NC STATE UNIVERSITY

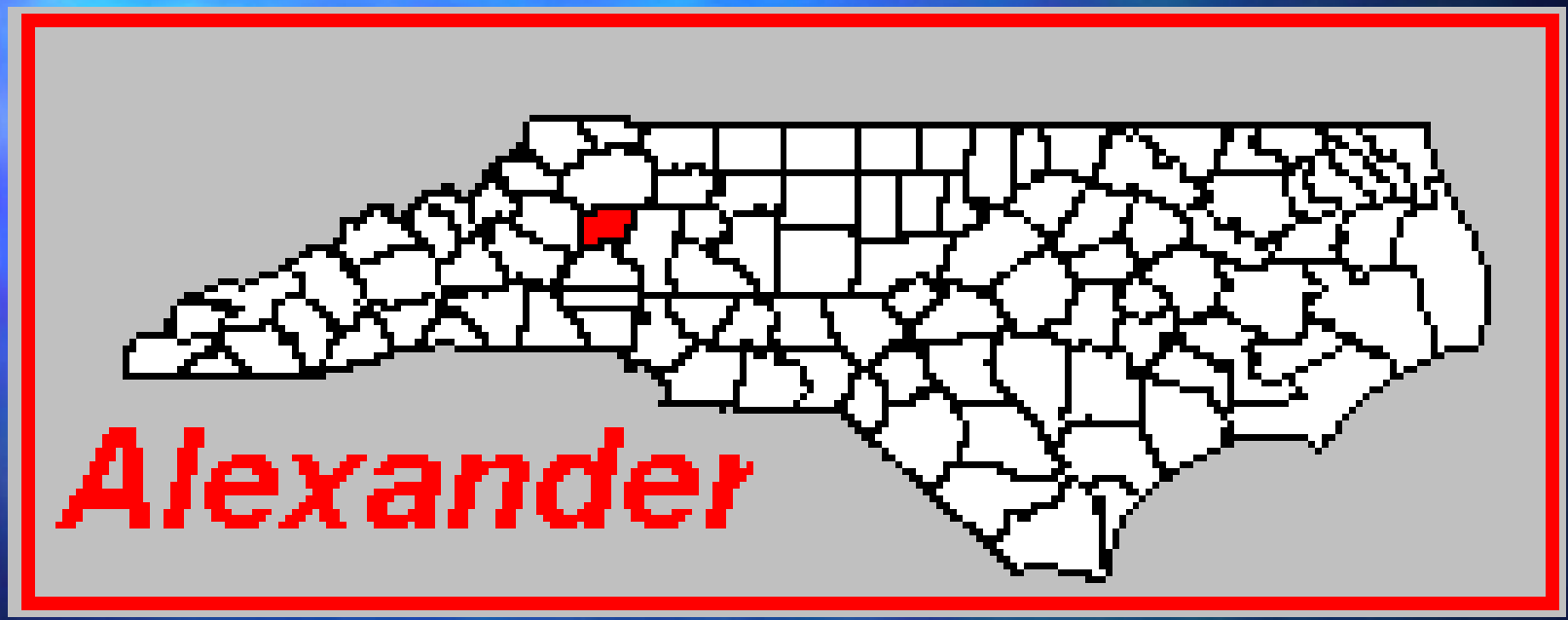
Helping People Put Knowledge to Work

North Carolina Cooperative Extension Service

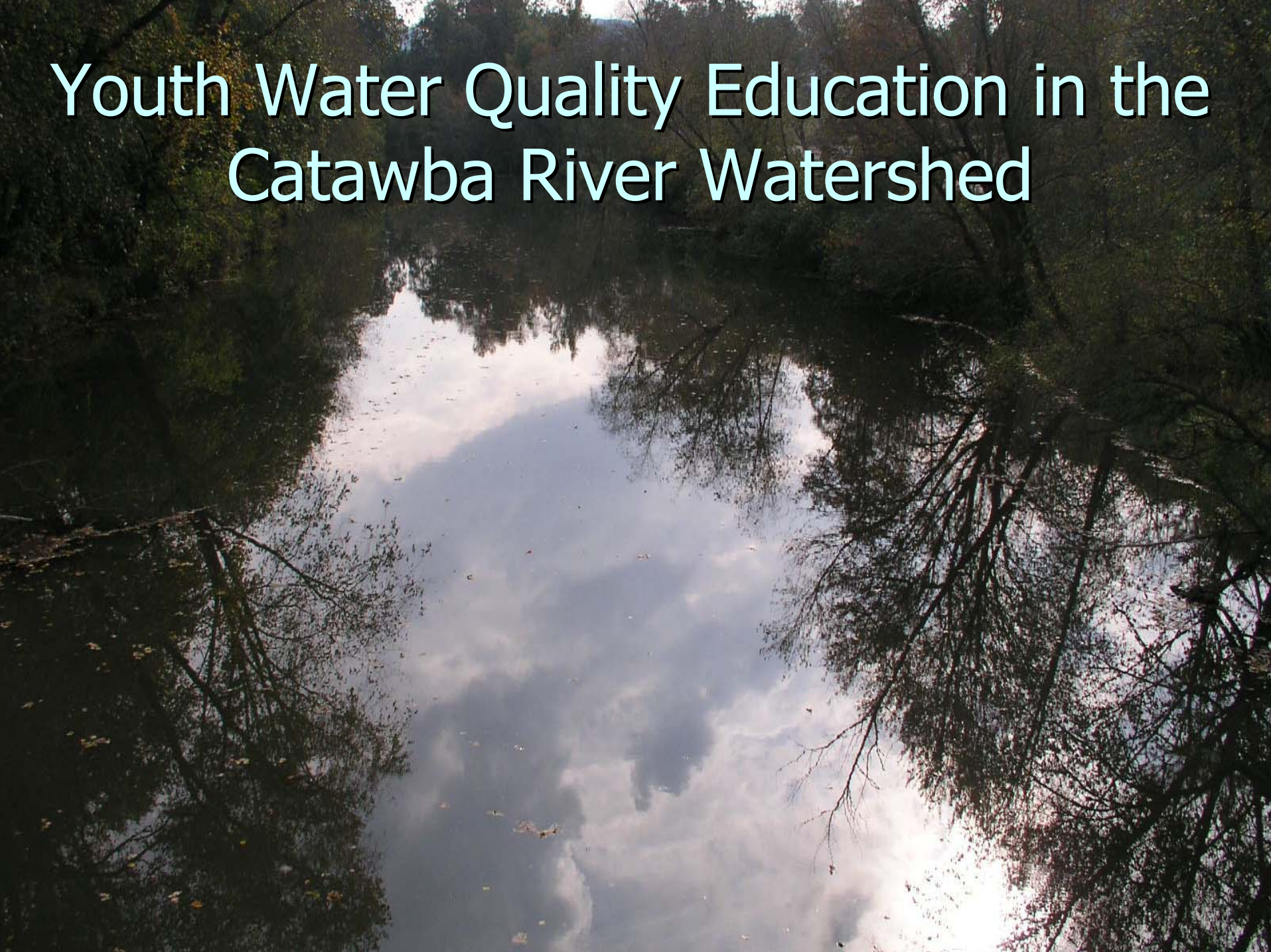
NC STATE UNIVERSITY
A&T STATE UNIVERSITY
COOPERATIVE EXTENSION

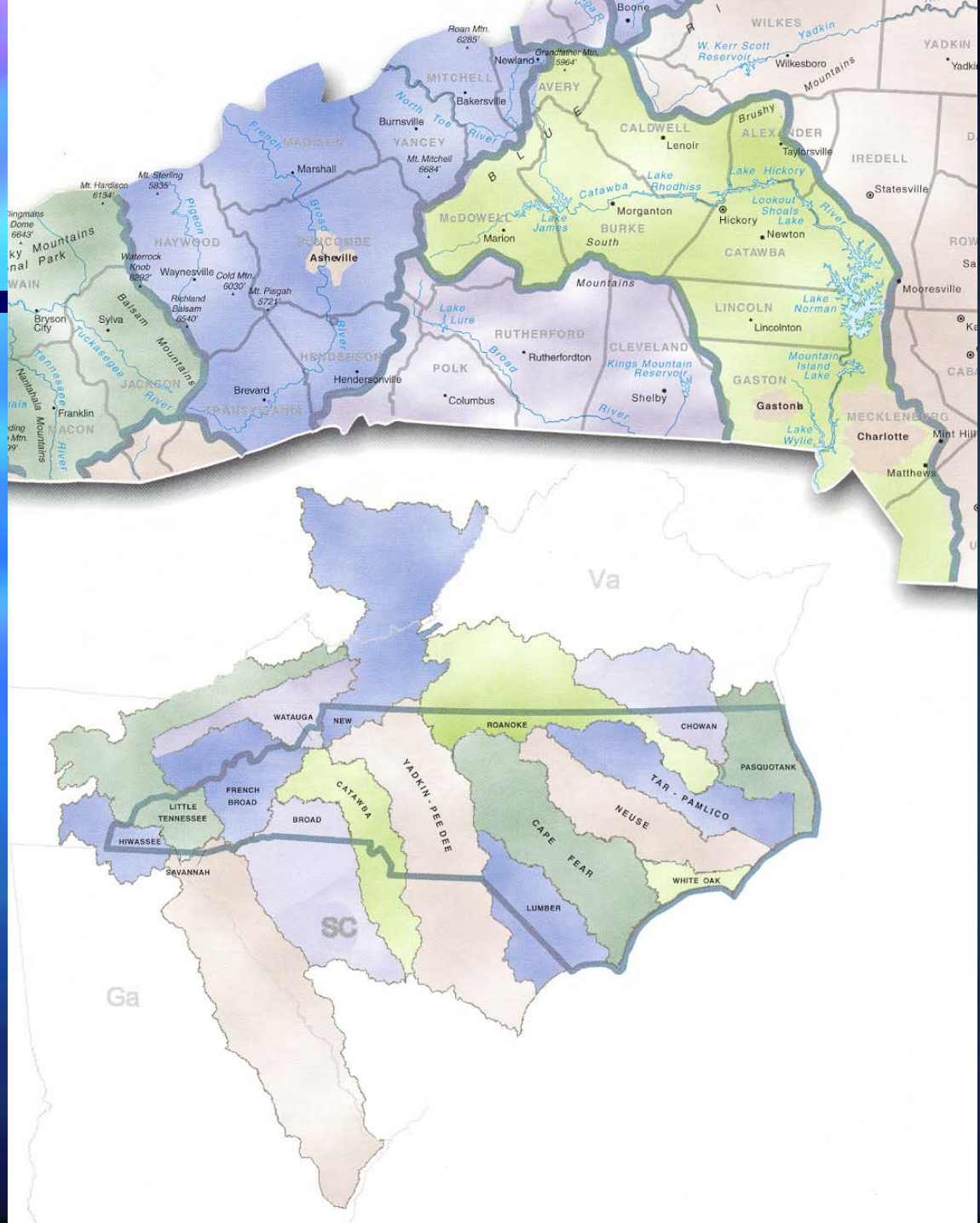
Helping People Put Knowledge to Work

College of Agriculture and Life Sciences, NC State University
School of Agriculture and Environmental Sciences,
NC A&T State University



Youth Water Quality Education in the Catawba River Watershed




Boone
WILKES
Yadkin
W. Kerr Scott Reservoir
Wilkesboro
YADKIN
Roan Mtn. 6285'
Grandfather Mtn. 5964'
Newland
MITCHELL
AVERY
Bakersville
North Toe River
Burnsville
YANCEY
Mt. Mitchell 6684'
Brushy Mountains
CALDWELL
Lenoir
ALEXANDER
Taylorsville
IREDELL
Statesville
Lake Hickory
Lake Rhodhiss
Catawba River
Lookout Shoals Lake
Hickory
Newton
Morganton
Lake James
BURKE
South Mountains
McDOWELL
Marion
CATAWBA
Mooresville
Lake Norman
LINCOLN
Lincolnton
Mountains
Lake Lure
RUTHERFORD
Rutherfordton
CLEVELAND
Kings Mountain Reservoir
Shelby
Broad River
POLK
Columbus
Hendersonville
HENDERSON
Mountain Island Lake
GASTON
Gastonia
Charlotte
MECKLENBURG
Lake Wylie
Matthews
Mint Hill
French Broad River
MADISON
Marshall
Mt. Sterling 5835'
Mt. Hardison 6134'
Pigeon River
HAYWOOD
Waterrock Knob 6292'
Waynesville
Cold Mtn. 6030'
Mt. Pisgah 5721'
Richland Balsam 6540'
Asheville
BUNCOMBE
Bryson City
Sylva
Balsam Mountains
Tuckasegee River
JACKSON
Brevard
TRANSYLVANIA
Tennessee River
Nantahala Mountains
Franklin
MACON
Va
SC
Ga
WATAUGA
NEW
ROANOKE
CHOWAN
PASQUOTANK
FRENCH BROAD
LITTLE TENNESSEE
BROAD
CATAWBA
YADKIN - PEE DEE
TAR - PAMLICO
NEUSE
HIWASSEE
SAVANNAH
CAPE FEAR
WHITE OAK
LUMBER

Streams

Rivers

Lake Hickory

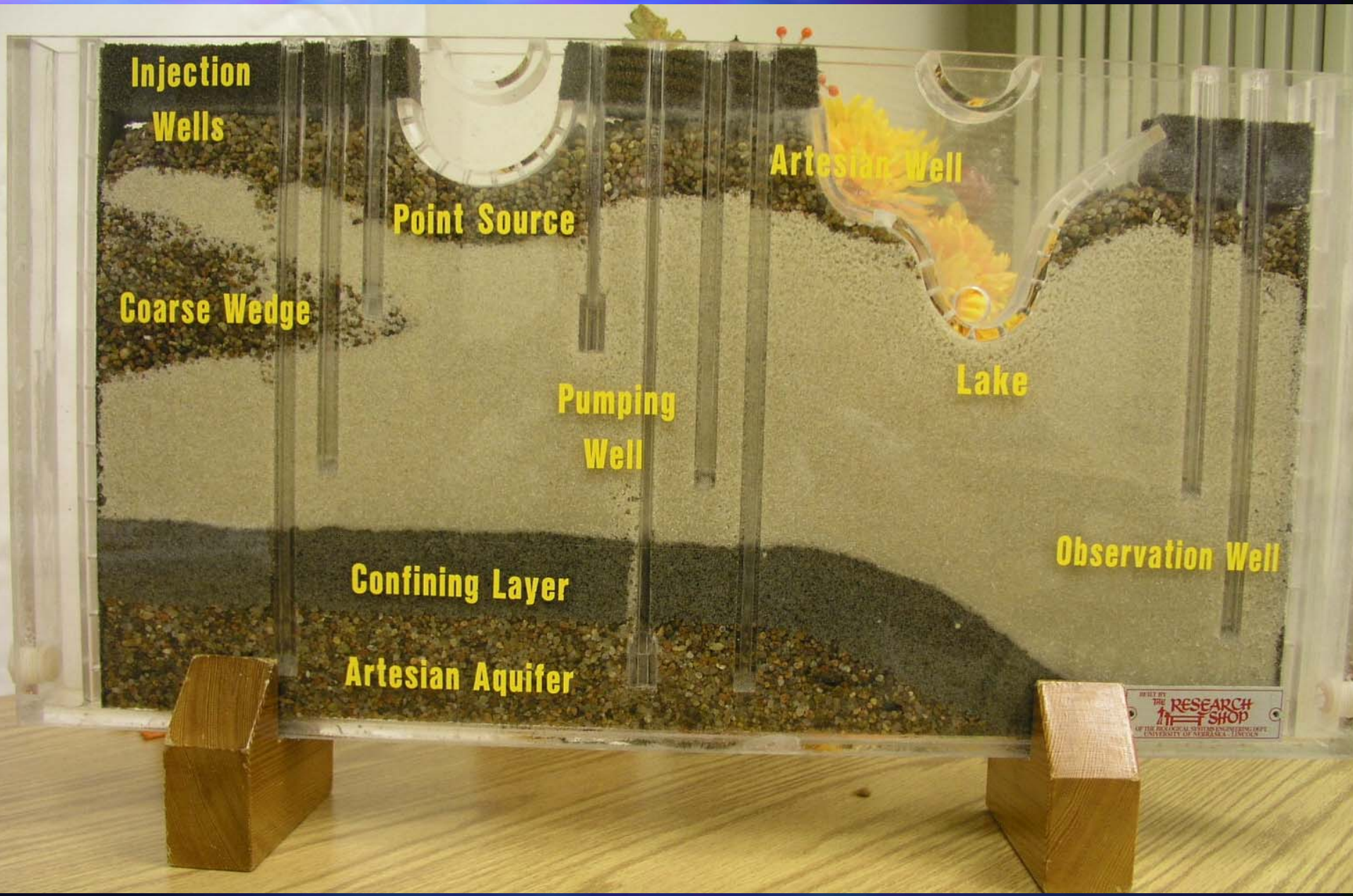
Storm Drain Stenciling

School Enrichment Programs

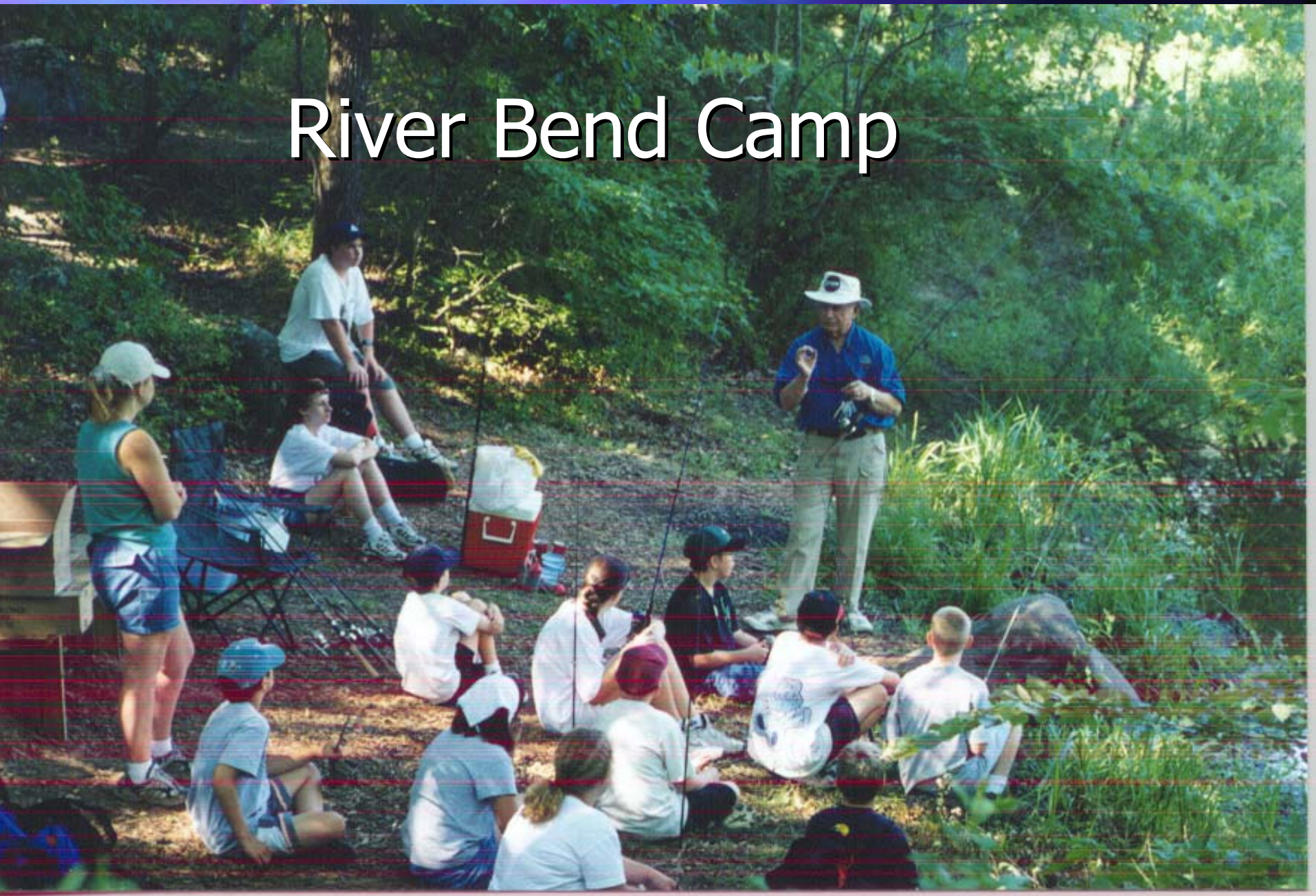

EXIT

Ground Water Model

- In Class Rooms and at Field Days
- Over 146 Youth Groups
- Demonstrates:
  - Drilled well contamination
  - Ground water movement
  - Water body contamination
  - Etc.


Injection Wells
Point Source
Artesian Well
Coarse Wedge
Lake
Pumping Well
Observation Well
Confining Layer
Artesian Aquifer
BUILT BY THE RESEARCH SHOP

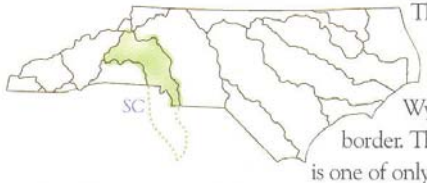
River Bend Camp




Vermicomposting

CATAWBA RIVER BASIN

The Catawba River basin in North Carolina is a place of extremes—you can discover both urban and wild adventures within its boundaries. The basin contains a large national wilderness area near its headwaters and the country's second-fastest growing major city where the Catawba River flows into South Carolina. This haven of natural wonders includes 6,000-foot Grandfather Mountain, the Pisgah National Forest, Linville Falls, one of the most beautiful and popular cascades in the Appalachian Mountains, and Linville Gorge, one of the deepest canyons in the eastern United States.



The Catawba River begins on the eastern slopes of the Blue Ridge Mountains in McDowell County. It flows east, then south into Lake Wylie on the North Carolina-South Carolina border. The Linville River, a tributary of the Catawba, is one of only four in the state with the designation Natural and Scenic River. Other major tributaries are the Johns River, Dutchman's Creek, South Fork Catawba River and Sugar Creek.

The basin also is a land of lakes. The Catawba River contains the most major dams of any North Carolina river. The longest free-flowing stretch of the Catawba River in North Carolina is only about 17 miles. Most of the 224-mile river exists as a chain of seven man-made lakes, which first supplied electric power for industry and now provide recreation, drinking water and electricity for expanding Piedmont towns and cities. One of these reservoirs, Lake Norman, is the largest man-made lake in the state. (The river feeds four additional reservoirs in South Carolina.)

The Catawba River was named for the tribe that first settled its banks. Catawba,

CHARLES BRASWELL JR.

Lake James is the first of seven man-made lakes on the Catawba River in North Carolina

profile:

Total miles of streams and rivers: 3,004

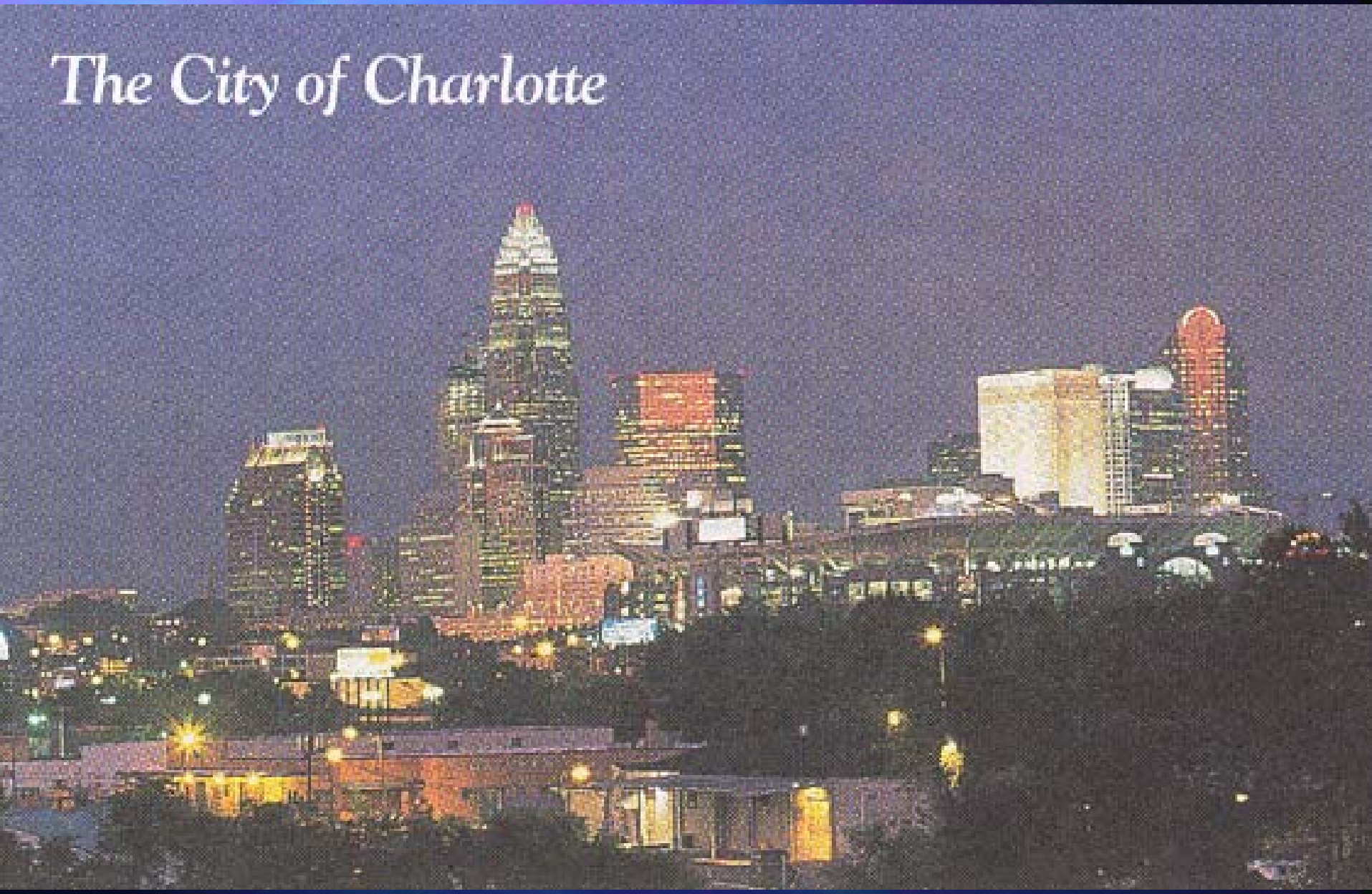
Municipalities within basin: 58

Counties within basin: 11

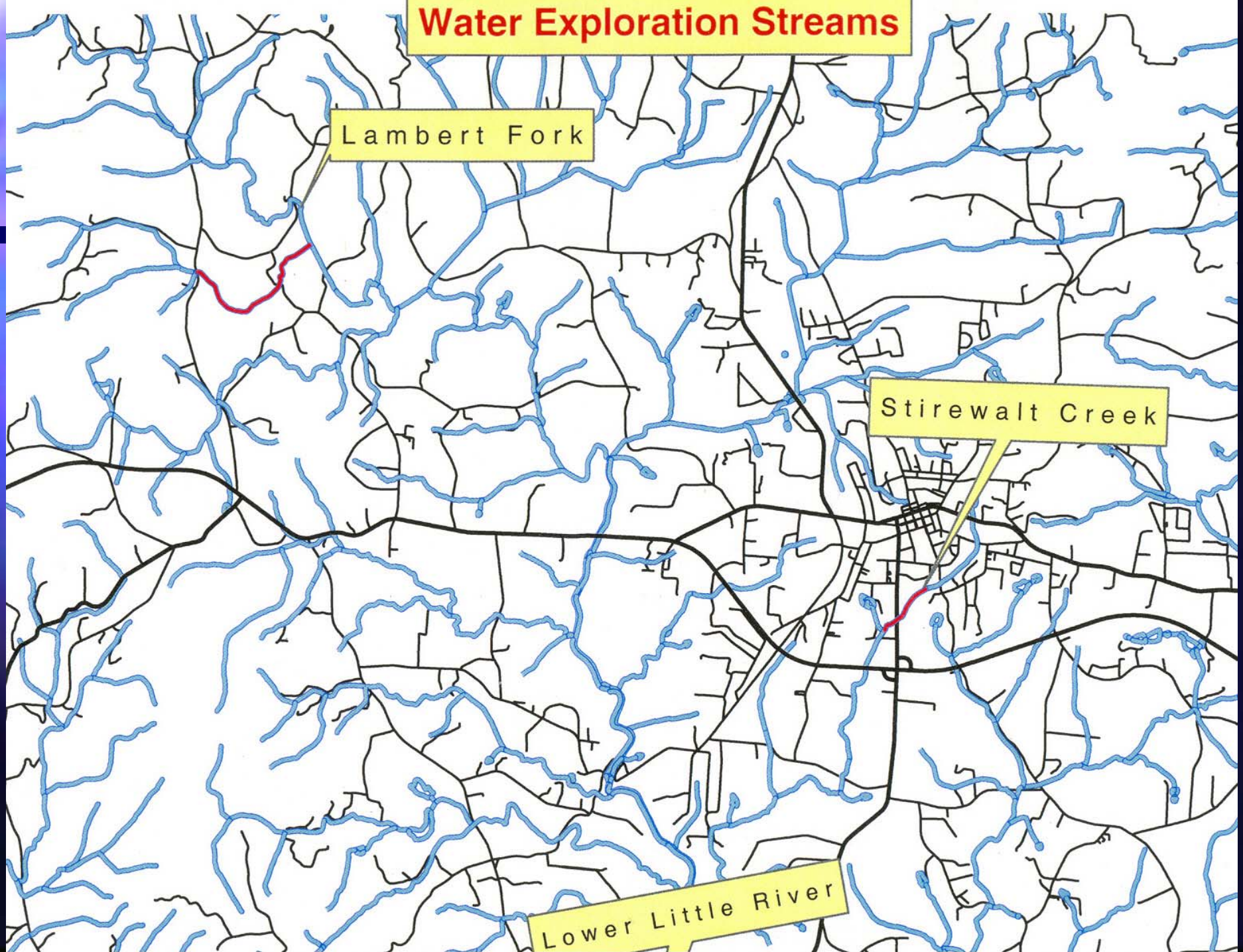
Size: 3,285 square miles

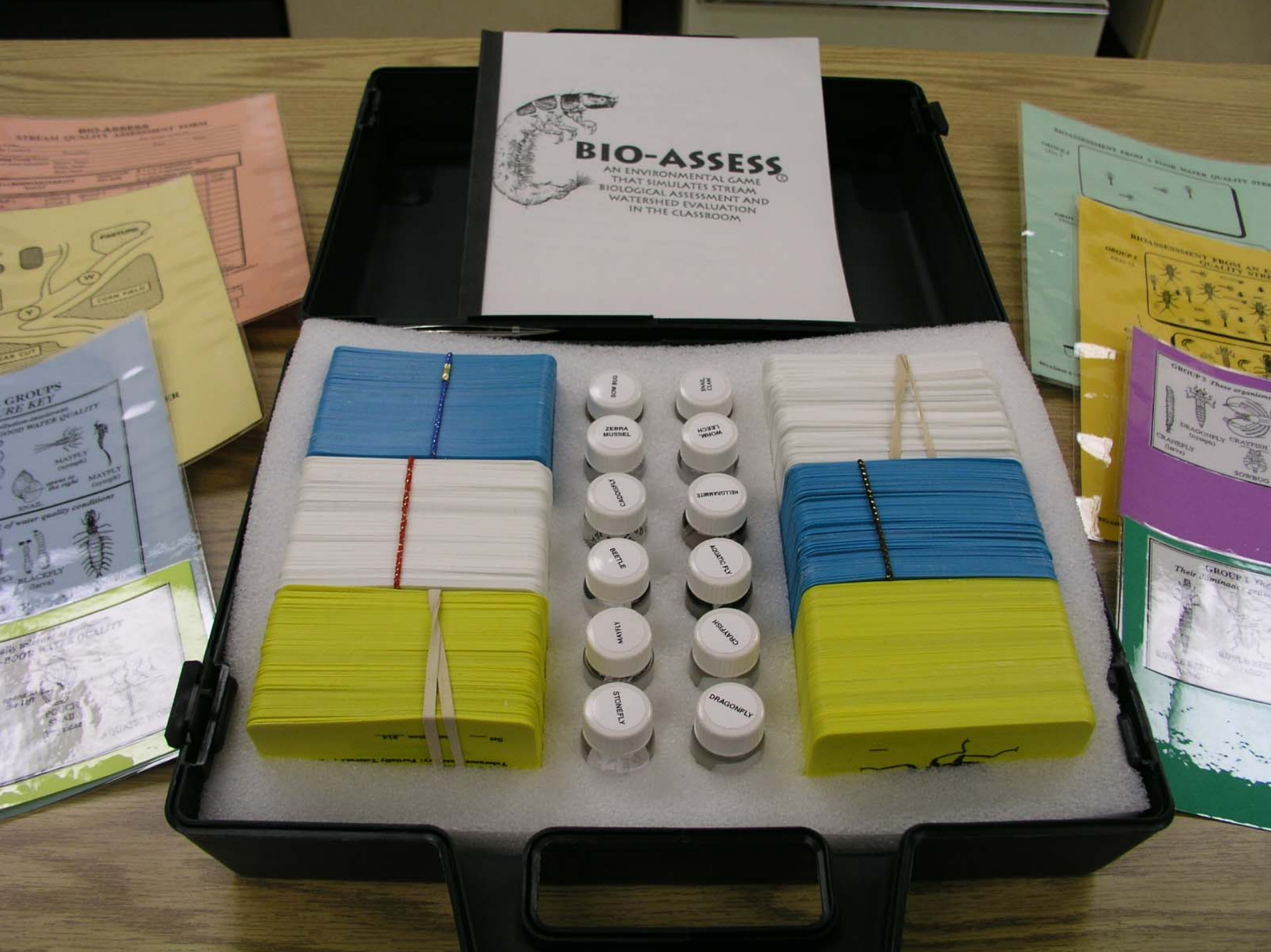
Population: 1,170,512 (2000)

(in North Carolina)


The City of Charlotte

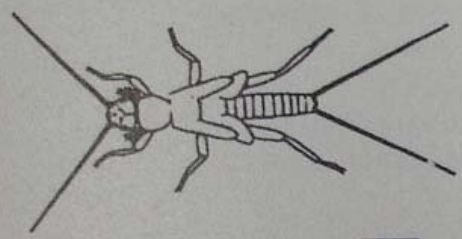

ALEXANDER COUNTY
GIS DEPARTMENT
Miles
0
2
4
8


Water Exploration Streams
Lambert Fork
Stirewalt Creek
Lower Little River


BIO-ASSESS©
AN ENVIRONMENTAL GAME
THAT SIMULATES STREAM
BIOLOGICAL ASSESSMENT AND
WATERSHED EVALUATION
IN THE CLASSROOM
ZEBRA MUSSEL
CADDISFLY
BEETLE
MAYFLY
STONEFLY
WORM/ LEECH
HELLGRAMMITE
AQUATIC FLY
CRAYFISH
DRAGONFLY

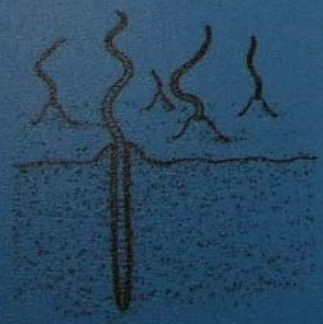
Family: Hydropsychidae
Examples: *Hydropsyche, Cheumatopsyche*
Life stage: **LARVA**
Tolerance Value: 4
Tolerance Category: Partially Tolerant (PT)
Feeding Group: **FILTERING COLLECTOR** (FC)

Set 4 illustration 033



COMMON NAME: **STONEFLY**
Order: Plecoptera
Family: Nemouridae
Examples: *Nemoura, Amphinemura*
Life stage: **NYMPH**
Tolerance Value: 2
Tolerance Category: Intolerant (I)
Feeding Group: **SHREDDER** (SH)

Set 7 illustration 026

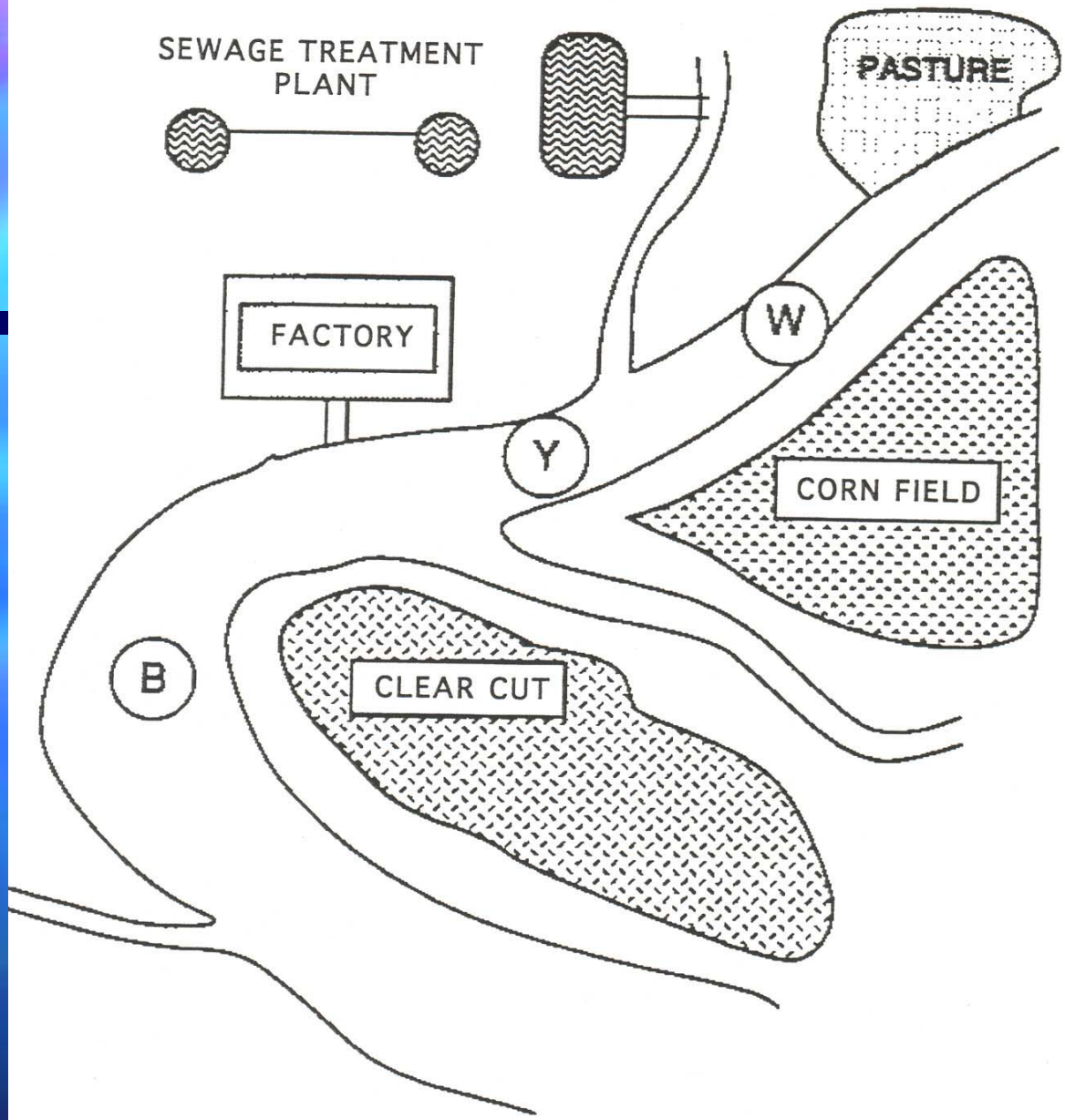


COMMON NAME: AQUATIC WORM
Class: Oligochaeta
Family: Tubificidae
Examples: *Tubifex*
Life stage: IMMATURE TO ADULT
Tolerance Value: 10
Tolerance Category: Tolerant (T)
Feeding Group: COLLECTOR / GATHERER (CG)

Set ___ illustration 044

COMMON NAME: **CADDISFLY**
Order: Trichoptera
Family: Hydropsychidae
Examples: *Hydropsyche, Cheumatopsyche*
Life stage: **LARVA**
Tolerance Value: 4
Tolerance Category: Partially Tolerant (PT)
Feeding Group: **FILTERING COLLECTOR** (FC)

Set 4 illustration 033



STREAM WITH POTENTIAL IMPACTS ON WATER QUALITY AND AQUATIC BIOTA, AND THREE SAMPLING SITES (W, Y AND B)


Bio-Asses

BIO-ASSESS
STREAM QUALITY ASSESSMENT FORM

Stream Name_____ Site (Color of Deck)_____
Describe Location _____
County_____ Town/City_____ Date_____ Time_____
Monitoring Group Name_____
Names of team members: Yellow Team_____
White Team_____
Blue Team _____

MACROINVERTEBRATE TALLY

Letter Code For Tally:
R = 1 to 3 individuals (Rare)
C = 4 to 9 (Common)
A = 10 or more (Abundant)

GROUP 1 TAXA	*Letter Code*	GROUP 2 TAXA	*Letter Code*	GROUP 3 TAXA	*Letter Code*
Mayfly		Hellgramite		Aquatic Worm	
Stonefly		Dragonfly		Midge	
Caddisfly		Crane Fly		Pouch Snail**	
Riffle Beetle		Filtering Caddisfly*			
Snail		Crayfish			
		Scud			
		Sowbug			
		Snipe Fly			
		Blackfly			
Number of Taxa =_____ Multiply by 3 =_____ (Index Value)		Number of Taxa =_____ Multiply by 2 =_____ (Index Value)		Number of Taxa =_____ Multiply by 1 =_____ (Index Value)	

* Filtering Caddisflies are in the Family Hydropsychidae (gills on abdomen; most common caddisfly)
** Pouch snails are in the Family Physidae (shell opens to the left; air-breathing snail)

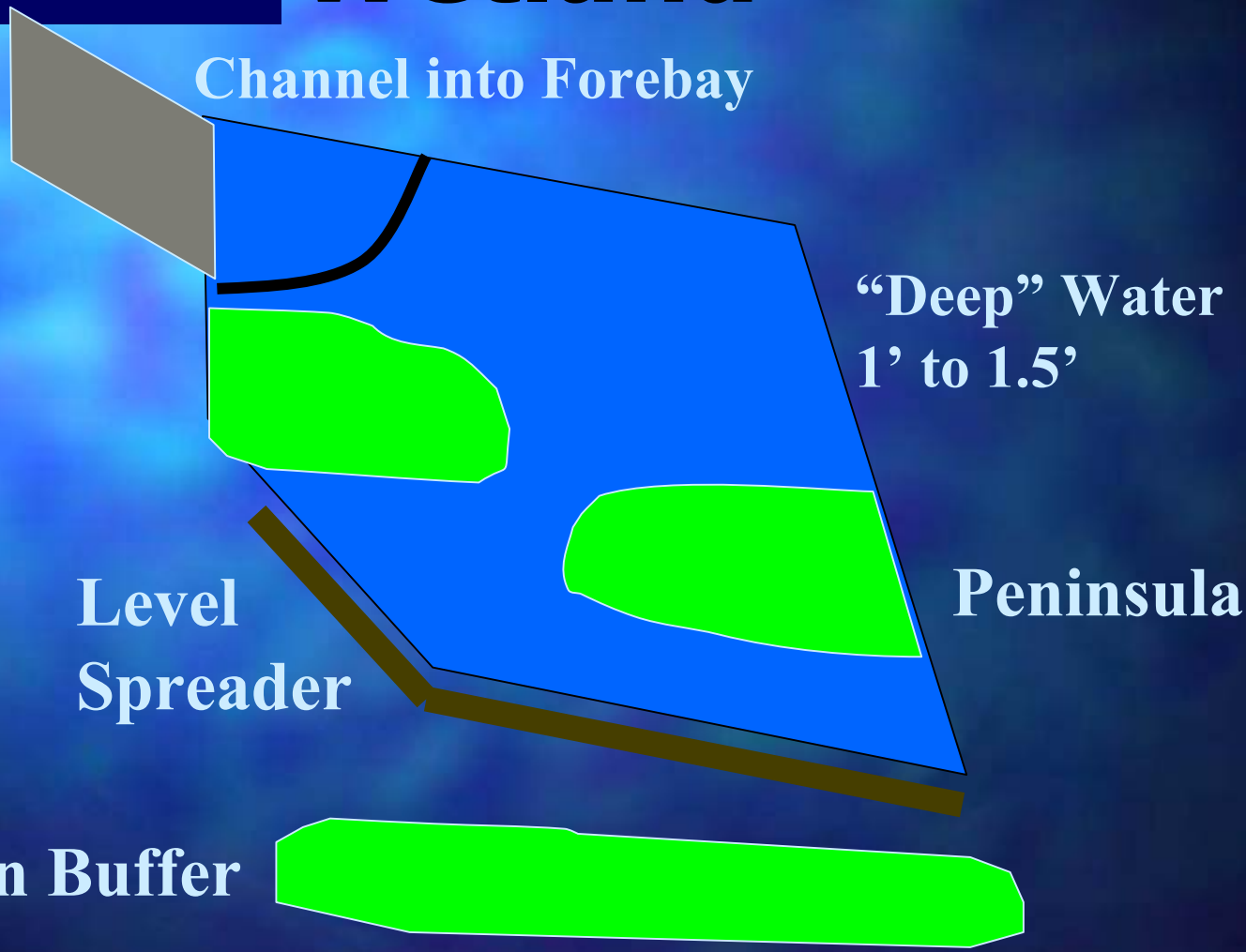
Total Number of Taxa ☐
(Sum of Number of Taxa in Each Group)

Cumulative Index Value ☐
(Sum of Index Values for Each Group)

STREAM QUALITY ASSESSMENT :
(Check box corresponding to Cumulative Index Value)

EXCELLENT (>22) ☐ GOOD (17-22) ☐
FAIR (11-16) ☐ POOR (<11) ☐

Sugar Loaf School Wetland



Watershed

Why Construct Wetlands?

- Serves as diversion for runoff
- Serves as habitat for wildlife
- Traps sediment and pollutants
- Stores water during wet periods
- Serves as educational demonstration site

Cross Section of Wetland

Native Aquatic Plants


Wool Grass


Cardinal Flower


Rose Mallow


Soft Rushes


Softstem Bulrushes


Arrowhead or Duck-potato


Pickerelweed


Cattails


solo


Fragrant Water-lilies


Water Lotus

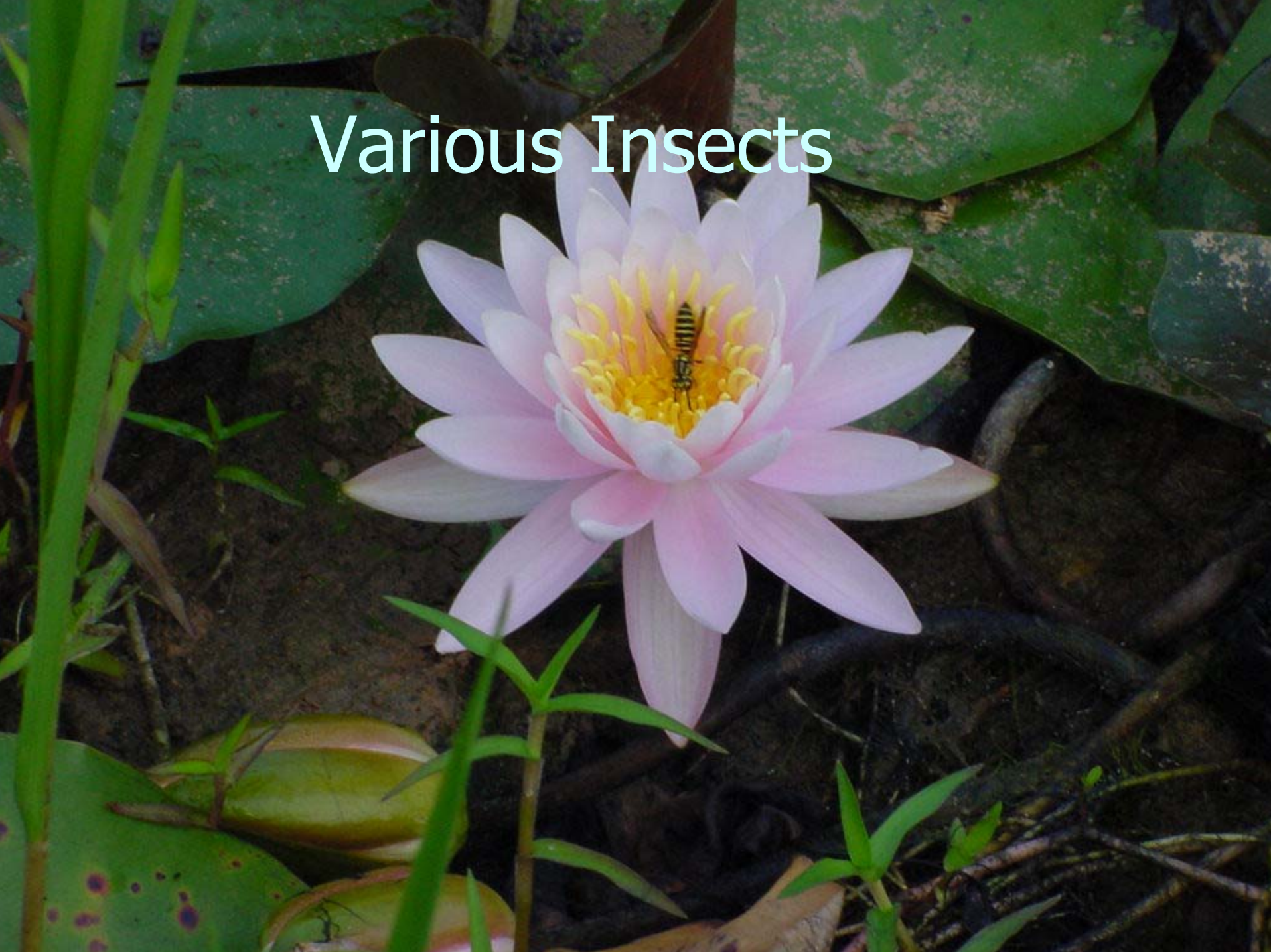
Various Plant Zones

- Deep Pools
- Shallow Water
- Shallow Land
- Upland

Frogs


Killdeer

Dragon Flies


Various Insects


White Tailed Deer


Alexander County
Water Quality Improvement
Goals of project at Deal Farm and Sugarloaf Elementary School
1) Improve water quality in North Carolina streams impacted by livestock access and stormwater runoff;
2) Evaluate the effectiveness of the best management practices (BMPs) through water quality monitoring;
3) Demonstrate the effectiveness of BMPs through educational workshops and tours.
Erosion in pasture
Stormwater causes Rill and Gully Erosion in Pasture
Gully
WETLAND DEVELOPMENT
Wetland area during construction
Constructed Wetland
4-Years after Wetland Constructed
STREAMBANK STABILIZATION
Crib Wall installation
1-Year after vegetation established
4-Years after project completed
Funding Agencies
Cooperators

Success For All Involved


http://www.ces.ncsu.edu/
copubs/crd/water/001/

Sugar Loaf Wetlands

- 55 outdoor sessions
- 7 different elementary schools
- 2 teacher trainings
- Recipient of 2 Community Based Enhancement Grants


Happening at

Clean Water For Years To Come