

## Preliminary survey of the Hydrobiidae of Alabama

Stephanie A. Clark

Department of Biological Sciences, Box 870345, Tuscaloosa, AL, 35487

Currently Chicago Academy of Sciences, Suite 201, 4001 North Ravenswood Ave, Chicago, IL, 60613-2576

### Introductions

Alabama has one of the richest hydrobiid faunas for any state in the United States at the generic level. To date 16 genera (See Table 1) have been recorded from the state and include both freshwater and estuarine groups. Part of the reason for this diversity is thought to be due to the five major physiographic provinces that occur within Alabama, resulting in a wide range of different habitat types, ranging from the salt marshes of Baldwin and Mobile counties in the south, to the southern extent of the ancient Appalachian Ranges in Jackson and Dekalb counties in the north.

Genus	No of species	Endemic	Basin	Habitat type
<i>Amnicola</i>	3-4, all unnamed	No	Across state	Freshwater
<i>Antrorbis</i>	1	Yes	Upper Coosa	Freshwater
<i>Birgella</i>	1	No	Tennessee, Mobile	Freshwater
<i>Clappia</i>	2, plus 2 unnamed	Yes	Cahaba, Coosa	Freshwater
<i>Fontigens</i>	2 unnamed	No	Cahaba, Coosa	Freshwater
<i>Helebops</i>	1	No	Coastal	Estuarine
<i>Lepyrium</i>	1	Yes	Cahaba	Freshwater
<i>Lyogyrus</i>	2-3 unnamed	No	Tennessee	Freshwater
<i>Marstonia</i>	6, plus at least 4 unnamed	No	Tennessee, Mobile	Freshwater
<i>Notogillia</i>	1, probably unnamed	No	Choctawhatchee	Freshwater
<i>Onobops</i>	1	No	Coastal	Estuarine
<i>Probythinella</i>	2	No	Tennessee, coastal	Freshwater & Estuarine
<i>Pseudotryonia</i>	1	No	Tombigbee	Freshwater
<i>Somatogyrus</i>	23*, plus 1-2 unnamed	No	Tennessee, Mobile	Freshwater
<i>Stiobia</i>	1, possibly 1 unnamed	Yes	Coosa	Freshwater
<i>Texadina</i>	1	No	Coastal	Estuarine

**Table 1.** List of genera, estimate of the number of species for each genus, whether genus is endemic, major drainages and habitat preference. \*The genus *Somatogyrus* appears to contain a number of synonyms and currently includes a few species which belong in other genera.

The creeks, streams and rivers, can be broadly grouped into eight drainages, the largest is the Mobile River drainage which includes the Alabama, Tombigbee, Black Warrior, Cahaba, Coosa and Tallapoosa Rivers which covers a substantial portion of the state and eventually empties into the Gulf of Mexico. The next largest drainage is the Tennessee River, which flows across the full width of the State from Chattanooga to Mississippi and includes the Elk, Flint and Paint Rock Rivers. The third largest system is the Escambia River and includes the Conecuh and Sepulga Rivers. The other systems include the Chattahoochee, Chipola, Choctawhatchee, Escatawpa and Yellow Rivers which occur in the southern half of the state.

## Survey sites

A total of 333 freshwater sites (see Figures 1 - 8, Appendix 1) were visited across the state, with at least one sample from each of the eight separate river drainages found in Alabama. A total of 144 sites (see Figure 3) were positive for hydrobiid snails; 95 had a single species, 27 had two species; 15 had three species; 3 had four species; 2 had five species (US036 - Limestone Creek, US315 - Piney Creek, Limestone Co.) and one site had six species (US085 and US262, Flint River at Old US-431, Madison Co.).

## Museum visits

In addition to the above fieldwork, I visited the following museums: the Florida Museum of Natural History, Gainesville, Florida - on three occasions; the Natural History Museum, Smithsonian Institute, Washington, D.C. and the University of Michigan, Museum of Zoology, Ann Arbor, Michigan, to examine their collections, photograph types and use their libraries.

## Material

All samples are preserved in alcohol, with a subset frozen. The shells, protoconchs and operculums of 22 populations have been examined using the scanning electron microscope, which has revealed a number of potentially very useful characters, particularly the microsculpture of the protoconch.

To date a limited amount of DNA sequence data has been obtained from about 20 populations. Unfortunately, several populations (particularly the amnicolids) have proved difficult to obtain useful DNA sequence data and require further research to find suitable DNA markers.

## Highlights of this survey since September, 2003.

Rediscovery of *Clappia cahabensis* one of two species of hydrobiid thought to be extinct, and the extension of its range from, being only known from the type location (Cahaba River, 1 mile north of Centreville, Bibb Co.) to almost 8 km up the Little Cahaba River from its junction with the Cahaba River in Bibb County and upstream on the Cahaba River to least a kilometer or so above the junction of Shades Creek, in Shelby County.

The discovery of several previously unrecorded populations of *Lepyrium showalteri* in the lower Little Cahaba and Cahaba Rivers, in Bibb and Shelby Counties, although *Lepyrium* has historically been recorded in the Cahaba River from near Centreville, Bibb County north to about Gurnee, Shelby County. It would appear that *Lepyrium* has suffered a range reduction, but the author has not had a chance to fully search all the potential areas this species might occur within the Cahaba and Little Cahaba Rivers.

The discovery of at least two possibly three new species within the Tannehill State Historic Park, Tuscaloosa / Jefferson Counties, including a species of *Marstonia*, *Clappia* and *Somatogyrus*. The *Marstonia* has been found in at a couple of additional small, slow-moderately flowing streams of the Cahaba and Little Cahaba Rivers. The new species of *Marstonia* represents the first record of this genus in the Cahaba system (see Stns US339, Tuscaloosa Co., US340-343, US400-401, US435, Jefferson Co., US351, US482, Shelby Co.).

The discovery in April, 2006 of a species of *Marstonia* in a tributary of the Black Warrior River, this represents the first record of the genus from the Black Warrior system (US628, Blount Co.).

Three new populations of *Marstonia scalariformis* were found, these were the Flint River at the Hayes Nature Reserve (US261, Madison Co.); Round Island Creek at CR-25 (US269, Limestone Co.) and Piney Creek at Old Highway 20 (US315, Limestone Co.).

A number of new populations of *Marstonia* have been found along the Tennessee River, including some of the larger tributary creeks and rivers. In addition there are possibly at least up to three unnamed species occurring in the smaller tributaries of the Tennessee River, with at least one in Piney Creek, west of Huntsville (US336, Limestone Co.), one in Spring Creek, Tuscumbia (US306-307, Colbert Co.) and one in a spring fed tributary of the Flint River, east of Huntsville (US079-082, Madison Co.).

The ranges of the recently described species, *Marstonia angulobasis* Thompson, 2005 and *M. hershleri* Thompson, 1995, have been extend a few kilometers up the Paint Rock (US091, Jackson Co.) and Coosa Rivers (US431, Elmore Co.) respectively.

The species *Somatogyrus strengi* has been recorded from several new locations both along the Tennessee River as well as some of its tributaries including the Flint and Paint Rock Rivers. Historically the species had been recorded from two sites, one near Florence, the other Bridgeport, by a single specimen. To date the species has been found from below Wilson Dam, east to the US-117 bridge crossing near Stevenson, Jackson County (US500), a little south of Bridgeport. However, it is clear from the egg capsule type, shell shape and animal colouration that *S. strengi* is not a member of the genus *Somatogyrus*, but is more closely related to *Amnicola* and appears to belong to a new genus.

After examining all the holotypes of *Somatogyrus* held in Ann Arbor, it is clear that several of the species named from the Coosa and Tennessee Rivers by Bryant Walker from 1904-1909, are synonyms. Two species, *Somatogyrus constrictus* and *S. aldrichi* appear to represent aberrant specimens of other species, while another, *S. biangulatus* appears to be more closely related to *Marstonia* than *Somatogyrus*, based on shell characters.

Based on shell morphology and limited DNA sequence data, it appears that none of the species of *Somatogyrus* found in the Cahaba and Little Cahaba Rivers have been formally named, although many of the names applied to the Coosa and Tennessee River drainages have been used. The overall shell shape and habitat preferences of the species present in the Cahaba system are similar to those presently found in the Coosa River system. However, the limited DNA sequence data suggests that the species in the Cahaba drainage are more similar to each other than they are to morphologically similar species found in the Coosa drainage. The limited DNA sequence data also suggests that *Lepyrium* is more closely related to *Somatogyrus* from the Cahaba River than to those of the Coosa River, a hypothesis first suggested by Fred Thompson in 1984.

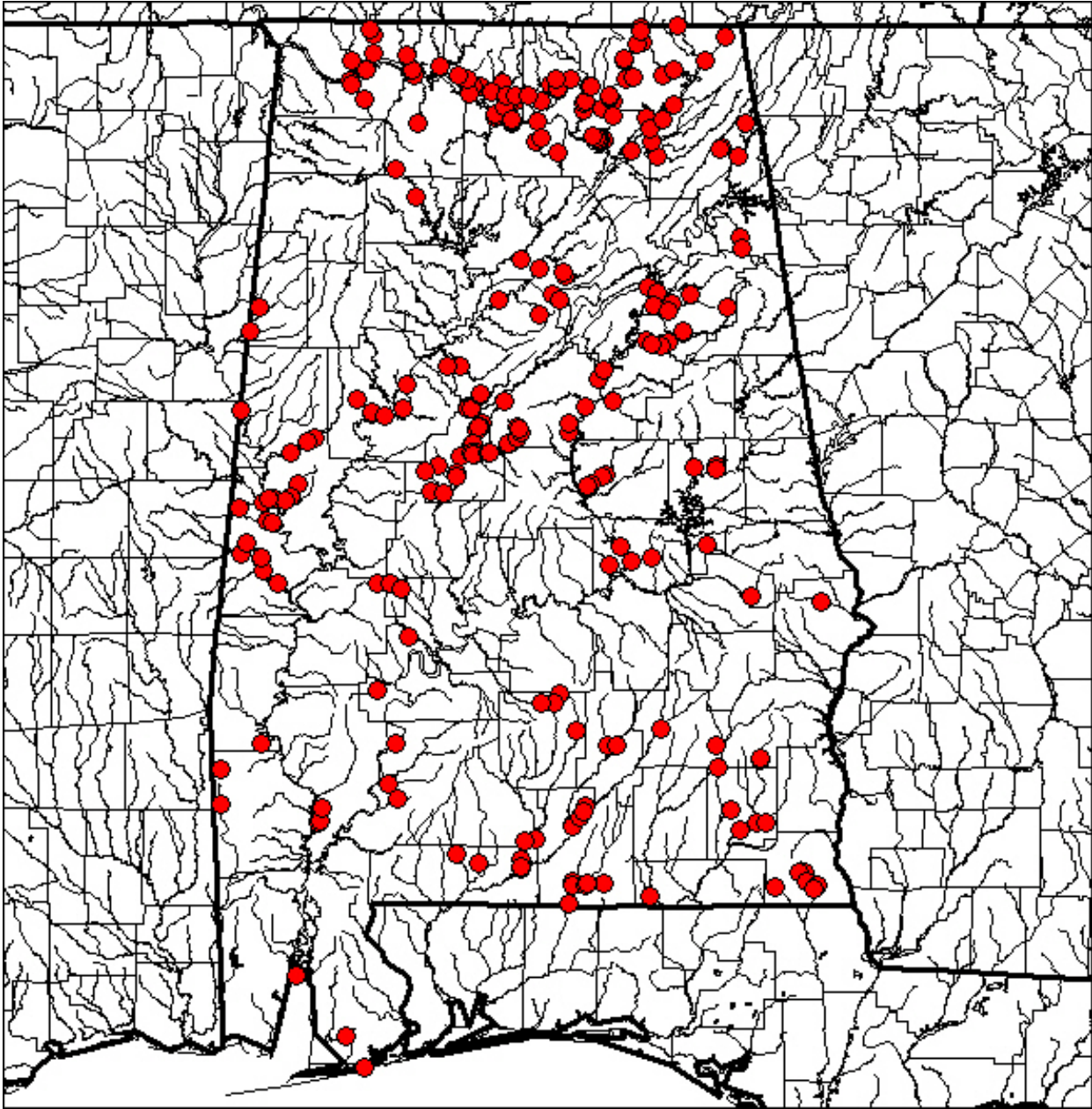
At least two potentially new species of *Lyogyrus* have been found in small creeks, which are tributaries of the Tennessee River.

## Conclusions

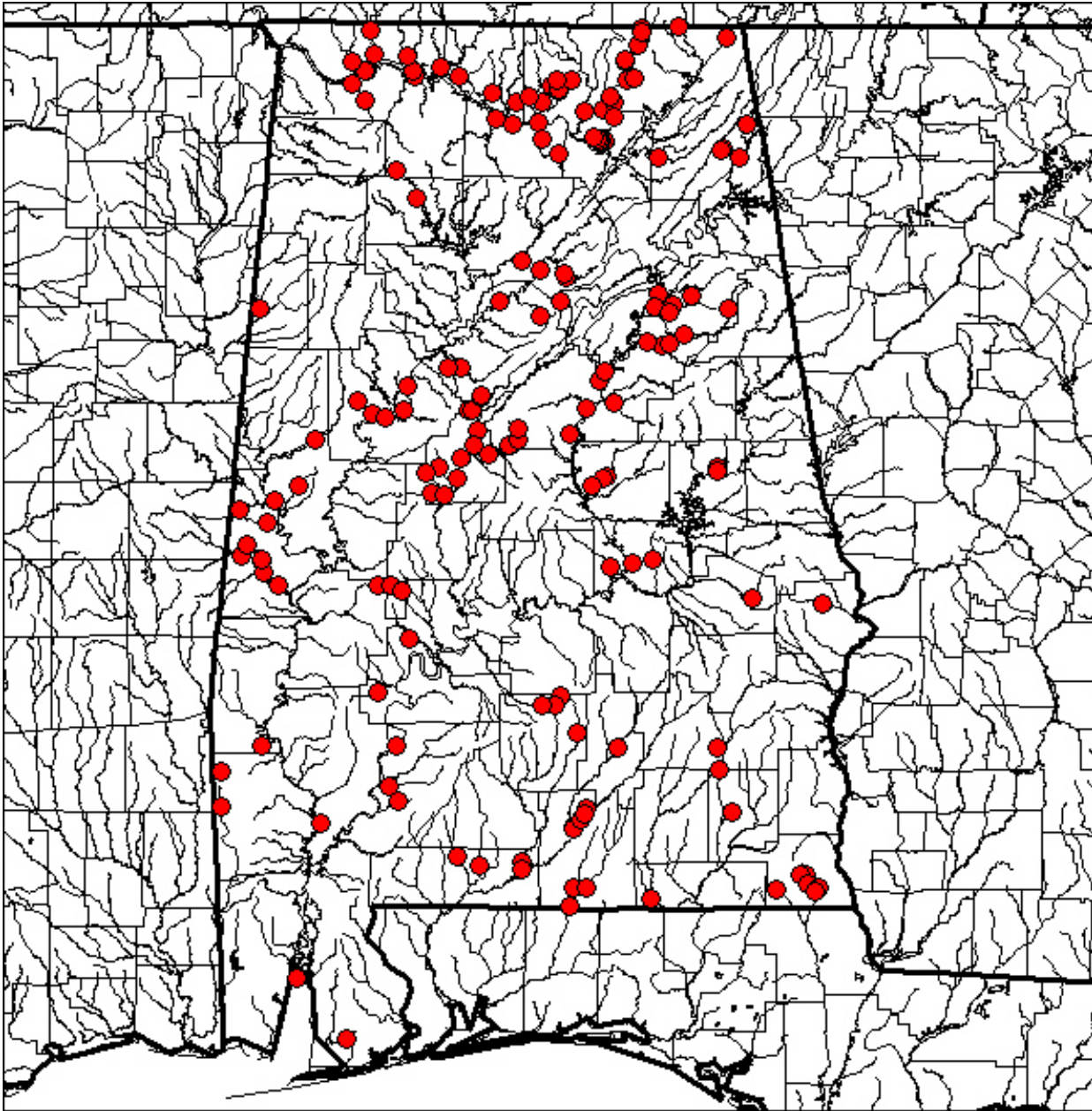
It is clear from the above that more work is required before we have a much fuller accounting of the hydrobiid fauna of Alabama, even allowing for the significant loss of shoal habitats in the Black Warrior, Coosa and Tennessee Rivers after they were dammed. The two most speciose genera are *Marstonia* and *Somatogyrus*, although there appears to be several species that have been loosely identified as *Amnicola*. A combination of shell, anatomical and molecular characters are required to adequately address issues of taxonomy and phylogeny, in this very diverse group of freshwater snails.

## **Acknowledgements**

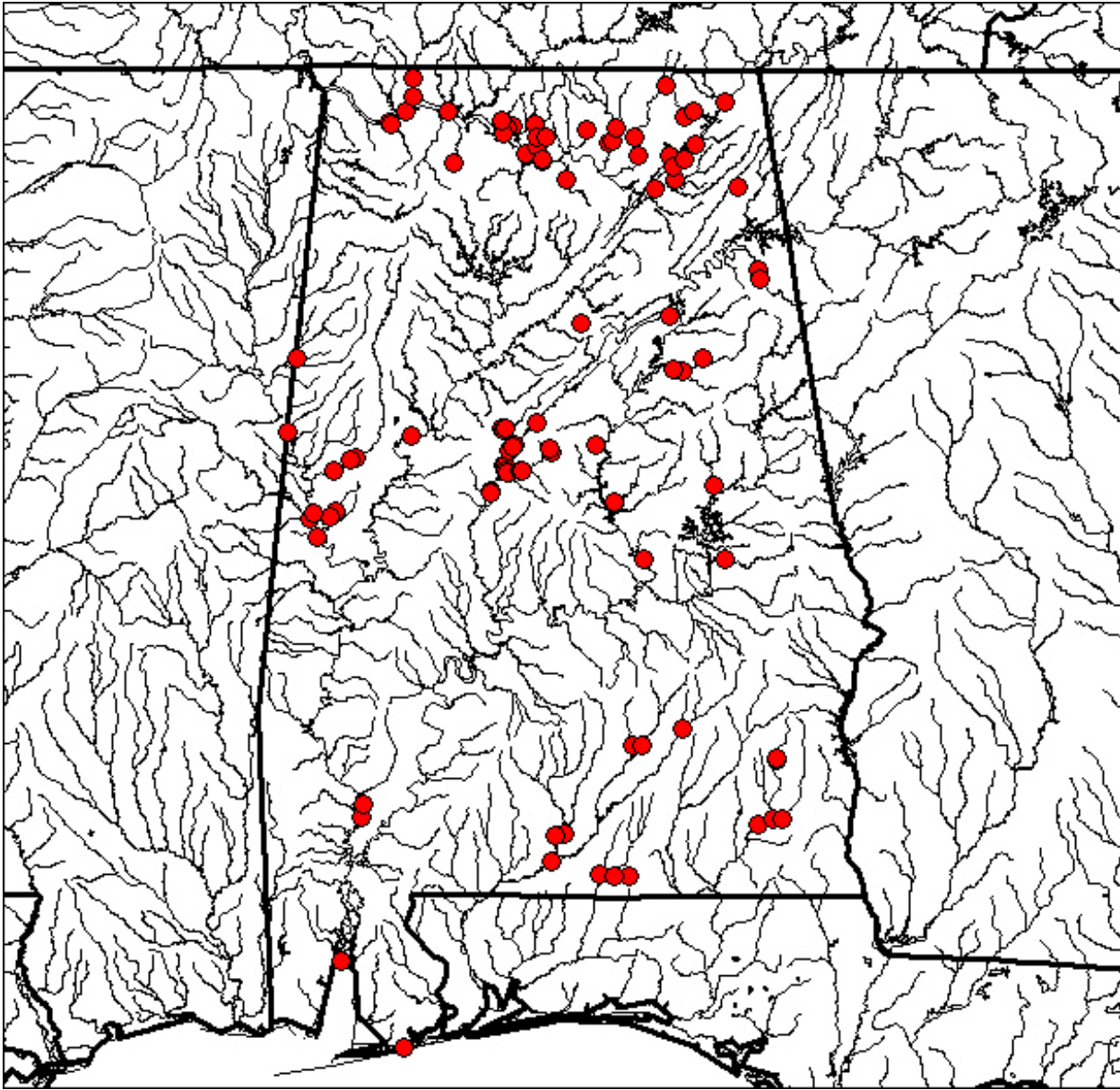
I greatly appreciate all the help and hospitality provided by several people over the last three years, but especially Paul Johnson, David Campbell, John Slapcinsky and John Burch. The following people provided assistance in the field: Randall Blackwood, Paul Freeman, Jeff Garner, Jim Godwin, Bernard Kuhajda, Malcolm Pierson and Doug Shelton. The following people freely provided their time and advice: John Burch and Fred Thompson. The following people provided access to the collections under their care: Robert Hershler (National Museum of Natural History, Smithsonian Institution, Washington, D.C.), Kevin Cummings, Illinois Natural History Survey, Champaign, Illinois), Diarmaid Ó Foighil (University of Michigan, Museum of Zoology, Ann Arbor, Michigan) and John Slapcinsky (Florida Museum of Natural History, University of Florida, Gainesville, Florida). The following people provided photographs of holotypes in their collections: Adam Baldinger (Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts) and Paul Callomon (Academy of Natural Sciences, Philadelphia, Pennsylvania).



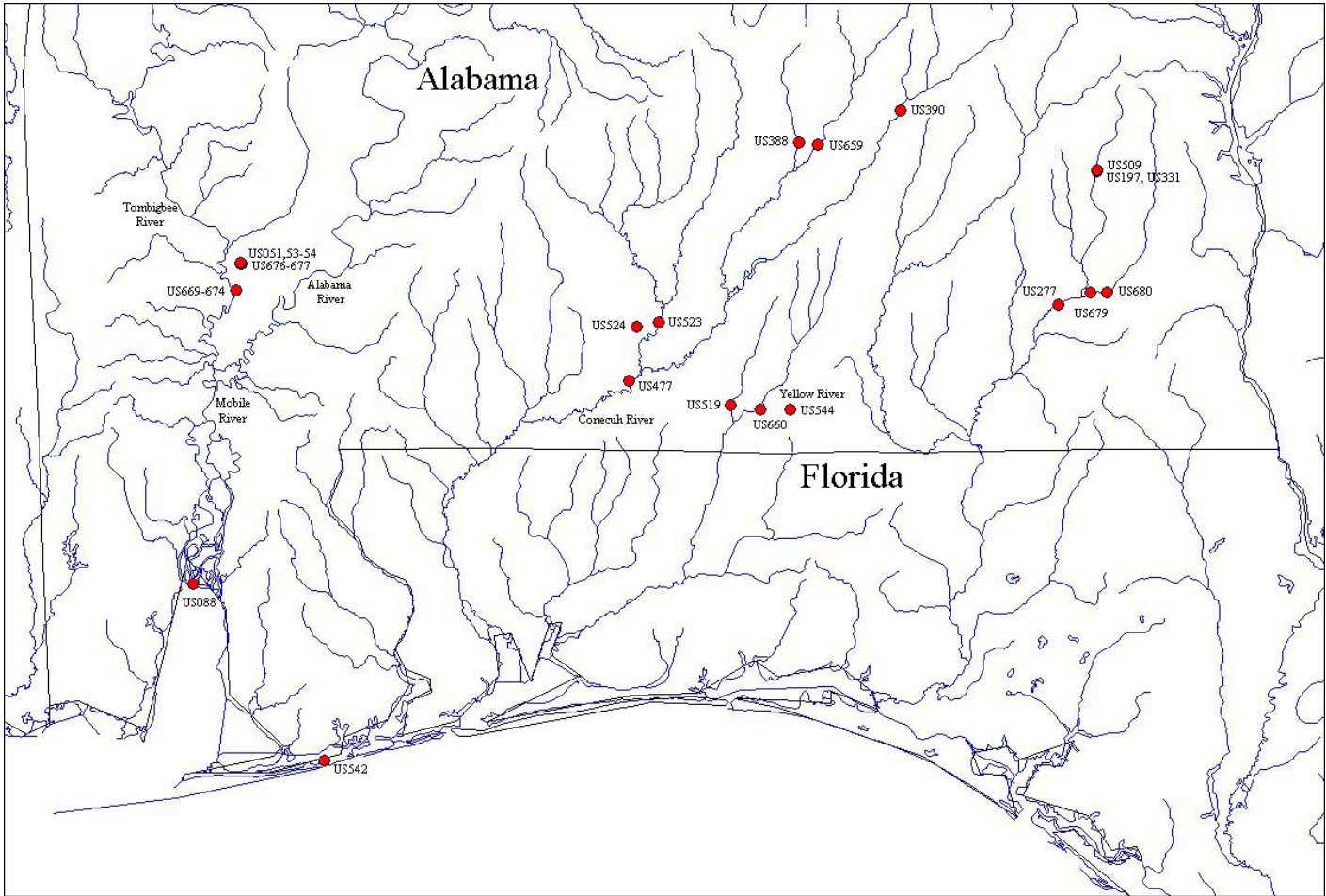
**Figure 1.** All sites sampled during the period September, 2003 to November, 2006.



**Figure 2.** Sites where no hydrobiids were found.

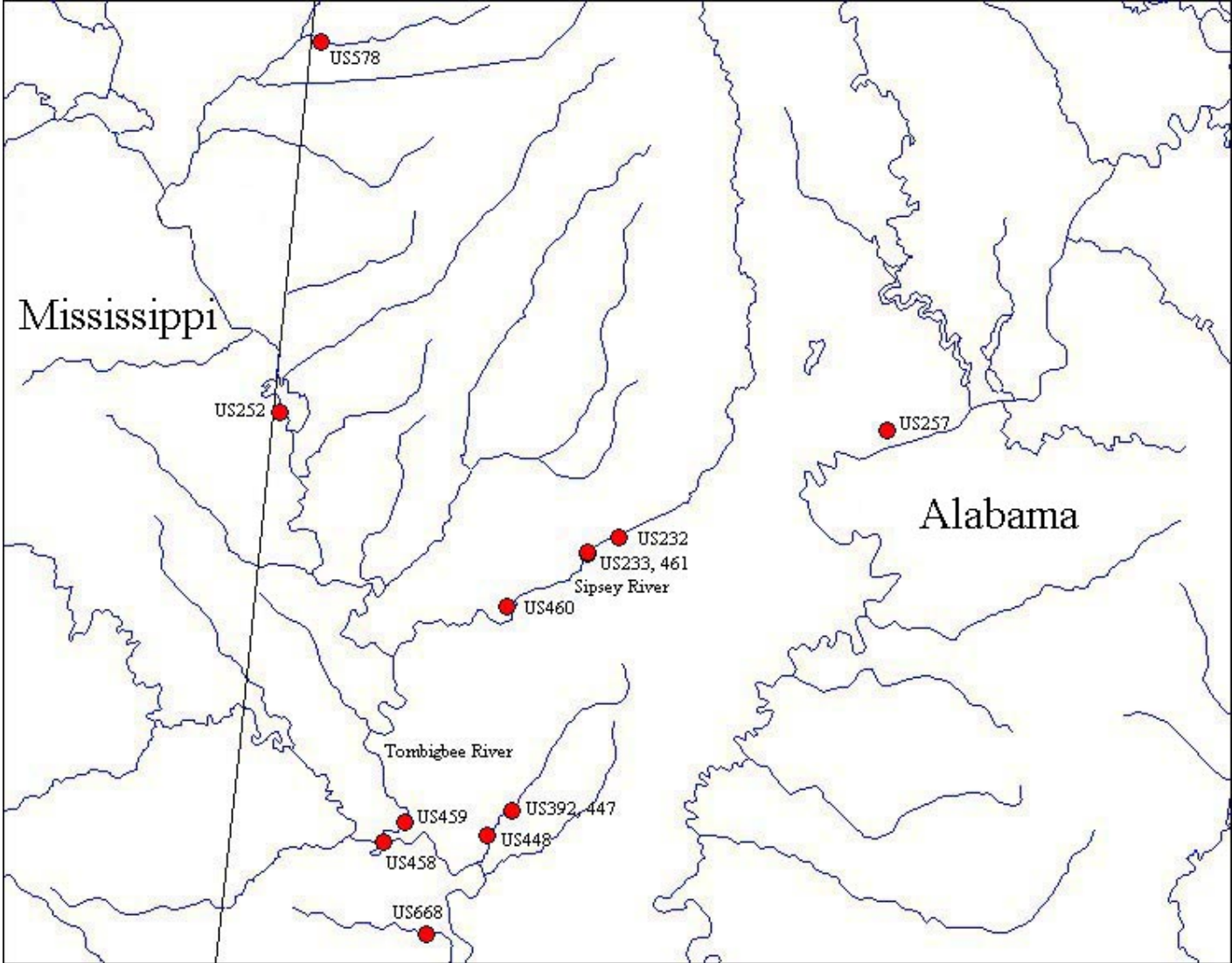


**Figure 3.** All positive hydrobiid sites.

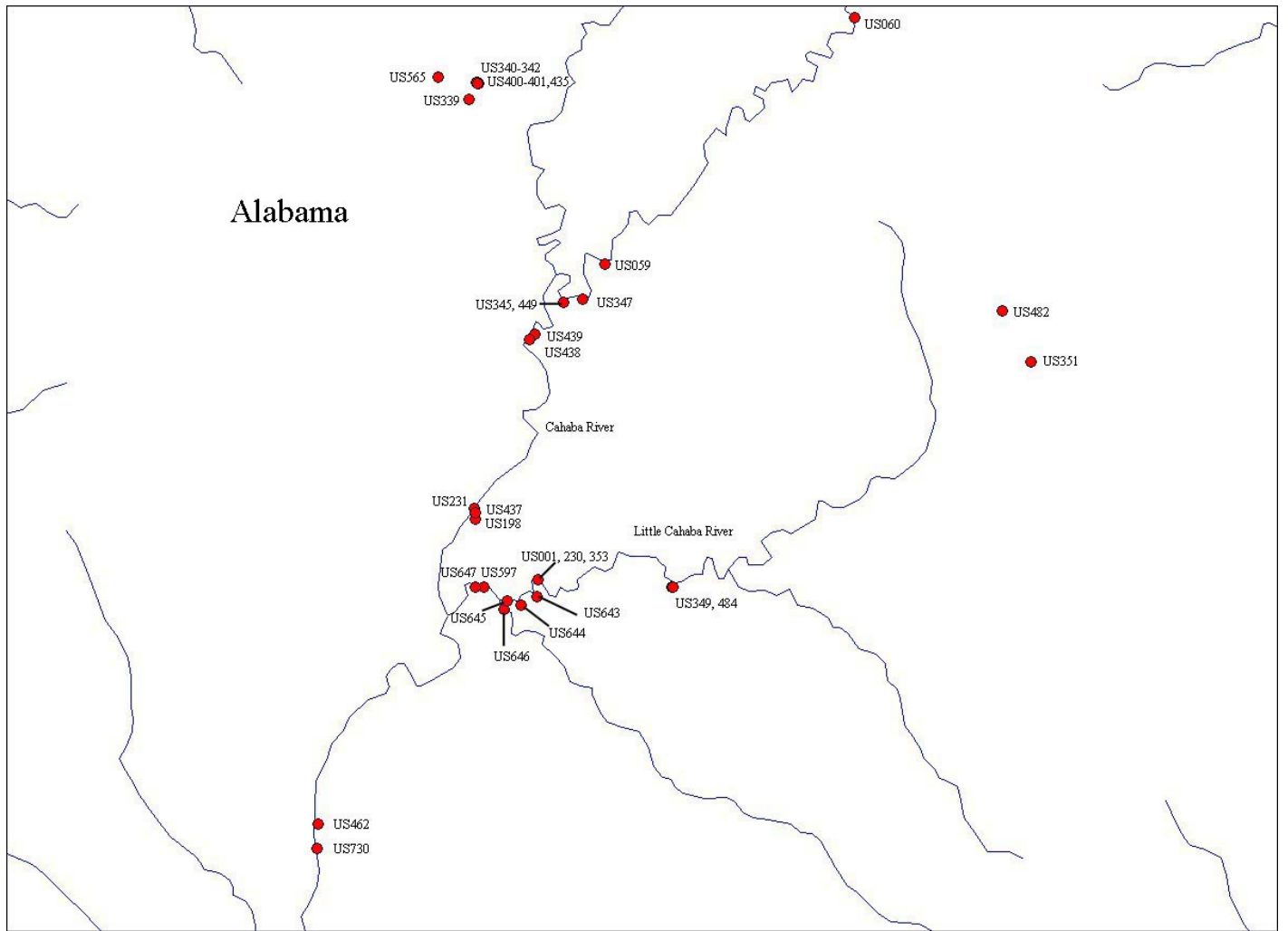


**Figure 4.** Positive hydrobiid sites located in southern Alabama.

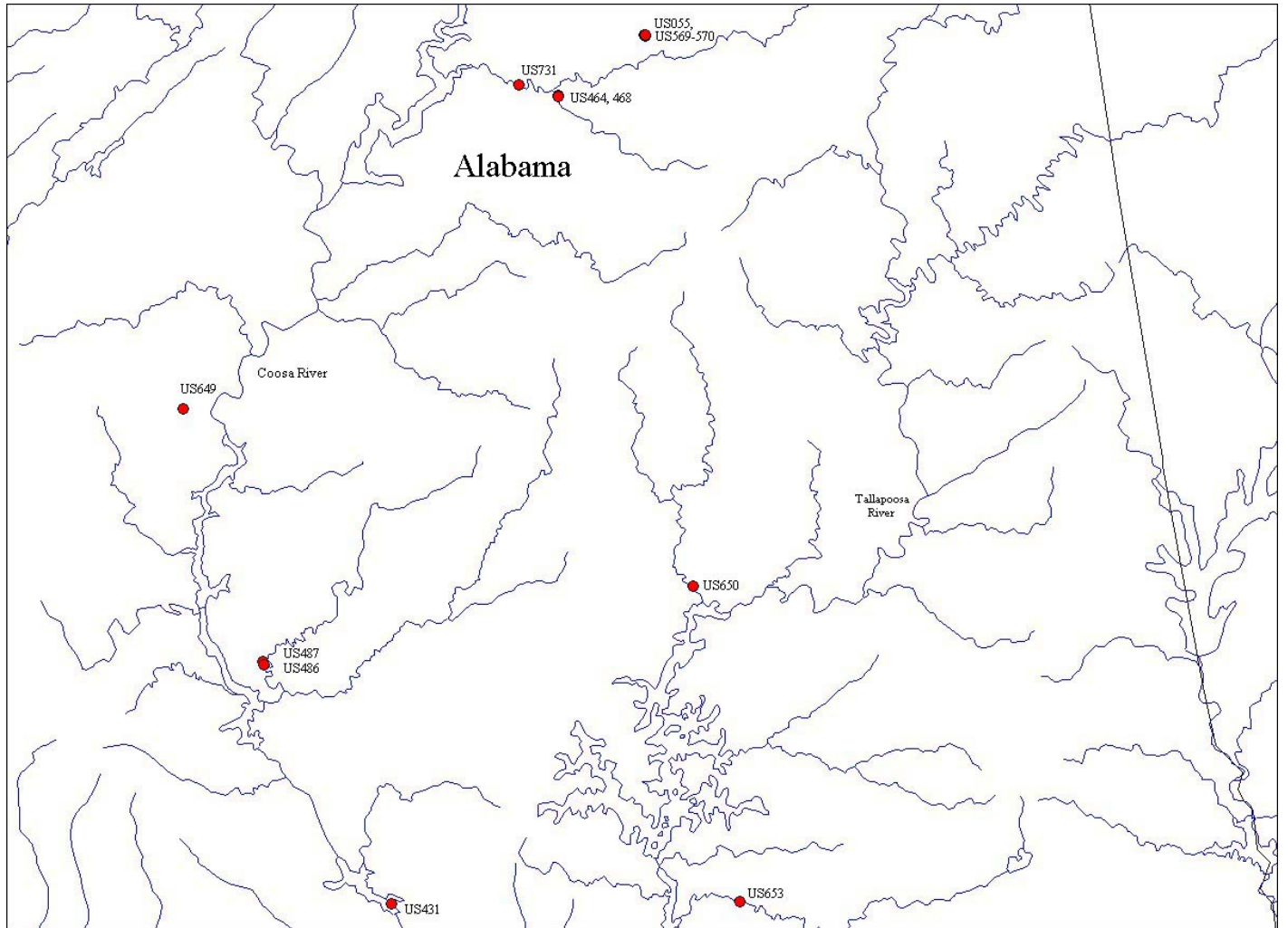




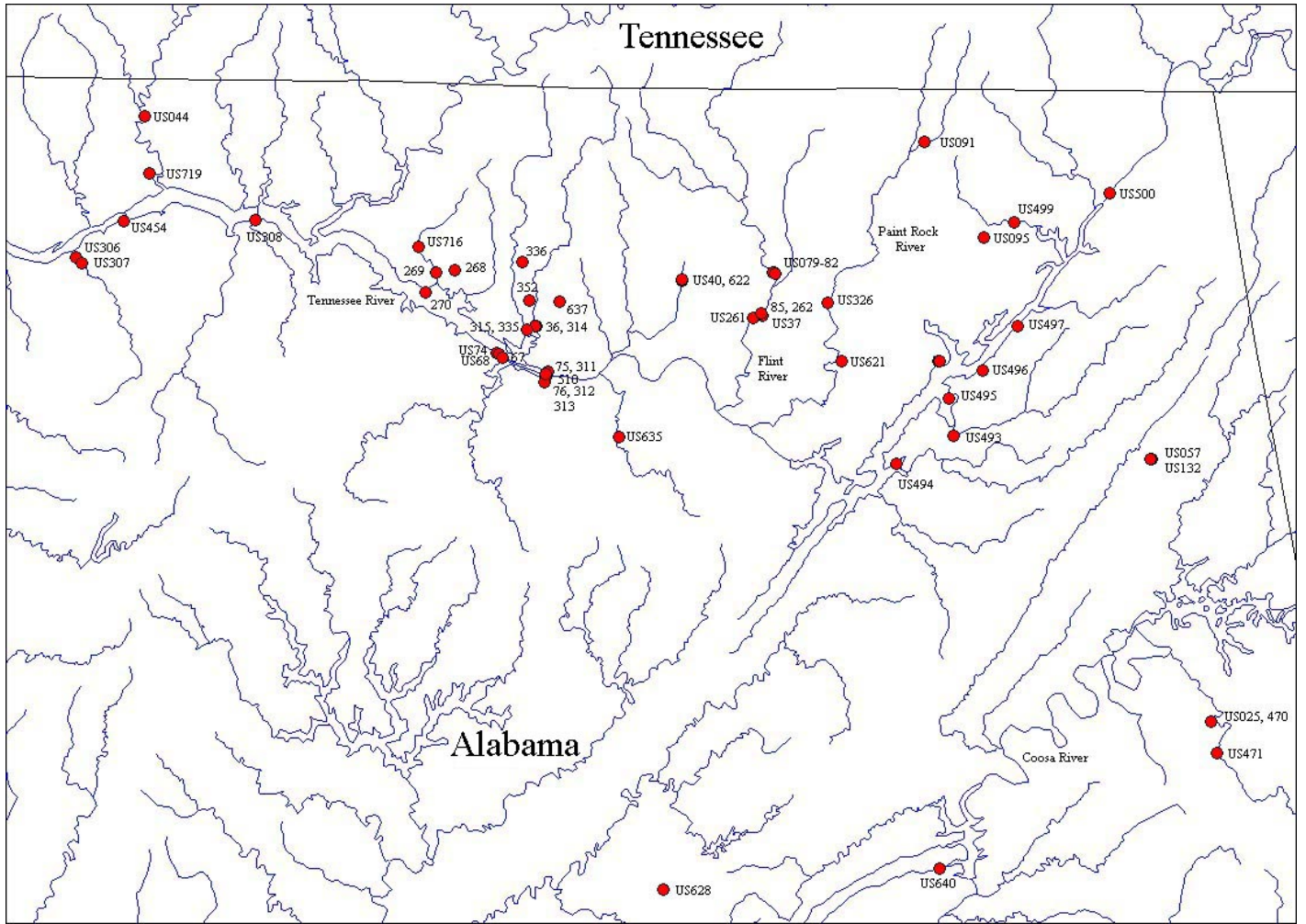
**Figure 5.** Positive hydrobiid sites located in west central Alabama.



**Figure 6.** Positive hydrobiid sites on the Cahaba and Little Cahaba Rivers of central Alabama.



**Figure 7.** Positive hydrobiid sites located in east central Alabama.



**Figure 8.** Positive hydrobiid sites located in northern Alabama.