Mapping the Distributions of the Freshwater Fishes of North America: Data and Tools

Comparing Apples,Oranges and Pineapples: Mapping the distribution of brook trout; Lessons learned from the Eastern Brook Trout Joint Venture

Mark Hudy
USDA Forest Service, Fish and Aquatic Ecology Unit
and
T.Douglas Beard, Jr.
United States Geological Survey

1. Many recent and historic events have changed the distribution of fishes making the creation of distribution maps of fishes problematic.

2. Unbiased assessments at the appropriate scale are critical for the conservation of fishes.

Mapping and Distribution Problems

- Collection methods
- Data resolution
- Data quality
- Age of data
- Database compatibility
- Incomplete data
- Historic distribution
- Absence rule sets
- File cabinet data
- Meta data













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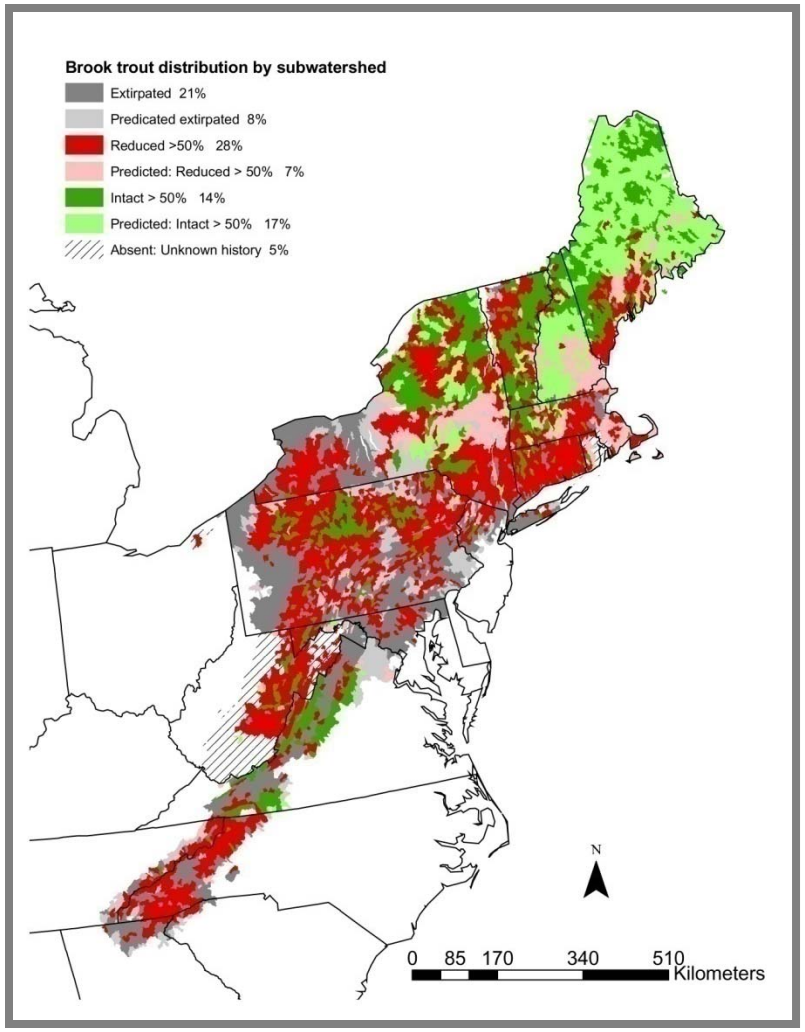
Case History: Eastern Brook Trout Joint Venture

1. Evaluate the distribution of brook trout for the EBTJV assessment.

2. Context:

   -lots of states

   -inconsistent fine scale data



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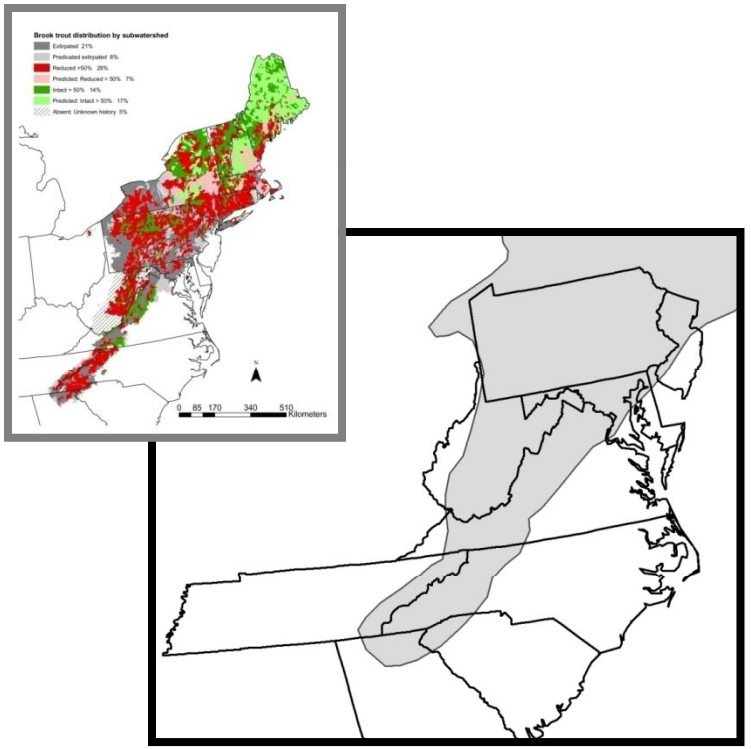
Today's Objectives

Evaluate differences in distribution at four scales on a subset of the data.



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Assessment Scales

Sub-basins (4th HUC; 8 digit)

53 (avg size= 254,172 ha)

Watersheds (5th HUC; 10 digit)

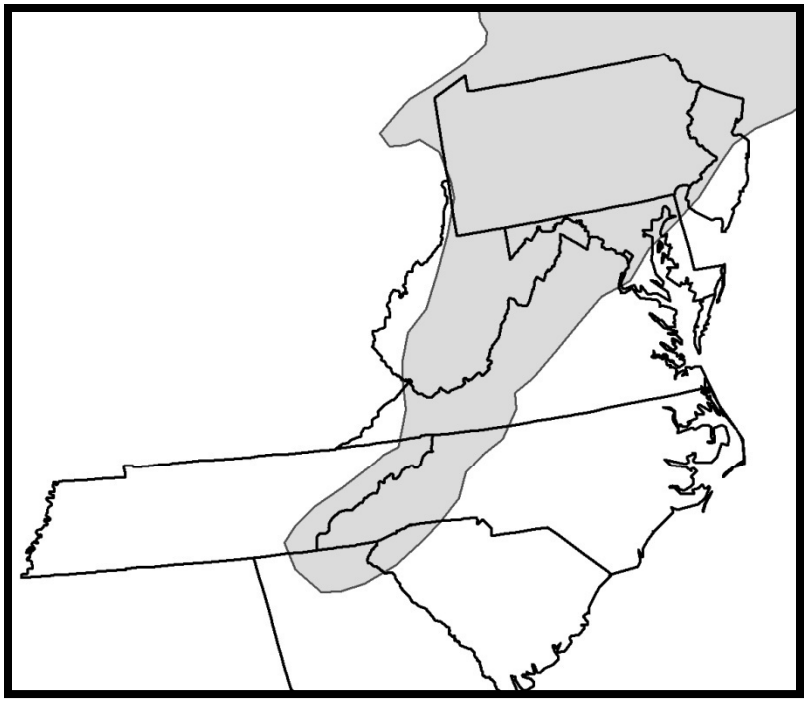
690 (avg size = 41,201 ha)

Subwatersheds (6th HUC; 12 digit)

3,079 (avg size = 8,879 ha)

Catchments (14 digit ?)

124,688 (avg size = 237 ha)



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Methods

Data Collection

- 17 states
- 115 fisheries biologists
- > 30 electronic data bases

- Collected all available data bases
- Put into GIS (subwatershed level)
- Validated with experts at local office.
- Added "file cabinet data" following age and QA/QC rule sets.

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Hudy et al. 2008 NAJFM 28:1069-1085


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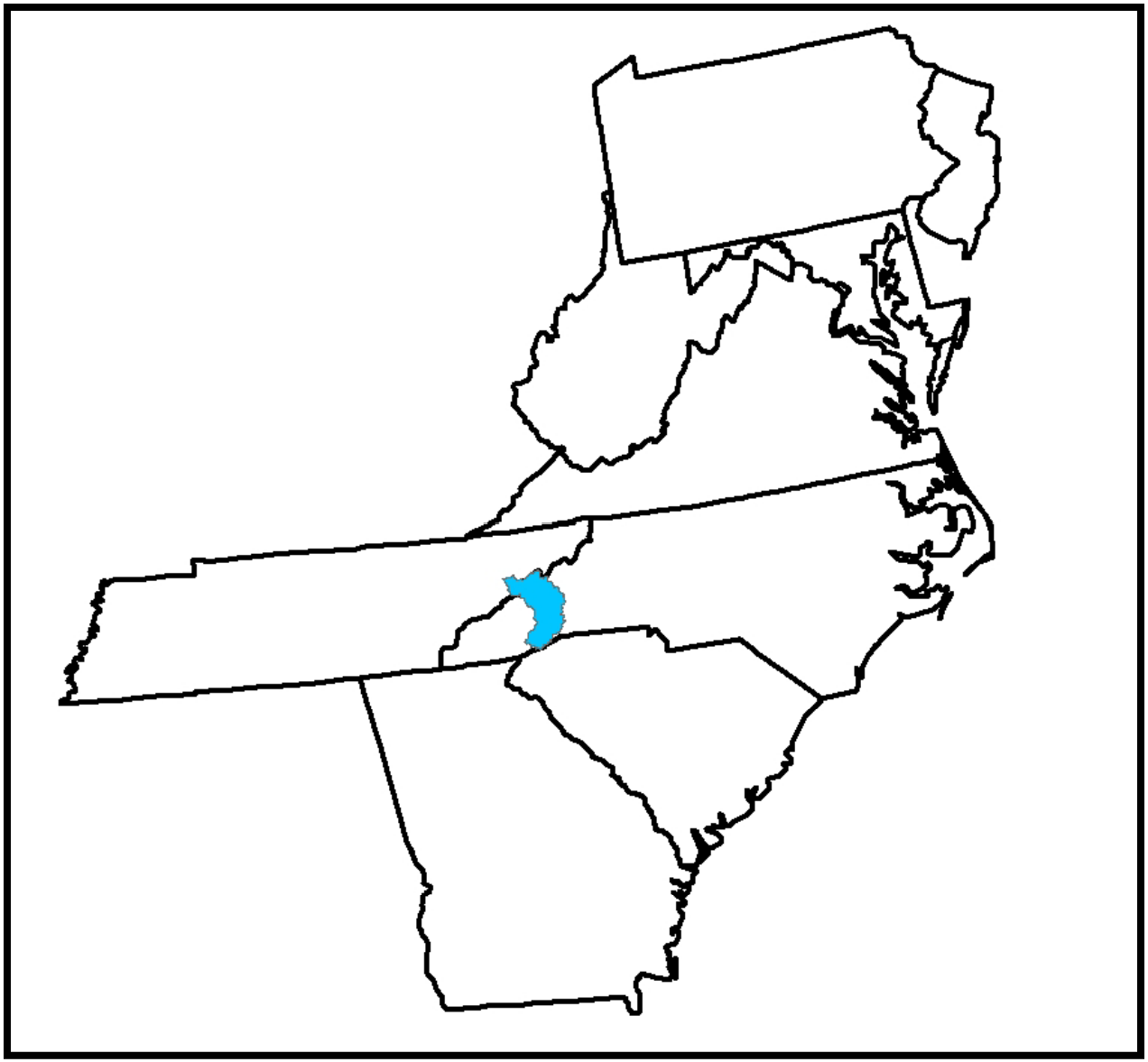
Results



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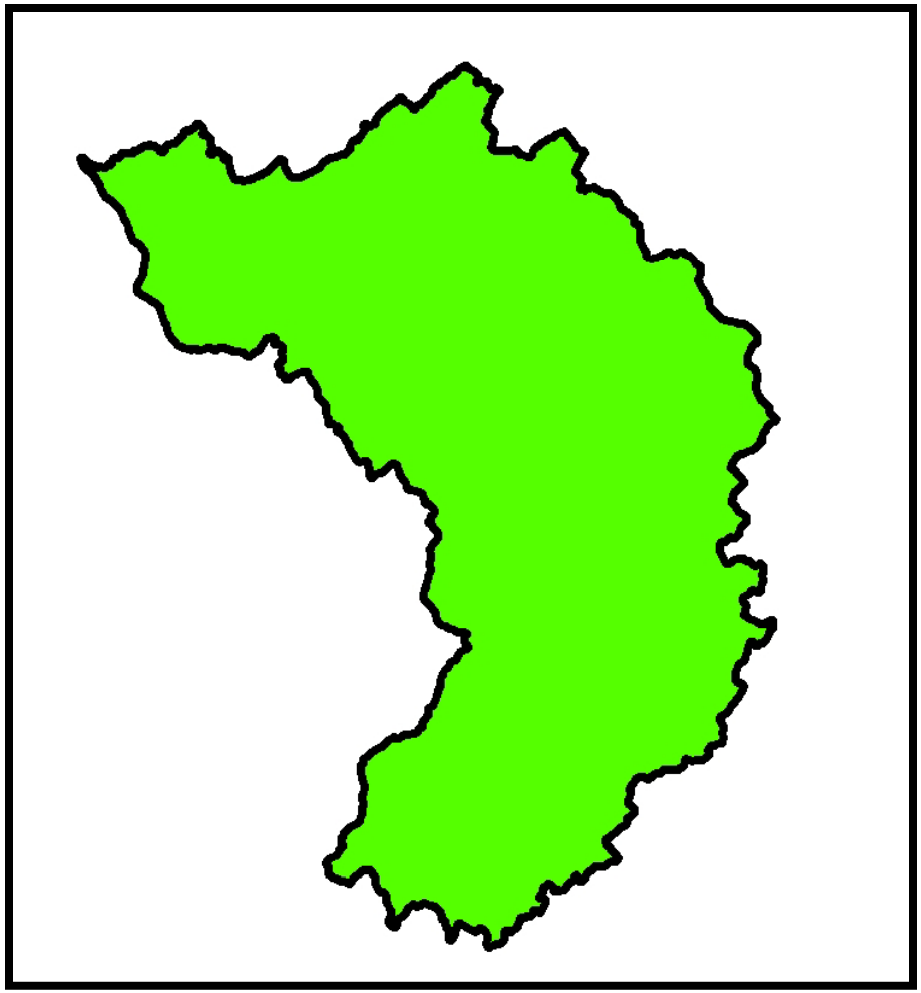
Sub-basins (4th HUC)
100%



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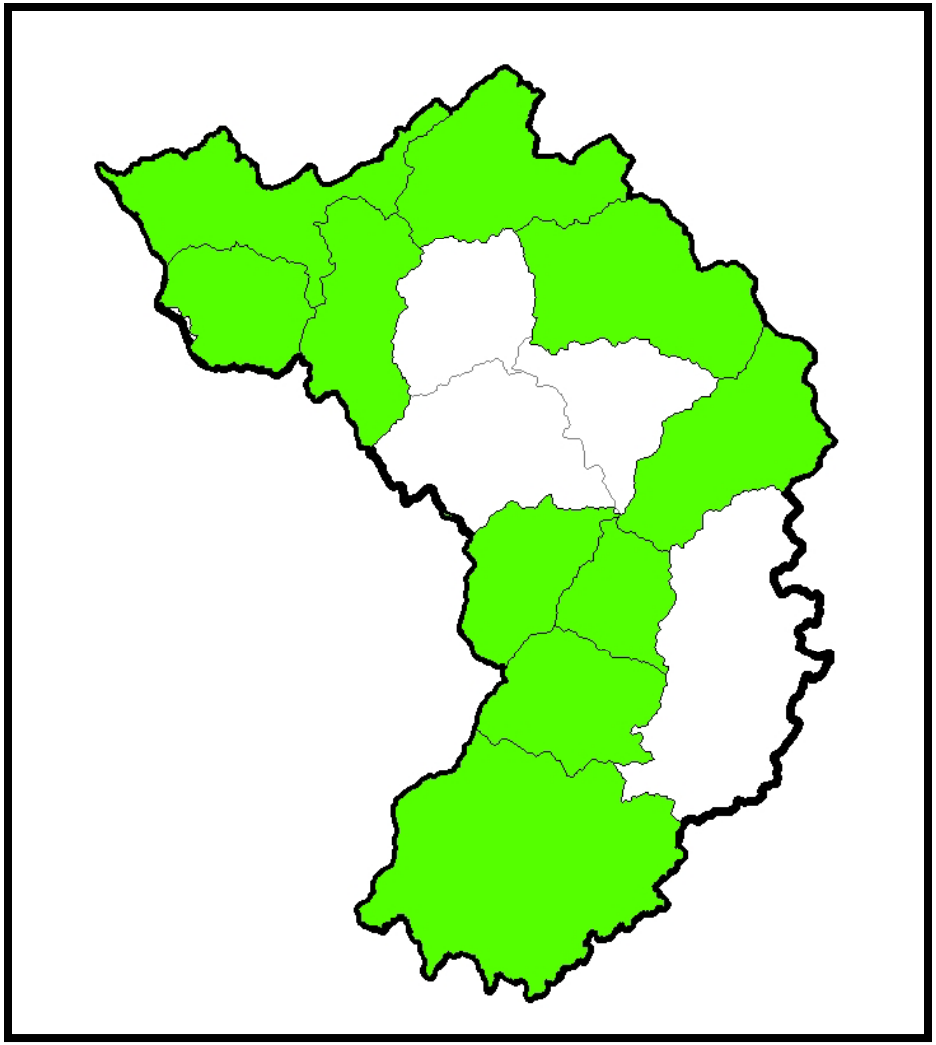
Watersheds (5th HUC)
76%



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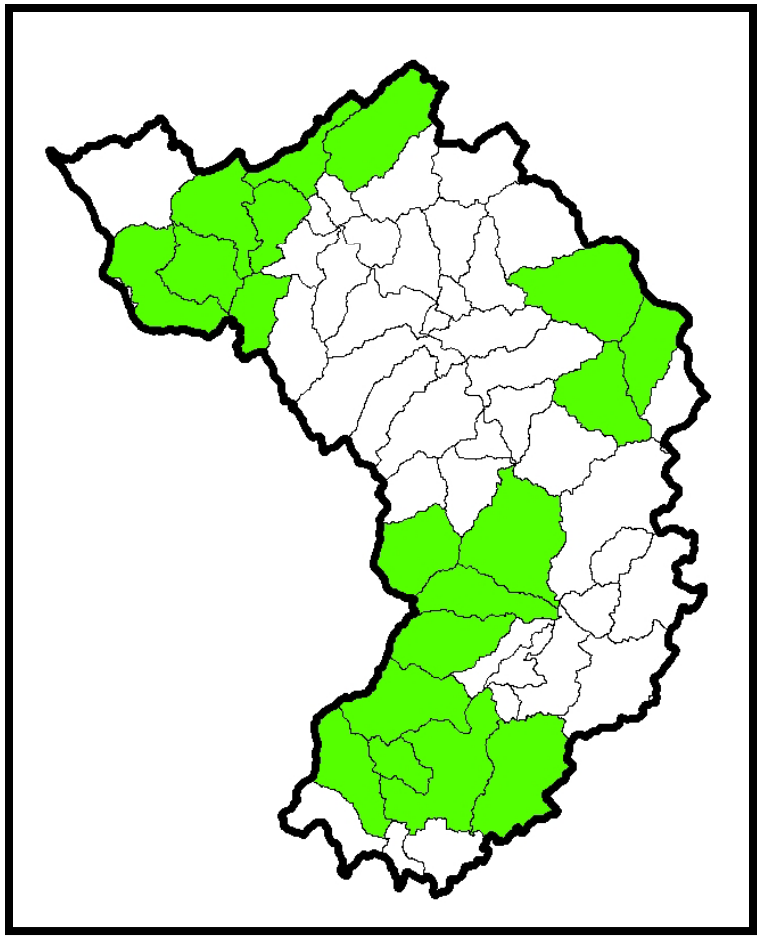
Subwatersheds (6th HUC)
33%



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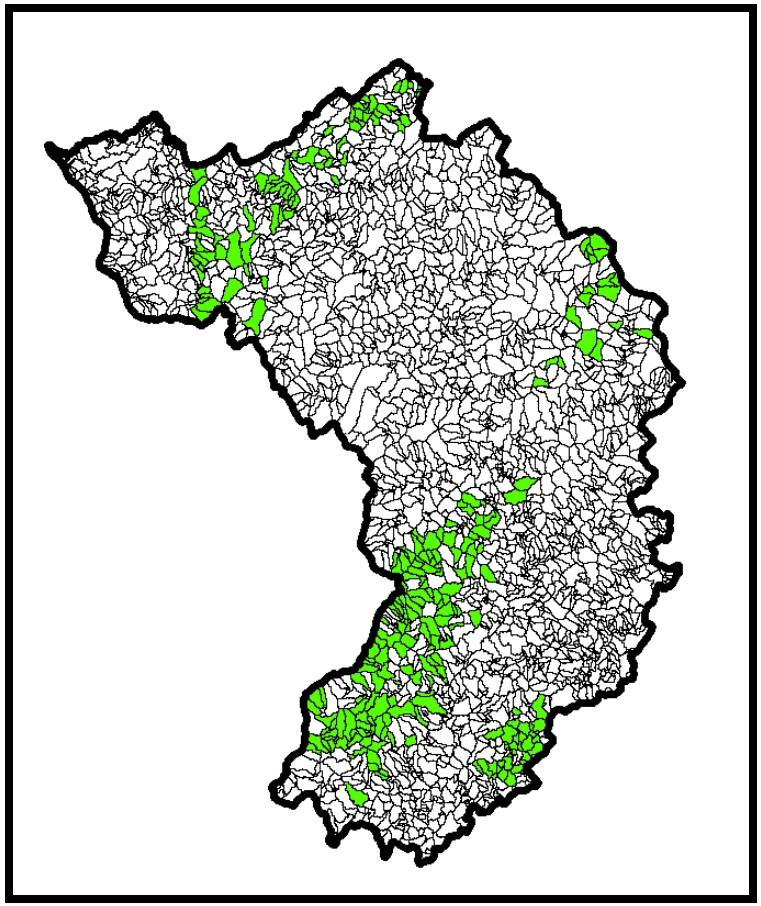
Catchments
11%



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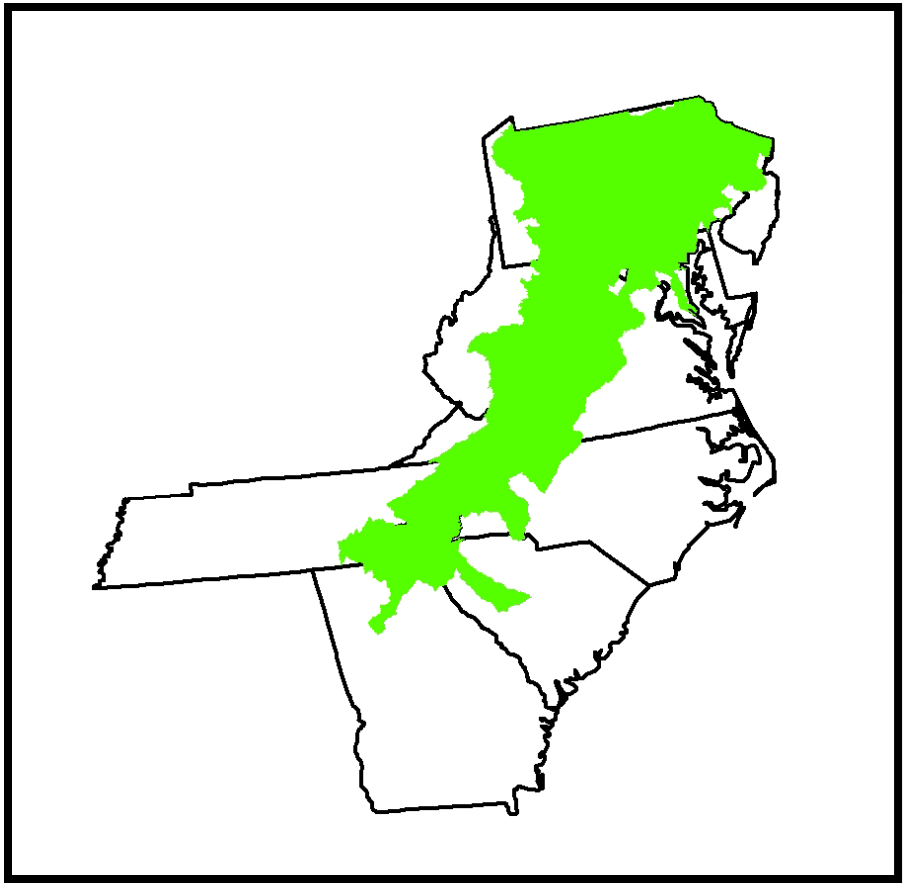
Brook Trout Distribution: Sub-basin (4th HUC)

88% of 85 sub-basins

"Brook trout are well distributed throughout their native range".



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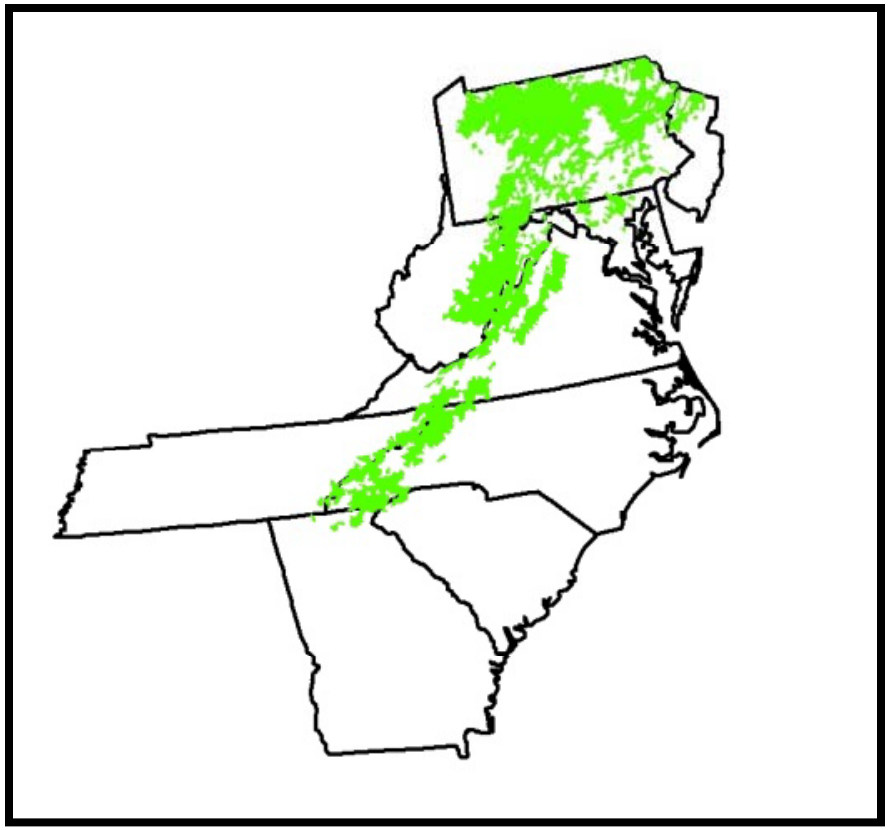
Brook Trout Distribution: Watershed (5th HUC)

72% of 690 watersheds



"There have been some losses of brook trout but they are still found in approximately 75% of their range".

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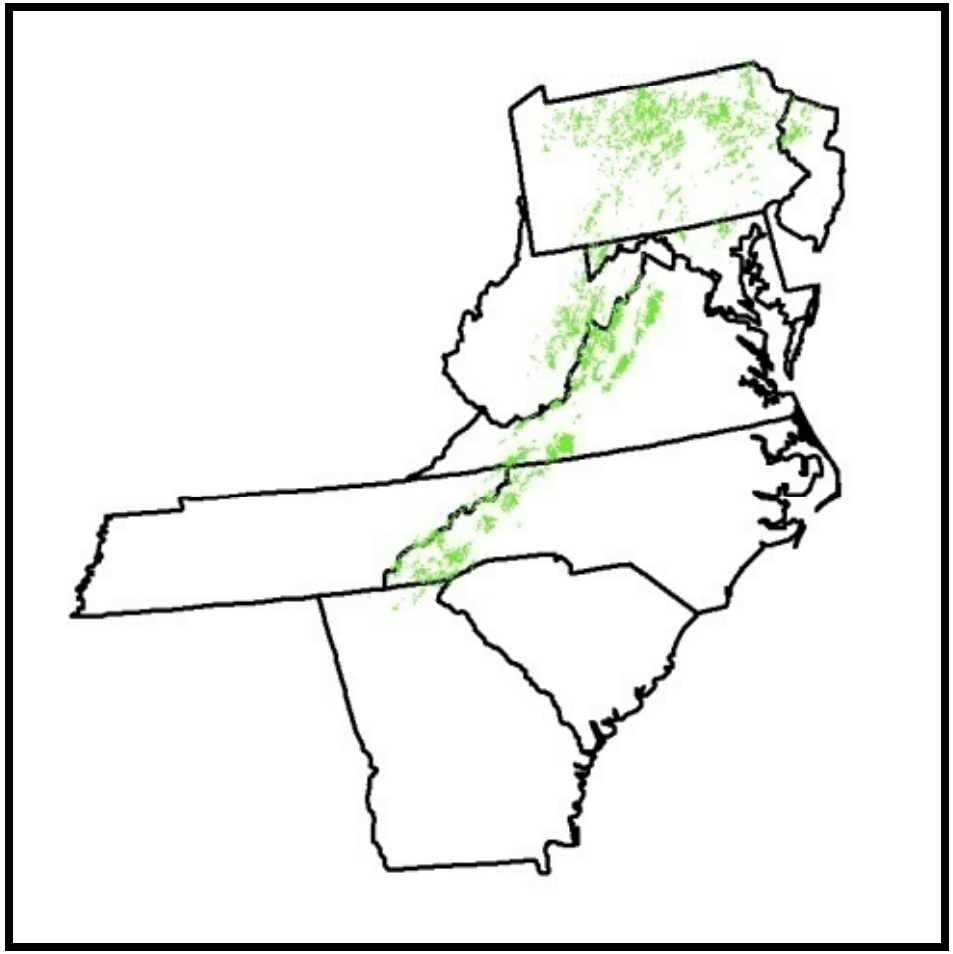
Brook Trout Distribution: Subwatershed (6th HUC)

47 % of 3,079 subwatersheds

"Brook trout have been extirpated from over half of their historic subwatersheds".



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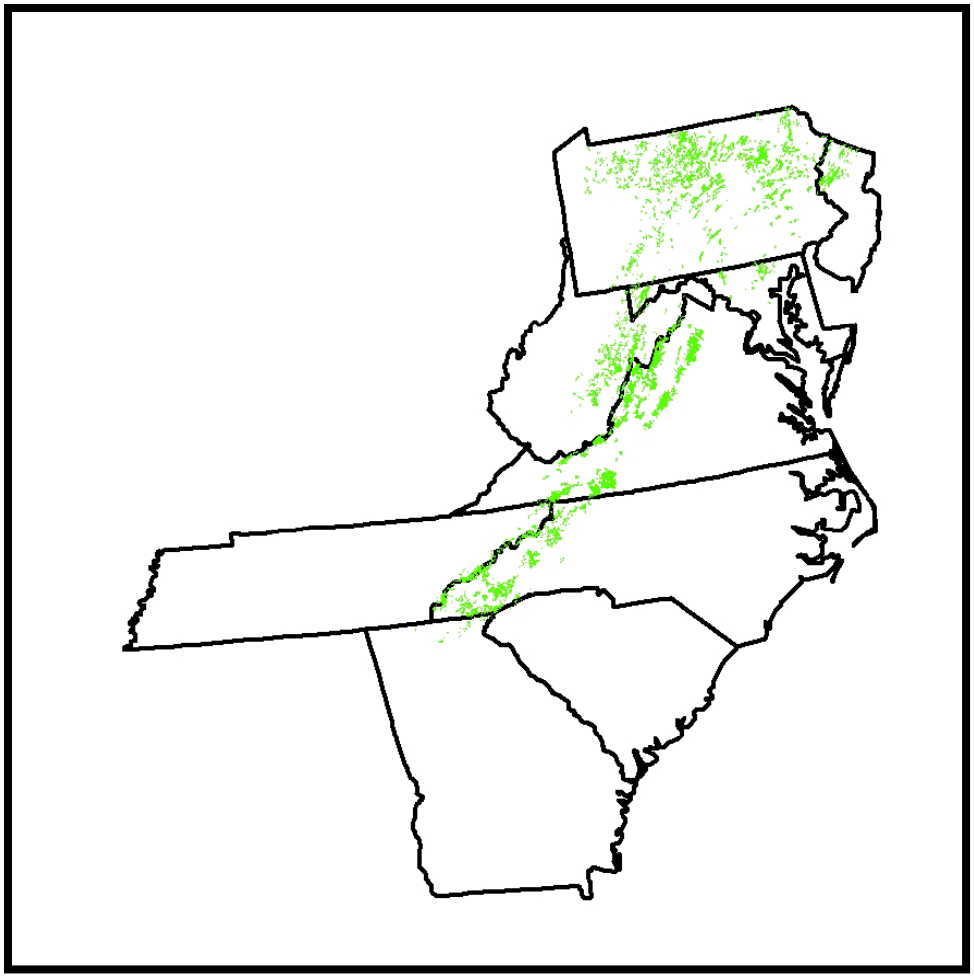
Brook Trout Distribution: Catchments

11 % of 124,688 catchments

"Brook trout have been extirpated from 90% of their historic catchments".



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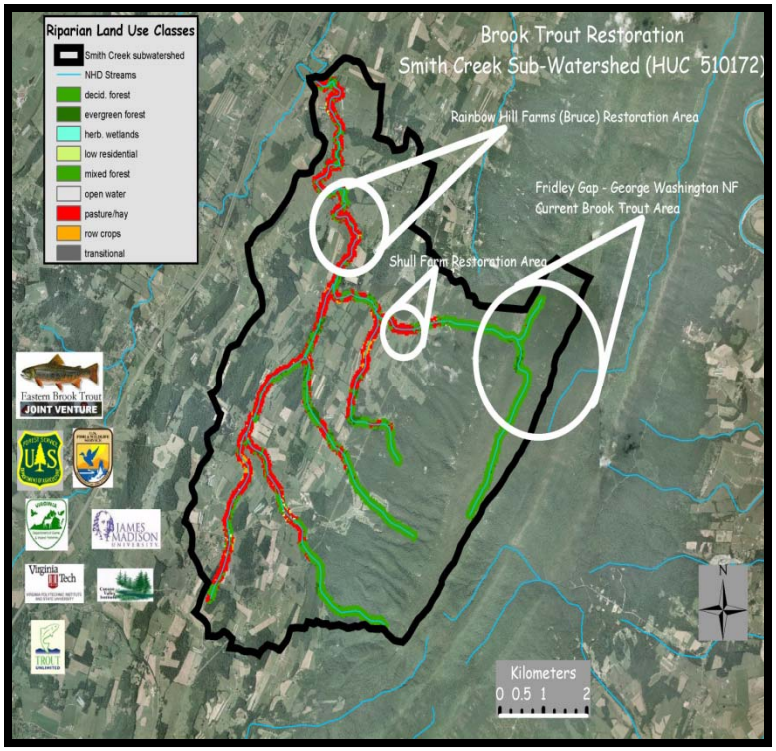
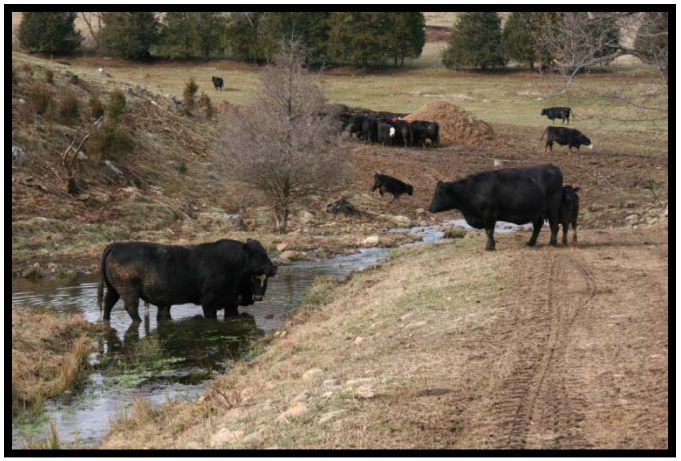
Lessons Learned


Lessons ~~Learned~~
Observed

1. What's the question! Match the mapping scale to the Question.





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1. What's the question! Match the mapping scale to the Question.

Corollary lesson: "It is often just as important to explain what the distribution/assessment is not to prevent misuse of the data".

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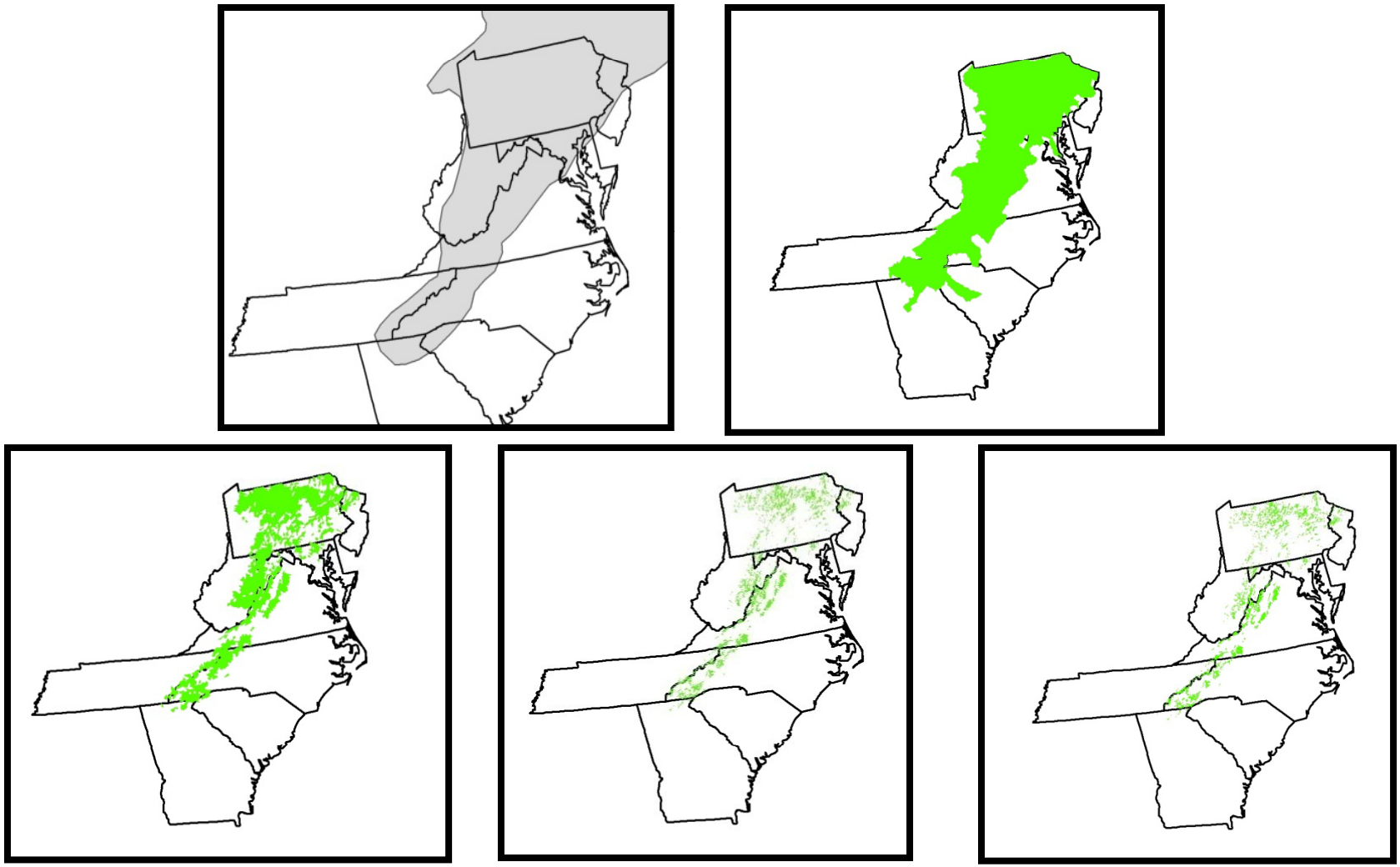
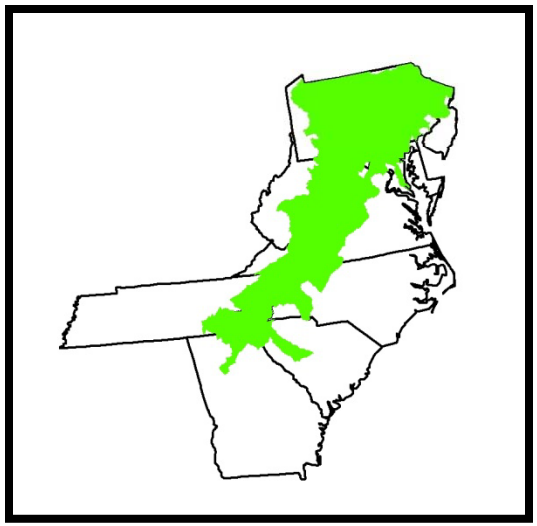
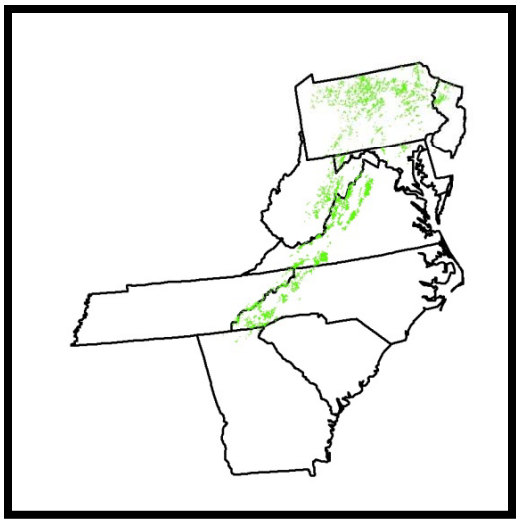
2. The scale at which results are reported can bias impressions of the true distribution.



2. The scale at which results are reported can bias impressions of the true distribution.

Corollary lesson: "The same database will be used to support opposite opinions"!





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3. Large scale analyses may require a least common denominator (LCD) approach for a “apples to “apples comparison.

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Corollary Lesson: "People will throw fruit at you for throwing out their unique data" !

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4. Regardless of what the GIS analyst says: All the distribution data is not in the GIS data base!

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Corollary Lesson: "No we could not have just used Nature Serve"!

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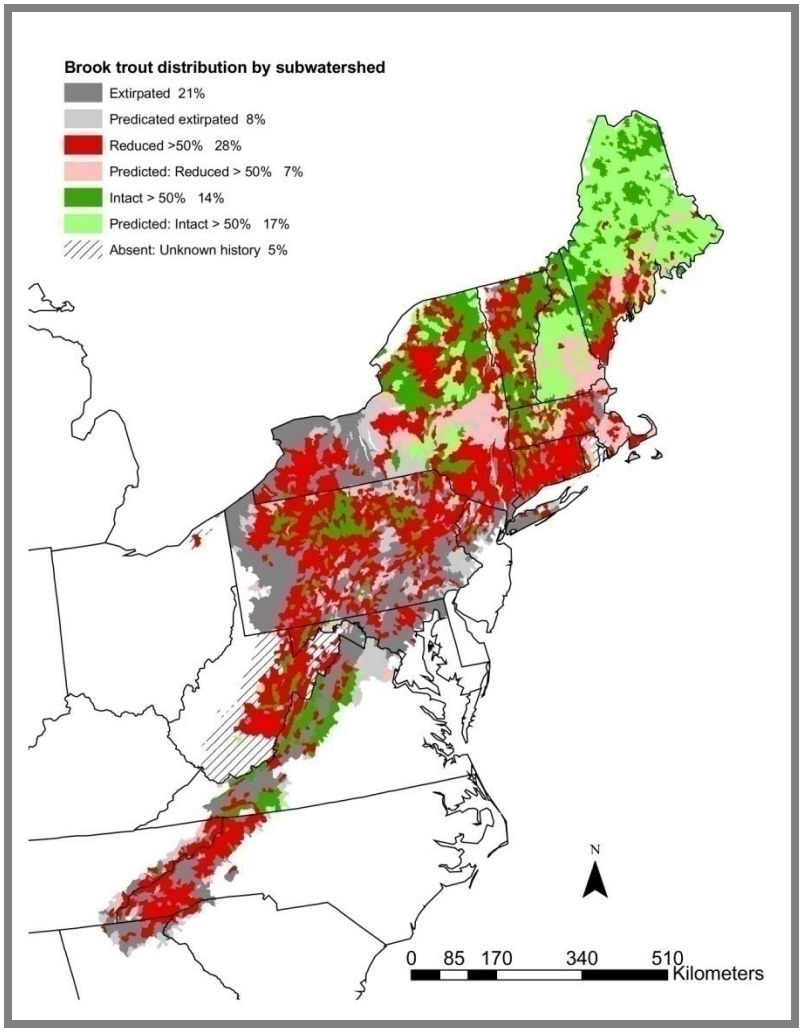
5. The finer the scale the more unknown status calls. Models?

Land Use metrics predicted brook trout status correctly 71 % of the time on 5,000 6th level HUC's (Hudy et al. 2008)



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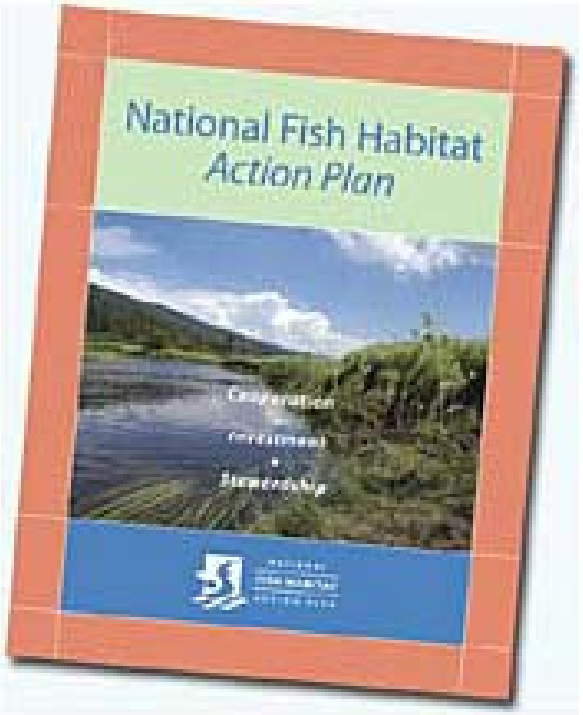
5. The finer the scale the more unknown status calls. Models?

Corollary Lesson: "What's that question again"!

The 33 % rule!

Thanks to the EBTJV Partners!




WHENEVER YOU TALK, I THINK ABOUT MY FISHING LURES UNTIL THE NOISE STOPS.