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AN ASSESSMENT OF FRESHWATER MUSSEL POPULATIONS AT SELECTED STATIONS IN TRIBUTARIES OF THE CHATTAHOOCHEE RIVER, ALABAMA, 2006-07

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By

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A cooperative effort of the Geological Survey of Alabama and the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries

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CONTENTS

FIGURES

TABLES

AN ASSESSMENT OF FRESHWATER MUSSEL POPULATIONS AT SELECTED STATIONS IN TRIBUTARIES OF THE CHATTAHOOCHEE RIVER, ALABAMA, 2006-07

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ABSTRACT

During the spring and summer months of 2006 and 2007, the authors sampled for freshwater mussels in selected tributaries of the Chattahoochee River in Alabama. Visual and tactile searches were employed, often with the aid of mask and snorkel. An aggregate total of 710 individuals representing 13 species were collected either live or fresh dead from 41 stations. An additional three species were represented by weathered dead shells only. Only one federally listed species was encountered, the shinyrayed pocketbook, *Hamiota subangulata*, represented by fresh dead shells from two stations. However, five other species of highest or high conservation concern in Alabama were collected either live or fresh dead.

INTRODUCTION

Mussels are an important food resource for many animals such as birds, fishes, and mammals (including, historically, man). They were once used as a source of raw material for tools, adornment, and buttons and are currently used in the cultured pearl industry. Because of their role as benthic filter-feeders and because of their longevity, mussels are also valuable indicators of ecological health; and trends in mussel health and uptake of toxins are useful in predicting potential environmental problems (Naimo, 1995). Mussels are widely considered to be among the most imperiled groups of organisms in the world (Williams and others, 1993; Lydeard and Mayden, 1995; Neves and others, 1997; Lydeard and others, 2004; Strayer and others, 2004).

The effects of man's activities on the environment have had a profound influence on the native mussel fauna and that influence has been well documented in the literature (see Bogan, 1993, Neves and others, 1997, and Lydeard and Mayden, 1995, for reviews). Documented effects on mussels include physical stresses related to scour, deposition of sediments, altered suspended sediment loads, altered and often variable flow regimes, permanent temperature changes and variable temperature fluctuations, long periods of oxygen depletion, changes in hydrostatic pressure, and filtering or blocking of light

transmission (Ellis, 1936; Bates, 1962; Bogan, 1993). Chemical effects from point and nonpoint sources (NPS) of pollution also affect mussels, which filter suspended particulate matter from the water column during normal feeding and store it in their tissue. The toxic effects of chemical uptake may be either acute or chronic (Naimo, 1995).

Impoundment is considered primary among the factors that negatively affect native mussel populations (Ortmann, 1924; Scruggs, 1960; Isom, 1969; Benke, 1990; Williams and others, 1992; Yeager, 1993). Impoundment of streams creates an environment unsuitable to native mussels by altering the chemical and physical properties of the water body, thereby affecting feeding, respiration, reproduction, and other life history activities necessary for survival, as well as altering the composition of the host fish population. The downstream effects of impoundment are equally important. Although there may appear to be stream flow of sufficient quality and quantity to support mussels, changes in seasonality, intensity and duration of flow, patterns of scour and deposition of sediment, and altered components of suspended sediments—the source of mussel food—often render downstream habitats unsuitable (Vaughn and Taylor, 1999). Furthermore, fragmenting of populations by impoundments may effectively diminish the survival of mussel populations by interrupting gene flow and possibly reducing the availability of potential host fishes (Bogan, 1993).

Clench and Turner (1956) provided a benchmark study of the freshwater mussel fauna of the eastern Gulf of Mexico drainages, including the Chattahoochee River and its tributaries. Revisions to their list have been made in subsequent treatments of various drainages in that region (e.g., Butler, 1989; Williams and Fradkin, 1999; Brim Box and Williams, 2000; Blalock-Herod and others, 2005). In a thorough assessment of the mussel fauna of the Apalachicola basin, Brim Box and Williams (2000) reported that 30 of 33 species historically known from the Apalachicola River system were known at some time in the Chattahoochee River or its tributaries, and that 18 of those were found live there during their sampling effort in 1991-1992.

In 2005 and again in 2006, the Geological Survey of Alabama was contracted by the Alabama Department of Conservation and Natural Resources to assess the mussel fauna in tributaries of the Chattahoochee River in Alabama with funding provided by

Section 6 of the Endangered Species Act. The objective was to ascertain the presence of federally listed endangered and threatened species and/or species of conservation concern in selected stream reaches in Alabama. This report summarizes study results for two seasons of qualitative sampling.

ACKNOWLEDGMENTS

Gratitude is expressed to former Chattahoochee Riverkeeper George Williams of Searcy, Alabama, for sharing his knowledge of the watershed, assistance in field sampling, and in coordinating access to some streams. Anne Wynne of the Geological Survey of Alabama created the figure. Joe Stillwell of Russell County, Alabama, graciously permitted access to his property. Mike Gangloff, Lee Hamm, and Hillary Strickland of Auburn University, Brett Smith of the Geological Survey of Alabama, and Sandy Pursifull, formerly of the Alabama Aquatic Biodiversity Center, provided logistical support and assisted with field sampling. Art Bogan of the North Carolina Museum of Natural Science and Jim Williams of Gainesville, Florida, provided assistance with identifications of some specimens. Anne Wynne of the Geological Survey of Alabama created the figure used in this report.

STUDY AREA

The Chattahoochee River forms a significant portion of the boundary between Alabama and Georgia, and is part of the Apalachicola River basin (Mettee and others, 1996) (fig. 1). The Fall Line crosses the study area, dividing unconsolidated coastal sediments to the south from harder rocks of the interior to the north. Upstream of the Fall Line in the study area (in Chambers, Lee, and Randolph Counties), streams generally have higher gradients and gravel/sand substrates, while those downstream (in Barbour, Henry, Houston, and Russell Counties) generally have lower gradients and mud or sand bottoms (Mettee and others, 1996). Sampling stations and stream names are marked in figure 1 and corresponding station descriptions are listed in table 1.

METHODS

Due to the nature of the project and limited resources, a semi-quantitative sampling protocol was employed (timed search), where more effort was expended in habitats favorable for occupation by target species than in habitats with less potential for those species (Strayer and Smith, 2003). For that reason, species that prefer an alternative

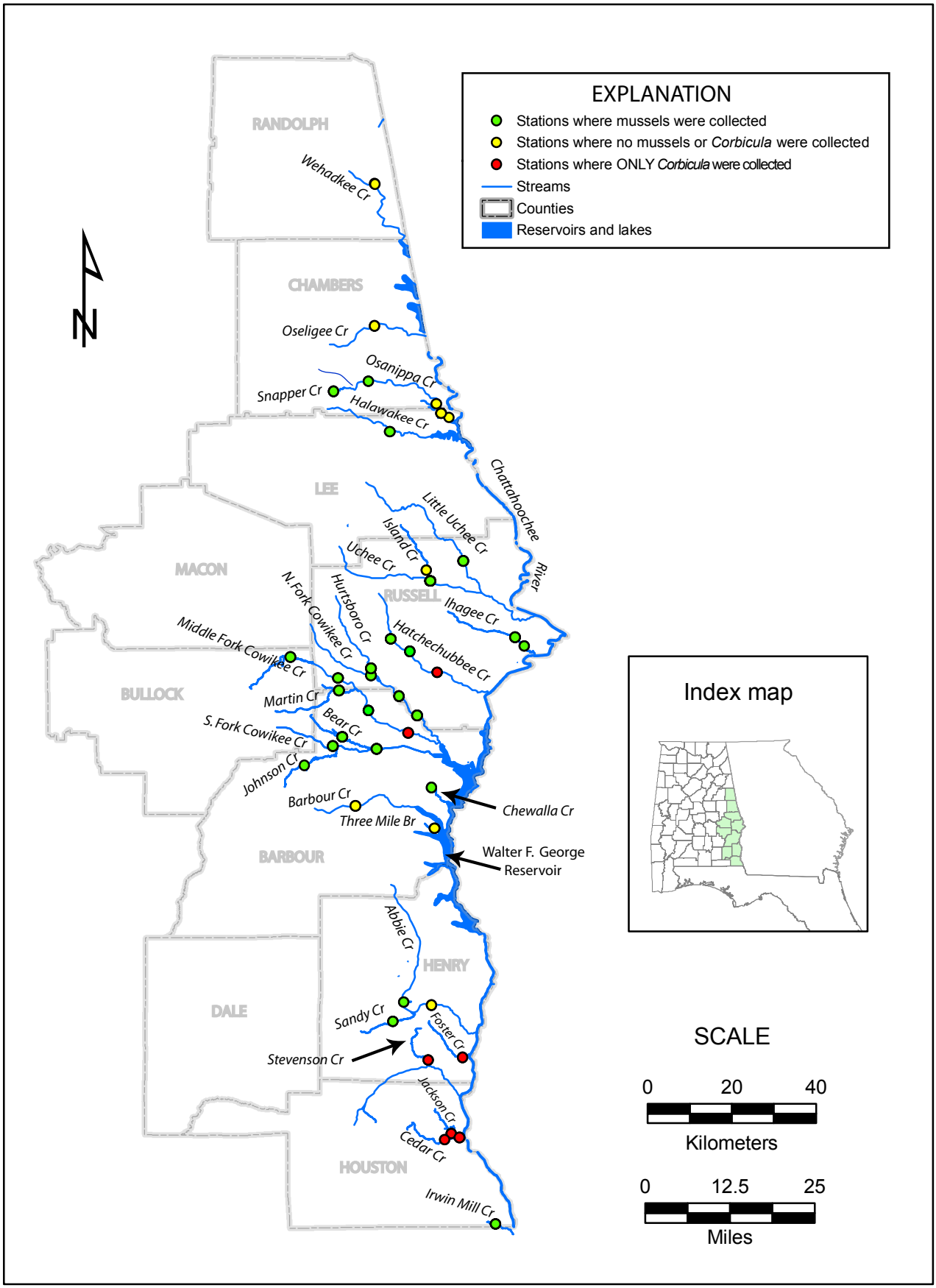

Figure 1. Map of the Chattahoochee River system showing Alabama mussel sampling stations from 2006 and 2007.

Table 1.—Summary information for mussel sampling stations in the Chattahoochee River system, Alabama, 2006-07

Sampling station	Map coordinates	County	Date
Irwin Mill Creek at Alabama Hwy. 95 near Chattahoochee State Park	N 31˚ 00.313' W 85˚ 2.463'	Houston	6/14/2006
Cedar Creek at Alabama Hwy. 95 near Calumet	N 31˚ 11.393' W 85˚ 7.135'	Houston	6/15/2006
Jackson Creek at lowermost bridge crossing near Calumet	N 31˚ 11.929' W 85˚ 8.104'	Houston	6/15/2006
Cedar Creek at Cook Road north of Pansey	N 31˚ 11.125' W 85˚ 92.004'	Houston	6/15/2006
Stevenson Creek at Alabama Hwy. 134, tributary of Omussee Creek, east of Grandberry	N 31˚ 21.307' W 85˚ 11.099'	Henry	6/15/2006
Foster Creek at Alabama Hwy. 95 bridge about 4 miles southeast of Haleburg	N 31˚ 21.667' W 85˚ 06.658'	Henry	4/26/2007
Abbie Creek at Co. Rd. 65 bridge upstream of the Alabama Hwy. 95 bridge	N 31˚ 28.370' W 85˚ 10.657'	Henry	4/26/2007
Sandy Creek at Co. Rd. 99 bridge 3 miles north of Tumbleton	N 31˚ 26.258' W 85˚ 15.586'	Henry	4/26/2007
Abbie Creek at Co. Rd. 57 bridge about 4 miles east of Danzey	N 31˚ 28.713' W 85˚ 14.202'	Henry	4/26/2007
Three Mile Branch at Woodlane Drive upstream of U.S. Hwy. 431	N 31˚ 51.020' W 85˚ 10.296'	Barbour	5/1/2007
Barbour Creek at Co. Rd. 79 bridge near White Oak Station, about 6 miles east of Clayton	N 31˚ 53.888' W 85˚ 20.449'	Barbour	5/2/2007
Chewalla Creek at Fox Ridge Road near U.S. Hwy. 82	N 31˚ 56.261' W 85˚ 26.943'	Barbour	9/5/2007
South Fork Cowikee Creek at bridge on Poplar Springs Rd. (Co. Rd. 79), just north of U.S. Hwy. 82 near Batesville	N 32˚ 01.171' W 85˚ 17.731'	Barbour	5/1/2007
South Fork Cowikee Creek at Co. Rd. 49 bridge near Comer	N 32˚ 1.535' W 85˚ 23.309'	Barbour	9/5/2007
Johnson Creek at Co. Rd. 49 near Barbour County Wildlife Management Area	N 31˚ 59.097' W 85˚ 26.449'	Barbour	9/5/2007
Bear Creek at bridge on Co. Rd. 49, just north of U.S. Hwy. 82 near Comer	N 32˚ 02.693' W 85˚ 22.102'	Barbour	5/2/2007
Middle Fork Cowikee Creek at bridge on Jones Circle Rd. near Hawkinsville	N 32˚ 03.255' W 85˚ 13.663'	Barbour	5/1/2007
Middle Fork Cowikee Creek at bridge Co. Rd. 49 about 3 miles northeast of Spring Hill	N 32˚ 06.067' W 85˚ 18.767'	Barbour	5/2/2007
Martin Creek at bridge on Martin Creek Rd. about 5 miles southwest of Rutherford	N 32˚ 08.640' W 85˚ 22.539'	Barbour	5/2/2007
Middle Fork Cowikee Creek at Reeves Road (Co. Rd. 3) about 5 miles southeast of Hurtsboro	N 32˚ 10.261' W 85˚ 22.700'	Russell	5/3/2007

Table 1.—Summary information for mussel sampling stations in the Chattahoochee River system, Alabama, 2006-07, continued

Middle Fork Cowikee Creek at Alabama Hwy. 51 bridge near Guerryton	N 32˚ 12.978' W 85˚ 28.779'	Bullock	5/3/2007
North Fork Cowikee Creek at Russell Co. Rd. 42 (Continuation Road) bridge (abandoned) near Glenville	N 32˚ 5.479' W 85˚ 12.533'	Barbour/ Russell	9/6/2007
North Fork Cowikee Creek at abandoned bridge on Co. Rd. 40 at Cowikee Hunting Club	N 32˚ 7.970' W 85˚ 14.860'	Russell	5/1/2007
Hurtsboro Creek at bridge on Co. Rd. 49 near Rutherford	N 32˚ 10.585' W 85˚ 18.482'	Russell	5/3/2007
North Fork Cowikee Creek at bridge on Co. Rd. 4 (Prudence Road) at Rutherford	N 32˚ 11.505' W 85˚ 18.457'	Russell	5/3/2007
Hatchechubbee Creek at U.S. Hwy. 431 at Pittsview	N 32˚ 10.944' W 85˚ 9.961'	Russell	5/25/2006
Unnamed tributary to Hatchechubbee Creek entering downstream of the Co. Rd. 13 bridge	N 32˚ 13.700' W 85˚ 13.430'	Russell	5/25/2006
Hatchechubbee Creek at confluence of High Log Creek at Antioch Road south of Hatchechubbee	N 32˚ 15.223' W 85˚ 15.939'	Russell	5/25/2006
Ihagee Creek at Alabama Hwy. 165 near Oswichee	N 32˚ 15.512' W 85˚ 59.984'	Russell	5/24/2006
Ihagee Creek at intersection of Co. Rd. 38 and Co. Rd. 18	N 32˚ 14.345' W 85˚ 58.811'	Russell	5/24/2006
Little Uchee Creek upstream of Co. Rd. 28 bridge	N 32˚ 25.244' W 85˚ 6.610'	Russell	5/26/2006
Uchee Creek at Alabama Hwy. 169 bridge east of Parkmanville	N 32˚ 22.680' W 85˚ 10.860'	Russell	5/23/2006
Island Creek at Co. Rd. 32 bridge northwest of Parkmanville	N 32˚ 24.053' W 85˚ 11.347'	Russell	5/24/2006
Halawakee Creek at U.S. Hwy. 29 bridge near Bean's Mill	N 32˚ 41.810' W 85˚ 16.035'	Lee	5/22/2006
Osanippa Creek at Co. Rd. 379 bridge	N 32˚ 44.168' W 85˚ 9.119'	Lee	6/7/2006
Unnamed tributary of Osanippa Creek at Co. Rd. 375 bridge	N 32˚ 44.121' W 85˚ 9.466'	Lee	6/7/2006
Unnamed tributary of Osanippa Creek at Co. Rd. 377 bridge (Lantuck Road)	N 32˚ 44.980' W 85˚ 10.123'	Chambers	6/7/2006
Osanippa Creek at Co. Rd. 83 bridge near Cusseta	N 32˚ 43.236' W 85˚ 18.775'	Chambers	6/7/2006
Snapper Creek at Co. Rd. 173 bridge near Danway	N 32˚ 46.952' W 85˚ 23.212'	Chambers	6/7/2006
Oseligee Creek at Co. Rd. 173 bridge near Denson	N 32˚ 55.348' W 85˚ 17.980'	Chambers	6/8/2006
Wehadkee Creek at abandoned bridge between Wehadkee and Springfield (Pittman) near High Shoals Falls	N 32˚ 13.448' W 85˚ 17.826'	Randolph	6/6/2006

specific habitat type may be underrepresented. Sampling stations were selected based on accessibility to bridge or foot trails; isolated reaches between such points were often not sampled and may harbor quality habitat and additional records. Collecting effort varied according to the quality of habitat and/or the mussel fauna encountered at each station. We detected mussels by visual inspection while wading in streams or walking along the stream margins, and by hand while grubbing or using mask and snorkel.

All mussels encountered were identified to species following Turgeon and others (1998) with some exceptions. *Elliptio fumata* and *Elliptio pullata* were not recognized by Turgeon and others (1998). Generic placement of *Hamiota subangulata* and *Quadrula infucata* have changed since Turgeon and others (1998) was published (Serb and others, 2003; Roe and Hartfield, 2005).

Condition (live, fresh dead, weathered dead, or relic) and identity of all shell material collected was determined and numbers of each species recorded on a field data sheet. Most live individuals were identified in the field and returned to the substrate. A few specimens of common *Villosa* species were relaxed in a chilled cooler and placed in 95 percent ethanol for genetic research ongoing at The Ohio State University. Voucher material of fresh dead specimens was archived in the Auburn University and North Carolina Museum of Natural Science collections. Most weathered dead and relic material was discarded. Habitat data for each station were recorded, and each station was referenced to nearby landmarks and georeferenced with the aid of a hand-held Global Positioning System unit. Data collected in the field were subsequently transferred into an Excel spreadsheet at the Geological Survey of Alabama for permanent storage and future reference. Status of conservation concern in Alabama follows Mirarchi (2004) with the following designated rankings of priority (P): P1-highest conservation concern, P2-high conservation concern, P3-moderate conservation concern, P4-low conservation concern, and P5-lowest conservation concern.

RESULTS AND DISCUSSION

During the 2006 and 2007 field seasons, 41 stations were sampled for mussels in the study area (fig. 1, table 1). Thirteen stations yielded only Asian clams, *Corbicula fluminea*, and four stations yielded neither mussels nor Asian clams (fig. 1). Approximately 68.5 person hours were expended actively searching for mussels, during

which 16 species were collected, and all but 3 species were represented by live and/or fresh dead individuals (table 2). An aggregate total of 710 specimens were collected, with 540 (76 percent) represented by *Elliptio* species. *Elliptio fumata* (formerly *Elliptio complanata* in part), and *Elliptio pullata* (formerly *Elliptio icterina* in part) were broadly distributed throughout the study area. However, due to overlapping shell characters and the fact that neither of these two species is federally listed or of conservation concern in Alabama, we chose to combine their numbers. Three species, the elephantear, *Elliptio crassidens*, the washboard, *Megalonaias nervosa*, and the eastern floater, *Pyganodon cataracta*, were represented by weathered dead or relic shells only, and their numbers are not included in abundance totals. Catch per unit effort values (CPUE) (aggregate total of specimens of each species collected per hour sampled throughout the study area) for each species collected are presented in table 2. No attempt was made to compare CPUE values among sampling stations.

Only one federally listed species, the endangered shinyrayed pocketbook, *Hamiota subangulata*, also a State of Alabama P1 species, was encountered and was represented by fresh dead individuals from Uchee Creek in Russell County and Middle Fork Cowikee Creek in Barbour County. Members of three additional P1 and two P2 species were collected alive, and most were collected in the Uchee Creek and Cowikee Creek systems. They include the southern elktoe, *Alasmidonta triangulata*, rayed creekshell, *Anodontoides radiatus*, delicate spike, *Elliptio arctata*, sculptured pigtoe, *Quadrula infucata*, and downy rainbow, *Villosa villosa*. A few rayed creekshells were also collected from Hatchechubbee Creek, Russell County. *Quadrula infucata* was collected in 1995 in North Fork Cowikee Creek in Barbour County (GSA unpublished data) but was not collected there during this study.

The reason for the persistence of a quality mussel fauna at some locations within the Chattahoochee River tributaries sampled cannot be explained based on the results of this preliminary study, but may be related to habitat quality and other anthropogenic factors. The habitat found in Uchee Creek was comprised of isolated areas of relatively stable sand and gravel separated by sandy/muddy pools, with backwaters, undercut banks, tree roots, and logs. The Cowikee Creek system is predominantly forested, with relatively little agriculture. Hopefully, the diversity of the mussel faunas in these isolated

Table 2.—Freshwater mussel species and abundance for each species collected from selected tributaries of the Chattahoochee River, Alabama, 2006-07

Species	Conservation priority[1]	Abundance[2]	
		Number	CPUE
Alasmidonta triangulata	P1	1	0.01
Anodontoides radiatus	P2	22	0.32
Elliptio arctata	P1	1	0.01
Elliptio crassidens	P5	wd	--
Elliptio fumata[3] (formerly *Elliptio complanata*) *Elliptio pullata*[3] (formerly *Elliptio icterina*)	P5	540	7.9
Hamiota subangulata	E, P1	2	0.03
Megalonaias nervosa	P5	wd	--
Pyganodon cataracta	P3	wd	--
Pyganodon grandis	P5	3	0.04
Quadrula infucata	P1	2	0.03
Toxolasma paulus	P3	12	0.18
Uniomerus columbensis[3]	--	2	0.03
Villosa lienosa	P5	58	0.85
Villosa vibex	P5	66	1.0
Villosa villosa	P2	1	0.01
Total	--	710	10.4

[1] P1=Priority 1 (Highest Conservation Concern), P2=Priority 2 (High Conservation Concern), P3=Priority 3 (Moderate Conservation Concern), P4=Priority 4 (Low Conservation Concern), P5=Priority 5 (Lowest Conservation Concern); E=federally listed endangered.

[2] Aggregate total number of live mussels and fresh dead shells among all stations sampled; wd=weathered dead shells not included in totals; CPUE=catch per unit effort (hours).

[3] Not recognized by Mirarchi (2004) or Turgeon and others (1998).

streams will persist and provide a source of stock for replenishing populations in other streams.

Despite the low rainfall totals during this study period, streams generally maintained adequate base flows, but the chemical nature of the water and substrates in the study area are unknown. This area is generally rural with little heavy industry or large farming operations that might directly affect the streams, yet there are apparently significant sources of sedimentation throughout the study area. For example, significant bank failure was observed about 100 meters downstream of the bridge at Alabama Highway 169 in Uchee Creek along a high bank where the creek makes a sharp bend to the right. Large segments of the bank were collapsing and huge volumes of sediment and trees were being introduced into the stream. If this condition persists, it may have a significant, negative effect on the mussel fauna there. This situation may be occurring in other stream reaches in the study area as well, increasing the potential impacts on other mussel populations.

In an area with a mussel population similarly diminished by habitat alteration, Miller and Lynott (2006) have documented the successful recovery of a freshwater mussel fauna after improvements in habitat quality were made. The Verdigris River in Kansas, which had a documented depletion of its mussel fauna by impoundments and their associated effects, including high levels of suspended solids, has shown a marked recovery attributed, at least in part, to improvements in discharge schedules from dams in the system and resultant decreases in suspended solids.

CONCLUSIONS AND RECOMMENDATIONS

Many streams sampled during this study showed significant sedimentation problems as observed in extensive sand bars, loose substrate, and failing stream banks, resulting in poor mussel faunas. While most sampling was limited to areas around access points, such as bridges and foot trails, there may be isolated reaches of streams that contain quality habitat and may yield diverse mussel faunas upon further study. Water quantity appears to be sufficient to support the mussel fauna based on low rainfall but adequate stream flows during this period of study, but the chemical quality of water and substrate is unknown. Based on the results of this study and the habitat requirements of freshwater mussels, we make the following recommendations:

- Mussel faunas in streams either not sampled or under-sampled during this study should be evaluated to thoroughly characterize the mussel fauna throughout the study area.
- Water quality, sediment quality, and bedload sedimentation studies should be executed and the results of those studies used to assess their effects on the existing mussel populations. After a thorough characterization of the factors affecting the mussel fauna, efforts should be taken to address those factors, including the installation and maintenance of best management practices.
- Quantitative assessment of the fauna should be undertaken as a benchmark against which future changes can be compared, and to determine which populations would provide the best source of broodstock for future propagation and reintroduction efforts.
- Periodic monitoring of the mussel population should be continued until evidence of a viable, self-sustaining fauna is documented.

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APPENDIX

Summary of field notes for mussel sampling stations in tributaries of the Chattahoochee River in Alabama, 2006-07

Irwin Mill Creek at Alabama Highway 95
N31° 00.313' W85° 02.463'
Houston County, Alabama
June 14, 2006
Elliptio fumata – 11 live
Toxolasma paulus – 8 live
Villosa vibex – 19 live (including 3 subadults)
Corbicula fluminea – present

Cedar Creek at Alabama Highway 95 south of Calumet
N31° 11.393' W85° 07.135'
Houston County, Alabama
June 15, 2006
No mussels
Corbicula fluminea – present

Jackson Creek at lowermost bridge crossing, southwest of Calumet
N31° 11.929' W85° 08.104'
Houston County, Alabama
June 15, 2006
No mussels
Corbicula fluminea – present

Cedar Creek at Cook Road northeast of Pansey
N31° 11.125' W85° 09.004'
Houston County, Alabama
June 15, 2006
No mussels
Corbicula fluminea – present

Stevenson Creek at Alabama Highway 134 east of Grandberry Crossroads
N31° 21.307' W85° 11.099'
Henry County, Alabama
June 15, 2006
No mussels
Corbicula fluminea – present

Foster Creek at Alabama Highway 95 south of Haleburg
N32° 10.944' W85° 09.961'
Henry County, Alabama
August 26, 2007
No mussels
Corbicula fluminea – present

Abbie Creek at County Road 65 bridge upstream of Alabama Highway 95 bridge
N31° 28.370' W85° 10.657'
Henry County, Alabama
April 26, 2007
No mussels
No *Corbicula fluminea*

Sandy Creek at County Road 99 north of Tumbleton
N31° 26.258' W85° 15.586'
Henry County, Alabama
April 26, 2007
Elliptio fumata – 16 live
Villosa lienosa – 2 live (to Ohio State University Museum of Zoology)
Corbicula fluminea – present, common

Abbie Creek at County Road 57 east of Danzey
N31° 28.713' W85° 14.202'
Henry County, Alabama
April 26, 2007
Villosa lienosa – 2 live
Corbicula fluminea – present

Three Mile Branch at Cal Wilson property
N31° 51.020' W85° 10.296'
Barbour County, Alabama
May 1, 2007
No mussels
No *Corbicula fluminea*

Barbour Creek at White Oak Station on County Road 79 just north of Alabama Highway 30
N31° 53.888' W85° 20.449'
Barbour County, Alabama
May 2, 2007
No mussels
No *Corbicula fluminea*

Chewalla Creek at Fox Ridge Road near U.S. Highway 82
N31° 56.261' W85° 10.677'
Barbour County, Alabama
September 6, 2007
Elliptio pullata – 1 live
Corbicula fluminea – present, common

South Fork Cowikee Creek at bridge on County Road 79 (Poplar Springs Road) near Batesville
N32° 01.171' W85° 17.731'
Barbour County, Alabama
May 1, 2007
Anodontoides radiatus – 1 fresh dead
Elliptio fumata – 1 fresh dead
Uniomerus columbensis – 1 live
Corbicula fluminea – present

South Fork Cowikee Creek at County Road 49 bridge near Comer
N32° 01.535' W85° 23.309'
Barbour County, Alabama
September 5, 2007
Anodontoides radiatus – 2 fresh dead
Elliptio pullata – 5 fresh dead
Corbicula fluminea – present

Johnson Creek at County Road 49 bridge near Comer
N31° 59.097' W85° 26.943'
Barbour County, Alabama
September 5, 2007
Elliptio pullata – live
No *Corbicula fluminea*

Bear Creek at County Road 49 near U.S. Highway 82 at Bishop Hill Plantation Hunting Preserve
N32° 02.693' W85° 22.102'
Barbour County, Alabama
May 2, 2007
Anodontoides radiatus – 1 live
Elliptio fumata – 7 live
Elliptio pullata – 16 live
Villosa lienosa – 1 alive (female)
Corbicula fluminea – present, common

Middle Fork Cowikee Creek at bridge on Jones Circle Road near Hawkinsville
N32° 03.255' W85° 13.663
Barbour County, Alabama
May 1, 2007
No mussels
Corbicula fluminea – present

Middle Fork Cowikee Creek at bridge on County Road 49 near Springhill
N32° 06.067' W85° 18.767
Barbour County, Alabama
May 2, 2007
Hamiota subangulata – 1 fresh dead
Corbicula fluminea – present

Martin Creek at Martin Creek Road five miles southwest of Rutherford
N32° 08.640' W85° 22.539
Barbour County, Alabama
May 2, 2007
Elliptio fumata – 5 live
Elliptio pullata – 5 live
Villosa lienosa – 2 live
Corbicula fluminea – present, common

Middle Fork Cowikee Creek at County Road 3 (Reeves Road) southeast of Hurtsboro
N32° 10.261' W85° 22.700
Russell County, Alabama
May 3, 2007
Elliptio fumata – 35 live
Pyganodon cataracta – 1 weathered dead
Corbicula fluminea – present, common

Middle Fork Cowikee Creek at Alabama Highway 51 near Guerryton
N32° 12.978' W85° 28.779
Bullock County, Alabama
May 3, 2007
Elliptio pullata – 1 live, 2 fresh dead
Corbicula fluminea – present

North Fork Cowikee Creek at County Road 42 (Continuation Road) bridge near Glenville
N32° 05.479' W85° 12.533'
Barbour/Russell County line, Alabama
September 6, 2007
Anodontoides radiatus – 2 fresh dead (1 small)
Elliptio fumata – 1 live
Elliptio pullata – 1 live, 3 fresh dead
Villosa lienosa – 1 fresh dead
Corbicula fluminea – present, common

North Fork Cowikee Creek at County Road 40 bridge (abandoned) at Cowikee Hunting Club
N32° 057.970' W85° 14.860'
Barbour/Russell County line, Alabama
September 6, 2007
Anodontoides radiatus – 3 live
Elliptio sp. – 1 live
Villosa lienosa – 5 live (3 to Ohio State University Museum)
Corbicula fluminea – present, common

Hurtsboro Creek at bridge on County Road 49 near Rutherford
N32° 10.585' W85° 18.482'
Russell County, Alabama
May 3, 2007
Elliptio fumata – 1 weathered dead

North Fork Cowikee Creek at County Road 4 bridge (Prudence Road) at Rutherford
N32° 11.505' W85° 18.457'
Russell County, Alabama
May 3, 2007
Elliptio fumata – 2 live
Elliptio pullata – 9 live
Villosa lienosa – 5 live
Corbicula fluminea – present, common

Hatchechubbee Creek at U.S. Highway 431 at Pittsview
N32° 10.944' W85° 09.961'
Russell County, Alabama
May 25, 2006
No mussels
Corbicula fluminea – present

Unnamed tributary (colloquially known as Urchin Creek for numerous fossil urchins) to Hatchechubbee Creek entering downstream of the County Road 13 bridge
N32° 10.944' W85° 09.961'
Russell County, Alabama
May 25, 2006
Elliptio fumata – 5 live
Uniomerus columbensis – 1 live
Villosa lienosa – 1 fresh dead
Corbicula fluminea – present

Hatchechubbee Creek at confluence of High Log Creek at Antioch Road near Hatchechubbee
N32° 15.223' W85° 15.939'
Russell County, Alabama
May 25, 2006
Anodontoides radiatus – 2 live
Elliptio sp. – 53 live
Villosa lienosa – 23 live (8 females)
Corbicula fluminea – present

Ihagee Creek at Alabama Highway 165 near Oswichee
N32° 15.512' W84° 59.984'
Russell County, Alabama
May 24, 2006
Elliptio sp. – 6 live
Villosa vibex – 3 live
Corbicula fluminea – present

Ihagee Creek at intersection of County Roads 18 and 38
N32° 14.345' W84° 58.811'
Russell County, Alabama
May 24, 2006
Elliptio sp. – 150 live
Corbicula fluminea – present, common

Little Uchee Creek at Joe Stillwell property upstream of County Road 28 bridge
N32° 25.244' W85° 06.610'
Russell County, Alabama
May 26, 2006
Elliptio crassidens – 1 relic
Megalonaias nervosa – 1 relic
Villosa vibex – 18 live, 1 fresh dead

Uchee Creek at Alabama Highway 169 bridge near Parkmanville
N32° 22.680' W85° 10.860'
Russell County, Alabama
May 23, 2006 and July 26, 2006
Alasmidonta triangulata – 1 live
Anodontoides radiatus – 11 fresh dead
Elliptio arctata – 1 live
Elliptio sp. – 50 live
Hamiota subangulata – 1 fresh dead
Pyganodon grandis – 3 live
Quadrula infucata – 1 live, 1 fresh dead
Toxolasma paulus – 1 live
Villosa lienosa – 11 live (female)
Villosa vibex – 25 live
Villosa villosa – 1 fresh dead
Corbicula fluminea – present, common

Island Creek at County Road 32 bridge near Parkmanville
N32° 24.053' W85° 11.347'
Russell County, Alabama
May 24, 2006
No mussels
No *Corbicula fluminea*

Halawakee Creek at U.S. Highway 29 bridge near Bean's Mill
N32° 41.810' W85° 16.035'
Lee County, Alabama
May 22, 2006
Elliptio sp. – 100 live

Osanippa Creek at County Road 379 near Blanton
N32° 44.168' W85° 09.119'
Lee County, Alabama
June 7, 2006
No mussels
Corbicula fluminea – present

Unnamed tributary of Osanippa Creek at County Road 375 near Blanton
N32° 44.121' W85° 09.466'
Lee County, Alabama
June 7, 2006
No mussels
Corbicula fluminea – present

Unnamed tributary of Osanippa Creek at County Road 377 (Lantuck Road)
N32° 44.980' W85° 10.123'
Chambers County, Alabama
June 7, 2006
No mussels
Corbicula fluminea – present

Osanippa Creek at County Road 83 near Cussetta
N32° 43.236' W85° 18.775'
Chambers County, Alabama
June 7, 2006
Elliptio fumata – 6 live
Corbicula fluminea – present

Snapper Creek at County Road 173 near Danway
N32° 46.952' W85° 23.212'
Chambers County, Alabama
June 7, 2006
Elliptio fumata – 50 live (7 kept)
Toxolasma paullus – 2 live
Corbicula fluminea – present

Oseligee Creek at County Road 173 bridge near Denson
N32° 55.348' W85° 17.980'
Chambers County, Alabama
June 8, 2006
No mussels
No *Corbicula fluminea*

Wehadkee Creek at abandoned bridge between Wehadkee and Springfield near High Shoals Falls
N33° 13.448' W85° 17.826'
Randolph County, Alabama
June 6, 2006
No mussels
No *Corbicula fluminea*

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