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**A Survey for Threatened and Endangered Mussels in the Little  
Cahaba River, Shelby County, Alabama.**

**Completed by**

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## **Introduction**

The Cahaba River in Central Alabama historically supported a diverse freshwater mussel and snail population. Although much of the lower Cahaba mollusk fauna contains at least 7 federally protected mollusks (*Hamiota altilis*, *Hamiota perovalis*, *Ptychobranthus greenii*, *Pluerobema perovatum*, *Leptoxis ampla*, *Lioplax cyclostomaformis*, *Lepyrium showalteri*), relatively few records of threatened or endangered (T&E) species have been reported from the Cahaba River Drainage upstream of the U.S. Hwy 280 bridge crossing (P.D. Johnson ADCNR, pers. com.). Shell material of *Hamiota (Lampsilis) altilis*, the Finelined pocketbook, collected in the Little Cahaba River was deposited in the Auburn University Museum collection by Randy Haddock (Cahaba River Society) in 2004. However, no recent snorkel or SCUBA surveys have targeted the Little Cahaba River to determine if live T&E mussels are extant in this reach.

Ongoing development of the Little Cahaba watershed is currently unregulated despite the potential for impacts to T&E mollusks. The goal of this survey was to determine if T&E mussels and snails are present in the Little Cahaba River in Shelby County, Alabama near the confluence of Coal Branch, a putative sediment source and to determine the likely impact of sediment inputs on mussel populations. During high water periods, Coal Branch carries a considerable silt load which may negatively affect sensitive mussel populations in the Little Cahaba (Fig. 1)

## **Methods**

### *Study Site*

The Little Cahaba River originates just northeast of the town of Leeds and flows for ~20 km through Shelby County, Alabama to its confluence with the Cahaba River just upstream of the U.S. Highway 280 bridge crossing (Fig. 2). The Little Cahaba within the study section ranged from 10-20 m in width and with average depths <0.5 m. Numerous pools (some > 5 m deep) and riffles were present at all sites. Substrate composition was a mix of cobble, gravel, and sand in much of

the study reach was dominated by sand and silt from the small mill dam upstream to the confluence of Coal Branch. Coal fines were also observed in this reach.

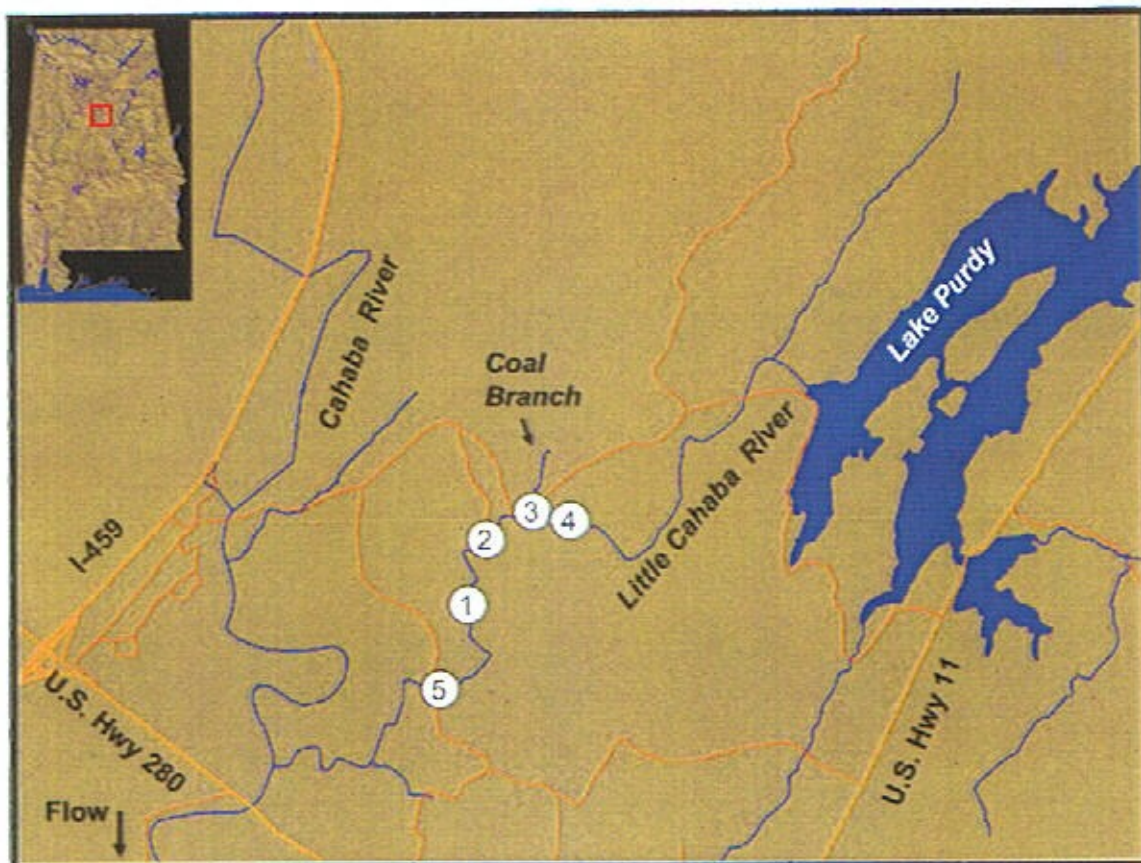


Figure 2. Map of study sites showing proximity to Lake Purdy and U.S. Hwy 280 near Birmingham, AL.

#### *Mussel Surveys*

We conducted visual/tactile mussel surveys at 5 sites between Lake Purdy and Cahaba Beach Road (Fig. 2, Table 1). At each site, 3 searchers looked for mussels using mask and snorkel for ~1 h while moving upstream. After completing searches, mussels were identified to species, measured and then returned to the stream bed. An experienced observer (Gangloff) also examined the study area for snails while conducting mussel searches. Voucher specimens

(empty shells or in a few cases live animals) for all species encountered were retained and deposited into the Auburn University Museum.

Table 1. Description, location, and time spent searching for mussels at 5 sites searched on the Little Cahaba River, Shelby County, AL on 25 May 2006.

Site	Description	Latitude Longitude	Reach Length	Search Time
1	Downstream point on Jones Property	33.44457 86.69587	150	3.0
2	End of Jones Road	33.44940 86.69460	150	3.0
3	Just downstream Coal Branch	---n/a---	50	1.5
4	Upstream of Coal Branch	33.45112 86.68957	100	3.0
5	Cahaba Beach Road	33.44024 86.69908	150	3.0
Total			600	13.5

### Results and Discussion

We found a total of 22 mussels in 13.5 person hours (mean CPUE = 1.63 mussels per hour) of search time in the Little Cahaba River. We found 6 species alive and weathered shells of *Amblema elliotii* (Table 2). Mussel abundance was greatest at Site 1 where we found 13 mussels (CPUE = 4.33) and lowest just below the confluence of Coal Branch. Mussel diversity was greatest at Site 2 where we found 7 unionid species (Fig 3).

We found 2 federally protected mussel species. The triangular kidneyshell (*Ptychobranthus greenii*) is federally endangered and is currently restricted to <10 highly isolated populations. The Triangular kidneyshell is locally common in the lower mainstem Cahaba River. This population may represent the furthest upstream occurrence of this species in the Cahaba Drainage. The southern purple lilliput (*Toxolasma corvunculus*) is a noteworthy find and represents only the second recent record for this species in the Cahaba Drainage (Stuart McGregor, GSA, pers. com.). Although not protected by federal statute, *T. corvunculus* is ranked as Priority 1 (greatest conservation concern) species by

the state of Alabama and as a G1 (critically imperiled) species by NatureServe (<http://www.natureserve.org>).

We did not find any protected aquatic snails during our surveys. The water temperatures are probably too cool for the Cylindrical Lioplax (*Lioplax cyclostomaformis*) or rocksnails (*Leptoxis* spp.). Both *L. cyclostomaformis* and *Leptoxis* are abundant in the lower Cahaba. The viviparid snail *Campeloma decisum* was common in this reach as was the Asiatic clam, *Corbicula fluminea*.

Aside from the unusually cold water temperatures caused by the hypolimnetic (deep water) releases from Lake Purdy, physical habitat conditions appeared optimal for freshwater mussels and snails in the study reach. Mussel abundance in this reach is low relative to the Lower Cahaba, probably because low temperatures limit mussel production. All three protected mussel species require clear, flowing water and stable substrates for growth and reproduction. Freshwater mussels have a parasitic larval stage (glochidia) which presumably facilitates dispersal over large distances. To increase the likelihood of finding a suitable host, mussels present an array of lures that mimic fish food items. Suspended sediments can obscure lure displays and lead to unsuccessful reproductive events. Although mussels were not very abundant in the study reach, we did find gravid females which suggests recent successful exchange of gametes in these populations.

Degraded tributaries like Coal Branch can profoundly affect the high-quality streams they feed into. Degraded streams that contribute excessive amounts of fine sediments (sand and silt) into larger streams can smother large portions of the stream bed and the organisms living in the substrate. Shifting sand and unconsolidated bed materials moving down degraded systems typically provide poor habitat for endangered mollusks. It appears likely that sediment originating in the Coal Branch sub-watershed are impacting protected mussels in this reach of the Little Cahaba River. I recommend that developers implement additional mitigative measures to reduce sediment migration to the Little Cahaba River.

Table 2. List of freshwater mussel and snail species encountered in surveys of the Little Cahaba River on 25 May 2006. Indicates taxa not collected alive.

	Common Name	Scientific Name	N Sites
Mussels	Coosa fiveridge	<i>Amblema elliottii</i>	2
	Finelined pocketbook	<i>Hamiota attilis</i>	4
	Triangular kidneyshell	<i>Ptychobranchus greenii</i>	4
	Alabama orb	<i>Quadrula asperata</i>	2
	Southern Purple Lilliput	<i>Toxolasma corvunculus</i>	1
	Little spectaclecase	<i>Villosa lienosa</i>	4
	Southern rainbow	<i>Villosa vibex</i>	1
Snails	Pointed Campeloma	<i>Campeloma decisum</i>	5
		<i>Elimia clara</i>	5
		<i>Elimia cahawbensis</i>	5

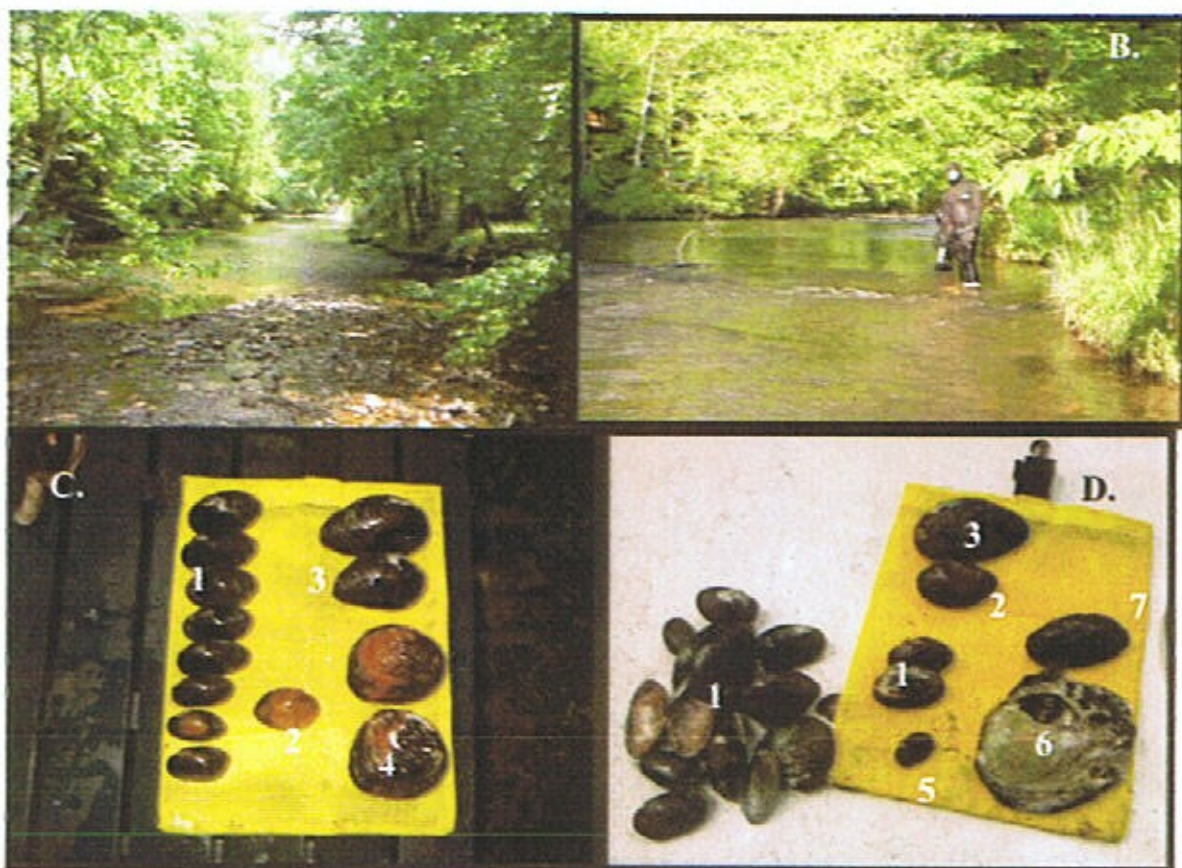


Figure 3. Pictures from surveys of the Little Cahaba River, between Lake Purdy and Cahaba Beach Road, Shelby County, AL 25 May 2006. Panel A) Downstream most point on Jones property reach, B) divers entering the Little Cahaba near Site 4, C&D) Mussel catch from Site 1 (C) and 2 (D) surveys-species are numerically coded. 1 = *Villosa lienosa*, 2 = *Hamiota altilis*, 3 = *Ptychobranchus greenii*, 4= *Quadrula asperata*, 5 *Toxolasma corvunculus*, 6 = *Amblema elliotii*, 7 = *Villosa vibex*,



Figure 4. Triangular Kidneyshell (*Ptychobranchus greenii*) [top] and finelined pocketbook (*Hamiota attilis*), 2 federally protected mussels that were found throughout the study reach.