

Connecting NPScape with Inventories, Monitoring, and Protected Areas

Shepard McAninch

Ecologist

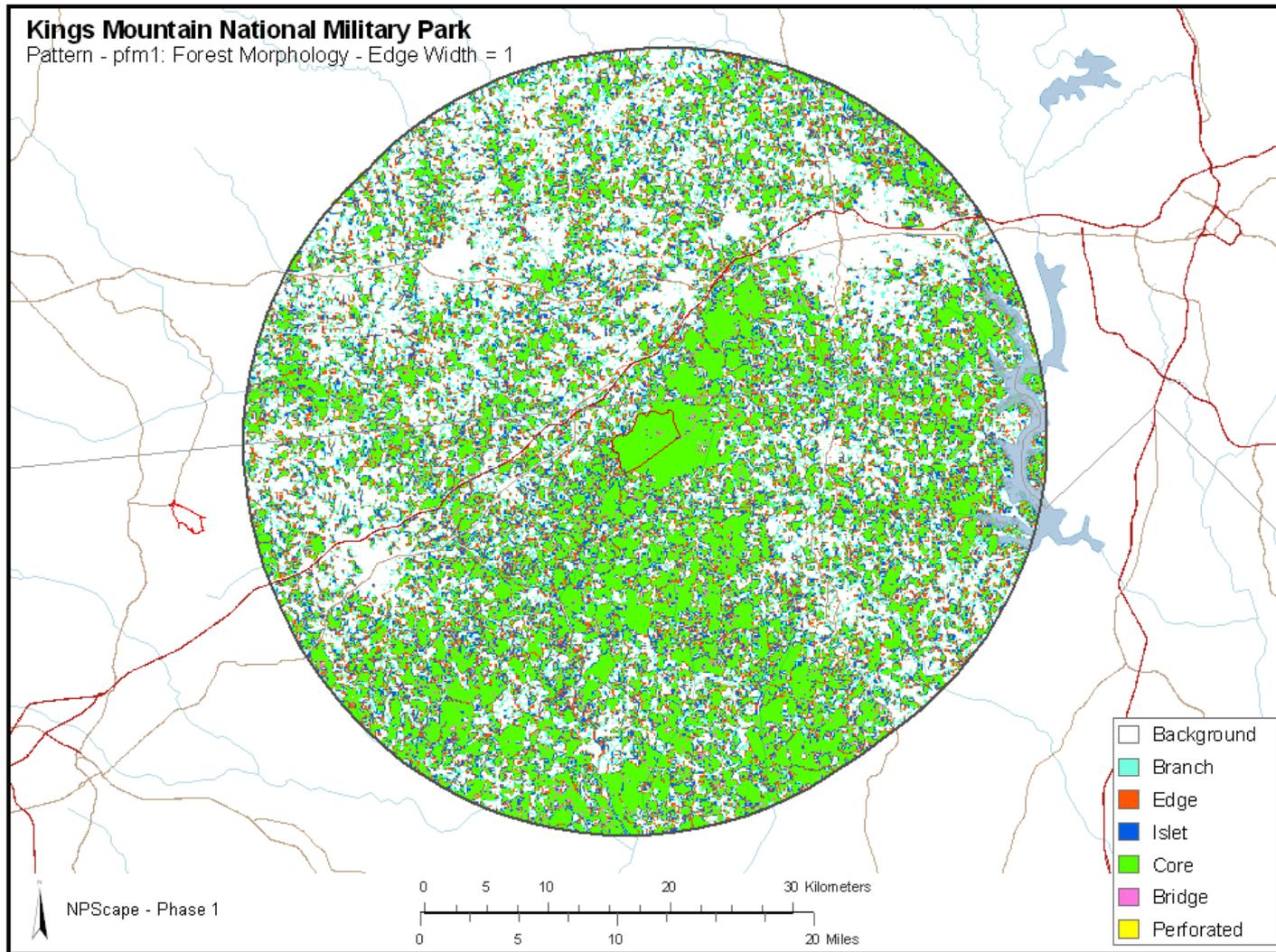
Cumberland Piedmont Network

A Fish Tale



Carolina darter - *Etheostoma collis*

NPScape Phase 1 Forest Pattern Map



2005 – 2006 Fish Inventory

- 19 species
- 6 on SC Conservation Priority List
- Carolina Darter Highest Level of Concern & Natureserve G3 - Vulnerable



Carolina darter - *Etheostoma collis*



Flat Bullhead - *Ameiurus platycephalus*



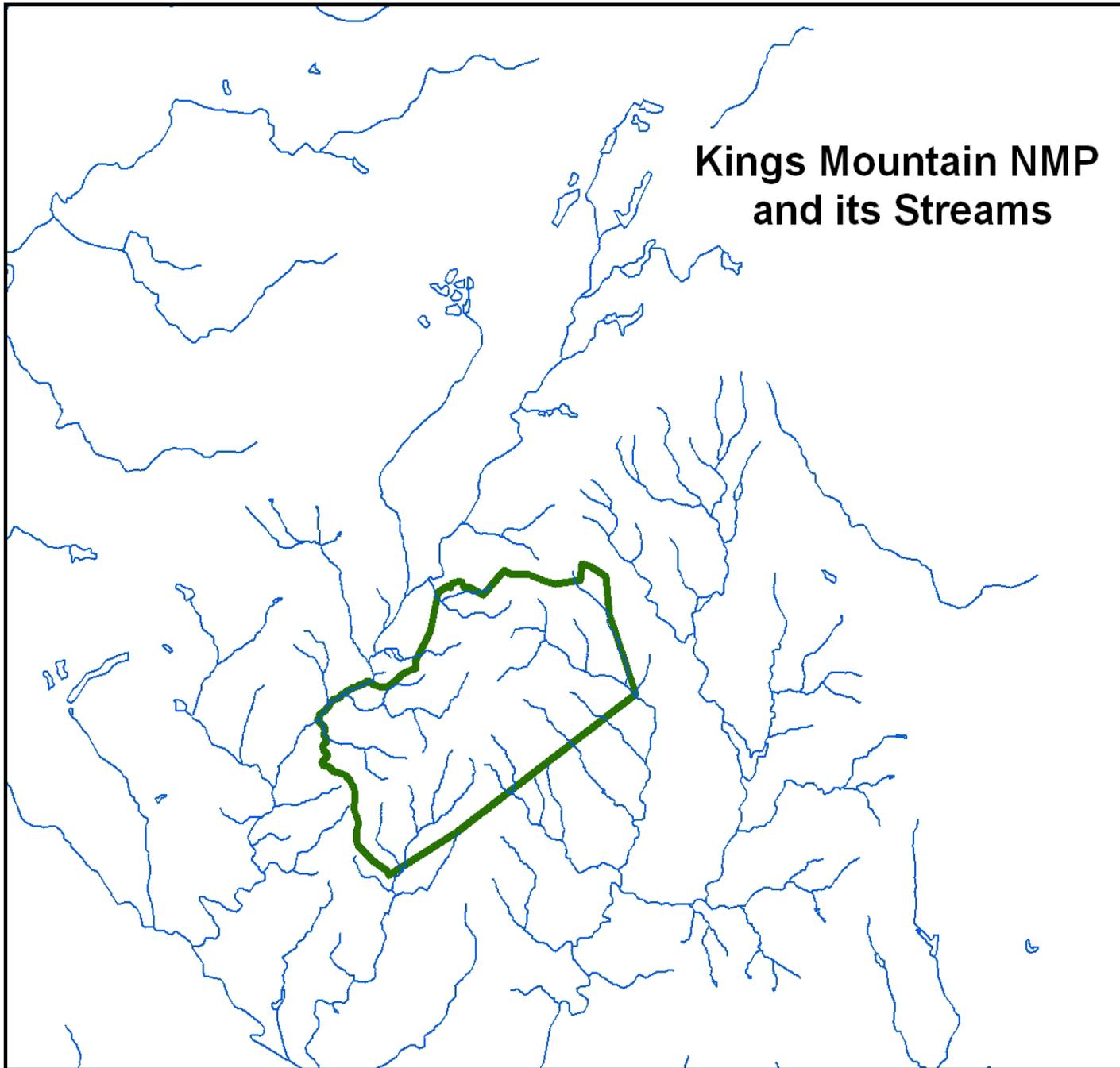
Carolina fantail darter - *Etheostoma flabellare*

Kings Mountain NMP and its Streams

Legend

 Streams

 KIMO Boundary

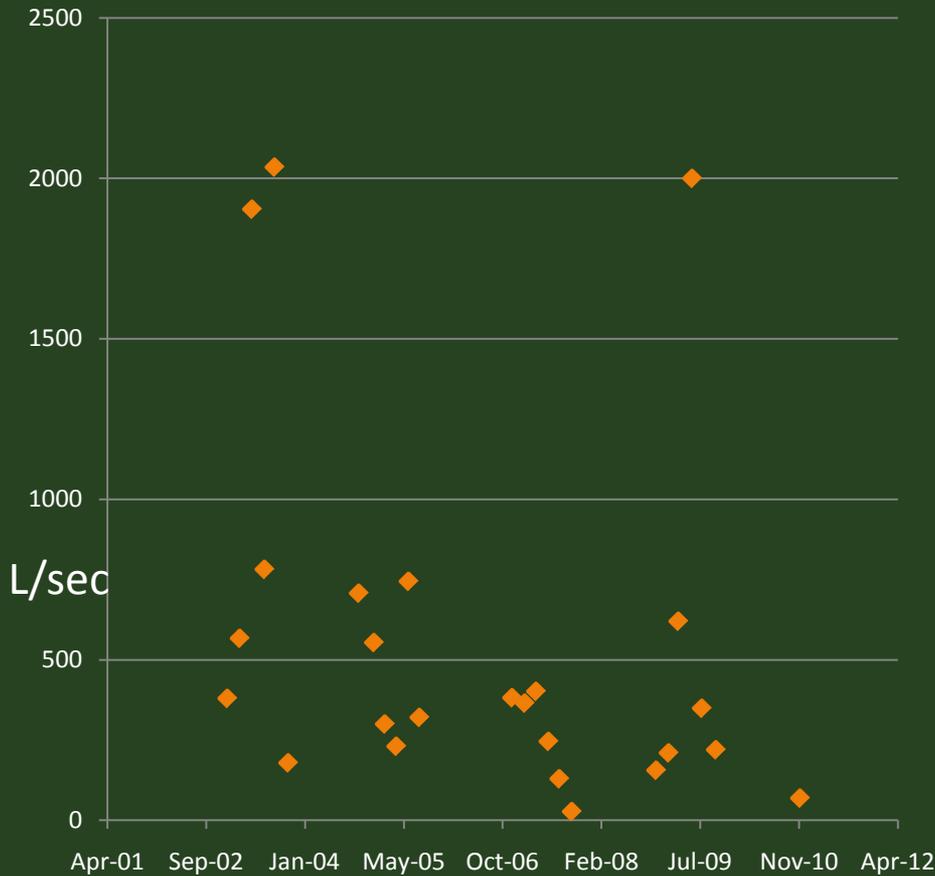


Why was the Carolina darter only
found in Long Branch?

or

How do Long Branch
and Kings Creek differ?

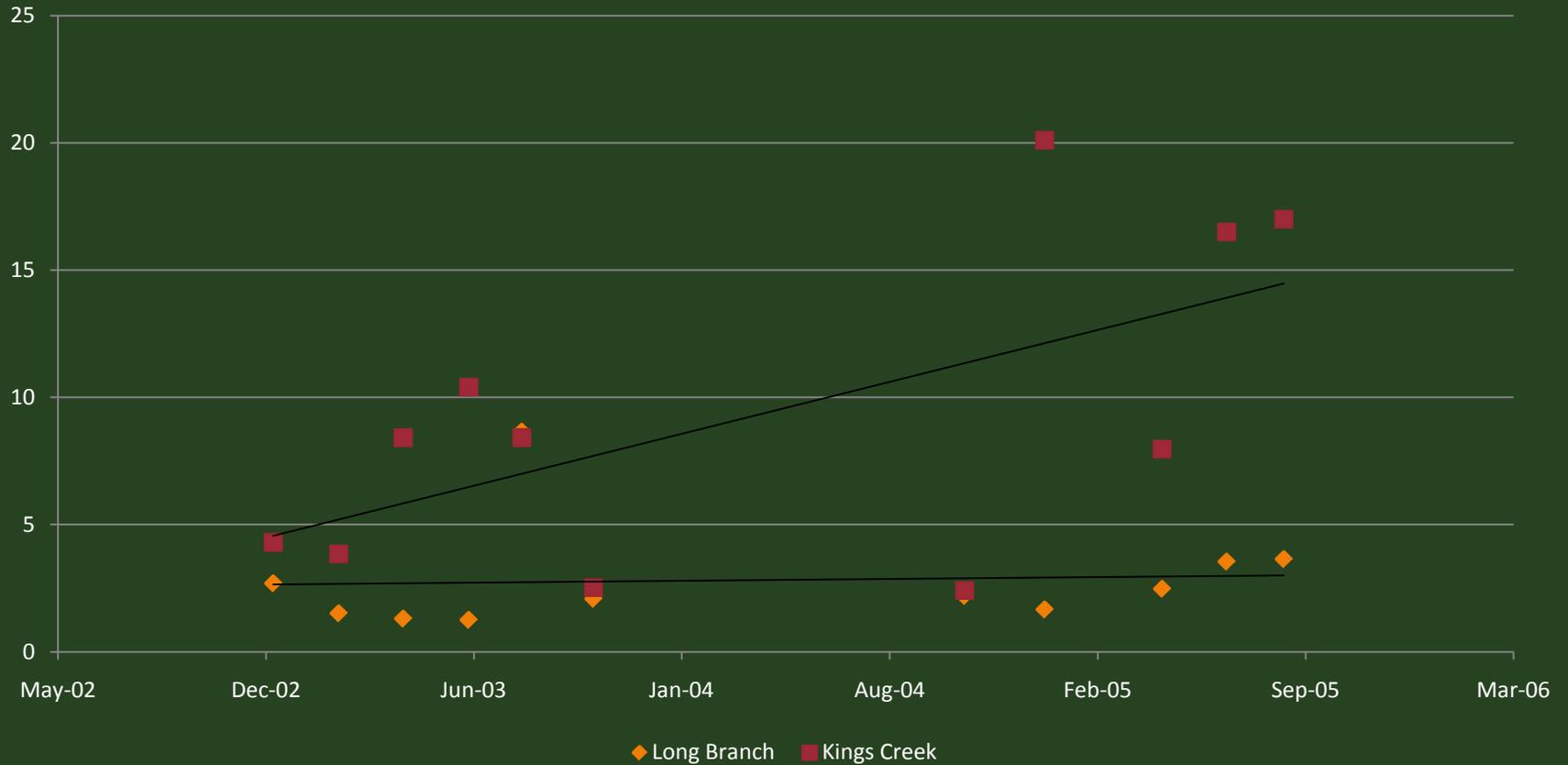
CUPN has been monitoring water quality and quantity since 2002



- Kings Creek largest stream at KIMO
- Long Branch the second largest

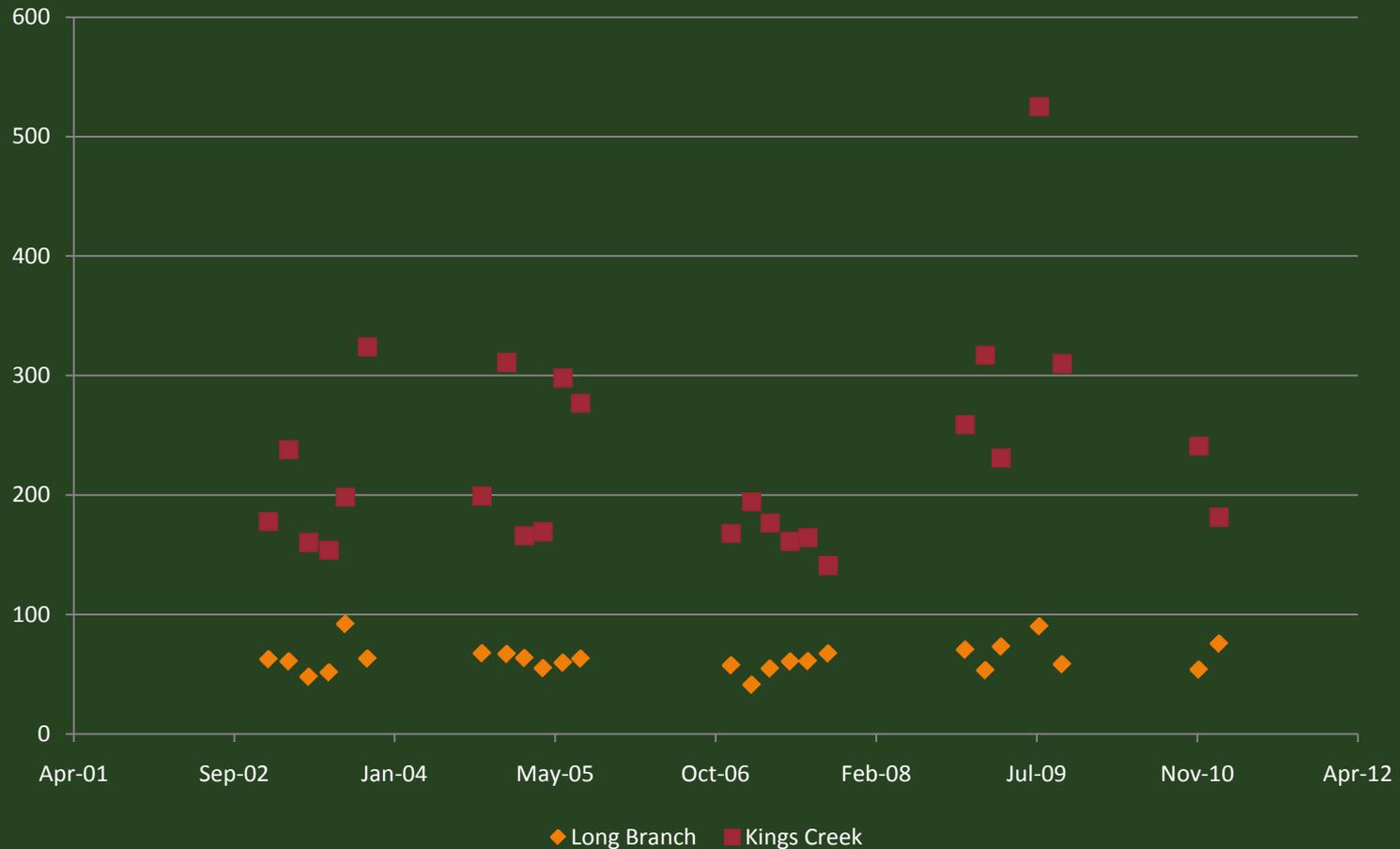
Discharge at Kings Creek

Turbidity



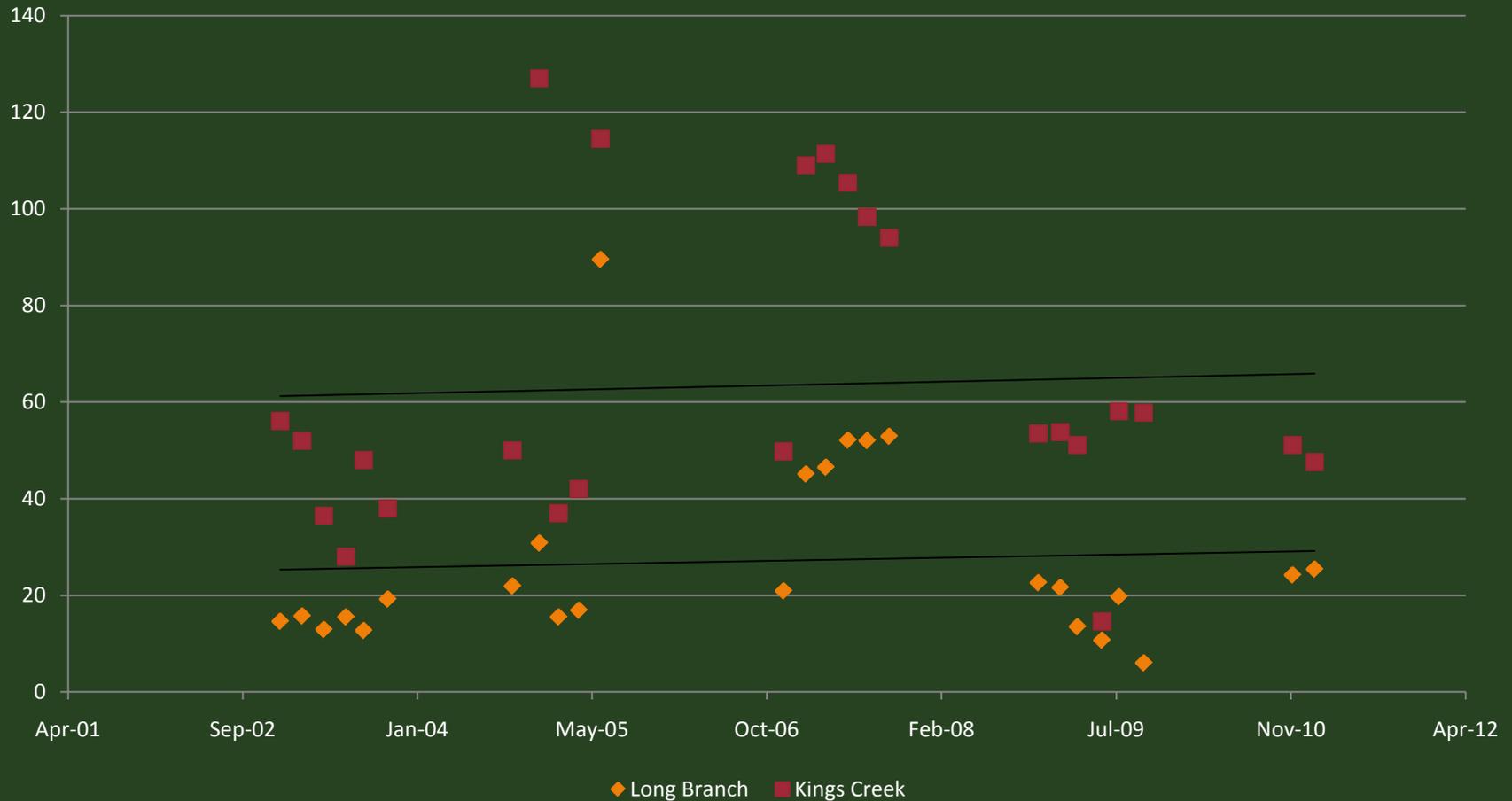
- Long Branch was consistently clean
- Kings Creek was getting dirtier

Specific Conductance



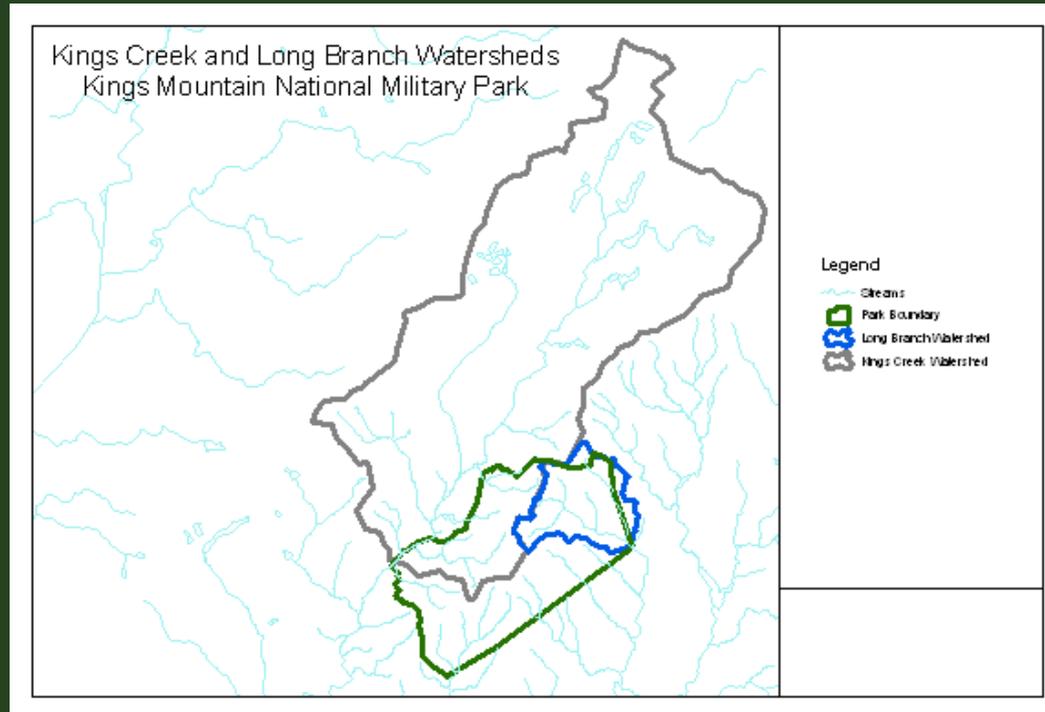
- Long Branch normal for pristine mountain streams
- Kings Creek has a high load of conductive chemicals

Acid Neutralizing Capacity



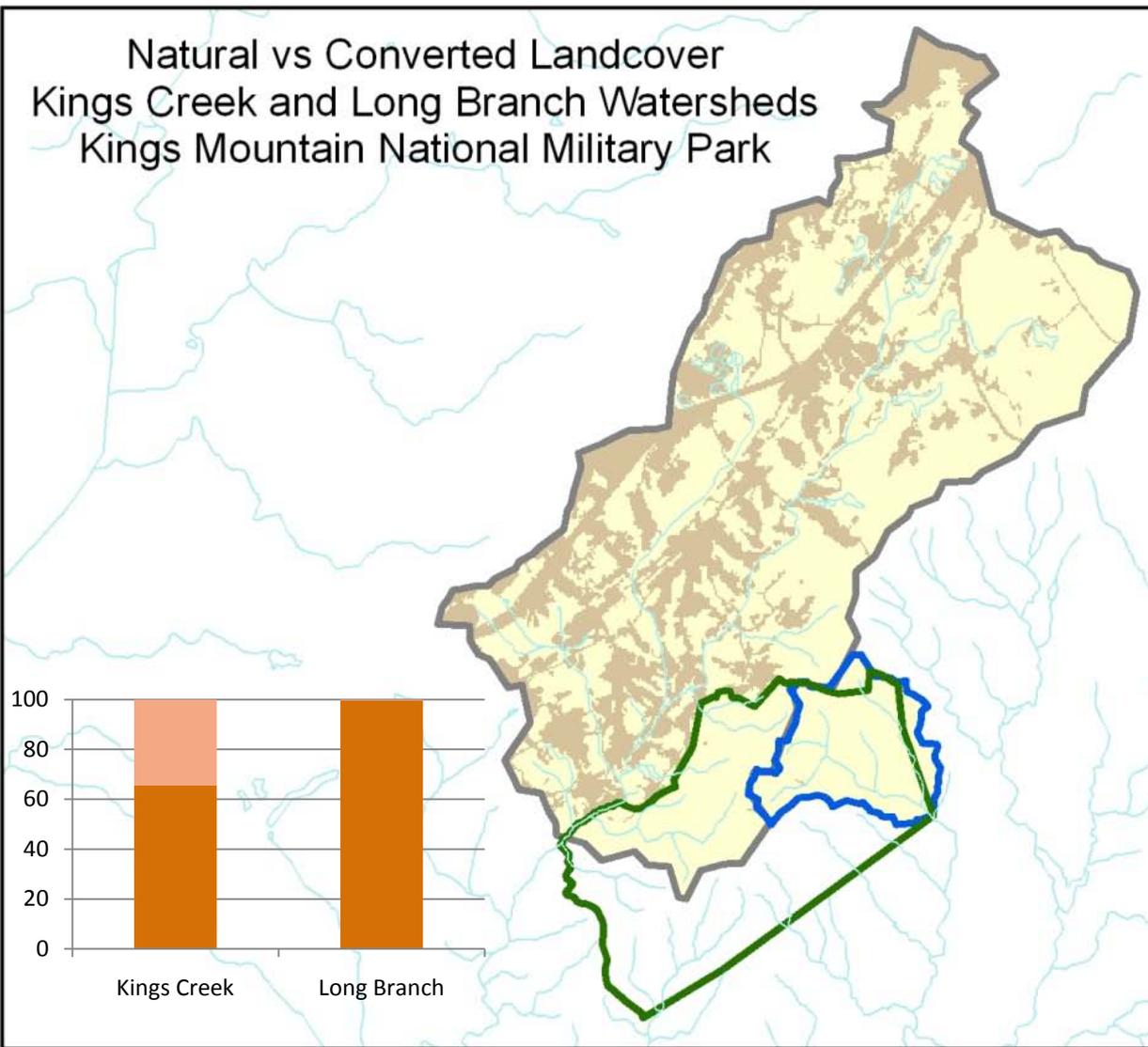
Kings Creek has more, and is more alkaline.

NPScape Products Describe Areas Of Analysis



- NPScape products can describe any place in & around parks
- To use the ArcGIS tools & scripts, must define Areas Of Analysis
- Buffers , pre-defined polygons, and assorted 'sheds such as water, view, air, travel, LCC regions; any polygon defining an ecological question
- Watersheds were delineated based on 30 arc second Digital Elevation Models
- Data Free from USGS at Earth Explorer
- <http://edcsns17.cr.usgs.gov/EarthExplorer/>

Natural vs Converted Landcover Kings Creek and Long Branch Watersheds Kings Mountain National Military Park

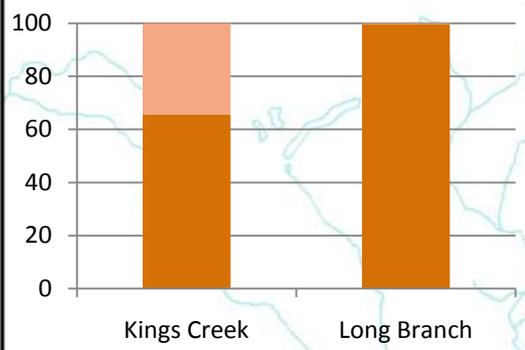


Legend

- Streams
- Park Boundary
- Long Branch Watershed
- Kings Creek Watershed

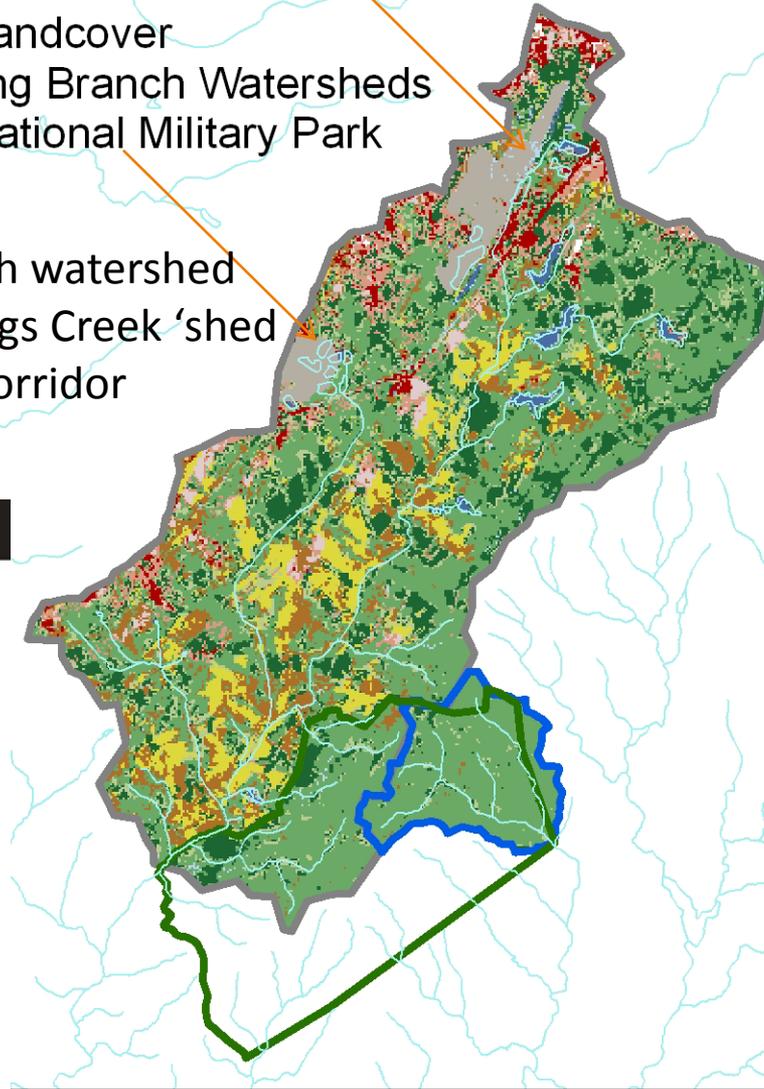
Natural vs Converted

- Converted
- Natural



1992 Landcover
 Kings Creek and Long Branch Watersheds
 Kings Mountain National Military Park

- Forested Long Branch watershed
- More Developed Kings Creek 'shed
- Towns, farms, I-85 Corridor
- Foote Lithium Mine



Legend

- Streams
- Park Boundary
- Long Branch Watershed
- Kings Creek Watershed
- Landcover - 1992**
- Bare Rock/Sand/Clay
- Commercial/Industrial/Transportation
- Deciduous Forest
- Emergent Herbaceous Wetlands
- Evergreen Forest
- Low Intensity Residential
- Mixed Forest
- Open Water
- Pasture/Hay
- Quarries/Strip Mines/Gravel Pits
- Row Crops
- Urban/Recreational Grasses
- Woody Wetlands



Prepared in cooperation with the National Park Service

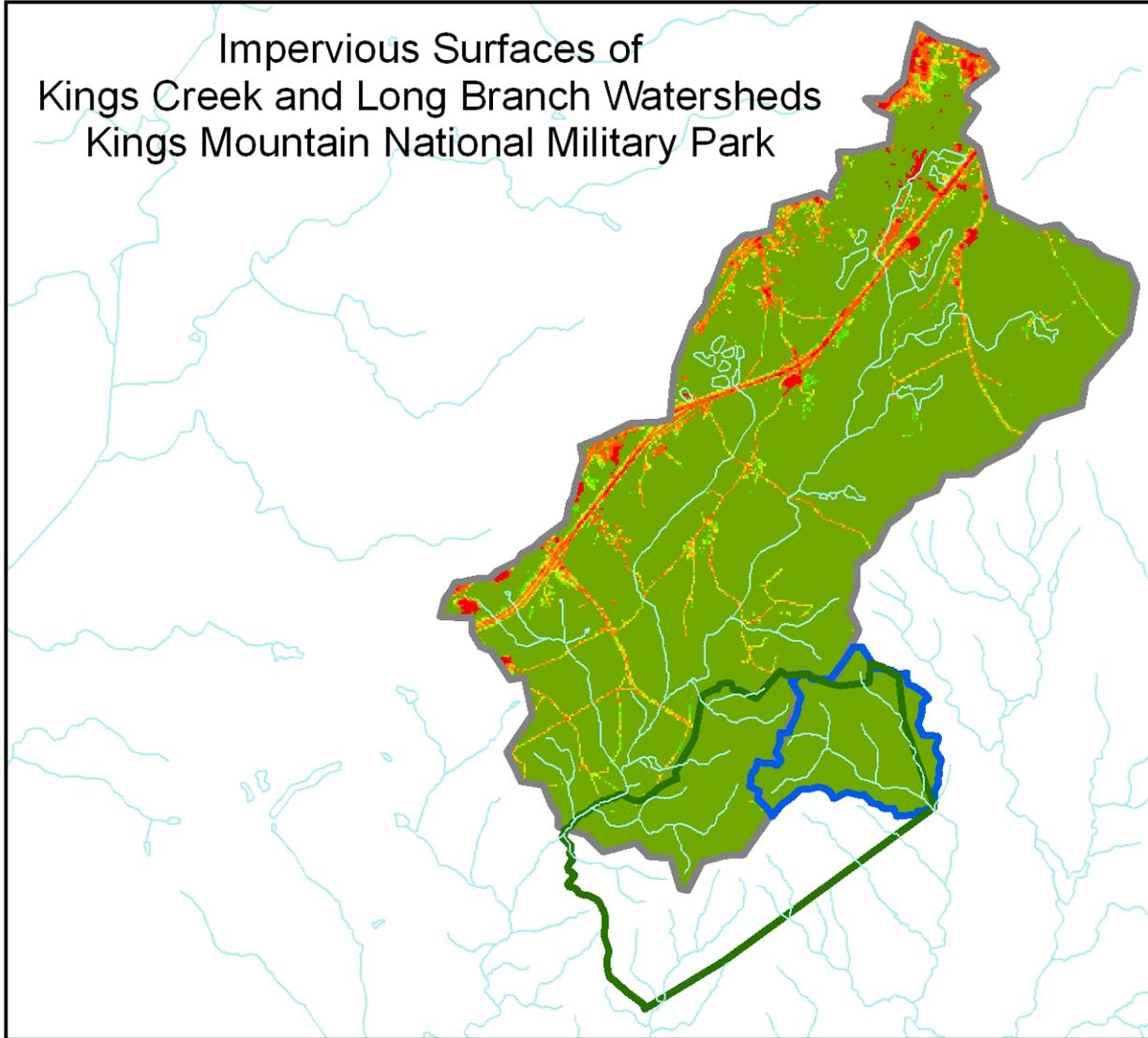
Geologic Map of the Kings Mountain and Grover Quadrangles, Cleveland and Gaston Counties, North Carolina, and Cherokee and York Counties, South Carolina

By J. Wright Horton, Jr.

Pamphlet to accompany
 Scientific Investigations Map 2981



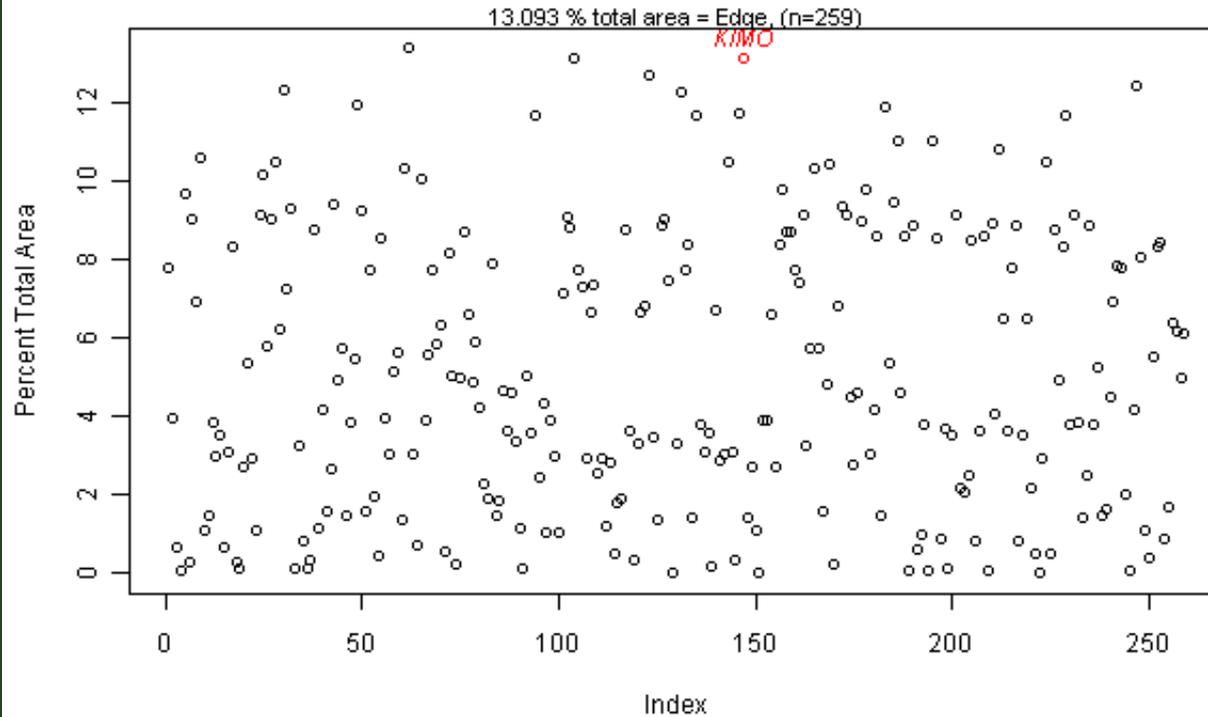
Impervious Surfaces of Kings Creek and Long Branch Watersheds Kings Mountain National Military Park



Legend

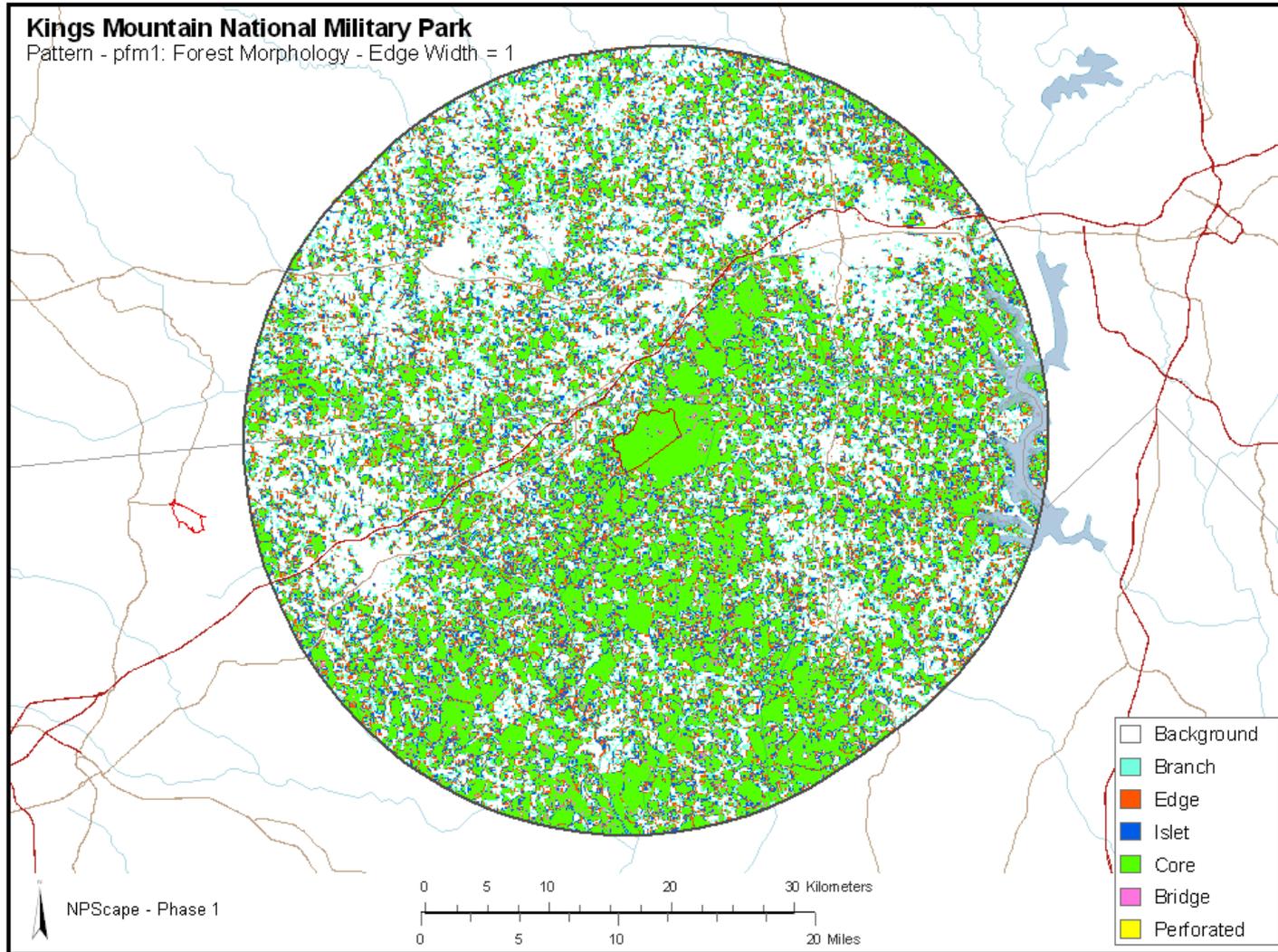
- Streams
- Park Boundary
- Long Branch Watershed
- Kings Creek Watershed
- 0-2%
- 2-4%
- 4-6%
- 6-8%
- 8-10%
- 10-15%
- 15-25%
- 25-50%
- 50-100%

Forest Morphology (edge width=1) - Percent Edge (30km): KIMO



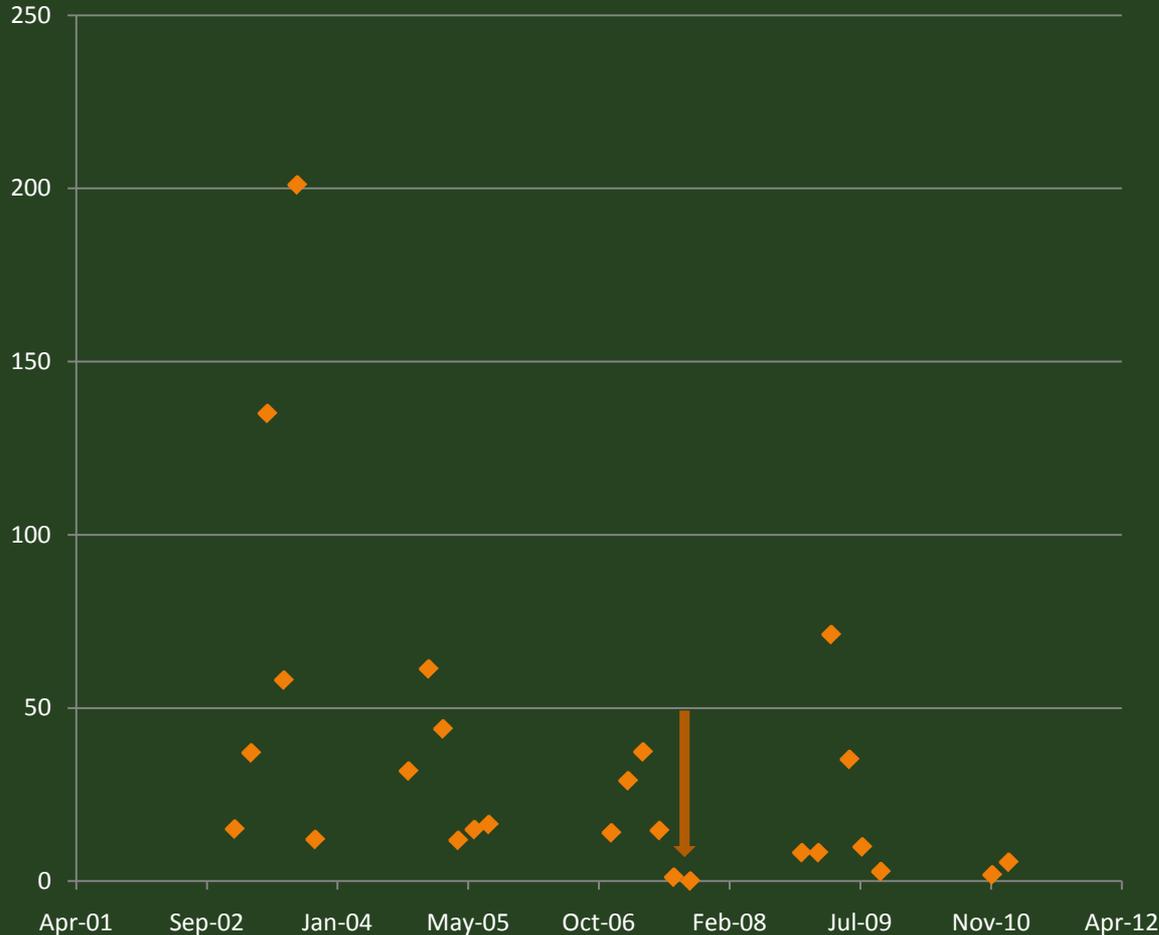
“The occurrence of several species of state conservation concern in the park is noteworthy...Highback chub, greenfin shiner, Carolina darter, seagreen darter, and Carolina fantail darter are all endemic to the southern Atlantic Slope. **All of these species face similar threats across their range: impacts from land development, deforestation, loss of riparian cover, siltation, and hydrologic alterations (channelization and impoundment construction).**” Scott M., 2006 Inventory of Fishes in Kings Mountain National Military Park.

NPScape Phase 1 Forest Pattern Map



Extreme Drought – Long Branch

Long Branch Discharge L/sec



- “Long Branch at the border with Kings Mountain State Park had no measurable flow, water was essentially sloshing back and forth in a standing pool.” (As I waded about trying to find some flow) Water Trip report, September 25, 2007
- Then we did not sample park for a year

KIMO experienced extreme drought

U.S. Drought Monitor

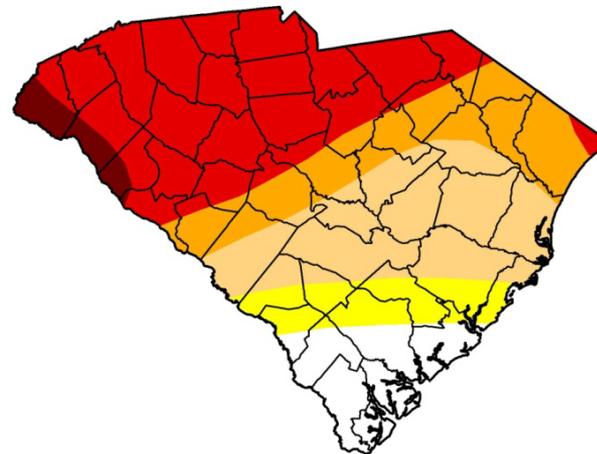
September 25, 2007

Valid 7 a.m. EST

South Carolina

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.9	90.1	82.0	57.9	40.9	3.0
Last Week (09/18/2007 map)	9.9	90.1	82.0	57.9	40.9	3.0
3 Months Ago (07/03/2007 map)	9.9	90.1	27.4	2.5	0.0	0.0
Start of Calendar Year (01/02/2007 map)	93.1	6.9	0.0	0.0	0.0	0.0
Start of Water Year (10/03/2006 map)	62.5	37.5	8.5	0.0	0.0	0.0
One Year Ago (09/26/2006 map)	89.6	10.4	0.0	0.0	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, September 27, 2007

Author: David Miskus, JAWF/CPC/NOAA

That got worse

U.S. Drought Monitor

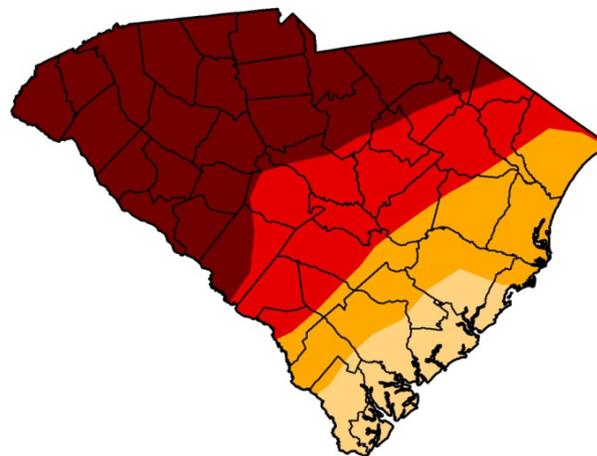
December 11, 2007

Valid 7 a.m. EST

South Carolina

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.0	100.0	100.0	89.8	70.5	45.9
Last Week (12/04/2007 map)	0.0	100.0	100.0	86.1	64.2	37.4
3 Months Ago (09/18/2007 map)	9.9	90.1	82.0	57.9	40.9	3.0
Start of Calendar Year (01/02/2007 map)	93.1	6.9	0.0	0.0	0.0	0.0
Start of Water Year (10/02/2007 map)	9.9	90.1	82.0	65.6	42.7	18.3
One Year Ago (12/12/2006 map)	93.2	6.8	0.0	0.0	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



Released Thursday, December 13, 2007

Author: Brian Fuchs, National Drought Mitigation Center

<http://drought.unl.edu/dm>

And stayed dry

Possibly stressing the fish

- The last 10 years has been the driest decade in the last 50 years (before that, decadal records unreliable)*
- 2007 the driest year since 1894 in the region*
- What happened to the fish?
- Next Steps
- Re-inventory
- NPScape Analysis 2006 NLCD Products
- ArcGIS scripts & tools can analyze local datasets – state, other agency, nonprofit, etc...



Kings Mountain State Park (tributary to Clark Fork), York County, July 2008.

Longs Branch, downstream from Kings Mountain NMP

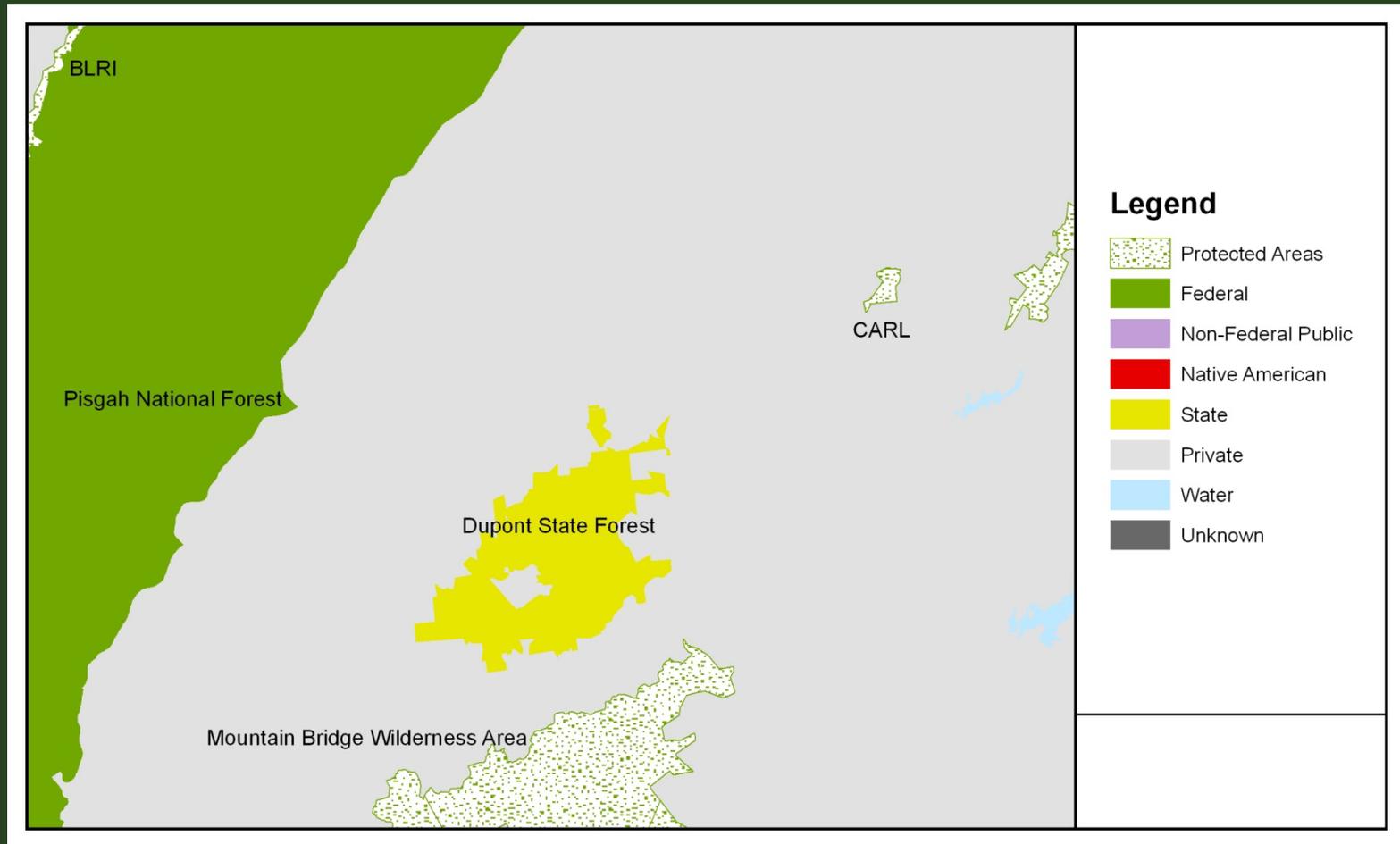
*Hope Mizzell, SC State Climatologist

Photo credit SC DNR

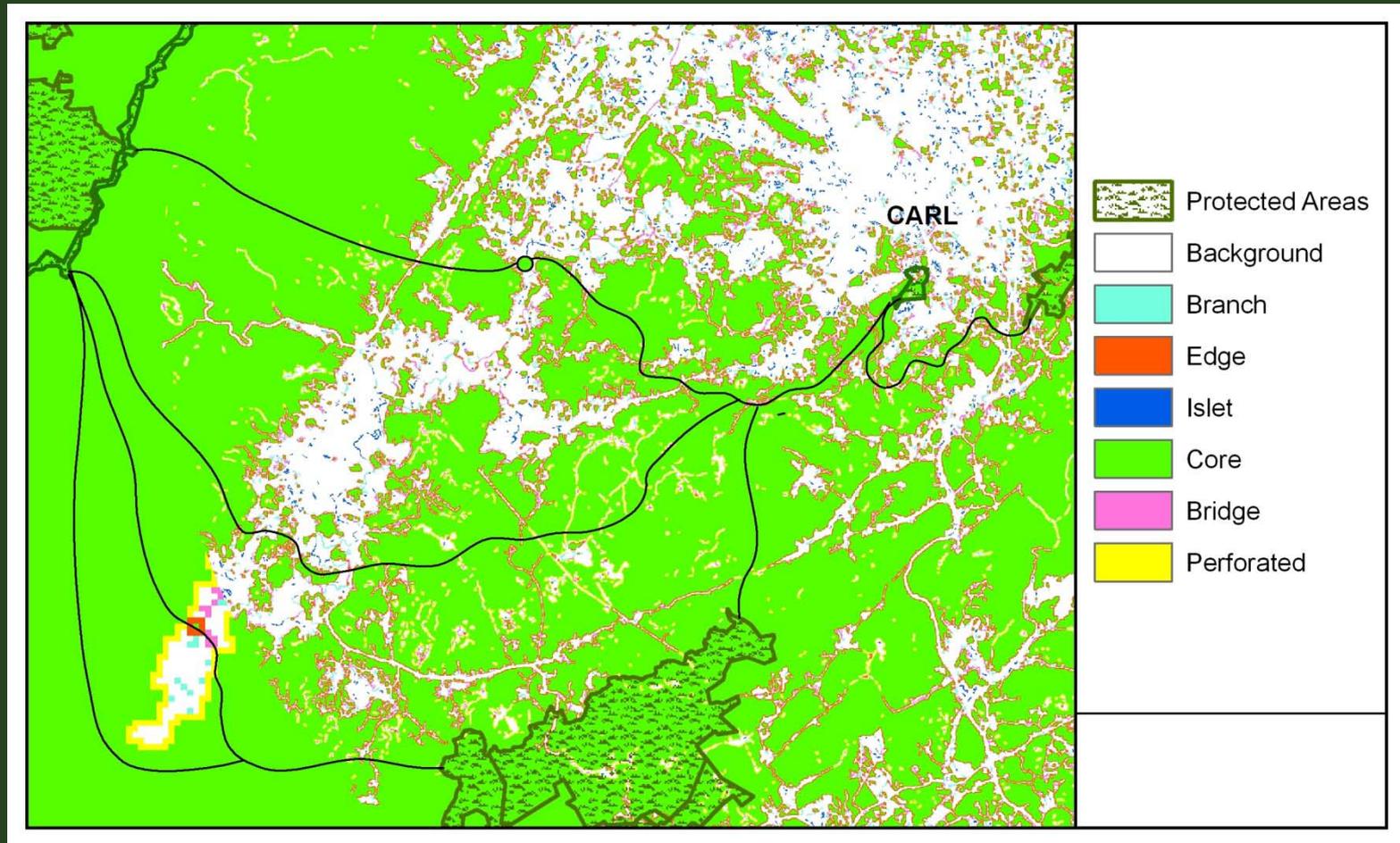
Green Corridors for CARL

- Like many eastern parks, development is rapidly surrounding Carl Sandburg Home National Historic Site
- A Request was made to map natural corridors connecting them with other protected lands
- We can do this with various NPScape layers

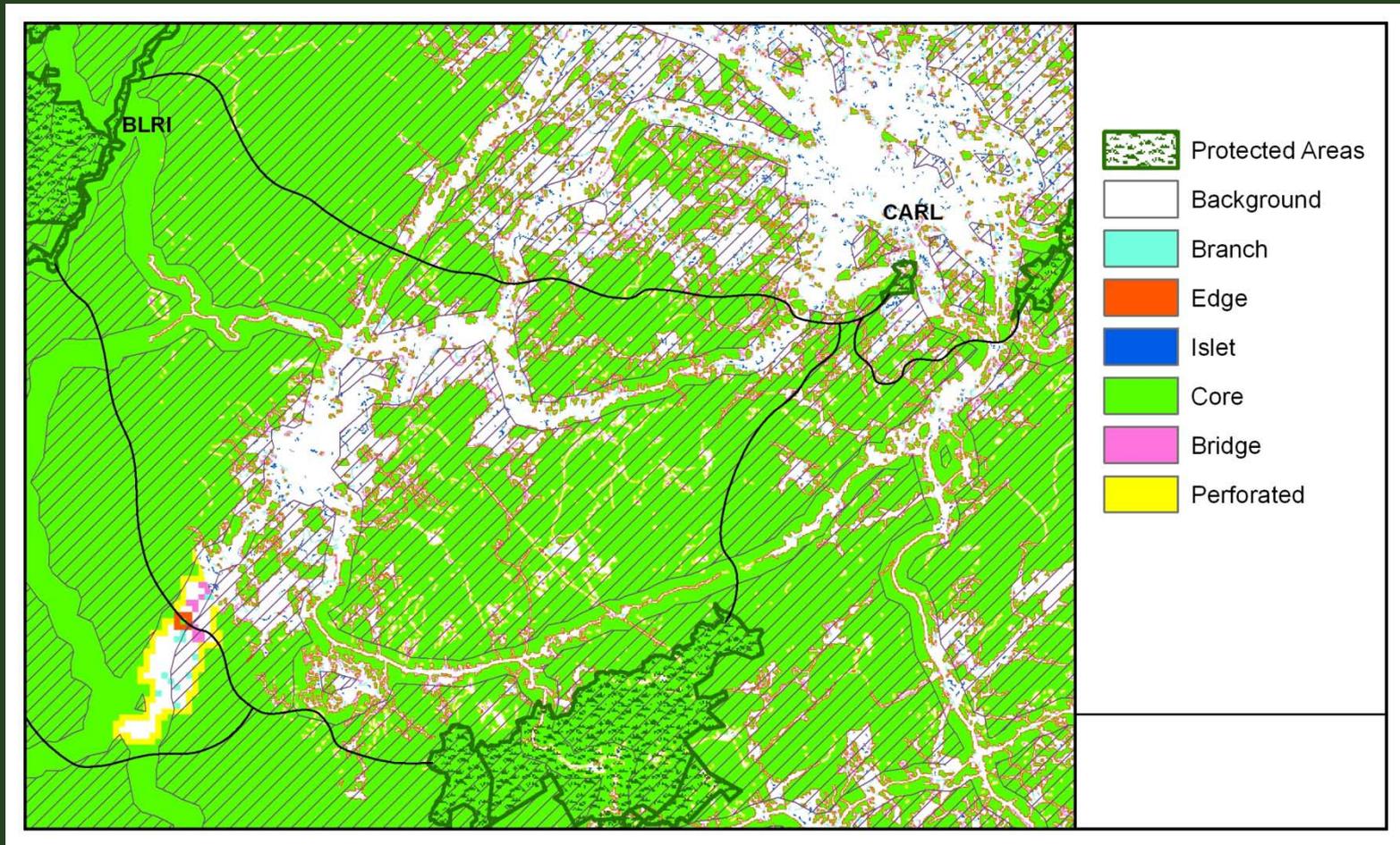
Protected Lands & Ownership



Forest Morphology



Adding Areas Without Roads



Questions?

Shepard_McAninch@nps.gov