Measuring Conservation Status

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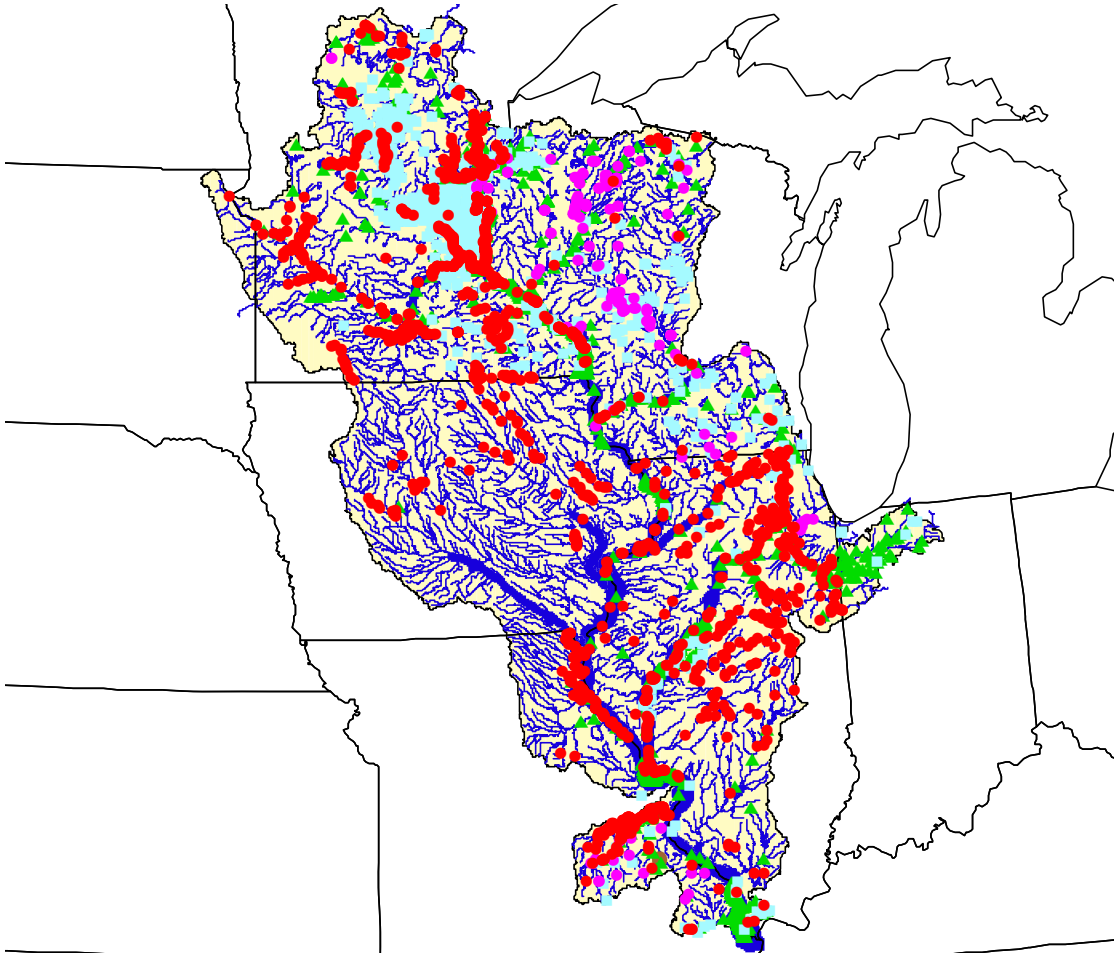
Global Conservation Approach Team
The Nature Conservancy

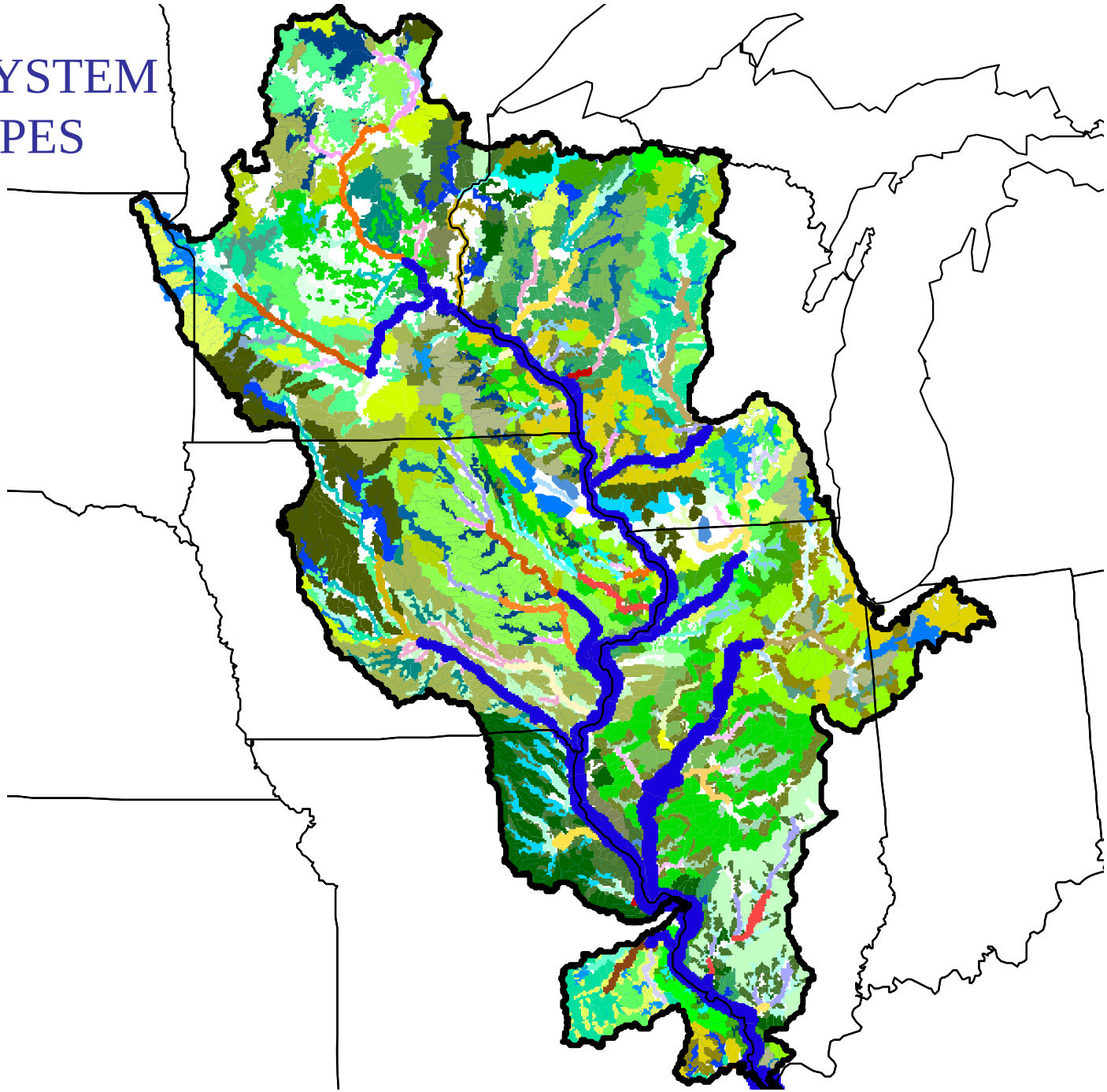
Measures

- Summarize information
- Provide few, simplified attributes to evaluate status and change of biodiversity feature viability/integrity, threats, conservation management, strategy effectiveness
- Communicate situation to a broad audience

UPPER MISSISSIPPI RIVER WATERSHED
SPECIES FEATURES



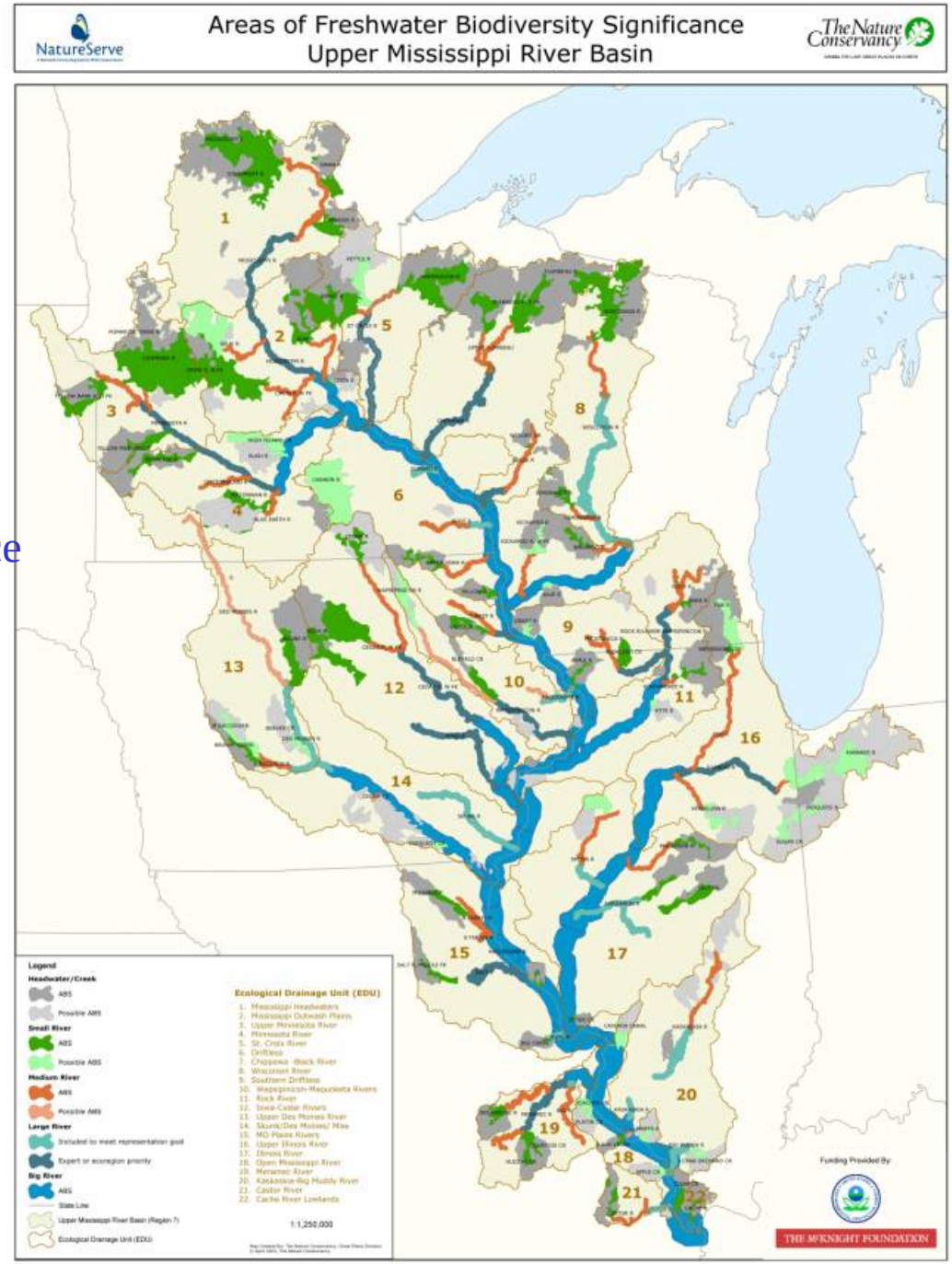
ECOSYSTEM TYPES



At least one population of 102 species (78%)

45% meeting overall distribution & abundance targets

At least one example of each ecosystem type within each EDU



Tennessee-Cumberland Conservation Areas

Kilometers
0 50 100

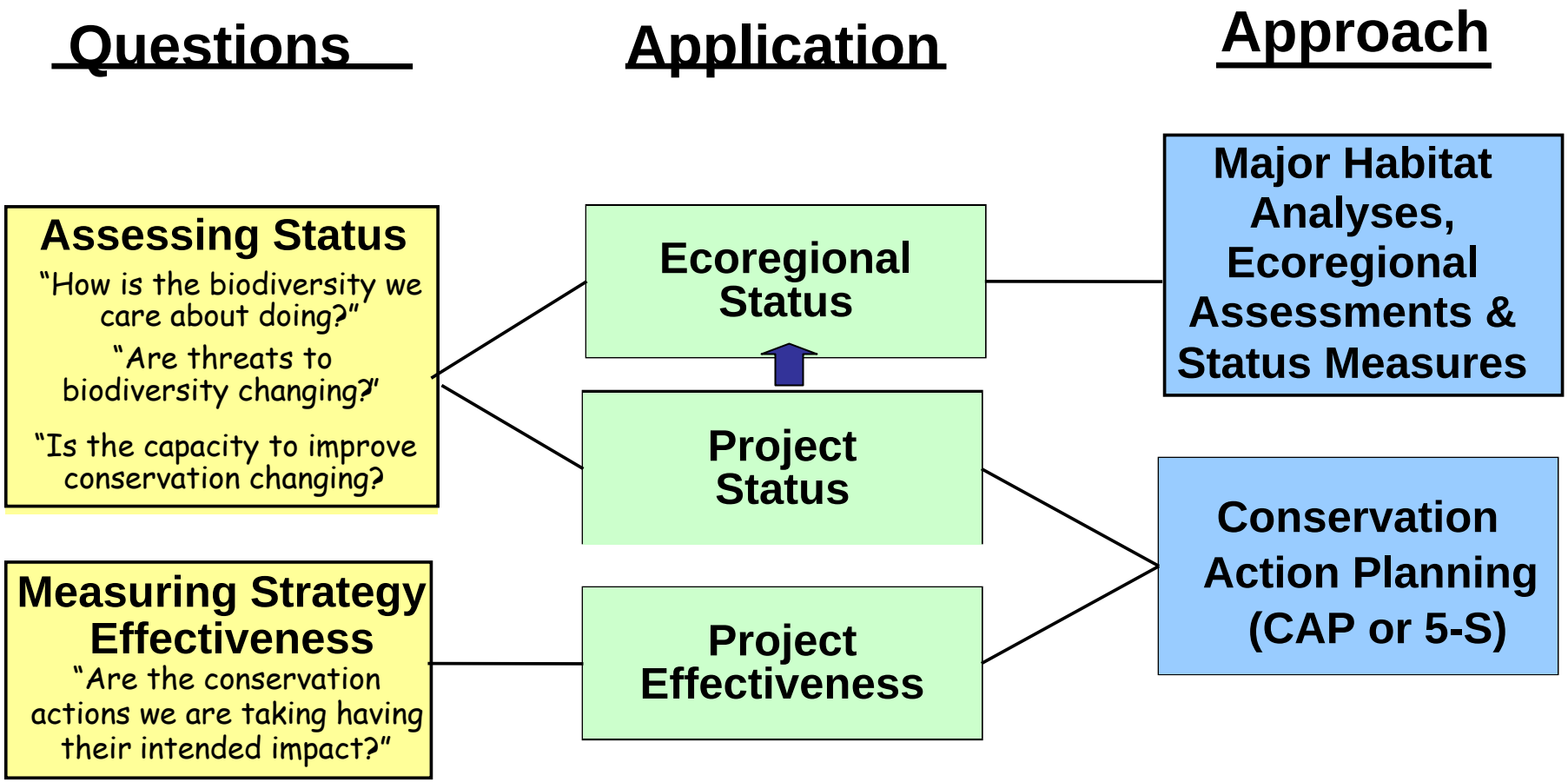
N

State border

The Nature Conservancy®
Saving the Last Great Places

WWF®

1 Beaverdam Creek
2 Upper Watauga River
3 Doe River
4 North Fork Holston River
5 Holston River above Cherokee Lake
6 Beech Creek
7 Holston R below Cherokee Dam
8 Upper Nolichucky/Cane/Toe Rivers
9 Lower Nolichucky River
10 Upper French Broad
11 Pigeon River
12 Little River (Tennessee River)
13 Tuckasegee River
14 Upper Little Tennessee River
15 Abrams Creek
16 Citico River
17 Telico River
18 Upper Clinch River
19 Powell River
20 Emory River
21 White's Creek/Piney River
22 Fires Creek
23 Valley River
24 Hanging Dog Creek
25 Hiwassee River cut-off
26 Ocoee River Headwaters
27 Wilscot Creek
28 Lower Ocoee River
29 North Chickamauga Creek
30 South Chickamauga Creek
31 Sequatchie River
32 Paint Rock River
33 Flint River
34 Tennessee below Guntersville
35 Indian Creek/Kelly Spring
36 Beaverdam Swamp
37 Limestone Creek
38 Piney Creek
39 Swan Creek/Florence Cave Complex
40 Mulberry Creek
41 Elk River
42 Shoal/Butler Creeks
43 Cypress Creek
44 Tennessee River/top of Pickwick Lake
45 Buffalo River
46 Duck River
47 Whiteoak Creek
48 Blood River
49 East and West Forks Clark's R
50 Upper Cumberland R and tribs
51 Rockcastle River
52 Buck Creek
53 South Fork Cumberland River
54 Calfkiller River
55 Cane Creek
56 Rocky River
57 Collins River
58 Hickman Creek
59 Mulherrin Creek
60 Round Lick Creek
61 East Fork Stones River
62 Mill Creek
63 Harpeth River
64 Red River headwaters
65 Little River (lower Cumberland R.)
66 Lower Cumberland River
67 White Spring
68 Kelly Creek
69 Walden Ridge tributaries


Questions
Application
Approach
Assessing Status
"How is the biodiversity we care about doing?"
"Are threats to biodiversity changing?"
"Is the capacity to improve conservation changing?
Measuring Strategy Effectiveness
"Are the conservation actions we are taking having their intended impact?"
Ecoregional Status
Project Status
Project Effectiveness
Major Habitat Analyses, Ecoregional Assessments & Status Measures
Conservation Action Planning (CAP or 5-S)

Viability	A (High)	B (Medium)	C (Low) ?	
Threats	insignificant or no threats	low	medium	high
Conservation Management	very good	good	fair	poor/none
Effective Conservation	high	moderate	fair	poor/none

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Viability/Integrity Criteria

- **Size** (population size, ecological system area, stream length)
- **Condition** (age-structure, indices of biotic integrity, SA scoring system, presence of exotic species, status of critical key ecological processes, flow, etc)
- **Landscape Context** (buffer and catchment condition: land cover/use, dams levees, etc.)

Threats Criteria

- **Severity:** How severe is the threat to impacting the viability/integrity of a biodiversity feature?
- **Scope:** How wide spread is the threat?
- **Immediacy:** Current/Future

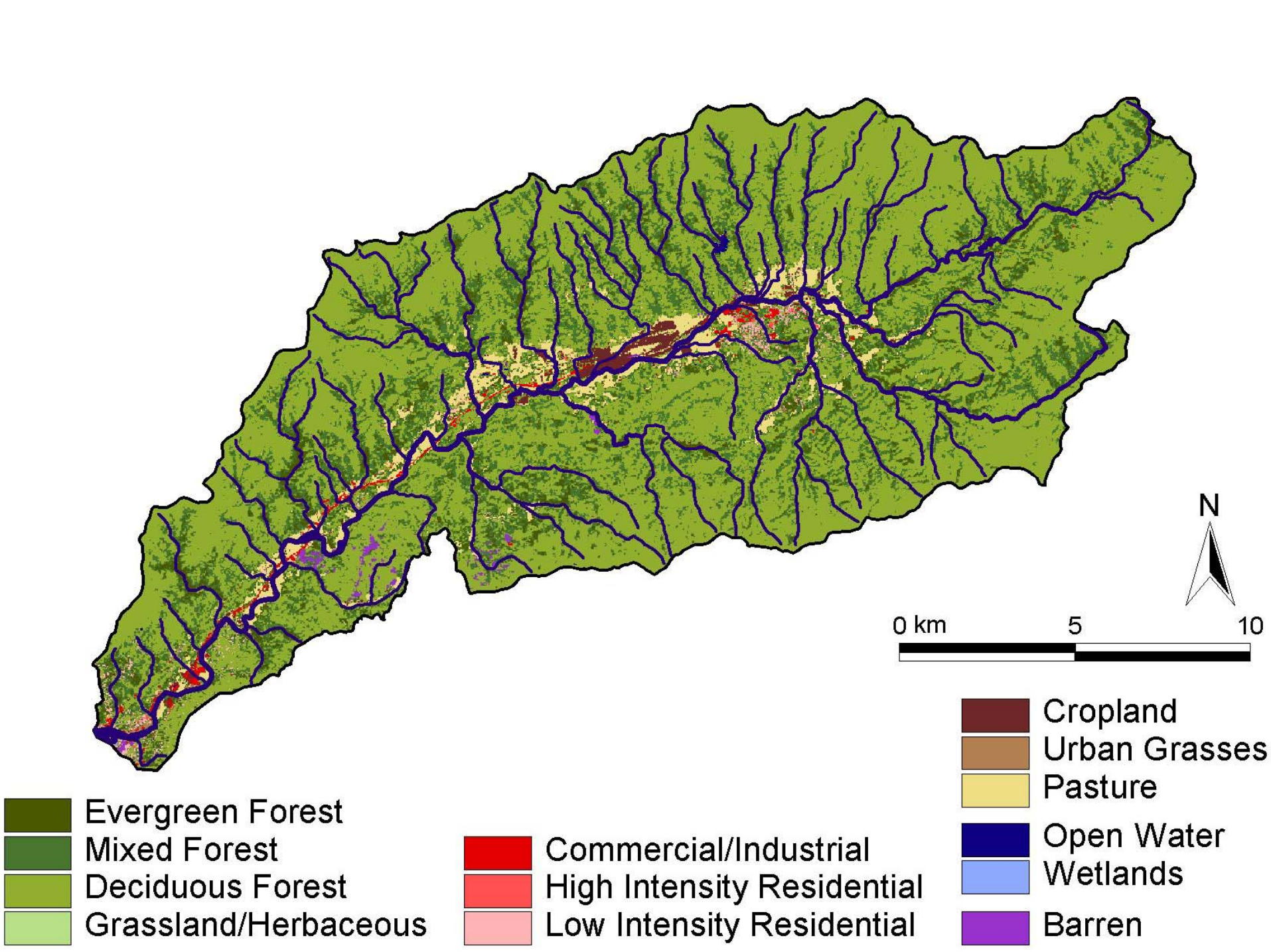
Commonly Used Landscape Attributes for Evaluating Condition, Landscape Context and Threats (Often done for catchment *and* buffer)

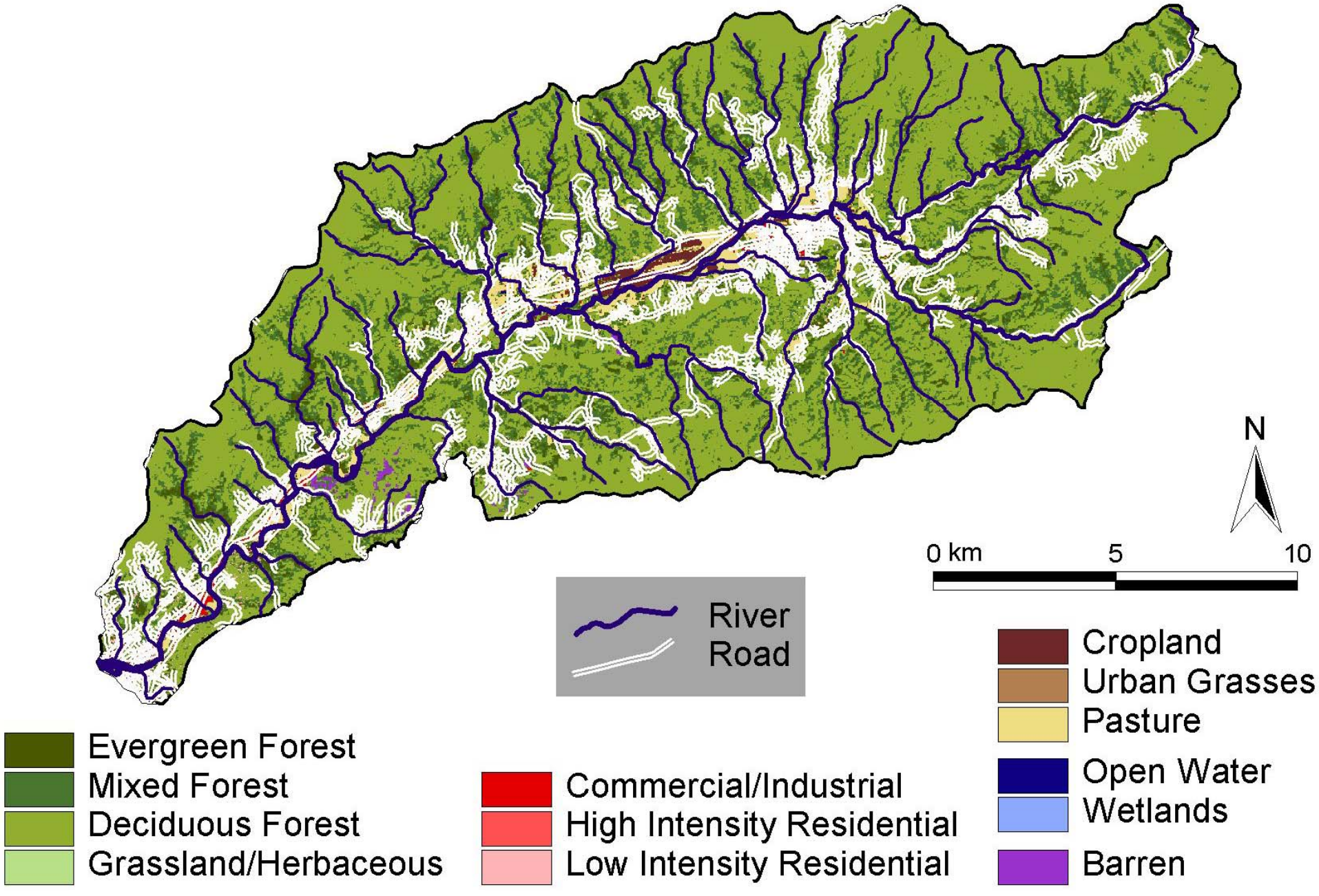
- Condition/Landscape Context

- Natural Cover
- Agriculture Type and Cover
- Impervious Cover
- Urban areas
- Human Population Density
- Dams
- Road Density
- Road Crossing Density
- Connectivity

Future Threat

- Population Growth
- Planned Dams
- Resource Extraction Leases
- Point sources of pollution (risk)
- *Estimated Water Demands*
- *Climate Change*


N
0 km
5
10
Evergreen Forest
Mixed Forest
Deciduous Forest
Grassland/Herbaceous
Commercial/Industrial
High Intensity Residential
Low Intensity Residential
Cropland
Urban Grasses
Pasture
Open Water
Wetlands
Barren


N
0 km
5
10
River
Road
Evergreen Forest
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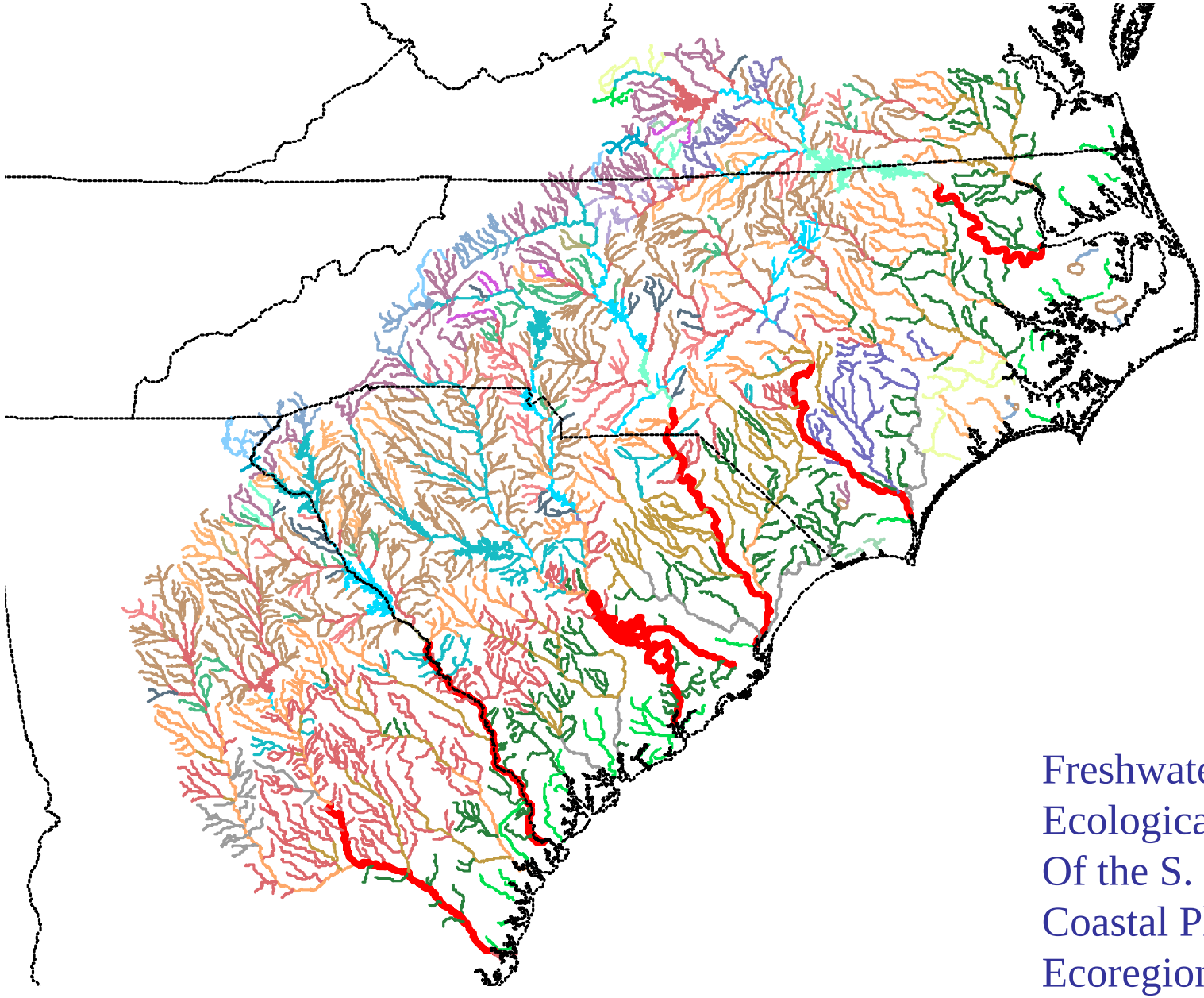
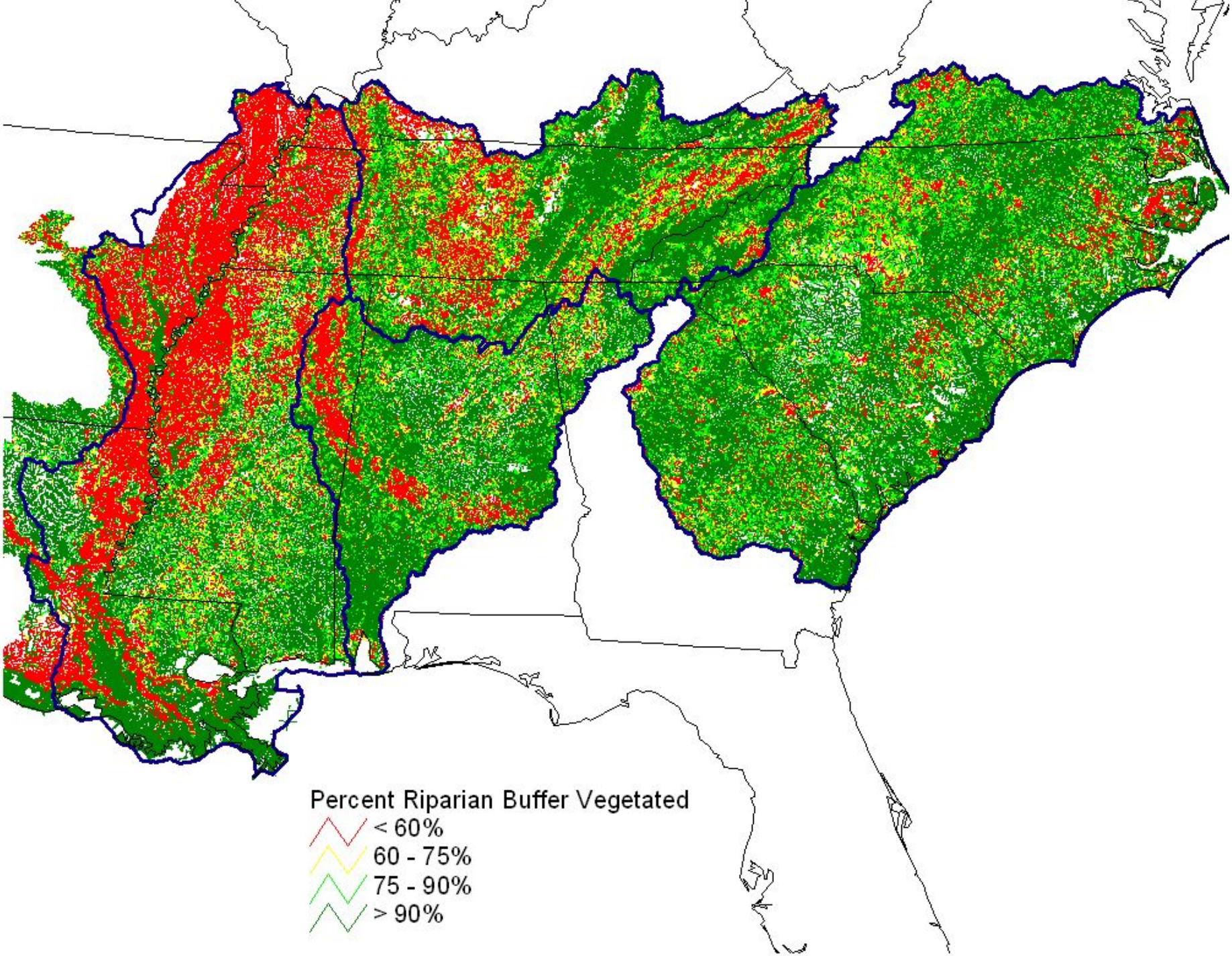
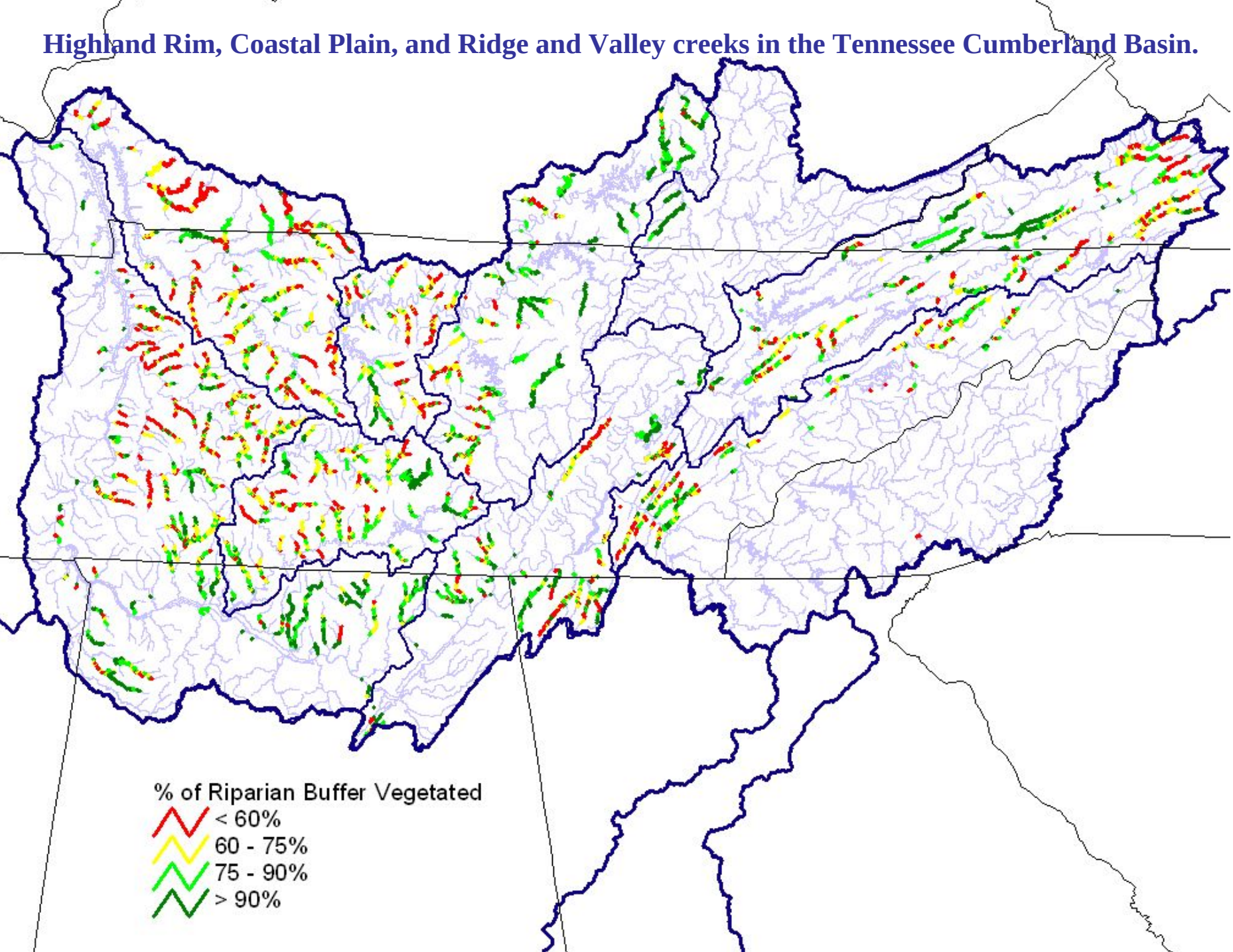
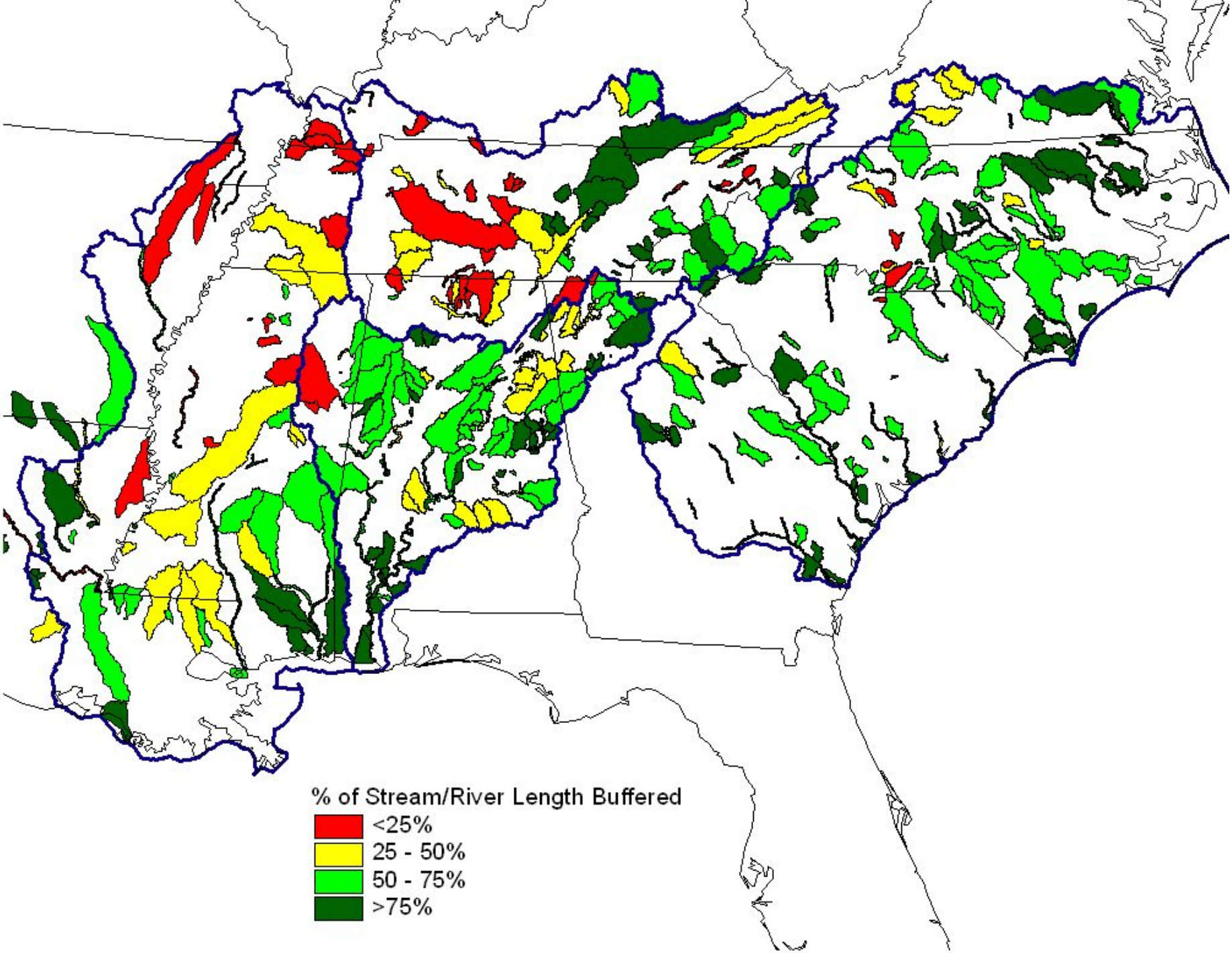


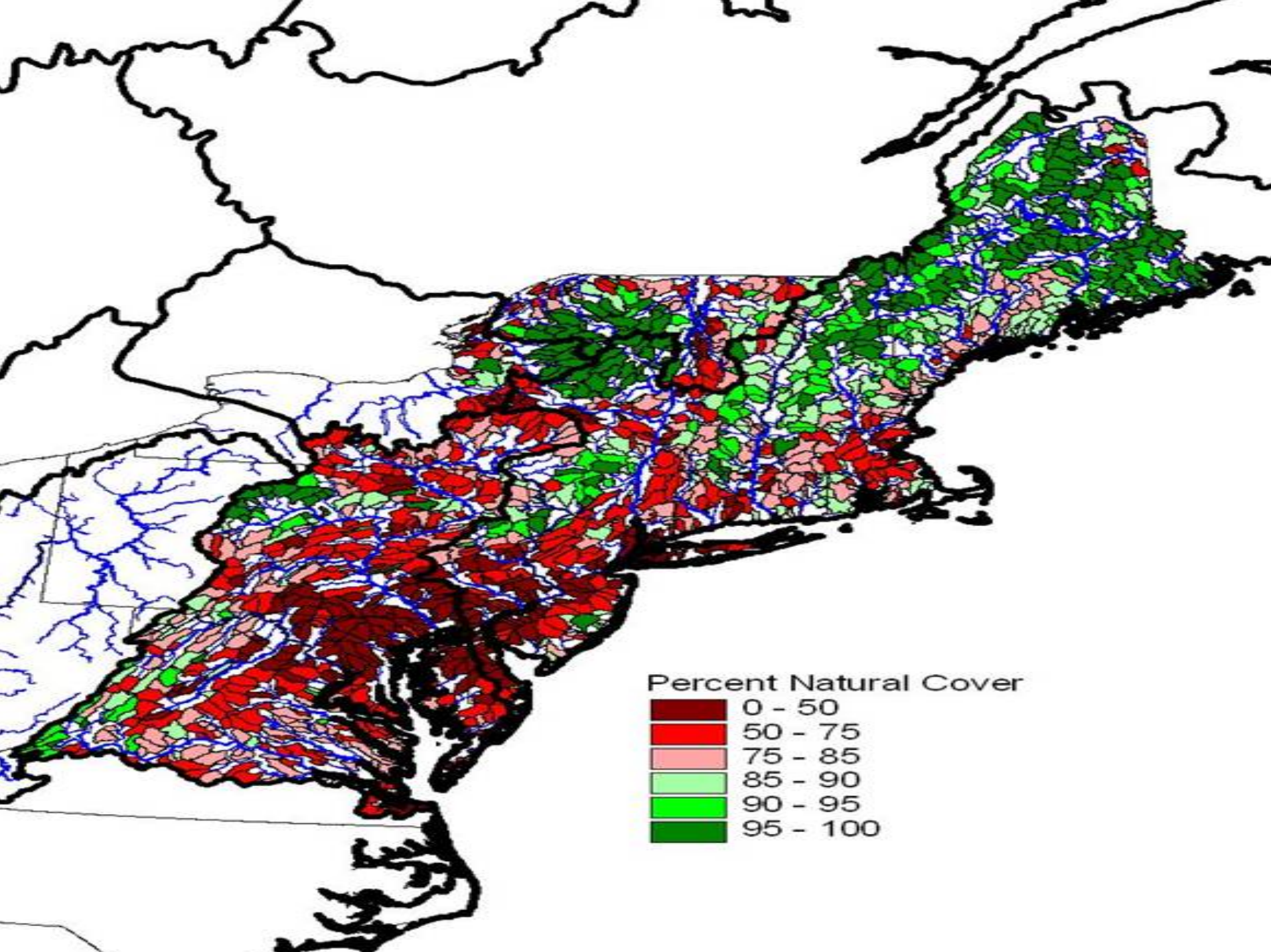
Freshwater
Ecological Systems
Of the S. Atlantic
Coastal Plain
Ecoregion

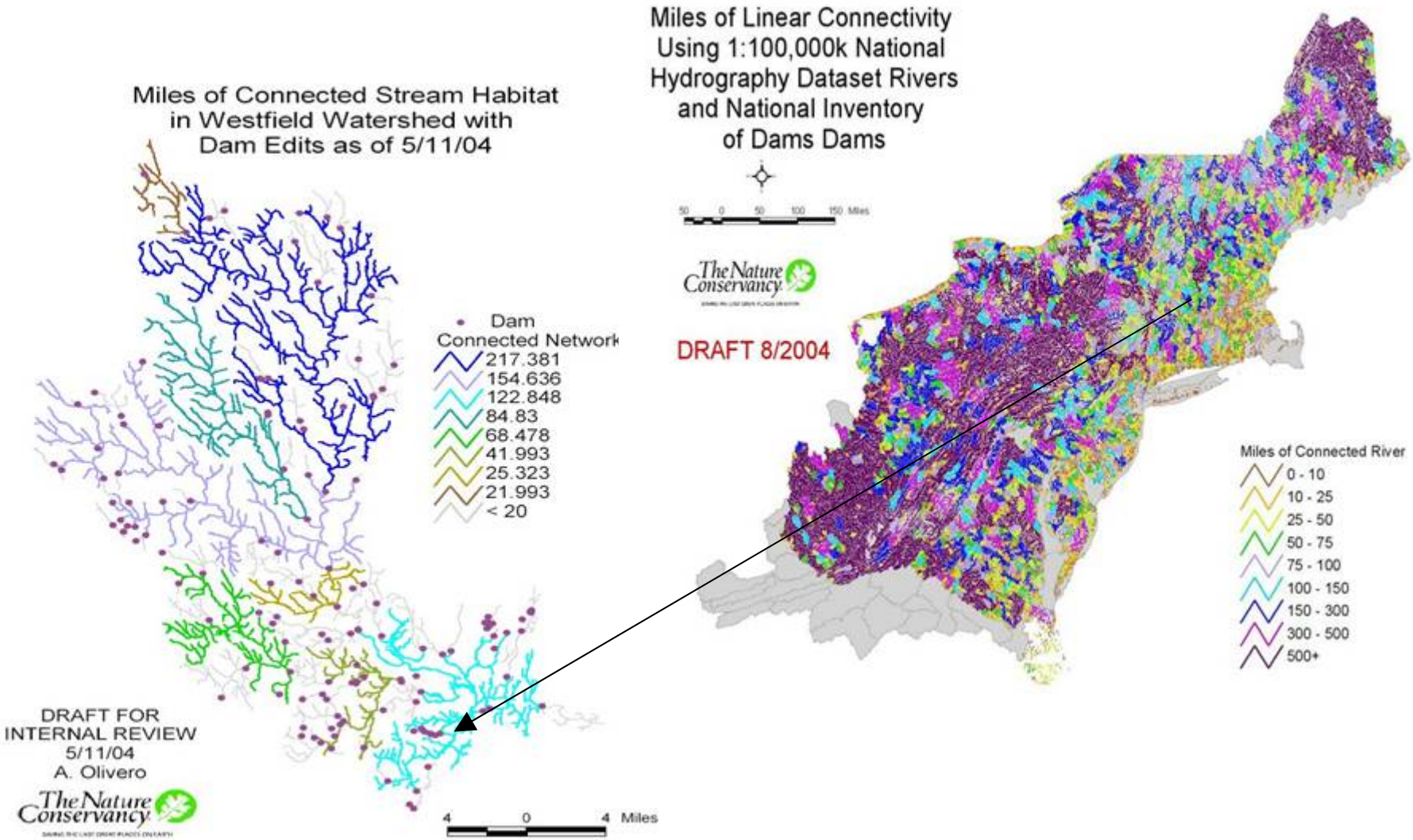

Percent Riparian Buffer Vegetated
< 60%
60 - 75%
75 - 90%
> 90%

Highland Rim, Coastal Plain, and Ridge and Valley creeks in the Tennessee Cumberland Basin.




% of Stream/River Length Buffered
<25%
25 - 50%
50 - 75%
>75%


Percent Natural Cover
0 - 50
50 - 75
75 - 85
85 - 90
90 - 95
95 - 100


Miles of Connected Stream Habitat
in Westfield Watershed with
Dam Edits as of 5/11/04
Dam
Connected Network
217.381
154.636
122.848
84.83
68.478
41.993
25.323
21.993
< 20
4 0 4 Miles
DRAFT FOR
INTERNAL REVIEW
5/11/04
A. Olivero
The Nature Conservancy
Miles of Linear Connectivity
Using 1:100,000k National
Hydrography Dataset Rivers
and National Inventory
of Dams Dams
50 0 50 100 150 Miles
The Nature Conservancy
DRAFT 8/2004
Miles of Connected River
0 - 10
10 - 25
25 - 50
50 - 75
75 - 100
100 - 150
150 - 300
300 - 500
500+

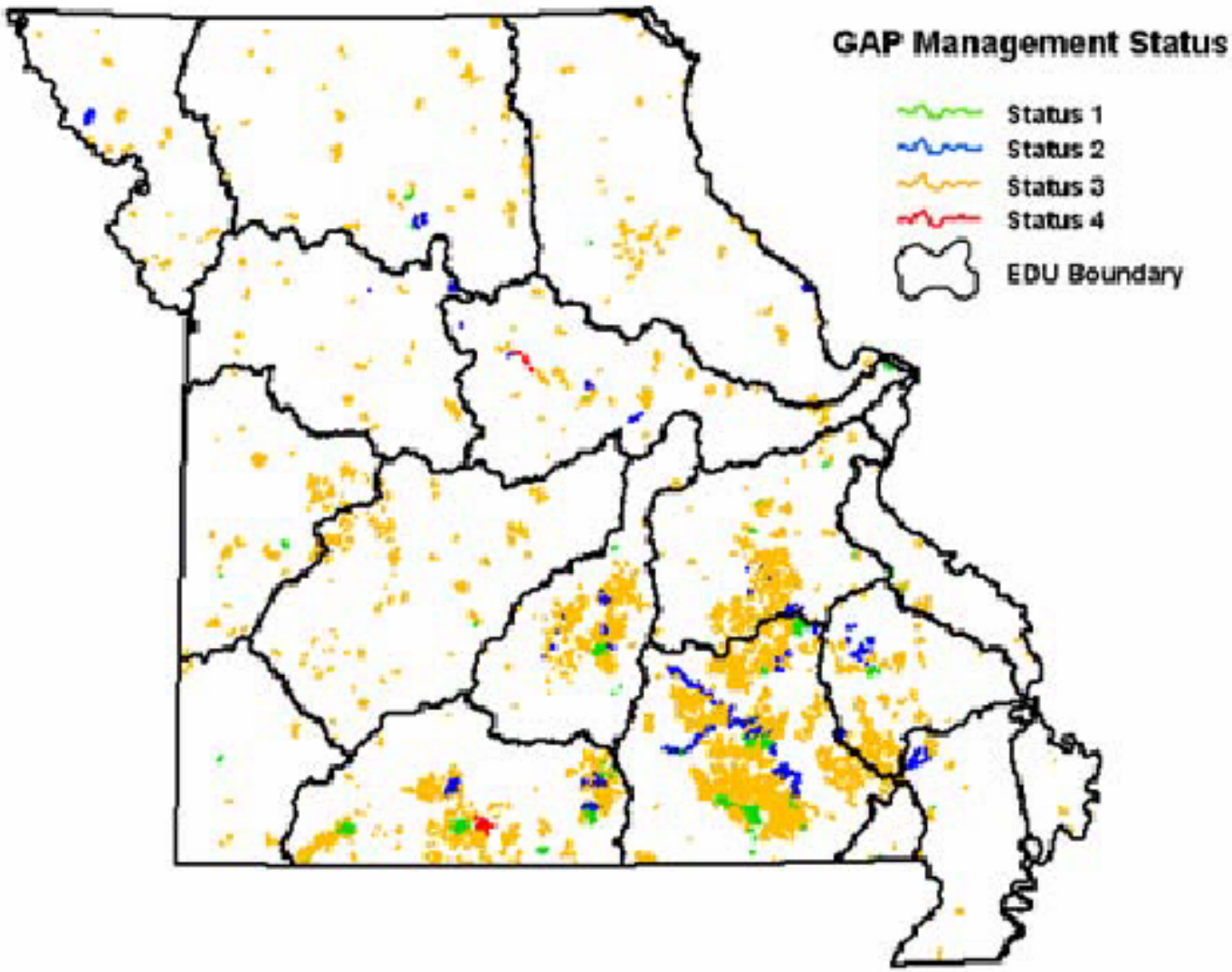
Conservation Management and Effectiveness

- Protected Areas (IUCN categories, others)
- Managed Areas
- Management practices: e.g.Water Management,
- Enabling Conditions: Policies, Laws
- *Need to evaluate not only type of protection/management, but effectiveness of management*

Coverage		IUCN				
I	II	III	IV	V	IV	NONE
Coverage		GAP				
I	II	III	None			
Coverage other Conserved areas						
?	?	?				

MANAGEMENT EFFECTIVENESS

LEGAL	**MONITOR**	PLAN	RES USE	**RESORS**	IMPL
status	res. needs	mgmt plan	rec	staffing	law enforc
dispute	monitor	inventory	harvest	funding	threat work
objective	data use	particip.	zoning	infrastruct	key activit.



Map of stream segments with greater than 50% of their length flowing through public land displayed according to the four GAP management status categories.

Sowa et al. 2005

Table 5.1. An example of the upstream drainage network and overall watershed statistics generated for each stream segment in the Missouri Valley Segment coverage. Table shows, for three individual stream segments, the percent of the upstream network and watershed falling in all public lands (GAP 1-4) and the percent falling in lands classified as GAP management status 1 or 2 (GAP 1-2).

Stream Segment ID	Upstream Network GAP 1-4	Watershed in GAP 1-4	Upstream Network GAP 1-2	Watershed in GAP 1-2
10300101 8377	11.49%	14.48%	0.0%	2.78%
10300101 5579	11.47%	29.61%	0.0%	0.96%
10300101 5888	10.76%	8.44%	10.76%	8.44%

Sowa et al. 2005

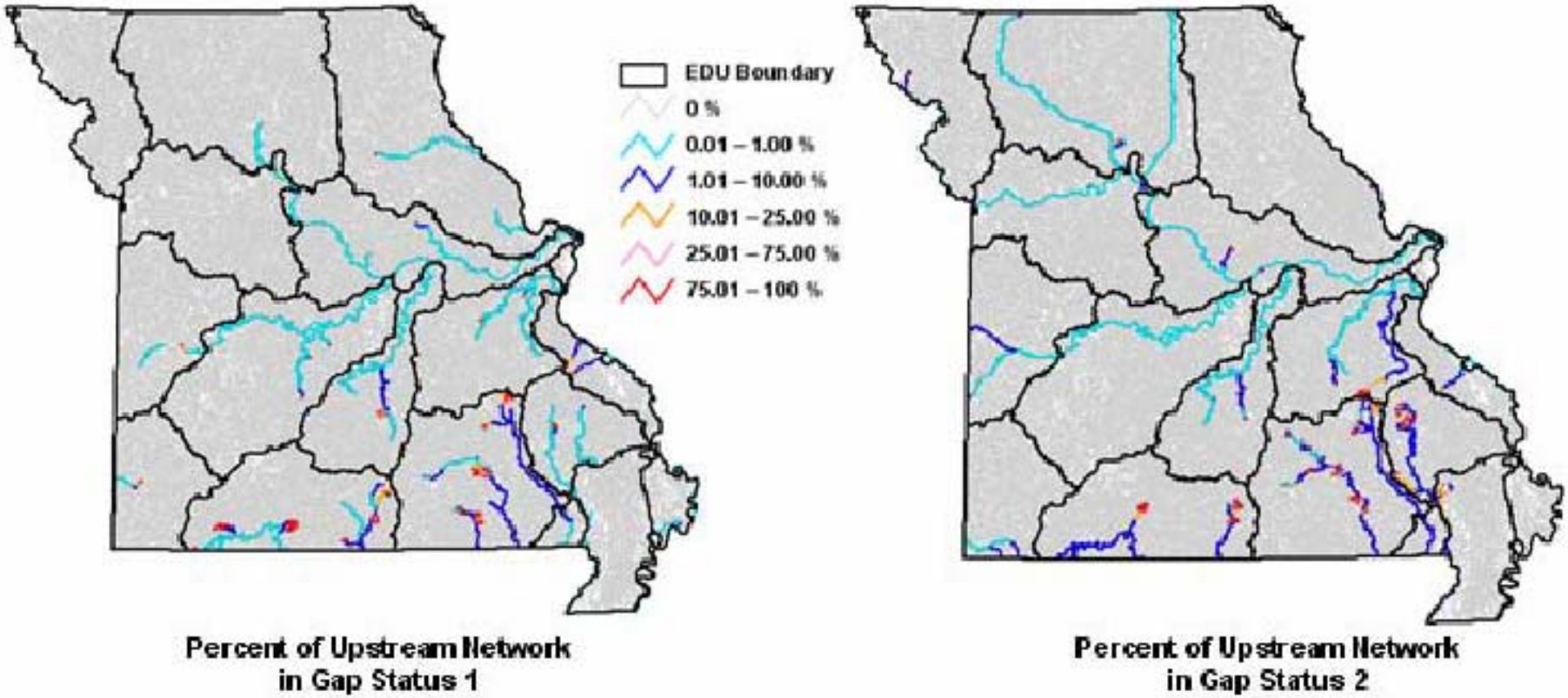


Figure 5.5. Maps showing the percent of the upstream network of each stream segment that is contained within lands classified as GAP management status 1 and 2.

Sowa et al. 2005

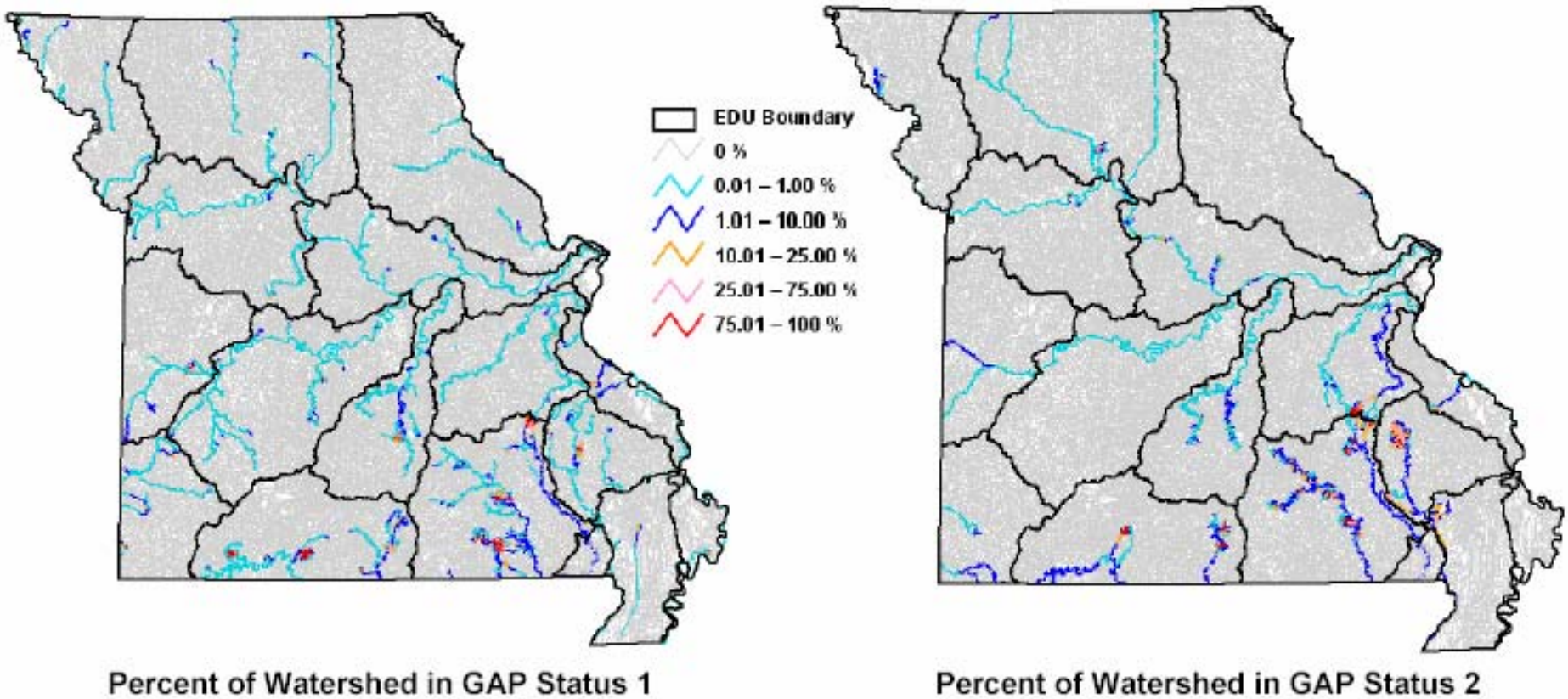


Figure 5.7. Maps showing the percent of the watershed of each stream segment that is contained within lands classified as GAP management status 1 and 2.

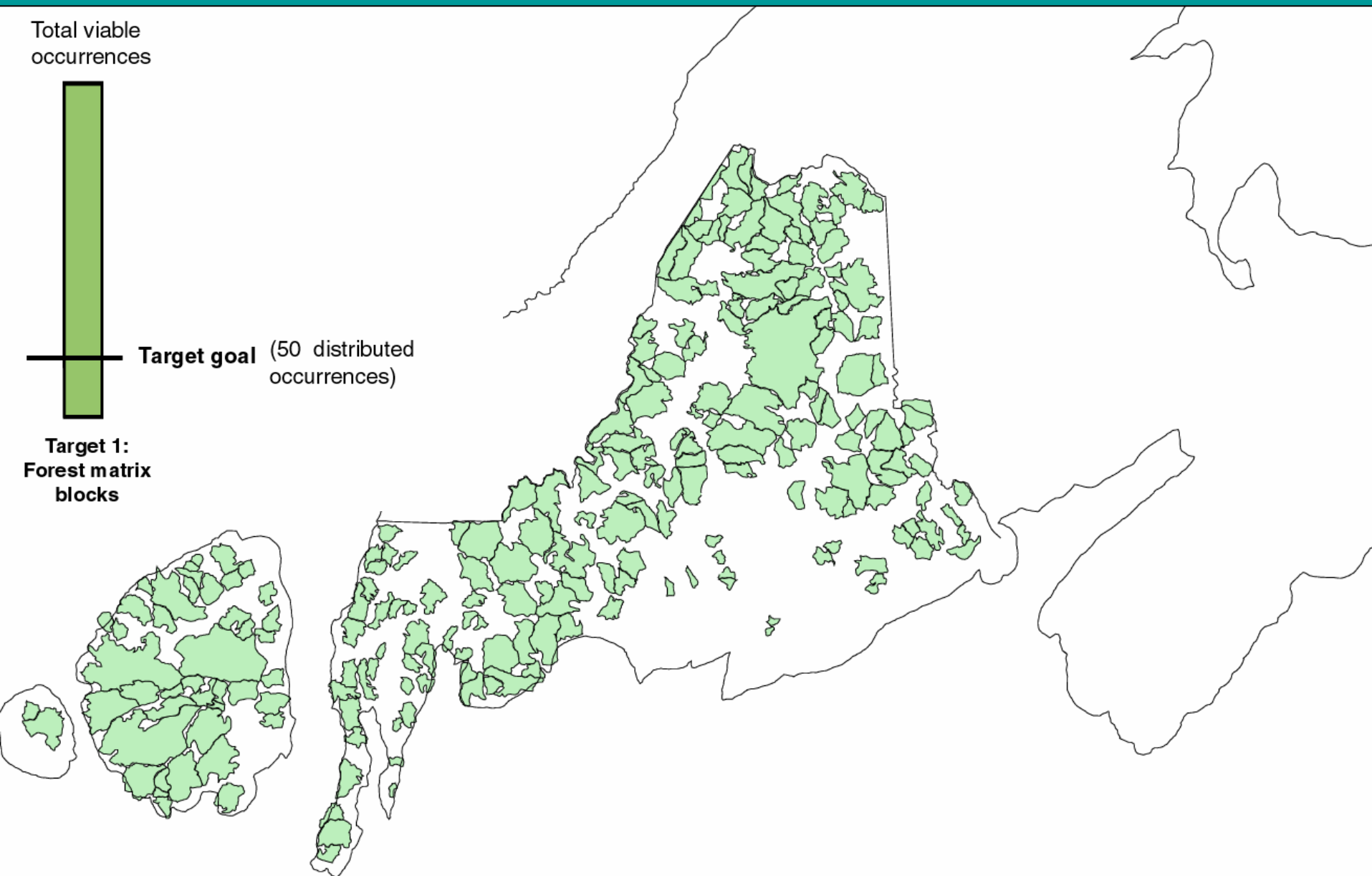
Sowa et al. 2005

Table 5.4. Number of kilometers and relative percentage statistics for stream segments flowing through each GAP management status, broken down according to stream size classes. Note: Great Rivers (MO and MS Rivers) were not included in the assessment and the relative percentage statistics for "All Sizes" exclude the total kilometers (1,664) for this stream size class.

Stream Size	Total Km	GAP1 Km	Percent in GAP1	GAP2 Km	Percent in GAP2	GAP3 Km	Percent in GAP3	GAP4 Km	Percent in GAP4
Headwater	129,394	374	0.29	403	0.31	6,493	5.02	45	0.04
Creek	27,624	85	0.31	109	0.40	881	3.19	0	0.00
Small River	11,904	40	0.34	175	1.47	483	4.06	0	0.00
Large River	3,547	47	1.32	108	3.04	134	3.77	0	0.00
Great River	1,665	NA	NA	NA	NA	NA	NA	NA	NA
All Sizes	174,134	546	0.3	795	0.5	7,990	4.6	45	0.03

Sowa et al. 2005

Integrating all measures: Biodiversity, threat and conservation status



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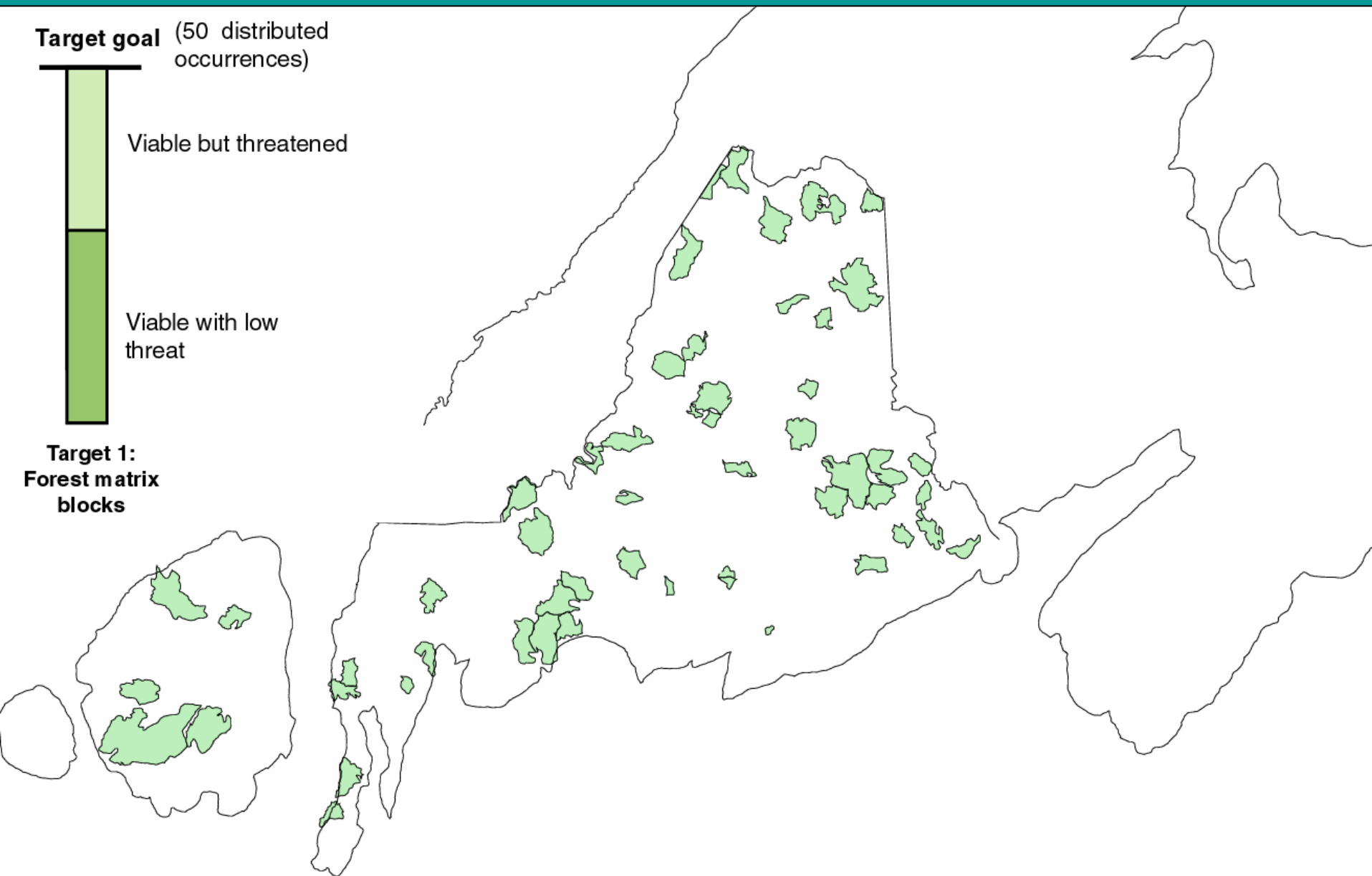

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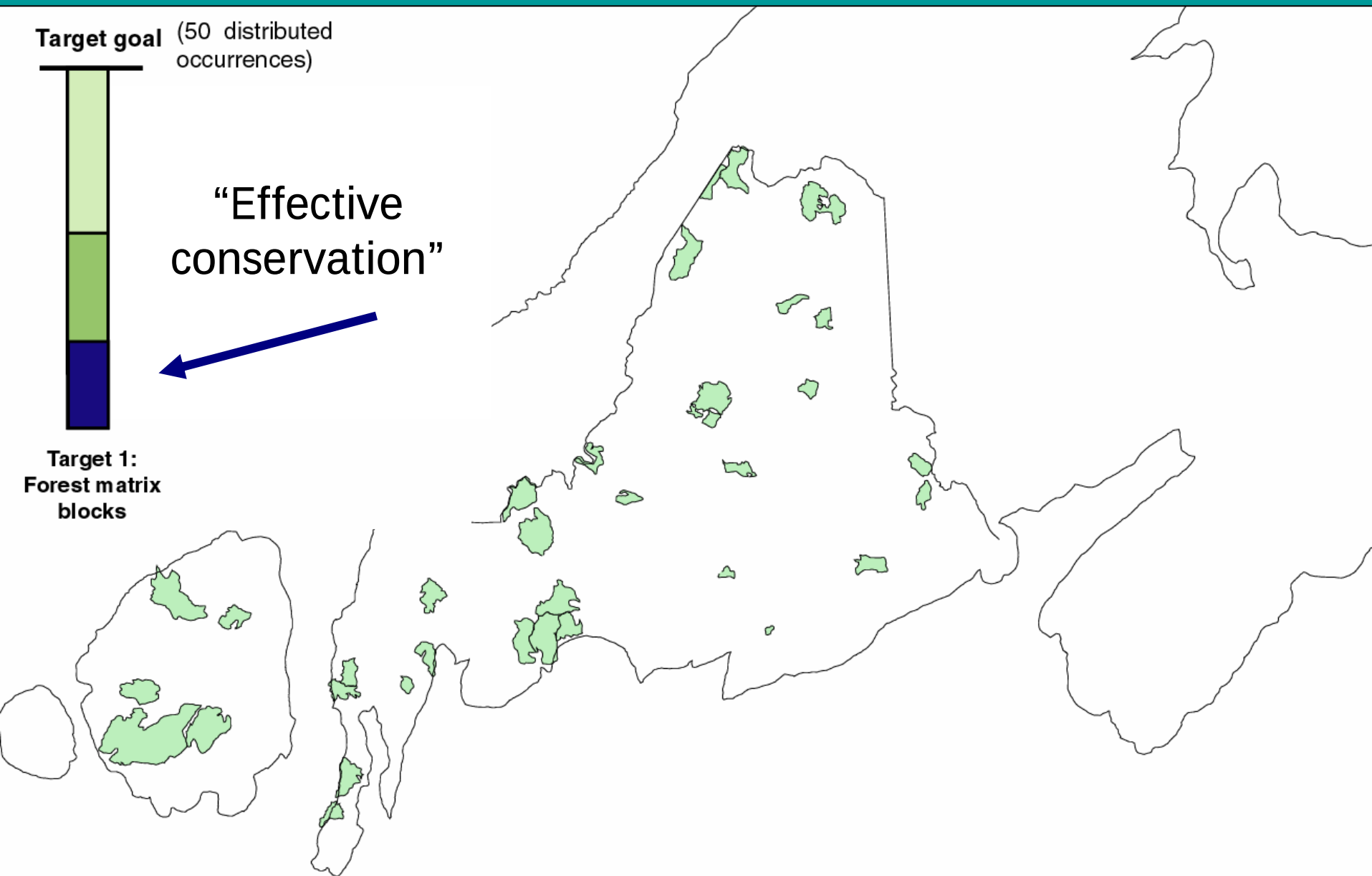
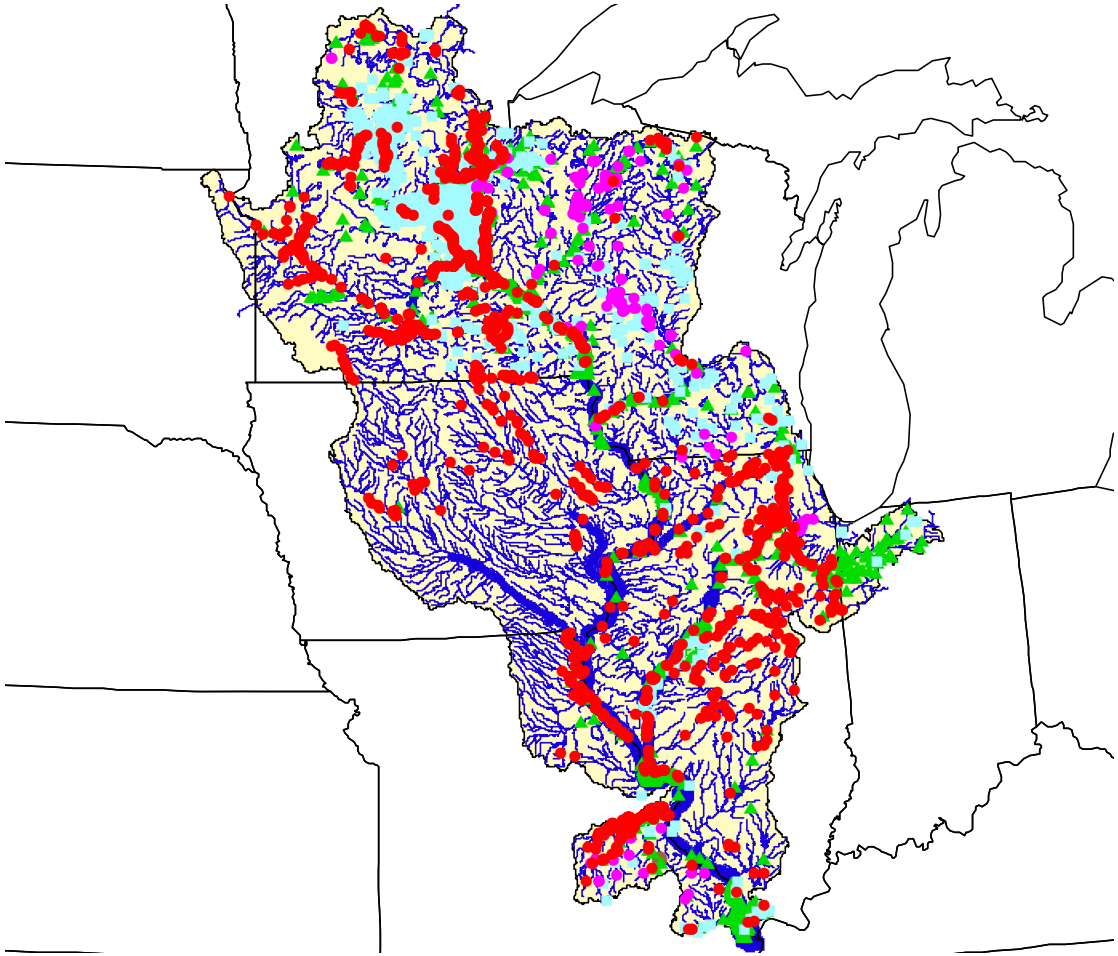


UPPER MISSISSIPPI RIVER WATERSHED SPECIES TARGETS



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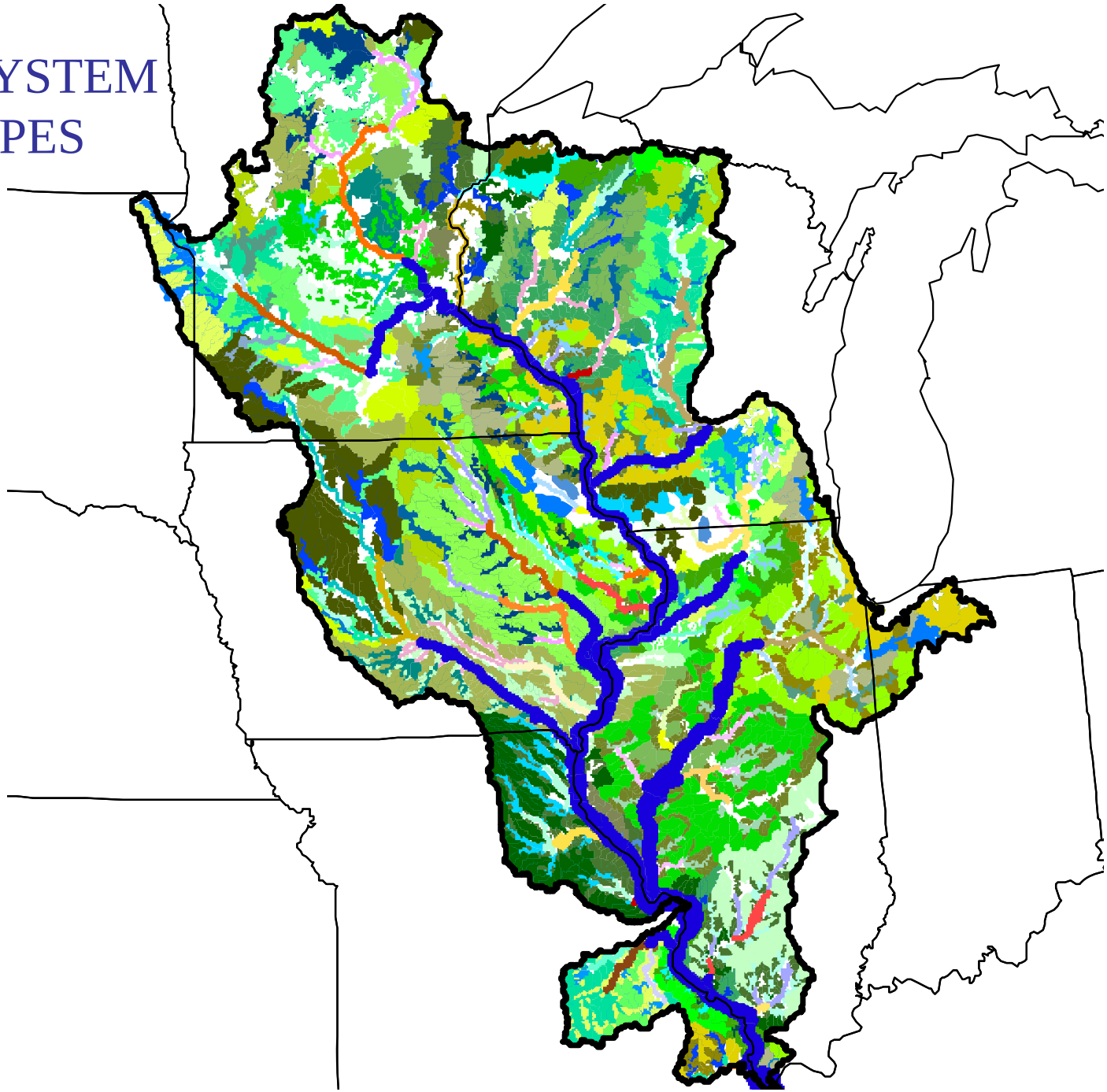
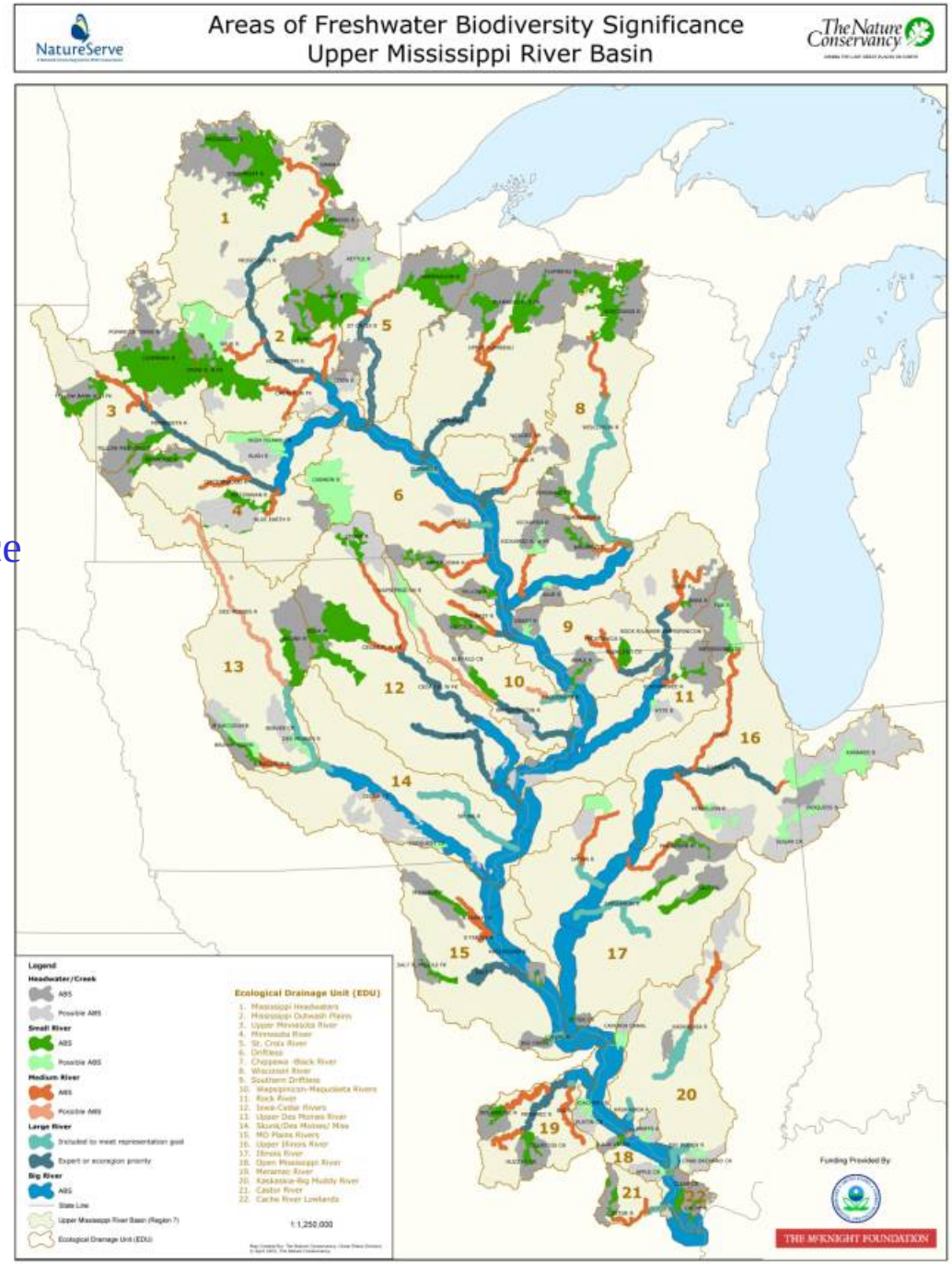


At least one population of 102 species (78%)

45% meeting overall distribution & abundance targets

At least one example of each ecosystem type within each EDU



% Biodiversity Feature/Group Meeting Targets

% Target achieved

100%								
91-99%				10%				
81-90%	5%							
71-80%			10%					
61-70%	10%			10%				
51-60%		10%	30%					
41-50%			30%					
31-40%	9%							
21-30%		5%		30%				
11-20%	36%		30%					
1-10%	30%	45%		25%				
0	10%	40%		25%				
	Birds	Mammals	Amphibs.	Insects	T&E	Species	Ecosyst	TOTAL

Unit of Measurement

Lotic

- Length, % of stream?
- Buffer?
- Catchment?

- Length, % of stream within an ecosystem?
- Number of ecosystems/length of stream

Unit of Measurement

Lentic/wetlands

- Number of lakes/wetlands?
- Area/size of lakes/wetlands?
- Number of lake/wetland area/size classes?
- % of lakes/wetlands

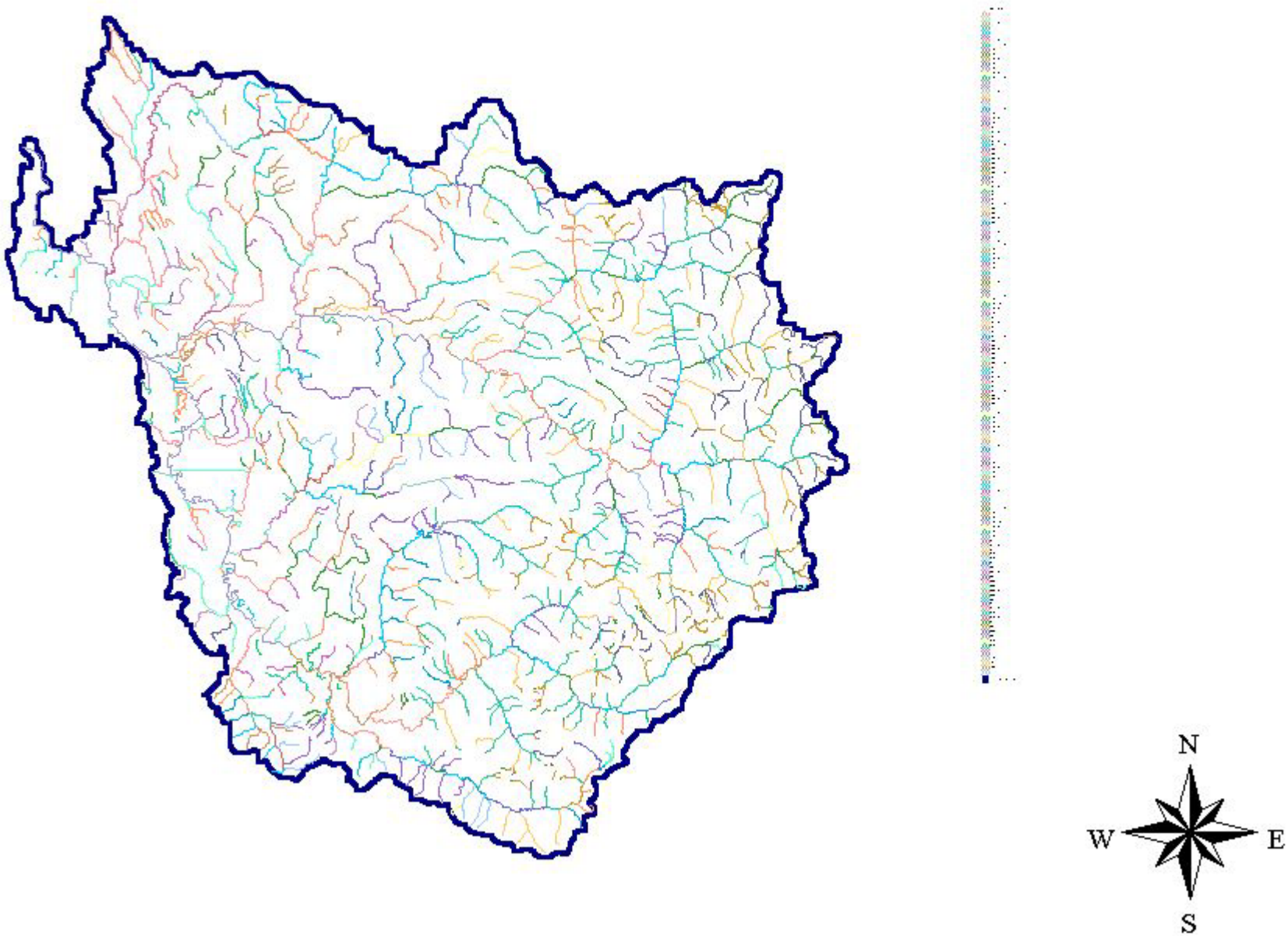
Unit of Measurement

Units stratified within freshwater ecoregions and finer-scale classification units?

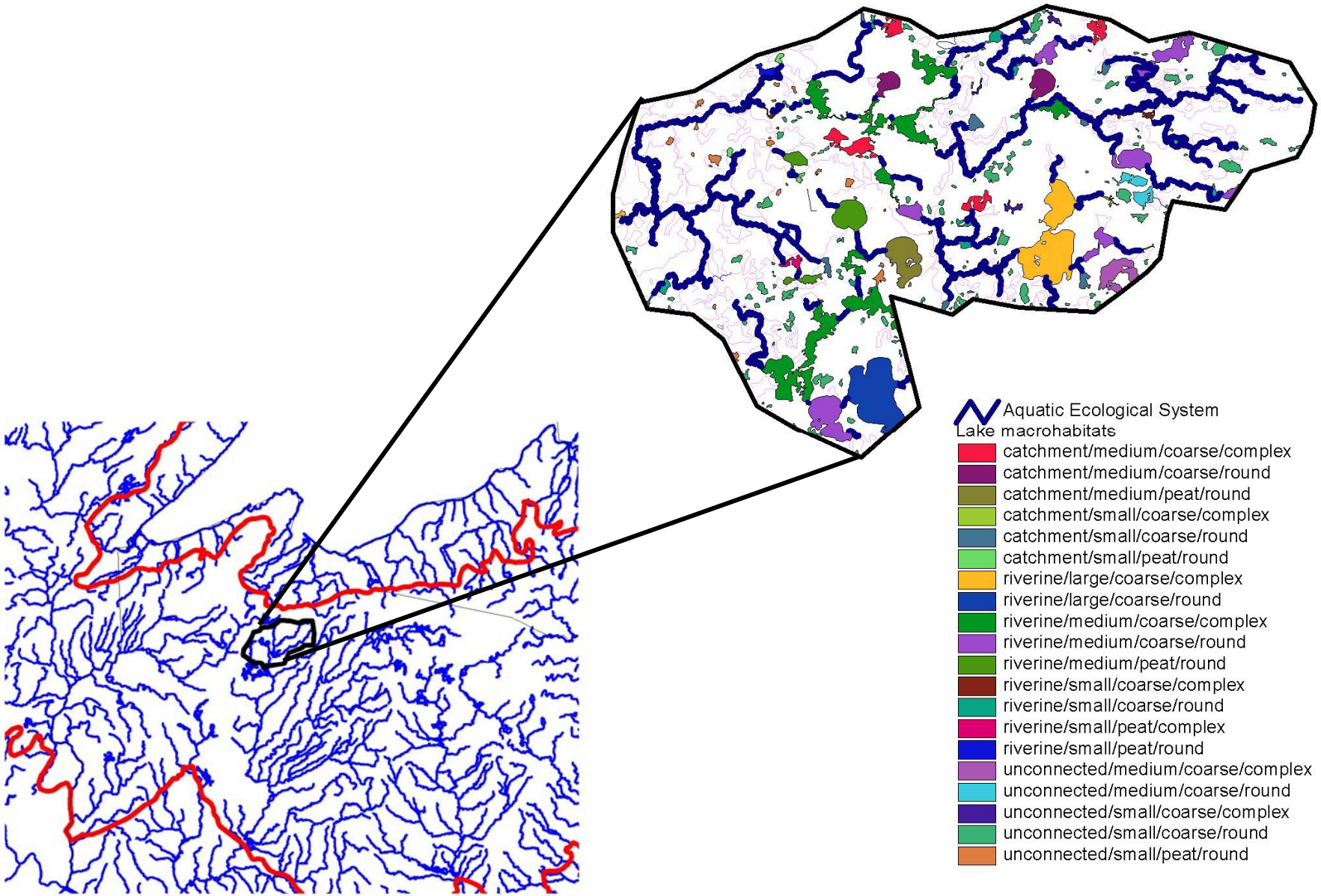
Connectivity?

Continuity?

Stream Macrohabitats



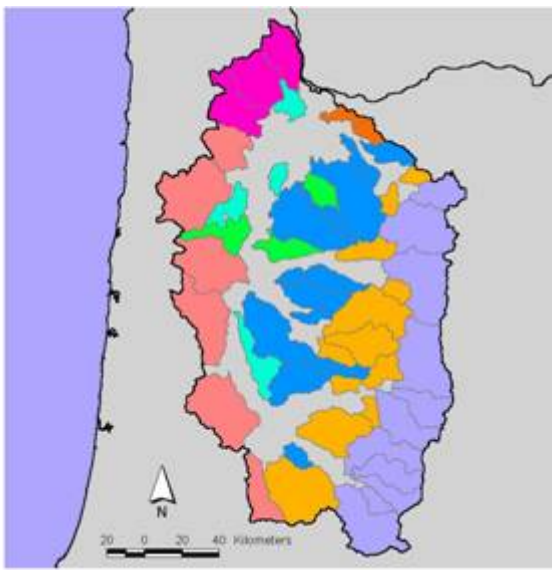
Lake Macrohabitats



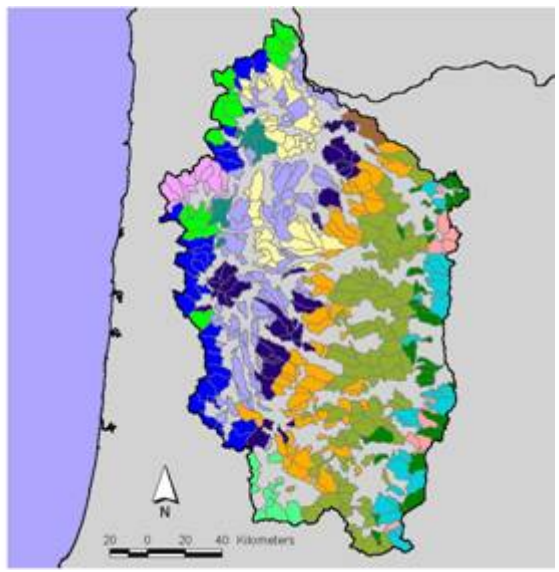
An example of four sizes of freshwater landscape ecosystems

> 10000 km^2
(large rivers)

1000 – 10000 km^2
(medium rivers)



100 – 1000 km^2
(small rivers)



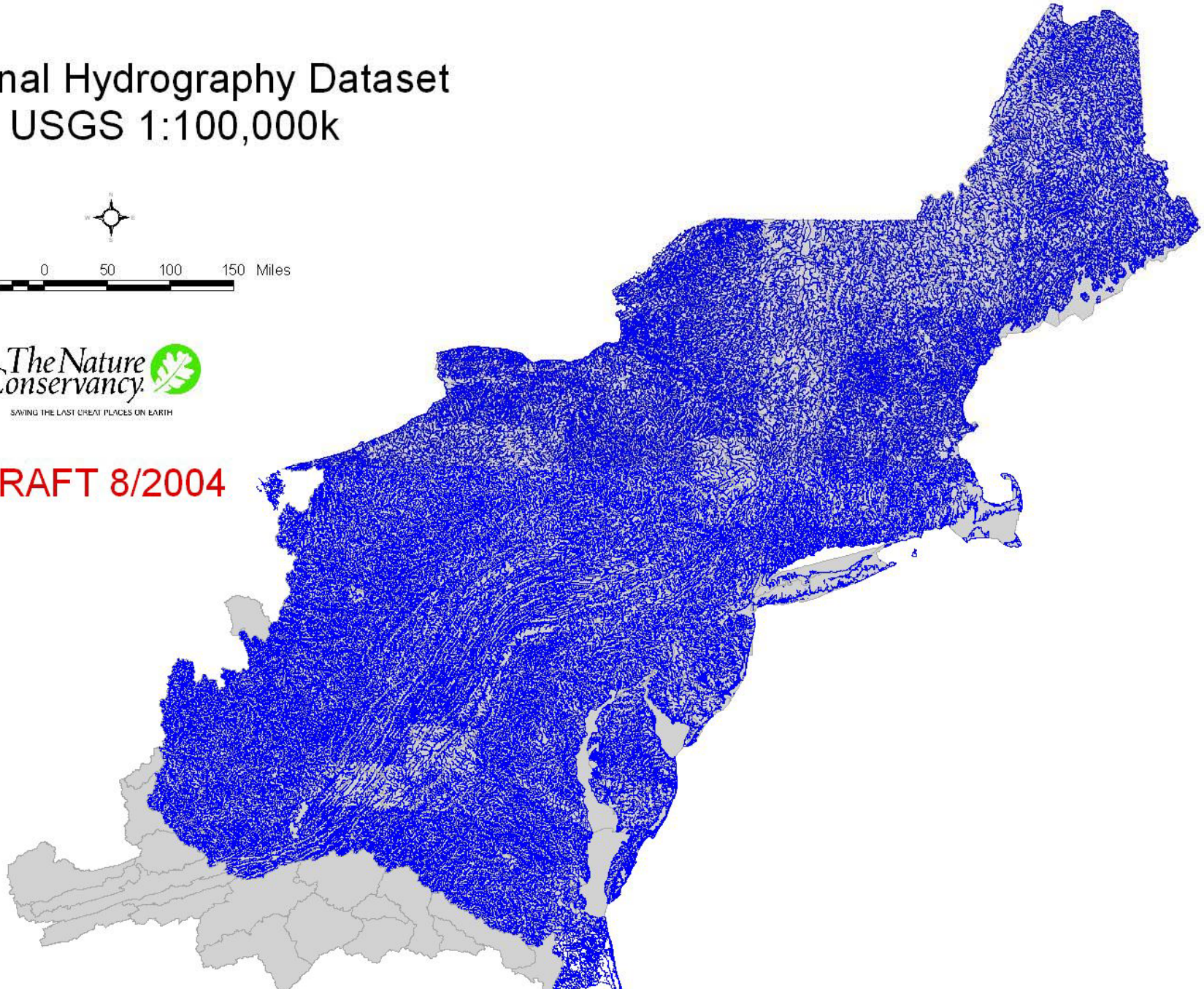
0 – 100 km^2
(headwaters
and creeks)

National Hydrography Dataset
USGS 1:100,000k

50 0 50 100 150 Miles

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

DRAFT 8/2004




DAVID HOKEUSFIVS