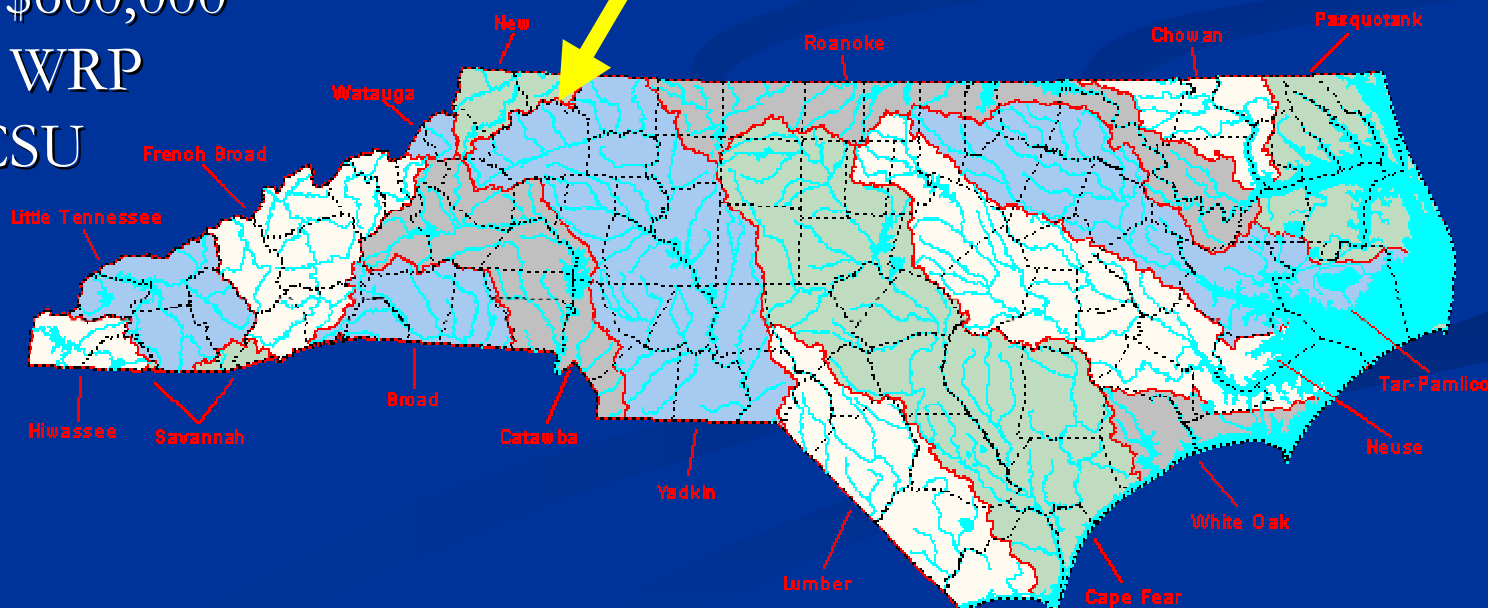
BHR > 1.5

Completed 10/00

Const Cost = \$600,000

Funding: NC WRP

Designer: NCSU







September 2000



June 2002



September 2000



June 2002











# Pine Valley Golf Course

*Wilmington, NC*

DA = 0.5 mi<sup>2</sup>

Length = 1000 ft

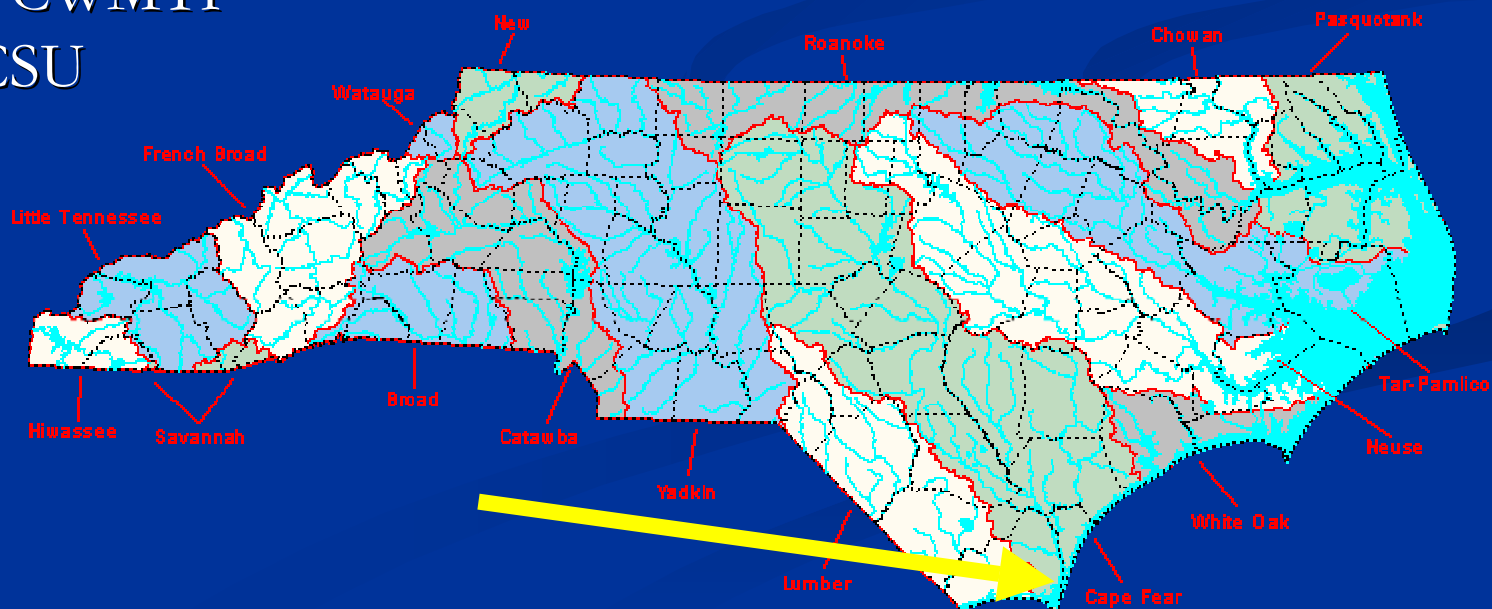
BHR > 2

Completed 5/01

Const Cost = \$125,000

Funding: NC CWMTF

Designer: NCSU

















# Rocky Branch Restoration Project

*NC State University,*

DA = 1 mi<sup>2</sup>

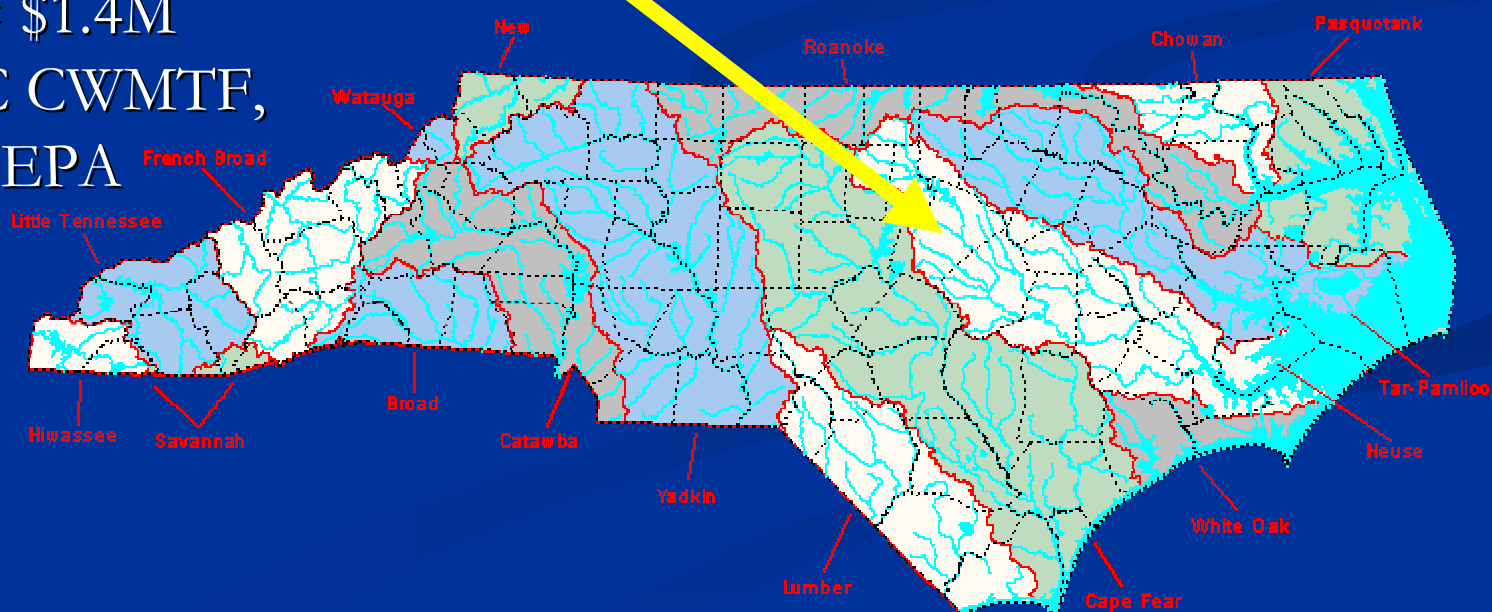
Length = 3,000 ft

BHR > 2

Completed 6/02

Const Cost = \$1.4M

Funding: NC CWMTF,  
NCDOT, USEPA





# Reach 2





# Reach 3









# Reach 4









# Lessons Learned

- Natural Channel Design can work in all settings
- Team approach is essential
- Increased planning & design necessary for urban projects
- Plan for storms during & after construction
- Designers must be on-site during construction
- Quality construction will make or break a project
- Landowner cooperation essential
- Vegetation, vegetation, vegetation
- Learn from mistakes!!!





# Questions?

