Watershed Assessment Of The Big Canoe Creek System For The Recovery And Restoration Of Imperiled Aquatic Species

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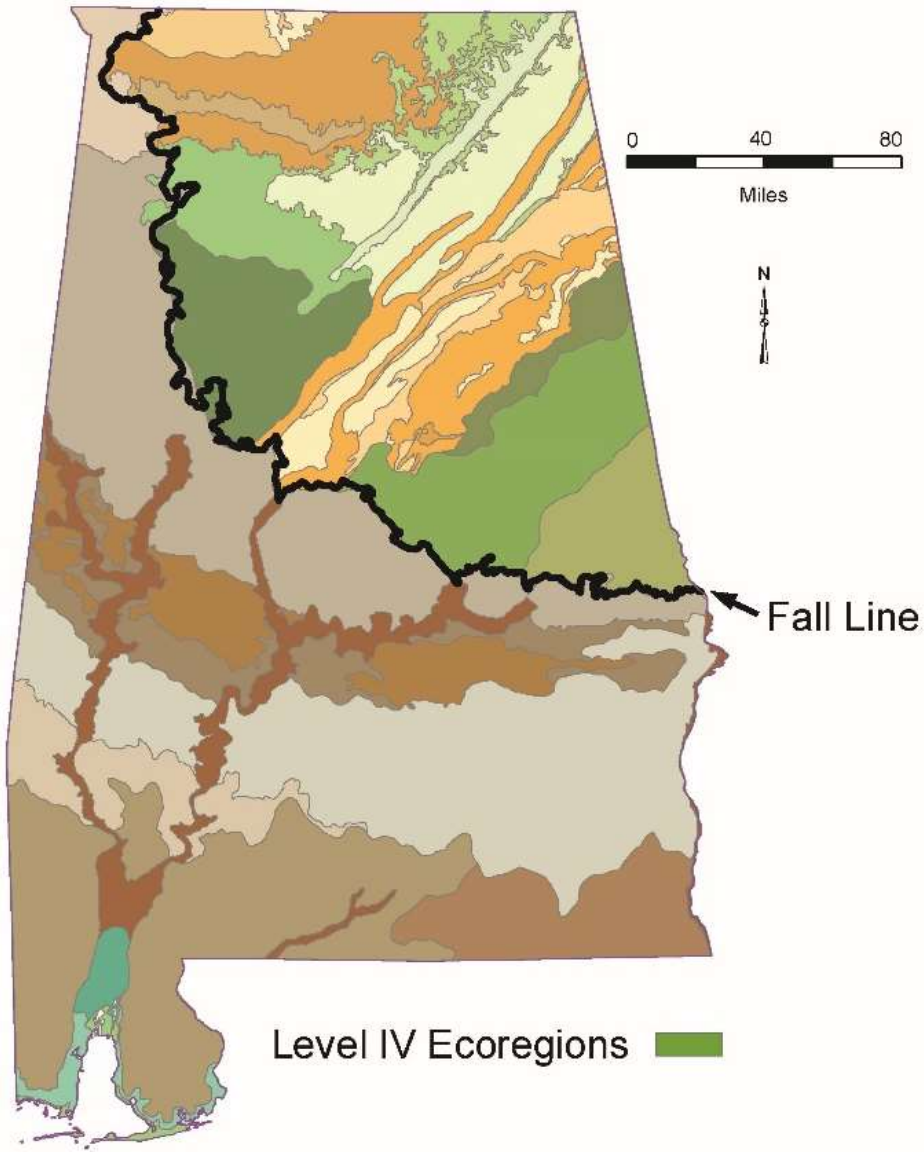
The freshwater fauna of Alabama have a high degree of endemism and diversity thanks to the Fall Line!



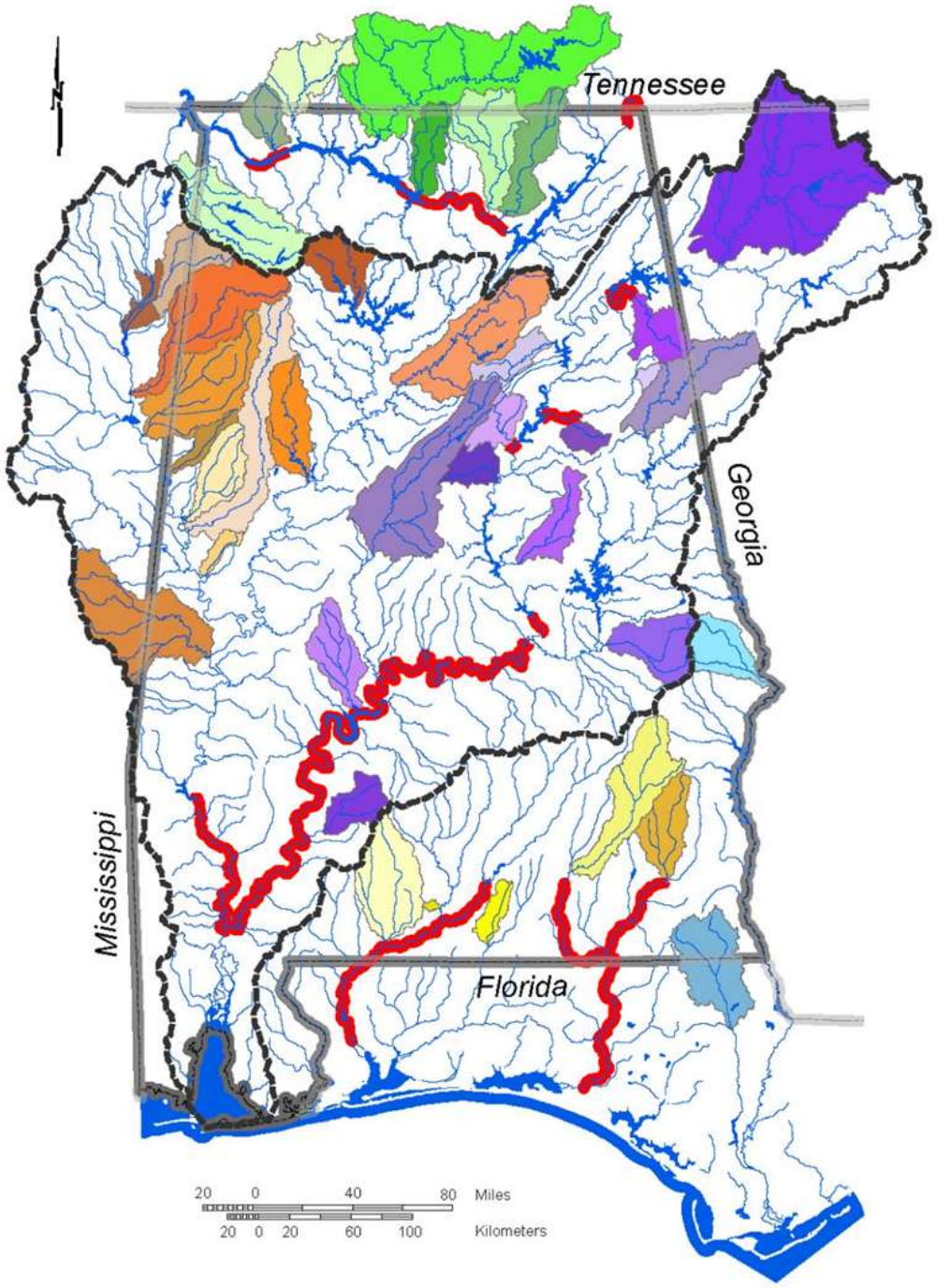
Unfortunately, this diversity is diminishing from loss of suitable habitat.

Threats include:

Impoundments

Channel modification

Erosion and sedimentation issues

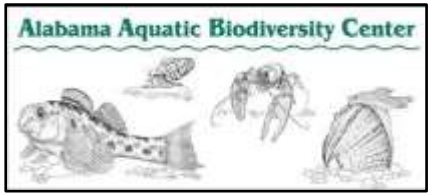


For the recovery of endangered species to be successful, habitat must be restored.

To facilitate habitat restoration and watershed management activities, 51 Strategic Habitat Units (SHUs) and Strategic River Reach Units (SRRUs) were designated for rare freshwater species in the Mobile Basin and Alabama.

The SHUs and SRRUs include high-quality rivers and streams representing the range of small stream to large river habitats essential for these species.

Alabama Rivers and Streams Network (ARSN) partners work cooperatively on species recovery opportunities in the SHUs and SRRUs



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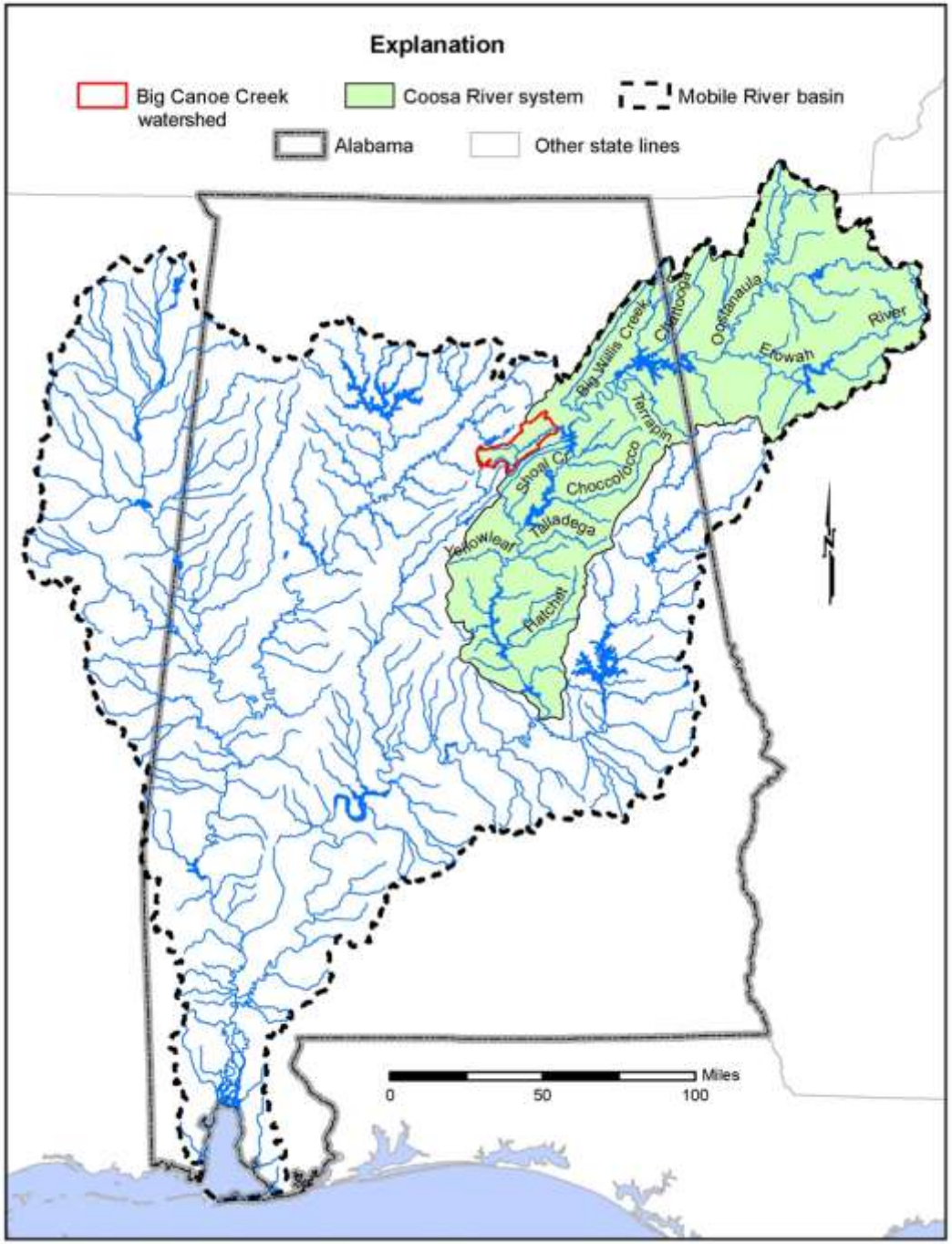
Biological monitoring and road crossing surveys are conducted in the SHUs to identify areas in need of protection

Linking locations of imperiled species with specific water quality threats is critical!!

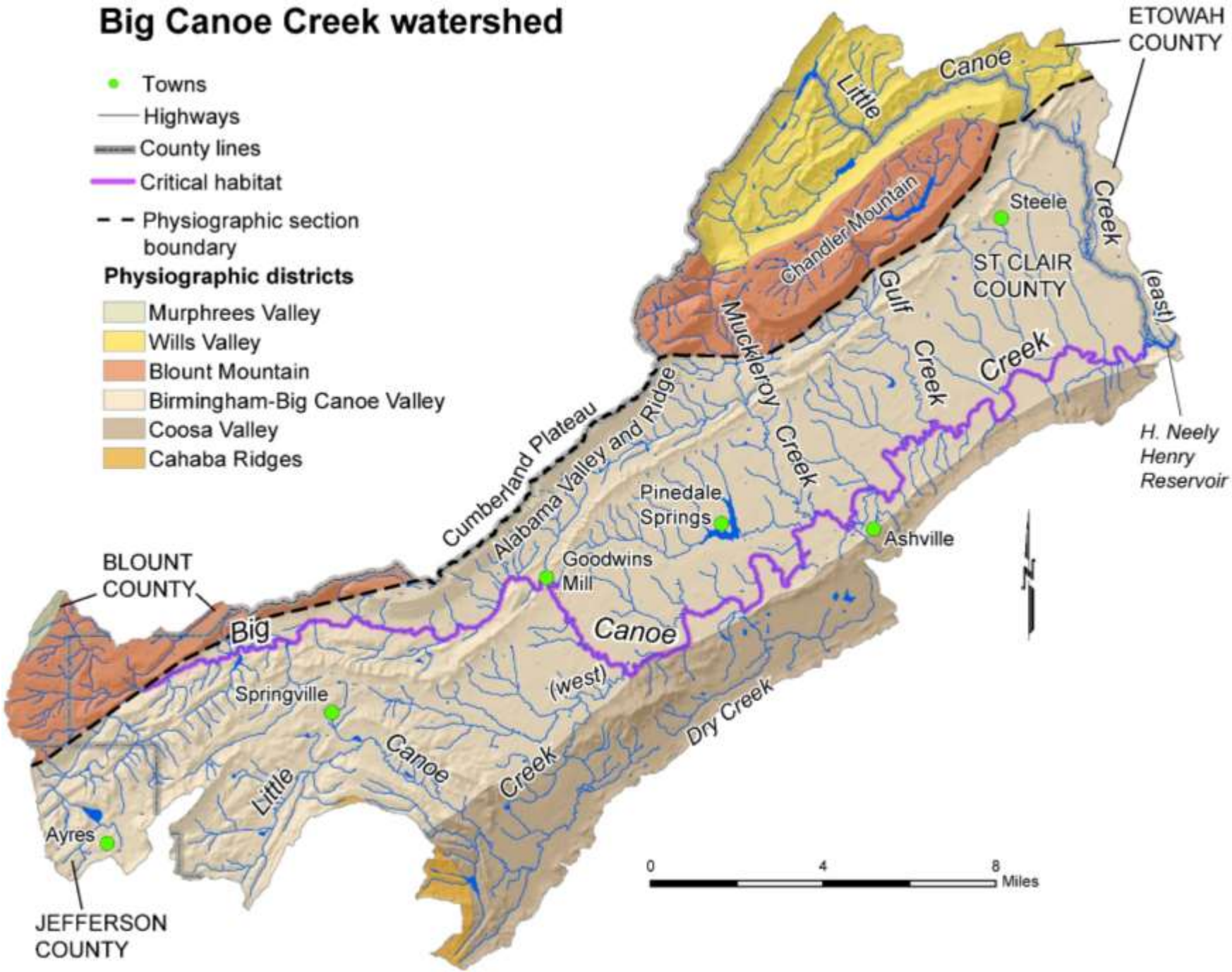
After completing the watershed assessment, an action plan for species recovery and restoration can begin. The action plans needs to be implemented by a local cooperative partnership through a variety of activities, including:

Repairing degraded stream reaches

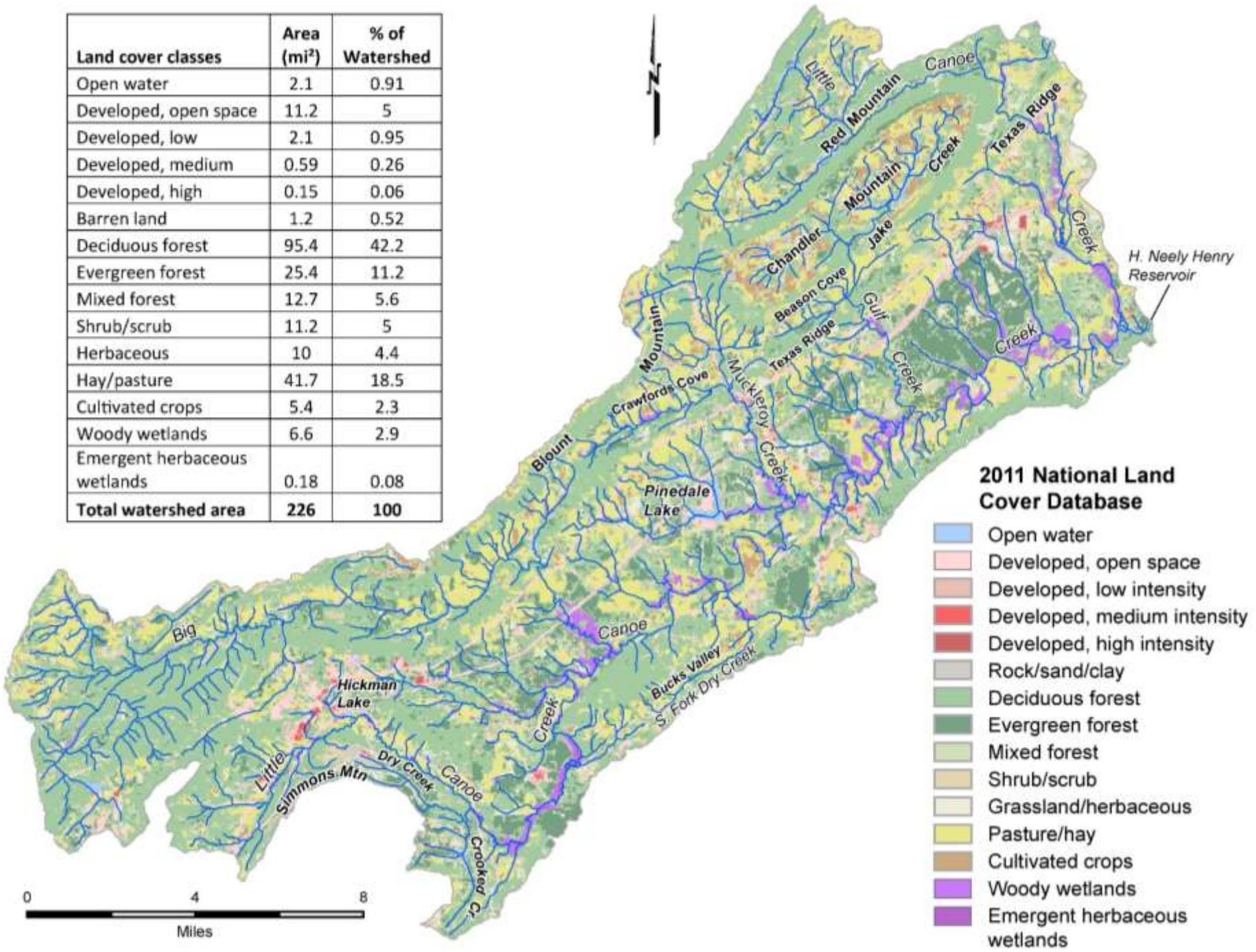
Restoration of biodiversity with culture-raised species



Location of the Big Canoe Creek SHU in the Mobile Basin


Big Canoe Creek watershed
Towns
Highways
County lines
Critical habitat
Physiographic section boundary
Physiographic districts
Murphrees Valley
Wills Valley
Blount Mountain
Birmingham-Big Canoe Valley
Coosa Valley
Cahaba Ridges
ETOWAH COUNTY
Little Canoe Creek
Chandler Mountain
Steele
ST CLAIR COUNTY
Gulf Creek
Muckleroy Creek
Creek (east)
H. Neely Henry Reservoir
Cumberland Plateau
Alabama Valley and Ridge
Pinedale Springs
Ashville
Goodwins Mill
BLOUNT COUNTY
Big Canoe Creek (west)
Springville
Dry Creek
Little Canoe Creek
Ayres
JEFFERSON COUNTY
N
0
4
8
Miles

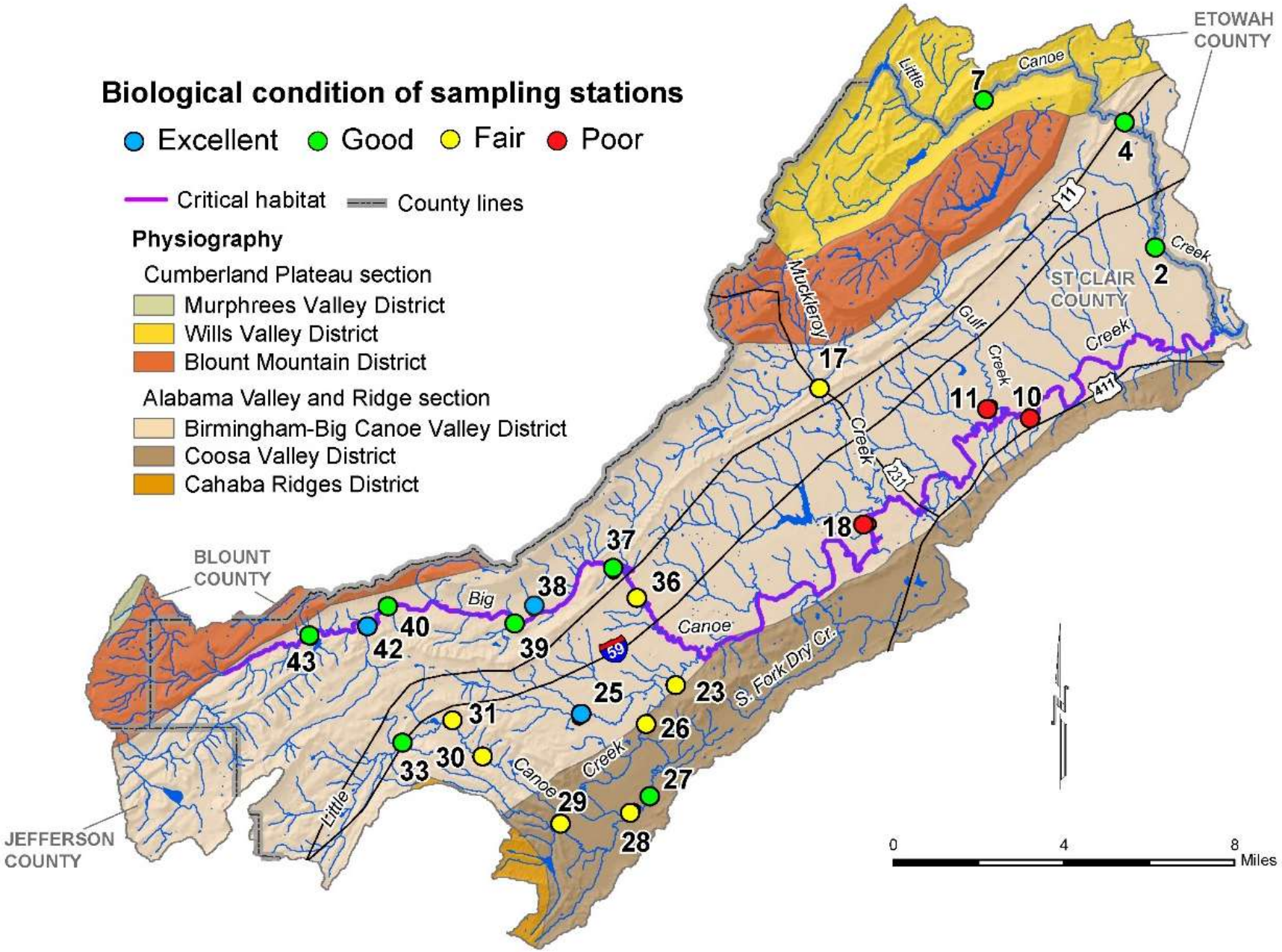
Land cover classes	Area (mi^2)	% of Watershed
Open water	2.1	0.91
Developed, open space	11.2	5
Developed, low	2.1	0.95
Developed, medium	0.59	0.26
Developed, high	0.15	0.06
Barren land	1.2	0.52
Deciduous forest	95.4	42.2
Evergreen forest	25.4	11.2
Mixed forest	12.7	5.6
Shrub/scrub	11.2	5
Herbaceous	10	4.4
Hay/pasture	41.7	18.5
Cultivated crops	5.4	2.3
Woody wetlands	6.6	2.9
Emergent herbaceous wetlands	0.18	0.08
Total watershed area	**226**	**100**



Stream water quality was assessed in the Big Canoe Creek system through fish IBI (Index of Biotic Integrity) surveys using metrics evaluating the composition, structure, and functional relationships of fish communities.

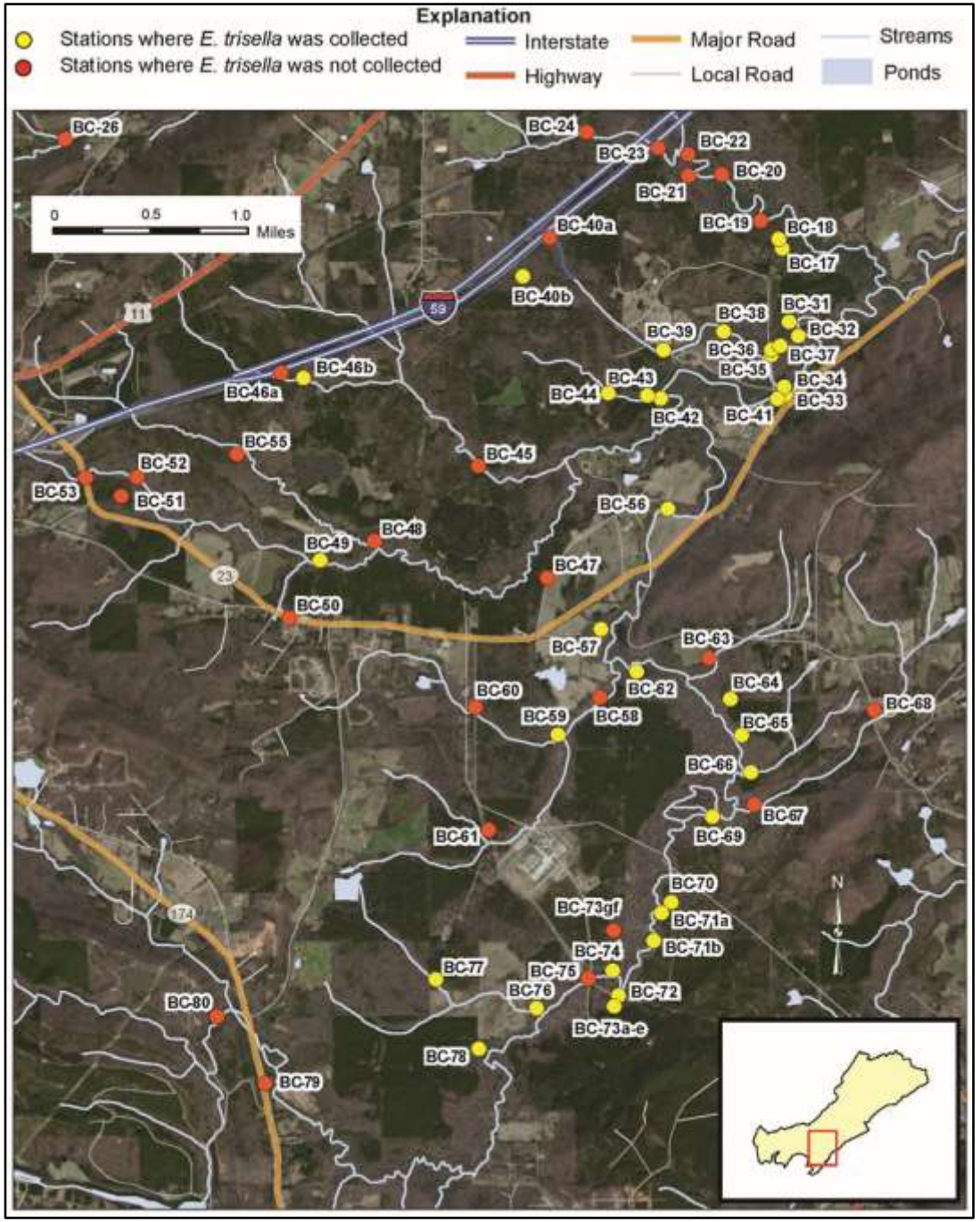
Four habitat types were sampled during each survey- riffles, runs, pools, and shorelines.

Biological condition results from fish IBI surveys in the Big Canoe Creek watershed



While conducting these fish surveys, the Trispot Darter (*Etheostoma trisella),* was rediscovered. It had been <u>50 years</u> since it had been collected in Alabama - with only two specimens ever recorded from the state! Due to the lengthy absence of collection records in the state, the species had been presumed to be extirpated from Alabama.

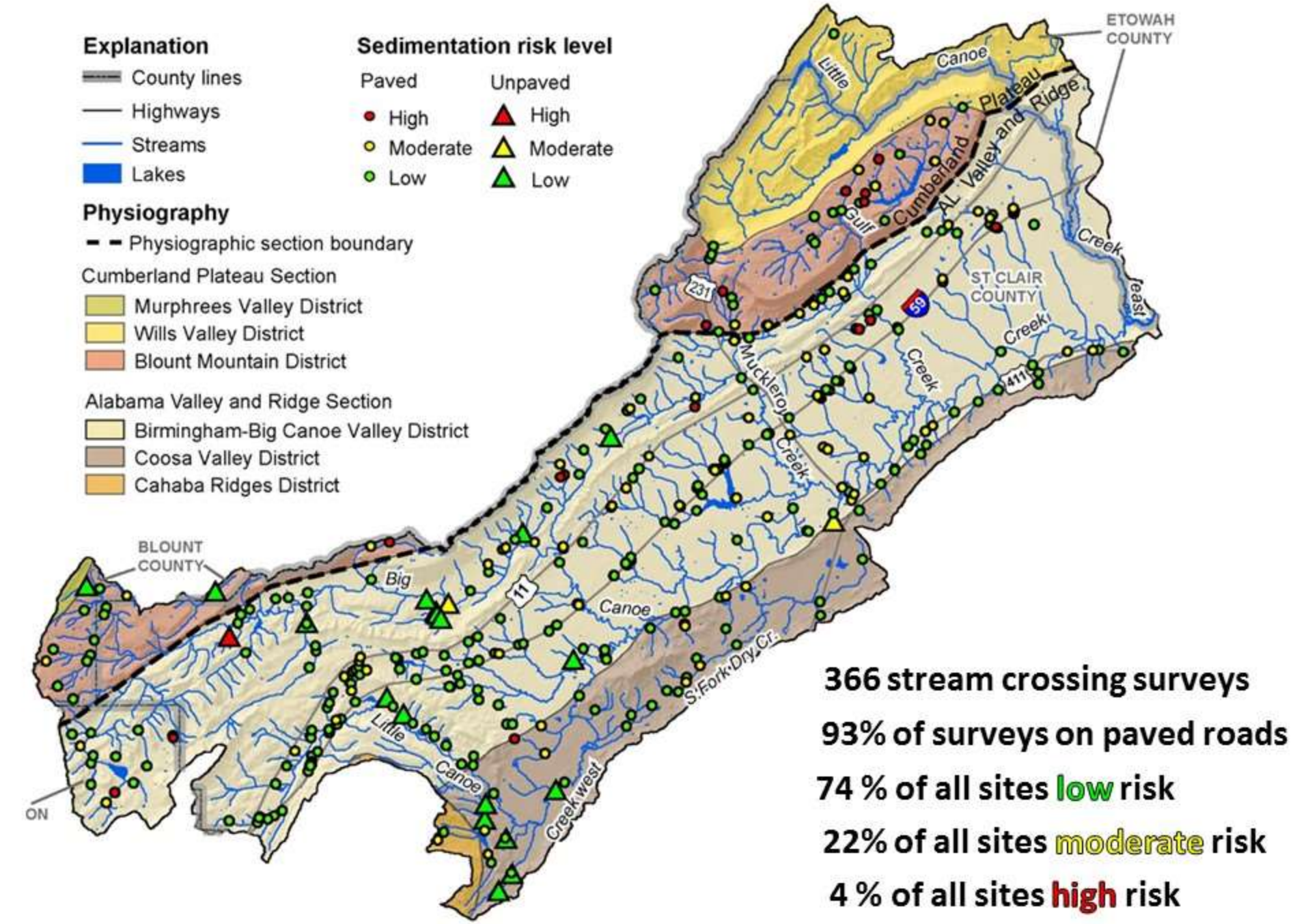
Surveys after the Trispot Darter's rediscovery found significant breeding areas in the Little Canoe Creek (west) subwatershed. Spawning can occur in small off-channel seeps and seasonally wet tributaries.



- **The GSA and ARSN partners also performed stream crossing surveys during the Big Canoe SHU assessment**
- **Stream sedimentation is one the biggest threats to water quality in the United States, and poorly maintained road-stream crossings act as major conduits of sediment to aquatic systems**
- **Excessive stream sedimentation covers up the stream's physical habitat features that aquatic organisms need to survive. This habitat degradation can lead to the loss of native species and increase opportunities for invasive species to take over.**

Stream crossings were assessed with the sedimentation risk index (SRI)

SRI category	SRI metric
Waterway condition	1. Upstream channel morphology
	2. Downstream channel morphology
	3. Downstream channel/bank alteration
Crossing structure condition	4. Upstream culvert skew angle
	5. Crossing fill condition
	6. Crossing inlet/outlet condition
Road approaches I	7. Potential eroded volume of sediment from the road surface
	8. Soil type and erodibility
	9. Road approach slope
	10. Road approach surface material
Road approaches II	11. Condition of the four drainage ditch outlets to streams
	12. Condition of the four ditches draining to streams


Explanation
County lines
Highways
Streams
Lakes
Sedimentation risk level
Paved
High
Moderate
Low
Unpaved
High
Moderate
Low
Physiography
Physiographic section boundary
Cumberland Plateau Section
Murphrees Valley District
Wills Valley District
Blount Mountain District
Alabama Valley and Ridge Section
Birmingham-Big Canoe Valley District
Coosa Valley District
Cahaba Ridges District
ETOWAH COUNTY
BLOUNT COUNTY
ST CLAIR COUNTY
Little Canoe Creek
Big Canoe Creek
Muckleroy Creek
Creek
S. Fork Dry Cr.
Creek west
Creek east
Plateau
Ridge
Valley and
Cumberland
AL
Gulf
231
59
411
11
366 stream crossing surveys
93% of surveys on paved roads
74 % of all sites low risk
22% of all sites moderate risk
4 % of all sites high risk

Conditions observed at high sedimentation risk sites

Channel and bank erosion

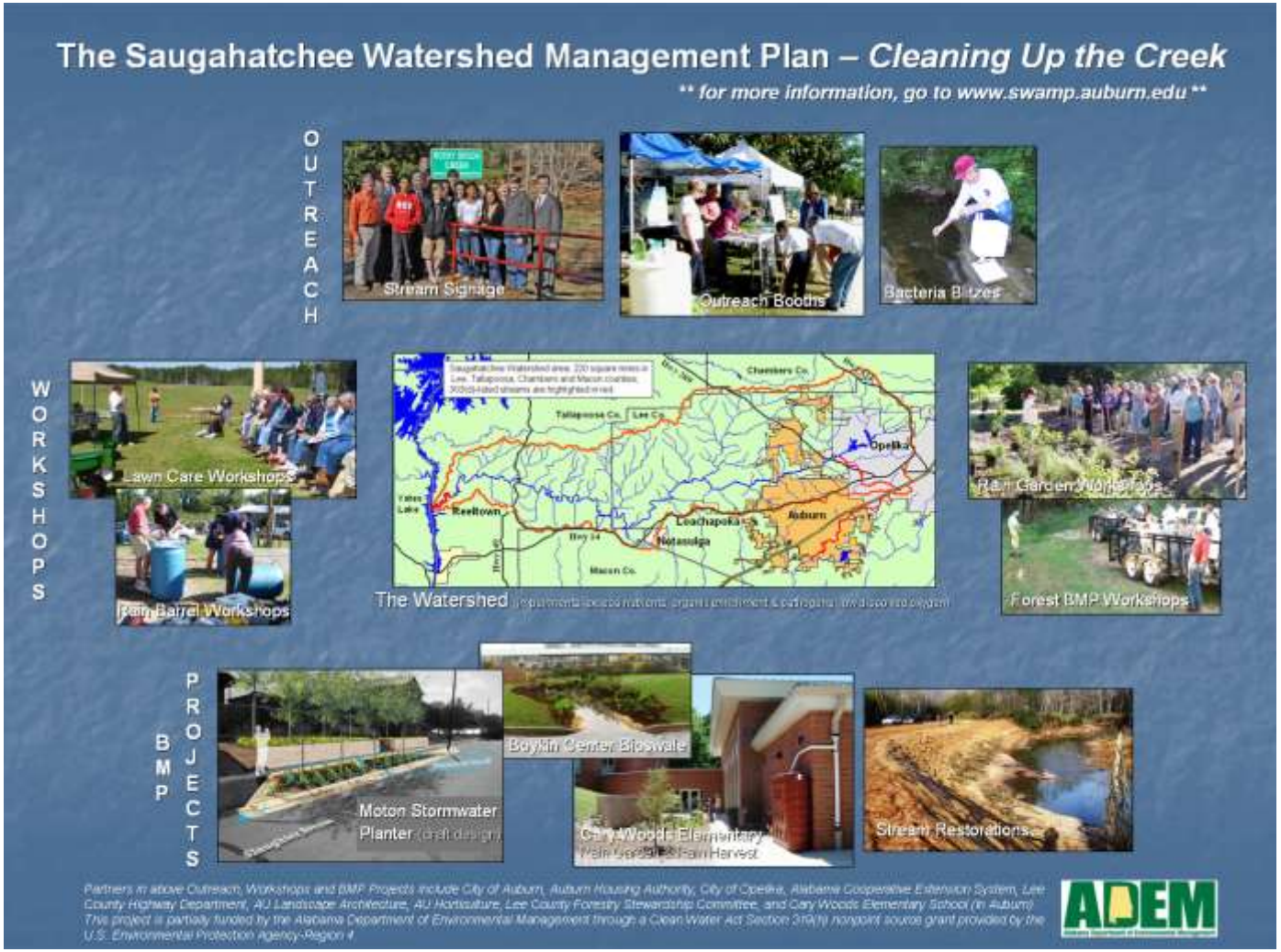
Steep road approaches

Poor crossing fill condition

Fish barriers were also recorded during the SRI surveys and stream reaches blocked by small dams or perched crossing structures were documented. The 20 sites with fish barriers will be evaluated for restoration.

The data in the Big Canoe SHU assessment can be used by a local cooperative partnership in the development of a watershed management plan (WMP)

Example of a WMP



An action plan for Big Canoe SHU has been created to facilitate the development of a WMP

The Big Canoe SHU action plan identifies the following:

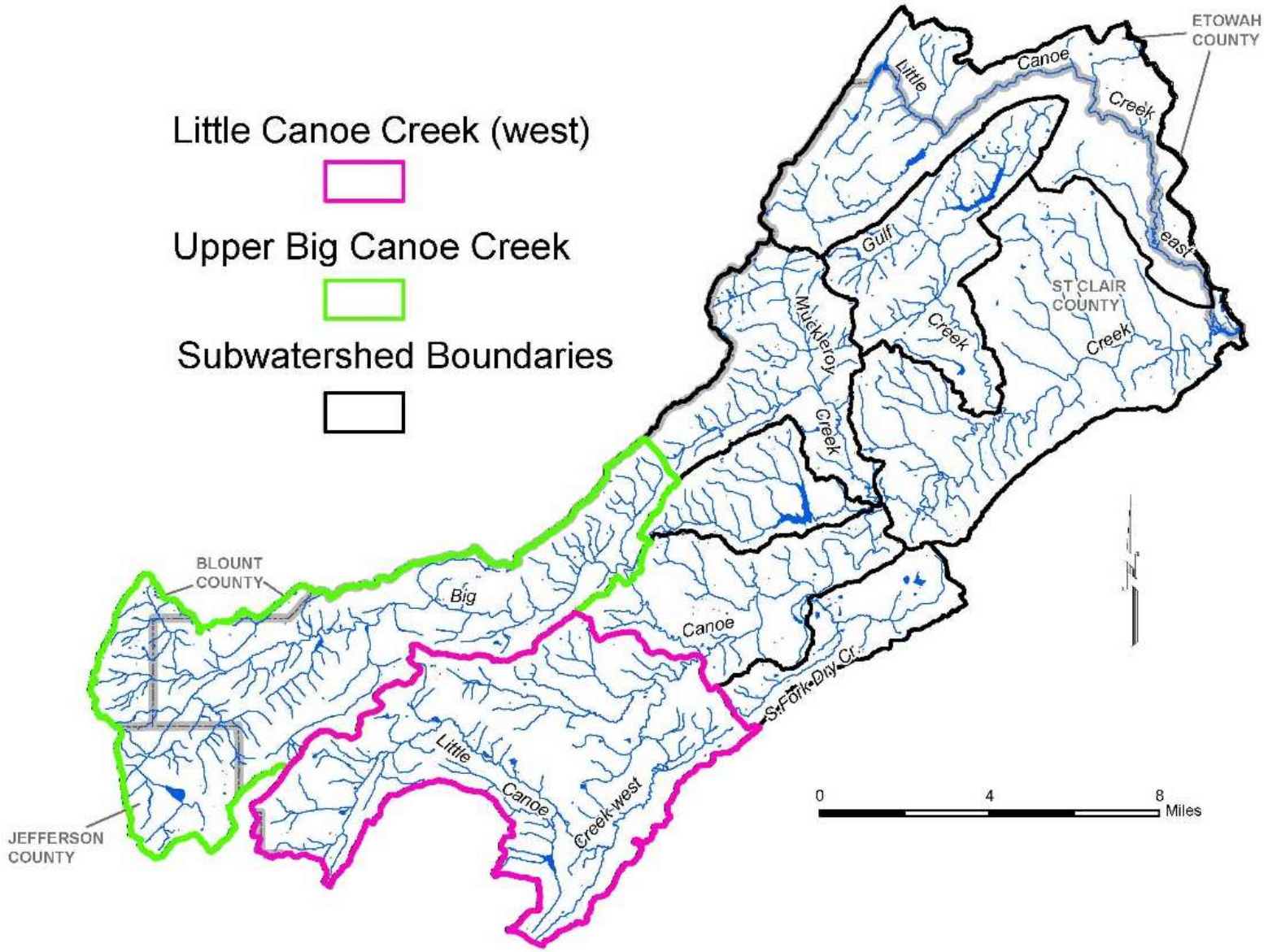
- **Water resource issues affecting imperiled species in the SHU**
- **Where these issues/problems are located**
- **Recommendations for improving aquatic habitat and water quality**

Water resource issues affecting imperiled species in the SHU were categorized into an impairment matrix

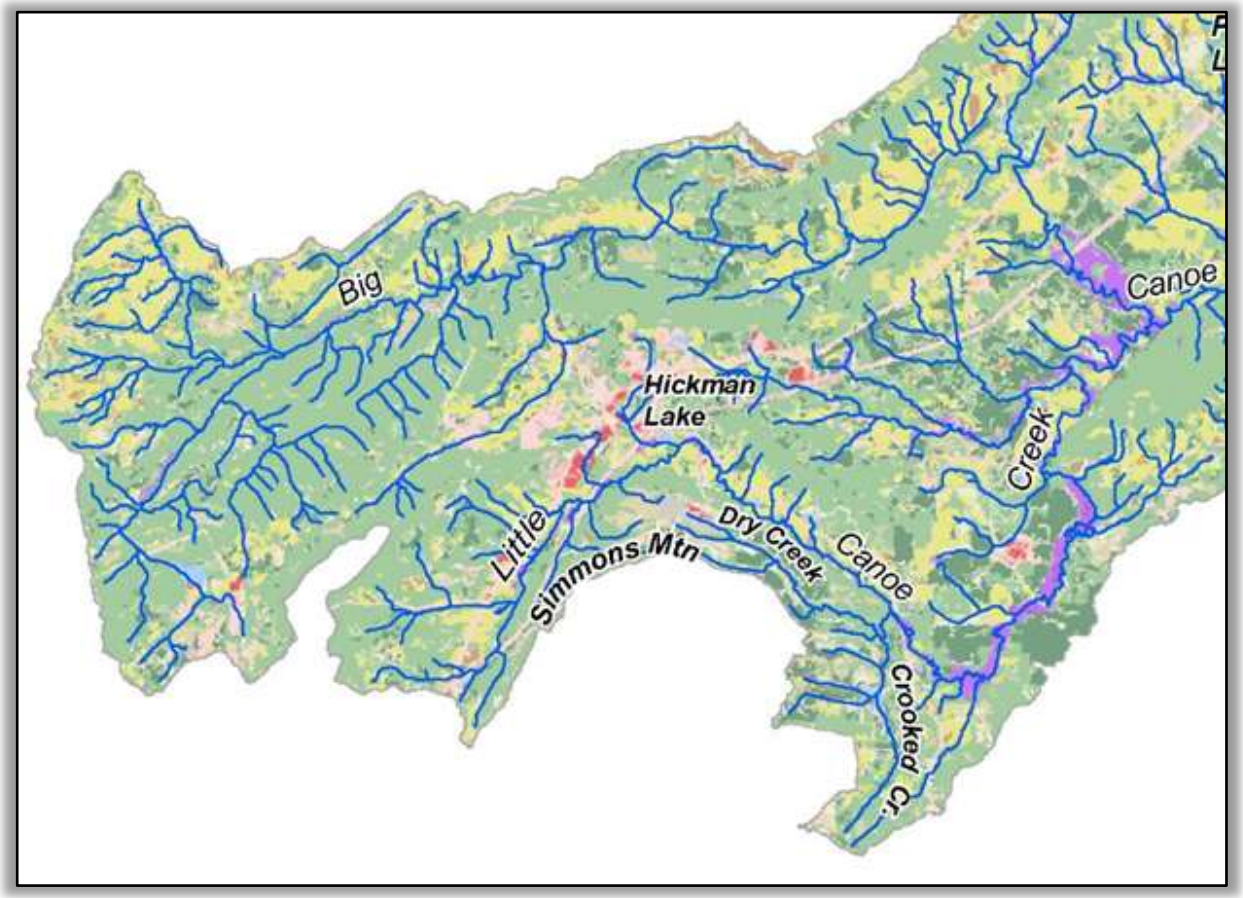
Impairment Matrix

Subwatershed	Stream Impairment					Sources of Impairment			
	Sedimentation	Nutrients/ E. coli	Habitat	Biological	Agricultural runoff	Roadside erosion	Urban development	Unstable banks	Fish barriers
Lower Big Canoe Creek	x	–	x	x	x	–	–	x	x
Lower Little Canoe Creek (east)	x	–	x	–	–	x	–	–	–
Gulf Creek	x	–	–	x	–	x	–	–	x
Muckleroy Creek	x	–	x	–	x	x	x	–	–
Middle Big Canoe Creek	x	–	x	x	x	–	–	x	–
Pinedale Lake	–	–	–	–	–	–	–	–	–
Dry Creek	–	–	–	–	–	–	–	–	–
Upper Little Canoe Creek (west)	x	–	x	–	–	–	x	–	x
Upper Big Canoe Creek	–	–	–	–	–	x	x	–	x

Subwatersheds recommended as priority targets for restoration activities and best management practices in the Big Canoe SHU:



Sedimentation is a problem in the main channel habitat of Little Canoe Creek (west), and in the darter's breeding habitat in small ephemeral steams that feed into Little Canoe Creek (west). With increased pressure from land conversion, the proper installation of forestry and construction BMPs and the management of stormwater runoff critical.



The SHU Action Plan also recommends the establishment of conservation easements on private land connected to Trispot Darter breeding sites.

Questions?

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Alabama Rivers and Streams Network (ARSN)

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