ALABAMA MUSEUM of Natural History

Bulletin

Bulletin 21 April 2, 2000

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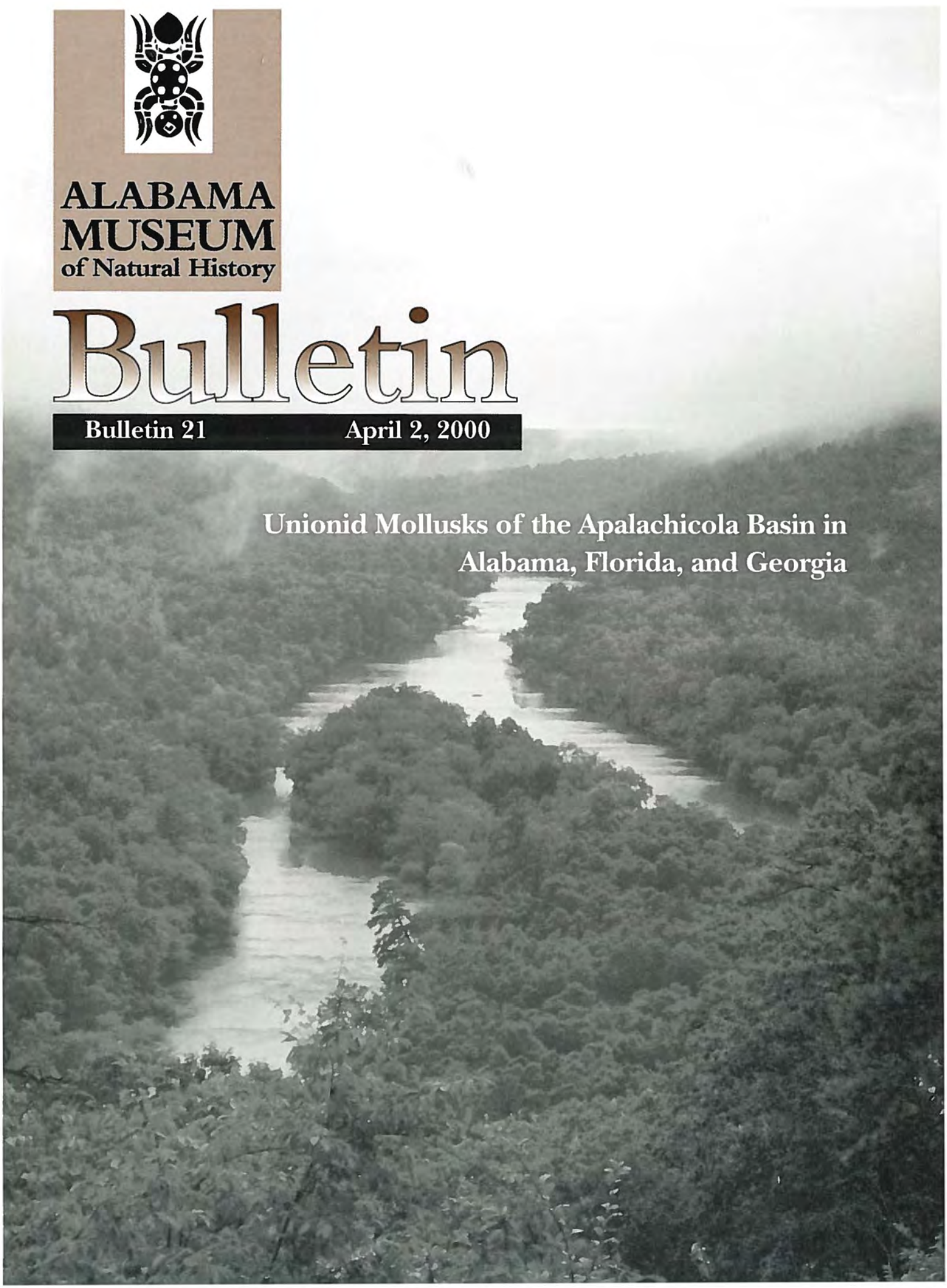

BULLETIN
ALABAMA MUSEUM OF NATURAL HISTORY

The scientific publication of the Alabama Museum of Natural History. Richard L. Mayden, Editor. John C. Hall, Managing Editor.

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The BULLETIN is devoted primarily to scholarship and research concerning the natural history of Alabama and the Southeast. It appears twice yearly in consecutively numbered issues.

Communication concerning manuscripts, style, and editorial policy should be addressed to: Editor, BULLETIN ALABAMA MUSEUM OF NATURAL HISTORY, The University of Alabama, Box 870340, Tuscaloosa, Alabama 35487-0340; telephone (205) 348-7550 or emailed to *mayden@bama.ua.edu*. Prospective authors should examine the Notice to Authors inside the back cover. A link to the Bulletin's website may be found at <<*http:/www.ua.edu/history.htm*>> .

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When citing this publication, authors are requested to use the following abbreviation: **Bull. Alabama Mus. Nat. Hist.**

ISSN: 0196-1039

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by Jayne Brim Box and James D. Williams

Photographs by Richard T. Bryant

THE UNIVERSITY OF ALABAMA
TUSCALOOSA, ALABAMA

April 2, 2000

Dedicated to
Herbert D. Athearn, Ruth D. Turner, and William J. Clench (posthumously)
for their contributions to our knowledge of southern unios

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Unionid Mollusks of the Apalachicola Basin in Alabama, Florida, and Georgia

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Abstract: The Apalachicola Basin, formed by the Apalachicola, Chattahoochee, and Flint (ACF) rivers, is one of the largest drainages in the eastern Gulf Coastal Plain. Historically, these rivers and their tributaries were known for their rich unionid populations but until recently a comprehensive study of the mussels had not been done. In 1991, a two-year study began to determine the status of the 33 species known from the ACF Basin. Collections were made, using SCUBA and snorkeling techniques, at over 300 sites in the channels and tributaries of the three rivers. More than 2,500 historical records were obtained from museums and other sources. Based on the results of this survey, two species are considered extinct throughout their range, two are extirpated from the basin, seven are endangered, three are threatened, six are of special concern, and thirteen are considered currently stable. A review of the systematics, distribution, habitat, and life history of each species is presented. Systematic, taxonomic, zoogeographic, and conservation issues concerning ACF unionid mussels are also presented.

INTRODUCTION

The North American freshwater mussel fauna is the richest in the world and historically probably numbered over 300 species (Stansbery, 1971). Within North America, the southeastern United States has more species than any other region, with about 80% of the fauna (Burch, 1973). North America's freshwater mussel fauna is in decline, however, with 7% of the species presumed extinct, 40% considered endangered or threatened, 24% of special concern, 24% stable, and about 5% undetermined (Williams and Neves, 1995). There appears to have been a precipitous decline in freshwater mussel populations throughout the southeastern region, including the Apalachicola, Chattahoochee, and Flint (ACF) Basin, in the past 40 years (Heard, 1970; Williams et al., 1993).

The ACF rivers form one of the largest basins in the eastern Gulf of Mexico and drain portions of east Alabama, west Georgia, and northwest Florida. River systems flowing into the eastern Gulf of Mexico, including drainages from the Suwannee River west to the Escambia River, are important areas for molluscan speciation and endemism, with about 56% of the fauna comprised of endemics (Butler, 1989). Within this area, the ACF Basin contains the greatest total number of mollusk species as well as endemics (Clench and Turner, 1956). This basin is thought to be a major center of unionid species origin. Six mussel species, three of which are endemic to the ACF Basin, were of particular concern in this study and were originally candidates for federal listing as threatened or endangered species by the U.S. Fish and Wildlife Service (USFWS, 1991). These species were the fat threeridge, *Amblema neislerii* (Lea, 1858b); the winged spike, *Elliptio*

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nigella (Lea, 1852a); the purple bankclimber, *Elliptoideus sloatianus* (Lea, 1840); the lined pocketbook, *Lampsilis binominata* Simpson, 1900; the shinyrayed pocketbook, *Lampsilis subangulata* (Lea, 1840); and the oval pigtoe, *Pleurobema pyriforme* (Lea, 1857a).

Mollusks are one of the best-sampled invertebrate groups largely because of the interest of shell collectors beginning in the 18th century (Barnes, 1980). These collections, many of which were made by private individuals and were later donated or purchased by natural history museums, form the backbone of our historical knowledge of unionid mussels. Collections from the ACF rivers date back to 1833, when Timothy A. Conrad traveled through the ACF Basin, passing over both the Flint and Chattahoochee rivers. He was unsuccessful in collecting mussels from the Chattahoochee River (Wheeler, 1935), but did obtain mussels from the Flint River. Conrad (1834a) described the first new species from the ACF Basin, *Quincuncina infucata*. From the 1830s to the 1870s, Isaac Lea of Philadelphia described over 60 species from the basin, 10 of which are recognized today. Lea received specimens from the ACF Basin from a wide range of collectors, including Major LeConte, Rev. George White, H. M. Neisler, Dr. Boykin, W. Spillman, G. Hallenbeck, J. Postell, J. H. Couper, and others (Clench and Turner, 1956).

Conrad (1834a) was the first to note that freshwater mussels from rivers draining the Gulf of Mexico differed from those of the Atlantic slope region, and that in the ACF Basin, some mixing of these two faunal groups occurred. Later, van der Schalie (1938) also reported that the basin consisted of a "strikingly peculiar fauna" that was distinct from the Alabama River drainage to the west and the Atlantic coastal drainages to the east. The biological uniqueness of the basin is due to a combination of factors including its geographic location, physiographic and geologic diversity, and its unglaciated status during the last glacial period (Adams and Hackney, 1992). Its relatively isolated geographic location, between the Alabama Basin to the west and the southern Atlantic Slope drainages to the east, is especially important, as faunal elements representing both regions are present in the ACF Basin. In addition, the unique geological features that occur where the upper Coastal Plain physiographic province meets the Piedmont has produced a diverse animal fauna that includes both Coastal Plain (southern) and Piedmont (northern) forms (Wharton, 1972).

In the early 1900s Herbert H. Smith of the Alabama Museum of Natural History and associates collected large numbers of mollusks from the ACF Basin. Smith, in collaboration with G. H. Clapp of Pittsburgh, B. Walker of Detroit, T. H. Aldrich of Washington, D.C., and H. A. Pilsbury of the Academy of Natural Sciences, Philadelphia (who later was replaced by J. B. Henderson), established the "syndicate" (Clapp, 1920). The members of this group financed the collecting, processing, and shipping of land shells and freshwater mollusks collected from the southeastern region, including the ACF Basin, by Smith and several local field collectors that he personally trained. Collections were made for the syndicate for about six years (1904 to 1910). Afterwards, Smith continued to collect freshwater mussels for Walker and land snails for Clapp. Clapp (1920) estimated that during this period, Smith and his co-workers collected from 40,000 to 50,000 specimens of unionids, as well as many thousands of snails.

Bryant Walker commissioned Smith to survey the Chipola River system, and that survey represented the first attempt to systematically sample one of the major ACF rivers for unionids. From 1916 to 1919, Joseph A. Burke of Barbour County, Alabama, and later his brother, Charles H. Burke of Crenshaw County, Alabama, whom Smith described as "the best collector that we have ever employed," surveyed the mainstem and selected tributaries of the Chipola River under Smith's direction. The Burkes visited a total of 25 sites in the mainstem and tributaries of the Chipola River, and many of the mussels collected in that survey were sent to Walker in Detroit. Walker left the shells in their original shipping containers, but never catalogued them, and van der Schalie (1940), the curator of mollusks at the University of Michigan Museum of Zoology, later catalogued and published the results of that survey.

Over the next 60 years, sporadic surveys were made in limited areas of the ACF Basin. In 1929, William Clench and Peter Okkelberg of the University of Michigan surveyed portions of the upper Flint and Chattahoochee rivers (as well as portions of the Altamaha River in Georgia). This was a reconnaissance trip to determine what river systems should be surveyed more completely in later expeditions. In 1933, Clench surveyed additional sites in the ACF Basin with Henry van der Schalie. In 1953, Clench, now at Harvard University, returned to the basin with his wife and Ruth D. Turner, also of Harvard University, with the intent to survey mussels in areas that would shortly be inundated by the completion of the Jim Woodruff Lock and Dam at the confluence of the Chattahoochee and Flint rivers, as well as Spring Creek, a major Flint River tributary (Clench, 1955). In 1954, they returned to the region to continue their survey, which now included river systems from the Escambia River east to the Suwannee River system (Clench and Turner, 1956). On this trip they were joined by Donald F. McMichael of the Australian Museum in Sydney. The success of this trip was due to widespread drought conditions that made the rivers "low and clear, making possible the collection of a rich fauna unavailable during a period of normal or high water" (Clench and Turner, 1956). The drought conditions allowed them to collect in the lower parts of the main channel of the Flint and Chattahoochee rivers, areas that were inaccessible in normal flow years (Clench, 1955). In the early 1960s, Clench returned to the ACF

Basin with Richard Johnson and Sam Fuller, and they surveyed several new sites that were not covered in the 1953–1954 survey. During this same time period (early 1940s through late 1960s) Herbert Athearn of the Museum of Fluviatile Mollusks surveyed over 30 sites, primarily in Chattahoochee and Flint river drainages.

The next systematic assessment of ACF unionids occurred in 1975, when William H. Heard of Florida State University conducted a survey of endangered mussels of the Gulf and southeastern states for the USFWS (Heard, 1975a). This survey consisted of 17 sites, 14 of which were mainstem localities. Heard (1977) also provided the first published list of unionids of the Apalachicola River drainage. During this same period, Jenkinson (1973) completed a survey of 21 sites from three Chattahoochee River tributaries. From 1967 to 1990, Harry Lee and Henry McCullagh, members of the Jacksonville Shell Club, collected mussels from 23 sites across all four major rivers of the basin. In 1982, Cliff Coney and Todd Macneir surveyed nine sites in the Flint and Chattahoochee river systems. Eugene Keferl of the Coastal Georgia Community College, Brunswick, Georgia, surveyed 26 sites in the basin from 1976 to 1991. Robert S. Butler of the USFWS made 29 collections from 25 sites between 1987 and 1993. Other individuals made sporadic, limited collections from the ACF Basin over a 160 year period.

Although isolated collections have been made in the ACF Basin for over 160 years, a comprehensive survey of the three major rivers of the basin and their tributaries had not been conducted. The primary objective of this study was to provide a comprehensive study of the historical and current distribution of all mussels in the three major rivers of the basin and their tributaries, and to obtain conservation status information on the six candidate endangered and threatened species. In addition to the distributional analysis, we also examined aspects of the biology and habitat requirements of all unionids collected.

Fig. 1. ACF Basin in Alabama, Florida, and Georgia. The Fall Line is indicated by a solid line.

STUDY AREA

The Apalachicola, Chattahoochee, and Flint rivers form one of the largest drainages in the eastern Gulf Coastal Plain, and drain portions of east Alabama, west Georgia, and northwest Florida (Fig. 1). The ACF Basin encompasses approximately 50,800 km^2 (Leitman et al., 1983) and drains parts of the Blue Ridge, Piedmont, and Coastal Plain physiographic provinces. The basin is one of the largest and longest in the southeastern U.S. and wholly or partially encompasses 77 counties in 3 states: Alabama (10), Florida (8), and Georgia (59) (Fig. 2).

The Apalachicola River originates at the confluence of the Chattahoochee and Flint rivers just north of the Florida/Georgia border. It is 182 km long and lies entirely within the Coastal Plain. It drains approximately 6,200 km^2, about half of which is the Chipola River system (Elder and Mattraw, 1984). It is the largest river in Florida with monthly mean discharges of approximately 25,000 cubic feet per second (cfs) and seasonal highs approaching 100,000 cfs (Livingston et al., 1974). The river has been named an Outstanding Florida Water (Florida Department of Natural Resources, 1989). The Apalachicola River is highly turbid due to the suspension of clays and fine sands. In addition, the predominantly sand and gravel river bottom forms continuously shifting bars, although in the upper river limestone outcroppings mitigate this effect (Livingston, 1992). A distinctive feature of the Apalachicola River is its dense bottomland hardwood forest that contains more than 1,500 trees per hectare (Mattraw and Elder, 1984). The average annual litter fall produced by this vegetation (800 g/m^2) makes the Apalachicola floodplain forest one of the most productive in warm temperate regions.

The Chipola River is the major tributary to the Apalachicola River and is the fourth largest river in the ACF Basin, draining approximately 1,649 km^2. The Chipola River begins in extreme southeastern Alabama, flows 177 km south into Florida, and empties into the Apalachicola River near Sumatra (Florida Department of Natural Resources, 1989). The river is considered a spring-fed river, containing many small spring runs as well

Fig. 2. Counties of the ACF Basin in Alabama, Florida, and Georgia.

as a first magnitude spring (discharge of at least 2.83 m^3s^{-1}), and is designated as an Outstanding Florida Water (Florida Department of Natural Resources, 1989).

The Chattahoochee River originates in the Blue Ridge Mountains of northern Georgia and flows approximately 702 km to its confluence with the Flint River at Lake Seminole on the tri-state boundary. For much of this distance it forms the border of Alabama and Georgia. The Fall Line, near Columbus, Georgia, marks the boundary of the Coastal Plain and the Piedmont physiographic provinces.

The Flint River originates in the crystalline rocks of the Piedmont, just south of Atlanta, and flows 564 km south to its confluence with the Chattahoochee River. Approximately 193 km of the Flint River lies in the Piedmont province, while the remaining 371 km are in the Coastal Plain, all within the state of Georgia.

There are 16 impoundments in the ACF Basin that were built between 1834 and 1975 (Fig. 3). The Chattahoochee River is impounded at 14 places, including the oldest dam in the basin, the Eagle-Phoenix Dam at Columbus (Ecological Specialists, 1992). The five largest dams in the basin, Buford, West Point, Barlett's Ferry, Walter F. George, and Jim Woodruff, influence seasonal, weekly and daily river flows (Leitman et al., 1983), and depending on annual rainfall, water is stored in the largest reservoirs for later release for recreation, navigation, and hydroelectric generation. The remaining dams, including the two on the Flint River, do not have an appreciable effect on seasonal and weekly flows and only minimally effect daily flows. Most of these smaller dams were built in the early 1900s. In addition to these 16 dams, Dead Lakes on the Chipola River was dammed in 1960,

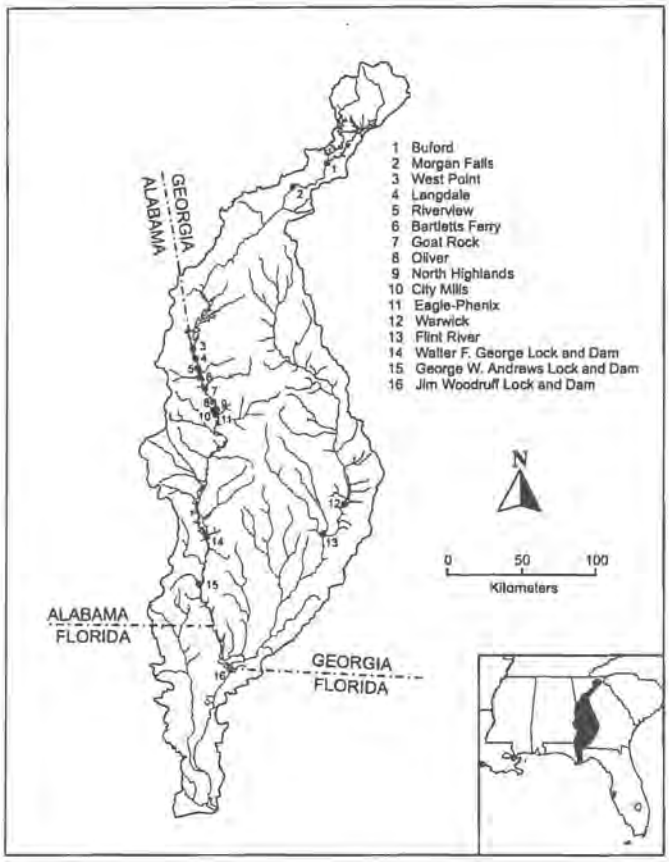

Fig. 3. Major impoundments in the ACF Basin.

although that structure was subsequently removed in 1987.

The ACF rivers have been maintained as a navigation channel discontinuously since the early 1800s (Thurston, 1973) and continuously since 1946 (Mesing and Hardin, 1990). The navigation channel extends from the Gulf of Mexico at the mouth of the Apalachicola River, north to Columbus, Georgia, on the Chattahoochee River, and northeast to Bainbridge, Georgia, on the Flint River. The physical alterations required to maintain a navigable channel included de-snagging, dredging, the building of 29 sets of groins to increase scouring (Couch et al., 1996), training-dikes and a lock, 7 channel straightenings to eliminate meanders, and the removal of limestone and rock outcroppings and shoals by blasting. In the Apalachicola River, yearly dredging is required to maintain the current navigation channel, and about 150 disposal sites for dredged material have been authorized for use (Leitman et al., 1983).

METHODS

In the summers of 1991 and 1992, collections were made in the channels and tributaries of the ACF Basin. The goal of this survey was to thoroughly sample all potential habitats where unionids could be found. Sites were picked based on the following criteria: to obtain a thorough and even coverage of the basin; to survey sites where, based on habitat characteristics, there was the maximum chance of encountering one of the target mussel species; and to re-survey as many of the historical sites as possible. Historical sites (e.g., Columbus, Georgia) that were known to be depauperate of mussels based on other surveys were not sampled.

This survey was conducted using timed searches. This technique has been shown to be just as effective as quantitative methods if the objective of the survey is to find the majority of mussel species present, as well as to locate rare species (Miller and Payne, 1993). All mussels were collected by hand using either SCUBA, snorkeling, or by direct observations in shallow areas. Mussels were collected by touch, as well as looking for trails, siphons, or shells. SCUBA divers were used at approximately 40% of the sites surveyed, snorkeling was used at 25% of the sites surveyed, and the remaining 35% of the sites were shallow enough to collect mussels without SCUBA or snorkeling. All possible habitats where mussels could occur were checked, including root mats, rock crevices, logs, etc.

The presence/absence of all mussels encountered and their relative abundance were recorded for each site. In addition, standard field data for each site were recorded, including drainage, locality, current, time, stream dimensions and conditions. Each site was sampled until no new species were found or all potential habitats where mussels could occur were surveyed.

In addition to the survey data, we have included the results of miscellaneous collections made in the basin between 1993 and 1996. These collections were primarily made by the authors in conjunction with other mussel studies.

All mussels returned to the laboratory were temporarily suspended in mesh bags in aerated tanks. Each bag was later emptied into plastic tubs and rinsed thoroughly. Live mussels were separated from shells, and the shells were identified and measured. Live mussels were relaxed using sodium pentobarbital. Following relaxation, mussels were fixed in 10% formalin, rinsed, and transferred to 70% ethanol. Fixed mussels were measured, identified to species, and sexed (when possible). Length-frequency histograms were generated based on live and/or fresh dead shells. All female mussels collected live and relaxed were later checked for the presence of glochidia. Glochidia were differentiated from eggs by the methods outlined in Lefevre and Curtis (1910). In general, where there was no apparent sexual dimorphism (e.g., *Elliptio*), all animals were checked for glochidia.

A thorough literature search was conducted to obtain published and unpublished records of unionids from the ACF Basin. Collections of major natural history museums were examined to obtain additional records. The historical information was used to identify sites where candidate species would likely be found, as well as to identify areas that needed more intensive survey coverage. This information was also used to establish a context for the interpretation of present data, in that the historical records served as a baseline for analyzing changes in distribution. This search included visits to natural history museums and solicitation from individuals and private collectors. For general purposes, any collection made prior to 1991 was considered to be a historical collection, and any historical information that could not be located within the basin was not included in the database.

Museum specimens examined in this study are housed in the collections of the following institutions: Academy of Natural Sciences of Philadelphia (ANSP); United States National Museum (USNM), Smithsonian Institution; Museum of Comparative Zoology (MCZ), Harvard University; Field Museum of Natural History (FMNH), Chicago; Museum of Fluviatile Mollusks (MFM), Cleveland, Tennessee; Museum of Zoology (UMMZ), University of Michigan; Museum of Zoology (OSUM), Ohio State University; Florida Museum of Natural History (FLMNH), University of Florida; Carnegie Museum of Natural History (CM), Pittsburgh. During our museum visits, we occasionally encountered several species that were catalogued as a single lot. The original museum number was retained for each species identified from these lots.

Records were also obtained from private collectors, often from their personal field notes. Additional records were obtained from unpublished (e.g., gray literature) as well as published sources. These records were reported using the collector's initials followed by either the

collector's field number (when available), or a number we designated for record keeping purposes, and are as follows: AE = A. Edwards, University of Georgia Museum of Natural History, Athens, Georgia; BHW = B. H. Wright (1899); BF = B. Forrer, personal communication, Northfield, Ohio; CC = C. Coney, deceased, formerly Los Angeles County Museum; DS = D. Shelton, personal communication, Mobile, Alabama; DC = D. Cox, unpublished report, 1970, Florida Game and Fresh Water Fish Commission, Tallahassee, Florida; EPK = E. P. Keferl, personal field notes, Coastal Community College, Brunswick, Georgia; FSU = small research collection of W. H. Heard at Florida State University, Tallahassee, Florida; GTW = G. T. Watters, personal field notes, Ohio State University Museum, Columbus, Ohio; GWP = G. W. Percy (1976); HGL = H. G. Lee, personal field notes, Jacksonville, Florida; HV = H. van der Schalie (1940); IL = I. Lea (1863d); JCB = J. Brim Box, survey collections, U.S. Geological Survey, Gainesville, Florida; JDW = J. D. Williams, survey collections, U.S. Geological Survey, Gainesville, Florida; JJJ = J. J. Jenkinson (1973); LAA = L. A. Ager, unpublished report (1987), Florida Game and Fresh Water Fish Commission, Tallahassee, Florida; PWP = P. W. Parmalee, personal communication, University of Tennessee, Knoxville, Tennessee; RIJ = R. I. Johnson (1977); RSB = R. S. Butler, personal field notes, U.S. Fish and Wildlife Service, Asheville, North Carolina; SLY = S. L. Yarbourgh, unpublished report, Columbus Museum, Columbus, Georgia; WHH = W. H. Heard (1964, 1975a, 1977); WHM = W. H. McCullagh, personal field notes, Jacksonville, Florida; WJC = W. J. Clench and R. D. Turner (1956). For most records, the number of specimens collected are given in parentheses after the museum or field number. In cases where the number of individuals was not reported, the letters "NR" are used in place of numbers.

Computer-based maps were generated from the historical and present survey data reported in the distribution records section. These maps illustrated the present and historic distribution of each freshwater mussel species in the ACF Basin. Because each dot on the distribution maps covers over five miles, some dots overlap and therefore all occurrences may not be visible. Some records were not included in the distribution records or maps because of the vagueness of the locality data. For instance, two records of *Elliptio fraterna* from the USNM were not plotted on maps or listed in the distribution records because the accompanying information only said "Chattahoochee River." This included several type specimens listed in synonymy. The locality data present in the distribution records were, in some cases, changed to add additional information. For example, the tags accompanying many museum specimens simply stated "Columbus, Georgia." For those records, we added the county and drainage.

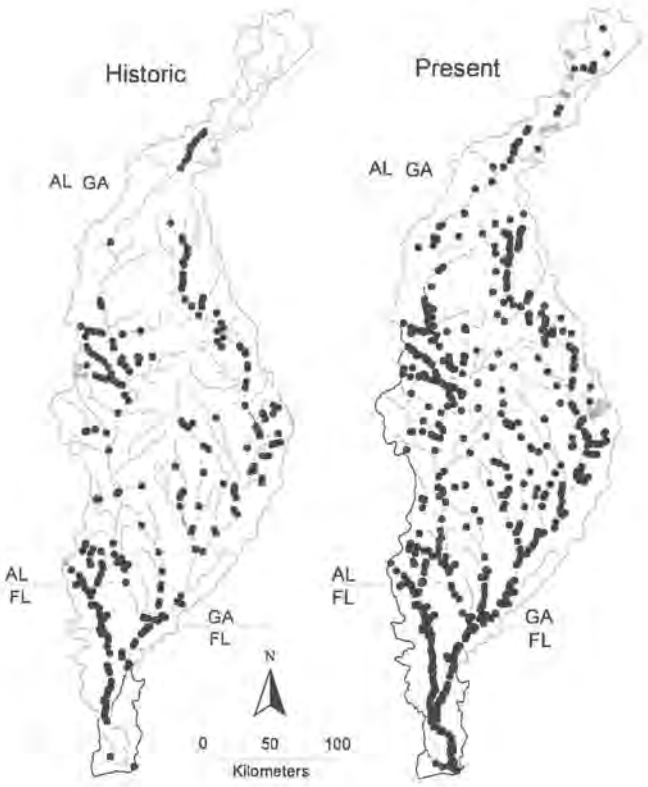

Fig. 4. Historical and current collection sites in the ACF Basin.

RESULTS

Over 2,600 historical records of 33 species of freshwater mussels from the ACF Basin were collected from natural history museums, private collections, and published and unpublished sources. These records encompassed approximately 260 sites (Fig. 4). The timing of historic collections occurred sporadically over the past 160 years. Significant collecting efforts in the basin were made during four time periods: pre-1900, between 1910 and 1920, the 1950s, and post-1970 (Fig. 5).

The historical data indicated that mussels were widespread and relatively common to abundant at numerous sites in the ACF Basin. Museum lots and literature records documented scores, even hundreds, of specimens of one or more species from many sites in the basin. In addition, the common occurrence of juvenile specimens in many museum collections substantiated population viability and indicated reproduction at the time of the historic collections.

A total of 5,757 live animals and 2,988 shells of 29 species was found from 324 sites in 1991–92 (Table 1). Approximately 620 person-hours in 81 days were spent in the water looking for mussels in this survey, with an average of 1.9 person-hours per site. The person-hours per site ranged from 0.3 to 7.6.

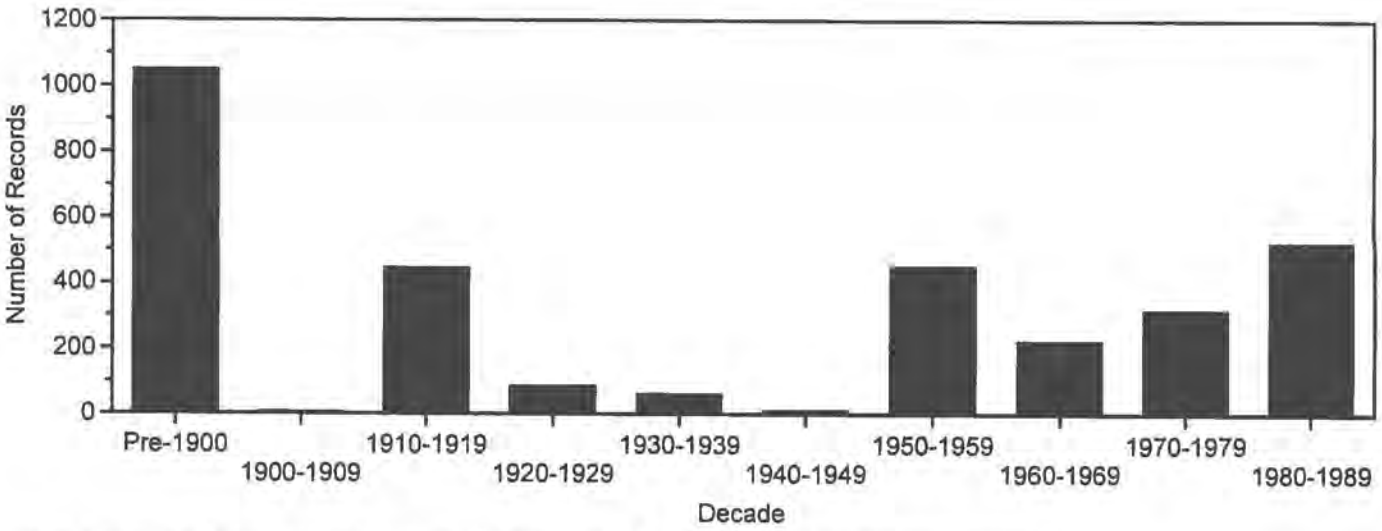

Fig. 5. Periods of significant collecting effort in the ACF Basin, based on museum records.

Historically, 27 species were known from the mainstem and direct tributaries of the Apalachicola River. In this survey, 300 live animals and 424 shells were collected from 35 mainstem sites. An additional 104 live animals and 151 shells of 8 species were collected from 15 tributary sites. The mainstem of the Apalachicola River continues to harbor three big-river species, two of which were originally candidates for listing (USFWS, 1991). Populations of *Elliptoideus sloatianus* and *Megalonaias nervosa* were found immediately below Jim Woodruff Lock and Dam, especially in limestone/sand habitats. *Amblema neislerii*, although once reported to be common below the dam, was now rare. *Amblema neislerii* and *M. nervosa* also persist in the Chipola River mainstem, although *E. sloatianus* was not found in the Chipola River system in this survey. Historically, 28 mussel species were known from the Chipola River system. In addition, van der Schalie (1940) reported 21 species we recognize today from the mainstem of the Chipola River. In this survey, 30 mainstem sites were visited and 384 live animals and 291 shells of 19 species were found. Of the 21 species van der Schalie reported from the mainstem of the river, only *Strophitus subvexus* and *Medionidus penicillatus* were not found in the current survey, although the latter species was found to be common in a Chipola River tributary in 1994. An additional 77 live animals and 82 shells of 12 species were collected from 2 Chipola River tributaries in 1991 and 1992.

Some of the most productive historical localities were non-productive during the current survey. In this survey, although 44 sites were sampled in the mainstem (including impoundments) of the Chattahoochee River, only 5 species were found. Historically, 30 species were known from the Chattahoochee River system, with more than 35 nominal species described from near Columbus, Georgia. Of these nominal species, eight are recognized today. Only one of these eight species, *Toxolasma paulus*, was found in unimpounded stretches of the mainstem of the Chattahoochee River in this survey. In Chattahoochee tributaries, 64 sites were visited and 368 live mussels and 135 shells of 16 species were found.

Mussels were more abundant in the Flint River system than the Chattahoochee River system. Sixty sites were surveyed in the mainstem of the Flint River, and 1,087 live animals and 555 shells of 22 species were found. Historically, 29 species were known from the Flint River system, and this river system is the type locality for *Amblema neislerii*, *Elliptio purpurella*, and *Quincuncina infucata*. Live *Q. infucata* and *E. purpurella* were found in the Flint River system during this survey, but live *A. neislerii* were not. A few weathered *A. neislerii* shells were found in the Lake Seminole arm of the lower Flint River. An additional 3,402 live mussels and 1,270 shells were found from 74 tributary sites.

Based on survey results, several major Flint River tributaries harbor diverse mussel faunas. Sixteen species were found in Kinchafoonee Creek, 14 species were found in Muckalee Creek, and 9 species were found in Chickasawhatchee Creek. Three listed species, *Lampsilis subangulata*, *Medionidus penicillatus*, and *Pleurobema pyriforme*, were found in each of these creeks, and these tributaries contained some of the highest mussel diversity of the 324 sites surveyed. All three streams are in the Coastal Plain within a five-county area of southwestern Georgia. In comparison, the mussel faunas of some historically productive Flint River tributaries in the Piedmont appear to be in decline. For instance, there are historical records of *Anodontoides radiatus*, *Alasmidonta triangulata*, *Elliptoideus sloatianus*, *L. binominata*, *L. subangulata*, and *M. penicillatus* from Line Creek at the Georgia Route 16 crossing. All of these species are either federally listed as endangered or threatened, extinct, or

Table 1. Number of live mussels and shells found during the 1991 to 1992 survey. Additional specimens that were found in 1994 through 1996 are not included in this table, because in most cases only presence/absence was noted.

SPECIES	COMMON NAME	Live animals	Shells
Alasmidonta triangulata	Southern elktoe	2	0
Amblema neislerii	Fat threeridge	32	37
Anodonta heardi	Apalachicola floater	1	18
Anodontoides radiatus	Rayed creekshell	2	1
Elliptio arctata	Delicate spike	99	21
Elliptio chipolaensis	Chipola slabshell	11	1
Elliptio complanata	Eastern elliptio	1,769	755
Elliptio crassidens	Elephantear	524	374
Elliptio fraterna	Brother spike	0	0
Elliptio icterina	Variable spike	664	113
Elliptio nigella	Winged spike	0	0
Elliptio purpurella	Inflated spike	369	16
Elliptoideus sloatianus	Purple bankclimber	102	79
Glebula rotundata	Round pearlshell	199	226
Lampsilis binominata	Lined pocketbook	0	0
Lampsilis straminea claibornensis	Southern fatmucket	15	59
Lampsilis subangulata	Shinyrayed pocketbook	44	22
Lampsilis teres	Yellow sandshell	100	300
Lasmigona subviridis	Green floater	0	0
Medionidus penicillatus	Gulf moccasinshell	10	3
Megalonaias nervosa	Washboard	87	100
Pleurobema pyriforme	Oval pigtoe	84	13
Pyganodon cataracta	Eastern floater	1	1
Pyganodon grandis	Giant floater	35	52
Quincuncina infucata	Sculptured pigtoe	235	122
Strophitus subvexus	Southern creekmussel	5	1
Toxolasma paulus	Iridescent lilliput	360	137
Uniomerus carolinianus	Florida pondhorn	74	71
Utterbackia imbecillis	Paper pondshell	61	113
Utterbackia peggyae	Florida floater	32	69
Villosa lienosa	Little spectaclecase	531	176
Villosa vibex	Southern rainbow	269	70
Villosa villosa	Downy rainbow	40	38
TOTAL		5,757	2,988

considered endangered in the basin (Table 2). During this survey and a subsequent survey of Line Creek in 1995 (Butler and Brim Box, 1996), only *A. radiatus* and *L. subangulata* were found at the Georgia Route 16 crossing.

The average mussel species richness was calculated, based on the 1991–1992 survey data, for each of the 12 USGS hydrological units that occur in the ACF Basin. Average species richness per site was highest in the Kinchafoonee-Muckalee unit (Fig. 6). The Chattahoochee River system had the lowest average species richness per site (0.7) from 108 sites, especially compared to the Flint River system, where 134 sites were surveyed and the average species richness per site was 4.3. An average of three and four species was found in the Apalachicola and Chipola river systems, respectively.

Of the 33 species in the ACF Basin, 6 were originally candidates for federal listing as endangered or threatened species (USFWS, 1991). In 1994 two additional species, *Elliptio chipolaensis* and *Medionidus penicillatus*, were proposed for listing (USFWS, 1994). Of these eight species, which represent 24% of the ACF mussel fauna, two endemic species, *Elliptio nigella* and *Lampsilis binominata*, were not found in the current survey and are presumed extinct (Table 2). The other six species have been listed as threatened or endangered (USFWS, 1998).

Of the 110 sites where the mussels listed as endangered or threatened were historically collected, 42 were re-surveyed. One or more of the listed mussel species persisted at 20 (48%) of the historical sites re-surveyed. In addition, one or more of the listed species was found at 31 new sites

in this survey. Of those historical sites where listed species were not found in the current survey, we can conclude from the historical record that the listed species disappeared from 60% of these sites in the last 30 years.

SPECIES ACCOUNTS

The following 33 species accounts for the ACF Basin mussels are arranged in alphabetical order. We have used common and scientific names suggested by Turgeon et al. (1998). Each account includes headings for synonomy, diagnostic characters, overall distribution, ACF historical distribution and abundance, ACF distribution and abundance, habitat, life history, and conservation status. The above headings are generally self-explanatory with the exception of synonomy. In the synonomy we have included the citation for the original species description, type locality, and type specimen. In many cases, the process that led to the designation of a type specimen is confusing. During the late 1800s and early 1900s descriptions of new species did not include any reference to a type specimen. These early species descriptions did refer to a specimen(s) from one or more localities that were examined by the author. Most descriptions did not include a figured specimen. As was typical of the day, most of Isaac Lea's original descriptions of new species were published without a figured specimen. However, in subsequent publications, I. Lea often provided an illustration of a specimen used in the original description, either in his Observations of the genus Unio or other publications such as the Transactions of the American Philosophical Society. In an attempt to stabilize unionid taxonomy, Johnson (1967b, 1974, 1975), Johnson and Baker (1973), and Clench and Turner (1956) refer to the specimen figured by the author in the original or subsequent description as the "figured holotype." In most cases, to conform to provisions of the international code of zoological nomenclature, specimens referred to as the "figured holotype" are, in fact, the lectotype. If there were additional specimens referred to in the original description, other than the one subsequently figured, these became paralectotypes.

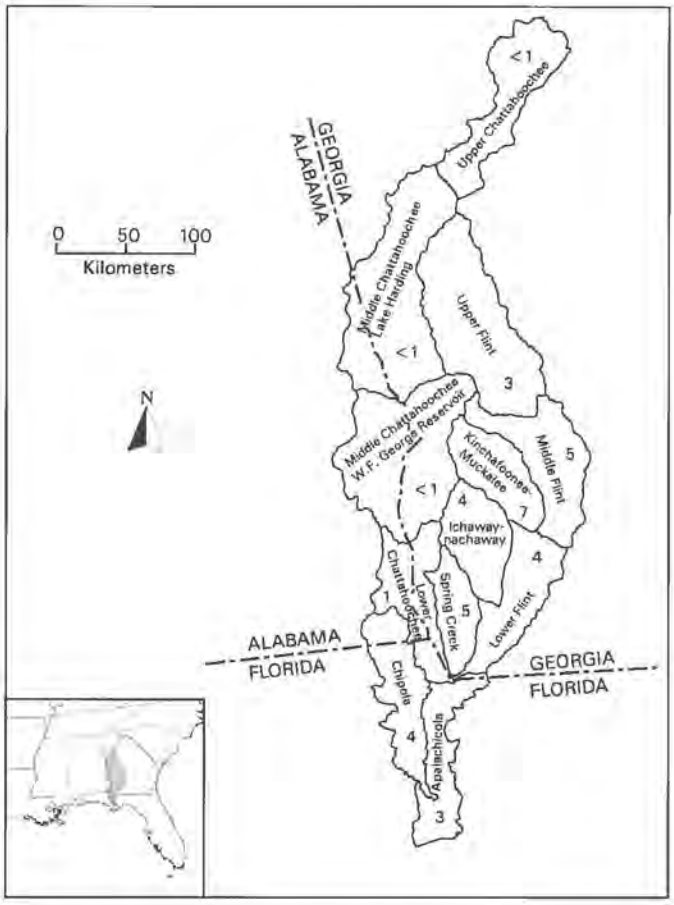

Fig. 6. Average species richness for each hydrologic unit based on the 1991–1992 survey data.

Table 2. Conservation status of the freshwater mussel fauna of the ACF Basin based on Williams et al. (1993), our current assessment of the species status within the ACF Basin, and U.S. Fish and Wildlife Service status. Species status is categorized as CS = Currently Stable; E = Endangered; EX = Endangered, Possibly Extinct; SC = Special Concern; T = Threatened; X = Extinct; XT = Extirpated; and * denotes that the species was not recognized in 1993, and was considered part of a wider ranging species by Williams et al. (1993).

SPECIES	COMMON NAME	WILLIAMS ET AL. 1993	ACF BASIN	USFWS STATUS
Alasmidonta triangulata	Southern elktoe	SC*	E	
Amblema neislerii	Fat threeridge	E	E	E
Anodonta heardi	Apalachicola floater	CS*	T	
Anodontoides radiatus	Rayed creekshell	SC	E	
Elliptio arctata	Delicate spike	T	SC	
Elliptio chipolaensis	Chipola slabshell	T	T	T
Elliptio complanata	Eastern elliptio	CS	CS	
Elliptio crassidens	Elephantear	CS	CS	
Elliptio fraterna	Brother spike	E	XT	
Elliptio icterina	Variable spike	CS	CS	
Elliptio nigella	Winged spike	E	X	
Elliptio purpurella	Inflated spike	CS*	SC	
Elliptoideus sloatianus	Purple bankclimber	T	T	T
Glebula rotundata	Round pearlshell	CS	CS	
Lampsilis binominata	Lined pocketbook	EX	X	
Lampsilis straminea claibornensis	Southern fatmucket	CS	SC	
Lampsilis subangulata	Shinyrayed pocketbook	T	E	E
Lampsilis teres	Yellow sandshell	CS	CS	
Lasmigona subviridis	Green floater	T	XT	
Medionidus penicillatus	Gulf moccasinshell	E	E	E
Megalonaias nervosa	Washboard	CS	CS	
Pleurobema pyriforme	Oval pigtoe	E	E	E
Pyganodon cataracta	Eastern floater	CS	SC	
Pyganodon grandis	Giant floater	CS	CS	
Quincuncina infucata	Sculptured pigtoe	SC	SC	
Strophitus subvexus	Southern creekmussel	SC	E	
Toxolasma paulus	Iridescent lilliput	CS	CS	
Uniomerus carolinianus	Florida pondhorn	CS	CS	
Utterbackia imbecillis	Paper pondshell	CS	CS	
Utterbackia peggyae	Florida floater	CS	CS	
Villosa lienosa	Little spectaclecase	CS	CS	
Villosa vibex	Southern rainbow	CS	CS	
Villosa villosa	Downy rainbow	SC	SC	

Fig. 7. *Alasmidonta triangulata*, **length 39 mm. MCZ 254754: [Chattahoochee River], Columbus, Muscogee County, Georgia. Photo copyrighted by Richard T. Bryant.**

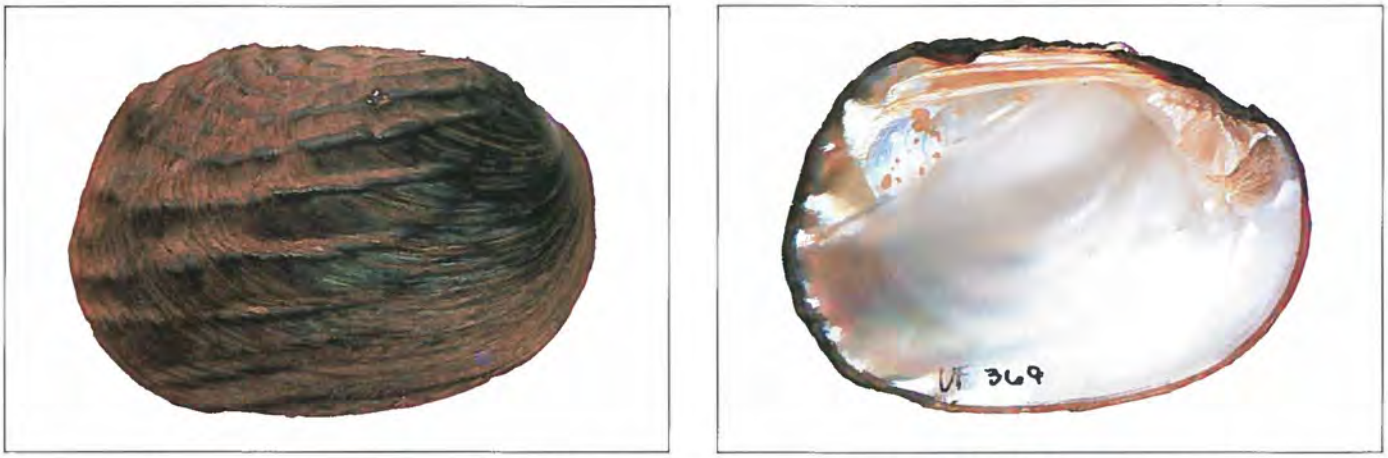

Fig. 8. *Amblema neislerii*, **length 70 mm. FLMNH 369: Chipola River, Dead Lake at Chipola Park, 20 mi. S of Blountstown, Calhoun County, Florida, 3 September 1954. Photo copyrighted by Richard T. Bryant.**

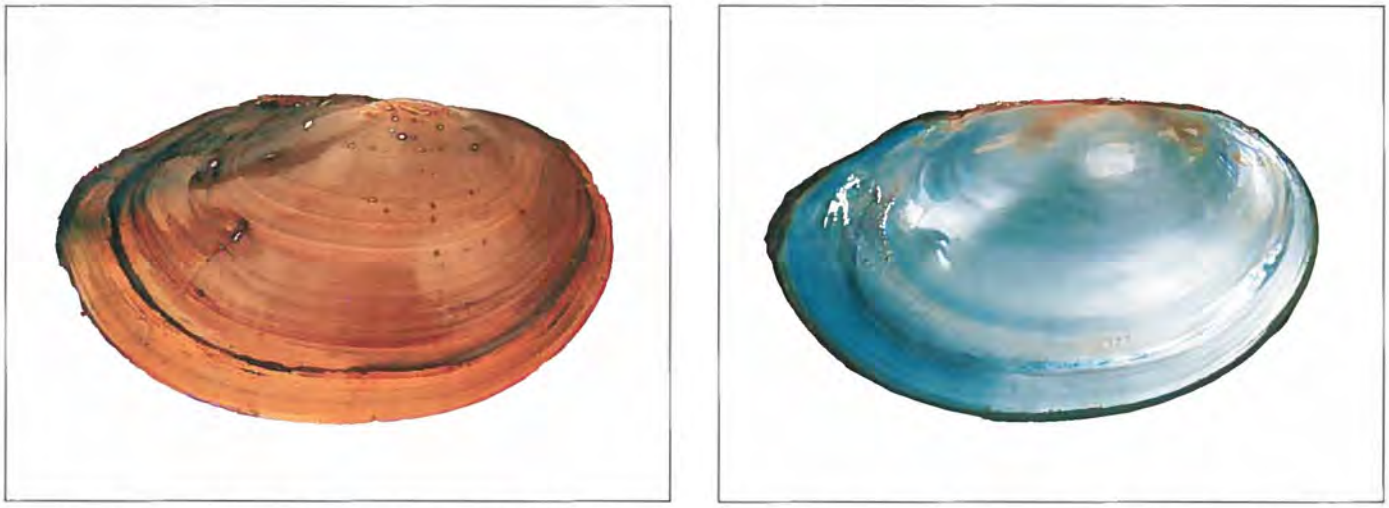

Fig. 9. *Anodonta heardi*, **length 113 mm. JCB91-102: Harrison Creek at first 180-degree bend above confluence of Brothers River, along north side of bend (W of Apalachicola River navigation mile 14.8), Franklin County, Florida, 7 September 1991. Photo copyrighted by Richard T. Bryant.**

Fig. 10. *Anodontoides radiatus*, **length 48 mm. FLMNH 64086: Sandy Creek, near Evergreen, Conecuh County, Alabama [Escambia River drainage], May 1910. Photo copyrighted by Richard T. Bryant.**

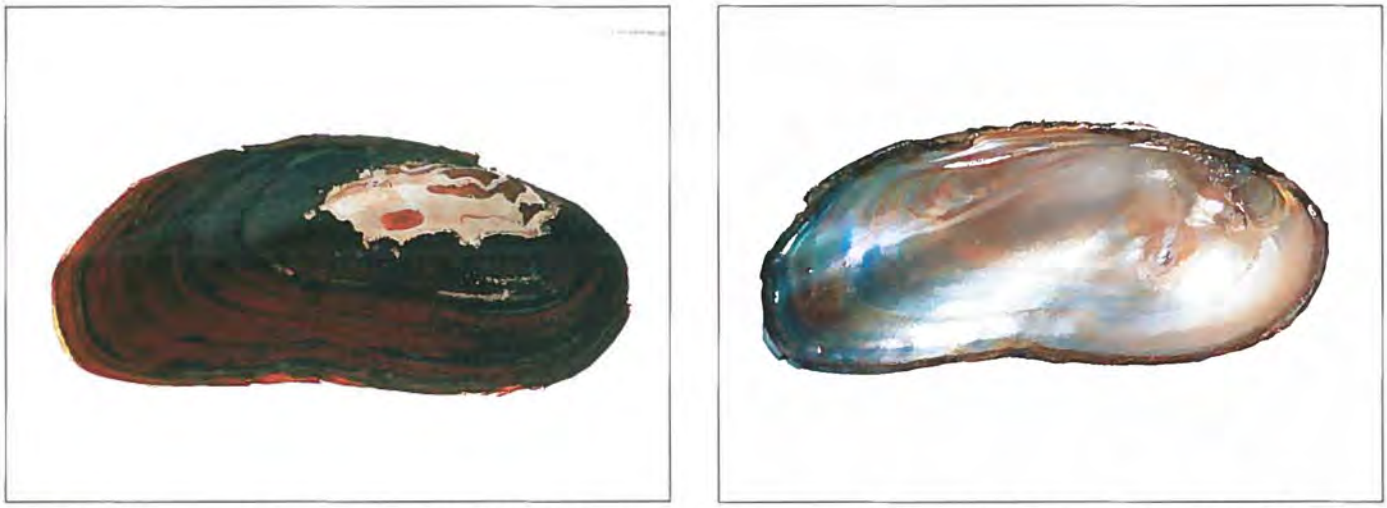

Fig. 11. *Elliptio arctata*, **length 66 mm. JCB91-019: Apalachicola River at navigation mile 92.5 just S of Rock Bluff Landing, Liberty County, Florida, 18 June 1991. Photo copyrighted by Richard T. Bryant.**

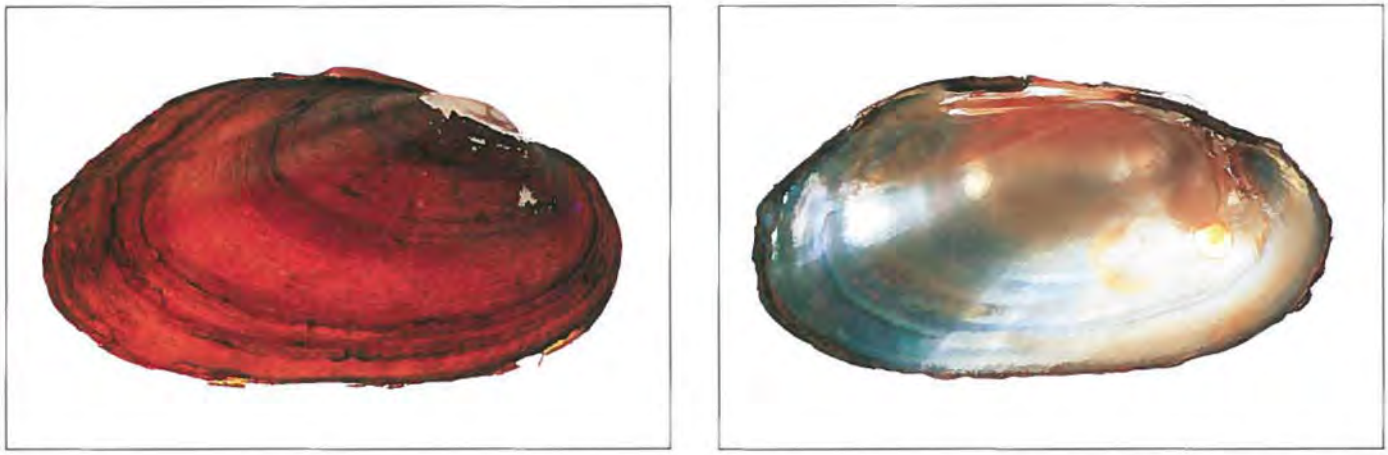

Fig. 12. *Elliptio chipolaensis*, **length 43 mm. JCB91-037: Chipola River near river mile 53.1, Bullet Bend, Calhoun County, Florida, 25 June 1991. Photo copyrighted by Richard T. Bryant.**

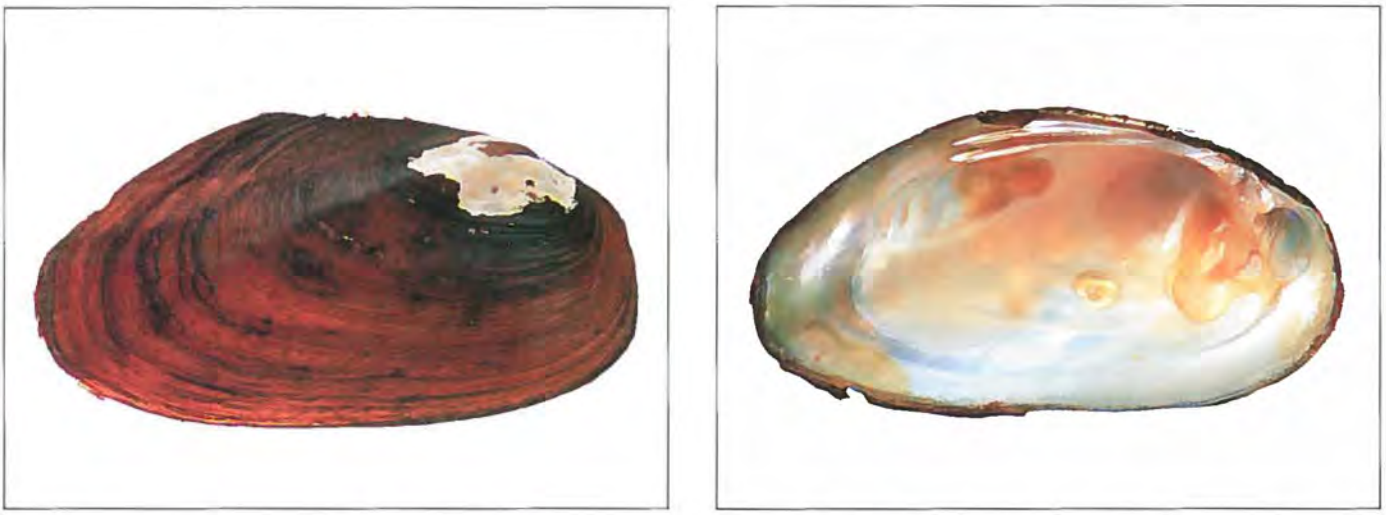

Fig. 13. *Elliptio complanata*, **length 69 mm. JCB92-205: Lake Seminole in Spring Creek, ca. 1 river mile above Smith Landing Rd., ca. 10 air mi. W of Bainbridge, Decatur County, Georgia, 25 September 1992. Photo copyrighted by Richard T. Bryant.**

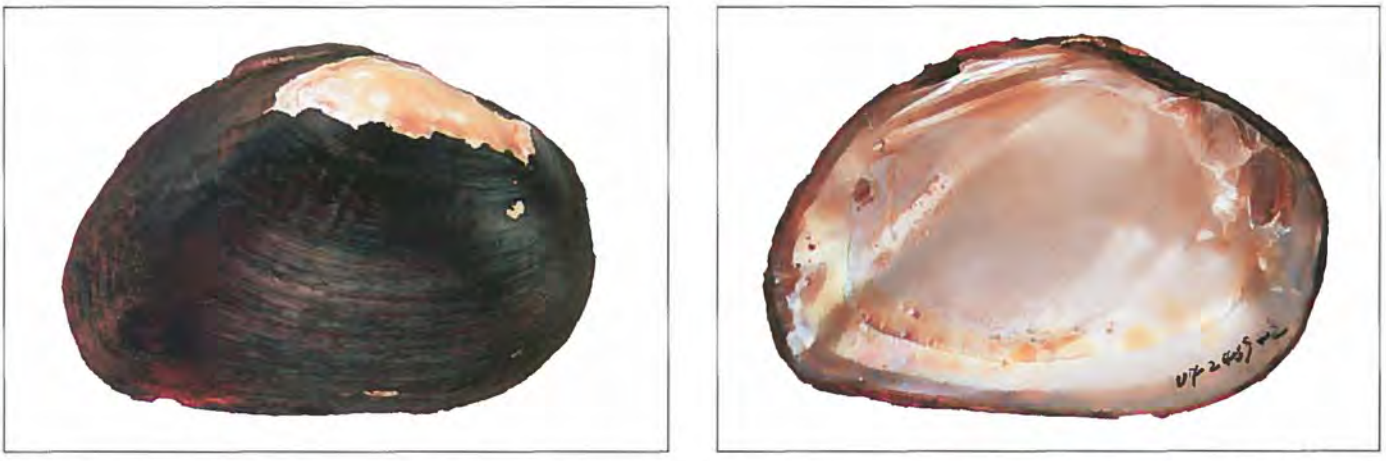

Fig. 14. *Elliptio crassidens*, **length 72 mm. FLMNH 243942: Chipola River, 1.3 mi. above FL 71 bridge, 12 mi. SW of Blountstown, Calhoun County, Florida, 23 August 1980. Photo copyrighted by Richard T. Bryant.**

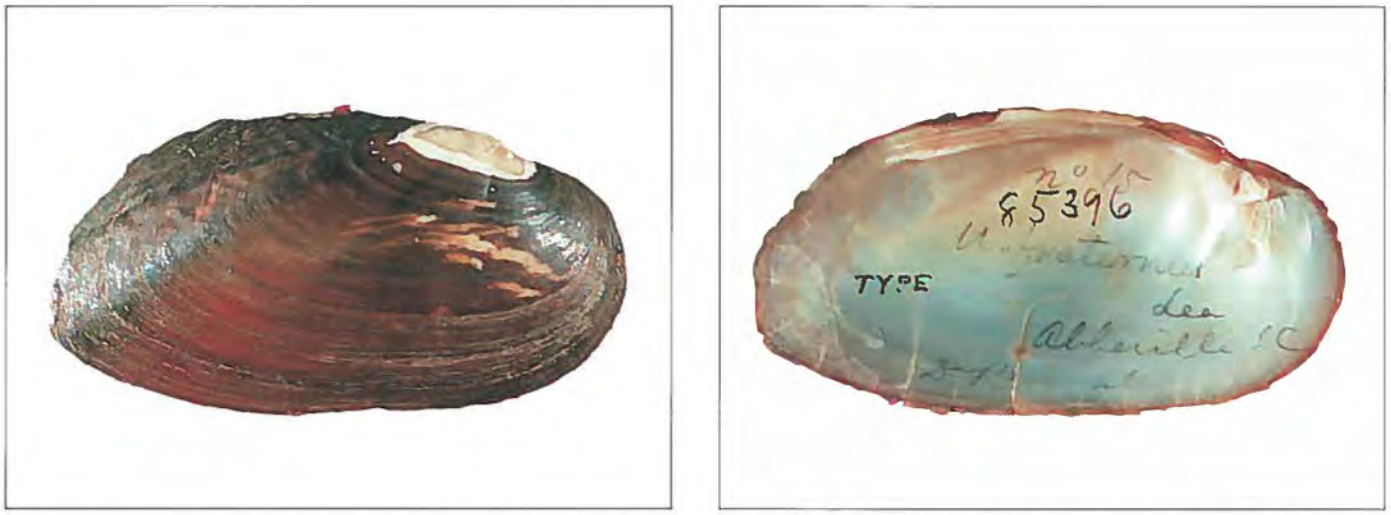

Fig. 15. *Elliptio fraterna*, length 61 mm. USNM 85396: Abbeville District [Savannah River drainage], South Carolina, before 1852. Photo by James D. Williams.

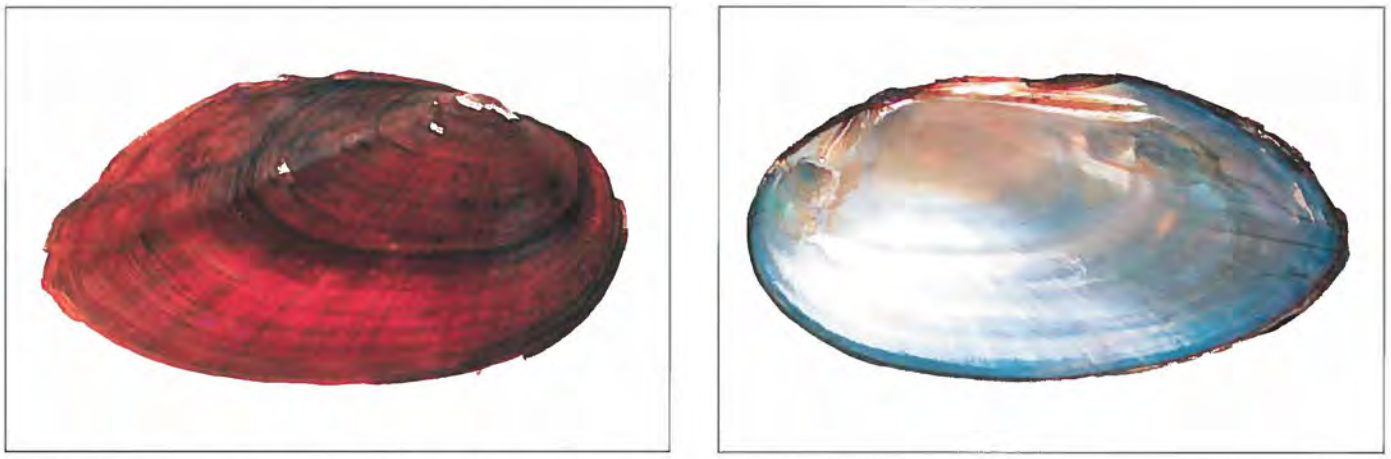

Fig. 16. *Elliptio icterina*, length 42.5 mm. JCB92-130: Potato Creek at GA Rt. 74, ca. 2.25 air mi. WNW of Thomaston, Upson County, Georgia, 23 July 1992. Photo copyrighted by Richard T. Bryant.

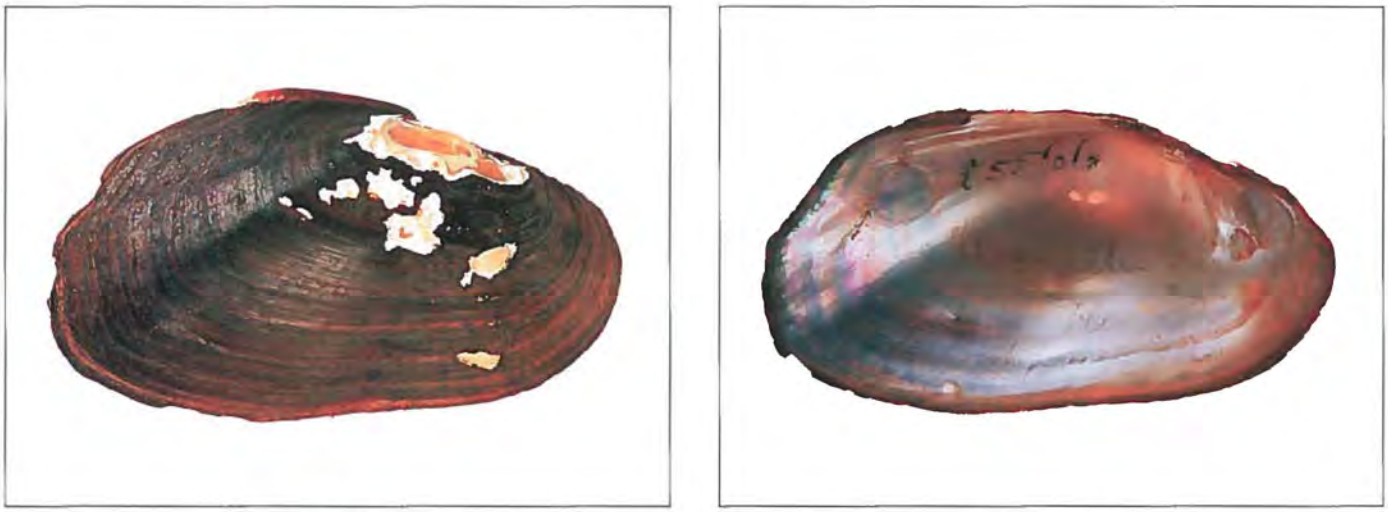

Fig. 17. *Elliptio nigella*, length 55 mm. USNM 85566: Flint River, near Albany, Dougherty County, Georgia. Photo copyrighted by Richard T. Bryant.

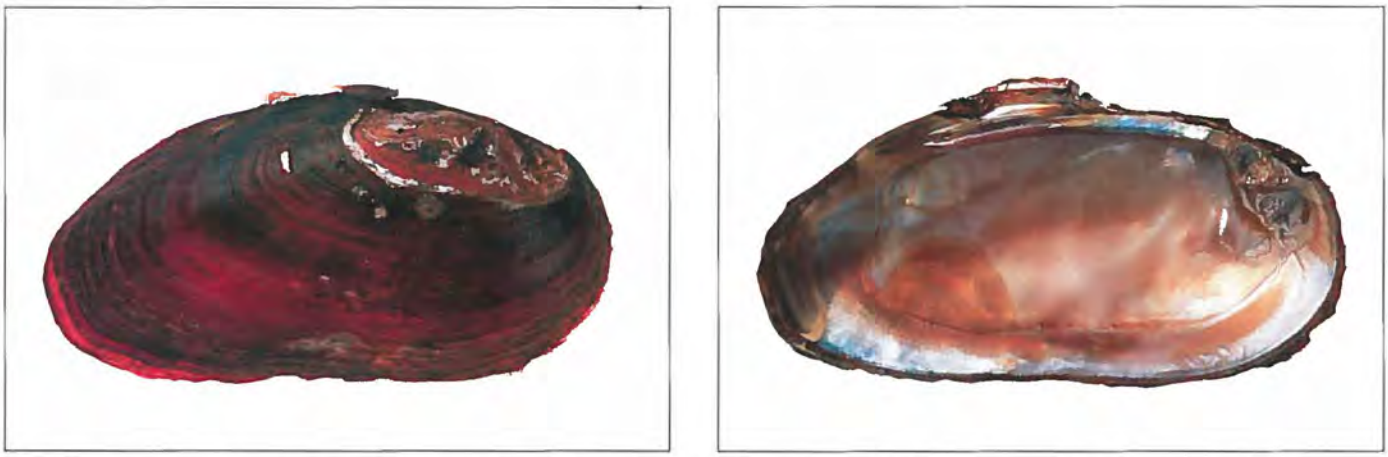

Fig. 18. *Elliptio purpurella*, length 49 mm. JCB92-159: Muckalee Creek at GA 195, 3.5 air mi. NE of Leesburg, Lee County, Georgia, 11 August 1992. Photo copyrighted by Richard T. Bryant.

Fig. 19. *Elliptoideus sloatianus*, **length 117 mm. JCB92-200: Flint River, ca. 2 air mi. above boat ramp at end of CR345, ca. 6 air mi. above U.S. Rt. 84 (Bainbridge) at bend with large limestone outcrop, Decatur County, Georgia, 24 September 1992. Photo copyrighted by Richard T. Bryant.**

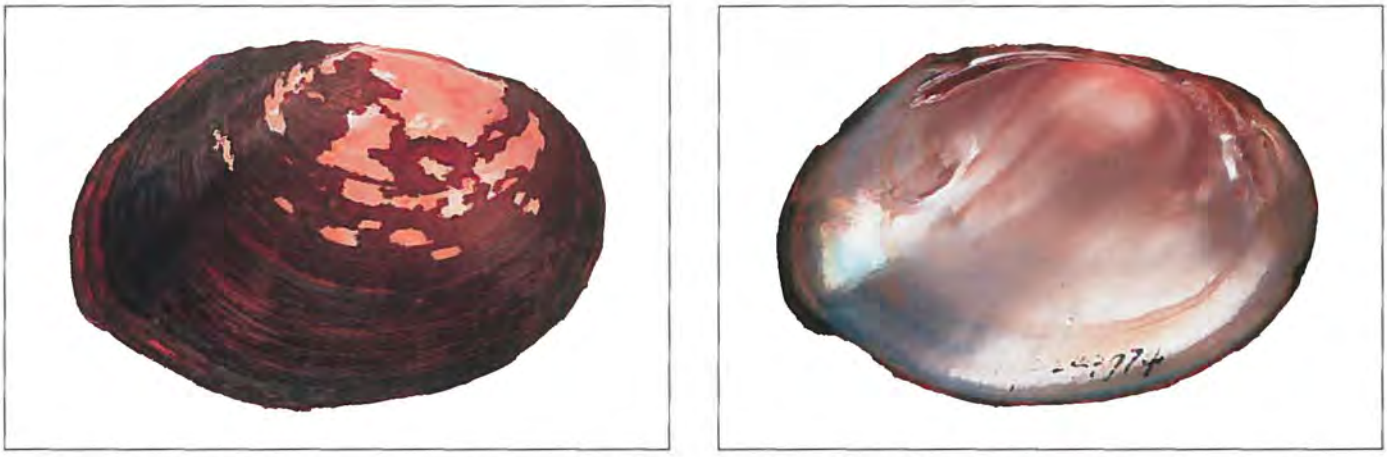

Fig. 20. *Glebula rotundata*, **length 67 mm (exterior), 58 mm (interior). FLMNH 243974: Chipola River, 200 m S of FL 22A bridge, 4 mi. E of Wewahitchka, Gulf County, Florida, 14 August 1988. Photo copyrighted by Richard T. Bryant.**

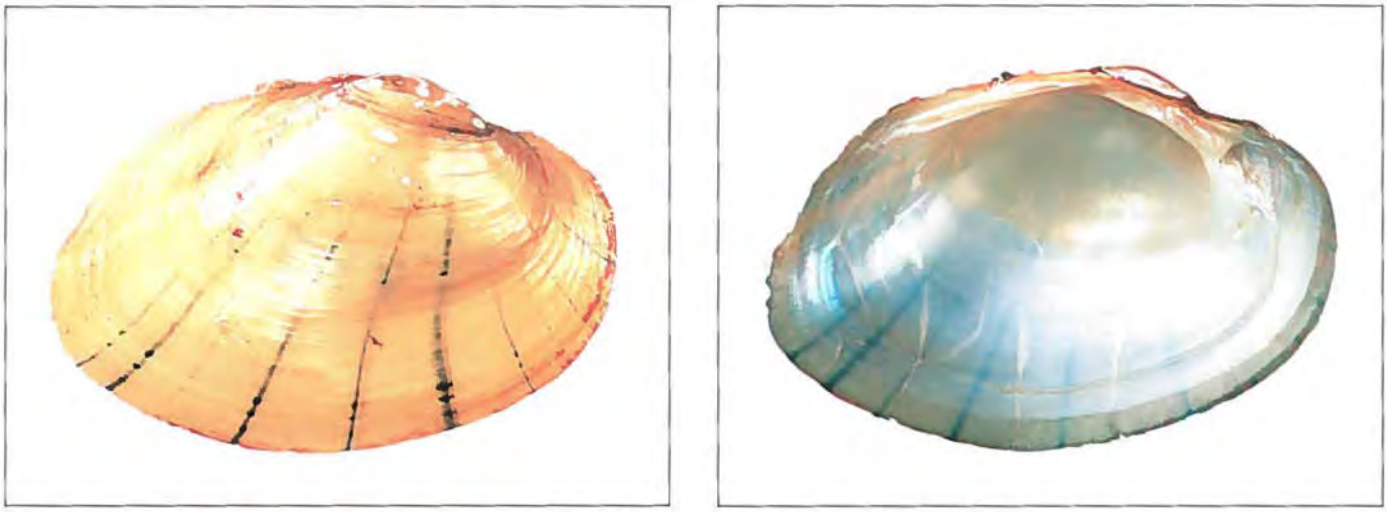

Fig. 21. *Lampsilis binominata*, length 37 mm. USNM 84883: [Chattahoochee River], Columbus, Muscogee County, Georgia. Photo copyrighted by Richard T. Bryant.

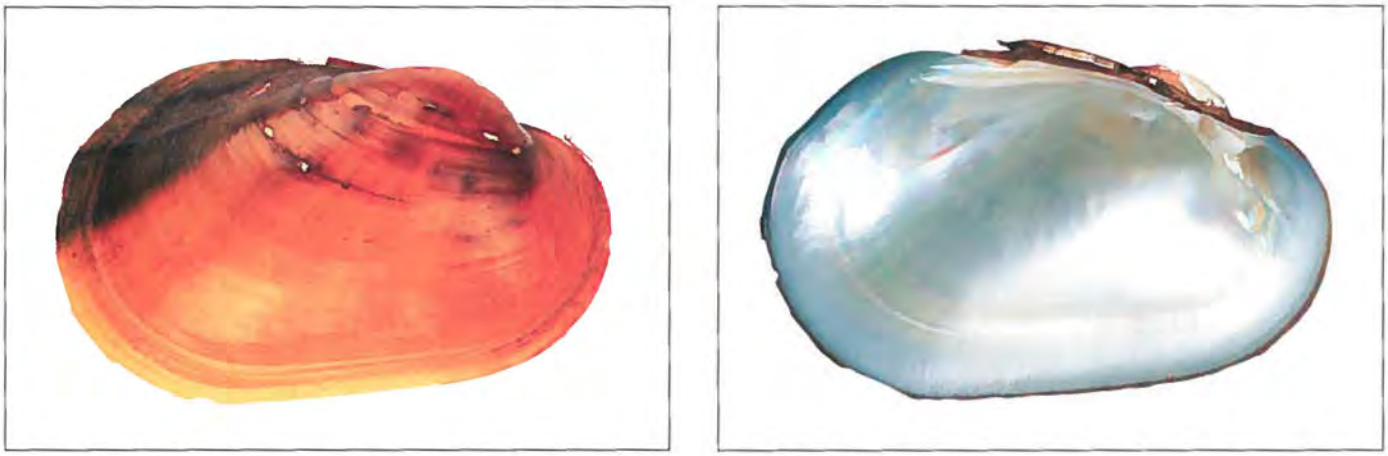

Fig. 22. *Lampsilis straminea claibornensis*, length 58 mm. JCB91-90: Chipola River, 0.1 mi. above confluence of Apalachicola River, navigation mile 27.9, along east bank, Gulf County, Florida, 11 August 1990. Photo copyrighted by Richard T. Bryant.

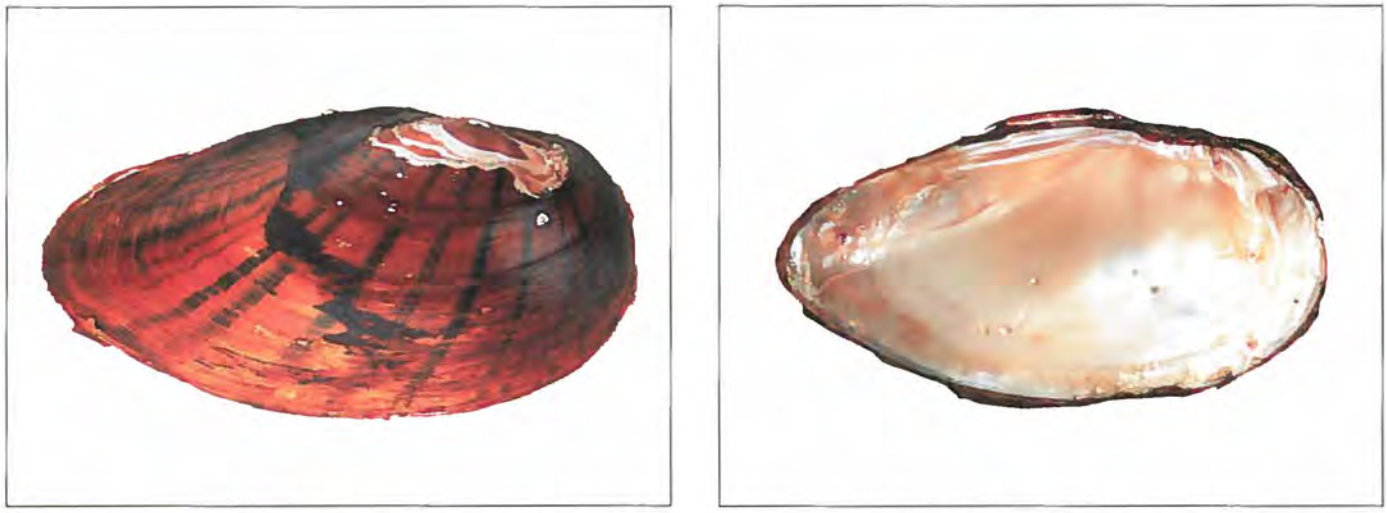

Fig. 23. *Lampsilis subangulata*, length 70 mm. JCB92-155: Kinchafoonee Creek at GA Rt. 45, ca. 5.5 air mi. SW of Plains, ca. 8.5 air mi. SE of Preston, Webster County, Georgia, 10 August 1992. Photo copyrighted by Richard T. Bryant.

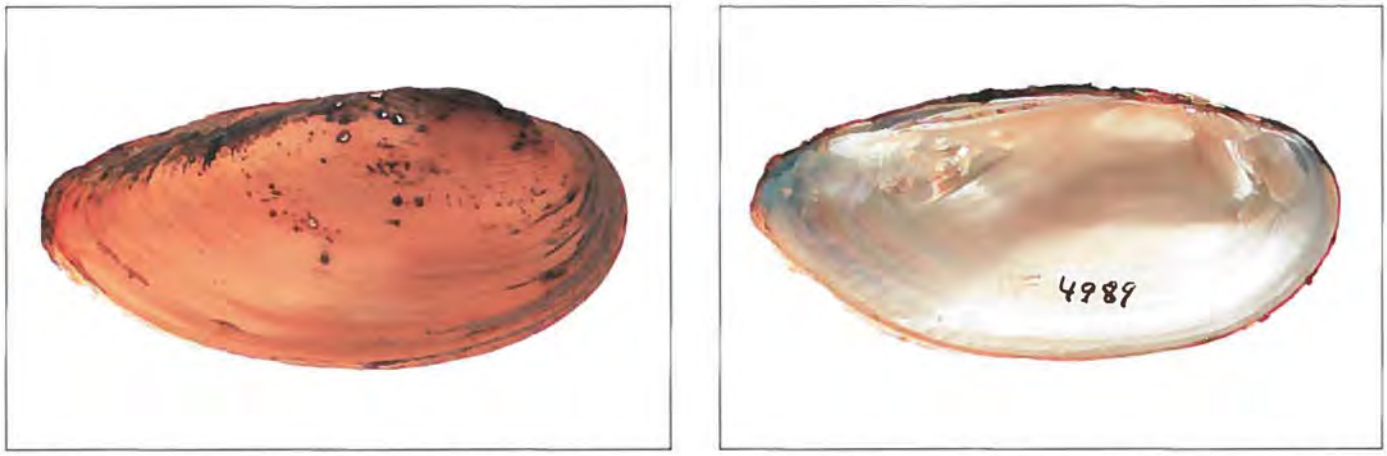

Fig. 24. *Lampsilis teres*, length 86 mm. FLMNH 4989: Mosquito Creek, 1 mi. S of Chattahoochee, Gadsden County, Florida, October 1953. Photo copyrighted by Richard T. Bryant.

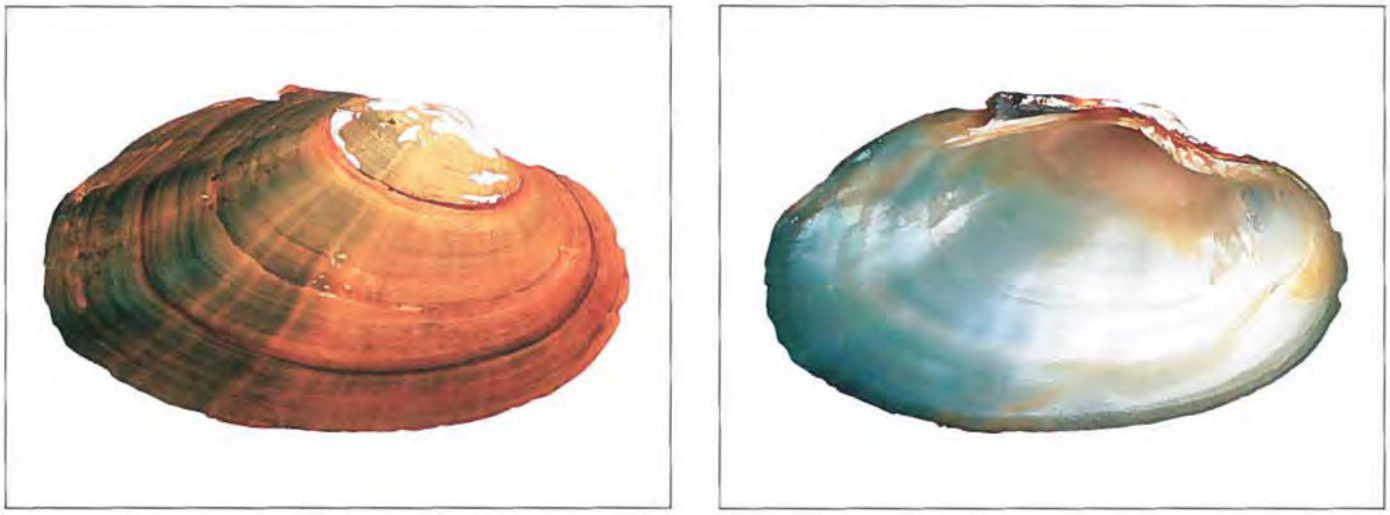

Fig. 25. *Lasmigona subviridis*, length 48 mm. UMMZ 23324: Chattahoochee River at Columbus, Muscogee County, Georgia. Photo copyrighted by Richard T. Bryant.

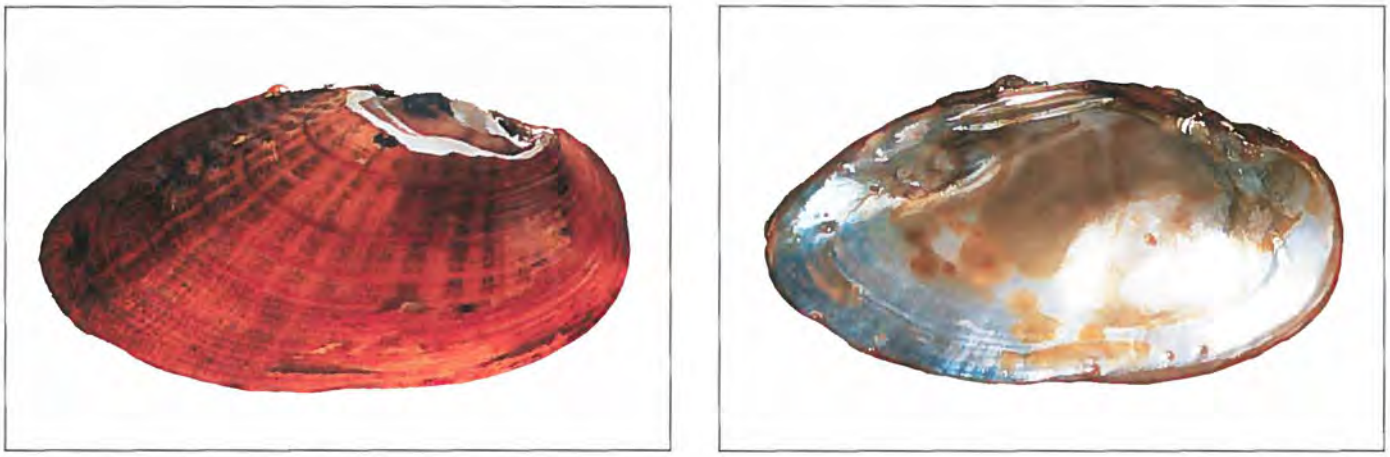

Fig. 26. *Medionidus penicillatus*, length 36 mm. JCB92-155: Kinchafoonee Creek at GA Rt. 45, ca. 5.5 air mi. SW of Plains, ca. 8.5 air mi. SE of Preston, Webster County, Georgia, 10 August 1992. Photo copyrighted by Richard T. Bryant.

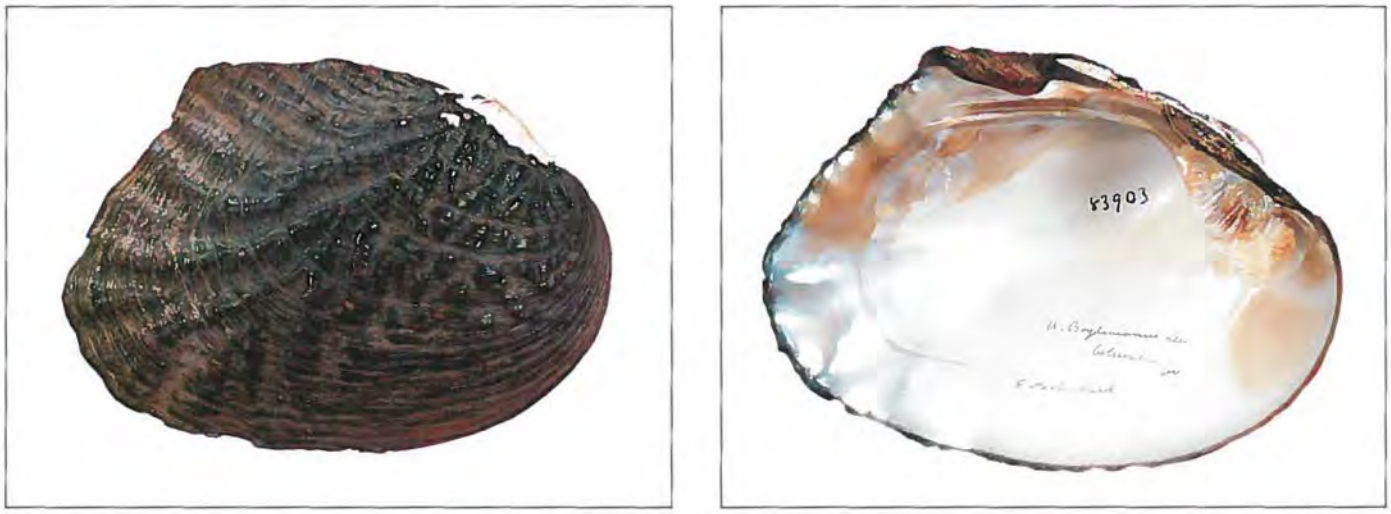

Fig. 27. *Megalonaias nervosa*, **length 118 mm. USNM 83903: Chattahoochee River, Columbus, [Muscogee County], Georgia, 1840. Photo copyrighted by Richard T. Bryant.**

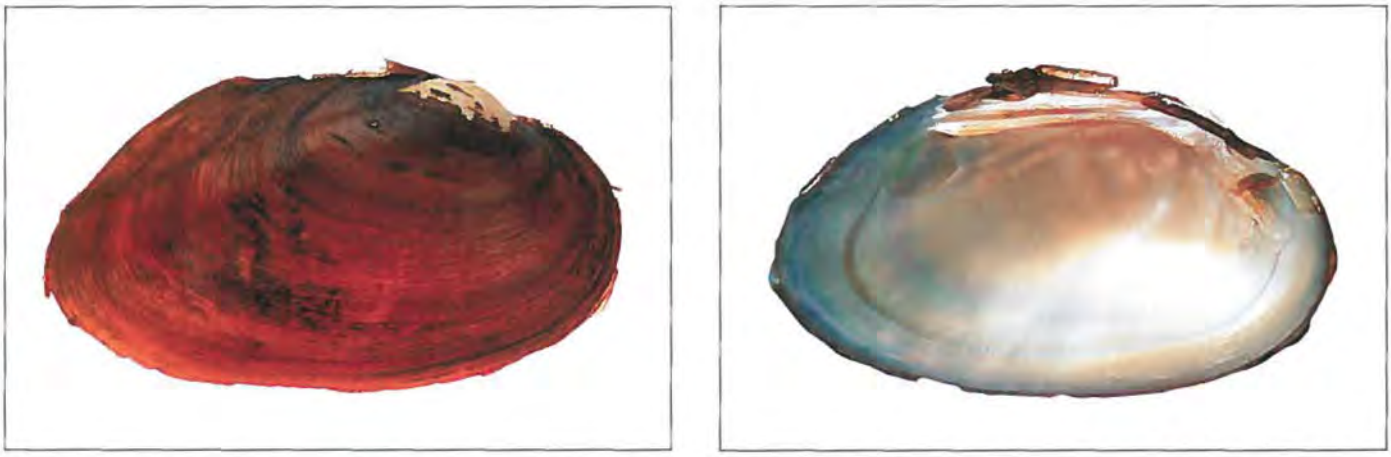

Fig. 28. *Pleurobema pyriforme*, **length 39 mm. JCB91-119: Chipola River at river mile 62.5, confluence of Sink Creek, along east bank, Jackson County, Florida, 14 August 1991. Photo copyrighted by Richard T. Bryant.**

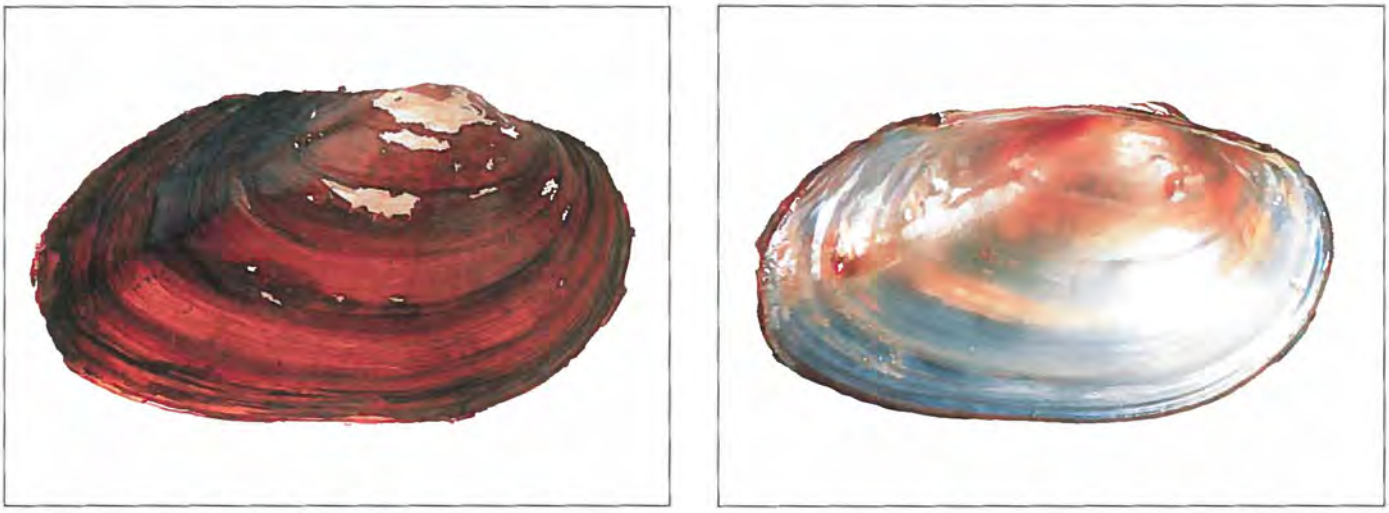

Fig. 29. *Pyganodon cataracta*, length 92 mm. JCB91-90: Chipola River, 0.1 mi. above confluence of Apalachicola River, navigation mile 27.9, along east bank, Gulf County, Florida, 11 August 1990. Photo copyrighted by Richard T. Bryant.

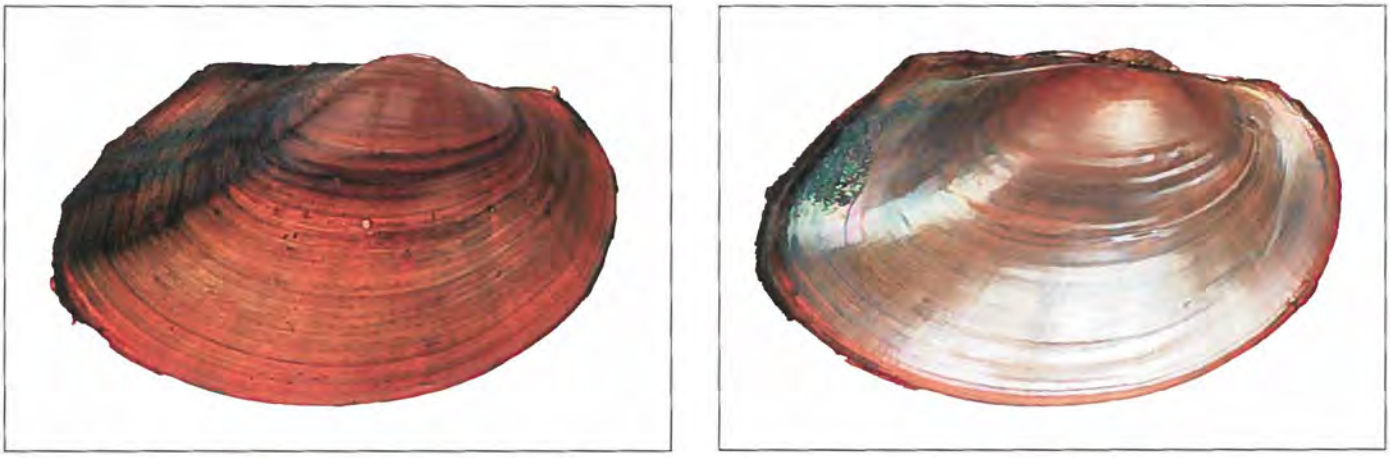

Fig. 30. *Pyganodon grandis*, length 84 mm. JCB91-102: Harrison Creek at first 180-degree bend above confluence of Brothers River, along north side of bend (W of Apalachicola River navigation mile 14.8), Franklin County, Florida, 7 September 1991. Photo copyrighted by Richard T. Bryant.

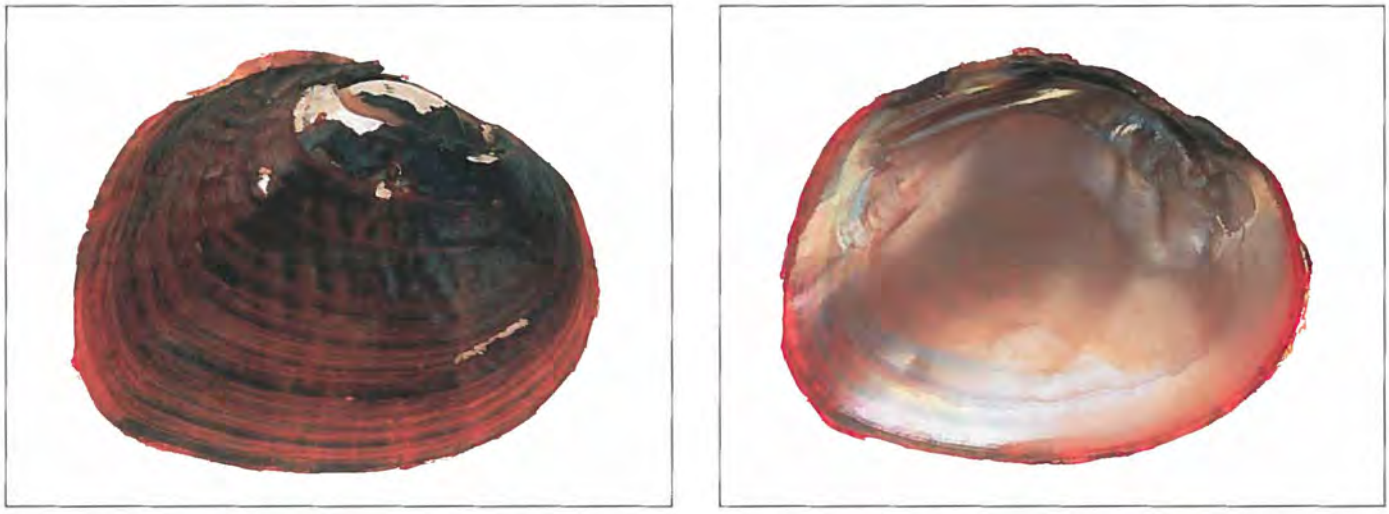

Fig. 31. *Quincuncina infucata*, length 38 mm. JCB92-159: Muckalee Creek at GA 195, ca. 3.5 air mi. NE of Leesburg, Lee County, Georgia, 11 August 1992. Photo copyrighted by Richard T. Bryant.

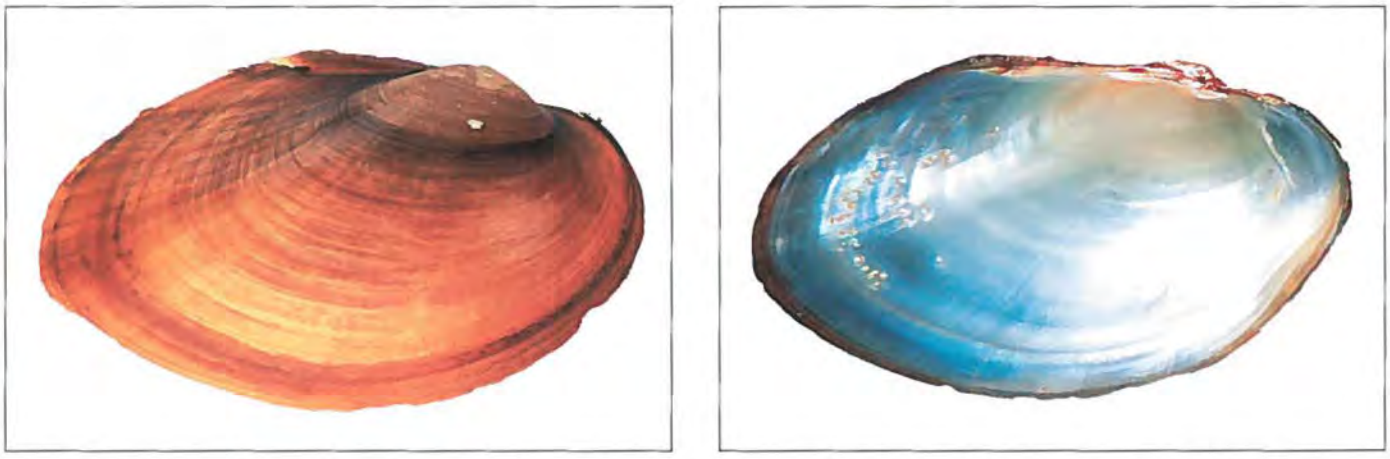

Fig. 32. *Strophitus subvexus*, length 49 mm. JCB92-172: Kinchafoonee Creek at CR123, ca. 5.25 air mi. NW of Preston, Webster County, Georgia, 2 September 1992. Photo copyrighted by Richard T. Bryant.

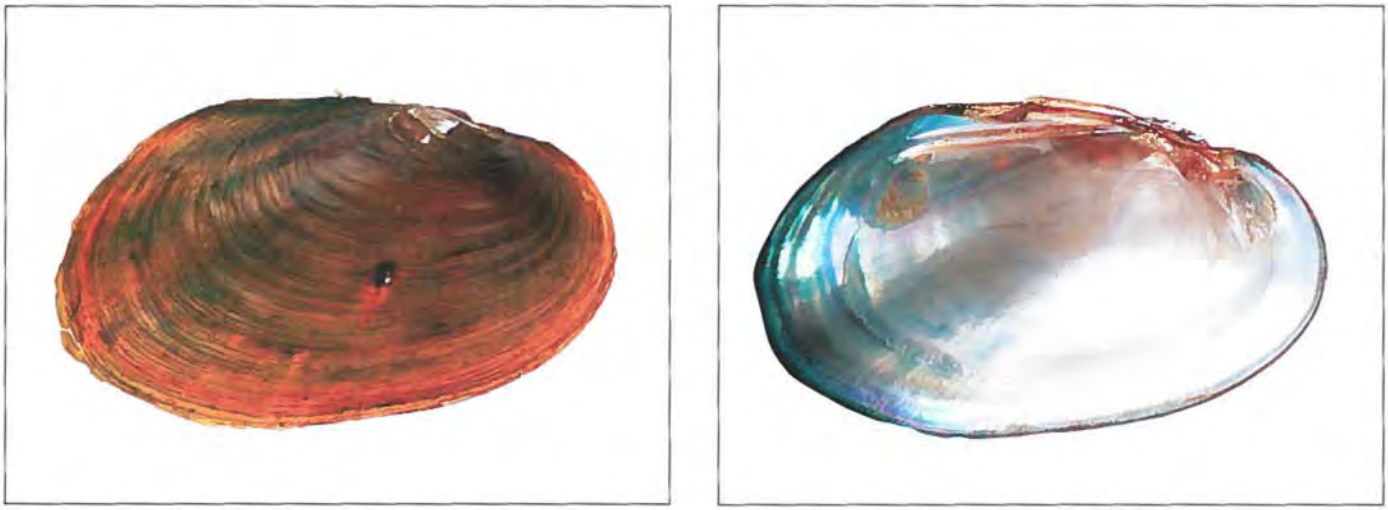

Fig. 33. *Toxolasma paulus*, **length 22 mm. JCB92-058: Mill Creek at GA Rt. 300, ca. 7.5 mi. SSW of Oakfield, Worth County, Georgia, 10 June 1992. Photo copyrighted by Richard T. Bryant.**

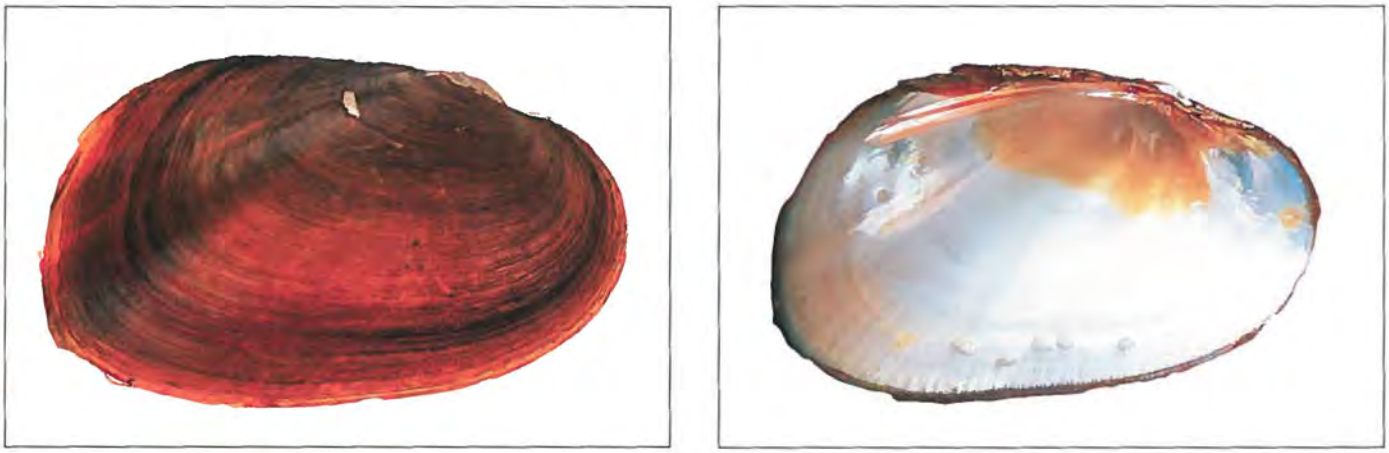

Fig. 34. *Uniomerus carolinianus*, **length 40.5 mm. JCB92-063: Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond, ca. 7.25 air mi. SSW of Oakfield, Worth County, Georgia, 10 June 1992. Photo copyrighted by Richard T. Bryant.**

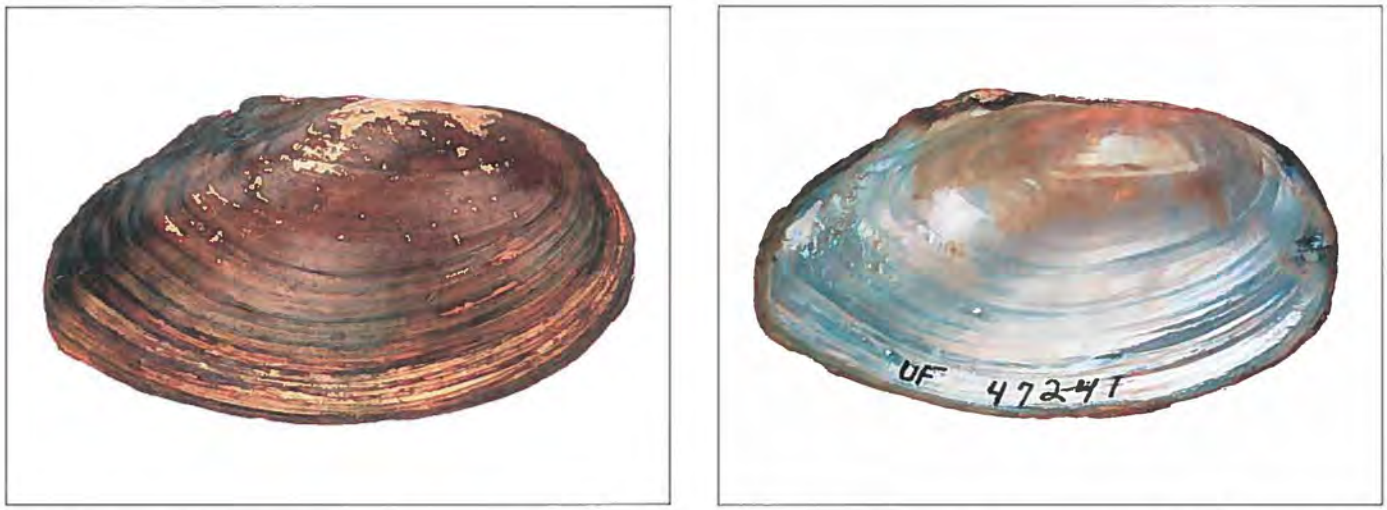

Fig. 35. *Utterbackia imbecillis*, **length 84 mm. FLMNH 47241: Apalachicola River below Jim Woodruff Dam at Chattahoochee, Gadsden County, Florida, 18 May 1974. Photo copyrighted by Richard T. Bryant.**

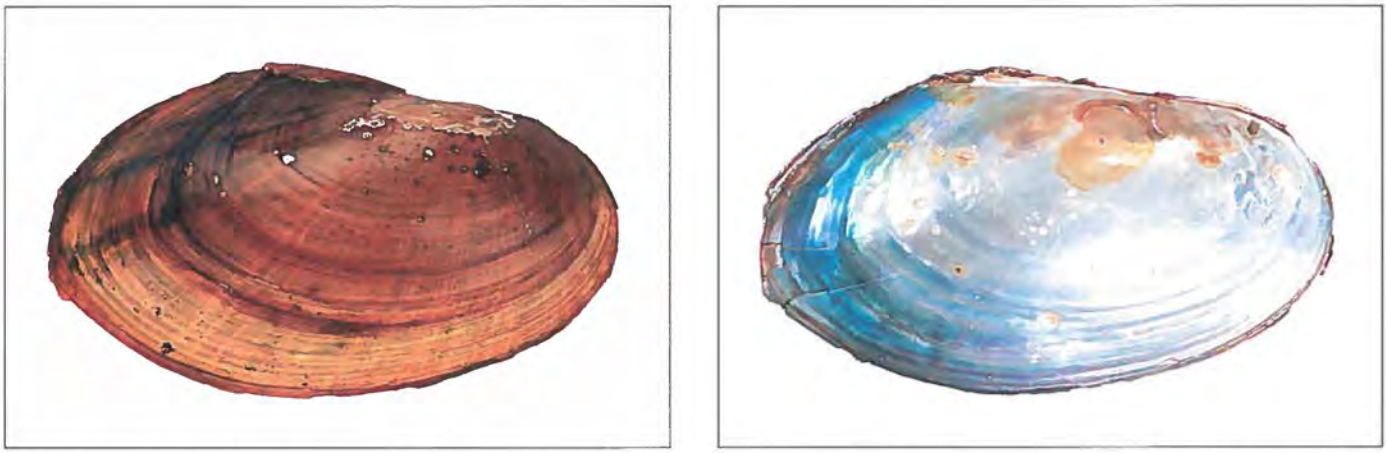

Fig. 36. *Utterbackia peggyae*, **length 54 mm. JCB92-126: Flint River at CR246 (Flat Shoals Rd.), ca. 5.25 air mi. WSW of Concord, ca. 10.75 air mi. WSW of Zebulon, Pike County, Georgia, 22 July 1992. Photo copyrighted by Richard T. Bryant.**

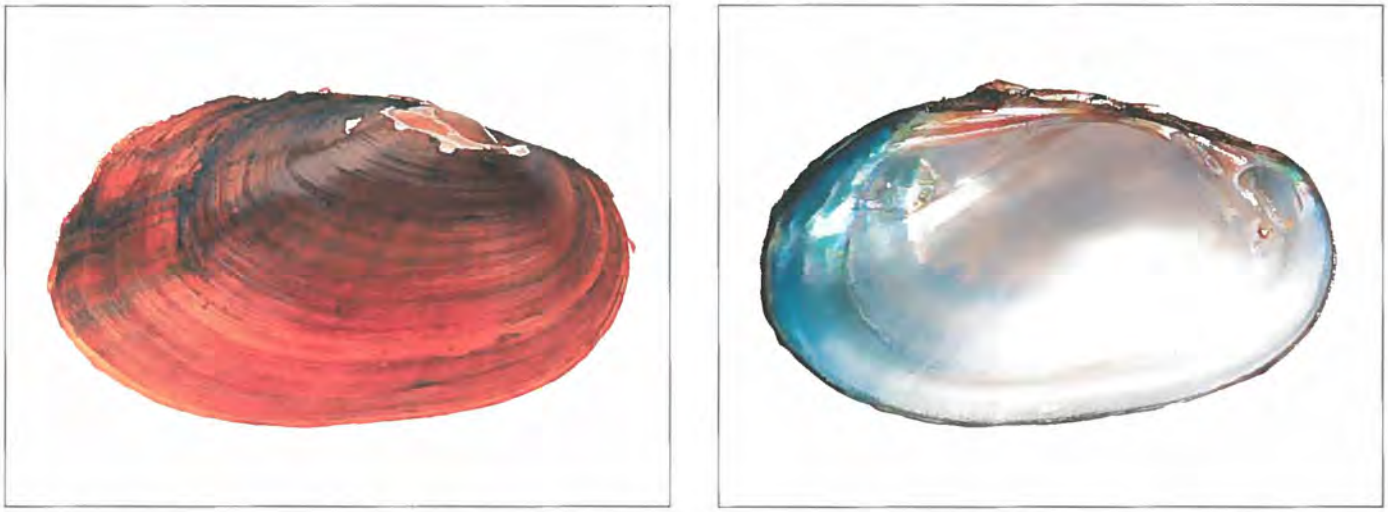

Fig. 37. *Villosa lienosa*, length 39 mm. JCB92-040: Mosquito Creek at GA Rt. 97, ca. 20 air mi. SW of Bainbridge, Decatur County, Georgia, 27 May 1992. Photo copyrighted by Richard T. Bryant.

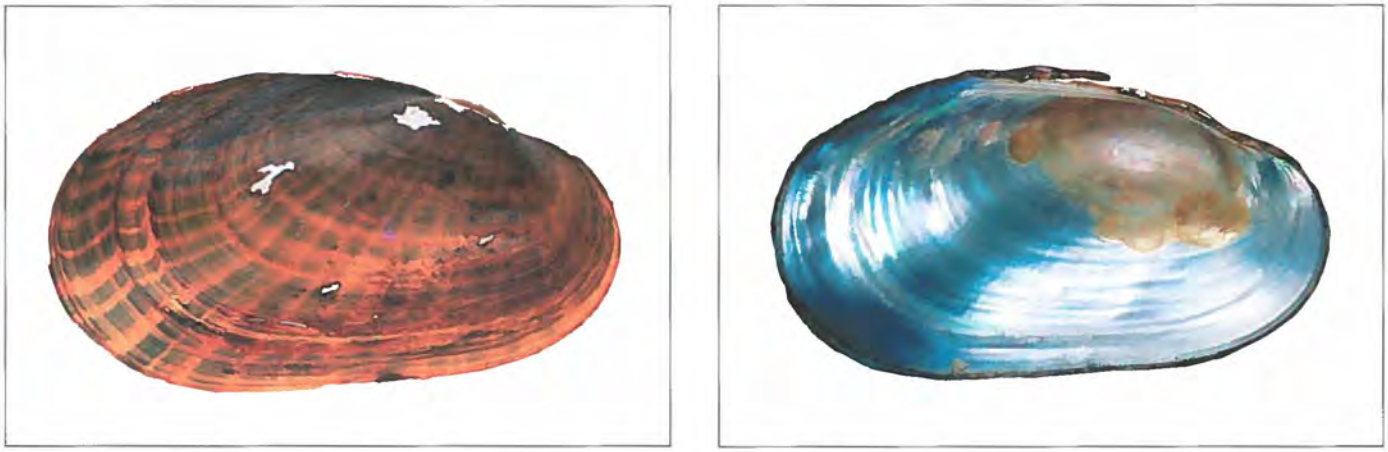

Fig. 38. *Villosa vibex*, length 61 mm. JCB92-051: Spring Creek at CR391, 1.3 road mi. W of junction GA Rt. 310/CR391, 13 air mi. NW of Bainbridge, Decatur County, Georgia, 29 May 1992. Photo copyrighted by Richard T. Bryant.

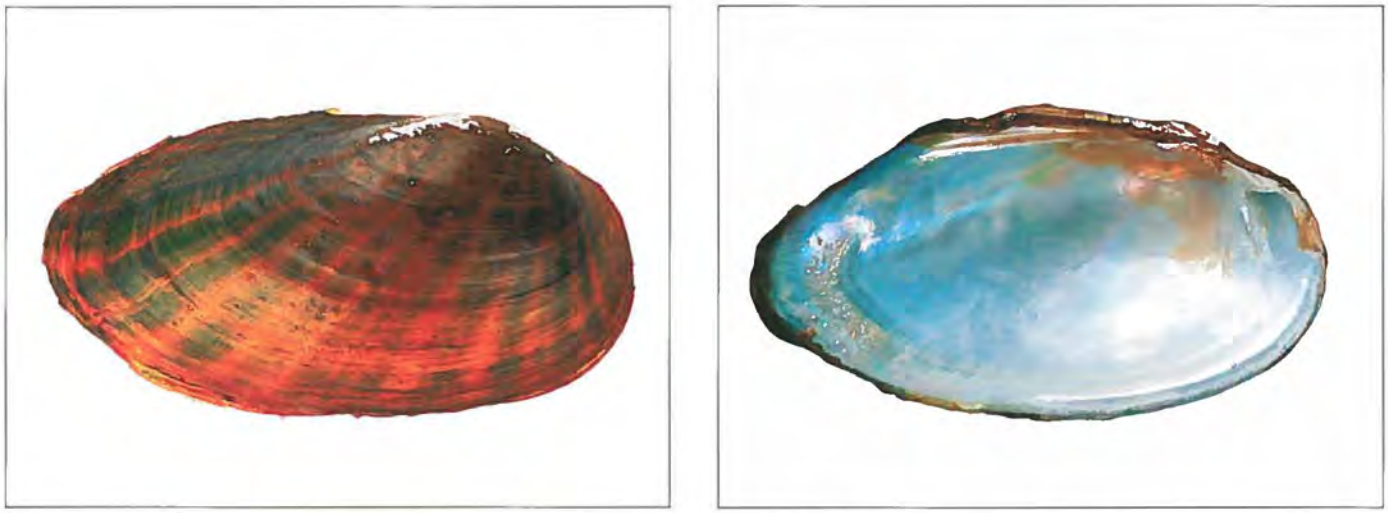

Fig. 39. *Villosa villosa*, female, length 55 mm. JCB92-063: Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond, ca. 7 air mi. SSW of Oakfield, Worth County, Georgia, 10 June 1992. Photo copyrighted by Richard T. Bryant.

Alasmidonta triangulata (Lea, 1858)

Southern elktoe
Figure 7

Synonymy

Margaritana triangulata Lea, 1858a
Proc. Acad. Nat. Sci. Phila. 10: 138.
Type Locality: [Chattahoochee River], Columbus, [Muscogee County], Georgia. Clench and Turner (1956) restricted the type locality.
Type Specimen: USNM 86249. Clench and Turner (1956) designated this specimen as the lectotype. Clarke (1981) subsequently designated the same specimen as the lectotype.

Alasmidonta triangulata was synonymized under the name *A. undulata* by Clarke (1981). He noted that the form *A. triangulata* occurred in coastal drainages south of Virginia and that these specimens generally differed from *A. undulata* (which occurs in the coastal drainages of Virginia and northward) in shell shape and thickness, width of the hinge plate, the color of the nacre, shell sculpturing, and the position of the umbos. He argued that these characteristics were ecophenotypic rather than genetic, and that although beak sculpturing, posterior slope sculpturing, and relative height/length were more strongly developed in *A. triangulata*, those characters were "too irregularly expressed to be reliable taxonomic discriminants." In addition, Clarke (1981) found no differences in glochidia attributable to genetic divergence and noted that differences in pigmentation, the number of papillae within the incurrent opening, and the position of the labial palps in relation to the inner demibranchs were probably due to geographical factors and did "not seem to be useful for taxonomic purposes."

The stomach anatomy of two specimens of *Alasmidonta triangulata* collected in this survey were examined by D. Smith (pers. comm.). He compared the right side and anterior sorting areas of these animals to specimens of *A. undulata* from Connecticut, North Carolina, and New York, and concluded that, based on stomach anatomy, the ACF Basin specimens were not distinguishable from *A. undulata*.

We have examined additional specimens and the evidence presented by Clarke (1981) and conclude that *Alasmidonta triangulata* should be recognized as a distinct species. The comment by Clarke (1981) that characters used to differentiate *A. triangulata* "are probably ecophenotypic and not genetic" may be true, but we feel additional investigation is needed to accurately address this question. Some of the characters Clarke (1981) considered to be ecophenotypic in *A. triangulata* were used to distinguish other species in the genus *Alasmidonta*. In addition, two endemic species (*A. arcula* and *A. wrightiana*) occur in the Altamaha and Ochlockonee rivers, respectively, which are located between the ranges of *A. undulata* and *A. triangulata*. The disjunct distribution of *A. triangulata* would also suggest it is likely a species distinct from *A. undulata*. We are currently collecting tissue for genetic studies in an attempt to resolve this question. Until results of this study are available, we recommend recognition of *A. triangulata* as a distinct species.

Diagnostic Characters

Shell morphology of *Alasmidonta triangulata* was described in detail by Clench and Turner (1956). Williams and Butler (1994) also described the shell morphology of *A. triangulata* under the name of *A. undulata*. This species can be distinguished from other ACF unionids by the combination of its inflated shell morphology, slight crenulations along the posterior slope, and moderately thin shell. In addition, it also lacks a well developed lateral tooth and is the only species of *Alasmidonta* that occurs in the ACF Basin.

The entire outer gill of *Alasmidonta undulata* is utilized as a marsupium. Branchial papillae are short, singular and occur in primarily one row with a sparse second row of papillae. The anal aperture lacks papillae. The posterior portion of the mantle margin is punctuated with dark brown, square blotches. The anatomy of *A. undulata* was described by Lea (1859d) and Ortmann (1911).

Distribution

An ACF Basin endemic, *Alasmidonta triangulata* is restricted to the Chattahoochee River system in Alabama and Georgia, the Flint River system in Georgia, and the Apalachicola and lower Chipola rivers in Florida.

ACF Historical Distribution and Abundance

We have located 43 historical collections from 29 sites in the ACF Basin (Fig. 40). It once occurred in all four major rivers of the basin, including 17 historical records from the Chattahoochee River drainage. It does not appear to be restricted to the Coastal Plain, as there is at least one record of *A. triangulata* from the upper Chattahoochee River system, and multiple records from Flint River tributaries that are in the Piedmont.

There is little historical information concerning the abundance of *Alasmidonta triangulata*. The largest collection of this species reported from the ACF Basin was made in 1955 and consisted of 31 shells from Mulberry Creek, a tributary of the Chattahoochee River. Jenkinson (1973) found 17 specimens of this species at 4 sites on Little Uchee and Uchee creeks, both Chattahoochee River tributaries. He collected this species only at sites below the Fall Line.

ACF Distribution and Abundance

Two live *Alasmidonta triangulata* were found in this survey from a single location in Potato Creek, a tributary of the Flint River (Fig. 40). An additional live specimen was found in Uchee Creek in 1994. A single weathered shell was also found in Lake Blackshear when that reservoir drained after Tropical Storm Alberto in 1994 (D. Shelton, pers. comm.).

Habitat

In the ACF Basin, *Alasmidonta triangulata* was found in larger creeks and river mainstems and seemed to prefer sandy mud, particularly in and around rock pools (Clench and Turner, 1956). In Chattahoochee River tributaries, *A. triangulata* was found in sand bars, but was absent near rocks or in muddy sediments (Jenkinson, 1973). In this survey, the two live specimens found both occurred in a sand and silt substrate. The single individual found in 1994 in Uchee Creek occurred in stable sand and gravel. *Alasmidonta triangulata* was found in habitats similar to that reported for *A. undulata* (Ortmann, 1919; Clarke and Berg, 1959).

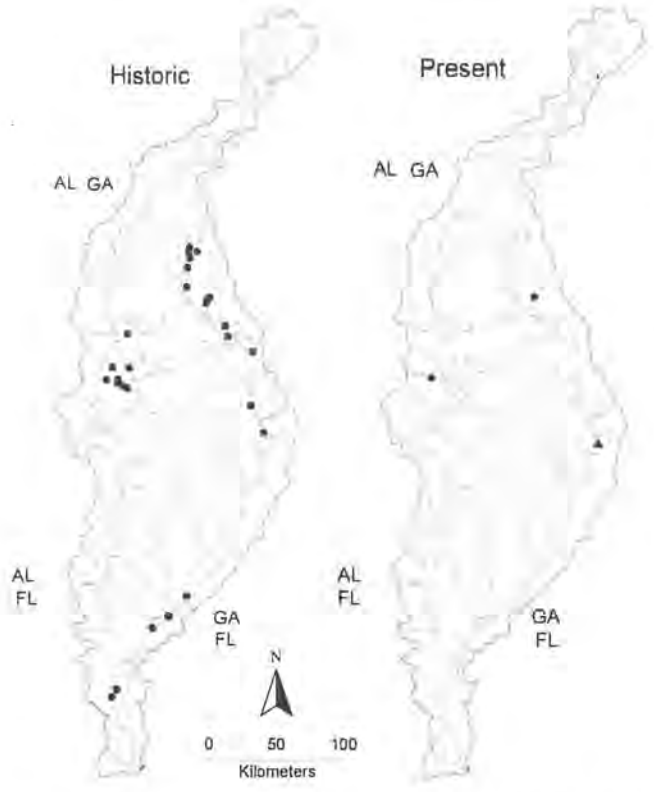

Fig. 40. Distribution of *Alasmidonta triangulata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

Life History

The host fish is unknown for *Alasmidonta triangulata*. Gravid *A. undulata* were found from August to October (Clarke, 1981), September and October (Lea, 1838), and July to the following June in Pennsylvania (Ortmann, 1919). *Alasmidonta arcula* from the Altamaha River, Georgia, had the marsupium partially filled with mature glochidia in late May (Clarke, 1981).

Conservation Status

Although historically the triangle floater occurred in all of the major rivers in the ACF Basin, today it is very rare in the system. *Alasmidonta triangulata* was first recognized as rare by Clench and Turner (1956), and considered endangered by Athearn (1970) and Stansbery (1971). Heard (1975a) also considered this species to be rare throughout its entire range, and in danger of extinction. In a review of endangered mollusks in Alabama, Stansbery (1976) considered *A. triangulata* a species of special concern. Williams and Butler (1994) reported that only a single live specimen had been taken in Florida in the past 20 years (Chipola River in 1986) and considered the Florida population of *A. undulata* (= *A. triangulata*) to be endangered. It has been extirpated from the main channel of the Chattahoochee River and it also appears to be extirpated from the main channel of the Apalachicola River. The only recent record of this species from the Flint River mainstem is from an impoundment. The fragmented range of this species leaves the isolated populations vulnerable to extirpation and, therefore, we have assigned it a conservation status of endangered in the basin (Table 2).

Amblema neislerii (Lea, 1858)

Fat threeridge
Figure 8

Synonymy

Unio neislerii Lea, 1858b
Proc. Acad. Nat. Sci. Phila. 10: 165.
Type Locality: Flint River at Lanier, [10 miles north of Oglethorpe, Macon County], Georgia. See Clench and Turner (1956) for a discussion of the type locality at the town of Lanier.
Type Specimen: Lectotype USNM 83993.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Williams and Butler (1994). This species can be distinguished from other large ACF mussels by seven to nine horizontal, parallel ridges on the shell, as well as the highly inflated appearance of larger specimens. The parallel ridges are also quite distinct on younger specimens,

thereby separating this species from *Glebula rotundata*, *Elliptoideus sloatianus*, and *Megalonaias nervosa*.

The anatomy of the genus *Amblema* was described by Utterback (1915). Although Utterback described the branchial opening of *Amblema* as "long with a few small arboreal papillae," the branchial papillae of *A. neislerii* are long, singular, occur in two weakly defined rows, and are slightly pigmented. The anal aperture is slightly crenulate. The anal and supra-anal apertures are roughly the same length and there is no mantle suture separating the two. The septa and water-tubes of Amblemine mussels are well-developed and continuous, and the septa are not perforated (Heard and Guckert, 1971). All four gills are marsupial.

Distribution

The fat threeridge is endemic to the main channel of the Apalachicola and Chipola rivers in Florida, and the Flint River in Georgia (Fig. 41). There are no historical records from tributaries. It has never been reported from the Chattahoochee River drainage.

There are two published records of *Amblema neislerii* from the Escambia River in Florida that are considered to be erroneous (Williams and Butler, 1994). *Amblema plicata* is the only species of *Amblema* currently recognized from the Escambia River system in Florida and Alabama (Mulvey et al., 1997).

ACF Historical Distribution and Abundance

We have located 56 historical collections of *Amblema neislerii* from 21 sites in the ACF Basin (Fig. 41). Twelve of these records are from six sites in the Flint River drainage. The last record of this species occurring in the Flint River was a single live individual collected in 1988 in Baker County, Georgia.

Clench and Turner (1956) commented on the abundance of the fat threeridge in Dead Lakes in the Chipola River. They found approximately 10–15 individuals per m^2 for a length of about 200 m along the shore. They noted that this species could be locally abundant, but in other parts of the basin it was rare. Butler and McCullagh (pers. comm.) found about 100 live individuals of *A. neislerii* below Dead Lakes in 1988. Eight of the museum collections we examined contained 10 or more individuals.

ACF Distribution and Abundance

Amblema neislerii were found at 11 of the 324 sites surveyed (Fig. 41). Thirty-two live individuals were found from a total of seven sites, while shells only were found at an additional four sites. In 1996, live animals were found at two additional sites in the main channel of the Apalachicola River. Live *A. neislerii* were found only in the Chipola and Apalachicola rivers. The current distribution of this species in the Chipola River appears to correspond to the historic distribution, from Scotts Ferry downstream to the Apalachicola River.

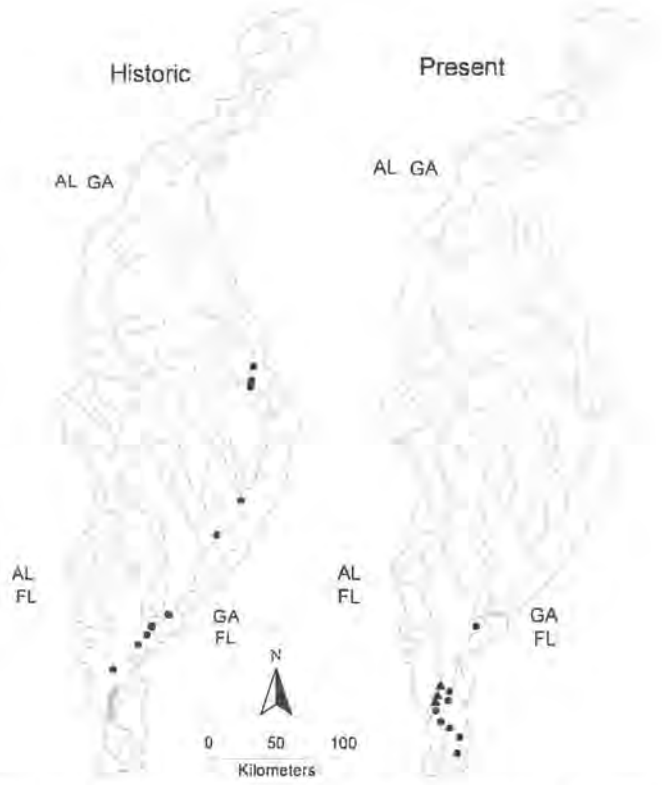

Fig. 41. Distribution of *Amblema neislerii* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

In the mainstem of the Apalachicola River, live *Amblema neislerii* were found at four localities in the lower river, as well as below Jim Woodruff Lock and Dam. The population of *A. neislerii* below Jim Woodruff Lock and Dam (for a distance of about 2 miles) appears to be dwindling compared to observations by malacologists who sampled the area 20 to 30 years ago (Heard, 1975a).

Although the type locality for *Amblema neislerii* is the Flint River, near Oglethorpe, Georgia, no live fat threeridge were found in the Flint River mainstem, impoundments, or tributaries. Shells only were found at two localities in the Flint River arm of Lake Seminole, below Bainbridge, Decatur County, Georgia. The chalky and stained condition of these valves, however, indicated they likely died many years previous to this survey.

Habitat

Amblema neislerii inhabits the main channel of small to large rivers in slow to moderate current. This species can be found in substrates ranging from sand to muddy sand in moderate current (Heard, 1975a). About 60% of the individuals encountered in this survey were found at sites that had predominantly sandy silt substrates. It historically occurred in Dead Lakes on the Chipola River, an area with no to sluggish current. No live *A. neislerii* were found in any of the four reservoirs surveyed within its historical range.

Life History

There is little published information on the anatomy or reproduction of *Amblema neislerii*. Although many observations have been made on the anatomy and reproduction of a closely related species, *A. plicata*, only three (Frierson, 1904; Ortmann, 1912, 1914) are based on southern populations.

Amblema neislerii were collected monthly from the Apalachicola River and were gravid only in May in water temperatures of 24°C (O'Brien, 1997a). Host fishes, based on laboratory experiments, include the weed shiner, *Notropis texanus*, bluegill, *Lepomis macrochirus*, redear sunfish, *L. microlophus*, largemouth bass, *Micropterus salmoides*, and blackbanded darter, *Percina nigrofasciata* (O'Brien, 1997a). The speckled madtom, *Noturus leptacanthus*, and eastern mosquitofish, *Gambusia holbrooki*, did not serve as hosts.

There was little evidence of *Amblema neislerii* recruitment in the upper Apalachicola River, although juveniles (i.e., 3–4 years old) were found in the lower river. Richardson and Yokley (1996) similarly found no evidence of recent recruitment at two sites in the upper Apalachicola River and only limited evidence (three shells less than 50 mm) in the lower river. Length-frequency data for *A. neislerii* found in the summer of 1991 are presented in Figure 42.

Conservation Status

Amblema neislerii was identified by Athearn (1970) and Stansbery (1971) as rare and endangered. Heard (1975a) considered this species to be rare throughout its entire range, and in danger of extinction. He also noted its decline (from abundant to rare) in the main channel of the Apalachicola River over a seven-year period. The USFWS (1989, 1991) included *A. neislerii* as a candidate for endangered or threatened status. Williams et al. (1993) reviewed the status of the fat threeridge throughout its range and assigned it endangered status. Williams and Butler (1994) considered *A. neislerii* to be threatened in Florida. *Amblema neislerii* was proposed for federal endangered status in 1994 (USFWS, 1994) and was listed as endangered in 1998 (USFWS, 1998) (Table 2).

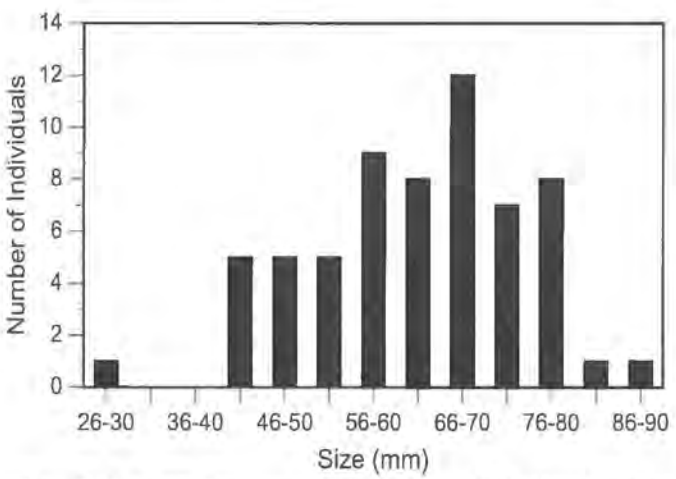

Fig. 42. Length-frequency distribution of *Amblema neislerii* found in the summer of 1991.

Anodonta heardi Gordon and Hoeh, 1995

Apalachicola floater

Figure 9

Synonymy

Anodonta heardi Gordon and Hoeh, 1995
Walkerana 7(17/18): 265.
Type Locality: Apalachicola River, approximately 9.7 km north of Blountstown at Ocheesee Landing, Calhoun County, Florida.
Type Specimen: Holotype UMMZ 253324.

The Apalachicola floater was originally confused with *Anodonta gibbosa* by Clench and Turner (1956). Later Johnson (1969a), Heard (1975a and b, 1979), and Hoeh (1990) referred to *A. heardi* as *A. couperiana*, and Johnson listed its range as peninsular Florida to the Ochlockonee and Apalachicola river systems in the Florida panhandle. Heard (1975b) noted that populations of "*A. couperiana*" in the Apalachicola River differed from peninsular Florida *A. couperiana* in that the Apalachicola River populations contained females and hermaphrodites, while *A. couperiana* from the Myakka River contained males and females but no hermaphrodites. Hoeh (1990) suggested that Apalachicolan populations of *A. couperiana* had diverged reproductively and allozymically and deserved specific level recognition. This designation was also supported by the conchological differences noted between these two species. Williams and Butler (1994) reported the Apalachicola floater as *Anodonta* sp. Gordon and Hoeh (1995) noted that *A. heardi* was more closely related to *A. couperiana* and *A. suborbiculata* than *Utterbackia peggyae* or *U. imbecillis*. Clench and Turner's (1956) records of *A. gibbosa* from the ACF Basin contained specimens of *Pyganodon grandis* and a single specimen of *A. heardi*.

Diagnostic Characters

Shell morphology was described by Gordon and Hoeh (1995). *Anodonta heardi* reaches a length of 113 mm. *Anodonta heardi* can be distinguished from *Utterbackia imbecillis* and *U. peggyae* by its heavier shell morphology, greater degree of ventral convexity, and umbos that extend just above the hinge line (Gordon and Hoeh, 1995). *Anodonta heardi* can be distinguished from *A. couperiana* by the latter's more compressed posterior slope that results in a more pronounced wing development. The soft anatomy has not been described.

Distribution

The total range of this species is unclear at this time, although based on current information it is considered to be endemic to the ACF Basin. *Anodonta heardi* is suspected to occur parapatrically with *A. couperiana*, which is found along the southern Atlantic slope and peninsular Florida, and *A. suborbiculata*, which is found from the Brazos River in Texas east to the Escambia River system in the Florida panhandle.

ACF Historical Distribution and Abundance

Historically *Anodonta heardi* was known from three Florida localities: two on the mainstem of the Apalachicola River and one from TanVat pond in the lower Chattahoochee River drainage (Gordon and Hoeh, 1995) (Fig. 43). Because of its similarity in shell morphology to other ACF Anodontines, additional specimens may have been deposited in museum collections under other names.

Nothing is known about the historical abundance of this species, and Gordon and Hoeh(1995) noted that it was probably rare in the basin. Heard (1975a) (under *A. couperiana*) also noted that it was rare in the basin.

ACF Distribution and Abundance

A total of 1 live *Anodonta heardi* and 18 shells was found in the lower and middle mainstem of the Apalachicola River, an unnamed tributary of Abrams Creek in the Flint River drainage, and Uchee Creek in the Chattahoochee River drainage (Fig. 43). These are the first records of this species from the Flint River drainage, as well as the first records from Alabama and Georgia. In 1996, additional live animals were found at another site in the mainstem of the Apalachicola River, as well as a site surveyed in 1991 (when a shell only was found).

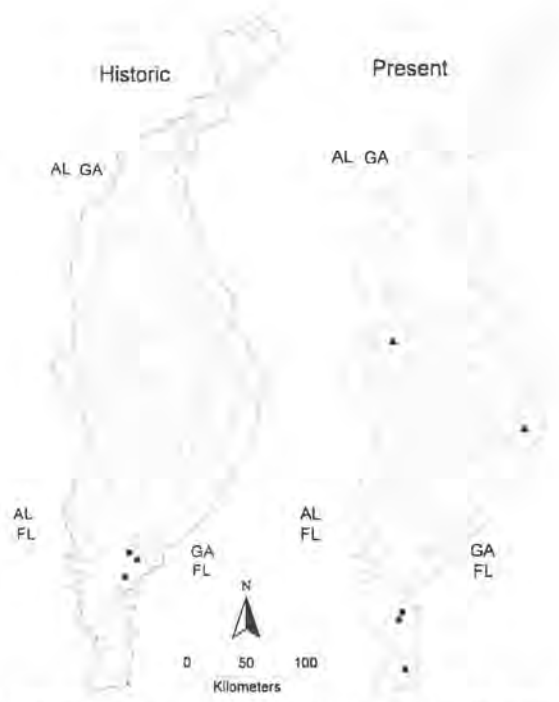

Fig. 43. Distribution of *Anodonta heardi* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material

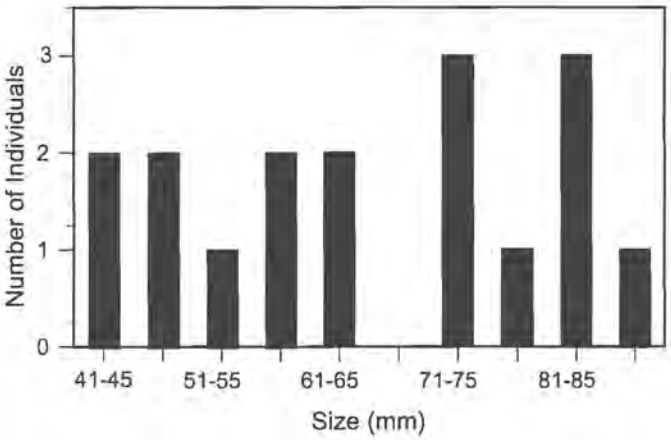

Fig. 44. Length-frequency distribution of *Anodonta heardi* found in the summer of 1992.

Habitat

Like most species of the genus *Anodonta*, the Apalachicola floater inhabits waters with little or no current such as floodplain lakes and backwater areas of the Apalachicola River in muddy substrates (Gordon and Hoeh, 1995). The live specimen found in this survey was found at a site where the predominant substrate was detritus and fine sediments.

Life History

Heard (1975b) described various aspects of the reproductive biology of the Apalachicola floater as *Anodonta couperiana*. Females displayed early oogenesis in early August and were spent by mid-November. Hermaphroditic individuals were also noted in the population. The fish host for *A. heardi* is unknown. Length-frequency data for *A. heardi* shells found in 1992 are presented in Figure 44.

Conservation Status

Williams and Butler (1994) considered the Apalachicola floater endangered in Florida. The conservation status of this species was not examined by Williams et al. (1993), since that review was limited to described species. Based on its current distribution and rarity in the basin, we have assigned *Anodonta heardi* a conservation status of threatened (Table 2).

Anodontoides radiatus (Conrad, 1834)

Rayed creekshell
Figure 10

Synonymy

Alasmodonta radiata Conrad, 1834b
Amer. Jour. Sci. 25(2): 341, pl. 1, fig. 10.
Type Locality: Small streams in south Alabama.
Type Specimen: Figured lectotype ANSP 41147.

Margaritana elliottii Lea, 1858a
Type Locality: Chattahoochee River, near Columbus, [Muscogee County, Georgia].

Margaritana elliptica Lea, 1859a
Type Locality: Tombigbee River, Columbus, [Lowndes County, Mississippi].

Anodonta showalterii Lea, 1860b
Type Locality: Coosa River, Wetumpka, [Elmore County, Alabama].

This species has been placed in six genera: *Alasmidonta, Anodon, Anodonta, Anodontoides, Margaritana,* and *Strophitus.* It is retained in the genus *Anodontoides* (following Johnson, 1967a) until the soft anatomy can be critically examined. The genus *Anodontoides* was described by Simpson (*in* Baker, 1898).

In the ACF Basin *Anodontoides radiatus* has been confused with *Strophitus subvexus* by some investigators. Clench and Turner (1956) reported *A. elliottii* from the Apalachicola, Chipola, and Chattahoochee drainages. Although Clench and Turner's records of *A. elliotii* from the Chattahoochee River (MFM 5753; MFM 5730; MFM 5811; MFM 5829) and Apalachicola River system (Mosquito Creek) (MCZ 190085) are *A. radiatus,* Johnson (1967a) correctly re-identified their Chipola River records (MCZ 191988; MCZ 191473; MCZ 19189) as *S. subvexus.*

Diagnostic Characters

Anodontoides radiatus is a small to medium-sized species that reaches 75 mm in length and is elliptical in outline. Shell morphology was described by Johnson (1967a) and Williams and Butler (1994). Frierson (1927) noted that this may be the most beautiful shell in the United States if the shells are in perfect condition. In the ACF Basin, this species can be mistaken for *Villosa vibex.* However, *A. radiatus* differs from that species by its lack of lateral teeth, and its thin shell with prominent dark green rays that are especially apparent along the posterior edge of the shell. There is a single rudimentary pseudocardinal tooth in the left valve and a low, narrow pseudocardinal in the right valve.

The anatomy of the rayed creekshell is limited to brief descriptions by Lea (1859d, 1863c) of *Anodonta showalterii* and *Margaritana elliottii. Anodonta showalterii* is based on specimens from the Coosa River in Alabama, and *M. elliottii* is from the Chattahoochee River, near Columbus, Georgia. Of the two specimens of *A. showalterii* examined by Lea (1863b), at least one was a gravid female with glochidia in the entire outer gill. Ortmann (1911) commented on the general anatomical differences between the genera *Anodontoides* and *Strophitus,* and focused his discussion on the presence of placentulae (conglutinates in short, solid cords) that occur in *Strophitus* but not *Anodontoides.*

The gross anatomy of *Anodontoides radiatus* and *Strophitus subvexus* is surprisingly similar, in that both have branchial papillae that are singular and occur in two or three intermingled rows. The anal aperture is crenulate. The inner mantle margin at the branchial and anal apertures is darkly pigmented with red and black striations, while the outer mantle margin is lightly peppered. There is a long suture, about the length of the supra-anal opening, that separates that aperture from the anal aperture.

Distribution

Anodontoides radiatus occurs from the Tickfaw River system in Louisiana (Vidrine, 1985) east to the ACF Basin, but apparently is absent from the Yellow, Choctawhatchee, and

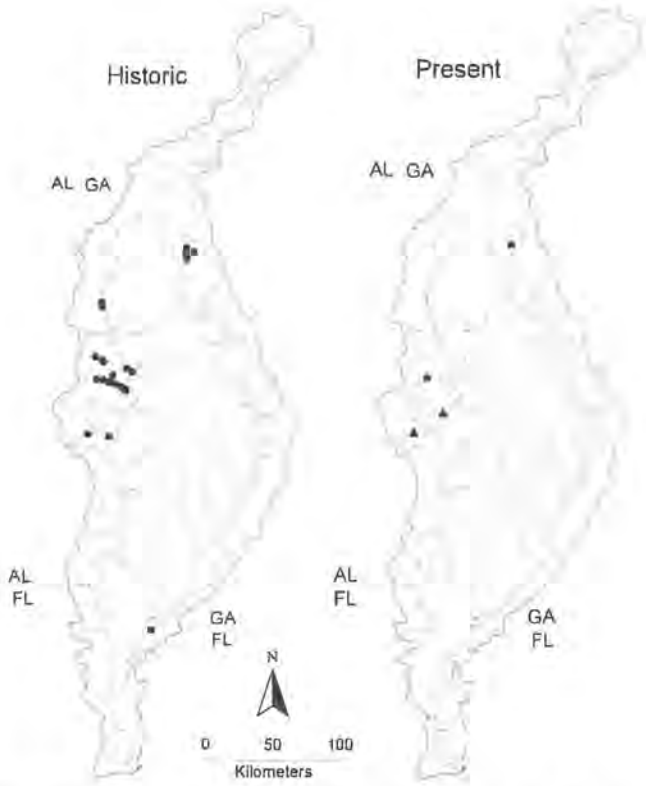

Fig. 45. Distribution of *Anodontoides radiatus* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals

Chipola rivers (Williams and Butler, 1994). It occurs in the Tombigbee-Alabama River system in Alabama and Mississippi, and the Conecuh-Escambia system in Alabama (Heard, 1975a), although there are no known records of its occurrence from the latter drainage in Florida.

ACF Historical Distribution and Abundance

We have located 35 historical collections of *Anodontoides radiatus* from 21 sites in the ACF Basin (Fig. 45). Historically, it occurred in the mainstem and tributaries of the Chattahoochee River, and in the headwaters of the Flint River, including Line Creek. A single specimen was collected in 1955 from Mosquito Creek, a tributary of the Apalachicola River in Gadsden County, Florida. This is the only known specimen from the Apalachicola River drainage and the only Florida record (Williams and Butler, 1994). Clench and Turner (1956) erroneously concluded the material van der Schalie (1940) called *Strophitus spillmanii* from the Chipola River was *A. radiatus*, which Johnson (1967a) later identified as *S. subvexus*. We know of no historical records of *A. radiatus* from the Chipola River drainage.

There is little known about the historical abundance of the species. Jenkinson (1973) found 21 specimens at 7 sites in Little Uchee and Uchee creeks. He reported this species at locations below the Fall Line, with the exception of a single locality on Uchee Creek. The largest known collection made in the ACF Basin was by H. H. Smith on 25 June 1915, and consisted of 24 individuals from Uchee Creek (Russell County, Alabama).

ACF Distribution and Abundance

Two live individuals and one shell were found in this survey (Fig. 45). Both of the live animals were found in Uchee Creek, a location where Jenkinson (1973) also found *Anodontoides radiatus*. In 1994, a shell was found in Hatchechubbee Creek (Chattahoochee drainage). In 1994 and 1995, two live individuals were found, one each in Spring and Line creeks, both tributaries of the Flint River.

Habitat

Jenkinson (1973) found live *Anodontoides radiatus* in the slower portions of sand-bottomed streams. Clench and Turner (1956) noted that it preferred slack water areas in larger rivers and also could be found in large slow-flowing creeks. Heard (1979) noted that it was found in muddy sand in slight to moderate current. Although the rayed creekshell is known from large rivers (Chattahoochee River, Muscogee County, Georgia), most collections are from small to medium-sized creeks where it occurs in mud, sandy mud, or sand and gravel substrates. In this survey, live *A. radiatus* were found in silty clay along the bank.

Life History

The host fish for this species is unknown. In the genus *Anodontoides*, sea lamprey, *Petromyzon marinus*, have been found carrying the glochidia of the cylindrical papershell, *A. ferussacianus* (Wilson and Ronald, 1967). Clarke and Berg (1959) also reported that Morrison (pers. comm.) speculated that the mottled sculpin, *Cottus bairdi*, may be the host fish for *A. ferussacianus*. In the Flint River drainage, a single gravid female was found on 27 September 1995, and in the Escambia River drainage, gravid *A. radiatus* were found in early December 1995 (D. Shelton, pers. comm.).

Conservation Status

While the range of *Anodontoides radiatus* covers portions of Alabama, Florida, Georgia, Louisiana, and Mississippi, its occurrence is sporadic. Museum records suggest that historically it was seldom collected in large numbers, and today it is unusual to find more than a few individuals at a site.

Clench and Turner (1956) noted that *Anodontoides radiatus* was "exceedingly rare" in the ACF Basin. Heard (1975a) listed *A. radiatus* among species he considered to have a reduced range or abundance (i.e., are now very rare or extinct in part of their present or past range, respectively). Williams et al. (1993) considered the rayed creekshell to be of special concern throughout its range, indicating that it should be carefully monitored. In Florida, Williams and Butler (1994) assigned it a conservation status of undetermined, pending thorough surveys to determine if the species still existed in Florida. Based on the results of this survey, we have assigned *A. radiatus* a conservation status of endangered in the ACF Basin (Table 2).

Elliptio arctata (Conrad, 1834)

Delicate spike
Figure 11

Synonymy

Unio arctatus Conrad, 1834b
Amer. Jour. Sci. 25(2): 340, pl. 1, fig. 9.
Type Locality: Johnson (1970) restricted the type locality to the Alabama River, Alabama.
Type Specimen: Lectotype ANSP 41356 selected by Johnson (1970), pl. 10, fig. 4.

Unio strigosus Lea, 1840
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Unio tortivus Lea, 1840
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Numerous other synonyms of *Elliptio arctata* from At-

lantic slope drainages were listed by Johnson (1970), and we have restricted ours to only those species described from the ACF Basin.

Diagnostic Characters

Shell morphology was described by Johnson (1970). As in other *Elliptio* species, the shell morphology of *E. arctata* is highly variable. For instance, shells found below Jim Woodruff Lock and Dam in the Apalachicola River tend to be very arcuate and compressed, while individuals from the mainstem of the Flint River tend to be only slightly arcuate and less compressed.

Several features of *Elliptio arctata*, considered in combination, separate it from other ACF *Elliptio* species. The incurrent papillae of *E. arctata* are pigmented, sparsely packed and very long. The excurrent chamber is heavily pigmented with numerous, prominent papillae. The supra-anal aperture is about half the length of the anal opening. The hinge ligament is very short and the umbo cavity is very shallow. The lateral teeth are weak and short. In the ACF Basin, this species is easily confused with *E. purpurella*, but can be distinguished from the latter species by its larger, more compressed shell and white nacre. Glochidia are brooded in the full length of the outer demibranchs.

Distribution

The delicate spike occurs in Atlantic Coast drainages from the Cape Fear River in North Carolina south to the Savannah River in Georgia and South Carolina. *Elliptio arctata* is apparently absent from the drainages south of the Savannah River in Georgia, peninsular Florida, and Gulf drainages east of the ACF Basin. It occurs in the Gulf drainages from the Apalachicola Basin west to the Mobile Basin of Alabama, Georgia, Mississippi, and Tennessee (Johnson, 1970). van der Schalie (1940) reported this species from the Peace River in peninsular Florida, but those records are probably *E. icterina*.

ACF Historical Distribution and Abundance

We have located 91 historical records of *Elliptio arctata* from 66 sites in the basin (Fig. 46). This species was known from the main channel and tributaries of the Apalachicola, Chattahoochee, Chipola, and Flint rivers. *Elliptio arctata* is known from above and below the Fall Line.

It is difficult to assess the historical abundance of *Elliptio arctata* in the basin because of the taxonomic confusion surrounding this species. For instance, during a survey of the Chipola River from 1916 to 1918, van der Schalie (1940) reported more than 100 individuals of *E. arctata* were collected from each of 10 different sites, including 559 individuals at a single site. However, after examining specimens at the UMMZ, we have concluded that the material from the Chipola River that van der

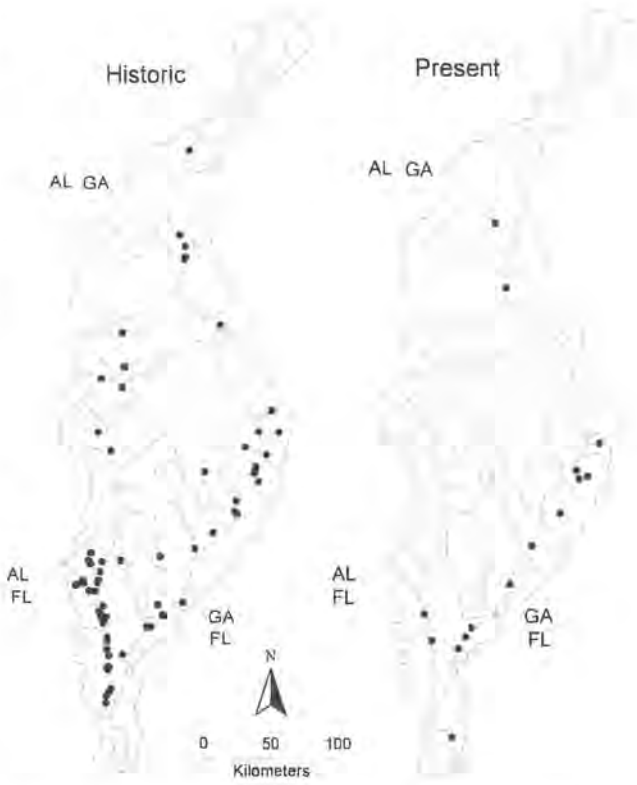

Fig. 46. Distribution of *Elliptio arctata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

Schalie labeled *E. arctata* is actually a mix of *E. arctata*, *E. purpurella*, *E. icterina*, and *E. complanata*. A collection of *E. arctata* in the FLMNH does contain 109 shells. Every other museum collection of *E. arctata* we examined contained six or fewer individuals.

ACF Distribution and Abundance

Elliptio arctata were found in the main channel of the Apalachicola and Chipola rivers, and in the mainstem and tributaries of the Flint River above and below the Fall Line (Fig. 46). A total of 99 live animals and 21 shells was found. This species was found at 17 sites, or about 5% of the 324 sites surveyed. *Elliptio arctata* were not found at any sites in the Chattahoochee River drainage, although we have located eight historical records (from seven counties) of this species from that drainage. In this survey *E. arctata* were found in four tributary sites. Three of those sites were directly below impoundments, suggesting that this species does well in the tailwaters of small reservoirs. No live individuals were found in reservoirs.

Habitat

Elliptio arctata was reported to live in rivers, along the shoreline, among and under rocks (Johnson, 1970). Only

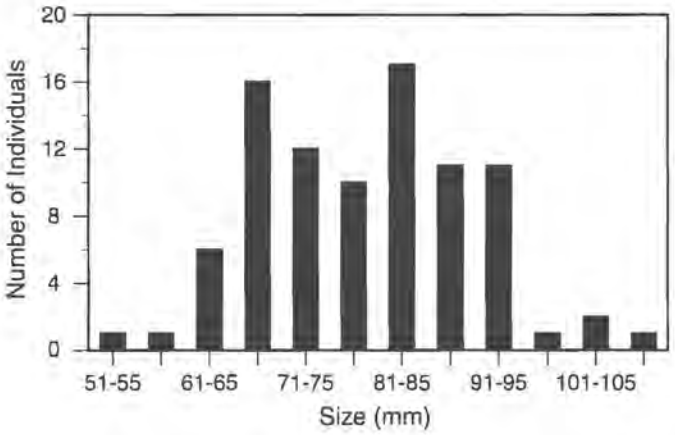

Fig. 47. Length-frequency distribution of *Elliptio arctata* found in the summer of 1992.

2 of the 94 historical records contained habitat information. Of these records, one listed sand and gravel and the other listed sand and vegetation as the substrates where this species occurred. In Florida, *E. arctata* has been reported from fine gravel and sand in moderate current (Heard, 1979).

In this survey, 36% of the *Elliptio arctata* collected were found at sites with sand and limestone rock substrates, with an additional 25% of individuals found at sites containing mainly sand substrates. *Elliptio arctata* occurs primarily in areas with current.

Life History

Little is known about the life history of the delicate spike. Length-frequency data for *Elliptio arctata* found in the summer of 1991 are presented in Figure 47. A total of 97 individuals was checked for glochidia from June to September. Only two gravid females were found, on 18 June 1991, from the main channel of the Apalachicola River. The host fish for *E. arctata* is unknown.

Conservation Status

Williams et al. (1993) reported the conservation status of the delicate spike as special concern. This was the first assignment of a conservation status to this species. Within the ACF Basin, we have assigned *Elliptio arctata* a conservation status of special concern (Table 2).

Elliptio chipolaensis (Walker, 1905)

Chipola slabshell
Figure 12

Synonymy

Unio chipolaensis Walker, 1905
The Nautilus 18(12): 135, pl. 9, figs. 6–7.
Type Locality: Clench and Turner (1956) restricted the type locality to the Chipola River, 1 mile north of Marianna, Jackson County, Florida.
Type Specimen: Lectotype UMMZ 96363.

Diagnostic Characters

Shell morphology was described by Walker (1905) and Clench and Turner (1956). *Elliptio chipolaensis* can be distinguished from other ACF *Elliptio* by its chestnut-colored periostracum, the presence of one to four dark concentric bands on the shell, and the slightly concave posterior slope. The nacre is usually salmon colored, but can also be bluish white in some specimens. The Chipola slabshell attains a length of about 85 mm.

The branchial and anal apertures of *Elliptio chipolaensis* are roughly the same size. The branchial papillae form two rows, with the inner row consisting of long, discontiguous papillae, while the outer papillae are more densely packed and shorter. The branchial and anal apertures are darkly pigmented, while the supra-anal aperture is only lightly pigmented. The outer two demibranchs are marsupial, and glochidia fill the entire outer demibranch.

Distribution

Elliptio chipolaensis has been considered to be endemic to the Chipola River drainage (van der Schalie, 1940; Clench and Turner, 1956). However, we extend the range to include one tributary of the Chattahoochee River, Mill Creek, Houston County, Alabama.

ACF Historical Distribution and Abundance

We have located 37 historical records of *Elliptio chipolaensis* from 17 sites (Fig. 48). Once considered a Chipola River endemic, we have located a single specimen from Mill Creek, a tributary of the Chattahoochee River that is located in Houston County, Alabama. This is the only known record of *E. chipolaensis* from outside the Chipola River drainage. In the Chipola River drainage, it is generally distributed in the river mainstem and the lower portion of larger tributaries, but appears to be absent from most tributaries, including the Alabama portion of the system (van der Schalie, 1940).

Little is known about the historical abundance of this species. Heard (1975a) noted that *Elliptio chipolaensis* was relatively uncommon but could be locally abundant. Clench and Turner (1956) considered this species to be rare. van der Schalie (1940) re-

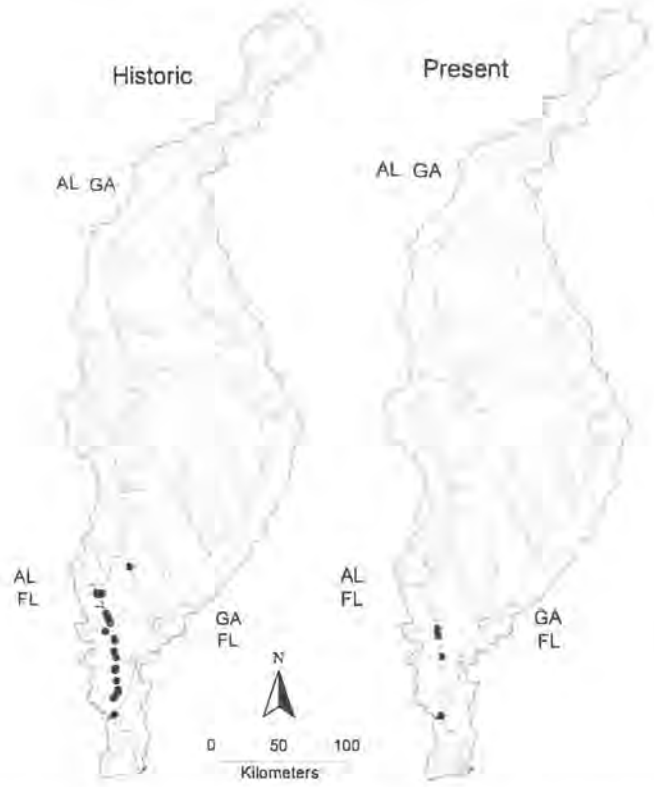

Fig. 48. Distribution of *Elliptio chipolaensis* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present.

ported that a total of 31 individuals from 6 sites was found during a survey of the Chipola River from 1915 to 1918.

ACF Distribution and Abundance

A total of 12 *Elliptio chipolaensis* was found at 4 sites in the main channel of the Chipola River (Fig. 48). In this survey, eight live individuals were found just below the Florida Rt. 22A bridge in Gulf County, Florida, where the dam on Dead Lakes was located prior to its removal in 1987. We resurveyed the Mill Creek site (Chattahoochee River drainage) in 1994 but failed to find *E. chipolaensis*.

Habitat

Elliptio chipolaensis is associated with muddy sand and sandy clay substrates in the main channel of the Chipola River in moderate current (Heard, 1979). It is also found in silty sand substrates (Williams and Butler, 1994). van der Schalie (1940) noted that this species was absent from Chipola River tributaries and also from Dead Lakes, and suggested that it avoided lakes or slow, impounded waters.

Of the 13 historical collections that specify the substrate types where *Elliptio chipolaensis* was found, 9 of the collections list sand as the primary substrate, while 4 collections list mud. During this survey, nearly 70% of the specimens were found at sites with a predominantly sandy substrate.

Life History

Little is known about the life history of *Elliptio chipolaensis*. Three gravid *E. chipolaensis* were found in late June 1991. One historical collection also lists a gravid female found in late June 1988 (R. S. Butler, pers. comm.). In this survey, individuals collected ranged in size from 47 to 76 mm in length.

Conservation Status

This species was considered rare by Clench and Turner (1956). Heard (1975a) considered *Elliptio chipolaensis* to be relatively uncommon, yet widespread and locally abundant. *Elliptio chipolaensis* was assigned a threatened status by Williams et al. (1993) and Williams and Butler (1994). *Elliptio chipolaensis* was proposed for federal threatened status in 1994 (USFWS, 1994) and was listed in 1998 (USFWS, 1998) (Table 2).

Elliptio complanata (Lightfoot, 1786)

Eastern elliptio
Figure 13

Synonymy

Mya complanata Lightfoot, 1786
Catalogue of the Portland Museum, p. 100.
Type Locality: Johnson (1948) restricted the type locality to the Potomac River, Washington, District of Columbia [approximately opposite Fairfax County, Virginia].
Type Specimen: Type specimen has not been found.

Unio fumatus Lea, 1857c
Type Locality: Chattahoochee River, near Columbus, [Muscogee County], Georgia. Type locality restricted by Johnson (1974).

Unio subniger Lea, 1857c
Type Locality: Flint River, near Macon, [Crawford County], Georgia.

Unio roswellensis Lea, 1858b
Type Locality: Chattahoochee River, Roswell, Cobb County, Georgia.

Unio hallenbeckii Lea, 1859c
Type Locality: Flat Rock Creek, near Columbus, [Muscogee County], Georgia; Four Mile Creek, near Columbus, [Muscogee County], Georgia.

Unio salebrosus Lea, 1859c
Type Locality: Flat Rock Creek, near Columbus, [Muscogee County], Georgia. Type locality restricted by Johnson (1974).

Unio quadratus Lea, 1859c

Type Locality: Factory Creek, near Columbus, [Muscogee County], Georgia. Type locality restricted by Johnson (1974).

Unio basalis Lea, 1872

Type Locality: Carter's Creek, near Columbus, [Muscogee County], Georgia.

Unio corneus Lea, 1874

Type Locality: [Chattahoochee River], Columbus, [Muscogee County], Georgia. Type locality restricted by Johnson (1974).

Unio dooleyensis Lea, 1874

Type Locality: Flint River, Dooley County, Georgia. Type locality restricted by Johnson (1974).

Unio gesnerii Lea, 1874

Type Locality: Uchee River [Creek], [Russell County, Alabama], near Columbus, [Muscogee County], Georgia.

Unio invenustus Lea, 1874

Type Locality: [Chattahoochee River], Columbus, [Muscogee County], Georgia. Type locality restricted by Johnson (1974).

Elliptio complanata, widespread along the Atlantic Coast and eastern Gulf of Mexico drainages, is a highly variable species with more than 90 known synonyms (Johnson, 1970). Since Johnson (1970) presented a complete synonymy we have restricted ours to only those species that were described from the ACF Basin.

Diagnostic Characters

The shell morphology of *Elliptio complanata* was described by Reardon (1929) and Johnson (1970). This is a widespread and highly variable species and its shell often varies in shape, coloration, and thickness (Counts et al., 1991), even within the same drainage. In the ACF Basin this species is difficult to distinguish from *E. icterina*, although *E. complanata* shells tend to have parallel dorsal and ventral margins and a biangulated posterior point. *Elliptio complanata* also tends to be larger and has a darker periostracum than *E. icterina*.

Reardon (1929) gave a detailed account of the anatomy of *Elliptio complanata*, and Ortmann (1911) also described anatomical features. The most reliable means of distinguishing *E. complanata* from *E. icterina* may be through the nature of the marsupia and ovisacs (Britton and Fuller, 1979). For example, the marsupia of *E. complanata* occupy the entire length of the outer gill (Reardon, 1929), whereas in *E. icterina*, they do not (Fuller, 1972a). In the ACF Basin, *E. complanata* can be distinguished from other *Elliptio* species by its heavily pigmented incurrent aperture that is usually a dark purple or red color. The incurrent papillae are usually singular and occur in two rows.

Distribution

Elliptio complanata is widely distributed and ranges from the Hudson Bay drainage of southern Canada, southward to the St. Lawrence drainage, west to Michigan and Wisconsin, and south along the Atlantic Coast to the Altamaha River in Georgia (Matteson, 1948a; Johnson, 1970). It occurs in eastern Gulf drainages from the Ochlockonee westward to the Apalachicola and Econfina Creek basins.

ACF Historical Distribution and Abundance

We have located 208 historical records of *Elliptio complanata* from 81 sites in the ACF Basin (Fig. 49). Historically, it occurred in the main channel and tributaries of the Apalachicola, Chattahoochee, Flint, and Chipola rivers.

Very little information is known about the historical abundance of this species in the ACF Basin, especially since many authors (van der Schalie, 1940; Clench and Turner, 1956) synonymized *Elliptio complanata* under one or several different names. van der Schalie (1940) reported that *E. strigosus* were collected from 23 of the 25 stations surveyed in the Chipola River drainage. This included 5 stations where 1,557, 1,097, 698, 517, and 438 *E. strigosus* were collected, respectively. After examining specimens at the UMMZ, we have concluded that the material van der Schalie labeled *E. strigosus* is a mix of *E. complanata* and *E. icterina*, indicating both of these species

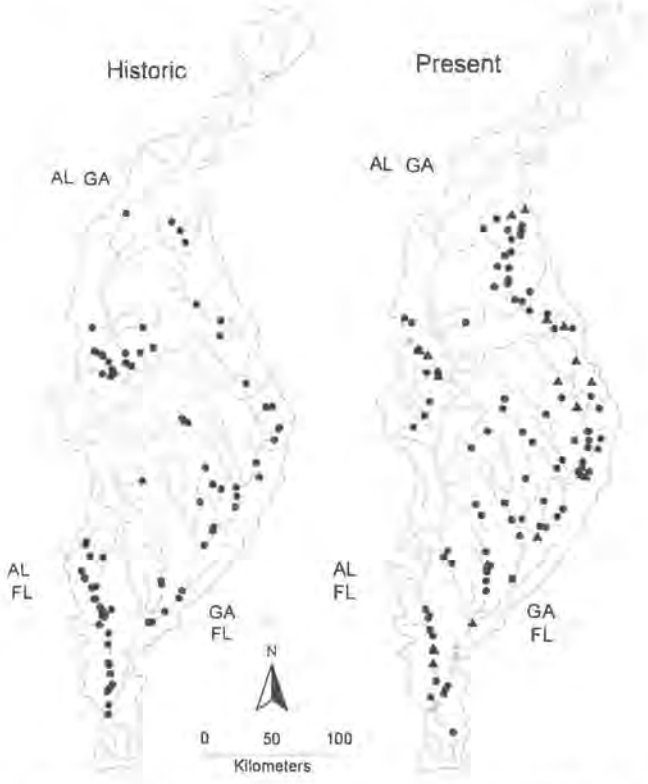

Fig. 49. Distribution of *Elliptio complanata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

were extremely abundant in the Chipola River system at that time. R. S. Butler (pers. comm.) also noted that when he collected in Spring Creek, Jackson County, Florida, a tributary of the Chipola River, he found *E. complanata* in densities approaching 30 individuals per m^2. Jenkinson (1973) found 81 specimens of this species at 8 sites in Little Uchee and Halawakee creeks, at sites above and below the Fall Line. Other researchers have noted that in drainages outside of the ACF Basin, this species is often the most abundant unionid found at a particular site, and sometimes the only species present at a location (Clarke and Berg, 1959; Counts et al., 1991).

ACF Distribution and Abundance

Elliptio complanata were found in the main channel and tributaries of the Flint and Chipola rivers, the mainstem of the Apalachicola River, and tributaries of the Chattahoochee River (Fig. 49). This was the most common species encountered in this survey, with 1,769 animals and 755 shells found from a total of 102 (32%) of the sites surveyed. Although four synonyms of *E. complanata* were described from the mainstem of the Chattahoochee River, it was not found during this survey at any of the 20 mainstem sites surveyed. It is, however, one of only a few species that constitutes a remnant Chattahoochee River tributary fauna that is reduced to isolated populations in small, headwater streams. This species was most common in tributary streams, and was found live in Lake Blackshear, a reservoir on the Flint River, but was absent from the other six reservoirs surveyed. It occurs both above and below the Fall Line.

Habitat

Elliptio complanata is often both widespread and abundant (Taylor, 1985; Strayer and Ralley, 1991; Downing et al., 1993), and has been reported from a variety of habitats, including small creeks, large rivers, ponds, lakes, and reservoirs (Counts et al., 1991). In South Carolina, *E. complanata* densities were significantly greater in sand and sand/mud substrates than in sand/gravel substrates (Leff et al., 1990), although in New York it was reported in a wide variety of substrates except soft mud (Clarke and Berg, 1959). Kat (1982) found that *E. complanata* had reduced growth rates in muddy substrates, and speculated that these fine particle sizes may result in reduced feeding efficiencies.

In the ACF Basin, *Elliptio complanata* has been reported from a wide variety of habitats, including rocks in fast current to flocculent sandy mud (Jenkinson, 1973), to sandy substrates in moderately swift current (Heard, 1979). In this survey, 40% of the specimens were found at sites that had mixed sand and limestone rock substrates, 33% were found at sites with predominantly sand and fine sediments (silts and clays), and 20% were found at sites with predominantly sandy substrates.

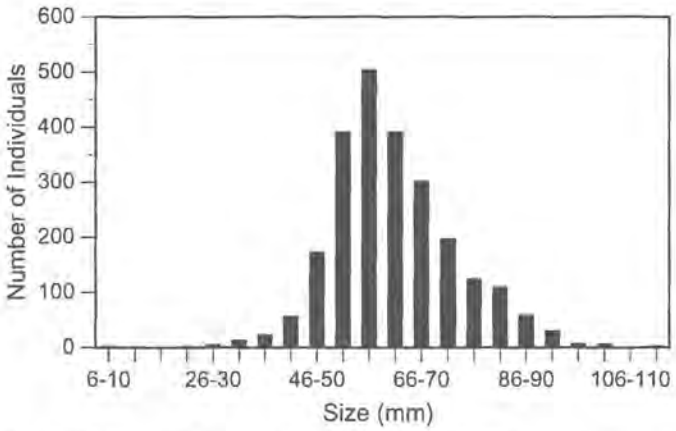

Fig. 50. Length-frequency distribution of *Elliptio complanata* found in the summer of 1992.

Life History

Length-frequency data for *Elliptio complanata* found in 1992 are presented in Figure 50. A detailed life history of *E. complanata* in Michigan was published by Matteson (1948b). Reproduction in Michigan was studied throughout the year and fertilization occurred from late April to late May, with glochidia released from mid-June to mid-July. Ortmann (1909) noted that this species reproduced only once annually, based on the observations of Conner (1907), from July to August, and Lea (1863c) noted that this species reproduced in May. Ortmann (1909) never found *E. complanata* gravid in Pennsylvania in August.

Downing et al. (1993) found that egg production in *Elliptio complanata* was influenced more by body size than by the spatial aggregation of the population, and that animals smaller than 50 mm in length were not gravid. Maximum ovum production occurred at about 80 mm of shell length, and egg production continued to increase with body size up to about 75% of the maximum size (Downing et al., 1989). Glochidia release was also highly synchronous and occurred in early July.

Matteson (1948b) detailed the method used by female *Elliptio complanata* to expel glochidia. He noted females expelled long, adhesive mucous filaments that formed a web and the individual hook-less glochidia, "streaming from the exhalent siphon," adhered to this web. Matteson (1955) examined specimens weekly over a two-year time span, and found that the period of gravidity varied from year to year, but the variation was always in direct relation to water temperature. *Elliptio complanata* conglutinates are long, narrow and slightly broader ventrally (Britton and Fuller, 1979). In this survey, 1,769 *E. complanata* were checked for the presence of glochidia. Gravid females were found from June to August.

Although Matteson (1948b) infected 12 species of fishes with *Elliptio complanata* glochidia, transformation to the juvenile stage occurred only on the yellow perch, *Perca flavescens*. The yellow perch is native to, but rare in, the ACF Basin. Other reported hosts include the green sun-

fish, *Lepomis cyanellus*, orangespotted sunfish, *L. humilis*, largemouth bass, *Micropterus salmoides*, and white crappie, *Pomoxis annularis* (Young, 1911), as well as the banded killifish, *Fundulus diaphanus* (Wiles, 1975). The host fish for *E. complanata* in the ACF Basin is unknown.

Conservation Status

Elliptio complanata is widely distributed and appears to be tolerant of moderate levels of habitat disturbance. Conservation status throughout its range was reported as currently stable by Williams et al. (1993). Within the ACF Basin, we have also designated the status of *E. complanata* as currently stable (Table 2).

Elliptio crassidens (Lamarck, 1819)

Elephantear
Figure 14

Synonymy

Unio crassidens, Lamarck, 1819
Histoire naturelle des Animaux sans Vertébres 8: 71.
Type Locality: "l'Amerique septentrionale, dans le Mississippi, l'Ohio, et plusieurs lacs." Type locality restricted to the Ohio River, Cincinnati, [Hamilton County], Ohio (Johnson 1969b).
Type Specimen: Lectotype Museum National d'Histoire Naturelle, Paris. Un-numbered *U. crassidens* var. b selected as lectotype by Johnson (1969b).

Unio (*Elliptio*) *nigra* Rafinesque, 1820
Type Locality: Ohio River.

Unio cuneatus Barnes, 1823
Type Locality: Ohio River.

Unio incrassatus Lea, 1840
Type Locality: Chattahoochee River, near Columbus, [Muscogee County], Georgia.

Unio danielsii B. H. Wright, 1899
Type Locality: Spring Creek, Decatur County, Georgia.

The elephantear in Gulf of Mexico drainages, including the ACF Basin, previously was recognized as a southern subspecies, *Elliptio crassidens incrassatus*, of the wide ranging *E. crassidens* (Clench and Turner, 1956). However, more recent investigators (Johnson, 1970; Burch, 1975; Heard, 1979; Turgeon et al., 1998) have not recognized *incrassatus* as a valid subspecies.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956), Johnson (1970) and Vidrine (1993). Like other members of the genus *Elliptio*, shell characters for *E. crassidens* are variable, with marked differences between forms found in mainstem, tributary, and reservoir populations within and between the four major rivers of the ACF Basin. Clench and Turner (1956) recognized the subspecies *incrassatus*, based on conchological features. They noted that *E. crassidens* had a much larger, heavier shell and lacked the sculpturing on the posterior slope characteristic of the subspecies *incrassatus*. However, they also noted that some specimens of *E. c. incrassatus* also lacked sculpturing on the posterior slope. In general, *E. crassidens* from the ACF Basin have dark shells with distinct wrinkles on the posterior slope. The pseudocardinal teeth are broad and prominent, and the lateral teeth are heavy.

Lea (1863c) discussed the anatomy of *Elliptio crassidens*. The branchial papillae of *E. crassidens* occupy two rows, and the papillae of the inner row are long, slender and usually bifid. Although shell morphology is quite variable, we have noted that the bifid nature of the branchial papillae is very consistent in ACF populations. The bifid nature of *E. crassidens* papillae separate it from other ACF *Elliptio*, whose branchial papillae are usually singular. In addition, the color of the mantle margins, branchial opening, and superanal and anal openings are consistently dark orange to purple in populations throughout the basin.

Distribution

Elliptio crassidens is widespread in the Mississippi River drainage, from West Virginia and western Pennsylvania northwest to Wisconsin, south to Missouri and eastern Louisiana. It has been reported along the Gulf Coast from the Amite River in Louisiana east to where it was recently discovered in the lower reaches of the mainstem of the Ochlockonee River in Florida (J. Brim Box, pers. observ.). It has not been reported from the Suwannee or Choctawhatchee rivers.

ACF Historical Distribution and Abundance

We have located 112 historical records of *Elliptio crassidens* from 46 sites in the ACF Basin (Fig. 51). Historically, this species was known from the main channel of the Apalachicola River, and from a single record from Mosquito Creek, an Apalachicola tributary. It was also known from the main channel and tributaries of the Chattahoochee, Chipola, and Flint rivers. In the ACF Basin, this species was most common at sites in the Coastal Plain, as only a few historical records were from sites immediately below or just above the Fall Line.

Almost nothing is known about the historical abundance of *Elliptio crassidens* in the basin. We have located 11 historical collections that contained over 10 individuals each, with the largest collection containing 60 individuals. A total of 63 individuals from 7 sites was collected between 1915 and 1918 from the Chipola River, with 51 individuals collected from a single site (van der Schalie, 1940).

ACF Distribution and Abundance

Over 500 live individuals and 374 shells were found from 67 sites in the basin, making *Elliptio crassidens* one of the most ubiquitous large river species below the Fall Line

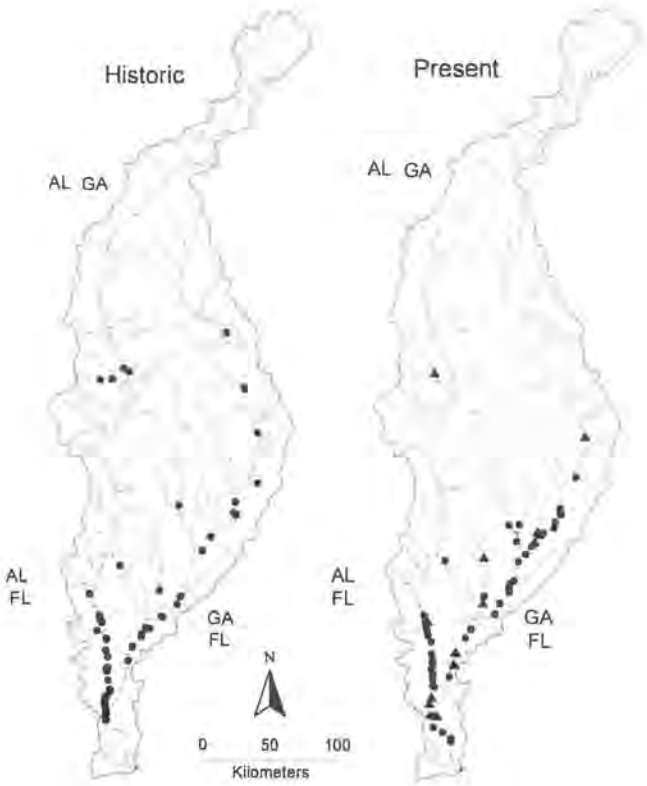

Fig. 51. Distribution of *Elliptio crassidens* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

in the ACF Basin (Fig. 51). *Elliptio crassidens* were found in the main channel of the Apalachicola River, as well as the main channel and tributaries of the Flint and Chipola rivers. In the Chattahoochee River system, shells only were found at one site on Little Uchee Creek, and in 1994 a live specimen was found in Sawhatchee Creek, and these were the only specimens found in that system.

Elliptio crassidens can be locally abundant in the main channels of the Flint and Chipola rivers. Beds of *E. crassidens* numbering in at least the 100s to 1,000s of individuals were found in the main channel of the Flint River in Baker and Mitchell counties, Georgia, as well as in the main channel of the Chipola River in Florida. It was also locally abundant below the Jim Woodruff Lock and Dam in the main channel of the Apalachicola River.

Habitat

Although the elephantear is found in a variety of habitats, in the ACF Basin it is most common in large creeks to rivers with moderate to swift currents. In Florida, *Elliptio crassidens* was reported from muddy sand, sand, and rock substrates in moderate current (Heard, 1979). In southeastern Georgia, it occurs in strong currents in the sandbars of large rivers and creeks (Johnson, 1970). The shell morphology of this species may vary depending on the type of substrate it occurs in, and in the Apalachicola River, Heard (1979) noted that individuals found in rocky substrates were "stunted" as compared to significantly larger individuals in sand a half mile upstream.

Of the 16 historical records of *Elliptio crassidens* that specified substrate types, 10 indicated that *E. crassidens* occurred primarily in sandy substrates, with the other 6 records specifying either rock, clay, mud, or vegetation as the primary substrate types. In this survey, about 70% of the *E. crassidens* found occurred at sites that contained sand and limestone or rock substrates.

Life History

A length-frequency histogram for *Elliptio crassidens* found in 1991 is presented in Figure 52. Ortmann (1909) considered *E. crassidens* a summer breeder (based on Sterki, 1895). However, of the many specimens he collected in July, August, September, and October in Pennsylvania, none was gravid.

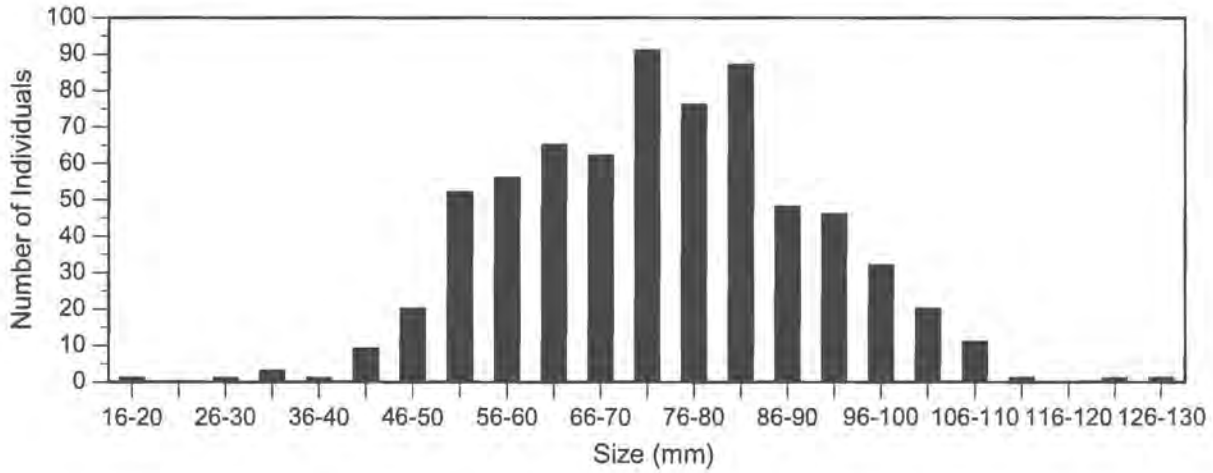

Fig. 52. Length-frequency distribution of *Elliptio crassidens* found in the summer of 1991.

The fish host for *Elliptio crassidens* was reported to be the skipjack herring, *Alosa chrysochloris*, based on the observations of natural infections (Howard, 1914a). Circumstances surrounding the identification of the skipjack herring as the host fish cast some doubt on the report. Howard (1914a) reported that the glochidia found on the skipjack herring and subsequently identified as *E. crassidens* had a hook at the apex of the shell. Other researchers reported the glochidia of the elephantear (Ortmann, 1911, 1919; Surber, 1915; Baker, 1928) as hookless. The host fish for this species in the ACF is unknown, although interestingly, the historical distribution of *E. crassidens* in the ACF Basin corresponds to the historical distribution of both *A. chrysochloris* and *A. alabamae*, the Alabama shad.

Only 12 gravid females were found in this survey, although over 500 individuals collected from June to September were checked for glochidia. Gravid females were found in June and August. The smallest gravid female found was 51 mm in length, collected on 25 June 1991 from the Chipola River.

Conservation Status

Williams et al. (1993) reviewed the status of *Elliptio crassidens* in the United States and Canada and assigned it a status of currently stable. In the ACF Basin, we have assigned it a conservation status of currently stable (Table 2).

Elliptio fraterna (Lea, 1852)

Brother spike
Figure 15

Synonymy

Unio fraternus Lea, 1852a
Trans. Amer. Philos. Soc. 10: 263, pl. 16, fig. 15.
Type Locality: Johnson (1974) restricted the type locality to the Abbeville District [Savannah River Drainage], South Carolina.
Type Specimen: Lectotype USNM 85396, designated and figured by Johnson (1970), is not the same specimen figured by Lea (1852b).

There is some confusion regarding the range and validity of this species. Clench and Turner (1956) overlooked *Elliptio fraterna* from the ACF Basin in their description of *E. mcmichaeli*, which is endemic to the Choctawhatchee River system to the west. Johnson (1970) did not recognize *E. mcmichaeli* and considered it a synonym of *E. fraterna*. Based on anatomical differences in the mantle margins, Fuller and Bereza (1974) recognized both species. We agree with Fuller and Bereza (1974) and consider *E. fraterna* to be a species distinct from *E. mcmichaeli*, based on these anatomical differences as well as zoogeographical patterns.

Diagnostic Characters

Shell morphology was described by Johnson (1970) and Britton and Fuller (1979). Lea (1863d) briefly described the anatomy of a specimen from the Flint River, near Albany, Georgia. In the ACF Basin, *Elliptio fraterna* can be distinguished from *E. crassidens* by its more compressed and elongate shape. The pseudocardinal teeth of *E. crassidens* are also much heavier than that of *E. fraterna*. In addition, the branchial papillae of *E. crassidens* in the ACF Basin are almost always bifid and the mantle margins are darkly pigmented, while the papillae of *E. fraterna* can be simple or bifid and the mantle margins are only slightly pigmented (Fuller and Bereza, 1974). This species can be distinguished from other ACF *Elliptio* by the combination of its compressed shell shape and the presence of prominent plications on the posterior slope of *E. fraterna* specimens.

Distribution

Lea (1852a) based his original description of *Elliptio fraterna* on specimens from both the Chattahoochee River drainage and the Abbeville District [Savannah River Drainage] of South Carolina. This is a disjunct distribution and we know of no records from intervening drainages.

ACF Historical Distribution and Abundance

We know of three records of *Elliptio fraterna* from three localities in the ACF Basin. The accompanying information of two additional specimens at the USNM simply say "Chattahoochee River," and could not be plotted. These records are significant, however, in that they further substantiate the validity of the historical presence of *E. fraterna* in the basin. This species historically occurred in the main channels of the Chattahoochee and Flint rivers (Fig. 53). We know of no records from tributary streams.

Little is known about the historical abundance of *Elliptio fraterna* in the ACF Basin. The paucity of collections of *E. fraterna* from the basin, however, suggests that it was always rare. The last known record of this species from the basin was collected from the Flint River at Albany in 1929 by W. Clench and P. Okkelberg.

ACF Distribution and Abundance

Elliptio fraterna was not collected in this survey and may be extirpated from the basin.

Habitat

There is almost no information on the habitat of *Elliptio fraterna*. In the mainstem of the Savannah River, this species was found only on sand bars (Britton and Fuller, 1979). Johnson (1970) reported it from the main channel of rivers and larger tributaries in swift current over sandy substrate, but did not specify where those observations were made. His observations may have been based on *E. mcmichaeli*, a closely related species endemic

Fig. 53. Historical distribution of *Elliptio fraterna* in the ACF Basin. Historic Map: ● indicates live and/or shell material present.

to the Choctawhatchee River system that also is known to occur on sand bars in swift current.

Life History

There is no information available on any aspect of the life history of *Elliptio fraterna.*

Conservation Status

Heard (1975a), the first to consider the conservation status of *Elliptio fraterna* throughout its range, reported it as endangered, and noted that Chattahoochee River populations could be extinct. It was last collected live in the Savannah River drainage in 1972 and was reported as endangered in South Carolina (Fuller, 1979). The conservation status of *E. fraterna* was reported as endangered by Williams et al. (1993). Based on the results of this survey we have assigned it a conservation status of extirpated from the ACF Basin (Table 2).

Elliptio icterina (Conrad, 1834)

Variable spike
Figure 16

Synonymy

Unio icterinus Conrad, 1834a
New Fresh Water Shells of the United States, p. 41, pl. 6, fig. 5.
Type Locality: Savannah River, muddy shore, opposite Augusta, [Richmond County], Georgia.
Type Specimen: Figured lectotype ANSP 41381.

Unio pullatis Lea, 1856
Type Locality: Creeks, near Columbus, [Muscogee County], Georgia.

Unio pullatus Lea 1858c
Type Locality: Creeks, near Columbus, [Muscogee County], Georgia. Lea (1858c) proposed this name as a replacement for *U. pullatis* (Lea, 1856).

Unio sublatus Lea, 1857c
Type Locality: Uchee Bar [Chattahoochee River], below Columbus, Georgia.

Unio tetricus Lea, 1857c
Type Locality: Flint River, near Albany, [Dougherty County], Georgia.

Unio aquilus Lea, 1857c
Type Locality: Flint River, near Macon, [county unknown], Georgia.

Unio viridiradiatus Lea, 1859b
Type Locality: Big Uchee River [Creek in Russell County, Alabama], near Columbus, Georgia.

Unio viridans Lea, 1859c
Type Locality: Near Columbus, [Muscogee County], Georgia.

Unio verutus Lea, 1859c
Type Locality: Flat Rock Creek, near Columbus, [Muscogee County], Georgia.

Unio mercerii Lea, 1862
Type Locality: [Flint River drainage], Lee County, Georgia.

Unio singularis B. H. Wright, 1899
Type Locality: Spring Creek [a branch of the Flint River], Decatur County, Georgia.

Elliptio icterina is widespread along the south Atlantic Coast and eastern Gulf of Mexico drainages. It is a highly variable species with more than 45 known synonyms (Johnson, 1970). Since Johnson (1970) presented a complete synonymy we have listed only those species that were described from the ACF Basin.

Diagnostic Characters

Shell morphology was described by Johnson (1970) and Britton and Fuller (1979). There is considerable variation in the shell morphology of *Elliptio icterina*. In the ACF Basin, it occurs sympatrically with and is difficult to distinguish from *E. complanata* and *E. arctata*.

We agree with Britton and Fuller (1979), who suggested that anatomical differences (e.g., marsupia and conglutinates) were more reliable diagnostic characters than shell morphology in distinguishing *Elliptio icterina* from *E. complanata* or *E. arctata*. The branchial and anal papillae of *Elliptio icterina* from the ACF Basin are only lightly to moderately pigmented with a reddish tinge, which distinguishes this species from both *E. arctata* and *E. complanata*, whose branchial and anal papillae are usually darkly pigmented. The anal aperture of *E. icterina* is small, about half the size of the supra-anal chamber, a character that also distinguishes this species from *E. arctata*. The ovisacs of *E. icterina* are confined to the outer two gills and when the females are charged, the marsupia are inflated and the conglutinates are broadly oval in shape (Britton and Fuller, 1979). In contrast to *E. complanata*, the marsupia of *E. icterina* do not extend the full length of the outer demibranch (Fuller, 1972a). Fuller (1971) figured the marsupium and egg masses.

Distribution

Elliptio icterina is found in coastal drainages from the Escambia River system in Alabama east to peninsular Florida, and north to the White Oak River of North Carolina (Johnson, 1970).

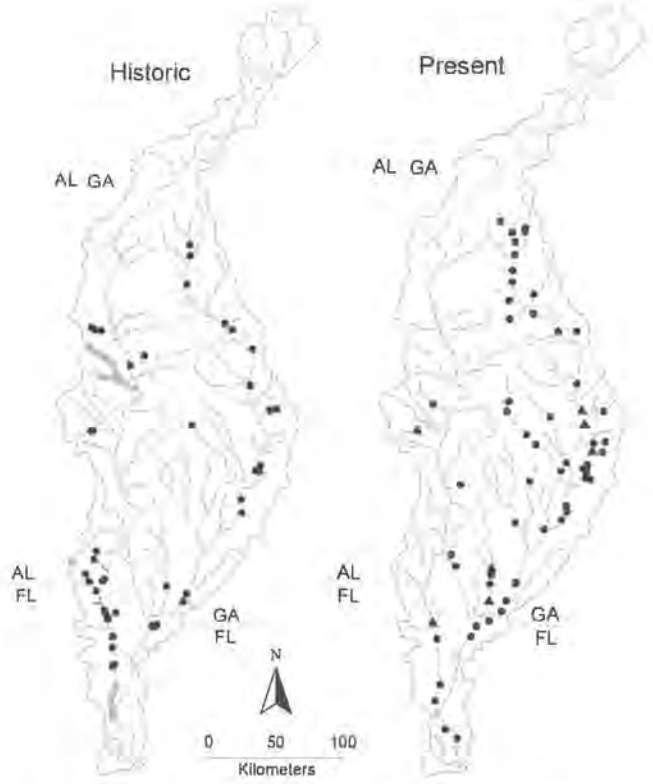

Fig. 54. Distribution of *Elliptio icterina* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

ACF Historical Distribution and Abundance

We have located 130 historical collections of *Elliptio icterina* from 72 sites in the basin. This species once occurred in the main channel and tributaries of the Apalachicola, Chipola, Chattahoochee, and Flint rivers (Fig. 54). Although there are numerous historical records from multiple sites on the mainstem of the Chipola and Flint rivers, *E. icterina* is known only from a single mainstem site on both the Chattahoochee and Apalachicola rivers.

Historical records suggest that *Elliptio icterina* was common in Chattahoochee River tributaries and in the main channel of the Chipola River. Lea (1858c), under the synonym *Unio pullatus*, noted that it was abundant in tributary streams around Columbus, Georgia. A total of 693 specimens was collected from 18 sites in 3 Chattahoochee River tributaries in the early 1970s (Jenkinson, 1973). van der Schalie (1940) reported that *E. strigosus* (= *E. icterina* and *E. complanata*) were collected from 23 of the 25 stations surveyed in the Chipola River drainage from 1915 to 1918. The largest number of specimens collected at each of these stations were 1,557, 1,097, 698, 517, and 438 individuals, respectively. After examining specimens at the UMMZ, we have concluded that the material van der Schalie labeled *E. strigosus* is a mix of *E. complanata* and *E. icterina*, suggesting both of these species were extremely abundant in the Chipola River system at that time.

ACF Distribution and Abundance

Elliptio icterina were found in the main channel and tributaries of the Apalachicola and Flint rivers, as well as the mainstem of the Chipola River and tributaries of the Chattahoochee River (Fig. 54). A total of 664 live animals and 113 shells was found at 64 sites in this survey, making this one of the most abundant species found in the basin. It is also one of only a few species that persists in tributaries of the Chattahoochee River system.

Habitat

Elliptio icterina occurs in a variety of substrates in slight to moderate current, in streams, lakes, reservoirs, ponds, and large rivers (Johnson, 1970; Heard, 1979). In the ACF Basin, it appears to be more of a tributary than a mainstem species. In Chattahoochee River tributaries, *E. icterina* was found in a variety of habitats, including sand and gravel, and in silt deposits between rocks (Jenkinson, 1973). Of the eight historical records we located that contained habitat information, five listed sand as the primary substrate type, two listed mud, and one listed

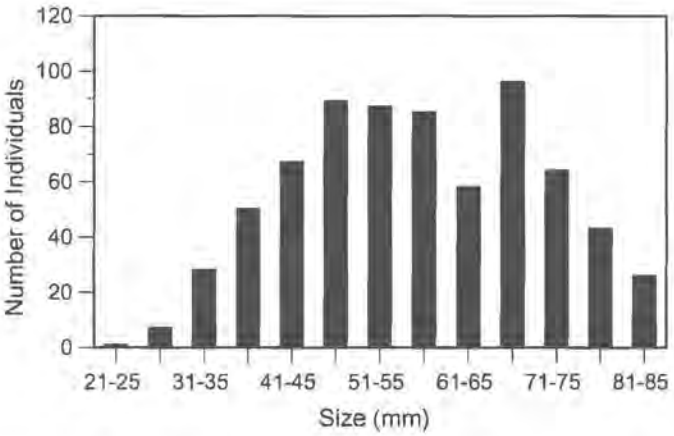

Fig. 55. Length-frequency distribution of *Elliptio icterina* found in the summer of 1992.

vegetation. In this survey, 40% of the individuals collected were found at sites with sand and limestone or other rock, while an additional 30% of the *E. icterina* collected were found at sites with primarily sand and clay substrates.

Life History

While *Elliptio icterina* is common to abundant in much of its range, there is almost no information on its life history. Length-frequency data for specimens found in 1992 in this survey are presented in Figure 55. Britton and Fuller (1979) suggested the life history of *E. icterina* was probably very similar to *E. complanata*, and reported egg masses in the marsupia during June and July in the Savannah River, South Carolina. In this survey, although 663 *E. icterina* were examined for glochidia, only 27 were gravid and these were found in June and July. The only known host fish (based on laboratory infections) for this species is the bluegill sunfish, *Lepomis macrochirus* (Ruessler and Keller, 1996).

Conservation Status

The conservation status of *Elliptio icterina* was listed by Williams et al. (1993) as currently stable throughout its entire range. Within the ACF Basin, we have assigned *E. icterina* a conservation status of currently stable (Table 2).

Elliptio nigella (Lea, 1852)

Winged spike
Figure 17

Synonymy

Unio nigellus Lea, 1852a
Trans. Amer. Philos. Soc. 10: 283, pl. 24, fig. 42.
Type Locality: Chattahoochee River, near Columbia, Georgia.
Type Specimen: Figured lectotype USNM 85567.

Unio denigratus Lea, 1857c
Type Locality: Streams, near Columbus, [Muscogee County], Georgia.

Frierson (1927) and Johnson (1968) placed *Elliptio purpurella* (Lea, 1857c) in the synonymy of *E. nigella*. However, we recognize *E. purpurella* as a valid species distinct from *E. nigella* (see *E. purpurella* species account).

The type locality usually given for *Unio nigellus*, Chattahoochee River, near Columbus, Georgia, may be in error. The tag accompanying the type specimen in the USNM is apparently mislabeled. The tag states the type locality as the "Chattahoochee River, near Columbus, Georgia." The stated locality in the Observations (Lea, 1852b) is "Chattahoochee River, near Columbia, Georgia, Dr. Boykin." The locality written on the inside of the figured shell also says Columbia. There is a town of Columbia on the Chattahoochee River, but it is located on the Alabama side of the river in Houston County. The town of Columbia is shown on a map of Alabama dated 1830 (Wheeler, 1935). We believe this locality is correct, which provides an additional site for this species in the lower Chattahoochee River.

Diagnostic Characters

The winged spike is a small species and is not known to exceed 45 mm in length. The shell morphology was described by Johnson (1968). *Elliptio nigella* is easily confused with other *Elliptio* species, especially *E. complanata*, but can be distinguished from that species by its prominent posterior ridge, strong biangulations along the posterior slope, thin shell, and the presence of faint green rays in younger specimens. In addition, the pseudocardinal teeth are small, pointed, crenulate, and double in both valves, whereas in *E. complanata*, the pseudocardinal teeth are often pronounced and heavy. The soft parts of *E. nigella* were briefly described by Lea (1859d, 1863c), under the names *U. nigellus* and *U. denigratus*.

Distribution

The winged spike is an ACF Basin endemic and is known only from the Chattahoochee and Flint river systems (Fig. 56). Although Simpson (1914) reported this species from "Chattahoochee River; south into Florida," he gave no basis for the Florida records and we have not located any records of *Elliptio nigella* from Florida.

ACF Historical Distribution and Abundance

We have located 17 historical collections of *Elliptio nigella* from 8 sites. It once occurred in the main channel of the lower and middle Flint River and in the Chattahoochee River in Muscogee County, Georgia, and Houston County, Alabama (see synonymy). This species was last collected live in Coolewahee Creek, a tributary of the Flint River, by H. Athearn in 1958.

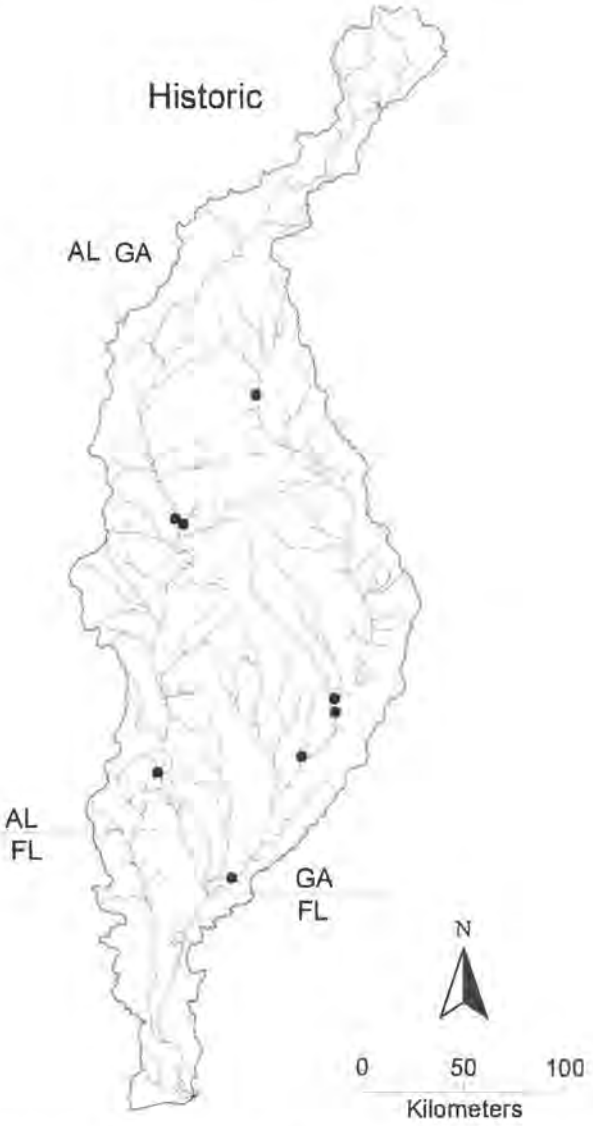

Fig. 56. Historical distribution of *Elliptio nigella* in the ACF Basin. Historic Map: ● indicates live and/or shell material present.

There is very little information known about the historical abundance of this species. Johnson (1968) noted that of the thousands of unionid mussels collected by Clench, Turner, and McMichael during the summer of 1954, only three specimens of *Elliptio nigella* were found.

ACF Distribution and Abundance

Elliptio nigella was not found in the current survey and may be extinct.

Habitat

Almost nothing is known about the habitat of *Elliptio nigella*. Johnson (1968) noted that *E. nigella* was found among rocks in muddy sand, although it is not clear whether this observation was based on *E. nigella*, *E. purpurella*, or *E. arctata*. This species was formerly known from Coolewahee Creek, a tributary of the Flint River, at a site that is spring-fed with a substrate consisting mainly of sand and limestone rock.

Life History

Nothing is known about the life history of *Elliptio nigella*.

Conservation Status

The rarity of *Elliptio nigella* in museum collections has long been recognized. The winged spike was first considered to be a rare and endangered species by Athearn (1970) and Stansbery (1971). The USFWS considered it a candidate species for possible addition to the endangered species list (USFWS, 1989, 1991). Williams et al. (1993) reviewed the status of the winged spike and assigned it a conservation status of endangered. *Elliptio nigella* was included in a list of extinct species by Opler (1977) and repeated by Palmer (1985). We have assigned *E. nigella* a conservation status of extinct (Table 2).

Elliptio purpurella (Lea, 1857)

Inflated spike
Figure 18

Synonymy

Unio purpurellus Lea, 1857c
Proc. Acad. Nat. Sci. Phila. 9: 171.
Type Locality: Flint River, near Albany, [Dougherty County], Georgia.
Type Specimen: Lectotype USNM 85675.

Since its description in 1857, *Elliptio purpurella* has rarely been recognized as a valid taxon. It has been placed in synonymy of several species, including *arctata* (Simpson, 1914), *nigella* (Frierson, 1927; Johnson, 1968), and *strigosus* (Clench and Turner, 1956). After careful examination of multiple collections of *Elliptio* species in museum holdings, comparison with the type material, and electrophoretic data (P. Mulvey, pers. comm.), we recognize *E. purpurella* as a valid species and give it the common name of inflated spike.

Diagnostic Characters

Shell morphology was originally described by Lea (1857c). The shell is inflated and is sometimes covered with broad, green rays. The nacre is usually purple. *Elliptio purpurella* can be distinguished from *E. complanata* and other ACF *Elliptio* by the combination of its diminutive size (rarely exceeding 65 mm in length), arcuate shell, long, curved lateral teeth, and small, pointed pseudocardinal teeth that are double in both valves.

The mantle margins at the branchial and anal apertures are moderately pigmented in *Elliptio purpurella*, but not as heavily pigmented as *E. complanata*. The branchial papillae are short, singular, and form two intermingled rows. The branchial papillae in *E. purpurella* do not extend anteriad as is common in *E. complanata*. The anal papillae are short and well defined. The branchial, anal, and supra-anal openings in *E. purpurella* are roughly the same size.

Distribution

Elliptio purpurella is endemic to the ACF Basin in Alabama, Florida, and Georgia.

ACF Historical Distribution and Abundance

Elliptio purpurella was historically known from the mainstem and tributaries of the Flint, Chattahoochee, and Chipola rivers (Fig. 57). We have located 30 historical records from 16 sites. There are no known historical records from the mainstem of the Apalachicola River. All of the historical records are from the Coastal Plain, with the northernmost records occurring near the Fall Line.

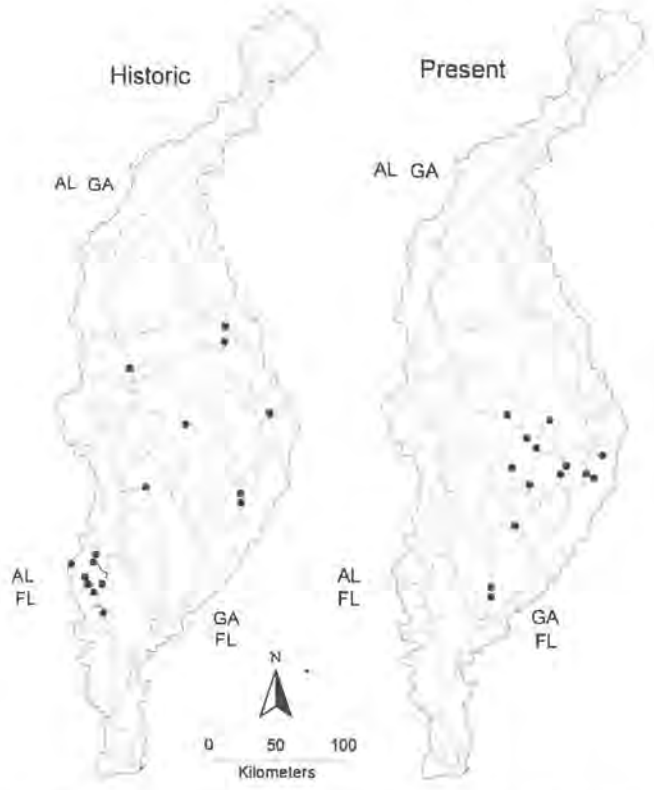

Fig. 57. Distribution of *Elliptio purpurella* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present.

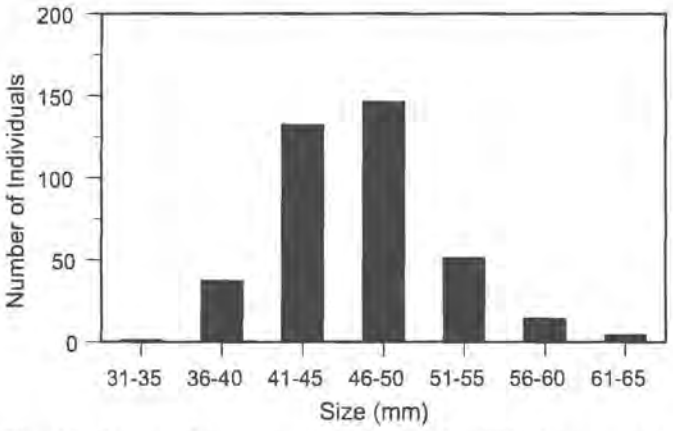

Fig. 58. Length-frequency distribution for *Elliptio purpurella* found in the summer of 1992.

ACF Distribution and Abundance

In this survey, 369 live animals and 16 shells were found from 14 sites (Fig. 57). *Elliptio purpurella* were found only in tributaries of the Flint River, and all of these sites were in the Coastal Plain. It was not found at any of the 135 main channel or 39 reservoir sites surveyed in the ACF Basin.

Habitat

Nothing is known from the historical record of the habitat preferences of this species. In this survey, 85% of the sites where *Elliptio purpurella* were found contained primarily sand and limestone rock substrates. An additional 8% of the sites contained primarily sand and clay substrates.

Life History

Nothing is known concerning the life history of *Elliptio purpurella*. Length-frequency data are presented for specimens found in the summer of 1992 (Fig. 58). Lea (1859d) briefly described the soft parts and glochidia. He did not report the date of collection for the gravid female. No gravid females were found during this survey, although all 369 live *E. purpurella*, collected from May through September, were checked for glochidia. The host fish is unknown.

Conservation Status

Although *Elliptio purpurella* is common in several Flint River tributaries, it appears to be extirpated from both the Chipola and Chattahoochee river drainages, and from the main channel of the Flint River. Based on this range reduction, we consider *E. purpurella* to be a species of special concern in the ACF Basin (Table 2).

Elliptoideus sloatianus (Lea, 1840)

Purple bankclimber
Figure 19

Synonymy

Unio sloatianus Lea, 1840
Proc. Amer. Philos. Soc. 1(13): 287.
Type Locality: Chattahoochee River, Georgia. Clench and Turner (1956) restricted the type locality to Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype AMNH 56104 is in the American Museum of Natural History.

Unio atro-marginatus Lea, 1840
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Unio plectrophorus Conrad, 1849a
Type Locality: Flint River, Georgia.

Unio aratus Conrad, 1849b
Type Locality: Flint River, Georgia.

Unio plectophorus Conrad, 1850
Type Locality: Flint River, Georgia. Conrad (1850) proposed this name as a correction of spelling for *U. plectrophorus* (Conrad, 1849a).

Frierson (1927) created the monotypic subgenus *Elliptoideus* under *Elliptio* for this species, although current authors have given *Elliptoideus* generic status (e.g., Turgeon et al., 1998).

Diagnostic Characters

The purple bankclimber is the second largest freshwater mussel in the ACF Basin, with shells reaching over 200 mm in length. The largest specimens are found in the Apalachicola River below Jim Woodruff Lock and Dam. Shell morphology was described by Lea (1840, 1842), Clench and Turner (1956), Burch (1973, 1975), and Williams and Butler (1994). *Elliptoideus sloatianus* can be distinguished from *Megalonaias nervosa* and *Amblema neislerii* by its shallow umbo pocket, and by the purple nacre along the margins of its shell.

Elliptoideus sloatianus is the only unionid in the ACF Basin that has arborescent branchial papillae (the term was coined by Lea [1859d] to describe the branchial papillae of *Margaritifera margaritifera*). The anal papillae are simple, and both the branchial and anal apertures are darkly pigmented. Ova are brooded in all four demibranchs (Frierson, 1927), which separates this species from the genus *Elliptio*. There is no mantle suture separating the supra-anal and anal portions of the excurrent aperture.

Distribution

Elliptoideus sloatianus is known only from the ACF Basin in Alabama, Georgia, and Florida, and the Ochlockonee River in Florida and Georgia (Clench and Turner, 1956; Burch, 1975). Heard (1979) reported one shell of *Elliptoideus* from the Escambia River, near Century, Florida, but Williams and Butler (1994) stated this record was based on the conchologically similar *Plectomerus dombeyanus*.

The purple bankclimber is known from fossils in two additional Florida drainages. The first record for this species outside of the modern range is from the Leisey Shell Pit, early Pleistocene deposits, near Tampa in the Hillsborough River drainage (Bogan and Portell, 1995). A second record, of unknown age, was collected from a spring in the mainstem of the Suwannee River (P. Fuller and J. D. Williams, pers. observ.).

ACF Historical Distribution and Abundance

We have located 68 historical collections of *Elliptoideus sloatianus* from 25 sites in the ACF Basin. Historically *E. sloatianus* occurred in the mainstems of all four major ACF rivers (Fig. 59). Although the only records of this species from the Chattahoochee River drainage are at Columbus, Georgia, there are at least three known collections of *E. sloatianus* from Indian middens in that drainage below the Fall Line (J. D. Williams, pers. observ.). In addition, there are three known historical records from Flint River tributaries.

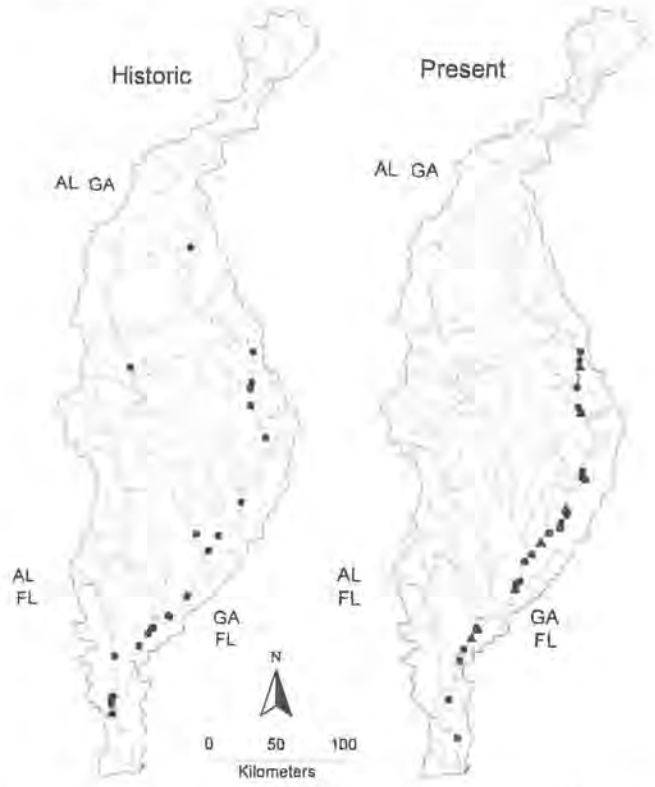

Fig. 59. Distribution of *Elliptoideus sloatianus* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

Very little information has been published on the historical abundance of *Elliptoideus sloatianus*. The largest historical collection we examined contained 31 individuals. van der Schalie (1940) did not report it from any of the 25 stations surveyed in the Chipola River drainage from 1915 to 1918. Clench and Turner (1956) considered *E. sloatianus* to be a "relatively rare species." Heard (1975a) noted that although this species was common in the Apalachicola River in the 1960s, population sizes, especially below the Jim Woodruff Lock and Dam, were "drastically reduced" by the mid-1970s.

ACF Distribution and Abundance

In this survey, *Elliptoideus sloatianus* were found at 30 sites in the Apalachicola and Flint rivers (Fig. 59). A total of 102 live animals and 79 shells was found during this survey. A single specimen was taken from an unnamed tributary of Mill Creek in the Flint River drainage. It appears to be very rare or extirpated from the Chipola and Chattahoochee rivers. The last record of this specimen from the Chattahoochee River was in the 1800s, while the last record from the Chipola River was in 1988. Of the 49 collections made in reservoirs during this survey, none contained purple bankclimbers.

Elliptoideus sloatianus can be locally abundant in the main channels of the Flint and Apalachicola rivers. Dozens of *E. sloatianus* were encountered in the mainstem of the Flint River in Decatur County, Georgia, and below the Jim Woodruff Lock and Dam in the main channel of the Apalachicola River.

Habitat

Elliptoideus sloatianus is found in sand, fine gravel, or muddy sand in moderate current (Heard, 1975a) in larger rivers and streams (Clench and Turner, 1956). Over 80% of the specimens collected in this survey were found at sites with sand/limestone substrates. This species prefers main channel habitats, and in the ACF Basin is often found in waters over 3 m in depth. It does not appear to tolerate impoundments.

Life History

Lea (1863b) briefly described the soft anatomy based on three male specimens. Fuller et al. (unpubl. ms.) found no gravid individuals in collections made in early September. Gravid females with viable glochidia were found in the Ochlockonee River in February and March 1996 (J. Brim Box, pers. observ.). O'Brien (1997b), based on laboratory infections, successfully transformed glochidia on three fishes, the mosquitofish, *Gambusia affinis*, guppy, *Poecilia reticulata*, and blackbanded darter, *Percina nigrofasciata*. However, because of low transformation rates, she did not consider these species as primary hosts. Eleven other species of fish, including sunfishes (Centrarchidae), minnows (Cyprinidae), bullhead catfishes (Ictaluridae), and suckers (Catostomidae) were infected with glochidia but did not produce transformed juveniles. Transformations occurred in 13 to 22 days at temperatures of 19 to 22°C.

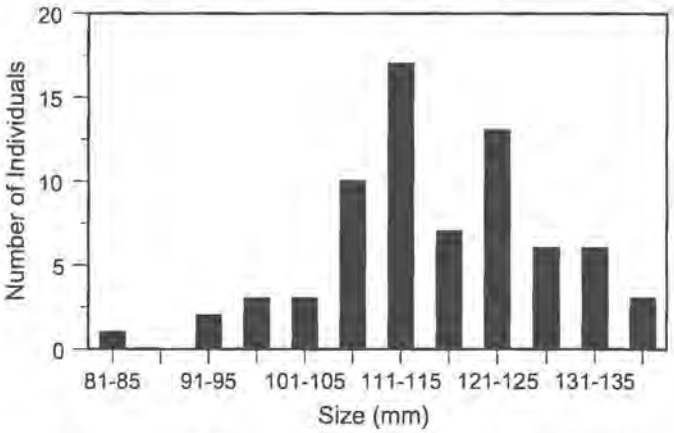

Fig. 60. Length-frequency distribution for *Elliptoideus sloatianus* found in the summer of 1992.

We found little evidence to document recent recruitment of *Elliptoideus sloatianus* in the ACF Basin. The smallest specimen found in this survey was 70 mm in length, and the average length was 124 mm (Fig 60). In addition, little recruitment was evident below Jim Woodruff Lock and Dam, although 25–30 years ago juveniles were commonly found there, suggesting long-term reproductive failure (W. Heard, pers. comm.). Richardson and Yokley (1996) similarly found no evidence of recent recruitment of *E. sloatianus* below the dam, or at two other sites where adult *E. sloatianus* were found in this survey.

Conservation Status

The purple bankclimber was considered rare by Clench and Turner (1956) and rare and endangered by Athearn (1970) and Stansbery (1971). The USFWS (1989, 1991) considered *Elliptoideus sloatianus* a candidate for endangered or threatened status. *Elliptoideus sloatianus* was assigned a threatened status by Williams et al. (1993), and in Florida, Williams and Butler (1994) considered it to be threatened. It was proposed for federal threatened status in 1994, and listed in 1998 (USFWS, 1998) (Table 2).

Glebula rotundata (Lamarck, 1819)

Round pearlshell
Figure 20

Synonymy

Unio rotundatus Lamarck, 1819
Histoire naturelle des Animaux sans Vertébres 6: 75.
Type Locality: Locality unknown. Clench and Turner (1956) restricted the type locality to Bayo [sic] Teche, St. Mary Parish, Louisiana.

Type Specimen: Lectotype USNM 85760 (Johnson 1969b, fig. 10) [for further comments see Johnson 1969b].

Unio suborbiculata Lamarck, 1819

Type Locality: Locality unknown. Clench and Turner (1956) restricted the type locality to Bayo [sic] Teche, St. Mary Parish, Louisiana.

Unio glebulus Say, 1831

Type Locality: Bayou Teche, St. Mary Parish, Louisiana.

Unio subglobosus Lea, 1834

Type Locality: Bayou Teche, [St. Mary Parish], Louisiana.

Unio grandensis Conrad, 1855

Type Locality: Rio Grande, Texas.

Diagnostic Characters

Glebula rotundata attains a length of over 105 mm. A monotypic genus, the pseudocardinal teeth are radially laminate with serrate edges, a character that separates it from other unionids (Burch, 1975). In addition, its subcircular outline and greenish-black and cloth-like periostracum distinguish it from other ACF unionids. Shell morphology was described by Clench and Turner (1956), Burch (1975), Vidrine (1993), and Williams and Butler (1994).

The branchial papillae are long, singular, and occur in multiple, poorly-defined rows. The anal aperture papillae are short and appear as crenulations. The anal and supra-anal openings are separated by a long, perforated suture. The mantle margin before the branchial aperture is serrated and unpigmented, while the mantle margin at the branchial and anal apertures is lightly pigmented dark reddish brown. The supra-anal opening is unpigmented. *Glebula rotundata* has ovisacs confined to the posterior part of the outer two demibranchs (Heard and Guckert, 1971).

Distribution

Glebula rotundata occurs from eastern Texas (Howells et al., 1996), to the Florida panhandle, and appears to be most abundant in the lower Mississippi River Basin in Louisiana and southern Mississippi (Parker et al., 1984). It extends as far north as Arkansas (Gordon, 1983) and northeast Oklahoma (Branson, 1969), with a disjunct population known from Kentucky (Schuster, 1988). It has also been reported from the Escambia, Chipola, and lower Choctawhatchee river systems in Florida (Heard, 1979; Butler, 1989). The eastern range for this species was reported to be the Apalachicola River system in Florida (Clench and Turner, 1956), but *G. rotundata* was found in the lower main channel of the Ochlockonee River in 1993 (J. Brim Box, pers. observ.), extending its eastern range.

ACF Historical Distribution and Abundance

We have located 25 historical collections of *Glebula rotundata* from 20 sites in the main channel and tributaries of the Apalachicola River, as well as the mainstem of the lower Chipola River (Fig. 61). In the ACF Basin, it appears to be confined to the lower Coastal Plain.

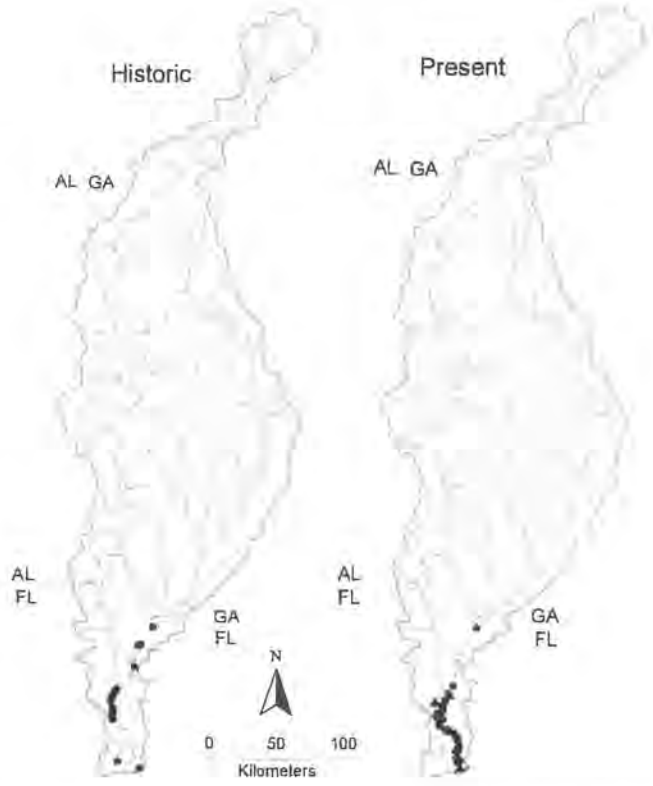

Fig. 61. Distribution of *Glebula rotundata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

There is very little historical information concerning the abundance of *Glebula rotundata* in the ACF Basin. van der Schalie (1940) reported that a total of three individuals was found at two sites in the lower main channel of the Chipola River when that system was surveyed from 1915 to 1918. Clench and Turner (1956) considered this species to be exceedingly rare in the ACF Basin, and limited to the lower reaches of the Apalachicola and Chipola rivers. Butler (1989), however, considered *G. rotundata* to be one of the most commonly encountered species in the lower Apalachicola River as well as in the Dead Lakes area of the lower Chipola River.

ACF Distribution and Abundance

In this survey, 199 live animals and 226 shells were found from 30 sites (Fig. 61). *Glebula rotundata* was found in the lower Chipola River up to Dead Lakes, and at multiple sites in the lower and middle Apalachicola River as well as at a single site immediately below Jim Woodruff Lock and Dam. This species was most common in the main channel of the Apalachicola River.

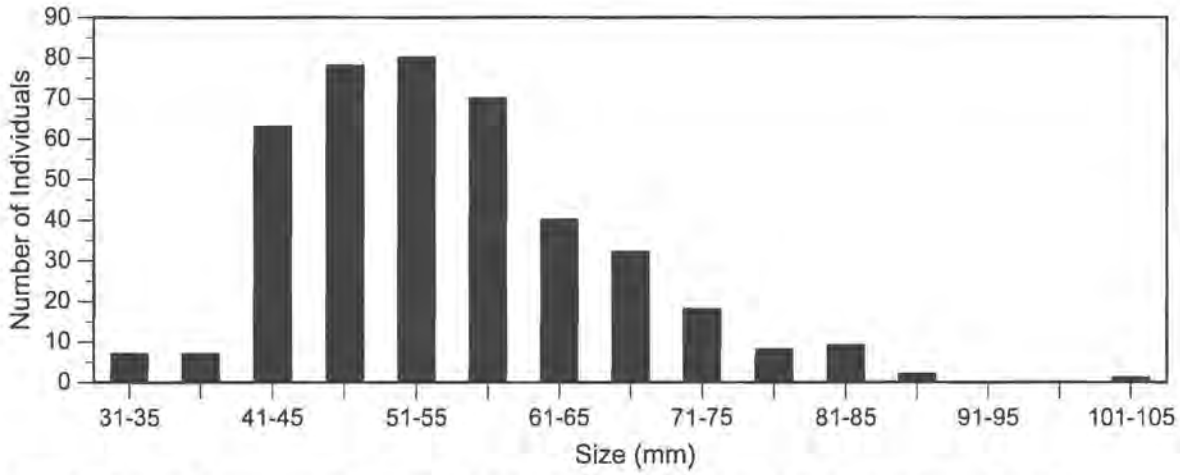

Fig. 62. Length-frequency distribution for *Glebula rotundata* found in the summer of 1991.

Habitat

Glebula rotundata is most frequently found in the lower portions of coastal rivers. It inhabits small to large rivers and associated sloughs, oxbows, and backwaters. Heard (1979) noted that in Florida, *G. rotundata* was found in muddy sand in moderate current. In Louisiana, this species was often found in clay (73%), sand (13%), and silt (8%) substrates (Parker et al., 1984).

In the ACF Basin, nine historical records list the substrate type: four were in sand with aquatic vegetation, three were in sand and mud, and two were in mud substrates. In this survey, 40% of the *Glebula rotundata* encountered were found at sites that had a primarily silty substrate, while an additional 40% of the specimens were found at sites that contained sand and clay or detritus. We found this species to be syntopic with *Rangia cuneata* in the lower part of the Apalachicola River. Vidrine (1993) also noted this association in Louisiana.

Life History

Length-frequency data for *Glebula rotundata* found in the summer of 1991 in this survey are presented in Figure 62. In Louisiana, *G. rotundata* glochidia were found encysted on the gills of the spotted gar, *Lepisosteus oculatus*, common carp, *Cyprinus carpio*, and white bass, *Morone chrysops*, as well as on two estuarine fishes, the hogchoker, *Trinectes maculatus*, and bay anchovy, *Anchoa mitchilli* (Parker et al., 1984). In addition, under laboratory conditions, *G. rotundata* glochidia successfully encysted and metamorphosed on the gill filaments and fins of the green sunfish, *Lepomis cyanellus*, and bluegill sunfish, *L. macrochirus* (Parker et al., 1984).

About 200 *Glebula rotundata* were checked for glochidia during this survey. A total of nine gravid females was found from June to August. Parker et al. (1984) observed that in Louisiana, larvigerous (glochidia free of the egg membrane) female *G. rotundata* were collected from April through October. Parker et al. (1984) suggested that the reproductive cycle of *G. rotundata* is atypical of other Lampsilinae, in that there are at least three periods of glochidia release a season (March through October in Louisiana).

Conservation Status

Glebula rotundata is locally abundant but is absent from many localities which appear to provide suitable habitat. Clench and Turner (1956) considered this species to be exceedingly rare in the ACF Basin. Heard (1975a) listed *G. rotundata* among species he considered reduced in range or abundance (i.e., is now very rare or extirpated in part of its present or past range, respectively). In Florida, Williams and Butler (1994) considered it to be a species of special concern based on its limited distribution, and the lack of recent records from the Escambia drainage. On a national basis, Williams et al. (1993) assigned it a status of currently stable. Based on the results of this survey, we have also assigned *G. rotundata* a conservation status of currently stable (Table 2).

Lampsilis binominata Simpson, 1900

Lined pocketbook
Figure 21

Synonymy

Unio lineatus Lea, 1840 non *Unio lineatus* Valenciennes, 1827
Proc. Amer. Philos. Soc. 1(13): 287.
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype USNM 84884 designated by Johnson (1974).

Lampsilis binominatus Simpson, 1900
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Lampsilis binominatus is a replacement name for *Unio lineatus* Lea, 1840.

The lined pocketbook was considered by Frierson (1927) to be a synonym of *Lampsilis ornata*, which occurs in Gulf drainages from the Escambia River, Florida and Alabama, west to the Amite River, Louisiana and Mississippi. Later Clench and Turner (1956) also placed *L. binominata* in the synonymy of *L. excavatus* (= *L. ornata*), and concluded that because they had not found any specimens of *L. excavatus* east of the Escambia River system, the type locality for *L. binominata* (Chattahoochee River at Columbus, Georgia) must be in error. Johnson (1967a) substantiated the original type locality based on subsequent collections of *L. binominata* from the ACF Basin, concluded that it was distinct from *L. excavatus*, and recognized *L. binominata* as a valid species. Based on conchological characters, this species is probably more closely related to *L. ornata* than any eastern species of *Lampsilis*.

Diagnostic Characters

The lined pocketbook is small, attaining a length of about 60 mm. Shell morphology was described by Johnson (1967a). Sexual dimorphism is apparent and the umbo extends high above the hinge line. In the ACF Basin, this species has been confused with *Lampsilis straminea claibornensis* and *L. subangulata*. *Lampsilis binominata* can be distinguished from those two species by its smooth, shiny, and yellow periostracum with a few prominent, narrow, sharply defined, dark green rays that extend from the umbo to the shell margin. The green rays of *L. subangulata* are wider, the shell is more elongate, and the umbo extends just above the hinge line, while *L. s. claibornensis* shells in the ACF Basin are usually rayless, dark yellowish to brown in color, and much larger and heavier than *L. binominata* shells.

Fuller and Bereza (1974) noted that a preserved male *Lampsilis binominata* at the ANSP had a faint eyespot, and concluded that this species was a more advanced member of its genus. Like other Lampsiline species, we assume that the ovisacs are confined to the posterior part of the outer two demibranchs (Heard and Guckert, 1971). Lea (1863d) provided a description of the soft parts of *U. lineatus* (= *L. binominata*), but the locality given for specimens list both Uchee Bar (on the Chattahoochee River) and the Altamaha River, Georgia. *Lampsilis binominata* does not occur in the Altamaha River. Unfortunately, there is no way to determine which specimen possessed the characteristics used to develop the description.

Distribution

The lined pocketbook is an ACF Basin endemic, and historically was confined to the upper Chattahoochee and Flint river systems (Fig. 63). There are no historical records of *Lampsilis binominata* from the Apalachicola River drainage. It is one of two ACF mussels that was restricted to areas on and above the Fall Line.

ACF Historical Distribution and Abundance

We have located 13 historical collections of *Lampsilis binominata* from 11 sites in the ACF Basin. The last known specimen of this species recorded from the basin was a shell collected from the Flint River at Warm Springs, Georgia, by J. Chandler in April 1976. This specimen was 35 mm in length and was estimated to be approximately three years old. The last known collection of live individuals was made by H. D. Athearn on 15 October 1967. During a single collecting trip he found a total of four specimens from two localities in the Flint River, Pike and Meriwether counties, Georgia.

Apparently this species was rare even to early collectors. A note accompanying two specimens collected from

Fig. 63. Historical distribution of *Lampsilis binominata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present.

the Chattahoochee River, Georgia, in the 1800s, observed that the collector was a "lucky fellow to get a pair." The largest collection we have located was in the USNM and contained eight individuals.

ACF Distribution and Abundance

Lampsilis binominata was not found in this survey. This species has not been collected live in over two decades and appears to be extinct.

Habitat

The lined pocketbook was confined to the main channels of the Chattahoochee and Flint rivers, as well as Line Creek, a headwater tributary of the Flint River that is equal in size to the river in that area. There are no other known records from tributary streams. Little is known about the habitat requirements for *Lampsilis binominata*. H. Athearn (pers. comm.) noted he collected this species in stabilized sand and shoals in moderate to swift current.

Life History

Nothing is known about the life history of *Lampsilis binominata*. An eyespot was noted in a preserved male specimen at the ANSP, indicating the host fish for this species may be piscivorous.

Conservation Status

Lampsilis binominata has always been rare compared to most other unionids in the ACF Basin. The paucity of animals found during the past 40 years indicates the rarity of *L. binominata* is real and not an artifact of collecting. The last known occurrence in the Chattahoochee River was at West Point, Georgia, in 1942, prior to construction of the West Point Reservoir in 1975. The reasons for its extirpation from the Flint River are not clear.

Lampsilis binominata was first recognized as a rare and endangered species by Athearn (1970) and Stansbery (1971). In reviews of endangered and threatened species in Alabama, Stansbery (1976) and Harris (1990) considered the lined pocketbook to be endangered. The USFWS included *L. binominata* as a candidate for endangered or threatened status, but indicated that additional data were needed before issuing a formal proposal (USFWS, 1989, 1991). Williams et al. (1993) reviewed the status of *L. binominata* and assigned it an endangered, possibly extinct, status. Based upon the results of this survey, we have also assigned it a conservation status of extinct (Table 2).

Lampsilis straminea claibornensis (Lea, 1838)

Southern fatmucket

Figure 22

Synonymy

Unio claibornensis Lea, 1838

Trans. Amer. Philos. Soc. 6: 105, pl. 24, fig. 115.

Type Locality: Alabama River, near Claiborne, [Monroe County, Alabama].

Type Specimen: Lectotype USNM 85020 designated by Johnson (1974).

Unio obtusus Lea, 1840

Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Unio pallescens Lea, 1845

Type Locality: [Black Warrior River], Tuscaloosa, [Tuscaloosa County], Alabama.

Unio contrarius Conrad, 1849a

Type Locality: Originally described from the Ogeechee River, Georgia. Johnson (1970) and Johnson and Baker (1973) considered this an error, noted the type localities of *U. oratus* and *U. contrarius* were transposed, and restricted the type locality to the Flint River, Georgia.

This is the only mussel in the ACF Basin where a subspecies is recognized. However, until the relationship between *straminea* and *claibornensis* is investigated using genetics and soft anatomy, we have followed Turgeon et al. (1998) and recognize the subspecies *Lampsilis straminea claibornensis*.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956). *Lampsilis straminea claibornensis* can be distinguished from other ACF Basin lampsiline mussels by its shell morphology, which is moderately thick, inflated, oval in outline, and attains a length of about 100 mm. In addition, the periostracum is smooth, and in the ACF Basin this species usually has a light to dark yellowish brown periostracum that is rayless.

A brief description of soft parts was reported by Lea (1859d, 1863d) and Ortmann (1923). The ovisacs are confined to the posterior part of the outer two demibranchs and form smooth pads (Heard and Guckert, 1971). Like other members of the genus, the tips of the marsupial gills are bluish when the female is gravid and immediately after release of glochidia. Female *Lampsilis straminea claibornensis* also have elaborate, enlarged mantel flaps with clearly visible eye spots. These flaps are usually beige in color, and are frequently striated with brown.

Distribution

Lampsilis straminea claibornensis is known from Gulf of Mexico drainages from the Lake Pontchartrain system in east Louisiana east to the Suwannee River system in Florida (Clench and Turner, 1956).

ACF Historical Distribution and Abundance

We have located 71 historical collections from 32 sites in the ACF Basin. *Lampsilis straminea claibornensis* is known from the mainstem and tributaries of the Apalachicola, Chipola, and Flint rivers (Fig. 64). We know of only four historical records of this species from the Chattahoochee River drainage, all from the mainstem of that river near Columbus, Georgia. van der Schalie (1940) reported *L. s. claibornensis* was more common in the mainstem of the Chipola River than in the headwaters.

Of the 72 historical collections that we have located, only 2 records contained more than a dozen individuals. While Clench and Turner (1956) noted this species was widely distributed and abundant in eastern Gulf drainages, and was found in both larger rivers as well as small streams, only three of their records from the ACF Basin were from tributary streams. van der Schalie (1940) reported a total of 22 specimens from the Chipola River drainage, collected from 6 stations (out of 24) surveyed from 1915 to 1918.

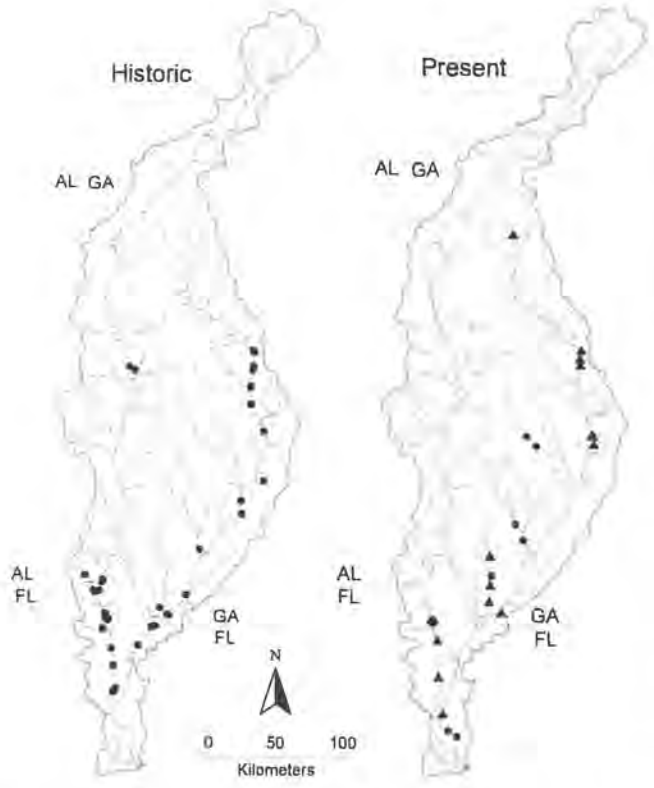

Fig. 64. Distribution of *Lampsilis straminea claibornensis* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

ACF Distribution and Abundance

Lampsilis straminea claibornensis were found at 25 of the 324 (7.7%) sites surveyed. A total of 15 live animals and 59 shells was found during this survey. This species was found in the mainstem of the Apalachicola River, and the mainstem and tributaries of the Chipola and Flint rivers (Fig. 64). No *L. s. claibornensis* were found in the Chattahoochee River system.

Although *Lampsilis straminea claibornensis* shells were found at multiple sites in the mainstem of the Flint River, no live animals were found at any of these sites. Live animals were found in several Flint and Chipola river tributaries during this survey as well as in 1994 and 1995. Although shells only were found in Line Creek, a Flint River headwater stream, *L. s. claibornensis* appears to be confined primarily to the Coastal Plain.

Habitat

In the ACF Basin, *Lampsilis straminea claibornensis* occurs primarily in the mainstem of large creeks and rivers in the Coastal Plain. We have located a few records of shells from reservoirs, but it does not appear to be common in impoundments. It has been reported from areas with slow to moderate current in firm sand or sandy mud (Clench and Turner, 1956; Heard, 1979). Of the 14 historical records where sediment data are available, 10 records indicated sand as the primary substrate. In this survey, 45% of the *L. s. claibornensis* were found at sites that contained a predominantly sand and limestone rock substrate, with an additional 20% found at sites that were predominantly sand.

Life History

Length-frequency data for *Lampsilis straminea claibornensis* found in the summer of 1992 are presented in Figure 65. Female *L. s. claibornensis* were only found in

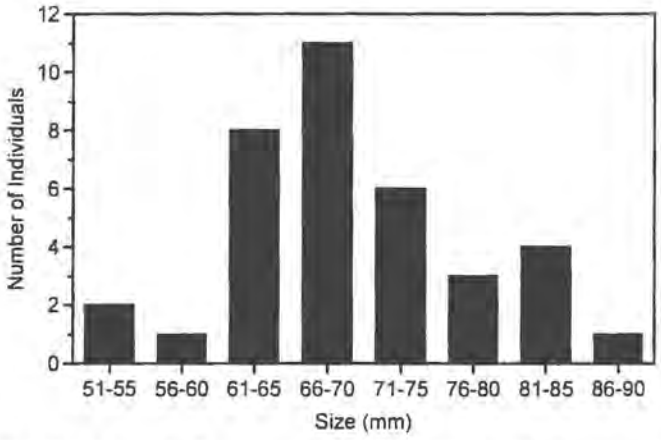

Fig. 65. Length-frequency distribution of *Lampsilis straminea claibornensis* found in the summer of 1992.

May and August during this survey. Only one gravid female was found, and it was collected in late May. H. Lee and H. McCullagh (pers. comm.) found gravid females in early and late March, early May, and late December. In the Suwannee River system in Florida, the peak period of gravidity for *L. s. claibornensis* was from April to late August (S. Ruessler, pers. comm.). The fish hosts, based on laboratory infections, include the largemouth bass, *Micropterus salmoides*, bluegill sunfish, *Lepomis macrochirus*, mosquitofish, *Gambusia holbrooki*, and golden shiner, *Notemigonus crysoleucas* (Ruessler and Keller, 1996). Of these species, the largemouth bass appears to be the most suitable host, as thousands of juveniles have been transformed per fish.

Conservation Status

The conservation status of *Lampsilis straminea claibornensis* was reported as currently stable throughout its range by Williams et al. (1993). Based on the results of this survey, we have assigned *L. s. claibornensis* a conservation status of special concern in the ACF Basin (Table 2).

Lampsilis subangulata (Lea, 1840)

Shinyrayed pocketbook
Figure 23

Synonymy

Unio sub-angulatus Lea, 1840
Proc. Amer. Philos. Soc. 1(13): 287.
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype USNM 85081 designated by Clench and Turner (1956).
Unio kirklandianus S. H. Wright, 1897
Type Locality: Oclocknee [Ochlockonee] River, Leon County, Florida.

Heard (1979) placed this species in the genus *Villosa* based on his observation that *Lampsilis subangulata* lacked mantle flaps (well-developed mantle flaps are a character that partly defines the genus *Lampsilis*) but had branchial villi. Williams and Butler (1994) followed Heard's generic designation. We have followed Turgeon et al. (1998) and have placed this species in the genus *Lampsilis* for consistency.

Diagnostic Characters

Lampsilis subangulata is a medium-sized mussel that reaches approximately 85 mm in length. Shell morphology was described by Clench and Turner (1956), Heard (1979), and Williams and Butler (1994). There is a pronounced sexual dimorphism in the shells, with males typically pointed posteriorly and females broader and rounder. Clench and Turner (1956) described *L. subangulata* as one of the most beautiful of the North American freshwater mussels. This species can be distinguished from other ACF unionids by its shiny, light yellowish brown shell with bright emerald green rays over the entire length of the shell. Older individuals may appear dark brown with obscured rays. The nacre is white, with some individuals exhibiting a salmon tint in the vicinity of the umbo cavity.

The soft parts of *Lampsilis subangulata* were described by Lea (1863d) who noted that the "branchial uterus" occupied about half the length of the outer demibranch, but did not extend to the posterior end. Lea also described the glochidia as pouch-shaped, whitish and hookless. An ovum was illustrated by Lea (1858d). The mantle margins are fleshy, pigmented rosy brown, with small dark spots of pigmentation producing a peppered appearance. Villi extend along the ventral margin about one third of the total length. The branchial papillae are in two rows, which are not always distinguishable. In gravid females, the tips of the outer demibranchs acquire a dark blue color. The septa and water tubes are undivided and run parallel to the gill filaments (Heard and Guckert, 1971).

Distribution

Lampsilis subangulata is endemic to eastern Gulf Coast drainages. It occurs in the main channel and tributaries of the ACF rivers, as well as in the main channel and tributaries of the Ochlockonee River system to the east. Clench and Turner (1956) and Burch (1975) erroneously reported *L. subangulata* from the Choctawhatchee River system, confusing it with *L. australis*.

ACF Historical Distribution and Abundance

We have located 126 historical collections of *Lampsilis subangulata* from 55 sites in the ACF Basin (Fig. 66). It is noteworthy that 23 of these records are from the Chattahoochee River and its tributaries. Historical records indicate that this species was once common in the main channel of the Flint and Chipola rivers. We know of no historic records of this species from the main channel of the Apalachicola River, although there are records of *L. subangulata* from Mosquito Creek, a tributary of the Apalachicola River near Chattahoochee, Florida. Most of the historical collections are from the Coastal Plain, although there is a record from the Chattahoochee River above Atlanta (near Roswell).

van der Schalie (1940) reported 94 specimens from 8 localities in the Chipola River, collected between 1915 and 1918. This included 55 individuals collected from a single site on the mainstem of the Chipola River in Calhoun County, Florida. Fourteen of the museum collections we examined contained at least a dozen *Lampsilis subangulata*, with a single collection from Coolewahee Creek with 54 specimens collected in 1958.

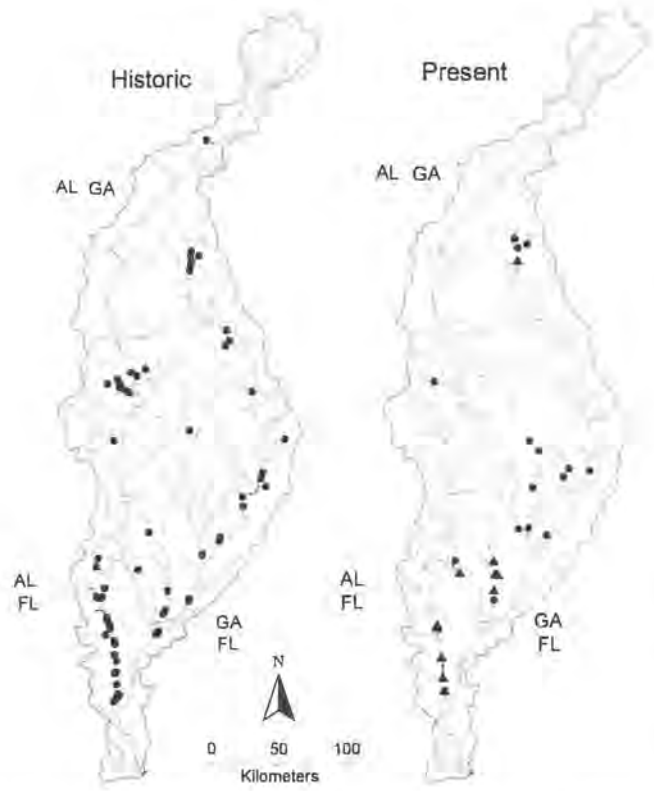

Fig. 66. Distribution of *Lampsilis subangulata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

ACF Distribution and Abundance

Shells and live *Lampsilis subangulata* were found at 24 (7%) of the 324 sites surveyed in the ACF Basin (Fig. 66). Sixty-six specimens of *L. subangulata* were found in the present survey. *Lampsilis subangulata* were found at 17 tributary sites. Most of these sites were in the Flint River drainage, although *L. subangulata* were also found in two tributaries of the Chattahoochee River. This species was also found at two sites in the main channel of the Flint River at its headwaters, and four sites in the mainstem of the Chipola River. In 1994 this species was found live in an additional Chattahoochee tributary, Sawhatchee Creek.

Habitat

Lampsilis subangulata was reported from medium-sized creeks to rivers in clean or silty sand substrates in slow to moderate current (Williams and Butler, 1994). Clench and Turner (1956) noted it preferred small creeks and spring-fed rivers. In Florida, Heard (1979) noted it was found in muddy sand and sand in slight to moderate current. In our survey, 45% of the individuals were found at sites with a sand/rock substrate. An additional 38% of the specimens were found at sites with either predominantly sand/clay or sandy substrates.

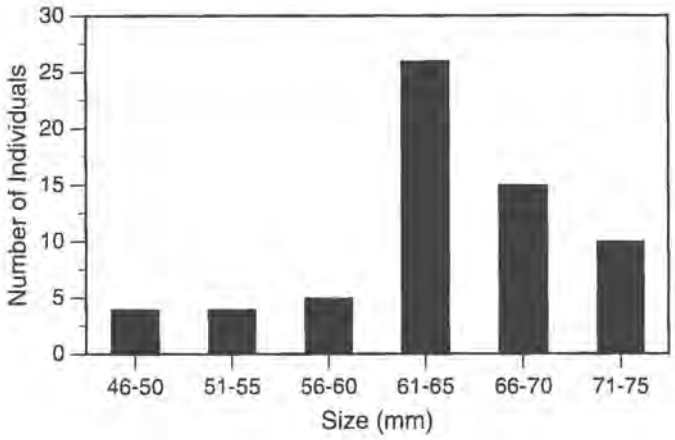

Fig. 67. Length-frequency distribution of *Lampsilis subangulata* found in the summer of 1992.

Life History

Lampsilis subangulata is one of four species known to produce a superconglutinate used to attract potential fish hosts (O'Brien et al., 1995; O'Brien, 1997b). Female *L. subangulata* carry eggs in the gills over the winter and release superconglutinates in late spring and early summer. Thirteen gravid females were found during this survey. Gravid females were found from the end of May until the middle of August. Heard (pers. comm.) reported finding gravid *L. subangulata* on 12 May 1974 from the Chipola River. The host fishes for *L. subangulata*, based on laboratory infections, include the largemouth bass, *Micropterus salmoides*, and the spotted bass, *M. punctatus* (O'Brien et al., 1995).

We found little evidence of recent recruitment during this survey. The smallest specimen of *Lampsilis subangulata* found was 53 mm. The smallest specimen found in museum lots was 29 mm. Length-frequency data are presented in Figure 67 for specimens found in the summer of 1992.

Conservation Status

The shinyrayed pocketbook was not considered for any conservation status until 1989, when the USFWS (1989, 1991) recognized it as a candidate for endangered or threatened status. In a review of the status of *Lampsilis subangulata* throughout its range, Williams et al. (1993) considered it threatened. Williams and Butler (1994) considered the shinyrayed pocketbook to be a species of special concern in Florida. The shinyrayed pocketbook was proposed for endangered status by the USFWS in 1994, and listed as endangered in 1998 (USFWS, 1998) (Table 2).

Lampsilis teres (Rafinesque, 1820)

Yellow sandshell
Figure 24

Synonymy

Unio teres Rafinesque, 1820
Monographie des coquilles bivalves fluviatiles de la Riviere Ohio, Contenant douze Genres et soixante-huit Espèces. Ann. gén. des. Sci. Physiq. Brux. 5(13): 321.
Type Locality: Wabash River [Indiana].
Type Specimen: Type was figured by Conrad (1836: 52, pl. 28) but the specimen has not been found (Johnson and Baker, 1973).

Unio anodontoides Lea, 1831
Type Locality: Mississippi River; Alabama River, [Alabama]; Ohio River.

Unio floridensis Lea, 1852a
Type Locality: Clench and Turner (1956) restricted the type locality to the Choctawhatchee River, 1 mile west of Caryville, Holmes County, Florida.

Lampsilis fallaciosus Smith, 1899
Type Locality: [Ohio River, Sedamsville, Hamilton County, Ohio] [for further comments see Johnson, 1975].

The species *Unio floridensis*, described by Lea (1852a) from the Choctawhatchee River, was recognized as the eastern subspecies of *L. teres* by Clench and Turner (1956). However, they pointed out that small specimens of *floridensis* were difficult to distinguish from *teres*. They called this species *L. anodontoides floridensis*. Examination of soft parts and analysis of genetic data are needed to determine if the taxon *floridensis* should be recognized as a valid species or subspecies. Until resolution of this issue, we recognize *teres* at the species level.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Vidrine (1993). In the ACF Basin, *Lampsilis teres* can be confused with *L. subangulata*. In general, *L. teres* lacks the broad, green rays that are characteristic of *L. subangulata*, although smaller *L. teres* may have a few green rays. In addition, the shell of *L. teres* is more elongate and yellow to yellowish brown than *L. subangulata*. *Lampsilis teres* is sexually dimorphic, and attains a length of 190 mm, with the largest shells in the ACF Basin found in the Apalachicola River below Jim Woodruff Lock and Dam.

The branchial papillae of *Lampsilis teres* occur in poorly defined multiple rows, and can be singular, bifid, and at times some appear almost dendritic. The anal papillae appear as short crenulations. The mantle margins at the branchial and anal apertures are pigmented, usually rosy brown, and spotted with small dark spots of pigmentation producing a peppered appearance. The mantle margins are fleshy, and the pigmentation along the ventral margins often appears as brown striations. There are no eyespots on the mantle flaps, which distinguishes this species from *L. straminea claibornensis* in the basin. In gravid females, the tips of the outer demibranchs acquire a dark blue color. In the demibranchs the septa and water tubes are undivided and run parallel to the gill filaments (Heard and Guckert, 1971).

Distribution

Lampsilis teres occurs in Gulf of Mexico drainages from the Withlacoochee River in the northwestern portion of peninsular Florida, west to Texas and northeast Mexico. It is widespread in the Mississippi River system north to Minnesota and Wisconsin.

ACF Historical Distribution and Abundance

We have located 101 historical collections of *Lampsilis teres* from 40 sites in the ACF Basin. Historically, *L. teres* occurred in the mainstems and tributaries of all four major ACF rivers (Fig. 68). It is known primarily from main channel sites, as only 16 collections (8 sites) are from tributary streams.

van der Schalie (1940) reported 47 specimens from 3 sites in the Chipola River, surveyed from 1915 to 1918. Clench and Turner (1956) noted it was "fairly abundant,"

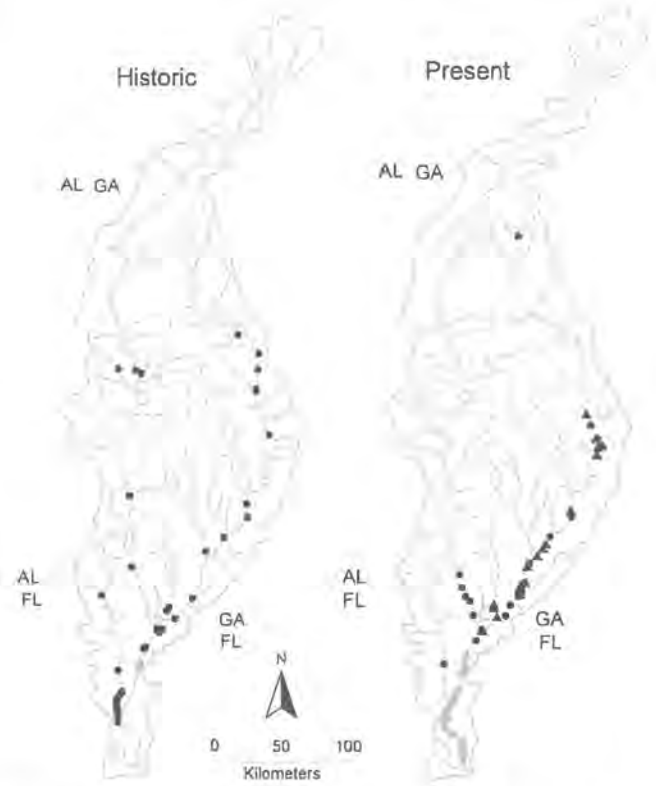

Fig. 68. Distribution of *Lampsilis teres* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

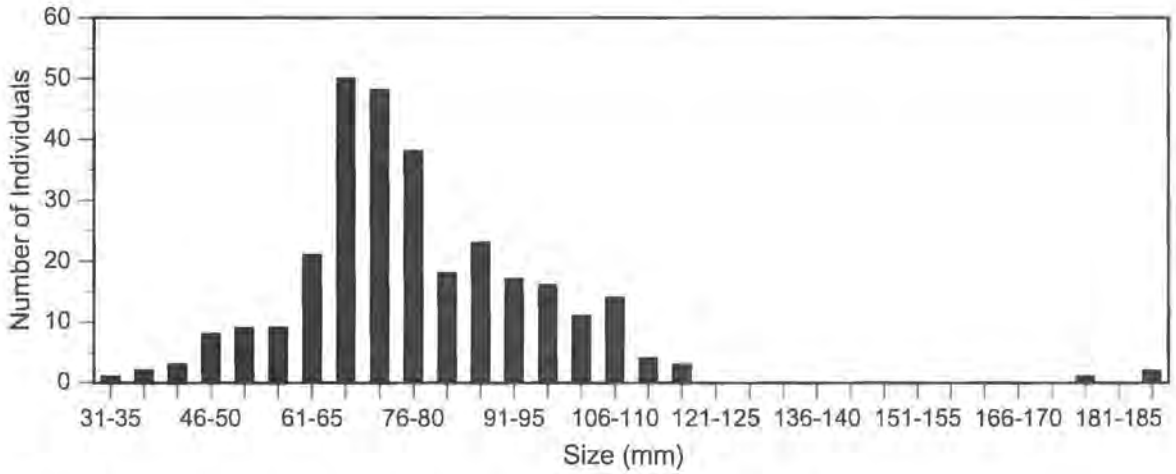

Fig. 69. Length-frequency distribution of *Lampsilis teres* found in the summer of 1991.

and ranged widely throughout the northern Gulf area. Jenkinson (1973) reported four specimens from two sites in Little Uchee Creek, a tributary of the Chattahoochee River, the only known historical records of this species from Chattahoochee River tributaries. Nine of the historical collections we examined contained 10 or more individuals.

ACF Distribution and Abundance

Lampsilis teres were found at 67 sites during this survey (Fig. 68). A total of 100 live animals and 300 shells was found. This species was found in the main channels and reservoirs of the Apalachicola, Chattahoochee, Flint, and Chipola rivers. Only five live animals and five shells were found in tributary streams, and these sites were very near the confluence of the major rivers. Although one shell was found in a headwater tributary of the Flint River in 1995, *L. teres* appears to be restricted mainly to the Coastal Plain.

The relative distribution of *Lampsilis teres* in the basin has not changed over time, with the exception that it appears to be extirpated from historical sites in the middle reaches of the Chattahoochee River. It was, however, found in that river at several sites in the backwaters of Lake Seminole. This species was found live at river kilometer 16.6 in the lower Apalachicola River, where it occurs sympatrically with *Rangia cuneata*, suggesting that *L. teres* is tolerant of periodic influxes of low salinity water.

Habitat

In the northern part of its range, *Lampsilis teres* occurred in medium to large rivers in sand or fine gravel (Cummings and Mayer, 1992). In the ACF Basin, it was reported from two Little Uchee Creek sites in stable sand (Jenkinson, 1973), and in the Apalachicola River it was found in muddy sand and sand in slight to moderate current (Heard, 1979). Heard (1979) also reported it in a few lakes and reservoirs, and in this survey, it was found in two of the reservoirs surveyed. We have located 24 historical ACF collections that list the substrate types in which *L. teres* was found. Of these, 54% of the records list sand as the primary substrate, followed by mud (29%), rock (13%), and silt (4%).

In this survey, over 50% of the individuals were found at sites with a primarily sand or sand/limestone substrate. An additional 25% of individuals were found at sites that contained primarily fine sediments.

Life History

Based upon either natural or laboratory infections, Surber (1914), Wilson (1916), and Coker et al. (1921) listed as possible fish hosts for *Lampsilis teres* the alligator gar, *Atractosteus spatula*, shortnose gar, *Lepisosteus platostomus*, longnose gar, *L. osseus*, shovelnose sturgeon, *Scaphirhynchus platorynchus*, orangespotted sunfish, *L. humilis*, green sunfish, *L. cyanellus*, warmouth, *L. gulosus*, largemouth bass, *Micropterus salmoides*, white crappie, *Pomoxis annularis*, and black crappie, *P. nigromaculatus*. Of these species, only the longnose gar, warmouth, largemouth bass, and black crappie occur in the ACF Basin.

In this survey, gravid *Lampsilis teres* were found in early June and September. Glochidia were about 300 microns in length. In addition, the number of charged ovisacs varied from 29 in a 78 mm (shell length) female to 37 in a 87 mm female. Length-frequency data for *L. teres* found in the summer of 1991 are presented in Figure 69.

In the New River, a Suwannee River tributary in Florida, female *Lampsilis teres* were observed in very shallow water (i.e., less than 8 cm) displaying a nondescript "lure" (i.e., modified mantle flap) that was gray, green, and blue (S. Ruessler, pers. observ.). The females appear to display only after dark, as we have looked for females displaying before dusk and could not find them, but returning to the same sites immediately after dark, females were easily observed displaying in the shallow water.

Conservation Status

The conservation status of the yellow sand shell was

reported as currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned *Lampsilis teres* a conservation status of currently stable in the ACF Basin (Table 2).

Lasmigona subviridis (Conrad, 1835)

Green floater
Figure 25

Synonymy

Unio subviridis Conrad, 1835
New Fresh Water Shells of the United States, appendix, p. 4, pl. 9, Fig. 1.
Type Locality: Schuykill [Schuylkill] River, Juniata River, [Blair County, Pennsylvania], creeks in Lancaster County, Pennsylvania.
Type Specimen: Figured lectotype ANSP 2105 has not been found.

Unio hyalinus Lea, 1845
Type Locality: [James River Drainage], Richmond, [Henrico County], Virginia.

Margaritana quadrata Lea, 1861a
Type Locality: East Tennessee. This locality appears to be incorrect (Clarke, 1985).

Unio pertenuis Lea, 1863a
Type Locality: Neuse River, near Raleigh, [Wake County], North Carolina.

Diagnostic Characters

Shell morphology was described by Clarke (1985). *Lasmigona subviridis* is similar in appearance to, and has been confused with, *Villosa vibex* in the ACF Basin. *Lasmigona subviridis* can be distinguished from *V. vibex* by the structure of its pseudocardinal teeth, which are double in the left valve and rudimentary in the right, and lateral teeth, which are thin, long, and straight. The pseudocardinal teeth in *V. vibex* are thin and triangular, and the lateral teeth are slightly curved. *Lasmigona subviridis* obtains a length of about 60 mm.

Distribution

Lasmigona subviridis occurs in Atlantic Coast drainages from the St. Lawrence-Hudson systems in New York, south to the Cape Fear system in North Carolina. It also occurs in the Ohio River drainage in the New-Kanawha systems of North Carolina, Virginia, and West Virginia (Clarke, 1985), and disjunctly in the Savannah River system (Fuller, 1971) and ACF Basin.

ACF Historical Distribution and Abundance

There are only two records of the green floater from the ACF Basin (Fig. 70). The earliest record is a single specimen (49 mm in length) from the Chattahoochee River at Columbus, Georgia. Interestingly, this record was correctly identified as *Unio viridis* [= *Lasmigona subviridis*], but apparently was overlooked by other researchers. Based on the tags that accompanied this specimen, it was probably collected in the 1800s. The second and most recent record of this species from the basin was a single individual (57 mm in length) collected in 1967 by H. Athearn in the Flint River, Pike and Meriwether counties (Athearn, 1992). We have examined both specimens and agree with their identification.

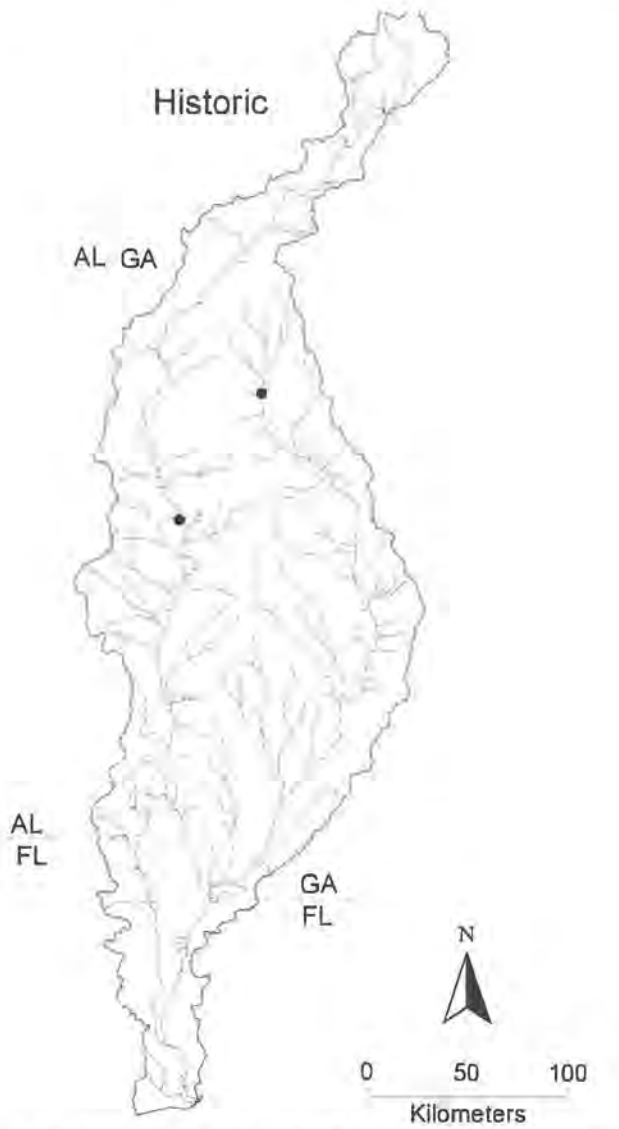

Fig. 70. Historical distribution of *Lasmigona subviridis* in the ACF Basin. Historic Map: ● indicates live and/or shell material present.

ACF Distribution and Abundance

Lasmigona subviridis was not found in the current survey and may be extirpated from the ACF Basin.

Habitat

Adams et al. (1990) summarized information on the habitat of the green floater and reported that it inhabited large creeks and small rivers. It typically avoids large rivers and swift current, and inhabits quieter pools and eddies, in substrates of sand and/or gravel. It has also been reported from canal systems in New York (Johnson, 1970).

Life History

The anatomy of *Lasmigona subviridis* was described in detail by Clarke (1985), who also described the glochidia. Ortmann (1919) reported large numbers of hermaphroditic individuals. He also found glochidia from September through June in Pennsylvania populations. The host fish is unknown.

Conservation Status

Lasmigona subviridis was reported as a species of special concern in South Carolina by Fuller (1979). Although Fuller (1977) did not consider it to be in need of conservation attention in North Carolina, in a more recent review it was considered endangered there (Adams et al., 1990). In Virginia, it was listed as threatened and reported to have undergone a dramatic decline (Neves, 1991). In Maryland, the green floater was listed as endangered by Gerberich (1984). Bogan (1991) reported it as extirpated in Pennsylvania. The USFWS considered it a candidate species for possible addition to the endangered species list (USFWS, 1989, 1991). Williams et al. (1993) reported the conservation status of the green floater throughout its range as threatened. Based on the results of this survey, we have assigned *L. subviridis* a conservation status of extirpated from the ACF Basin (Table 2).

Medionidus penicillatus (Lea, 1857)

Gulf moccasinshell
Figure 26

Synonymy

Unio penicillatus Lea, 1857c
Proc. Acad. Nat. Sci. Phila. 9: 171.
Type Locality: Clench and Turner (1956) restricted [erroneously, see Johnson (1977)] the type locality to the Chattahoochee River, near Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype has not been found.

Unio kingii B. H. Wright, 1900
Type Locality: A branch of the Flint River, Baker County, Georgia.

Van der Schalie (1940) reported two species of *Medionidus penicillatus* from the Chipola River, *M. penicillatus* and *M. kingi*. *Medionidus kingi* was later synonymized under *M. penicillatus* by Clench and Turner (1956), who recognized only one species of *Medionidus* from the Suwannee, Ochlockonee, and Apalachicola river systems. Their records of *M. penicillatus* from the Ochlockonee River are now recognized as *M. simpsonianus*, and their Suwannee River records are now recognized as *M. walkeri* (Johnson, 1977). Although Johnson (1974) pointed out that the type figured by Lea (1959d) was from the Flint River, near Albany, Georgia, Clench and Turner (1956) restricted the type locality of *M. penicillatus* to the Chattahoochee River, near Columbus, Georgia. We were unable to locate the lectotype from the type locality (Chattahoochee River near Columbus, Georgia) as restricted by Clench and Turner (1956).

Diagnostic Characters

Shell morphology was described by Johnson (1977). *Medionidus penicillatus* reaches a length of about 55 mm. It can be distinguished from other ACF unionids by a series of thin plications along the length of the posterior slope that are missing in other diminutive ACF mussel species. The shell is smooth, yellowish to greenish brown, with fine, typically interrupted green rays.

Members of the genus *Medionidus* can be distinguished from *Lampsilis* and *Villosa* by the position of the ovisacs (confined to the center of the outer demibranchs), as well as the shape of the glochidia. The anatomy of this species was discussed by Lea (1859d). The ventral mantle margin of *M. penicillatus* is darkly pigmented, almost black, with well-defined villi occurring three-fourths of its length. The branchial papillae are long, slender, and occur in two rows. The anal aperture is crenulate, and the mantle margin at the branchial, anal, and supra-anal apertures is pigmented dark reddish purple. There are no eyespots, although there is a small, lightly pigmented, rectangular patch on each side of the ventral mantle margin. This patch appears to occur only in females.

Distribution

Previous authors (Johnson, 1977; Butler, 1989) considered Yellow and Choctawhatchee river system records of *Medionidus* to be *penicillatus*. We have restricted the distribution of *M. penicillatus* to the ACF and Econfina Creek drainages, based on zoogeographic considerations (see discussion). Based on the proximity of the Econfina Creek to the Chipola River, and because *Medionidus* in the Econfina Creek probably originated from the ACF Basin, we consider *M. penicillatus* to be an ACF endemic. Records of *Medionidus* east of the ACF Basin are either *M. walkeri* (a Suwannee River system endemic), or *M. simpsonianus* (an Ochlockonee River system endemic). Until a comparative analysis of soft anatomy and genetics from all of the above drainages is made, the taxonomic status of *Medionidus* in Gulf of Mexico drainages is unclear.

ACF Historical Distribution and Abundance

We have located 93 historical collections of *Medionidus penicillatus* from 52 sites in the ACF Basin. Historically, this species was found in the main channels and tributaries of the Chattahoochee, Flint, and Chipola rivers (Fig. 71). In August 1954, Clench and Turner (1956) found a single specimen of *M. penicillatus* in the Apalachicola River at Chattahoochee, Florida, the only known record of this species occurring in the main channel of that river. Lea (1857c) reported a single record of this species from the Chattahoochee River, near Atlanta, Georgia, collected by Bishop Elliott, that Clench and Turner (1956) considered to be in error, but Johnson (1977) did not. The UMMZ also has two specimens from the "upper Chattahoochee River" that were once part of the Frederick Stearns collection.

There is a limited amount of information concerning the historical abundance of *Medionidus penicillatus* in the ACF Basin. Johnson (1977) concluded, based on specimens in museum collections, that this species was historically abundant in the ACF Basin, especially in the Flint River drainage, but was scarce elsewhere. Historical records indicate that *M. penicillatus* was once abundant in the tributaries of the Chipola River as well. For instance, from 1915 to 1918, 166 individuals of *M. penicillatus* were collected from 11 sites in the mainstem and tributaries of the Chipola River (van der Schalie, 1940). This included 67 individuals from a single site on Cowarts Creek and 63 individuals from a single locality on Spring Creek. During their survey of the ACF rivers in 1956, Clench and Turner found 23 individuals from a single locality in Marshall Creek [= Big Creek in Alabama], a tributary of the Chipola River. Jenkinson (1973) found seven specimens of *M. penicillatus* in Uchee Creek, and four specimens in Little Uchee Creek when he completed a survey of those Chattahoochee River tributaries in the early 1970s. Fifteen of the museum collections we examined contained a dozen or more *M. penicillatus* shells.

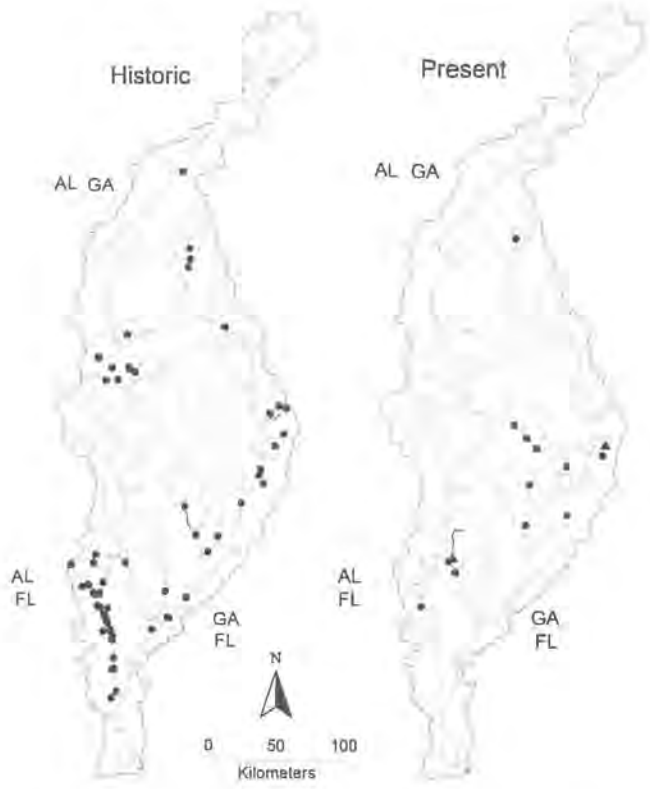

Fig. 71. Distribution of *Medionidus penicillatus* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

ACF Distribution and Abundance

Thirteen specimens of *Medionidus penicillatus* from nine sites were found in this survey (Fig. 71). Eight of these sites were in the Flint River drainage and one was in a Chattahoochee River tributary. Additional specimens were found at four other sites from 1993 to 1995, including one Chipola River tributary, one Chattahoochee River tributary, and two Flint River tributaries.

Medionidus penicillatus was collected at less than 3% of the 324 sites surveyed, and was one of the rarest species encountered in this survey. Only one individual was collected from the main channel of the Flint River. Populations of this species appear to be extirpated from historical sites in Alabama (Chattahoochee River drainage).

Habitat

Medionidus penicillatus occurs in a wide range of habitats, including sandy areas with a slight current (Jenkinson, 1973), streams and rivers where there is a moderate current and sand and gravel substrates (Clench and Turner, 1956), and in muddy sand substrates around tree roots in medium-sized streams with moderate current (Heard, 1975a). In Florida, this species is also known from sand and fine gravel substrates in slight to moderate current (Heard, 1979). In 1988 R. Hoeh (pers. comm.) found a single *M. penicillatus* in a backwater area of the Chipola River, in silty mud and sand with no current. Of the nine historical records that list substrate type, five list sand and gravel or rock as the substrate type where specimens were found, while four list mud and sand or mud.

In this survey, 46% of the *Medionidus penicillatus* collected were found at sites that contained a combination of sand and limestone rock substrates. The remaining specimens were found at sites that contained primarily sand and cobble, or sand, gravel, and clay substrates.

Life History

Medionidus penicillatus glochidia were figured by Lea (1858d), who described the glochidia as elongate and pouch-shaped with indented sides. *Medionidus penicillatus*

females release glochidia in early to late spring. A single gravid female was found in early August in this survey, but that individual may have been holding glochidia for release in the following spring. Gravid *M. penicillatus* were observed lying on top of gravel and sand substrates in mid-March (water temperature 13°C) and flapping their mantle margins (J. Brim Box, pers. observ.). It is thought this behavior is used to lure potential fish hosts, and has been noted in *M. acutissimus* in Alabama (W. R. Haag, pers. comm.). Fish hosts for *M. penicillatus* in the ACF Basin include the blackbanded darter, *Percina nigrofasciata*, and the brown darter, *Etheostoma edwini* (O'Brien, 1997b).

Conservation Status

The Gulf moccasinshell was first considered for conservation status by Athearn (1970) and Stansbery (1971). Heard (1975a) considered this species to be rare throughout its entire range, and in danger of extinction. Williams et al. (1993) assigned an endangered status to the Gulf moccasinshell, and Williams and Butler (1994) considered *Medionidus penicillatus* to be threatened in Florida. The Gulf moccasinshell was proposed for endangered status by the USFWS in 1994 and listed as endangered in 1998 (USFWS, 1998) (Table 2).

Megalonaias nervosa (Rafinesque, 1820)

Washboard
Figure 27

Synonymy

Unio (*Leptodea*) *nervosa* Rafinesque, 1820
Monographie des coquilles bivalves fluviatiles de la Riviere Ohio, Contenant douze Genres et soixante-huit Espècies. Ann. gén. des. Sci. Physiq. Brux. 5(13): 296.
Type Locality: Falls of the Ohio River.
Type Specimen: Type specimen has not been found.

Unio crassus var. *gigantea* Barnes, 1823
Type Locality: Mississippi River, near Prairie du Chien, [Wisconsin].

Unio heros Say, 1829
Type Locality: Fox River [tributary] of the Wabash, [opposite New Harmony, Indiana, White County, Illinois].

Unio multiplicatus Lea, 1831
Type Locality: Tennessee River; Ohio River.

Unio boykinianus Lea, 1840
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.

Unio triumphans B. H. Wright, 1898a
Type Locality: Coosa River, St. Clair County, Alabama.

In recent years, *Megalonaias boykiniana* has been recognized as a distinct species (Clench and Turner, 1956; Turgeon et al., 1988; Williams and Butler, 1994), distributed in eastern Gulf of Mexico drainages from the Escambia east to the Ochlockonee, except for the Choctawhatchee and Yellow rivers. After comparing specimens from the ACF Basin with material from other drainages, we were unable to find any reliable characters to distinguish *M. boykiniana* from *M. nervosa*. In addition, comparative DNA analysis of populations from several drainages failed to reveal any differences (Mulvey et al., 1997). Based on the lack of morphological and DNA differences, we place *M. boykiniana* in the synonymy of *M. nervosa*.

Diagnostic Characters

Megalonaias nervosa is the largest freshwater mussel in the ACF Basin. The largest specimens occur in the mainstem of the Apalachicola River, where individuals over 200 mm in length were once common (Heard, 1979). Shell morphology was described by Clench and Turner (1956) and Williams and Butler (1994) under *M. boykiniana*. This species can be distinguished from *Elliptoideus sloatianus* by the deep umbo cavities in *M. nervosa*. In addition, the nacre color varies from iridescent white to bluish white, while in *E. sloatianus* the nacre is usually whitish with purple along the margins in fresh dead individuals.

In the genus *Megalonaias*, all four demibranchs are marsupial and the glochidia are hookless (Heard and Guckert, 1971). Utterback (1915) described the "nutritive and reproductive structures" in the diagnosis of the genus. Lea (1863d) briefly described the soft anatomy of a nongravid female, but provided no details. The branchial aperture is very large and extends anteriad for a short distance around the posterior end. The branchial papillae are not well developed, but rather are short, stubby, and intermittently singular or dendritic. The anal papillae appear only as very fine crenulations. Both the branchial and anal apertures are pigmented dark brown, while the supra-anal opening is only faintly pigmented. Although Utterback (1915) reported the presence of a short mantle connection separating the anal and supra-anal openings, this suture was not apparent in specimens we examined from the ACF Basin.

Distribution

Megalonaias nervosa ranges throughout the Gulf of Mexico drainages, from Nuevo Laredo, Mexico, north and east through Texas and throughout the entire Mississippi River system north to Minnesota and Wisconsin (Burch, 1975). It also occurs in the larger Gulf of Mexico drainages of Alabama, Georgia, and Florida, from the Escambia River system east to the Ochlockonee River (Clench and Turner, 1956). It appears to be absent from the Yellow and Choctawhatchee river systems.

ACF Historical Distribution and Abundance

In the ACF Basin, *Megalonaias nervosa* historically was found in the main channels of all four major rivers, and in the lower end of a few tributaries (Fig. 72). We have located 120 historical collections of *Megalonaias nervosa* from 51 sites in the basin. It is noteworthy that 25 of the historical records are from the Chattahoochee River drainage where, until at least 1967, it occurred as far north as 13 miles above Atlanta (H. Lee, pers. comm.).

Historical records indicate that this species was once widespread and locally abundant throughout the basin. Eight of the historical collections we examined contained over 10 individuals each, including a single collection with 100 individuals. van der Schalie (1940) reported a total of four individuals from two stations collected in the lower mainstem of the Chipola River from 1915 to 1918.

ACF Distribution and Abundance

Shells and live *Megalonaias nervosa* were found at 42 (12%) of the 324 sites surveyed in the ACF Basin. A total of 87 live specimens and 100 shells was found. This species was found throughout the mainstems of both the Apalachicola and Flint rivers, and in the lower end of the Chipola River (Fig. 72). *Megalonaias nervosa* were found at sites above and below the Fall Line. Only three live individuals were found in tributary streams.

No live *Megalonaias nervosa* were found in the Chattahoochee River system during this survey, although shells only were found at one site on Little Uchee Creek. In 1992, a freshwater mussel survey was completed on the Chattahoochee River, near West Point, Georgia, and only a few weathered specimens of *Megalonaias nervosa* were found (EA Engineering, Science, and Technology, 1992). However, a small (50 mm) shell was found in 1996 at the confluence of Bull Creek and the Chattahoochee River in Muscogee County, Georgia, and additional live specimens were found in two Chattahoochee River impoundments after they were drawn down in 1998 (C. Stringfellow, pers. comm.).

Megalonaias nervosa can be locally abundant, with dozens of individuals found at some localities in the mainstem of the Flint River. In addition, hundreds of *M. nervosa* were exposed when Lake Blackshear on the Flint River drained after Tropical Storm Alberto in 1994.

Habitat

In the ACF Basin, *Megalonaias nervosa* is a large river species that historically was found in areas where there was a sand and mud bottom (Clench and Turner, 1956). It has also been reported from muddy sand, sand, and rocky substrates in moderate current in Florida (Heard, 1979). Individuals can be significantly larger in the Apalachicola River than in the Ochlockonee River to the east, even when populations in both rivers are found in similar sandy substrates (Heard, 1979).

Almost 60% of the *Megalonaias nervosa* found in this survey were found at sites that contained a sand and limestone rock substrate. The majority of the specimens found during this survey were in the main channels of the Apalachicola and Flint rivers, where *M. nervosa* was most common in the mid-channel, usually in sand and limestone substrates and in current.

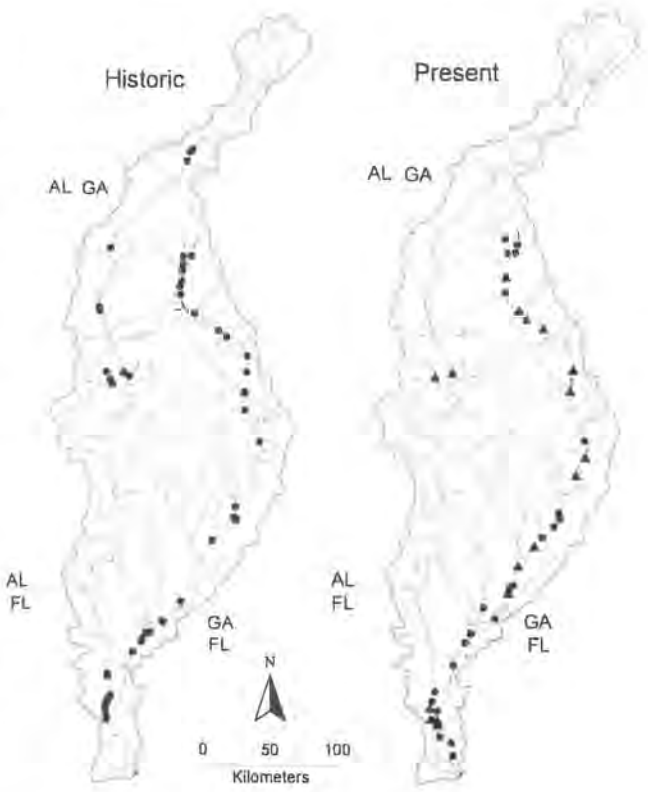

Fig. 72. Distribution of *Megalonaias nervosa* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

Life History

Very little information is available on the biology of *Megalonaias nervosa* in the southern portion of its range. In addition, there is considerable confusion regarding the reproductive strategy of *Megalonaias*, with some authors (Utterback, 1915; Coker et al., 1921; Heard and Guckert, 1971) suggesting that members of this genus are bradytictic breeders, while others (Lefevre and Curtis, 1910; Howard, 1914a) have suggested a tachytictic breeding period. In addition, Woody and Holland-Bartels (1993) considered *M. nervosa* to be a late, short-term tachytictic breeder, with fertilization and glochidia formation occurring between July and August in Wisconsin, and glochidia release occurring between September and November. In Missouri, Utterback (1916) found gravid *M. nervosa* in December, January, and February.

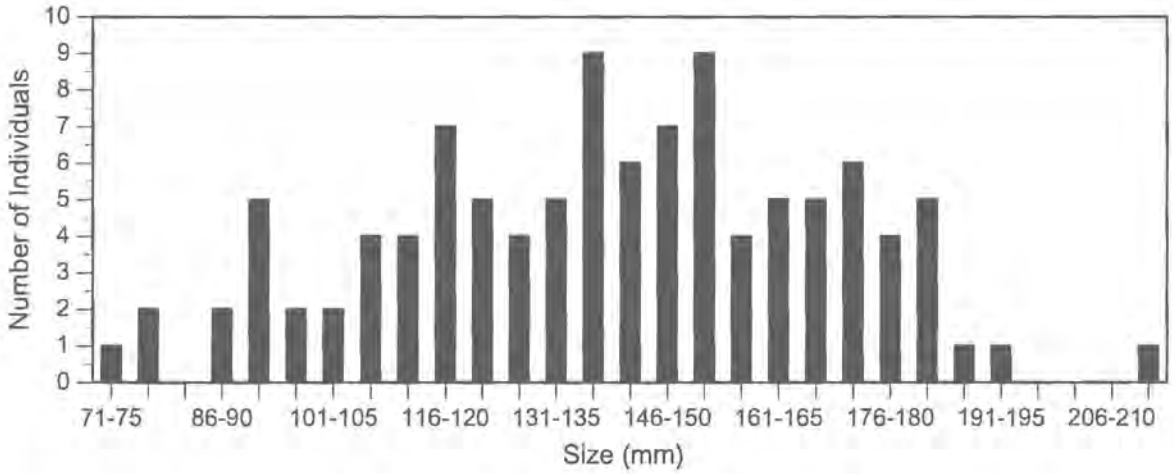

Fig. 73. Length-frequency distribution of *Megalonaias nervosa* found in the summer of 1991.

In this survey, 71 individuals were checked for glochidia from June to September. No gravid females were found. In addition, the smallest individual found was 63 mm in shell length. Little evidence of recent recruitment was noted in this survey (Fig. 73). In the historical collections, the smallest specimen found in museum lots was 15 mm in length.

The following species have been identified as fish hosts for *Megalonaias nervosa*: bowfin, *Amia calva* (Howard, 1914a), American eel, *Anguilla rostrata* (Surber, 1914), skipjack herring, *Alosa chrysochloris* (Wilson, 1916), gizzard shad, *Dorosoma cepedianum* (Howard, 1914a), highfin carpsucker, *Carpiodes velifer* (Howard, 1914a), channel catfish, *Ictalurus punctatus* (Howard, 1914a), brown bullhead, *Ameiurus nebulosus* (Coker et al., 1921), black bullhead, *A. melas* (Howard, 1914a), tadpole madtom, *Noturus gyrinus* (Coker et al., 1921), flathead catfish, *Pylodictis olivaris* (Howard, 1914a), white bass, *Morone chrysops* (Howard, 1914a), white crappie, *Pomoxis annularis* (Coker et al., 1921), black crappie, *P. nigromaculatus* (Howard, 1914a), largemouth bass, *Micropterus salmoides* (Howard, 1914a), bluegill, *Lepomis macrochirus* (Howard, 1914a), green sunfish, *L. cyanellus* (Coker et al., 1921), sauger, *Stizostedion canadense* (Howard, 1914a), and freshwater drum, *Aplodinotus grunniens* (Surber, 1914). Of the above listed fishes, the freshwater drum and sauger are absent from the ACF Basin, and several other species are introduced.

Conservation Status

Conservation status of *Megalonaias nervosa* was reported as currently stable by Williams et al. (1993) and as a species of special concern (under the name *M. boykiniana*) in Florida by Williams and Butler (1994). Based on the results of this survey, we have assigned it a conservation status of currently stable in the ACF Basin (Table 2).

Pleurobema pyriforme (Lea, 1857)

Oval pigtoe
Figure 28

Synonymy

Unio pyriformis Lea, 1857a
Proc. Acad. Nat. Sci. Phila. 9: 31.
Type Locality: [Chattahoochee River], near Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype USNM 84781.

Unio modicus Lea, 1857c
Type Locality: Chattahoochee River, 10 miles above Columbus, [Muscogee County], Georgia.

Unio striatus Lea, 1840
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia. Name preoccupied by *Unio striatus* Goldfuss, 1837.

Pleurobema simpsoni Vanatta, 1915
Vanatta (1915) proposed a new name for *U. striatus* Lea 1840, since *striata* had been used by Rafinesque. This was an error as the *striata* of Rafinesque was applied to a species of the genus *Obovaria*.

Unio amabilis Lea, 1865
Type Locality: Butler, Taylor County, [Flint River drainage], Georgia.

Unio bulbosus Lea, 1857c
Type Locality: Flint River, near Macon, Georgia.

Unio harperi B. H. Wright, 1899
Type Locality: Johnson (1967b) restricted the type locality to Spring Creek, Decatur County, [Flint River drainage], Georgia.

Unio reclusus B. H. Wright, 1898b
Type Locality: Oclocknee [Ochlockonee] River, Leon County, Florida.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Williams and Butler (1994). The shell morphology of *Pleurobema pyriforme* is plastic, in that individuals can be compressed, with a low umbo and yellow periostracum to inflated with a higher umbo, beaks more anterior on the shell and a darker periostracum. The posterior ridge is prominent, the lateral teeth are arched and the pseudocardinal teeth are heavy. Small individuals may have faint green rays on the shell.

The branchial papillae occur in two rows, with the outer row consisting mainly of well-defined singular papillae, while the inner row of papillae are spaced unevenly and discontiguously and are dendritic. The anal papillae are well-defined, short, and singular. The mantle margins are unpigmented except at the apertures, which are lightly pigmented. The anal and supra-anal openings are separated by a suture, are roughly the same size, and are about half the size of the branchial opening. The outer two demibranchs are marsupial, the glochidia are hookless, and the septa and water-tubes are undivided and run parallel to the gill filaments (Heard and Guckert, 1971). Secondary septa and water-tubes are not present.

Distribution

There is some confusion regarding the taxonomy and distribution of *Pleurobema pyriforme*. Clench and Turner (1956), Johnson (1970), and Burch (1975) listed *P. pyriforme* from the Suwannee River system west to the Apalachicola River system. Heard (1979) listed *P. pyriforme* from the Apalachicola, Ochlockonee, and Suwannee drainages, and included the Apalachicola River drainage in the distribution of *P. strodeanum*. Williams and Butler (1994) considered *P. pyriforme* to be an ACF Basin endemic. They recognized *P. reclusum* from the Ochlockonee and Suwannee river systems. Based upon recent genetic data (Kandl et al., 1997), we recognize only one species, *P. pyriforme*, from the Suwannee River drainage west to the Econfina Creek drainage, an independent coastal drainage located between the Choctawhatchee and Chipola rivers in west Florida. Therefore, Williams and Butler's (1994) records of *P. reclusum* from the Suwannee and Ochlockonee rivers and Heard's (1979) records of *P. strodeanum* from the Apalachicola drainage are *P. pyriforme*. *Pleurobema strodeanum* occurs only in the Escambia, Choctawhatchee, and Yellow rivers in west Florida and Alabama.

ACF Historical Distribution and Abundance

We have located 96 historic records of *Pleurobema pyriforme* from 57 localities in the ACF Basin. Historically, *P. pyriforme* occurred in the main channel of the Apalachicola River, and the main channel and tributaries of the Chipola, Chattahoochee, and Flint rivers (Fig. 74). Most of our historical records, however, are from tributaries. There are no recent historical records of this species occurring in the main channel of the Apalachicola River, although Percy (1976) reported a sub-fossil from a Middle Weeden site along the mainstem of the Apalachicola River in Jackson County, Florida. Historical records indicate this species was once widespread throughout both the Piedmont and Coastal Plain.

Historical records indicate that *Pleurobema pyriforme* could be locally abundant. van der Schalie (1940) reported that a total of 470 individuals was collected from 9 sites in the Chipola River system during a 1915-1918 survey. This included 295 individuals from a single location on Cowarts Creek (Houston County, Alabama). Jenkinson (1973) found 28 specimens of *P. pyriforme* at a single location in Uchee Creek and 8 specimens at 2 localities in Little Uchee Creek. Both of these streams are tributaries of the Chattahoochee River. Twenty-one of the museum collections we examined contained at least a dozen (and up to 110) specimens.

ACF Distribution and Abundance

Ninety-seven specimens of *Pleurobema pyriforme* from 17 sites were found in this survey (Fig. 74). Eighty-four

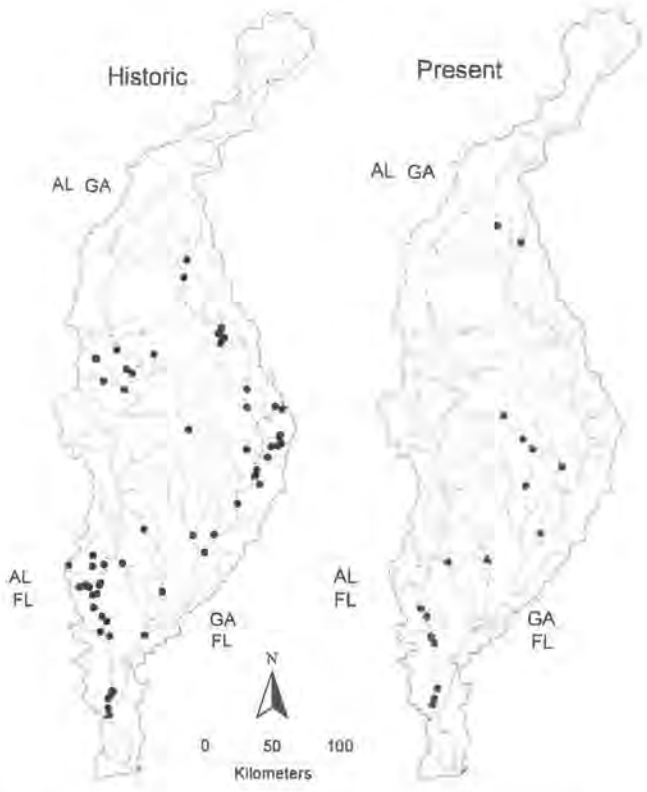

Fig. 74. Distribution of *Pleurobema pyriforme* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

(87%) of these specimens were live. No live specimens or shells were found in the Chattahoochee River mainstem, although two shells were found in Sawhatchee Creek during this survey, and in 1994 additional live animals were found at that site. Live *P. pyriforme* were found in eight tributaries of the Flint River, four sites in the main channel of the Chipola River, and from a single Chipola River tributary.

The oval pigtoe appears to be extirpated from its historical localities in the Chattahoochee River drainage, with the exception of Sawhatchee Creek in southwestern Georgia. In 1996, the three sites where Jenkinson (1973) reported *Pleurobema pyriforme* from Uchee and Little Uchee creeks were resurveyed using comparable sampling effort and no *P. pyriforme* were found (Howard, 1997). This species may also be extirpated from the main channel of the Flint River, except at the headwaters.

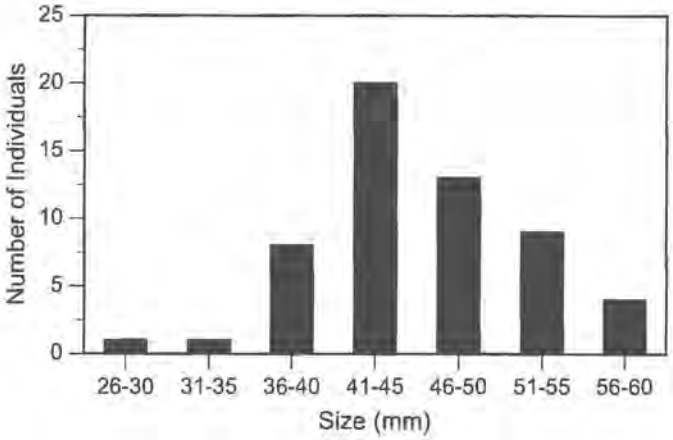

Fig. 75. Length-frequency distribution of *Pleurobema pyriforme* found in the summer of 1992.

Habitat

In the Chattahoochee River drainage, *Pleurobema pyriforme* was found in a variety of substrates, including sand bars and rock bottoms (Jenkinson, 1973). In Florida, this species was found in muddy sand and sand substrates in small to large streams with moderate current (Heard, 1975a, 1979). Williams and Butler (1994) noted that *P. pyriforme* occurred in silty sand to sand and gravel substrates, usually in slow to moderate current, and that it preferred stream channels with clean substrates.

In this survey, *Pleurobema pyriforme* was found at sites with a wide range of substrate types, including sand and detritus (36%), sand and clay or silt (25%), and sand and cobble (24%). This species appears to prefer sandy substrates and generally is more common in mid-channel areas with current than along slack-water areas near stream banks.

Life History

Length-frequency data for *Pleurobema pyriforme* found in the summer of 1992 are presented in Figure 75. Ortmann (1909) considered *Pleurobema* to have a short, summer breeding season. In this survey, only one gravid individual was found in late June, although gravid *P. pyriforme* were also collected from the ACF Basin from March to July in 1995 and 1996 (O'Brien, 1997b).

Based on laboratory infections, juvenile *Pleurobema pyriforme* transformed on the gills of the sailfin shiner, *Pteronotropis hypselopterus*, and the eastern mosquitofish, *Gambusia holbrooki* (O'Brien, 1997b). Seven other species of fish, including four species of shiners, two species of sunfish, and one species of darter failed to produce transformed juveniles.

Conservation Status

The oval pigtoe was first recognized as a species in need of conservation status more than 25 years ago (Athearn, 1970; Stansbery, 1971). Heard (1975a) considered this species to be widespread but rare in the Apalachicola system. *Pleurobema pyriforme* was listed as threatened in Alabama by Stansbery (1976). The USFWS (1989, 1991) considered it a candidate for endangered or threatened status. It was considered endangered by Williams et al. (1993). Williams and Butler (1994) also considered it endangered in Florida. It was proposed for federal endangered status by the USFWS in 1994 and listed as endangered in 1998 (USFWS, 1998) (Table 2).

Pyganodon cataracta (Say, 1817)

Eastern floater
Figure 29

Synonymy

Anodonta cataracta Say, 1817

Nicholson's Encyclopedia of Arts and Science, 2 [no pagination], pl. 3, Fig. 4.

Type Locality: Deep part of a mill dam. Johnson (1970) restricted the type locality to near Philadelphia, Philadelphia County, Pennsylvania.

Type Specimen: Type specimen has not been found.

Johnson (1970) presented a complete synonymy for *Pyganodon cataracta*, but none of those species are from the ACF Basin. Although we consider *Anodonta hallenbecki* to be a synonym of *P. grandis*, Clench and Turner's (1956) records of *A. hallenbecki* from the Chattahoochee River drainage are probably *P. cataracta*, based on shell morphology.

Diagnostic Characters

Shell morphology was described in detail by Johnson (1970), who also commented on the differences in shell shape between individuals from different drainages. Although both *Pyganodon grandis* and *P. cataracta* have the

double-looped beak sculpturing typical of the genus, the beak sculpturing in *P. grandis* is more distinct and consists of prominent raised ridges, whereas in *P. cataracta* it is not raised and is less distinct. *Pyganodon cataracta* is a large mussel that attains a length of more than 170 mm.

The anatomy of *Pyganodon cataracta* was described in detail by Simpson (1884) as *Anodonta fluviatilis*, who also described and illustrated the hooked glochidia and juveniles. The structure and function of the brooding gills of female *P. cataracta* were compared to the female non-marsupial demibranchs and gills of males by Tankersley and Dimock (1992). Reardon (1929) also described some aspects of *P. cataracta* anatomy.

Distribution

The eastern floater occurs along the Atlantic slope drainages from the St. Lawrence River system in Canada, south into the United States to the Altamaha River drainage in Georgia. In the eastern Gulf Coast drainages, it occurs only in the ACF Basin.

ACF Historical Distribution and Abundance

We have 21 historical records of *Pyganodon cataracta* from 12 sites in the ACF Basin (Fig. 76). This species was historically known from the main channel of the Apalachicola River, and from the main channel and tributaries of the Chattahoochee and Chipola rivers. We know of no historical records of this species from the Flint River drainage.

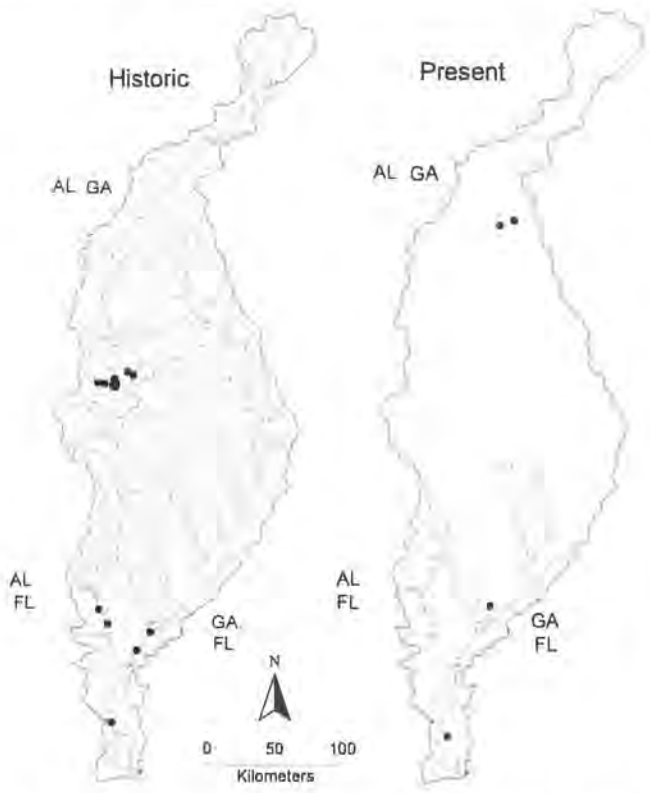

Fig. 76. Distribution of *Pyganodon cataracta* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live and shell material present.

There is very little historical information concerning the abundance of *Pyganodon cataracta* in the ACF Basin. Jenkinson (1973) reported finding 6 specimens from 5 sites (out of a total of 23 sites) in Uchee and Little Uchee creeks of the Chattahoochee River system.

ACF Distribution and Abundance

Pyganodon cataracta were found at two sites during this survey, and at two additional sites in 1995 (Fig. 76). This species was found in three tributaries of the Flint River, the first records of *P. cataracta* from that system. An additional specimen was found in the lower main channel of the Chipola River. We did not find it at any of the sites where Jenkinson (1973) reported it in the Chattahoochee River system.

Habitat

The eastern floater inhabits a variety of habitats, including rivers, creeks, lakes, and reservoirs. C. Coney (pers. comm.) reported finding this species in sand and gravel substrates in Uchee Creek. In West Virginia, *Pyganodon cataracta* was rare in the headwaters of the Potomac River, and appeared to be more common in larger, slower flowing waters (Taylor, 1985). In the Delmarva Peninsula, this species was common in lakes, ponds, and in large rivers to small creeks, and occurred in sand or mud substrates (Counts et al., 1991).

Life History

The hooked glochidia and juveniles of *Pyganodon cataracta* were described and illustrated by Simpson (1884). The glochidia were carried in the marsupia from September to April (Conner, 1909), and in North Carolina, *P. cataracta* brooded glochidia from November through January (Tankersley and Dimock, 1993). In Pennsylvania populations, glochidia release occurred from April to August (Ortmann, 1919).

Four species of fishes have been reported as hosts for *Pyganodon cataracta*, including the common carp, *Cyprinus carpio*, the white sucker, *Catostomus commersoni*, threespine stickleback, *Gasterosteus aculeatus*, and pumpkinseed sunfish, *Lepomis gibbosus* (Watters, 1994). Of the four species listed above, only the common carp, an exotic species, occurs in the ACF Basin.

Conservation Status

The conservation status of the eastern floater throughout its range was reported as currently stable by Williams et al. (1993). However, based on historical records and the current survey results, it appears to be rare in the ACF Basin. We have assigned it a conservation status of special concern in the ACF Basin (Table 2).

Pyganodon grandis (Say, 1829)

Giant floater
Figure 30

Synonymy

Anodonta grandis Say, 1829
New Harmony Disseminator 2(22): 339-341.
Type Locality: Fox River [tributary] of the Wabash, [opposite New Harmony, Indiana, White County, Illinois].
Type Specimen: Neotype Senckenberg Museum number 4300 selected by Haas (1930).

Anodonta gesnerii Lea, 1858a
Type Locality: Uphaupee [Uphapee] Creek, Macon County, Alabama.

Anodonta hallenbeckii Lea, 1858a
Type Locality: Uphaupee [Uphapee] Creek, Macon County, Georgia [Alabama].

The synonymy of *Pyganodon grandis* is lengthy and includes over 60 names (Simpson, 1914). We have only included those species that were described from eastern Gulf of Mexico drainages. There is considerable taxonomic confusion concerning this species in the ACF Basin. Clench and Turner (1956) and Heard (1979) did not recognize *P. grandis* from the basin, and how they treated specimens of this species from the ACF Basin is not clear. Johnson (1970) re-examined Clench and Turner's records of *Anodonta gibbosa* from eastern Gulf drainages and re-identified some of them as *P. grandis*. In addition, Clench and Turner's (1956) specimens originally labeled *A. gibbosa* in the UMMZ contain *P. grandis* and at least one specimen of *A. heardi*.

Diagnostic Characters

Shell morphology was described by Vidrine (1993). Both valves are without teeth, but the hinge is usually somewhat thickened. The beaks are swollen, elevated above the hinge line, and beak sculpturing usually consists of four to five double loops. Although both *Pyganodon grandis* and *P. cataracta* have the double-looped beak sculpturing that is typical of the genus, the beak sculpturing in *P. grandis* is more distinct and consists of prominent raised ridges, whereas the beak sculpturing in *P. cataracta* is less prominent.

The anatomy of *Pyganodon grandis* was described by Ortmann (1912, 1919). The anatomy of *P. grandis* in Missouri was described by Utterback (1915). The gill morphology was described by Richard et al. (1991). The branchial papillae occur in two distinct rows. The inner row of papillae are longer and are spaced discontiguously; the outer row of papillae are shorter, more slender, occur more evenly, and are more closely spaced than the inner row. The anal and supra-anal apertures are separated by a long fusion of the opposing inner mantle lobes, and this suture is about four times longer than the supra-anal opening. All three apertures are weakly pigmented, giving them a peppered appearance.

Distribution

The giant floater is one of the most widespread mussels in North America and several subspecies have been recognized. The distribution of *Pyganodon grandis*, including all subspecies, is the Mississippi, St. Lawrence, and Canadian Interior basins from western Ontario to Alberta. In Gulf of Mexico drainages, it occurs from northern Mexico into Texas and east to the Ochlockonee River, Florida and Georgia.

ACF Historical Distribution and Abundance

We have 59 historical records of *Pyganodon grandis* from 29 sites in the ACF Basin. Historically, this species occurred in the mainstem and a single tributary of both the Apalachicola and Chipola rivers, and from the mainstem and tributaries of the Chattahoochee and Flint rivers (Fig. 77).

Little is known about the historical abundance of *Pyganodon grandis* in the basin. The 2 largest museum collections that we located each contained 13 specimens.

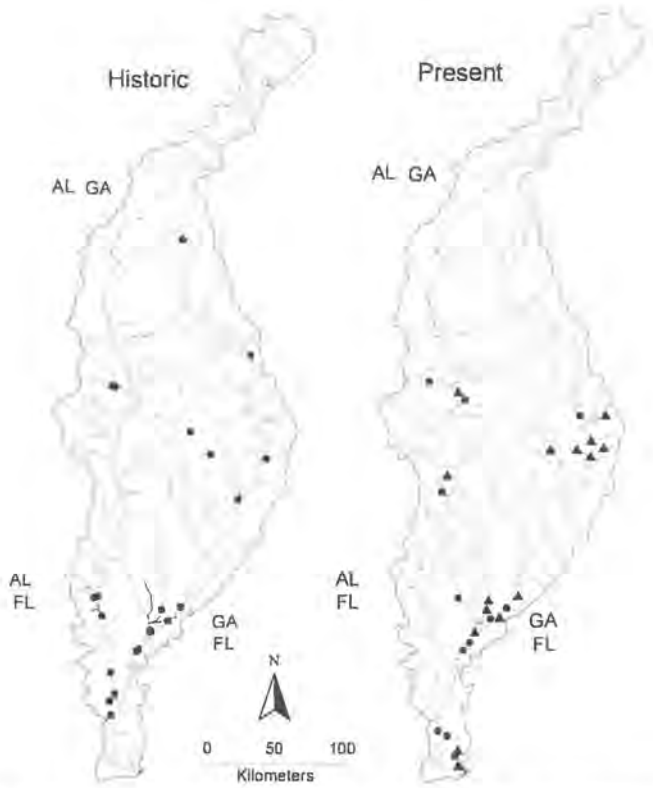

Fig. 77. Distribution of *Pyganodon grandis* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

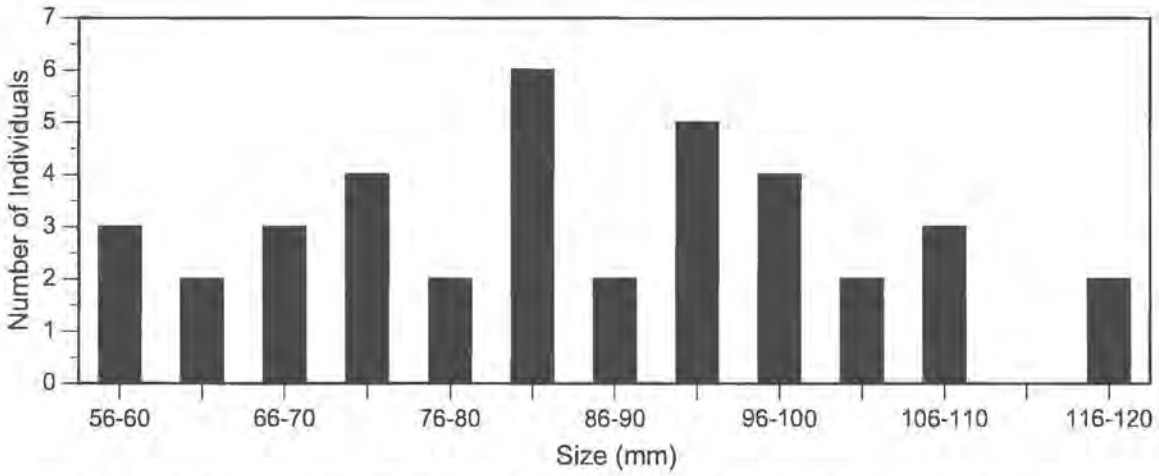

Fig. 78. Length-frequency distribution of *Pyganodon grandis* found in the summer of 1991.

ACF Distribution and Abundance

In this survey, 35 live and 52 shells of *Pyganodon grandis* were found. This species was found at 28 sites in the current survey, including the main channel of the Chipola River, the main channel and tributaries of the Apalachicola River, and the impoundments, main channels, and tributaries of the Chattahoochee and Flint rivers (Fig. 77).

Habitat

In this survey, *Pyganodon grandis* was found in main channels, tributaries, and impoundments, at sites with substrates ranging from sand and mud (53%) to primarily mud (24%). In other parts of its range, *P. grandis* occurred in mud or sand bottoms and showed a preference for finer substrates and quiet waters (Headlee, 1906). In laboratory experiments, this species showed a preference for sandy substrates over gravel substrates (Huehner, 1987).

Life History

There is considerable information on the life history of *Pyganodon grandis* in the northern portion of its range but there is almost no data based on southern populations. Figure 78 provides length-frequency data for specimens found in the ACF Basin in 1991. The most comprehensive review of life history information was based on the two subspecies that occur in Canada (Clarke, 1973). Aspects of the reproduction of *P. grandis* were described by Ortmann (1912, 1919). van der Schalie and Locke (1941) reported hermaphroditism in 2 of 14 individuals examined.

Pyganodon grandis is gonochoric (dioecious), and Ortmann (1912) described the glochidia. We found no gravid *P. grandis* during this survey, although a total of 34 individuals was checked for gravidity from May to September. In Louisiana, *P. grandis* collected at the end of September contained unfertilized eggs in the ovaries, and by mid-October had advanced to the glochidial stage when the larval thread, adductor muscle, mantle and barbed hooks were visible (Penn, 1939). By the end of November, all females collected were barren of glochidia. In Missouri, gravid females were found from December to March (Utterback, 1916). Baker (1928) reported the glochidia of *P. g. grandis* (as *Anodonta*) in Wisconsin were held in the marsupium from August to April or May. The giant floater has more reported fish hosts (37) than any other freshwater mussel (Watters, 1994).

Conservation Status

Pyganodon grandis, throughout its range, was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, *P. grandis* was assigned a conservation status of currently stable in the ACF Basin (Table 2).

Quincuncina infucata (Conrad, 1834)

Sculptured pigtoe

Figure 31

Synonymy

Unio infucatus Conrad, 1834a

New Fresh Water Shells of the United States, pp. 45-46, pl. 3, fig. 2.

Type Locality: Clench and Turner (1956) restricted the type locality to the Flint River, Albany, Dougherty County, assuming that this was where Conrad probably collected it. A map (Wheeler, 1935) of Conrad's route through Georgia in 1833 indicates he crossed the Flint River near Knoxville, Crawford County, Georgia.

Type Specimen: Type specimen has not been found (Johnson and Baker, 1973).

Unio securiformis Conrad, 1849b

Type Locality: Flint River, Georgia.

Unio kleinianus Lea, 1852a
Type Locality: Suwannee River, Florida.

Ortmann in Ortmann and Walker (1922) described the genus *Quincuncina*. Prior to the description of the genus *Quincuncina*, Simpson (1900, 1914) placed *Q. infucata* in the genus *Quadrula*.

Diagnostic Characters

The shell morphology of *Quincuncina infucata* was described by Clench and Turner (1956). In the ACF Basin, the shell sculpturing is highly variable, and is either inconspicuous (Heard, 1979) or pronounced, chevron-like ridges can extend across most of the shell (Clench and Turner, 1956). This sculpturing is especially apparent in tributary streams. This sculpturing distinguishes *Q. infucata* from all other ACF unionids.

A brief description of the soft anatomy of *Quincuncina infucata* was presented by Lea (1863d). Ortmann and Walker (1922) also presented information on the soft parts of *Quincuncina*. Glochidia are brooded in all four gills. The branchial papillae are dendritic and occur in one row. The anal aperture is barely crenulate, and the anal and supra-anal apertures are separated by a suture. The mantle margin is mostly unpigmented, except at the branchial and anal apertures, which are light brown.

Distribution

Quincuncina infucata occurs in the ACF Basin in Alabama, Florida, and Georgia, and in the Ochlockonee and Suwannee river systems, Florida and Georgia.

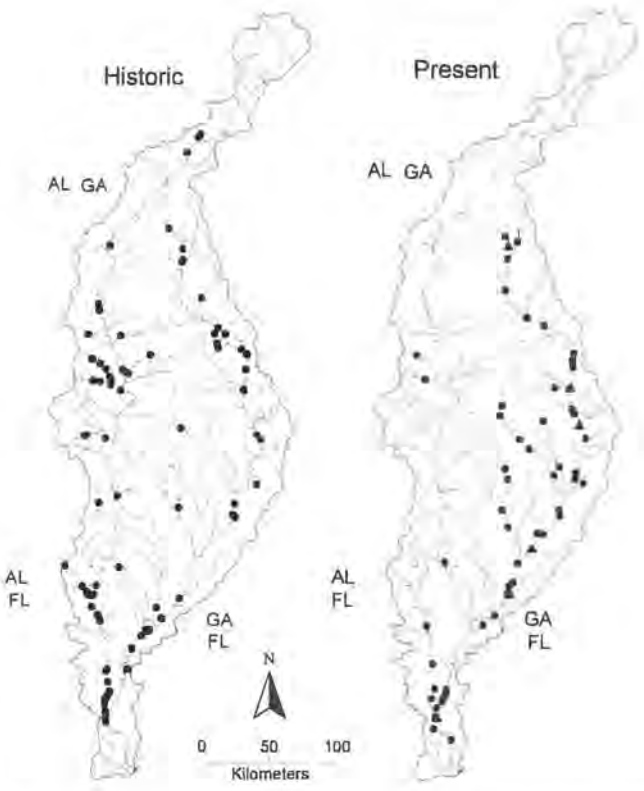

Fig. 79. Distribution of *Quincuncina infucata* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

ACF Historical Distribution and Abundance

We have located 164 historical records of *Quincuncina infucata* from 78 sites in the ACF Basin. It once occurred in the main channel and tributaries of the Chipola, Chattahoochee, and Flint rivers, and the mainstem and a single tributary (Mosquito Creek) of the Apalachicola River (Fig. 79). It is noteworthy that over 50 historical collections are from the main channel or tributaries of the Chattahoochee River. In addition, *Q. infucata* once occurred as far north in the Chattahoochee River as Atlanta.

Little is known about the historical abundance of *Quincuncina infucata*. The largest museum collection located contained 33 individuals and was from the Flint River drainage. *Quincuncina infucata* comprised over 86% of the shells found in a midden from a Middle Weeden Island site in Jackson County, Florida (main channel Apalachicola River), suggesting that it was locally abundant at that site (Percy, 1976). Heard (1964) noted that this species was found in considerable quantity in the Apalachicola River at Chattahoochee, Florida, but later (Heard, 1975a) noted that population sizes were drastically reduced in the Apalachicola River. In tributaries of the Chattahoochee River, Jenkinson (1973) collected 181 specimens from 9 sites. In the Chipola River drainage, a total of eight specimens from five sites was collected from 1915 to 1918 (van der Schalie, 1940).

ACF Distribution and Abundance

In this survey, 235 live *Quincuncina infucata* and 122 shells were found from a total of 54 sites (Fig. 79). Forty-four of these sites were either in the mainstem or tributaries of the Flint River drainage. This species was also found in the main channel and tributaries of the Apalachicola River, and from the mainstem of the Chipola River. *Quincuncina infucata* were also found in three Chattahoochee River tributaries from 1994 to 1996. *Quincuncina infucata* appears to be extirpated from the main channel of the Chattahoochee River, as well as from many of the historical sites where Jenkinson (1973) found it during his survey. It does not appear to tolerate impounded conditions, as only 2 live individuals were found in Lake Blackshear on the Flint River, although a total of 7 impoundments (39 sites) was surveyed.

Habitat

In Chattahoochee River tributaries, *Quincuncina infucata* historically occurred in shallow sand-bottomed

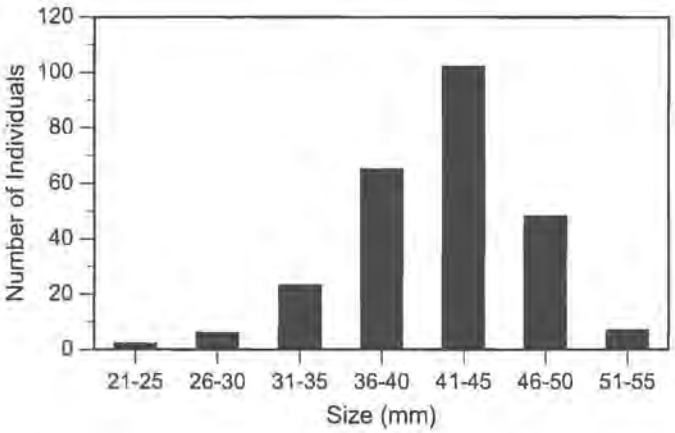

Fig. 80. Length-frequency distribution of *Quincuncina infucata* found in the summer of 1992.

pools and in rocky areas with swift current (Jenkinson, 1973). Clench and Turner (1956) noted that this species was found in the deeper portions of rivers, usually under debris, and that they seldom located it by seeing the siphons. Heard (1975a, 1979) reported finding *Q. infucata* in sand, muddy sand, and fine gravel substrates in small to large streams with moderate current. About 45% of the *Q. infucata* found in this survey occurred at sites that contained a sand and limestone rock substrate. An additional 24% were found at sites that contained a predominantly sand and detritus substrate. This species is rarely found in impoundments.

Life History

Very little is known about the life history of *Quincuncina infucata*. Length-frequency data for specimens found in the summer of 1992 are presented in Figure 80. Ortmann and Walker (1922) noted that the anatomy of *Q. infucata* was similar to that of *Q. burkei*, the type species for the genus. In this survey, 232 individuals were checked for glochidia, but only 6 were found gravid, on 12 and 27 June 1991. The host fish for *Q. infucata* is unknown.

Conservation Status

The sculptured pigtoe was listed by Williams et al. (1993) as a species of special concern. This status appears appropriate considering the disappearance of this species from the entire main channel of the Chattahoochee River, several Chattahoochee River tributaries, and portions of the Apalachicola River. It has never been considered for endangered or threatened status by the USFWS. Based on the results of this survey, we have assigned *Quincuncina infucata* a conservation status in the ACF Basin of special concern (Table 2).

Strophitus subvexus (Conrad, 1834)

Southern creekmussel
Figure 32

Synonymy

Anodonta subvexa Conrad, 1834b
Amer. Jour. Sci. 25(2): 341, pl. 1, fig. 12.
Type Locality: Black Warrior River, [Alabama].
Type Specimen: Type specimen has not been found.

Margaritana tombecbeensis Lea, 1858a
Type Locality: Tombecbee [Tombigbee] River, near Columbus, [Lowndes County], Mississippi.

Margaritana tombigbeensis Lea, 1861b
Type Locality: Tombecbee [Tombigbee] River, near Columbus, [Lowndes County], Mississippi. Lea (1861b) proposed this name as a replacement for *M. tombecbeensis*.

Margaritana columbensis Lea, 1867
Type Locality: Tombigbee River, near Columbus, [Lowndes County], Mississippi.

Margaritana gesnerii Lea, 1858a
Type Locality: Uphaupee [Uphapee] Creek, [Macon County], Alabama.

Margaritana spillmanii Lea 1858a
Type Locality: Tombecbee [Tombigbee] River, near Columbus, [Lowndes County], Mississippi.

The taxonomic status, generic and specific, of *Strophitus subvexus* has varied during the past century. van der Schalie (1940) reported it as *S. spillmanii* from the Chipola River drainage, and Clench and Turner (1956) erroneously assumed that these specimens of *S. spillmanii* were *Anodontoides elliottii* [= *A. radiatus*]. van der Schalie's specimens of *S. spillmanii* were later re-identified as *S. subvexus* by Johnson (1967a), who re-examined the systematic and taxonomic questions and recognized only one species of *Strophitus* on the Gulf Coast. Hence, both van der Schalie's (UMMZ 138467; UMMZ 138376) and Clench and Turner's (MCZ 191473; MCZ 19189) specimens from the Chipola River drainage are *S. subvexus*.

Diagnostic Characters

Shell morphology was described by Vidrine (1993) and Williams and Butler (1994). *Strophitus subvexus* has no lateral teeth and only a single low, stumpy pseudocardinal tooth in each valve (Johnson, 1967a). This species has been confused with *Anodontoides radiatus*, which has a thinner shell, and pronounced green rays on the posterior part of the valve.

Little is known about the anatomy of *Strophitus subvexus*, although Utterback (1916) described the reproductive anatomy of a congener (*S. undulatus*). Glochidia are brooded in the outer two demibranchs. Ortmann (1911) commented on the general anatomical differences between the genera *Anodontoides* and *Strophitus*, and

focused his discussion on the presence of placentulae (conglutinates in short, solid cords) that occur in *Strophitus* but not *Anodontoides*. In general, the gross anatomy of *A. radiatus* and *S. subvexus* is surprisingly similar, in that both have branchial papillae that are singular and occur in two or three intermingled rows. The anal aperture is crenulate. The inner mantle margin at the branchial and anal apertures is darkly pigmented with red and black striations, while the outer mantle margin is lightly peppered. There is a long suture, about the length of the supra-anal opening, that separates that aperture from the anal aperture.

Distribution

Strophitus subvexus occurs in most Gulf Coast drainages from the Sabine River drainage in Louisiana and Texas (Vidrine, 1993) east to the ACF Basin (Johnson, 1967a; Burch, 1975).

ACF Historical Distribution and Abundance

We have located 20 historical collections from 16 localities in the ACF Basin (Fig. 81). Historically, *Strophitus subvexus* occurred in the main channel and tributaries of the Chipola, Chattahoochee, and Flint rivers. There is one historical record of this species from the main channel of the Apalachicola River.

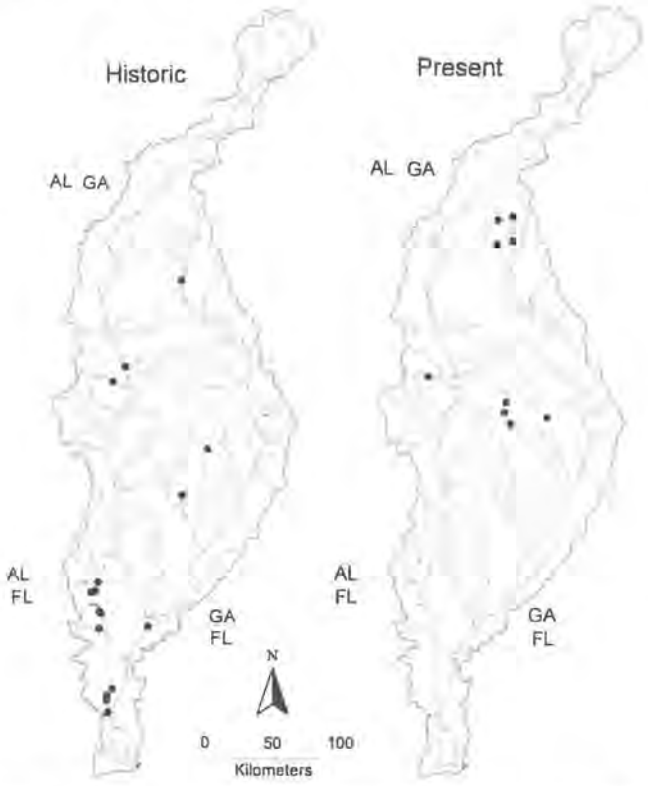

Fig. 81. Distribution of *Strophitus subvexus* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present.

Little is known about the historical abundance of this species, although van der Schalie (1940) considered it rare in the Chipola River drainage, based on a 1915 to 1918 survey, where only two specimens were found. Jenkinson (1973) did not find this species at any of the 21 localities he surveyed in Uchee and Little Uchee creeks, although C. Coney (pers. comm.) found a single specimen in Uchee Creek in 1982.

ACF Distribution and Abundance

Six southern creekmussels were found at four sites during this survey (Fig. 81). All four of these sites were in Flint River tributaries. From 1994 to 1996, additional specimens were found in Uchee Creek, a tributary of the Chattahoochee River, an additional site on Kinchafoonee Creek, two sites on Line Creek, and a site on Whitewater Creek, all Flint River tributaries. We did not find any specimens of *Strophitus subvexus* in the Chipola River drainage, although historically it was known from 10 localities in that drainage.

Habitat

Strophitus subvexus is found in small to large creeks, in substrates from sand to sandy mud, in slow or no current (Williams and Butler, 1994). Clench and Turner (1956) noted *S. subvexus* appeared to prefer backwater areas of rivers and slow-flowing large creeks. Seven of our historical records contain information about the sediments where *S. subvexus* was found. Of these records, six list sand and mud as the primary substrate type, while the lone record from the Apalachicola River lists rock and sand. Heard (1979) reported finding it in muddy sand in slight to moderate current. All of the live specimens found during this survey were found in sandy substrates, usually associated with some current.

Life History

Little is known about the life history of *Strophitus subvexus*, although Ortmann (1912), Utterback (1916), van der Schalie (1970), and Oesch (1984) commented on the life history of a closely related species, *S. undulatus* (= *S. edentulus* and *S. rugosus*). Utterback (1916) noted *S. undulatus* did not need a fish host for the metamorphosis of its glochidia, and speculated that this species owed its wide distribution to the "great vitality and nonparasitic life of the larvae," the constancy of the breeding season, and the buoyancy of the conglutinates, which facilitated the dispersal of juveniles. In addition, he noted that glochidia were found during every month of the year except for a few weeks in mid-summer. Gravid *S. undulata* were found in Pennsylvania beginning in July and ending in April and May (Ortmann, 1912). This species is an occasional hermaphrodite (van der Schalie, 1970).

The glochidia of *Strophitus subvexus* are large (240 x 300 microns), with prominent hooks. During this survey, two gravid individuals were found in August and September.

Although Haag and Warren (1997) listed 10 species as possible host fishes for *S. subvexus*, only 2 of those species, Alabama hogsucker, *Hypentelium etowanum*, and Tuskaloosa darter, *Etheostoma douglasi*, produced a moderate number (i.e., more than 2 transformed glochidia per trial) of juvenile mussels.

Conservation Status

Stansbery (1971) listed *Strophitus subvexus* as rare and endangered. It was assigned a conservation status of special concern by Williams et al. (1993). Williams and Butler (1994) considered *S. subvexus* threatened in Florida. Based on the results of this survey, we have assigned *S. subvexus* a conservation status of endangered in the ACF Basin (Table 2).

Toxolasma paulus (Lea, 1840)

Iridescent lilliput
Figure 33

Synonymy

Unio paulus Lea, 1840
Proc. Amer. Philos. Soc. 1(13): 287.
Type Locality: Chattahoochee River, Columbus, [Muscogee County], Georgia.
Type Specimen: Lectotype USNM 85274.
Unio cromwellii Lea, 1865
Type Locality: Kiokee Creek, near Albany, [Dougherty County], Georgia.
Unio marginis Lea, 1865
Type Locality: Blue Springs, Albany, [Dougherty County], Georgia.
Unio corvinus Lea, 1868
Type Locality: Flint River, Georgia.

There is considerable confusion regarding the taxonomy of the genus *Toxolasma* in the eastern Gulf and south Atlantic drainages. Some authors (Johnson, 1972; Heard, 1979) considered *T. paulus* to be a synonym of *T. parvus* (Barnes, 1823), although Call (1896) presented the only comprehensive effort to revise the group of species currently assigned to the genus *Toxolasma*. We have followed Clench and Turner's (1956) designation, and consider *T. paulus* distinct from *T. parvus*. In this classification scheme, *T. paulus* is the only *Toxolasma* recognized from the ACF Basin, although we are aware that there may be a second species present in the system. Until a thorough study of soft anatomy and genetics is undertaken to provide some basis for delineating species, we feel it is prudent to recognize a single species from the basin.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956). Sexual dimorphism is apparent, with females much more inflated than males and truncated posteriorly. The shell morphology of *T. parvus*, a closely related species often confused with *T. paulus*, has been described by Parmalee (1967), Johnson (1972), and Vidrine (1993).

Females have caruncles on the mantle below the branchial opening. Lea (1863d) briefly described the soft parts and a glochidium of *Toxolasma paulus*. Lea (1859d) also reported the color of the caruncle of *T. paulus* as "reddish," although it can range in color from reddish brown to white. The ovisacs are confined to the posterior part of the outer two demibranchs (Heard and Guckert, 1971). A long suture separates the anal and supra-anal openings. Portions of the tips of the marsupial gills are darkly pigmented when gravid. The branchial papillae are long, slender, and occur in two intermingled rows. The anal papillae are short and stubby. The mantle margins are pigmented at the apertures and are a dark reddish purple.

Distribution

Clench and Turner (1956) considered the range of *Toxolasma paulus* in Florida to include the St. Johns River south to the Peace River and west to the Yellow River. We have limited its western range to the ACF Basin. It is unclear what species of *Toxolasma* occurs in western Florida drainages. Although *T. paulus* has been confused with *T. parvus*, the latter species ranges throughout the Mississippi River drainage, from western New York west to Minnesota, north to southern Canada and Michigan, and south to Texas (Vidrine, 1993), Arkansas, Louisiana (Parmalee, 1967; Johnson, 1972), and east to Alabama.

ACF Historical Distribution and Abundance

We have located 214 records of *Toxolasma paulus* from 91 sites in the ACF Basin. Historically, it was found in the main channel and tributaries of all four major rivers of the basin (Fig. 82). Clench and Turner (1956) noted that it could be exceedingly abundant. A total of 395 specimens was collected from 17 sites in the Chipola River system when it was surveyed from 1915 to 1918 (van der Schalie, 1940). We have located at least 40 collections where over a dozen individuals were collected. This species was known from above and below the Fall Line.

ACF Distribution and Abundance

Toxolasma paulus were found at 59 sites in the current survey (Fig. 82). A total of 360 live animals and 137 shells was found. *Toxolasma paulus* were most common in tributary sites, and of the 47 sites where this species was found in the Flint River drainage, 38 of these sites were in tributary streams. One live *T. paulus* was also found in the main channel of the Chattahoochee River, making this one of only five species found live in the mainstem of that river.

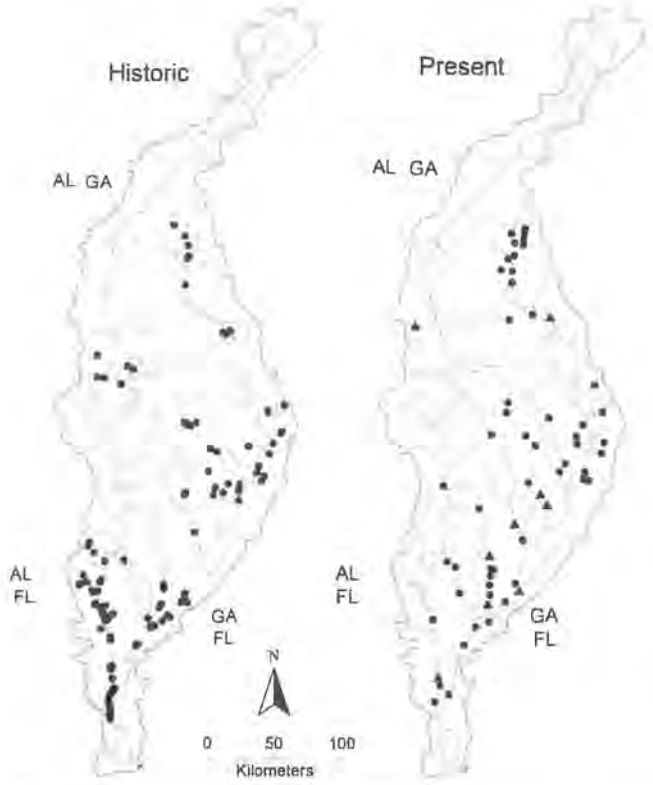

Fig. 82. Distribution of *Toxolasma paulus* in the ACF Basin Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

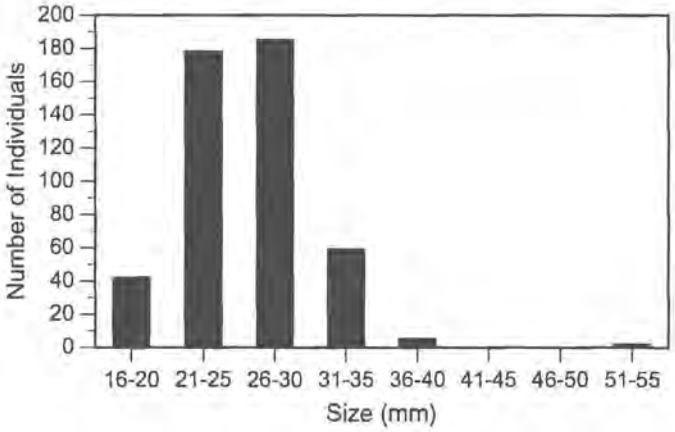

Fig. 83. Length-frequency distribution of *Toxolasma paulus* found in the summer of 1992.

Habitat

In the ACF Basin, *Toxolasma paulus* was found in a wide variety of habitats, from fine sand to rocky substrates (Jenkinson, 1973), and in Florida, in mud and sand in small streams with slight current, as well as lakes (Heard, 1979). Clench and Turner (1956) noted it was most often found along the slopes of a stream, and would migrate with the rise and fall of the water. Of the 31 historical records we have located that include the substrate type where this species was found, 20 records list sand as the primary substrate type, while 7 records list mud, 2 list silt, and 1 record each lists vegetation or rock. In this survey, 40% of the individuals were found at sites that had primarily sand and rock substrates, 31% were found at sites with sand and clay substrates, and 23% were found at sites with primarily sandy substrates.

Life History

Length-frequency data for *Toxolasma paulus* found in the summer of 1992 are presented in Figure 83. Heard (1969) noted that in *T. paulus*, mature ova and spermatozoa were present throughout the year.

In this survey, gravid *Toxolasma paulus* were found from May to July. However, though 346 individuals were checked for glochidia, only 9 gravid females were found. No gravid females were found in August or September. The host fish for *T. paulus* is unknown.

Conservation Status

Toxolasma paulus was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned it a conservation status of currently stable in the ACF Basin (Table 2).

Uniomerus carolinianus (Bosc, 1801)

Florida pondhorn
Figure 34

Synonymy

Unio caroliniana Bosc, 1801
Historie Naturelle des Coquilles 3: 142.
Type Locality: The stagnant waters of Carolina.
Type Specimen: Type specimen has not been found.
Unio columbensis Lea, 1857a
Type Locality: Creeks, near Columbus, [Muscogee County], Georgia.
Unio plantii Lea, 1857c
Type Locality: Flint River, near Macon, Georgia.

We have not attempted to include a complete synonymy for *Uniomerus carolinianus*, and have included only the two species of *Uniomerus* described from the ACF Basin. Clench and Turner (1956) considered *U. obesus* to be the only species of *Uniomerus* in Florida, and noted that they could not discern any "real differences between specimens from central and southern Florida, and those from elsewhere in the range of the species." Johnson (1970, 1972) synonymized *U. obesus* and *U. declivis* under *U. tetralasmus*, a species that occurs in the Mississippi Basin and the Gulf Coast from Texas east to the

Choctawhatchee Basin. Fuller (1972b) considered *Unio caroliniana* a *nomen dubium* and in its place recognized *U. tetralasmus*. Heard (1979) recognized two species, *U. carolinianus* and *U. declivis*, from Mosquito Creek, a tributary of the Apalachicola River. Davis (1983), using electrophoresis, also recognized *U. declivis* and *U. carolinianus* from Mosquito Creek. In contrast to Heard (1979), however, he could not distinguish all individuals of the two species using conchological characters. Because of this uncertainty, we have treated this group conservatively and recognize only *Uniomerus carolinianus* from the ACF Basin, based on our collections and material examined in museums.

Diagnostic Characters

Recognition of species in the genus *Uniomerus* using traditional taxonomic characters is extremely difficult. This is due in part to their widespread distribution and their considerable morphological variation. *Uniomerus carolinianus* is characterized by a satiny periostracum and absence of rays. These characters make it distinguishable from both *Elliptio complanata* and *E. icterina* in the ACF Basin. In addition, the beak sculpturing is oblique to the hinge line. Shell morphology for *U. tetralasmus* was described by Johnson (1970), and for *U. obesus* by Clench and Turner (1956) and Britton and Fuller (1979).

Fuller (1971) noted that Atlantic slope populations of *Uniomerus* differed morphologically from Mississippi Basin specimens only in that "the latter have a tendency toward minute papillation of the mantle margin before the branchial aperture." He also noted that *U. tetralasmus* could be distinguished from species of *Elliptio* by the former's dendritic branchial papillae and almost completely fused anal papillae. Females brood glochidia in the outer demibranchs only. The glochidia are hookless. The septa and water-tubes are undivided, and secondary septa are not present (Heard and Guckert, 1971). In specimens of *U. carolinianus* from the ACF Basin, the branchial papillae are dendritic and short (reduced). The anal papillae are absent or appear as minute crenulations. The supra-anal opening is slightly larger than the anal aperture, and separated by a small suture. The branchial aperture is almost twice as long as the other two apertures.

Distribution

Uniomerus carolinianus ranges along Atlantic Coast drainages from North Carolina south to Florida, and in Florida occurs from the St. Johns River system south to Lake Okeechobee, and in Gulf Coast drainages west to the ACF Basin.

ACF Historical Distribution and Abundance

We have located 79 records of *Uniomerus carolinianus* from 38 sites in the ACF Basin. Historically, this species occurred in the main channel and tributaries of the Apalachicola, Chipola, Flint, and Chattahoochee rivers

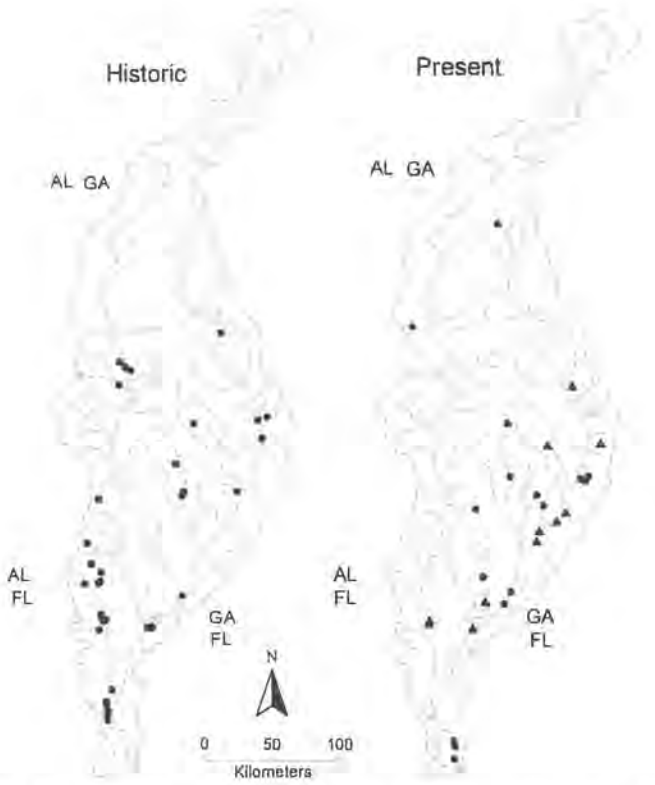

Fig. 84. Distribution of *Uniomerus carolinianus* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

(Fig. 84). Little is known about the historical abundance of this species in the basin. Twenty-one individuals were found from a total of six sites in the Chipola River drainage when it was surveyed from 1915 to 1918 (van der Schalie, 1940). Of the museum collections examined, 2 contained 15 individuals, 1 collection contained 11 individuals, and the remaining 51 collections contained fewer than 10 individuals each.

ACF Distribution and Abundance

Uniomerus carolinianus were found at 28 sites in the present survey (Fig. 84). A total of 74 live animals and 71 shells was found. This species was found in the main channel and tributaries of the Apalachicola, Chipola, and Flint rivers, and from a single tributary (Halawakee Creek) of the Chattahoochee River. It appeared to be most common in tributary streams, and was absent from reservoirs. It occurs above and below the Fall Line, but was more abundant in the Coastal Plain.

Habitat

Little is known about the habitat preference of *Uniomerus carolinianus*. In Florida, Heard (1979) noted that it occurred in muddy sand and sand in slight current,

and in lakes. Of the nine historical records that contain substrate information, six listed sand as the primary substrate type, two records listed silt, and one record listed rock and sand. In this survey, 69% of the specimens were found at sites that had primarily sand and clay or sand and limestone rock substrates. An additional 21% of specimens were found at sites with clay and limestone rock substrates.

Some additional information is available for a closely related species, *Uniomerus tetralasmus*. In West Virginia, *U. tetralasmus* showed no habitat preference in ponds, and was often buried in sand and gravel under a thick layer of silt (Taylor, 1984). In parts of Louisiana and Mississippi, *U. tetralasmus* was highly resistant to desiccation and occurred in areas of low dissolved oxygen concentrations and high turbidity (Stern, 1976). Frierson (1903) noted that *U. tetralasmus* was able to live in localities "where, from three to six months at a time, there is absolutely no water; in fact living shells have been thrown out by the plowshare, and hundreds have been seen killed by fire sweeping over the dried-up ponds."

Life History

There is no information of the life history of the Florida pondhorn. Length-frequency data for *Uniomerus carolinianus* found in the summer of 1992 are presented in Figure 85. The host fish is unknown for *U. carolinianus*. The golden shiner, *Notemigonus crysoleucas*, is the only known host fish for *U. tetralasmus* (Stern and Felder, 1978). In addition, based on laboratory infections, the green sunfish, *Lepomis cyanellus*, bluegill sunfish, *L. macrochirus*, mosquitofish, *Gambusia affinis*, and gizzard shad, *Dorosoma cepedianum*, did not appear to serve as host fishes for *U. tetralasmus* (Stern and Felder, 1978). In Louisiana, gravid *U. tetralasmus* were collected in February and March (Stern and Felder, 1978). In Missouri, gravid females were found in May and August (Utterback, 1916). Although 70 individuals were checked for glochidia from May through September in this survey, only a single gravid female was found in May.

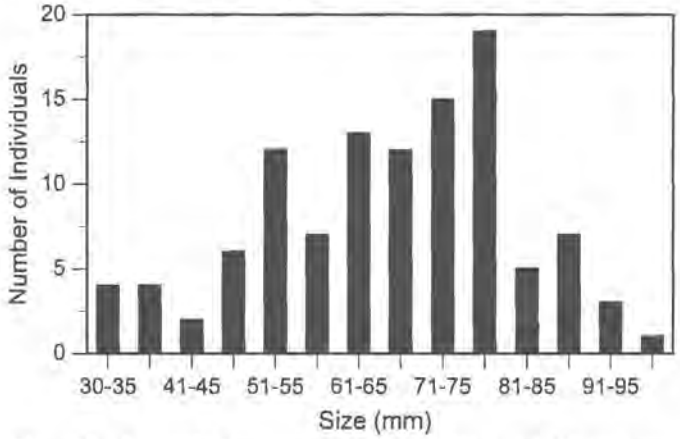

Fig. 85. Length-frequency distribution of *Uniomerus cariolinianus* found in the summer of 1992.

Conservation Status

The Florida pondhorn was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned *Uniomerus carolinianus* a conservation status of currently stable in the ACF Basin (Table 2).

Utterbackia imbecillis (Say, 1829)

Paper pondshell
Figure 35

Synonymy

Anodonta imbecillis Say, 1829
New Harmony Disseminator 2(23): 355.
Type Locality: Wabash River, subsequently restricted to the area of Wabash River, immediate region of New Harmony, Indiana, by Clench and Turner (1956).
Type Specimen: Neotype Senckenberg Museum number 4301 selected by Haas (1930).

Anodonta incerta Lea, 1834
Type Locality: Ohio River, near Cincinnati, [Hamilton County], Ohio.

Anodon horda Gould, 1855
Type Locality: Comanche Creek, Texas.

Anodonta henryiana Lea, 1857b
Type Locality: Matamoras, Tamaulipas, Mexico.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Johnson (1970). In addition, Johnson (1970) discussed how *Utterbackia imbecillis* could be distinguished from both *A. couperiana* along the Atlantic slope and *A. peggyae* (= *U. peggyae*) in Gulf drainages. *Utterbackia imbecillis* can be distinguished from *U. peggyae* by the latter's more rounded shell shape, and the presence of fine green rays on *U. peggyae* that are especially apparent at the ventral margin of the shell. These rays are rare on *U. imbecillis* shells.

Clarke and Berg (1959) summarized the anatomical descriptions of *Utterbackia imbecillis*. The incurrent papillae are long, singular, and occur in two weakly defined rows, with the inner papillae spaced unevenly and farther apart than the outer row. The anal aperture is without papillae or crenulation, and the inner surface is striated reddish brown. The supra-anal opening is very small and separated from the anal aperture by a long, fleshy suture. The branchial and anal apertures are darkly pigmented in ACF Basin specimens.

Distribution

Utterbackia imbecillis is widespread in the Mississippi River drainage from southern Minnesota and Wisconsin south to western Kansas, Oklahoma, and Texas, and

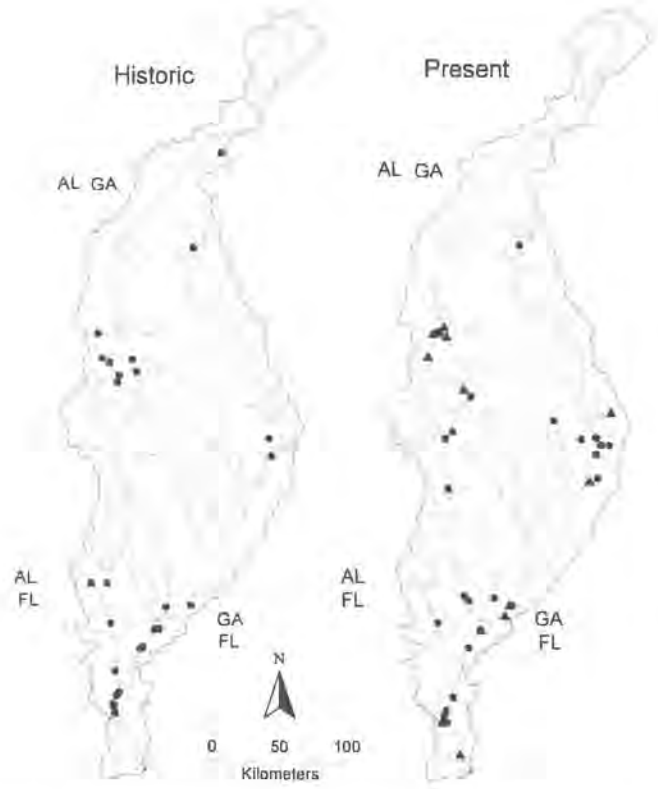

Fig. 86. Distribution of *Utterbackia imbecillis* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

northeastern Mexico, and east along the Gulf Coast to Florida and south Atlantic drainages in Florida and Georgia. There has been some confusion as to the distribution of this species in Florida, with some authors (Johnson, 1970, 1972; Heard, 1979) suggesting that it did not occur in the peninsular region of Florida, including the Suwannee River system. Hoeh et al. (1995) later collected this species from eight peninsular Florida locations and suggested it was probably broadly distributed in this region with large population sizes.

ACF Historical Distribution and Abundance

We have located 52 historical records of this species from 27 sites in the basin (Fig. 86). It was known from the main channel and tributaries of all four rivers in the basin.

Historically, *Utterbackia imbecillis* appeared to be locally abundant. Eight of the historical collections that were located contained over a dozen specimens. van der Schalie (1940) reported that a total of 366 specimens was found from 6 sites in the Chipola River system when it was surveyed from 1915 to 1918.

ACF Distribution and Abundance

Utterbackia imbecillis were found at 38 locations, in the mainstem and tributaries of all four rivers in the basin (Fig. 86). This was one of only five species that persists in the mainstem of the Chattahoochee River. *Utterbackia imbecillis* were found in five of the seven impoundments surveyed. Several impoundments on the mainstem of the Chattahoochee River harbor large (i.e., 1,000s of individuals observed), monospecific populations of *U. imbecillis*.

Habitat

Utterbackia imbecillis inhabits slackwater areas in mud or muddy sand (Clench and Turner, 1956), and can be found in ponds, creeks, or near the banks of larger rivers (Johnson, 1970). In this survey, 11 of the 34 (35%) sites where this species was found were in reservoirs. In addition, over 50% of the individuals found occurred at sites that had sand or mud substrates.

Life History

Utterbackia imbecillis differs from most freshwater mussels in that it is only one of seven known species of unionids north of Mexico that is a simultaneous hermaphrodite (i.e., produces mature oocytes and spermatozoa concurrently) (Hoeh et al., 1995). In addition, glochidial parasitism in this species may be facultative (Howard, 1914b; Fuller, 1974). Sterki (1898) was the first to report hermaphrodism in *U. imbecillis*, and Heard (1975b) described various aspects of its reproductive biology.

Heard (1975b) considered *Utterbackia imbecillis* to be a long-term bradytictic breeder, although Hoeh (as reported in Gordon and Layzer, 1989) noted that this species may act as a tachytictic brooder during the summer months and then switch to bradytictic behavior in cooler months. Watters (1994) reported mature glochidia from February to May. During this survey, gravid females were found only in June and July, although individuals collected from May to November were checked for glochidia.

Watters (1994) summarized host fish information for

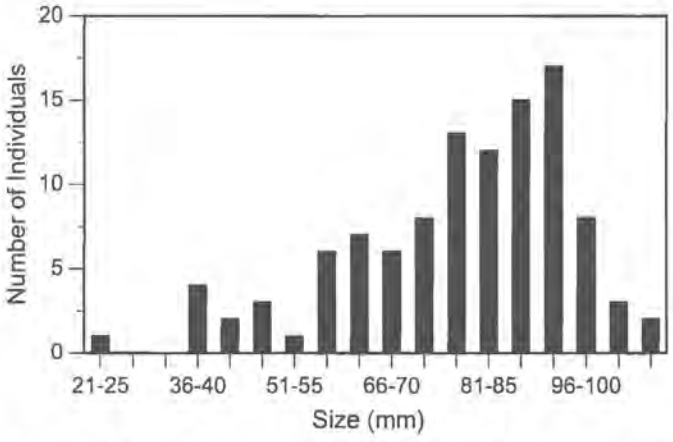

Fig. 87. Length-frequency distribution of *Utterbackia imbecillis* found in the summer of 1992.

the paper pondshell and noted that 11 host fishes have been identified, with 7 of these being sunfishes (family Centrarchidae). In addition, Trdan and Hoeh (1982) report successful transformations on the banded killifish, *Fundulus diaphanus*, rock bass, *Ambloplites rupestris*, largemouth bass, *Micropterus salmoides*, green sunfish, *Lepomis cyanellus*, and pumpkinseed sunfish, *L. gibbosus*. Length-frequency data for *Utterbackia imbecillis* found in the summer of 1992 are presented in Figure 87.

Conservation Status

Utterbackia imbecillis was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned it a conservation status of currently stable in the ACF Basin (Table 2).

Utterbackia peggyae (Johnson, 1965)

Florida floater
Figure 36

Synonymy

Anodonta peggyae Johnson, 1965
Breviora 213: 1, pl. 2, figs. 1-3.
Type Locality: Southeast shore of Lake Talquin, formed by a dam on the Ochlockonee River, Leon County public fishing ground, Leon County, Florida.
Type Specimen: Holotype MCZ 251040.

Diagnostic Characters

Shell morphology was described by Johnson (1965), who later detailed how it differed from other Anodontinae species (Johnson, 1972). *Utterbackia peggyae* can be distinguished from *U. imbecillis* by the presence of fine green rays on the ventral margin of the shell that are almost always absent on *U. imbecillis*. In addition, the shell is less elongate than *U. imbecillis*.

Kat (1983) contrasted the stomach anatomy of *Utterbackia peggyae* with *U. imbecillis*. Bogan and Hoeh (1995) pointed out, however, that Kat's illustration of the stomach anatomy of *Utterbackia peggyae* was actually an illustration of *U. peninsularis*, a previously undescribed *Utterbackia* species. Bogan and Hoeh (1995) figured the stomach anatomy for *U. peggyae*. The structure of the branchial, anal, and supra-anal apertures of *U. peggyae* is similar to *U. imbecillis*, except that on the outside of the mantle margin at these apertures, *U. peggyae* is pigmented with small dark spots that give the mantle a peppered appearance.

Distribution

Utterbackia peggyae is restricted to the eastern Gulf Coast drainages from the Escambia River drainage east to the Ochlockonee River drainage (Bogan and Hoeh, 1995). *Utterbackia peggyae* was formerly thought to occur in the Suwannee River system south to the Hillsborough River system (Johnson 1965, 1972). These records, however, were subsequently recognized as a new species, *U. peninsularis*, which is restricted to peninsular Florida and does not occur in the ACF Basin (Bogan and Hoeh, 1995).

ACF Historical Distribution and Abundance

We located 31 historical records of this species from 21 sites in the ACF Basin. *Utterbackia peggyae* were known from the mainstem and tributaries of the Chipola and Flint rivers (Fig. 88). A single record was also located from Mosquito Creek, a tributary of the Apalachicola River in Gadsden County, Florida, that consisted of 10 individuals collected by Clench, Turner, and McMichael in 1954. We know of no historical records of this species from the Chattahoochee River drainage. The largest historical collection contained 24 individuals, and was collected in the main channel of the Chipola River in 1954 by Clench, Turner, and McMichael.

ACF Distribution and Abundance

Utterbackia peggyae were found at 19 (5.8%) of the 324 sites surveyed. This species was found in the main channel and one tributary of the Apalachicola River, and in the

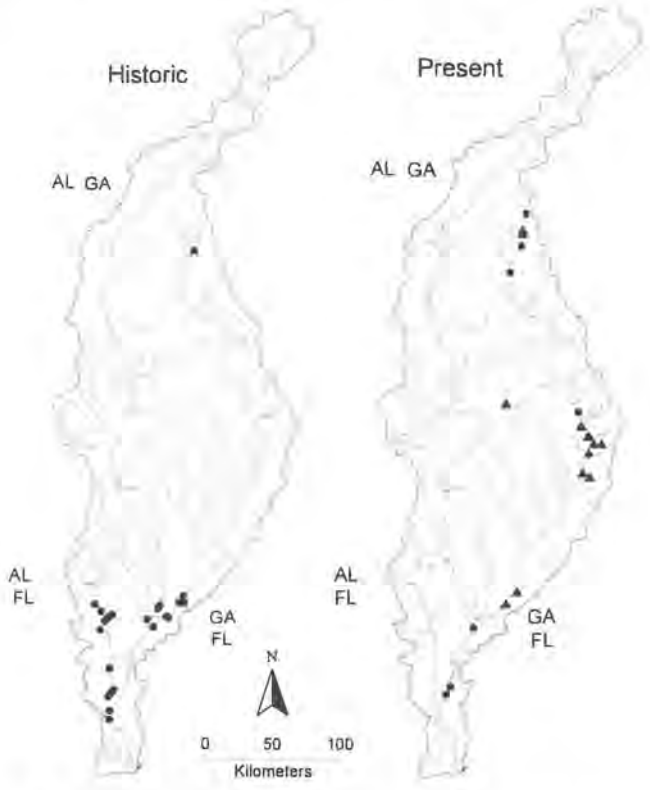

Fig. 88. Distribution of *Utterbackia peggyae* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

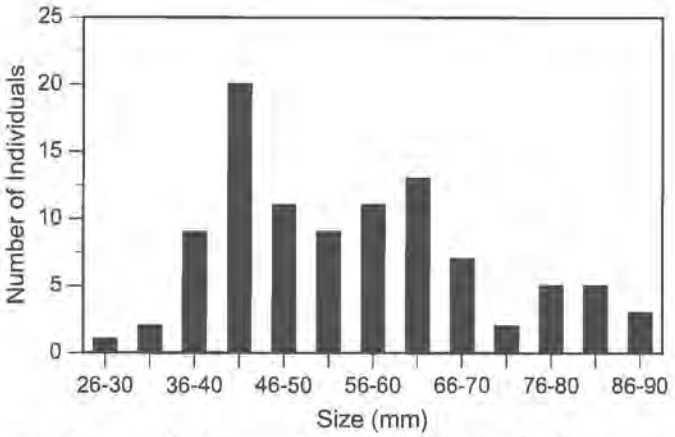

Fig. 89. Length-frequency distribution of *Utterbackia peggyae* found in the summer of 1992.

main channel, tributaries, and one impoundment (Lake Blackshear) of the Flint River system (Fig. 88). A total of 32 live specimens and 69 shells was found. This species was found above and below the Fall Line, but appears to be most common in the Coastal Plain. We did not find it in the Chipola River drainage, although 21 of the 31 historical records were from that drainage.

Habitat

Based on nine historical records where substrate information is available, *Utterbackia peggyae* was found in predominately sand and mud substrates. Johnson (1965) noted that *U. peggyae* was found in sluggish streams and ponds in sandy or muddy substrates. In this survey, over 90% of the individuals were found at sites with predominantly sandy substrates.

Life History

Heard (1975b) described various aspects of the reproductive biology of *Utterbackia peggyae*. *Utterbackia peggyae* is gonochoric (dioecious), unlike its closely related sister taxon, *U. imbecillis*, which is a simultaneous hermaphrodite (Hoeh et al., 1995). No gravid females of *U. peggyae* were found in the current survey, although a total of 32 individuals collected in June and July was checked for gravidity. Heard (1979) noted that one population of *U. peggyae* in Florida produced two consecutive broods in a year. The host fish is unknown. Length-frequency data for *U. peggyae* found in the summer of 1992 are presented in Figure 89.

Conservation Status

Williams et al. (1993) reported the conservation status of the Florida floater as currently stable. Based on the results of this survey, we have assigned *Utterbackia peggyae* a conservation status of currently stable in the ACF Basin (Table 2).

Villosa lienosa (Conrad, 1834)

Little spectaclecase
Figure 37

Synonymy

Unio lienosus Conrad, 1834b
Amer. Jour. Sci. 25(2): 339, pl. 1, fig. 4.
Type Locality: Small streams in south Alabama.
Type Specimen: A specimen labeled in the shell as "Type *U. lienosus* Con. Big Pr. [Prairie] Creek, Marengo County, Alabama," was found in the collection of the Alabama Museum of Natural History and is now at the FLMNH. However, Clench and Turner (1956) referred to a collection, ANSP 9747, as the holotype. Johnson and Baker (1973) considered ANSP 9747, consisting of several specimens, as syntypes but did not designate a lectotype.

Unio proximus Lea, 1852a
Type Locality: Georgia.

Unio concestator Lea, 1857a
Type Locality: Creeks, near Columbus, [Muscogee County], Georgia.

Unio fallax Lea, 1857a
Type Locality: Streams, near Columbus, [Muscogee County], Georgia; French Broad River, Tennessee.

Unio intercedens Lea, 1857a
Type Locality: Streams, near Columbus, [Muscogee County], Georgia.

Unio linguaeformis Lea, 1860a
Type Locality: [Chattahoochee River], Columbus, [Muscogee County], Georgia.

Unio unicostatus B. H. Wright, 1899
Type Locality: Spring Creek, Decatur County, Georgia.

The complete synonymy for *Villosa lienosa* is lengthy (see Clench and Turner, 1956 and Burch, 1975). We have restricted our synonymy to those species described from the ACF Basin.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Vidrine (1993). *Villosa lienosa* is a small to medium-sized mussel that can reach lengths of over 90 mm, although lengths of 40 to 60 mm are more common. Sexual dimorphism is very pronounced in this species, with the female shell being greatly inflated posteriorly. This species is easily distinguished in both sexes from *V. vibex* and *V. villosa* by the pattern of pigmentation on the ventral mantle margin. In *V. lienosa* the pigmentation (usually brownish) ends abruptly just ventral to the branchial opening. In the latter two species, the pigmentation extends along the length of the ventral mantle margin.

A brief description of the soft anatomy of *Villosa lienosa* was reported by Ortmann (1912). The branchial papillae

of *V. lienosa* are fine, singular, and occur in two rows. The anal papillae are well-defined, long, and singular. The suture separating the anal and supra-anal openings is long and only slightly smaller than the anal opening. The ovisacs are confined to the posterior part of the outer two demibranchs, are marked externally by sulci, and the marsupia do not form smooth pads (Heard and Guckert, 1971). The glochidia are hookless, and the septa and the water-tubes are undivided and run parallel to the gill filaments.

Distribution

Villosa lienosa occurs in the interior drainages of the Cumberland, Ohio, and Tennessee rivers, and southward throughout the Mississippi embayment. On the Gulf Coast, it occurs from the eastern portion of Texas eastward to the Suwannee River system in Florida and Georgia.

ACF Historical Distribution and Abundance

Historical records indicate that *Villosa lienosa* was abundant and widely distributed throughout the ACF Basin (Fig. 90). We have located 260 historical collections of *V. lienosa* from 102 sites in the basin. Historically, this species occurred in the main channel and tributaries of all four major rivers in the basin.

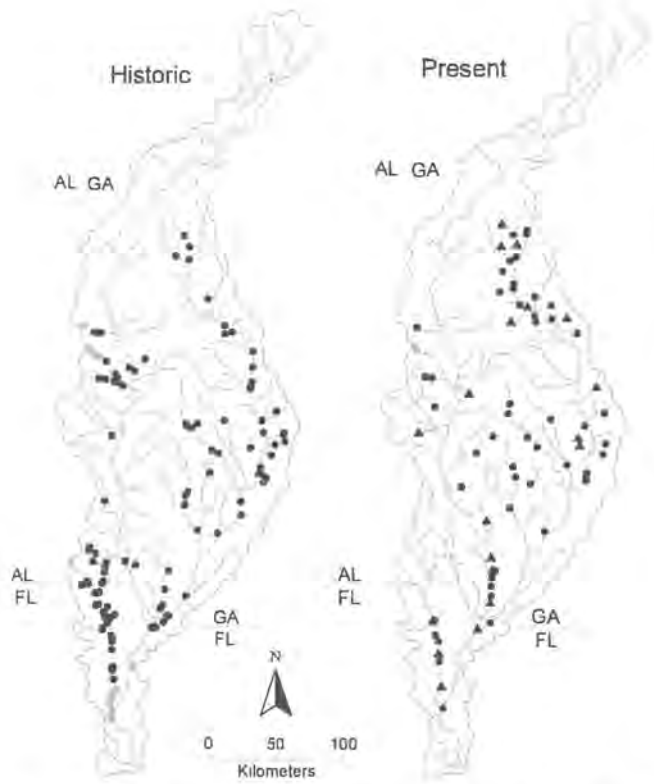

Fig. 90. Distribution of *Villosa lienosa* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

Based on historical records, it appears *Villosa lienosa* was historically abundant in the ACF Basin. We have located historical collections that contained 177, 159, 104, and 102 individuals, respectively. An additional 55 collections contained at least 10 individuals each. Jenkinson (1973) collected 106 specimens from 15 sites in the Chattahoochee River drainage, and found this species above and below the Fall Line. *Villosa lienosa* were found at all 25 stations surveyed in the Chipola River drainage from 1915 to 1918 (van der Schalie, 1940). A total of 1,252 individuals was collected, and van der Schalie (1940) reported this was one of the most common freshwater mussels collected in the Chipola River system. He also noted that although it was fairly abundant in the mainstem, it was even more common in tributary streams.

ACF Distribution and Abundance

Villosa lienosa were collected at 72 of the 323 sites surveyed (Fig. 90). A total of 531 live individuals and 176 shells was found. This species was found in 10 tributary streams of the Chattahoochee River system, making it one of the most common species in that drainage. A total of 45 live *V. lienosa* and 2 shells was found in an impounded section of lower Spring Creek, which was inundated by Lake Seminole. It was not found at any other reservoir sites.

This species is common above and below the Fall Line. Based on the current survey results, the distribution of *Villosa lienosa* in the basin is very similar to its historical distribution.

Habitat

In the Chattahoochee River drainage, *Villosa lienosa* was reported from soft mud to underneath rocks in fast current (Jenkinson, 1973). In Florida, it was found in sandy substrates in slight to moderate current (Heard, 1979). Clench and Turner (1956) noted it preferred muddy substrates, especially in detrital-rich areas. In this survey, 55% of the specimens were collected at sites that contained primarily muddy (silt and clay) substrates, and 33% were found at sites with predominantly sand and clay or limestone rock substrates.

Villosa lienosa was more common in ACF tributary streams than the main channels. Clench and Turner (1956) noted this species was sometimes the only one found at a site, and in Gulf drainages was most common in smaller rivers and creeks. Vidrine (1993) found that *V. lienosa* was the second most abundant species encountered in headwater creeks in Louisiana.

Life History

Ortmann (1912) reported three gravid *Villosa lienosa* from the Pearl River, Hinds County, Mississippi, collected 5 November 1910, and provided a figure of the glochidia. Subsequently, Ortmann (1924) examined the soft anatomy of additional specimens from the

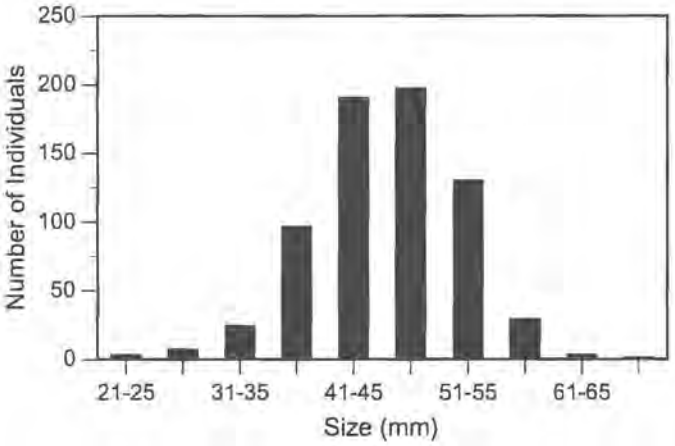

Fig. 91. Length-frequency distribution of *Villosa lienosa* found in the summer of 1992.

Choctawhatchee River in Dale County, Alabama, collected in November, and reported one gravid female. Heard (1969) reported periods of gamete production from specimens collected monthly from northern Florida. In this survey, gravid females were found from May to September, with the peak period of gravidity in September. The host fishes (based on laboratory infections) include the largemouth bass, *Micropterus salmoides*, and bluegill sunfish, *Lepomis macrochirus* (Ruessler and Keller, 1996). Length-frequency data for specimens found in the summer of 1992 are presented in Figure 91.

Conservation Status

Villosa lienosa was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned *V. lienosa* a conservation status in the ACF Basin of currently stable (Table 2).

Villosa vibex (Conrad, 1834)

Southern rainbow
Figure 38

Synonymy

Unio vibex Conrad, 1834a
New Fresh Water Shells of the United States, pp. 31-32, pl. 4, fig. 3.
Type Locality: Black Warrior River, South of Blount Spring, [Blount County], Alabama.
Type Specimen: Type specimen has not been found.

Unio exigus Lea, 1840
Type Locality: Chattahoochee River, near Columbus, [Muscogee County], Georgia.

Unio subellipsis Lea, 1856
Type Locality: Creeks, near Columbus, [Muscogee County], Georgia.

Unio sudus Lea, 1857c
Type Locality: Dry Creek, near Columbus, [Muscogee County], Georgia.

Unio obfuscus Lea, 1857c
Type Locality: Flint River, near Macon, Georgia.

Unio dispar Lea, 1860a
Type Locality: [Chattahoochee River], Columbus, [Muscogee County], Georgia.

The synonymy for *Villosa vibex* is lengthy, and we have only included those species named from the ACF Basin. Johnson (1970) presented a complete synonymy for this species.

Diagnostic Characters

Shell morphology was described by Johnson (1970) and Britton and Fuller (1979). *Villosa vibex* attains a length of about 100 mm, has a thin, smooth shell, and is moderately inflated. It is sexually dimorphic, with the males being bluntly pointed posteriorly and females more broadly rounded. This species can be distinguished from other ACF Basin *Villosa* by the presence of prominent green rays on the posterior portion of the shell, and its relatively thin pseudocardinal teeth, especially when compared to *V. lienosa*.

Ortmann (1923) provided a good description of the soft parts. The inner mantle fold anterior to the branchial opening are papillate in female specimens, but papillae may be only rudimentary or completely missing in males (Britton and Fuller, 1979). The mantle is darkly pigmented in *Villosa vibex*, and this pigmentation extends along most of the ventral margin. The pigmented ventral mantle margin makes this species easy to differentiate from *V. lienosa*. The soft parts are similar to *V. villosa*, except that the mantle flaps of female *V. vibex* are fleshier and larger. Eye spots are visible on some but not all females. The glochidia are hookless, and the septa and the water-tubes are undivided and run parallel to the gill filaments (Heard and Guckert, 1971).

Distribution

Villosa vibex ranges from the Lake Pontchartrain drainage of Louisiana east along Gulf of Mexico drainages to the Suwannee River system and into the Florida peninsula. It also occurs along the south Atlantic slope from the St. Marys River drainage in Florida and Georgia north to the Cape Fear River in North Carolina.

ACF Historical Distribution and Abundance

We have located 205 historical records of *Villosa vibex* from 91 sites in the ACF Basin. Historically, this species was widespread throughout the ACF system, and was known from tributaries of the Apalachicola River as well as the main channel and tributaries of the Chipola, Chattahoochee, and Flint rivers (Fig. 92).

Historically, it appears *Villosa vibex* was very common and abundant throughout the ACF Basin. Nine of the

museum collections we examined contained over 100 specimens each. Forty-eight other collections contained at least a dozen or more individuals. This species was found at all 25 sites surveyed in the Chipola River drainage from 1915 to 1918 (van der Schalie, 1940). During that survey, a total of 1,892 *V. vibex* was collected.

ACF Distribution and Abundance

A total of 269 live *Villosa vibex* and 70 shells was found in the current survey from 64 sites. This species was found in tributaries of the Apalachicola and Chattahoochee rivers, and in the mainstem and tributaries of the Chipola and Flint rivers (Fig. 92). Its current distribution in the basin is similar to its historical distribution, except that in the current survey it was not found in the mainstem of the Chattahoochee River. It is, however, one of a few species in this survey that was found in multiple tributaries of the Chattahoochee River system.

Habitat

Villosa vibex was found in mud or soft sand, especially in detrital areas, in small rivers and creeks (Johnson, 1970). In Florida, it was found in mud or soft sand in slight to moderate current and in lakes (Heard, 1979). It is usually more common in creeks with moderate current and sandy

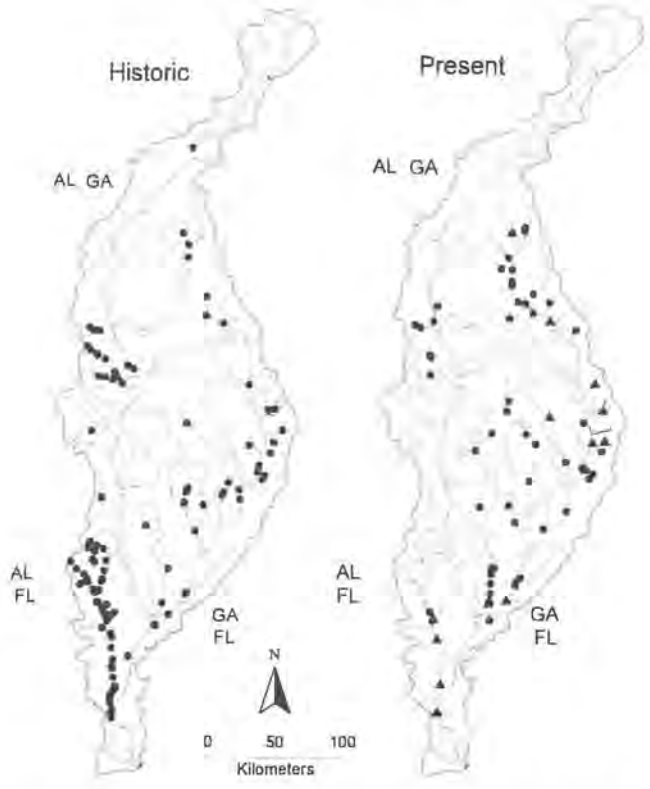

Fig. 92. Distribution of *Villosa vibex* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

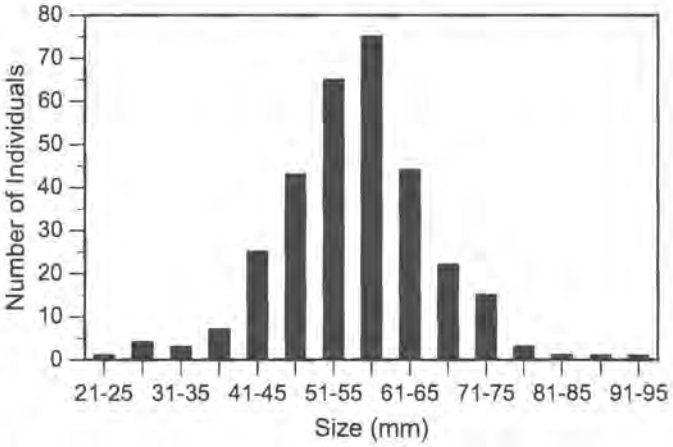

Fig. 93. Length-frequency distribution of *Villosa vibex* found in the summer of 1992.

mud bottoms (Williams and Butler, 1994). Of the 18 historical collections that included substrate information, 14 collections listed sand, 2 listed mud, and 2 listed silt as the primary substrates. In this survey, nearly all of the specimens located occurred at sites with predominantly sand and rock or sand and clay substrates.

Life History

Ortmann (1923) found females with mature glochidia in October from the Coosa River drainage, Georgia, and the Choctawhatchee River drainage, Alabama. Britton and Fuller (1979) noted that although Ortmann (1912) had suggested that *Villosa vibex* brooded glochidia in the winter, they found "numerous" gravid females in June in South Carolina. Heard (1969) reported periods of gamete production from specimens collected monthly from northwest Florida.

In this survey, a total of 249 *Villosa vibex* was checked for the presence of glochidia. Nineteen gravid females were found from May to November. In the ACF Basin, peak glochidia release is probably from early to late spring (S. Ruessler, pers. comm.). The primary fish host (based on laboratory infections) appeared to be the largemouth bass, *Micropterus salmoides*, as thousands of juveniles could be transformed from a single fish (Ruessler and Keller, 1996). Bluegill also served as a host fish in laboratory infections. Length-frequency data for *V. vibex* found in the summer of 1992 are presented in Figure 93.

Conservation Status

The southern rainbow was assigned a conservation status of currently stable by Williams et al. (1993). Based on the results of this survey, we have assigned *Villosa vibex* a conservation status of currently stable in the ACF Basin (Table 2).

Villosa villosa (Wright, 1898)

Downy rainbow
Figure 39

Synonymy

Unio villosus Wright, 1898c
The Nautilus 12(3): 32.
Type Locality: Johnson (1967b) restricted the type locality to the Suwannee River, [Luraville], Suwannee County, Florida.
Type Specimen: Lectotype USNM 150503 selected by Johnson (1967b), pl. 8, fig. 1.
Lampsilis wrightiana Frierson, 1927
Type Locality: Volusia County, Florida.

van der Schalie (1940) did not recognize this species from the Chipola River drainage. His records of *Carunculina vesicularis*, however, are probably *Villosa villosa*, based on material re-examined by the authors from the MCZ and UMMZ. In addition, his records of *C. minor* are a mixture of *V. villosa* and *Toxolasma paulus*. Curiously, neither Clench and Turner (1956) nor Johnson (1970, 1972) noted that van der Schalie had overlooked *V. villosa* from the Chipola River system.

Diagnostic Characters

Shell morphology was described by Clench and Turner (1956) and Johnson (1970). *Villosa villosa* can be distinguished from *V. vibex*, *V. lienosa*, and *Lampsilis subangulata* in the ACF Basin by the former's cloth-like periostracum. Like other species of the genus *Villosa*, it is sexually dimorphic, with females more broadly rounded at the posterior end than males. In addition, male *V. villosa* are often much more pointed than males of either *V. lienosa* or *V. vibex*. The shell morphology of *V. villosa* in the ACF Basin often resembles *Lampsilis subangulata*. However, *V. villosa* often has faint blue and yellow rays, while *L. subangulata* has a shiny yellow shell with prominent green rays.

The branchial papillae of *Villosa villosa* are singular, and occur in poorly-defined multiple rows. The anal aperture is small, about half of the size of the supra-anal opening, with papillae appearing as little more than crenulations. The mantle margin from the anal aperture to the supra-anal aperture is darkly pigmented. The ventral mantle margin is darkly pigmented, which distinguishes this species from *Villosa lienosa*. Well-defined and darkly pigmented villi occur along the mantle flap from the branchial opening to the posterior third of the ventral margin. *Villosa villosa* ovisacs occur in the posterior part of the outer two demibranchs and are marked externally by sulci (Heard and Guckert, 1971). The septa and watertubes are undivided and run parallel to the gill filaments. The glochidia are hookless.

Distribution

Villosa villosa is known from the St. Marys River system in Georgia and Florida, south to the central portion of the Florida peninsular, and west in Gulf of Mexico drainages to the Choctawhatchee River system (Johnson, 1972; Butler, 1989).

ACF Historical Distribution and Abundance

We have located 43 historical collections of *Villosa villosa* from 19 sites in the basin (Fig. 94). Historically, it occurred in the mainstem and tributaries of the Apalachicola, Chipola, and Flint rivers, and the mainstem of the Chattahoochee River.

Little is known about the historical abundance of this species. The largest historical collection we know of was from a tributary of the Flint River in Decatur County, Georgia, and consisted of 51 individuals. Six other collections contained 10 or more individuals.

ACF Distribution and Abundance

Villosa villosa were found at 19 of the 324 sites surveyed (Fig. 94). Forty live specimens and 38 shells were found. *Villosa villosa* were found in the mainstem and tributaries of the Chipola and Flint rivers, the mainstem of the Apalachicola River, and two tributaries of the Chattahoochee River. In 1996, additional specimens of *V.*

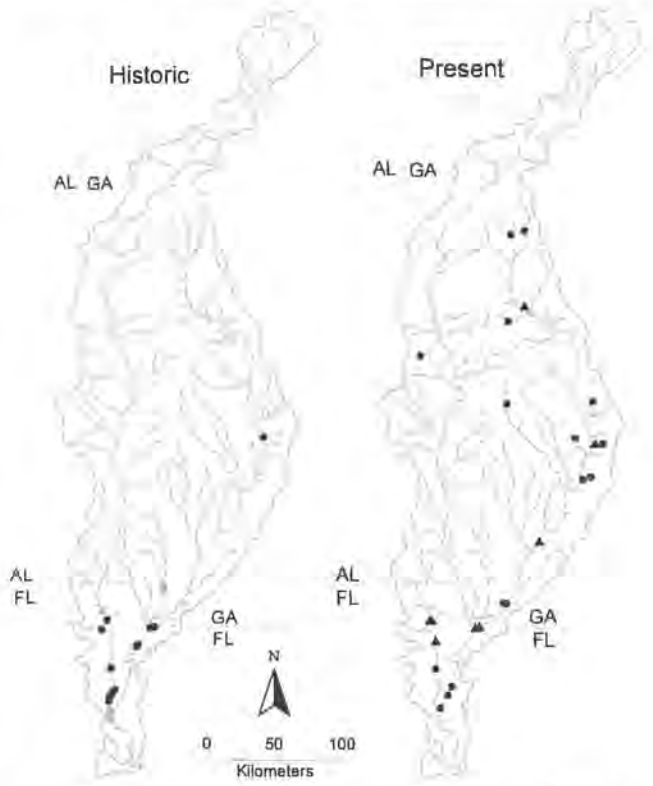

Fig. 94. Distribution of *Villosa villosa* in the ACF Basin. Historic Map: ● indicates live and/or shell material present. Present Map: ● indicates live or live and shell material present; ▲ indicates shells only, no live individuals found.

villosa were found at three other sites in the mainstem of the Apalachicola River. *Villosa villosa* were found at sites above and below the Fall Line, although this species appeared to be more common at sites below the Fall Line.

Habitat

This species may be tolerant of a wide range of habitats, as Clench and Turner (1956) found *Villosa villosa* in spring-fed streams and clear rivers, and Johnson (1970) reported it from the tannic-stained and muddy waters of the St. Marys River. In Florida, *V. villosa* was found in mud and muddy sand in reservoirs, and in muddy sand in moderate current (Heard, 1979). Butler (1989) noted this species could be abundant in habitats with slack current, murky water, and muddy substrates, and that in these habitats individuals were larger than in more lotic environments. Information included in historical collections indicate this species occurred in substrates that consisted of mud, sand, vegetation, or silt. All of the *V. villosa* found in this survey occurred at sites that contained primarily sandy substrates.

Life History

Of the 30 female *Villosa villosa* collected in the current survey, none was gravid. R. S. Butler found gravid females in the Apalachicola River and Mosquito Creek on 27 June 1988 (R. S. Butler, pers. comm.). In the Suwannee River system in Florida, this species was gravid from April through September (S. Ruessler, pers. comm.). The host fishes (based on laboratory infections) included the bluegill sunfish, *Lepomis macrochirus*, and largemouth bass, *Micropterus salmoides* (Ruessler and Keller, 1996). Length-frequency data for specimens found in the summer of 1992 are presented in Figure 95.

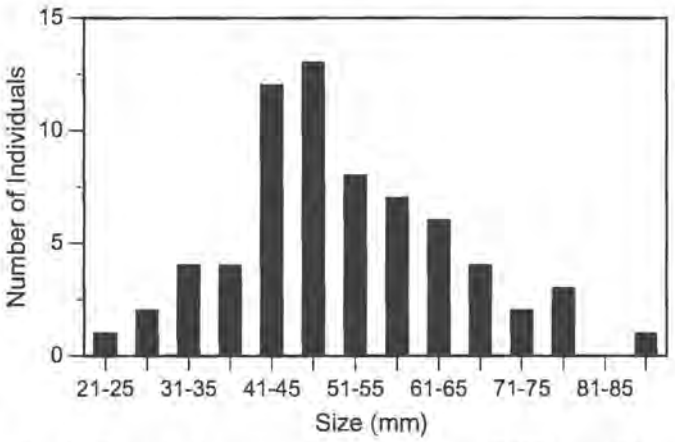

Fig. 95. Length-frequency distribution of *Villosa villosa* found in the summer of 1992.

Conservation Status

Villosa villosa was assigned a conservation status of special concern by Williams et al. (1993). Based on the results of this survey, we have assigned *V. villosa* a conservation status of special concern in the ACF Basin (Table 2).

DISCUSSION

Zoogeography

The ACF Basin is unique among eastern Gulf of Mexico drainages in that it has the largest drainage area east of the Mobile Basin and is the only system with its headwaters located above the Fall Line. The ACF Basin also has the highest freshwater mussel diversity of all Gulf of Mexico drainages east of the Mobile Basin. Mussel diversity in the ACF Basin also exceeds that found in any Atlantic slope drainage. It was historically represented by at least 19 genera and 33 species (Table 3). This fauna consists of species endemic to the ACF Basin and those with continuous or disjunct distribution from the south Atlantic and central Gulf of Mexico drainages. The endemic mussel fauna is likewise derived from adjacent drainages of the south Atlantic and central Gulf of Mexico.

Apalachicolan Region is a term that was coined by Clench and Turner (1956) and subsequently adopted by others (Johnson, 1970; Butler, 1989) to describe the diverse molluscan fauna of the eastern Gulf drainages from the Escambia River, Alabama and Florida, east to the Suwannee River in Florida and Georgia. We have chosen not to use this term in relation to the ACF mussels since it does not contribute any information to the explanation or understanding of the origin and distribution of the fauna. This all-inclusive term tends to obscure the origin and distinctive nature of the endemic molluscan fauna in each of the six major drainages (Escambia, Yellow, Choctawhatchee, Apalachicola, Ochlockonee, and Suwannee) in the area. For example the mussel fauna in the Escambia, Yellow, and Choctawhatchee drainages forms a distinctive zoogeographic unit which has more affinities with the Mobile Basin than the Apalachicola, Ochlockonee, and Suwannee drainages. The use of Apalachicolan Region for the molluscan fauna of the eastern Gulf of Mexico needs to be reevaluated.

The ACF Basin mussel fauna is characterized by a relatively high number (8 species, 24%) of endemic species. This is especially high compared to the fish fauna where there are only 7 of 79 species (9%) endemic (Swift et al., 1986). This high level of endemism is probably due to a long period of isolation from surrounding drainages.

Two generally accepted natural means of interbasin transfer of aquatic organisms are stream capture and confluence of stream mouths during lower sea level stands. Both of these processes have likely been involved in transfer of mussels in the ACF Basin, but it is difficult to determine which is the most likely for a given species. Johnson (1970) identified areas of possible faunal exchange by stream capture among the Chattahoochee, Coosa, Savannah, and Tennessee river systems, and among the Chattahoochee, Choctawhatchee, and Tallapoosa drainages. There is also supporting evidence of interbasin transfer via stream capture of some of these drainages based on the distribution of fishes (Swift et al., 1986). However, of the seven endemic fishes in the basin, only one appears unequivocally to be related to a Tennessee drainage species, and there is no evidence to suggest that any mussels entered the ACF Basin via stream capture from Tennessee Basin tributaries located north of the Chattahoochee River headwaters. One example of possible stream capture involves the Econfina Creek drainage located immediately west of the ACF Basin. Econfina Creek is a small (about 40 km in length) direct tributary of the Gulf of Mexico, located in Bay and Washington counties, Florida. It lies immediately west of the Chipola River and east of the Choctawhatchee River. The watershed is developed on a karst area that surrounds most of the drainage. The proximity to the Gulf of Mexico and the lowland nature of the watershed indicate that this drainage is probably geologically young. The mussel and fish fauna of this system consists of several widespread Coastal Plain species. The mussel fauna includes *Pleurobema pyriforme* and *Medionidus penicillatus*, two species that do not occur west of the drainage but do occur in the ACF Basin and, in the case of *P. pyriforme*, east to the Suwannee River system. These two species most likely entered the Econfina Creek system via stream capture of karst connection from the Chipola River drainage.

We believe the most plausible route of entry into the ACF Basin of some of the widely distributed mussel species (e.g., *Lampsilis teres* and *Utterbackia imbecillis*) occurred via Coastal Plain drainages during confluence of stream mouths at lower sea level stages. The endemic mussels, like fishes, appear to be most closely related to Coastal Plain species distributed to the east and/or west of the ACF Basin. For example, the current ACF Basin mussel fauna is a mixture of endemics and species that are shared with both Gulf of Mexico and south Atlantic drainages. Of the 33 species in the basin, 8 are endemic, 3 occur in the basin and drainages westward, 9 occur in the basin and drainages eastward, and 13 species occur in the basin and drainages to the east and west (Table 3). Of the three species occurring only westward, two, *Anodontoides radiatus* and *Strophitus subvexus*, are confined to Gulf drainages. The third, *Pyganodon grandis*, is widespread in the Gulf drainages and the Mississippi Basin. Of the nine species occurring only eastward, four, *Elliptio complanata*, *Lasmigona subviridis*, *P. cataracta*, and *Uniomerus carolinianus*, are all widespread on the Atlantic Coast from Georgia north to at least Virginia. Of the 13 species occurring east and west of the ACF Basin, 8 are generally more widespread westward and 5 are more widespread eastward.

The Fall Line (i.e., the boundary between the Coastal Plain and Piedmont physiographic provinces) crosses both the Chattahoochee and Flint rivers, and represents a major transitional area for aquatic organisms. In this study, the Fall Line appeared to have a strong influence on the distribution of 8 of the 33 species. Only two species, *Lampsilis binominata* and *Lasmigona subviridis*, were re-

Table 3. Distribution of the freshwater mussel fauna of the ACF Basin. Species occurrence is categorized as endemic to the ACF Basin, or occurring in the ACF Basin and drainages eastward and/or westward.

SPECIES	COMMON NAME	ACF & W	ACF ENDEMIC	ACF & E	ACF E & W
Alasmidonta triangulata	Southern elktoe		X		
Amblema neislerii	Fat threeridge		X		
Anodonta heardi	Apalachicola floater		X		
Anodontoides radiatus	Rayed creekshell	X			
Elliptio arctata	Delicate spike				X
Elliptio chipolaensis	Chipola slabshell		X		
Elliptio complanata	Eastern elliptio			X	
Elliptio crassidens	Elephantear				X
Elliptio fraterna	Brother spike			X	
Elliptio icterina	Variable spike				X
Elliptio nigella	Winged spike		X		
Elliptio purpurella	Inflated spike		X		
Elliptoideus sloatianus	Purple bankclimber			X	
Glebula rotundata	Round pearlshell				X
Lampsilis binominata	Lined pocketbook		X		
Lampsilis straminea claibornensis	Southern fatmucket				X
Lampsilis subangulata	Shinyrayed pocketbook			X	
Lampsilis teres	Yellow sandshell				X
Lasmigona subviridis	Green floater			X	
Medionidus penicillatus	Gulf moccasinshell		X		
Megalonaias nervosa	Washboard				X
Pleurobema pyriforme	Oval pigtoe				X
Pyganodon cataracta	Eastern floater			X	
Pyganodon grandis	Giant floater	X			
Quincuncina infucata	Sculptured pigtoe			X	
Strophitus subvexus	Southern creekmussel	X			
Toxolasma paulus	Iridescent lilliput			X	
Uniomerus carolinianus	Florida pondhorn			X	
Utterbackia imbecillis	Paper pondshell				X
Utterbackia peggyae	Florida floater				X
Villosa lienosa	Little spectaclecase				X
Villosa vibex	Southern rainbow				X
Villosa villosa	Downy rainbow				X
Total species per distribution category		3	8	9	13

stricted to areas above the Fall Line. Interestingly, *L. binominata* is extinct and *L. subviridis* is extirpated from the basin. *Amblema neislerii, Anodonta heardi, Elliptio chipolaensis, E. crassidens, E. purpurella,* and *Glebula rotundata* appear to be restricted to the Coastal Plain.

Systematic Problems

The estimate of the total number of mollusk species worldwide has ranged from 40,000 to over 150,000 species (Boss, 1971). There is considerable confusion in molluscan taxonomy and the unionids are no exception. The majority of North American unionids were described between 1820 and 1900 by conchologists with a typological species concept. During this period, more than 1,000 nominal species were described. Most of these descriptions were based on highly variable conchological characters, which created further confusion. In France, for instance, several hundred names have been suggested for the unionid fauna (Boss, 1971), a group represented by fewer than ten recognized species today.

Early collectors typically discarded the animal and kept only the shells. Clench (1955) lamented that the only problem with a roadside park on a stream he visited in Florida during a 1954 expedition was that "there was no

park attendant to boil out the catch." This practice has resulted in the collection of large numbers of shells representing a wide range of morphological variation with no soft parts. In many unionid genera, it is extremely difficult to accurately distinguish closely related species utilizing only shell characters. In some cases, it is much easier and more reliable to distinguish taxa based on soft parts.

The most extreme case of systematic problems in the ACF Basin is in the genus *Elliptio*. Clench and Turner (1956) noted that taxonomy of "This genus [*Elliptio*] is probably more confused than any other in the Unionidae of North America." There are 25 nominal species of *Elliptio* described from the ACF Basin alone. Reports of the number of valid species of *Elliptio* that occur in the basin range from three (Clench and Turner, 1956) to eight (Heard, 1979). In our examination of the unionid fauna in the ACF Basin, we recognized eight species of *Elliptio*, which represent 24% of the ACF mussel fauna. However, of the eight *Elliptio* recognized in this study and by Heard (1979), there are only six species in common. In addition to the eight *Elliptio* we recognize, there are at least two more that may represent valid species following a thorough anatomical and/or genetic analysis.

Systematic problems in the ACF Basin are not limited to the genus *Elliptio*. Based on conchological characters there may be two species of *Pleurobema* in the basin. Similar problems have been found in the genus *Pyganodon*, where there appears, based on DNA sequence data, to be an undescribed species in the Coastal Plain portion of the basin. In our examination of museum material of the genus *Toxolasma*, we recognized extreme conchological variation which likely represents more than one species. However, we could not find consistent conchological characters to define species-level differences.

The resolution of ACF-related systematic issues will depend on developing a holistic research approach that gives consideration to shell morphology, soft tissue anatomy, genetics, biology, and ecology. In addition, life history traits, such as the release of superconglutinates or other elaborate mimicry devises, can aid in delineation of species and have been overlooked as diagnostic characters.

Conservation

Our assessment of the conservation status of the 33 species of mussels that occur in the ACF Basin revealed a picture of significant decline during the past 30 years. Williams et al. (1993) evaluated the conservation status of mussels in the United States and Canada throughout their entire range. The conservation status reported for the 33 species occurring in the ACF Basin was: 17 (52%) currently stable, 5 (15%) special concern, 5 (15%) threatened, 5 (15%) endangered, and 1 (3%) possibly extinct (Table 2). Our evaluation of the conservation status of these species within the ACF Basin is based on the historical and current distribution, habitat requirements, and number of individuals encountered. We consider 13 (39%) species to be currently stable, 6 (18%) species are of special concern, 3 (9%) are threatened, 7 (21%) are endangered, 2 (6%) are extirpated, and 2 (6%) are extinct. A comparison of our conservation status and that reported by Williams et al. (1993) revealed that 11 of the 33 species (33%) have a reduced conservation status within the ACF Basin compared to their range-wide status.

The causes for the decline of freshwater mussels in North America are not well understood, although probable causes were summarized by van der Schalie (1938), Fuller (1974), Bogan (1993), and Williams et al. (1993). These include habitat degradation, the introduction of exotic bivalves including the Asian clam, *Corbicula fluminea*, and the zebra mussel, *Dreissena polymorpha*, pollution, and impoundments, although in most cases, the information implicating these factors is qualitative and/or anecdotal. Over-harvesting, commercial dredging, in-channel gravel or sand mining, channelization, and excess sedimentation caused, in part, by poor land use practices, are also known to impact unionids. van der Schalie (1938) speculated the following factors contributed to the decline of the North American mussel fauna in the previous decade: silting, pollution by sewage, mine and industrial wastes, power-dam developments, and unrestricted mussel gathering for the pearl button industry. Bogan (1993) suggested that the causes of unionid mussel declines are poorly known due to the cumulative lack of knowledge of unionid life history, ecology, distribution, fish hosts, and systematics.

The mussel fauna of the ACF rivers is in decline, especially when compared to historical records. Isaac Lea described over 35 nominal species of unionids from near Columbus, Georgia, although most of these species were later regarded as synonyms of 8 species currently recognized. In 1852, Lea also wrote that he had "received many specimens from Dr. Boykin, to whose kindness I owe many interesting and new species from the fruitful locality of Columbia, Georgia [Alabama]" (Lea, 1852b). Based on our survey results, freshwater mussels appear to be extirpated from most of the entire length of the Chattahoochee River. The decline of this mussel fauna was apparent to collectors as early as 1915. For instance, in a letter dated 27 October 1915, H. H. Smith of the Alabama Museum of Natural History, wrote to Bryant Walker of Detroit describing his experience on the Chattahoochee River:

"We took a steamboat down the Chattahoochee, to Eufaula. They have 'improved' that river, with a vengeance. Apparently, the idea was to turn it into a canal, by making jetties on one or both sides. The expense must have been enormous - out of all proportion to the object. As for results, a competent U.S. engineer has recently pronounced the jetties a failure: and the captain and pilot of our boat couldn't find enough cuss words for them. From a fairly picturesque stream they have made about the most unlovely waterway that I ever saw...

"The Chattahoochee is spoiled for conchologists - except, perhaps, way up, near Atlanta. From Columbus up, there are dams and mills at short intervals. As the water flows or is held back it causes fluctuations - 'factory tides' - as they are called - which are endless because there are so many dams: only by great good luck could one get really low water at any point. We tried it near Columbus, where there are plenty of gravel shoals and rocks: but, evidently, the river was at least three feet above low water - c.s., above the level of molluscan life: the rocks were all bare, and we didn't even see a dead shell. The branches of the Chattahoochee are all right, as far as I know, and should be explored."

William Clench noted that when he and P. Okkelberg visited the Chattahoochee River at Columbus, Georgia, in 1929, they failed to find a single freshwater mussel (Clench and Turner, 1956). van der Schalie (1938) speculated that the decline of the Chattahoochee mussel fauna was due to "intensive farming in this area [that] has caused considerable silting, and the clearing of the ground cover has resulted in devastating flood conditions." When Clench (1955) returned to the basin in the 1950s, he also attributed the extirpation of the once rich mussel fauna of the Chattahoochee River to an increase in farming during and after the Civil War that led to rapid soil erosion and the silting of that river. He wrote that " . . . years ago the Chattahoochee River possessed a rich biota. Today it is barren, at least for mollusks. We possess many lots of freshwater mollusks from this large river, all collected nearly a century ago, but now all appear to be extirpated . . . Rapid erosion of the soil silted the river beyond the capacity of the mollusks to survive and our museum series alone bear mute testimony to its once rich fauna." Clench also noted that while the Flint River also suffered from silting, a series of large springs mitigated the negative impacts of sedimentation. Clench and Turner (1956) did not find any unionids in the Chattahoochee River at Columbus during their collecting trips in 1953 and 1954, and considered the river to be depauperate of freshwater mussels.

The mussel fauna at Columbus continues to be depleted if not entirely extirpated. In 1992, a mussel survey conducted as part of the relicensing agreement for the Eagle-Phoenix Mills Hydroelectric Dam in Columbus failed to produce a single unionid shell or living mussel for a distance of five miles below the dam (Ecological Specialists, Inc., 1992). In 1992, a freshwater mussel survey was also completed on the Chattahoochee River, near West Point, Georgia, below the Langdale and Riverview hydroelectric facilities (EA Engineering, Science, and Technology, 1992). Their survey, which encompassed approximately 6.6 river miles, produced only two live mussels, both *Utterbackia imbecillis*. The surveyors also found a few weathered specimens of *Megalonaias nervosa*, which indicated that this species was extirpated only recently from the Chattahoochee River mainstem or may persist in very small numbers. Live *M. nervosa* have also recently been found in several Chattahoochee River impoundments (C. Stringfellow, pers. comm.).

Chattahoochee River tributaries also have lost much of their unionid faunas. For instance, in the early 1970s, Jenkinson (1973) surveyed 21 sites in Uchee, Little Uchee, and Halawakee creeks, tributaries of the Chattahoochee River, near Columbus, Georgia. From these sites, he collected 1,429 specimens of 16 species, including *Lampsilis subangulata*, *Medionidus penicillatus*, and *Pleurobema pyriforme*. In 1996, 20 of Jenkinson's original sites were resurveyed using comparable sampling effort (Howard, 1997). A total of 152 specimens of 7 species was found, which represents a 57% reduction of the fauna that occurred in these creeks in the early 1970s. The causes for the decline of the mussel fauna are not known, although Jenkinson (1973) speculated that an unknown pollutant from a large industrial park on a tributary stream to Halawakee Creek may have caused the disappearance of mussels in parts of the mainstem of the creek, because unionids were collected from all sites above the mouth, but not below it. In the current survey, it was noted that in-channel gravel and sand mining on Little Uchee Creek may have negatively affected the mussel fauna that once occurred there. Jenkinson (1973) recorded 13 species from a site on Little Uchee Creek and in this survey, no live unionids were found. *Megalonaias nervosa* and *Elliptio crassidens* shells were found in spoil areas where the creek was mined.

At present, it appears that the once rich and abundant Chattahoochee River system mussel fauna is reduced to remnant and isolated populations in small, headwater streams. In addition, some impoundments of the mainstem of the Chattahoochee River now support large, mono-specific populations of *Utterbackia imbecillis*, while at least two other impoundments contain isolated populations of *Megalonaias nervosa* and *Villosa* spp. (C. Stringfellow, pers. comm.).

The mussel fauna of the mainstem of the Flint River is also in decline, although compared to the Chattahoochee River system, portions of the Flint River system contain areas of high mussel diversity. Clench (1955) noted that in the 1950s, the Flint River was "still a rich stream and, when at low water stage, is very rewarding for the collector." He drew special attention to two sites he visited on the mainstem of the Flint River where mussels were particularly abundant: Hutchinson's Ferry, near Recovery, Georgia, and the Flint River at Bainbridge, Georgia. The habitat at both of these sites consisted of "ledge rock with clear pools of varying depths." It was during this expedition that he and Ruth Turner found a specimen of *Elliptio nigella*, one of the last records for that species from the main channel of the Flint River. Both of these sites were inundated by the completion of the Jim Woodruff Lock and Dam and during the current survey, only three species were found at these two sites. The river above Bainbridge,

however, still harbors large populations of big-river species, including *E. crassidens*, *Elliptoideus sloatianus*, and *Megalonaias nervosa*.

The Flint River is the type locality of the fat threeridge, as well as *Elliptio purpurella* and *Quincuncina infucata*. In this survey, we did not find a single live *Amblema neislerii* in the mainstem of the Flint River. The last known live specimen from the mainstem of the Flint River was collected in 1988. The two ACF mussels that are presumed to be extinct, *E. nigella* and *Lampsilis binominata*, were also historically found in the mainstem of the Flint River. The exact causes of the decline of the mussel fauna in the mainstem of the Flint River are not known.

A diverse mussel fauna still exists in many Flint River tributaries. In particular, several large tributaries of the Flint River harbored diverse mussel faunas that provided a stark contrast to the paucity of mussels found in the Chattahoochee River system. Kinchafoonee Creek (16 species), Muckalee Creek (14 species), and Chickasawhatchee Creek (9 species) each contained *Lampsilis subangulata*, *Medionidus penicillatus*, and *Pleurobema pyriforme*. This is significant because these streams contained all of the listed species that are known primarily from tributary streams. The other three listed species (*Amblema neislerii*, *Elliptoideus sloatianus*, and *Elliptio chipolaensis*) are confined mainly to the main channels of large rivers and are rarely found in tributary streams.

Historical surveys for freshwater mussels in the Apalachicola River are confined primarily to the area from directly below Jim Woodruff Lock and Dam to near Blountstown, Florida. The once rich mussel bed below the dam appears to be in decline. Heard (1975a) conducted an endangered mussel survey in several south Atlantic and Gulf Coast rivers for the USFWS. In a letter transmitting his survey results to the Office of Endangered Species, USFWS, Heard (1975a) reported that "The findings of the survey were/are most frustrating. Were it not for the various museum holdings, i.e., old collections, we would be up the proverbial creek concerning several species. In addition, upon revisiting numerous sites familiar to me via past collecting (beginning in 1962), I find that the population sizes are drastically reduced." He noted that *Elliptoideus sloatianus*, *Megalonaias nervosa*, *Amblema neislerii*, and *Quincuncina infucata* were in decline in the mainstem of the Apalachicola River, and that although they were common there just a few years prior to his survey, they had been replaced with "bottom-paving *Corbicula*."

In this survey, we found *Elliptoideus sloatianus* and *Megalonaias nervosa* to be common below the dam, although *Amblema neislerii* is now rare there. It was not clear from this survey, however, whether recruitment of any of these species is occurring below the dam. Although Richardson and Yokley (1996) quantitatively searched for juvenile mussels below the dam and at Rock Bluff Landing at navigation mile 92.5, they failed to find evidence of recent recruitment for any species, although they did find adult *Elliptio crassidens*, *E. arctata*, and *E. sloatianus*. In this survey, populations of *A. neislerii* were found in the lower Apalachicola River, an area that previously had not been surveyed for unionid mussels. In subsequent trips to the lower river, we found many small specimens of *A. neislerii*, suggesting recent recruitment into those sites. Changes in the mussel fauna below Jim Woodruff Lock and Dam may be tied to the unpredictable and highly fluctuating water releases associated with navigation windows, degraded water quality, and navigation maintenance dredging in the river channel.

The decline of the ACF Basin mussel fauna is disturbing because existing mussel beds may not contain enough individuals to provide adequate recruitment to sustain populations. For example, Downing et al. (1993) found that fertilization success in *Elliptio complanata*, a species known to form dense beds, was strongly correlated with spatial aggregation. In areas where mussels were found at densities of less than 10 mussels per m^2, complete fertilization failure was noted, while in beds of over 40 mussels per m^2, complete fertilization success was found. Almost nothing is known about fertilization success and spatial aggregation of mussel beds in the ACF Basin. The idea that mussel beds must be maintained at some minimum viable density, aggregation, or size distribution to sustain adequate fertilization may help to explain the paucity of recruitment noted at several historical sites (e.g., below Jim Woodruff Lock and Dam).

It is not surprising that the decline of the ACF mussel fauna was noted by early collectors because the habitats that the original fauna depended upon was altered as early as the 1800s. For instance, in 1829 Congress appropriated funds to aid navigation in the Apalachicola River that included the clearing of obstructions (Thurston, 1973). This work was completed in 1834, when the river was straightened at several points and major obstructions to navigation were removed. By 1835, about 25 stream boats were making regular trips between Apalachicola, Bainbridge, and Columbus (Goff, 1928). By the mid-1850s, navigation was impeded by snags and silt deposits. Surveys authorized by Congress in 1871 and 1872 indicated that extensive dredging and de-snagging would be needed in the ACF rivers to restore navigability. In 1873, Congress approved a plan proposed by the Army Engineers to provide channels 100 ft wide and 4 ft deep on the Chattahoochee River from Columbus to its confluence with the Flint River, on the Flint River from Bainbridge to its confluence with the Apalachicola River, and a 6 ft channel in the entire length of the Apalachicola River. De-snagging, dredging, and jetty building began in 1874. On the Chattahoochee River between Eufaula and Columbus, 16 obstacles, including several extensive gravel and limestone shoals and rock fingers, were removed by blasting or removing rock to widen and deepen the channel or

by the construction of jetties to narrow the river and force higher flows over the shoals (Thurston, 1973). On the Flint River, a clear channel at high water was maintained from Albany to Montezuma by dredging shoal areas, although by the end of the 1880s, it was apparent that deepening some shoal areas had lowered water levels in other areas, making them hazardous to river traffic.

There are currently 16 impoundments on the ACF rivers. Their effects on the unionid fauna are not well documented, although in other systems, impoundments have caused the extirpation of many mussel species (Fuller, 1974; Williams et al., 1992). Mattraw and Elder (1984) concluded that the ACF impoundments did not have an appreciable effect on nutrient flow patterns in the Apalachicola River, but noted that any new dam could alter the Apalachicola River's floodplain integrity, and consequently disrupt nutrient flow in the basin. They also noted that the critical elements for maintaining the high productivity and mobilization of nutrients in the system were annual flooding and the extensive natural bottomland hardwood forest of the Apalachicola River.

Sedimentation processes also have changed within the basin over the past 200 years, and these changes probably impacted unionid populations early on, especially in the Chattahoochee River drainage. In 1826, Richard Blount, a surveyor of the Georgia-Alabama state line, wrote that he counted 36 trout (probably bass, genus *Micropterus*) in the Chattahoochee River, near present-day Lanett, Alabama, while standing on the bank of the river, and that this was possible because the water was so clear (Trimble, 1974). Soil erosion in the Piedmont and Coastal Plain was noted early on, and intensive land clearing for cotton and row-crops in the 19th century led to extensive gully formation in this region (Bennett, 1939). In the counties that border the Chattahoochee and Flint rivers, settlement began in about the 1750s, land was converted to cotton plantations, and by the Civil War severe soil erosion was evident (Trimble, 1972). The most striking example of soil erosion in the basin is Providence Canyon, Georgia's "Little Grand Canyon," where a group of seven gully-canyons with up to 100 m of relief started forming in the mid-1800s (Magilligan and Beach, 1993). Tenant farming with corresponding poor farming practices after the Civil War exacerbated the problem.

Glenn (1911) documented erosion and sedimentation in the Chattahoochee Basin during the late 1800s and early 1900s. He reported the following:

"From Gainesville down to Atlanta 60 per cent of the uplands on either side of the river are cleared. On some of the poorer soils the clearing is not more than 40 per cent, but in others the proportion rises to 80 or 90 per cent. Much of the soil in this area is deeply rotted granite, and everywhere the old plateau surface has been carved by erosive agencies into forms that are as a rule sharply rounded. These uplands are practically all kept in cotton, and where they are not terraced erosion is rapid. Practically all of the small tributary streams on both sides of the river carry enormous quantities of sand into the river. The channels of many of these streams had filled so that it was impossible to drain their flood plains, and the lands along them had become practically worthless. The flood plains of others had been covered by sand or cut to pieces during floods and rendered useless. The sand brought down by these streams has accumulated in low-gradient reaches of the river so as to practically fill the channel.

"At Stringer's ford the North Georgia Electric Co. has developed power by a dam 36 feet high, which backs up the water 8 miles, to a point beyond Clark's bridge. This dam was completed July 4, 1904, and signs of filling with sand and silt were apparent a year later. This filling must readily increase and will ultimately destroy the storage value of the dam and force the company to depend on the capacity of the stream alone.

"At Shadburn's ferry the river channel has been greatly filled with sand, so that the running of the ferry during the summer and fall has become exceedingly difficult. Late in the winter the sand is swept out by floods, but it begins to accumulate again early in the spring. Floods are reported to be more frequent than formerly, and the annual damage to crops averages 15 to 20 per cent. Forty years ago the river was deep at this point and accumulations of sand were unknown."

Based on Glenn's (1911) observations it is clear that the erosion and sedimentation in the Chattahoochee River drainage, from its headwaters downstream to Columbus, Georgia, located at the Fall Line, were substantial. Sediment loads of this magnitude must have severely impacted the aquatic fauna in the basin.

Beginning in the 1930s, erosion had decreased due to a combination of improved soil conservation practices, the transition of farmland to pasture and forest, and an overall decrease in agriculture. The average annual concentration of total suspended sediment in the Chattahoochee River, near Atlanta, was about 400 ppm in the mid-1930s (when records are first available) compared to 1960s levels of less than 50 ppm (Hewlett and Nutter, 1969). This decrease in sediment yields had one potentially negative effect on unionids, however, in that lower stream order tributaries incised into their aggraded floodplains, and this headward incision produced new sources of high sediment yield and led to continued valley aggradation (Trimble, 1972).

By the mid-1970s, in the upper Chattahoochee River, the estimated average annual erosion ranged from approximately 900 to 6,000 tons per square mile per year (Faye et al., 1980). Erosion yields were highest in watersheds with high percentages of agricultural and transitional land uses, and lowest in urbanized watersheds. Conversely, estimated average suspended sediment yields were highest in predominantly urban watersheds (800 tons per year) as compared to mostly forested watersheds (300 tons per year). A large part of the sediment discharged from urban streams was probably due to stream

channel erosion (Faye et al., 1980). Increased sediment loads, especially fine sediment, can negatively affect unionids through several mechanisms. Fine silt and clay particles can clog the gills of mussels (Ellis, 1936), interfere with filter feeding (Kat, 1982; Aldridge et al., 1987), or limit burrowing activity (Marking and Bills, 1980; Vannote and Minshall, 1982). Fine sediments also may affect mussels indirectly by reducing the light available for photosynthesis and thus reducing the availability of unionid food items (Kanehl and Lyons, 1992).

The conservation of the declining ACF mussels must take into account several factors that are possibly unique from historical causes of species decline within the basin. The human population within the ACF Basin is predicted to grow from an estimated 2.6 million people in 1990 (U.S. Bureau of Census, 1991), to an estimated 3.4 million by 2010, with most of the growth occurring in Georgia, primarily in the metropolitan Atlanta area (Couch et al., 1996). The Atlanta region obtains its primary source of drinking water and hydroelectricity from the Chattahoochee River, and it is predicted that withdraws from the river will have to double to 529 million gallons per day by the year 2010 to keep pace with this population growth (Montgomery, 1991). In addition, as many as 44 wastewater treatment facilities discharge into a stretch of the Chattahoochee River between Buford and West Point dams (Bayne et al., 1990). The rise in the volume of treated wastewater that discharged directly into the Chattahoochee River around Atlanta, beginning in the mid-1970s, led to an increase in phytoplankton production on West Point Lake, 109 km downstream from Atlanta, and a shift from a mesotrophic to a eutrophic lake. Albany, Georgia, has an estimated population of 85,000, and as the city continues to grow, wetlands are filled for housing and commercial developments (Kalla et al., 1993). Also in this area, the conversion of hardwoods to pine results in drainage modifications that impact wetland hydrology (Swank and Douglass, 1974), changes that ultimately impact stream channel morphology. Major Flint River tributaries in the Albany area include Kinchafoonee, Muckalee, and Chickasawhatchee creeks. Each of these streams was found to harbor diverse mussel communities that included three federally listed species, and together may represent the highest mussel diversity in the basin. Any efforts to maintain, protect, and recover mussel resources in the basin should include these streams and their watersheds.

ACKNOWLEDGMENTS

We are appreciative of and would like to thank the following individuals for their contributions to this project: Field Work: Holly Blalock, Andre Daniels, Pam Fuller, Hannah Hamilton, Dennis Haney, Christine O'Brien, Noel Ocampo, Les Parker, Stacy Rowe, Shane Ruessler, and Doug Weaver, USGS/BRD, Gainesville, FL; Michael Spelman and Michael Hill, Florida Game and Fresh Water Fish Commission; Lloyd Stith and Bob Butler, USFWS; Carson Stringfellow, Columbus College; Dennis Cato, Bainbridge, GA. Museums: Kurt Auffenberg and Fred Thompson, FLMNH; Paul Greenhall and Bob Hershler, Smithsonian Institution, USNM; Ken Boss, Richard Johnson, Tonya Kausch, and Ruth Turner, MCZ; Rüdiger Bieler and John Slapcinsky, FMNH; Jack Burch, Diarmaid O'Foighil, Louanne Reich, and Renee Sherman, UMMZ; David Stansbery and Kathy Borror, OSUM; John Rawlins, CM; Herbert Athearn, MFM. Mapping and Data Management: Jeanette Howard and Mark McLean, University of Florida; Amy Benson, Howard Jelks, and Noel Ocampo, USGS/BRD, Gainesville, FL. Genetics: Hsiu-Ping Liu, Karen Kendl, and Peg Mulvey, Savannah River Ecology Lab; Chuck Lydeard, University of Alabama; Randy Hoeh, Kent State University, Kent, Ohio. The following provided ACF distributional data: Bob Butler, Asheville, NC; Gerry Dinkins, Oak Ridge, TN; Butch Forrer, Northfield, OH; Bill Heard, Florida State University, Tallahassee, FL; Amy Edwards, University of Georgia, Athens, GA; John Jenkinson, Chattanooga, TN; Gene Keferl, Brunswick, GA; Harry G. Lee and W. Henry McCullagh, Jacksonville, FL; Paul Parmalee, University of Tennessee, Knoxville, TN; Doug Shelton, Mobile, AL; Carson Stringfellow, Waverly Hall, GA; and Tom Watters, Ohio State University, Columbus, OH. We thank Herb Athearn, Art Bogan, Peg Mulvey, Gene Keferl, Doug Shelton, Paul Hartfield, Dick Biggins, and Dick Neves for their discussions concerning the biology of freshwater mussels. We express our sincere appreciation to Richard T. Bryant for the use of his copyrighted slides of the mussels from the ACF Basin. Sherry Bostick spent long, long hours entering museum data and preparing the manuscript, and we thank her for her dedication and patience in dealing with us. We thank Gail Carmody and Jerry Zeiwitz, USFWS, Panama City, FL, and Bob Butler and Mike Bentzien, USFWS, Jacksonville, FL, for their support of this project and their efforts in obtaining funding. We especially thank Bob Butler for his support and guidance throughout this project. Funding was provided by USGS/BRD, Gainesville, FL and the USFWS, Jacksonville and Panama City, FL.

Special thanks to Bob Butler, Kevin Cummings, and an anonymous reviewer for their detailed review of the final draft of the manuscript. Lisa Spinella reviewed a draft of the manuscript and suggested editorial changes. Any mistakes are the responsibility of the authors.

DISTRIBUTION RECORDS

Alasmidonta triangulata

Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; MCZ 190392 (1) Apalachicola River near Chattahoochee, 24 Aug. 1954.

Chattahoochee River Drainage. **ALABAMA: Russell County:** EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale, 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972; MFM 5826 (1) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 24 Sept. 1955; UMMZ 163767 (2) Uchee Creek near Nuckols, June 1915. **GEORGIA: Harris County:** MCZ 218136 (30) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of Mountain Hill, 5 Sept. 1955; MFM 5746 (1) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of Mountain Hill, 5 Sept. 1955; WJC56-099 (1) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of Mountain Hill. **Muscogee County:** FLMNH 63752 (2) Chattahoochee River near Columbus; MCZ 165696 (3) Chattahoochee River drainage near Columbus; MCZ 189801 (2) Chattahoochee River near Columbus; MCZ 254754 (7.5) Chattahoochee River drainage near Columbus; USNM 86252 (1) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **FLORIDA: Calhoun County:** GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 190391 (2) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954.

Flint River Drainage. **GEORGIA: Coweta County:** HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; MFM 11978 (8) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 15 Sept. 1964; MFM uncat. (5) Line Creek 6 km E of Haralson, 27 Nov. 1966. **Crawford County:** MCZ 237454 (4) Flint River 1 mi W of Nakomis, Sept. 1962. **Crisp County:** SLY76-001 (1) Flint River, Lake Blackshear near Cordele; UMMZ 164142 (1) Flint River 10 mi W of Cordele. **Decatur County:** FLMNH 405 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 410 (2) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190389 (15) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190390 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 191630 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, July 1953; MFM 5141 (1) Flint River near Bainbridge, 1 Sept. 1954; WJC56-097 (1) Flint River near Bainbridge. **Macon County:** MFM 7916 (2) Flint River 9.7 mi S of Oglethorpe, 11 Oct. 1958. **Meriwether County:** MFM 12150 (18) Flint River 5 mi E of Alvaton, 17 Aug. 1965; MFM 16718 (1) Whiteoak Creek 8.2 km SE of Alvaton, 15 Oct. 1967. **Pike County:** EPK (1) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena, ca. 13.25 air mi SW of Zebulon, 17 July 1976. **Spalding County:** MFM 14464 (3) Flint River at Long Creek Rd 17 km W of Griffin, 27 Nov. 1966. **Taylor County:** MCZ 37264 (7) Patsiliga Creek; USNM 26095 (3) Flint River drainage. **Upson County:** FLMNH 229882 (2) Potato Creek 2.3 mi WNW of Thomaston, 21 Oct. 1973; MFM 7137 (1) Potato Creek at Georgia Rt 36, 3 mi W of Thomaston, 23 April 1957; MFM 8313 (4) Potato Creek 2.4 mi NW of Thomaston, 27 Nov. 1966.

Present Records

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB94-045 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale.

Flint River Drainage. **GEORGIA: Crisp County:** DS (1) Flint River, Lake Blackshear near Cordele. **Upson County:** JCB92-130 (2) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston.

Amblema neislerii

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970; WHH75-007 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 1975. **Gadsden County:** ANSP 848873 (8) Apalachicola River near Chattahoochee, 17 Oct. 1978; DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; FLMNH 397 (4) Apalachicola River near Chattahoochee, 24 Aug. 1954; FLMNH 29743 (1) Apalachicola River at NM 105.3, rock shoal below Jim Woodruff Dam, 15 Jan. 1981; FLMNH uncat. (56) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 6 Oct. 1954; FSU C-396 (4) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; OSUM 51108 (14) Apalachicola River below U.S. Rt 90/Florida Rt 10 , 1 mi W of Chattahoochee, 29 Oct. 1981; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 215424 (8) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; UMMZ 215426 (10) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam. **Jackson County:** BF88-001 (3) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 1987; DC70-002 (1) Apalachicola River at NM 101.6, 1970; GTW87-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 1987; PWP77-001 (6) Apalachicola River below Jim Woodruff Dam near Chattahoochee, July 1977; PWP86-001 (6) Apalachicola River below Jim Woodruff Dam near Chattahoochee, Sept. 1986.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 35 (17) Chipola River, Dead Lake, 24 Aug. 1924; FLMNH 369 (7) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 13 Sept. 1954; FLMNH 4069 (17) Chipola River, Dead Lake, 24 Aug. 1924; FLMNH 20410 (7) Chipola River,

Dead Lake near Chipola Park 20 mi S of Blountstown, 6 Sept. 1954; FLMNH 63764 (1) Chipola River, 24 Aug. 1924; FLMNH 235581 (1) Chipola River, Dead Lake; HGL74-002 (1) Chipola River, Dead Lake, 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 190284 (29) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 190285 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MFM 5124 (30) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown; OSUM 17829 (29) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; UMMZ 100753 (5) Chipola River, Dead Lake, 24 April 1915; UMMZ 100754 (17) Chipola River, Dead Lake, 24 Aug. 1924; UMMZ 138368 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; WHH75-003 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 1975; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** EPK84-004 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 31 Aug. 1984; FLMNH 381939 (4) Chipola River, Dead Lake, 15 May 1930; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; MCZ 85900 (3) Chipola River, Dead Lake; MCZ 112045 (2) Chipola River, June 1918; OSUM 23454 (1) Chipola River 3 mi N of dam at Wewahitchka, 30 Sept. 1967; RSB88-014 (100) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138437 (6) Chipola River, June 1918; USNM 381939 (4) Chipola River, Dead Lake, 15 May 1930; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988.

Flint River Drainage. **GEORGIA: Baker County:** RSB88-003 (1) Flint River at Georgia Rt 37 in Newton, 16 Oct. 1988. **Decatur County:** MCZ 191595 (5) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954. **Dougherty County:** MCZ 115674 (3) Flint River near Albany, 1929. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MCZ 189796 (2) Flint River; UMMZ 100751 (1) Flint River (at former location of Lanier) ca. 10 mi N of Oglethorpe; USNM 83993 (2) Flint River (at former location of Lanier) ca. 10 mi N of Oglethorpe.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JDW96-110 (1) Apalachicola River at confluence of Hageman Ditch near NM 56. **Franklin County:** JCB91-094 (23) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island; JCB91-109 (3) Apalachicola River near NM 15.3 at south end of Bloody Bluff Island's back channel. **Gadsden County:** JCB92-206 (3) Apalachicola River at NM 106 below Jim Woodruff Dam. **Gulf County:** JDW96-113 (17) Apalachicola River at NM 46.8.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-042 (1) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); JCB91-044 (3) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-128 (11) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-041 (5) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-045 (3) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-090 (4) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank; JCB91-093 (7) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **GEORGIA: Decatur County:** JCB91-016 (3) Lake Seminole in river channel of Flint River arm at Georgia Rt 310 (Hutchinson Ferry Rd); JCB91-017 (3) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5).

Anodonta heardi

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** UMMZ 250516 (4) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 4 Aug. 1968; UMMZ 250517 (3) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 2 Aug. 1968. **Gadsden County:** UMMZ 250708 (0.5) Apalachicola River near Chattahoochee, 17 July 1986.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-080 (0.5) Apalachicola River at confluence of Hageman Ditch near NM 56; JDW96-110 (1) Apalachicola River at confluence of Hageman Ditch near NM 56. **Franklin County:** JCB91-102 (1) Harrison Creek at first 180-degree bend above confluence of Brothers River along north side of bend (W of Apalachicola River NM 14.8). **Liberty County:** JDW96-108 (1) Apalachicola River at RM 62.5.

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB92-135 (8.5) Uchee Creek at Uchee Creek Recreational Area and Marina at Ft. Benning ca. 6.5 air mi ESE of Nuckols ca. 11.5 air mi SSE of Phenix City.

Flint River Drainage. **GEORGIA: Worth County:** JCB92-061 (8) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield.

Anodontoides radiatus

Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** MCZ 190085 (1) Mosquito Creek 1 mi S of Chattahoochee.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** MFM 5730 (12) Cowikee Creek 6 mi N of Eufaula, 4 Sept. 1955; UMMZ 163765 (1) Cowikee Creek near Batesville, April 1917. **Lee County:** JJJ73-011 (1) Little Uchee Creek above CR12, 2.9+ mi NNE of Crawford, 31 Oct. 1972; JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972.

Russell County: CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; FLMNH 22283 (2) Uchee Creek, 28 Sept. 1973; FLMNH 64075 (15) Uchee Creek near Nuckols, 25 June 1915; FLMNH 64092 (2) Uchee Creek near Nuckols, June 1915; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-009 (1) Little Uchee Creek at CR28 between two former bridges ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; MCZ 62604 (6) Uchee Creek near Nuckols, Nov. 1928; MCZ 93374 (3) Chattahoochee River drainage; MCZ 111381 (2.5) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 1929; MCZ 189817 (6) Uchee Creek 10 mi S of Girard; MFM 5829 (9) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 24 Sept. 1955; UMMZ 54364 (1) Uchee Creek near Ft. Mitchell; UMMZ 105672 (2) Uchee Creek 6 mi NE of Seale; UMMZ 163769 (24) Uchee Creek near Nuckols, 25 June 1915; USNM 86257 (3) Uchee Creek. **Muscogee County:** FLMNH 64076 (4) Chattahoochee River near Columbus; MCZ 252110 (3) Chattahoochee River near Columbus; UMMZ 105661 (1) Chattahoochee River near Columbus; USNM 86256 (6) Chattahoochee River drainage near Columbus; USNM 123226 (2) Chattahoochee River drainage near Columbus. **Troup County:** MFM 5753 (1) Chattahoochee River near West Point, 5 Sept. 1955; MFM 5811 (1) Chattahoochee River 1 mi N of West Point, 24 Sept. 1955.

Flint River Drainage. **GEORGIA: Coweta County:** MFM 11980 (2) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 15 Nov. 1964; MFM 14449 (2) Line Creek 6 km E of Haralson, 27 Nov. 1966. **Meriwether County:** MFM 12148 (13) Flint River 5 mi E of Alvaton, 17 Aug. 1965. **Spalding County:** MFM 14463 (2) Flint River at Long Creek Rd 17 km W of Griffin, 27 Nov. 1966.

Present Records

Chattahoochee River Drainage. **ALABAMA: Barbour County:** JCB92-169 (1) South Fork Cowikee Creek near CR79 ca. 1.3 air mi NE of Batesville ca. 12.5 air mi NW of Eufaula. **Russell County:** JCB92-136 (2) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale; JCB95-024 (1) Hatchechubbee Creek at U.S. Rt 431/Alabama Rt 1 ca. 8 air mi S of Seale.

Flint River Drainage. **GEORGIA: Coweta County:** JCB95-108 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Decatur County:** JCB94-076 (1) Spring Creek at Georgia Rt 84 in Brinson.

Elliptio arctata

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** WJC56-072 (1) Apalachicola River drainage 5 mi N of Blountstown. **Gadsden County:** GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; WJC56-071 (1) Mosquito Creek near Chattahoochee.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** WJC56-070 (1) Cowikee Creek near Hawkinsville. **Russell County:** EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; UMMZ 96506 (2) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale; WJC56-069 (1) Uchee Creek near Ft. Mitchell. **GEORGIA: Cobb County:** WJC56-065 (1) Chattahoochee River near Marietta. **Early County:** WJC56-068 (1) Sawhatchee Creek 14 mi NW of Donaldsonville. **Harris County:** WJC56-066 (1) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of Mountain Hill. **Muscogee County:** FLMNH (1) Chattahoochee River near Columbus; UMMZ 23248 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 94056 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85674 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85890 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus. **Quitman County:** WJC56-067 (1) Chattahoochee River near Georgetown.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 64457 (1) Cowarts Creek, June 1916; FLMNH 64462 (1) Cowarts Creek near Madrid, Aug. 1916; FLMNH uncat. (1) Big Creek near Florida state line, Aug. 1916; HV40-001 (NR) Spring Creek near Florida state line; HV40-002 (NR) Spring Creek near Madrid, 1918; HV40-009 (NR) Rocky Creek near Pansey; HV40-010 (NR) Cowarts Creek near Cowart; HV40-011 (9) Cowarts Creek near Dothan; HV40-012 (NR) Cowarts Creek near Florida state line; HV40-025 (5) Cowarts Creek near Cottonwood; UMMZ 138487 (2) Cowarts Creek near Cottonwood, Aug. 1916; WJC56-073 (1) Cowarts Creek near Cowart; WJC56-074 (1) Big Creek near Madrid. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; HV40-019 (1) Chipola River; HV40-020 (42) Chipola River near Altha; HV40-021 (8) Chipola River near Blountstown; HV40-022 (100) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; HV40-023 (44) Chipola River at Pole Bluff Landing 7.1 km E of Kinard; WJC56-083 (1) Chipola River near Altha; WJC56-084 (1) Chipola River 2.5 mi SE of Chason; WJC56-085 (1) Chipola River 2 mi E of Clarksville; WJC56-086 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; WJC56-087 (1) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard; WJC56-088 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown. **Gulf County:** HV40-024 (1) Chipola River, Dead Lake; OSUM 30107 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; HV40-005 (NR) Spring Creek near Alabama state line; HV40-014 (18) Chipola River system 5 mi NE of Marianna; HV40-015 (20) Spring Creek 2.5 mi SE of Marianna; HV40-017 (113) Chipola River near Marianna; HV40-018 (44) Chipola River near Sink Creek; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-005 (1) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna, 10 Oct. 1987; UMMZ 138389 (1) Chipola River near Marianna, July 1918; WJC56-075 (1) Marshall Creek 8 mi W of Malone; WJC56-076 (1) Chipola River system (a stream) 1.5+ mi N of Campbellton; WJC56-077

(1) Chipola River 1 mi N of Marianna; WJC56-078 (1) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna; WJC56-079 (1) Chipola River 3 mi S of Marianna; WJC56-080 (1) Chipola River 12 mi SSE of Marianna; WJC56-081 (1) Chipola River near Marianna; WJC56-082 (1) Chipola River near Marianna.

Flint River Drainage. **GEORGIA: Baker County:** WJC56-059 (1) Cooleewahee Creek near Newton; WJC56-060 (1) Ichawaynochaway Creek 10 mi SW of Newton. **Coweta County:** EPK85-001 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan, 28 April 1985; EPK85-002 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 1985; WJC56-046 (1) Line Creek. **Crisp County:** WJC56-049 (1) Gum Creek 2 mi N of Cordele; WJC56-050 (1) Swift Creek 12 mi SW of Cordele; WJC56-051 (1) Flint River 10 mi W of Cordele. **Decatur County:** UMMZ 184230 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; WJC56-063 (1) Fourmile Creek 3 mi S of Bainbridge; WJC56-064 (1) Flint River near Recovery. **Dooly County:** UMMZ 56653 (1) Little Pennahatchee Creek 4 mi NW of Vienna; WJC56-048 (1) Little Pennahatchee Creek 4 mi NW of Vienna. **Dougherty County:** FLMNH 64979 (109) Flint River near Albany; OSUM 34324 (2) Flint River at U.S. Rt 82 in Albany, 26 Nov. 1972; UMMZ 247399 (6) Flint River 10 mi S of Albany; WJC56-057 (1) Flint River near Albany; WJC56-058 (1) Flint River at river bend 8 mi S of Albany. **Lee County:** WJC56-052 (1) Flint River drainage (a creek) near Chokee and DeSoto. **Meriwether County:** EPK85-003 (1) Line Creek at confluence of Flint River N of Georgia Rt 362 ca. 15 mi WSW of Griffin, 27 Aug. 1985. **Miller County:** WJC56-061 (1) Spring Creek near Colquitt. **Pike County:** EPK84-001 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 27 Aug. 1984. **Seminole County:** WJC56-062 (1) Spring Creek near Reynoldsville. **Taylor County:** WJC56-047 (1) Patsiliga Creek. **Terrell County:** WJC56-053 (1) Chickasawhatchee Creek 5 mi SE of Dawson. **Worth County:** EPK87-002 (1) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 25 Aug. 1987; WJC56-054 (1) Jones Creek 2 mi S of Oakfield; WJC56-055 (1) Abrams Creek 5 mi S of Oakfield; WJC56-056 (1) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Apalachicola River Drainage. **FLORIDA: Franklin County:** JCB91-094 (1) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Gadsden County:** JCB91-028 (2) Apalachicola River at NM 105.2 Race Bluff/Race Shoals 0.6 RM S of Jim Woodruff Dam; JCB91-030 (1) Apalachicola River between NM 100.1 and NM 100.4, 0.25 mi N of I-10. **Liberty County:** JCB91-019 (8) Apalachicola River at NM 92.5 just S of Rock Bluff Landing.

Chipola River Drainage. **FLORIDA: Gulf County:** JCB91-093 (4) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-119 (2) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-125 (1) Chipola River at RM 84.5, 200 m above Florida Rt 167 along west bank.

Flint River Drainage. **GEORGIA: Coweta County:** JCB92-109 (22) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan. **Crisp County:** JCB92-065 (21) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele. **Decatur County:** JCB91-017 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-200 (1) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop. **Dougherty County:** JCB91-142 (1) Flint River 0.7 mi above Dry Creek at spring above and across from Turtle Shoals. **Lee County:** JCB91-141 (1) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek. **Mitchell County:** JCB91-131 (7) Flint River ca. 3 RM below Georgia Rt 37. **Upson County:** JCB92-128 (20) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston. **Worth County:** JCB92-061 (8) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-063 (17) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

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Historic Records

Chattahoochee River Drainage. **ALABAMA: Houston County:** OSUM 35600 (1) Howard's Mill Creek at Alabama Rt 95, 1.2 mi SE of Gordon, 2 Aug. 1968.

Chipola River Drainage. **ALABAMA: Houston County:** UMMZ 139216 (28) Cowarts Creek, June 1916. **FLORIDA: Calhoun County:** FLMNH 428 (3) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 4977 (11) Chipola River Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 5000 (1) Chipola River Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 243937 (18) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 28 June 1986; GTW80-001 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 23 Oct. 1980; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 190293 (8) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 190297 (6) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MCZ 191917 (11) Chipola River Florida Rt 20 1 mi SE of Clarksville, 30 Aug. 1954; RSB88-005 (2) Chipola River Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-012 (7) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138436 (1) Chipola River near Blountstown, June 1918; UMMZ 138453 (11.5) Chipola River near Altha, July 1918; WHH75-002 (1) Chipola River Florida Rt 20, 1 mi SE of Clarksville, 1975; WHM80-001 (1) Chipola River Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River Florida Rt 71 (Scott's Ferry) 11.0 km NW of

Lewis, 26 July 1987; WJC56-092 (1) Chipola River 2.5 mi SE of Chason. **Gulf County:** WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; EPK81-005 (1) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 15 June 1981; FLMNH 389 (6) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; FLMNH 419 (5) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FSU C-104 (3) Chipola River Florida Rt 167, 2 km N of Marianna, 24 Sept. 1965; MCZ 190294 (5) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 190295 (6) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 190296 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; RSB87-004 (2) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-008 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; RSB88-009 (3) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 57431 (4) Spring Creek 2.5 mi SE of Marianna; UMMZ 57447 (1) Spring Creek 3 mi SE of Marianna; UMMZ 138388 (5) Chipola River near Marianna, July 1918; UMMZ 138409 (4.5) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 1918.

Present Records

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-037 (2) Chipola River near RM 53.1 Bullet Bend. **Gulf County:** JCB91-045 (8) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-120 (1) Chipola River at RM 67.2 confluence of Dry Creek; JCB91-121 (1) Chipola River at RM 72.7 ca. 1.6 mi S of I-10 along east bank.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** FLMNH 367 (16) Apalachicola River near Chattahoochee, 24 Aug. 1954; FLMNH 233210 (2) Apalachicola River near Chattahoochee; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 247471 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952.

Chattahoochee River Drainage. **ALABAMA: Houston County:** FLMNH 64440 (9) Golf Creek 3.5 mi E of Dothan; FLMNH 64464 (5) Golf Creek near Smyrna; UMMZ 94509 (14) Golf Creek 3.5 mi E of Dothan; UMMZ 163758 (11) Golf Creek near Smyrna, June 1916. **Lee County:** JJJ73-011 (1) Little Uchee Creek above CR12, 2.9+ mi NNE of Crawford, 31 Oct. 1972; JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-019 (1) Halawakee Creek at CR63, 8.3 mi NE of Opelika, 31 Aug. 1972; OSUM 33545 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 11 Sept. 1972. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972; UMMZ 96506 (2) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale; USNM 85467 (2) Chattahoochee River at dam near Phenix City; USNM 85670 (2) Uchee Creek. **GEORGIA: Harris County:** OSUM 35599 (1) Ossahatchie Creek at U.S. Rt 27, 2.4 mi N of Cataula, 5 Aug. 1967. **Muscogee County:** CM 61966 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; CM 61971 (5) Randall Creek near Columbus; FLMNH 436 (5) Randall Creek near Columbus; FLMNH 64481 (13) Chattahoochee River near Columbus; FLMNH 226078 (3) Chattahoochee River near Columbus; MCZ 190329 (5) Randall Creek near Columbus; MCZ 190383 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 23351 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 94072 (1) Chattahoochee River near Columbus; UMMZ 94362 (3) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 94502 (2) Randall Creek near Columbus; UMMZ 96682 (1) Chattahoochee River drainage near Columbus; USNM 30409 (4) Chattahoochee River drainage near Columbus; USNM 58195 (1) Chattahoochee River near Columbus; USNM 85398 (1) Chattahoochee River drainage near Columbus; USNM 85470 (2) Randall Creek near Columbus; USNM 85537 (2) Flat Rock Creek at Columbus; USNM 85552 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85571 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85574 (2) Flat Rock Creek at Columbus; USNM 85580 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85704 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus. **Randolph County:** UMMZ 166413 (3) Cemochechobee Creek about 2 mi S of Coleman, 20 June 1945.

Chipola River Drainage. **ALABAMA: Houston County:** CM 6111949 (2) Big Creek Lake near Madrid; FLMNH 64407 (1) Cowarts Creek near Cowart; FLMNH 64485 (25) Cowarts Creek near Dothan; FLMNH 64492 (15) Spring Creek near Madrid; FLMNH 64493 (13) Big Creek near Florida state line, Aug. 1916; FLMNH 229152 (2) Reedy Creek near Madrid; MCZ 190382 (2) Big Creek Lake near Madrid, May 1912; UMMZ 129207 (11) Big Creek Lake near Madrid, Aug. 1916; UMMZ 138471 (31) Rocky Creek near Pansey, Aug. 1916; UMMZ 138483 (13) Spring Creek near Madrid, Aug. 1916; UMMZ 138491 (3) Cowarts Creek near Dothan, June 1916; UMMZ 138499 (27) Big Creek near Taylor, June 1916; UMMZ 139199 (16) Spring Creek near Madrid, Aug. 1916; UMMZ 139225 (20) Spring Creek near Florida state line, Aug. 1916; UMMZ 139230 (19) Big Creek near Florida state line, Aug. 1916. **FLORIDA: Calhoun County:** FLMNH 381 (15) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 425 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 1932 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 20414 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 64375 (5) Chipola

River near Altha, July 1918; FLMNH 64403 (3) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; FLMNH 64463 (15) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; FLMNH 64465 (15) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; FLMNH 64478 (2) Chipola River, June 1918; FLMNH 64498 (15) Chipola River near Altha, July 1918; FLMNH 233221 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 251885 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 14 July 1995; FSU C-420 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 12 May 1967; RSB88-005 (1) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-008 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 June 1988; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138378 (16) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; UMMZ 138390 (27) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138391 (3) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138433 (8) Chipola River near Blountstown, June 1918; UMMZ 138457 (3) Chipola River near Altha, July 1918; UMMZ 184302 (6) Chipola River at RM 44.3, 30 m above Florida Rt 20 along west bank, 30 Aug. 1954; UMMZ 184317 (7) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1955. **Gulf County:** FLMNH 243996 (1) Chipola River, 27 Aug. 1988; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; UMMZ 138439 (36) Chipola River, June 1918. **Jackson County:** CM 46862 (2) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; CM 46870 (3) Chipola River at Florida Rt 167, 2 km N of Marianna; FLMNH 440 (3) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 871 (1) Blue Spring Run, Marianna; FLMNH 1334 (10) Spring Creek 3 mi E of Marianna; FLMNH 1335 (8) Spring Creek 3 mi E of Marianna; FLMNH 1347 (10) Spring Creek 3 mi SE of Marianna; FLMNH 1387 (3) Blue Springs 3 mi E of Marianna; FLMNH 1404 (6.5) Spring Creek 3 mi E of Marianna; FLMNH 2689 (4) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna, 11 Dec. 1932; FLMNH 2874 (19) Spring Creek 3 mi E of Marianna; FLMNH 2875 (8) Blue Springs 3 mi E of Marianna; FLMNH 2876 (18) Spring Creek 3 mi E of Marianna; FLMNH 2877 (14) Spring Creek 3 mi E of Marianna; FLMNH 2882 (3) Blue Springs 3 mi E of Marianna; FLMNH 2883 (8) Spring Creek 3 mi E of Marianna; FLMNH 2913 (1) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 4928 (7) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 8335 (1) Spring Creek 3 mi E of Marianna; FLMNH 30096 (6) Spring Creek 2 mi SE of Marianna; FLMNH 30098 (2) Chipola River at Florida Rt 167, 2 km N of Marianna, 20 Aug. 1979; FLMNH 64400 (5) Meretto Bridge at Marianna RFD; FLMNH 64466 (6) Meretto Bridge at Marianna RFD; FLMNH 64497 (10) Chipola River, July 1918; FLMNH 197700 (2) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 214611 (20) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 229180 (9.5) Marianna; MCZ 191845 (3) Chipola River at Florida Rt 167, 2 km N of Marianna; MCZ 191856 (2) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; OSUM 8706 (12) Chipola River 2 mi S of Marianna near Florida Rt 71, 4 Aug. 1963; RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-006 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 21 Nov. 1987; RSB87-007 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 10 Oct. 1987; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; RSB88-013 (1) Waddells Mill Creek at bridge 9.1 km S of Sills, 10 July 1988; UMMZ 55486 (5) Blue Spring run near Marianna; UMMZ 57432 (20) Spring Creek 3 mi SE of Marianna; UMMZ 57433 (10) Spring Creek 2.5 mi SE of Marianna; UMMZ 57448 (9) Spring Creek 3 mi SE of Marianna; UMMZ 138381 (20) Chipola River near Marianna; UMMZ 138382 (6) Chipola River near Marianna, July 1918; UMMZ 138389 (8) Chipola River near Marianna, July 1918; UMMZ 138407 (7) Chipola River at CR278 (Peacock Bridge) near Sink Creek; UMMZ 138418 (16) Chipola River near Marianna, July 1918; UMMZ 215376 (9) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna; UMMZ 234944 (1) Chipola River 1 mi N of Marianna, 25 May 1963; UMMZ 244657 (8) Spring Creek 2.5 mi SE of Marianna. **GEORGIA: Decatur County:** FLMNH 4965 (6) Spring Creek at Georgia Power and Light Co. dam near Reynoldsville (Sta. 1048).

Flint River Drainage. **GEORGIA: Baker County:** CM 6111824 (7) Flint River; FLMNH 30659 (3) Chickasawhatchee Creek, Elmodel; FLMNH 65702 (7) Flint River; MFM 7982 (1) Cooleewahee Creek 0.9 mi NE of Newton, 17 Nov. 1958; RSB88-003 (1) Flint River at Georgia Rt 37 in Newton, 16 Oct. 1988; UMMZ 56665 (5) Cooleewahee Creek near Newton. **Calhoun County:** FLMNH 125068 (4) Chickasawhatchee Creek 4 mi E of Leary, 2 Aug. 1973. **Coweta County:** EPK85-001 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan, 28 April 1985; FLMNH 233144 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 29 Sept. 1973; UMMZ 94172 (2) Line Creek; UMMZ 97031 (5) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; UMMZ 246790 (1) Line Creek; UMMZ 247416 (1) Line Creek. **Crisp County:** FLMNH 64915 (2) Gum Creek 2 mi N of Cordele; FLMNH 251872 (6) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele, 26 Aug. 1995; UMMZ 56713 (7) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele. **Decatur County:** CM 1955-10 (4) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery; FLMNH 165 (9.5) Fourmile Creek; FLMNH 167 (5) Reynoldsville Spring Creek 10 mi WSW of Bainbridge (Sta. 1643); FLMNH 374 (10) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 1907 (5) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 5003 (5) Flint River near Bainbridge, Sept. 1954; FLMNH 20418 (4) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 20419 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 20420 (6) Flint River near Bainbridge, 1 Sept. 1954; RSB88-001 (1) Spring Creek at Georgia Rt 84 in Brinson, 16 Oct. 1988; UMMZ 94515 (33) Spring Creek; UMMZ 184196 (3) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge; UMMZ 184196 (3) Flint River near Bainbridge, 1 Sept. 1954; UMMZ 184306 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1955; USNM 159190 (1) Spring Creek. **Dooly County:** FLMNH 15373 (6)

Pennahatchee Creek, Vienna; FLMNH 251856 (26) Turkey Creek 0.5 mi S of Byronville, 25 Aug. 1995; UMMZ 56662 (2) Flint River drainage (a stream) 6 mi NW of Vienna; UMMZ 56674 (6) Little Pennahatchee Creek 4 mi NW of Vienna; UMMZ 56675 (2) Flint River drainage (a stream) 6 mi NW of Vienna; UMMZ 56719 (4) Little Pennahatchee Creek 4 mi NW of Vienna. **Dougherty County:** CM 618353 (5) Flint River near Albany; FLMNH 379 (2) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; FLMNH 20416 (1) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; MCZ 19189 (5) Flint River at U.S. Rt 82 in Albany; MCZ 190345 (5) Flint River near Albany; UMMZ 54073 (5) Flint River near Albany; UMMZ 56673 (7) Flint River drainage (a creek) 6 mi W of Albany; UMMZ 94090 (3) Flint River near Albany; UMMZ 94118 (1) Flint River near Albany; UMMZ 96719 (1) Flint River at U.S. Rt 82 in Albany. **Lee County:** UMMZ 56659 (1) Lee's Creek 5 mi S of DeSoto. **Macon County:** USNM 85560 (2) Flint River at Georgia Rt 26 in Montezuma. **Pike County:** OSUM 24361 (24.5) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 24 Sept. 1968. **Taylor County:** FLMNH 251867 (14) Patsiliga Creek, 25 Aug. 1995; UMMZ 169790 (3) Patsiliga Creek near Butler, 15 Sept. 1948; UMMZ 246806 (1) Patsiliga Creek; UMMZ 247545 (1) Patsiliga Creek. **Terrell County:** UMMZ 56664 (4) Chickasawhatchee Creek 5 mi SE of Dawson; UMMZ 56676 (20) Kiokee Creek 15 mi SE of Dawson; UMMZ 56715 (3) Chickasawhatchee Creek 5 mi SE of Dawson. **Upson County:** FLMNH 31227 (2) Flint River, 21 May 1981; USNM uncat. (1) Flint River. **Webster County:** UMMZ 94092 (6) Kinchafoonee Creek 1 mi W of Preston; UMMZ 94409 (8) Kinchafoonee Creek 2 mi SE of Preston; UMMZ 94410 (1) Flint River drainage near Preston; UMMZ 230549 (8) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961. **Worth County:** FLMNH 251884 (2) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 26 Aug. 1995; FLMNH 251887 (6) Jones Creek 2 mi S of Oakfield, 27 Aug. 1995; UMMZ 58175 (19) Mill Creek at CR4 ca. 8 air mi S of Oakfield; UMMZ 58176 (15) Mill Creek at CR4 ca. 8 air mi S of Oakfield; UMMZ 58513 (5) Jones Creek 2 mi S of Oakfield; UMMZ 58514 (30) Jones Creek 2 mi S of Oakfield.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-034 (1) Apalachicola River at NM 90.0. **Franklin County:** JCB91-094 (1) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Jackson County:** JCB91-026 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **Liberty County:** JCB91-020 (1) Apalachicola River at NM 86.1 between and along rock dike and man-made dike.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** JCB92-168 (1) North Fork Cowikee Creek at unnamed/unnumbered dirt road ca. 7.5 air mi E of Spring Hill ca. 14 air mi NNW of Eufaula; JCB92-169 (1) South Fork Cowikee Creek near CR79 ca. 1.3 air mi NE of Batesville ca. 12.5 air mi NW of Eufaula. **Lee County:** JCB92-139 (35) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika; JCB92-140 (13) Little Uchee Creek below CR77 below Meadows Mill Pond ca. 7 air mi NW of Crawford ca. 11 air mi SE of Opelika; JCB92-141 (2) Little Uchee Creek at CR79 ca. 3 air mi N of Crawford ca. 10 mi WNW of Phenix City. **Russell County:** JCB92-136 (17) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale; JCB92-137 (4) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale; JCB92-166 (2) Hatchechubbee Creek at U.S. Rt 431/Alabama Rt 1 ca. 8 air mi S of Seale. **GEORGIA: Early County:** JCB92-041 (16) Kirkland Creek at U.S. Rt 84/Georgia Rt 38, 1.75 air mi WNW of Jakin; JCB92-042 (5) Sawhatchee Creek at Georgia Rt 273 ca. 0.25 air mi W of Cedar Springs ca. 7.25 air mi NW of Jakin. **Harris County:** JCB92-144 (10) Mulberry Creek at U.S. Rt 27/Georgia Rt 1 ca. 3.5 air mi S of Hamilton. **Randolph County:** JCB92-177 (42) Pumpkin Creek at CR27 ca. 6.5 air mi WSW of Benevolence ca. 7.5 air mi NW of Cuthbert. **Stewart County:** JCB92-176 (77) Lime Spring Branch at CR148 ca. 6.25 air mi SE of Westville ca. 7 air mi SE of Lumpkin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-036 (2) Chipola River at Peacock Springs above RM 55, 0.1 RM N of CR274; JCB91-037 (2) Chipola River near RM 53.1, Bullet Bend; JCB91-044 (5) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-117 (1) Chipola River at RM 44.3, 30 m above Florida Rt 20 along west bank; JCB91-128 (1) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-045 (11) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-093 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-119 (3) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-120 (13) Chipola River at RM 67.2 confluence of Dry Creek; JCB91-124 (85) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-125 (2) Chipola River at RM 84.5, 200 m above Florida Rt 167 along west bank; JCB91-127 (3) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek. **GEORGIA: Baker County:** JCB91-132 (1) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB92-045 (37) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-046 (16) Chickasawhatchee Creek at CR121 ca. 9 air mi NW of Newton; JCB92-047 (6) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton; JCB92-048 (1) Ichawaynochaway Creek at Georgia Rt 200 ca. 9.5 air mi WSW of Newton. **Calhoun County:** JCB92-163 (6) Pachitla Creek at CR153 ca. 2.75 air mi S of Morgan. **Clayton County:** JCB92-121 (2) Flint River at CR1334 (McDonough Rd) ca. 4.75 air mi SSW of Jonesboro ca. 9 air mi SSW of Morrow. **Coweta County:** JCB92-107 (29) White Oak Creek at Georgia Rt 16 ca. 4.25 air mi W of Turin ca. 6 air mi ESE of Newnan; JCB92-109 (50) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan; JCB92-110 (89) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (6) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crawford County:** JCB92-096 (18) Spring Creek at CR160 ca. 5 air mi SSW of Roberta. **Crisp County:** JCB92-065 (13) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (9) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele; JCB92-190 (98) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park; JCB92-194 (12) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB92-035 (45) Spring Creek at Georgia Rt 84 in Brinson; JCB92-051 (16) Spring Creek

at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB92-198 (1) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-200 (4) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-205 (13) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-055 (10) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus; JCB92-067 (1) Sandy Mount Creek at Georgia Rt 90 ca. 2.5 air mi NW of Vienna. **Dougherty County:** JCB91-139 (4) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals; JCB91-142 (1) Flint River 0.7 mi above Dry Creek at spring above and across from Turtle Shoals; JCB92-164 (79) Cooleewahee Creek at Georgia Rt 62 ca. 4.75 air mi W of junction Georgia Rt 91/Georgia Rt 62 ca. 9.5 air mi SW of Albany. **Early County:** JCB92-044 (7) Spring Creek at Georgia Rt 62 ca. 9.5 air mi ENE of Blakely; JCB92-178 (45) Spring Creek at CR282 (Christ Missionary Church Rd) ca. 3.5 air mi SE of Bluffton ca. 10.25 mi NE of Blakely. **Fayette County:** JCB92-112 (39) Whitewater Creek at CR275 ca. 2.75 air mi SW of Fayetteville; JCB92-150 (47) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (5) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Lee County:** JCB92-064 (7) Lee Creek at CR23 ca. 12.5 air mi E of Smithville; JCB92-158 (158) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg; JCB92-159 (23) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg; JCB92-192 (16) Lake Blackshear ca. 100 m W of entrance to Cedar Creek arm ca. 9 air mi WSW of Cordele. **Macon County:** JCB92-085 (19) Buck Creek at Georgia Rt 240 ca. 3.75 air mi W of Montezuma; JCB92-086 (3) Hogcrawl Creek at Georgia Rt 329 ca. 4 air mi E of Montezuma; JCB92-090 (1) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma. **Marion County:** JCB92-156 (40) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Meriwether County:** JCB92-116 (8) White Oak Creek at CR312 (Oakland Rd) old covered bridge ca. 2.25 air mi SE of Alvaton 4 air mi NNE of Gay; JCB92-117 (19) Red Oak Creek at Georgia Rt 109 ca. 2.25 air mi WSW of Gay; JCB92-118 (66) Cane Creek at Georgia Rt 85W in Raleigh ca. 4.75 air mi NE of Warm Springs. **Miller County:** JCB92-037 (43) Spring Creek at U.S. Rt 27 in Colquitt; JCB92-049 (2) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin; JCB92-050 (11) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Mitchell County:** JCB91-134 (1) Flint River ca. 4 RM above Georgia Rt 37 near Newton; JCB91-136 (3) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Pike County:** JCB92-125 (25) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon; JCB92-126 (29) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon; JCB92-127 (79) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon. **Spalding County:** JCB92-123 (2) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin. **Sumter County:** JCB92-056 (1) Flint River island ca. 1.5 RM below Reeves Landing ca. 13.75 air mi ENE of Americus; JCB92-089 (2) Sweetwater Creek at Georgia Rt 49 at south boundary of Andersonville; JCB92-152 (6) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus; JCB92-193 (10) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Taylor County:** JCB92-093 (14) Patsiliga Creek at junction Georgia Rt 208/Georgia Rt 137 ca. 7.5 air mi NNE of Butler; JCB92-094 (1) Flint River at Georgia Rt 137 ca. 11 air mi NE of Butler; JCB92-095 (1) Flint River at U.S. Rt 19/Georgia Rt 3 ca. 11 air mi N of Butler. **Terrell County:** JCB92-157 (98) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (65) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Upson County:** JCB92-098 (1) Auchumpkee Creek at CR174 (Allen Rd) ca. 10.5 air mi SE of Thomaston; JCB92-101 (27) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston; JCB92-128 (50) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston; JCB92-129 (2) Flint River at end of CR96 (Sprewell Rd) at Sprewell Bluff Park ca. 9.25 air mi WSW of Thomaston; JCB92-130 (1) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston; JCB92-131 (103) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (53) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (29) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB91-140 (1) Flint River at confluence of Abrams Creek; JCB92-059 (33) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-061 (162) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-062 (210) Mill Creek at CR4 ca. 8 air mi S of Oakfield; JCB92-063 (30) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

Elliptio crassidens

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970; DC70-004 (1) Apalachicola River ca. 2.6 mi below J.R. Landing, 1970; RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 27 Aug. 1988. **Gadsden County:** DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FLMNH 8368 (60) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; FLMNH 20417 (5) Apalachicola River near Chattahoochee, Aug. 1954; FLMNH 37822 (2) Apalachicola River near Chattahoochee, 20 May 1981; FLMNH 94750 (5) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 14 June 1986; FLMNH 213745 (24) Apalachicola River near Chattahoochee, 4 June 1977; FLMNH 243944 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 14 June 1986; FSU C-374 (11) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 7 May 1967; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; OSUM

28849 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 5 Aug. 1986; OSUM 29247 (5) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 31 July 1986; OSUM 51110 (19) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 29 Oct. 1981; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 184305 (6) Apalachicola River tributary near Chattahoochee, Aug. 1954; UMMZ 215422 (22) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10. **Jackson County:** DC70-002 (1) Apalachicola River at NM 101.6, 1970; GWP76-001 (1) Apalachicola River (at the Scholz Steam Plant) 3.5 mi SE of Sneads, 1976; OSUM 52199 (2) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 May 1981.

Chattahoochee River Drainage. **ALABAMA: Houston County:** WHH64-001 (1) Chattahoochee River at U.S. Rt 84/Alabama Rt 12, 3 mi SE of Gordon, 1964. **Russell County:** EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972. **GEORGIA: Muscogee County:** OSUM 10165 (3) Chattahoochee River drainage near Columbus; UMMZ 96605 (2) Chattahoochee River near Columbus; USNM 58140 (4) Chattahoochee River near Columbus; USNM 84537 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 84538 (8) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 170 (3) Chipola River 2.5 mi SE of Chason, 9 Oct. 1953; FLMNH 370 (18) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 376 (6) Chipola River 2 mi E of Clarksville, 30 Aug.1954; FLMNH 1932 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 38515 (7) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 19 May 1974; FLMNH 64478 (1) Chipola River, June 1918; FLMNH 64631 (8) Chipola River near Altha, July 1918; FLMNH 233209 (4) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 1 Sept. 1954; FLMNH 235580 (1) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); FLMNH 243942 (37) Chipola River at Abe Springs Landing 5.4 km E of Frink, 23 Aug. 1980; GTW86-003 (3) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 June 1986; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL74-002 (1) Chipola River, Dead Lake, 1974; HGL74-003 (1) Chipola River 2 mi E of Clarksville, 19 May 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 27 June 1988; UMMZ 138367 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; UMMZ 138449 (9) Chipola River near Altha, July 1918; UMMZ 184310 (7) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 1 Sept. 1954; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 2906 (8) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 24 Aug. 1924; FLMNH 47247 (34) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; FLMNH 211707 (3) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 214633 (1) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 243996 (7) Chipola River, 27 Aug. 1988; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; OSUM 23455 (6) Chipola River 3 mi N of dam at Wewahitchka, 30 Sept. 1967; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 96574 (2) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 24 April 1915; UMMZ 138445 (3) Chipola River, June 1918; USNM 381940 (4) Chipola River, Dead Lake, 15 May 1930; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH 2914 (1) Spring Creek 3 mi SE of Marianna, 28 Feb. 1933; FLMNH 2915 (1) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-005 (1) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna, 10 Oct. 1987; RSB87-008 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 138383 (1) Chipola River near Marianna, July 1918; UMMZ 138404 (4) Chipola River at CR278 (Peacock Bridge) near Sink Creek; UMMZ 138416 (1) Chipola River near Marianna, July 1918.

Flint River Drainage. **GEORGIA: Baker County:** CM 6111776 (1) Flint River; FLMNH 65702 (1) Flint River; RSB88-003 (1) Flint River at Georgia Rt 37 in Newton, 16 Oct. 1988. **Calhoun County:** UMMZ 68822 (11) Ichawaynochaway Creek. **Crisp County:** UMMZ 56689 (2) Flint River 10 mi W of Cordele. **Decatur County:** CM 1955-10 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery; CM 1955-11 (5) Flint River at U.S. Rt 27 in Bainbridge; FLMNH 375 (6) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 5003 (1) Flint River near Bainbridge, 1 Sept. 1954; UMMZ 184196 (5) Flint River near Bainbridge, Sept. 1954; UMMZ 184196 (5) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge; UMMZ 184230 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; UMMZ 184297 (6) Flint River near Recovery, Aug. 1954; UMMZ 184319 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; UMMZ 247448 (2) Flint River near Recovery, 28 Aug. 1954; USNM 168967 (4) Spring Creek. **Dougherty County:** FLMNH 379 (6) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; OSUM 10166 (1) Flint River near Albany; OSUM 34323 (0.5) Flint River at U.S. Rt 82 in Albany, 26 Nov. 1972; UMMZ 56668 (3) Flint River near Albany; UMMZ 56690 (1) Flint River near Albany; UMMZ 96612 (1) Flint River 10 mi S of Albany; UMMZ 96619 (7) Flint River 10 mi S of Albany; UMMZ 96674 (1) Flint River near Albany; UMMZ 121212 (8) Flint River 10 mi S of Albany; UMMZ 233996 (2) Flint River near Albany; USNM

84523 (2) Flint River drainage near Albany; USNM 84534 (24) Flint River near Albany. **Macon County:** HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; HGL86-006 (1) Flint River at Georgia Rt 26 in Montezuma, 1986. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/ Georgia Rt 3/Georgia Rt 22, 1982. **Worth County:** UMMZ 58300 (1) Mill Creek at CR4 ca. 8 air mi S of Oakfield.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-033 (1) Apalachicola River at NM 89.7; JCB91-034 (2) Apalachicola River at NM 90.0. **Franklin County:** JCB91-094 (5) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Gadsden County:** JCB91-027 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10; JCB91-028 (25) Apalachicola River at NM 105.2 Race Bluff/Race Shoals 0.6 RM S of Jim Woodruff Dam; JCB91-029 (22) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam; JCB91-030 (25) Apalachicola River between NM 100.1 and NM 100.4, 0.25 mi N of I-10. **Gulf County:** JCB91-095 (2) Apalachicola River near NM 20.7 in north pass to Brickyard Cutoff at west end of island ca. 10 m to south pass confluence. **Liberty County:** JCB91-021 (2) Apalachicola River at NM 83 at end of dike on sandy spoil site; JCB91-025 (2) Apalachicola River at NM 71 Point Poloway (across from Poloway Cutoff); JCB91-086 (3) Apalachicola River at NM 40.4 confluence of Swift Slough.

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB92-138 (2) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale. **GEORGIA: Early County:** JCB94-064 (1) Sawhatchee Creek at Georgia Rt 273 about 0.25 air mi W of Cedar Springs.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-036 (29) Chipola River at Peacock Springs above RM 55, 0.1 RM N of CR274; JCB91-037 (38) Chipola River near RM 3.1, Bullet Bend; JCB91-042 (2) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); JCB91-044 (7) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-111 (1) Chipola River at RM 34.5 ca. 5 RM N of Florida Rt 71; JCB91-112 (7) Chipola River at RM 37.5 ca. 8 RM N of Florida Rt 71; JCB91-113 (29) Chipola River at RM 41.3 ca. 3 RM S of Florida Rt 20; JCB91-114 (9) Chipola River at RM 49.9 confluence of Tenmile Creek ca. 5.6 RM above Florida Rt 20; JCB91-115 (6) Chipola River at RM 49.8, 5.5 RM above Florida Rt 20; JCB91-116 (6) Chipola River at RM 46.4 confluence of Fourmile Creek; JCB91-117 (5) Chipola River at RM 44.3, 30 m above Florida Rt 20 along west bank; JCB91-128 (19) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-041 (1) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-045 (19) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-090 (1) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank; JCB91-093 (15) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-119 (28) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-120 (7) Chipola River at RM 67.2 confluence of Dry Creek; JCB91-121 (7) Chipola River at RM 72.7 ca. 1.6 mi S of I-10 along east bank; JCB91-122 (8) Chipola River at RM 69.6 ca. 2.4 RM above confluence of Dry Creek; JCB91-123 (16) Chipola River at RM 74.8, 0.5 RM above I-10 confluence of unnamed creek along east bank; JCB91-124 (1) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-125 (6) Chipola River at RM 84.5, 200 m above Florida Rt 167 along west bank; JCB91-126 (14) Chipola River at RM 79.8 ca. 2 mi S of U.S. Rt 90/Florida Rt 10 along west bank; JCB91-127 (7) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-007 (84) Flint River above Lamar ca. 16 mi NNE of Bainbridge; JCB91-132 (23) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB91-133 (2) Flint River ca. 2 RM above Georgia Rt 37; JCB91-137 (11) Flint River ca. 1 RM below Dry Creek; JCB92-045 (2) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-046 (50) Chickasawhatchee Creek at CR121 ca. 9 air mi NW of Newton; JCB92-047 (92) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton; JCB92-048 (9) Ichawaynochaway Creek at Georgia Rt 200 ca. 9.5 air mi WSW of Newton. **Decatur County:** JCB91-001 (4) Flint River above Big Slough ca. 4.5 air mi N of Bainbridge; JCB91-002 (4) Flint River 4 air mi N of Bainbridge; JCB91-003 (8) Flint River at confluence of Big Slough Creek above Bainbridge; JCB91-004 (2) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-012 (2) Spring Creek 100 m N of Georgia Rt 253; JCB91-017 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-198 (12) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-199 (23) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-200 (12) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-201 (7) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/ CR394 (Cocktown Rd); JCB92-205 (1) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dougherty County:** JCB91-138 (4) Flint River ca. 0.25 RM above Dry Creek at Goat Island; JCB91-139 (19) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals; JCB91-142 (4) Flint River 0.7 mi above Dry Creek at spring above and across from Turtle Shoals. **Miller County:** JCB92-037 (1) Spring Creek at U.S. Rt 27 in Colquitt. **Mitchell County:** JCB91-130 (37) Flint River at hairpin bend ca. 10 air mi below Georgia Rt 37; JCB91-131 (46) Flint River ca. 3 RM below Georgia Rt 37; JCB91-134 (31) Flint River ca. 4 RM above Georgia Rt 37 near Newton; JCB91-135 (14) Flint River at confluence of Raccoon Creek; JCB91-136 (9) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Sumter County:** JCB92-193 (5) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Worth County:** JCB91-140 (1) Flint River at confluence of Abrams Creek.

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Historic Records

Chattahoochee River Drainage. **GEORGIA: Fulton County:** UMMZ 96683 (1.5) Chattahoochee River between Marietta and Atlanta. **Muscogee County:** UMMZ 96682 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus.

Flint River Drainage. **GEORGIA: Dougherty County:** UMMZ 98270 (2) Flint River near Albany.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** CM 1955-6 (7) Mosquito Creek near Chattahoochee; FLMNH 166 (14) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1953; FLMNH 169 (7) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; FLMNH 364 (13) Mosquito Creek near Chattahoochee, 12 Sept. 1954; FLMNH 20412 (9) Mosquito Creek near Chattahoochee, 12 Sept. 1954; FLMNH 20415 (6) Mosquito Creek below dam 1 mi E of Chattahoochee; FLMNH 68440 (7) Mosquito Creek near Chattahoochee; FSU C-1173 (1) Mosquito Creek below dam 1 mi E of Chattahoochee; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/ Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; UMMZ 184318 (7) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 12 Sept. 1954; UMMZ 218171 (3) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 24 May 1964; UMMZ 247477 (1) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; UMMZ 247502 (2) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** UMMZ 163278 (6) Bear Creek near Batesville, April 1917; UMMZ 163763 (1) Cowikee Creek near Batesville, April 1917. **Lee County:** JJJ73-011 (1) Little Uchee Creek above CR12, 2.9+ mi NNE of Crawford, 31 Oct. 1972; JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-016 (1) Little Uchee Creek at CR36, 4.1 mi SW of Salem, Sept. 1972; JJJ73-017 (1) Little Uchee Creek at CR32, 8 mi SE of Opelika, 1972; JJJ73-018 (1) Halawakee Creek just above mouth of unnamed tributary 6.9 air mi NNE of Salem 10.2 air mi ENE of Opelika, 1972; JJJ73-020 (1) Halawakee Creek below U.S. Rt 29, 7.6 mi NE of Opelika, 6 Feb. 1972; JJJ73-021 (1) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika, 1972. **Russell County:** JJJ73-001 (30) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 1972; JJJ73-002 (6) Uchee Creek at CR39, 3.2 mi NW of Ft. Mitchell, 27 Oct. 1972; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-007 (1) Little Uchee Creek above U.S. Rt 431, 7.5 mi NE of Seale, 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972; USNM 85897 (2) Uchee Creek; USNM 86018 (2) Uchee Creek. **GEORGIA: Muscogee County:** FLMNH 2759 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 97030 (2) Flat Rock Creek at Columbus; USNM 85579 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85899 (2) Flat Rock Creek at Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 226126 (1) Spring Creek near Florida line; FLMNH 229160 (2) Spring Creek near Madrid; UMMZ 129207 (11) Big Creek Lake near Madrid, Aug. 1916; UMMZ 138459 (19) Cowarts Creek near Florida state line; UMMZ 138492 (1) Cowarts Creek near Dothan, June 1916; UMMZ 138497 (NR) Big Creek Lake near Madrid, June 1916; UMMZ 138499 (1) Big Creek near Taylor, June 1916; UMMZ 139222 (14) Cowarts Creek near Cowart, June 1916; UMMZ 139225 (4) Spring Creek near Florida state line, Aug. 1916; UMMZ 139230 (19) Big Creek near Florida state line, Aug. 1916; WHM88-004 (1) Cowarts Creek at Alabama Rt 53 ca. 19 mi SE of Dothan, 1988. **FLORIDA: Calhoun County:** FLMNH 381 (14) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 1905 (7) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 20414 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 38505 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 19 May 1974; FLMNH 38506 (3) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1967; FLMNH 229162 (2) Chipola River near Altha; GTW80-001 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 23 Oct. 1980; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL67-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 26 June 1967; HGL74-002 (1) Chipola River, Dead Lake, 1974; HGL74-003 (1) Chipola River 2 mi E of Clarksville, 19 May 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; UMMZ 138378 (17) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; UMMZ 138455 (22) Chipola River near Altha; UMMZ 138457 (8) Chipola River near Altha, July 1918; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988; WHM89-003 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 19 Feb. 1989. **Gulf County:** FLMNH 47252 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; FLMNH 214635 (38) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138441 (2) Chipola River, June 1918; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH

4928 (7) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 64846 (2) Blue Spring Run near Marianna; FLMNH 214595 (19) Baker Creek; FLMNH 214612 (39) Waddell's Mill Creek at Mill Pond dam; GTW89-001 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 19 Feb. 1989; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; UMMZ 57462 (1) Blue Spring run near Marianna; UMMZ 138381 (20) Chipola River near Marianna; UMMZ 138389 (8) Chipola River near Marianna, July 1918; UMMZ 138407 (7) Chipola River at CR278 (Peacock Bridge) near Sink Creek; UMMZ 138408 (8) Chipola River at CR278 (Peacock Bridge) near Sink Creek; UMMZ 218170 (1) Chipola River 1 mi N of Marianna, 4 July 1964; UMMZ 247481 (2) Spring Creek 2.5 mi SE of Marianna. **GEORGIA: Decatur County:** FLMNH 4965 (1) Spring Creek at Georgia Power and Light Co. dam near Reynoldsville (Sta. 1048).

Flint River Drainage. **GEORGIA: Coweta County:** EPK85-002 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 1985; HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981. **Crawford County:** EPK (1) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 17 July 1976. **Decatur County:** CM 6111825 (4) Flint River; FLMNH 167 (5) Reynoldsville Spring Creek 10 mi WSW of Bainbridge (Sta. 1643); FLMNH 1907 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 65702 (4) Flint River; FLMNH 233222 (3) Spring Creek at Reynoldsville 10 mi WSW of Bainbridge (Sta. 1643); UMMZ 184196 (4) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge. **Dooly County:** FLMNH 251856 (1) Turkey Creek 0.5 mi S of Byronville, 25 Aug. 1995; UMMZ 56653 (4) Little Pennahatchee Creek 4 mi NW of Vienna; UMMZ 56675 (1) Flint River drainage (a stream) 6 mi NW of Vienna. **Dougherty County:** CM 618353 (3) Flint River near Albany; FLMNH 64822 (2) Flint River near Albany, Aug. 1902; FLMNH 64874 (3) Flint River at U.S. Rt 82 in Albany; FLMNH uncat. (3) Flint River at U.S. Rt 82 in Albany; MCZ 19189 (3) Flint River at U.S. Rt 82 in Albany; UMMZ 94367 (2) Flint River near Albany; UMMZ 97022 (2) Flint River near Albany; UMMZ 247560 (2) Flint River 10 mi S of Albany; USNM 85655 (2) Flint River near Albany. **Early County:** UMMZ 169782 (6) Dry Creek, 15 Sept. 1948. **Lee County:** FLMNH 47003 (1) Flint River at Georgia Rt 32, 10 mi E of Leesburg, 30 June 1967; USNM 86057 (2) Flint River at Georgia Rt 32, 10 mi E of Leesburg. **Macon County:** FLMNH 20709 (3) Flint River 4 mi E of Garden Valley, 22 Sept. 1969; FLMNH 30654 (1) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; FLMNH 46999 (4) Flint River at Georgia Rt 26 in Montezuma, 16 May 1981; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; USNM 85993 (2) Flint River at Georgia Rt 26 in Montezuma. **Meriwether County:** EPK84-003 (1) Line Creek at confluence of Flint River N of Georgia Rt 362 ca. 15 mi WSW of Griffin, 27 Aug. 1984. **Pike County:** EPK (1) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon, 17 July 1976. **Randolph County:** FLMNH 41524 (7) Ichawaynochaway Creek 3 mi N of Shellman. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982; UMMZ 94361 (11) Patsiliga Creek; UMMZ 94397 (2) Patsiliga Creek. **Webster County:** UMMZ 230549 (8) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961. **Worth County:** EPK87-002 (1) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 25 Aug. 1987; UMMZ 58514 (30) Jones Creek 2 mi S of Oakfield.

Present Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** JCB91-029 (3) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam; JCB91-031 (26) Apalachicola River at NM 99.6 mouth of Flat Creek just N of dirt boat ramp 0.4 RM below I-10. **Gulf County:** JCB91-095 (1) Apalachicola River near NM 20.7 in north pass to Brickyard Cutoff at west end of island ca. 10 m to south pass confluence. **GEORGIA: Decatur County:** JCB92-040 (4) Mosquito Creek at Georgia Rt 97 ca. 20 air mi SW of Bainbridge.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** JCB92-169 (18) South Fork Cowikee Creek near CR79 ca. 1.3 air mi NE of Batesville ca. 12.5 air mi NW of Eufaula. **Russell County:** JCB92-166 (1) Hatchechubbee Creek at U.S. Rt 431/Alabama Rt 1 ca. 8 air mi S of Seale. **GEORGIA: Clay County:** JCB92-179 (13) Hog Creek at Georgia Rt 266 ca. 5.5 air mi ENE of Fort Gaines. **Early County:** JCB92-041 (7) Kirkland Creek at U.S. Rt 84/Georgia Rt 38, 1.75 air mi WNW of Jakin; JCB92-042 (2) Sawhatchee Creek at Georgia Rt 273 ca. 0.25 air mi W of Cedar Springs ca. 7.25 air mi NW of Jakin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-044 (11) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-128 (3) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-045 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-091 (1) Chipola River ca. 2 mi above confluence of Apalachicola River NM 27.9 in major fork along east bank. **Jackson County:** JCB91-119 (4) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-123 (1) Chipola River at RM 74.8, 0.5 RM above I-10 confluence of unnamed creek along east bank. **GEORGIA: Baker County:** JCB91-137 (2) Flint River ca. 1 RM below Dry Creek; JCB92-045 (24) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-047 (1) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Coweta County:** JCB92-109 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan; JCB92-110 (11) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (2) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crawford County:** JCB92-096 (10) Spring Creek at CR160 ca. 5 air mi SSW of Roberta. **Crisp County:** JCB92-065 (13) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (11) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele; JCB92-190 (4) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park.

Flint River Drainage. **GEORGIA: Decatur County:** JCB91-001 (2) Flint River above Big Slough ca. 4.5 air mi N of Bainbridge; JCB91-004 (1) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-012 (2) Spring Creek 100 m N

of Georgia Rt 253; JCB91-017 (6) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-035 (10) Spring Creek at Georgia Rt 84 in Brinson; JCB92-051 (1) Spring Creek at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB92-198 (2) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank). **Dooly County:** JCB92-055 (1) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus; JCB92-067 (2) Sandy Mount Creek at Georgia Rt 90 ca. 2.5 air mi NW of Vienna. **Dougherty County:** JCB91-139 (8) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals. **Fayette County:** JCB92-150 (35) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (102) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Lee County:** JCB91-141 (2) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek; JCB92-158 (5) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg; JCB92-159 (10) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg; JCB92-192 (1) Lake Blackshear ca. 100 m W of entrance to Cedar Creek arm ca. 9 air mi WSW of Cordele. **Macon County:** JCB92-120 (3) Flint River at boat ramp near Georgia Rt 49 in Montezuma. **Marion County:** JCB92-156 (25) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Meriwether County:** JCB92-132 (1) Pigeon Creek at CR186 (Mitchell Cove Rd) ca. 3.5 air mi ENE of Manchester. **Miller County:** JCB92-050 (2) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Mitchell County:** JCB91-136 (1) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Pike County:** JCB92-125 (7) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon; JCB92-126 (3) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon; JCB92-127 (15) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon. **Sumter County:** JCB92-088 (6) Lime Creek at CR53 (Spring Creek Church Rd/Joe Stewart Rd) ca. 14.25 air mi ESE of Americus; JCB92-152 (10) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus. **Talbot County:** JCB92-146 (22) Lazer Creek at Georgia Rt 41 ca. 3 air mi S of Woodland ca. 4.5 air mi NNW of Talbotton. **Taylor County:** JCB92-093 (9) Patsiliga Creek at junction Georgia Rt 208/Georgia Rt 137 ca. 7.5 air mi NNE of Butler. **Terrell County:** JCB92-157 (8) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (26) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Upson County:** JCB92-130 (16) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston; JCB92-131 (22) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (3) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (37) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston; **Worth County:** JCB92-058 (104) Mill Creek at Georgia Rt 300 ca. 7.5 air mi SSW of Oakfield; JCB92-059 (19) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-060 (1) Jones Creek at Georgia Rt 300 ca. 1.25 air mi SSW of Oakfield; JCB92-062 (9) Mill Creek at CR4 ca. 8 air mi S of Oakfield; JCB92-063 (65) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

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Historic Records

Chattahoochee River Drainage. **ALABAMA: Houston County:** USNM 85567 (1) Chattahoochee River near Columbia. **GEORGIA: Muscogee County:** OSUM 24882 (2) Chattahoochee River drainage near Columbus; UMMZ 94093 (2) Chattahoochee River drainage near Columbus; USNM 85567 (4) Chattahoochee River near Columbus; USNM 85568 (8) Chattahoochee River near Columbus.

Chipola River Drainage. **FLORIDA: Jackson County:** UMMZ 138422 (1) Chipola River near Marianna, July 1918.

Flint River Drainage. **GEORGIA: Baker County:** MFM 7982 (2) Cooleewahee Creek 0.9 mi NE of Newton, 27 Nov. 1958. **Decatur County:** CM 1955-10 (3) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery; FLMNH 61608 (2) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 191112 (2) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954. **Dougherty County:** CM 618353 (1) Flint River near Albany; FLMNH 64979 (1) Flint River near Albany; FLMNH uncat. (1) Flint River at U.S. Rt 82 in Albany; MCZ 19189 (1) Flint River at U.S. Rt 82 in Albany; MCZ 191478 (1) Flint River near Albany; USNM 85567 (8) Flint River near Albany; USNM 123288 (4) Flint River near Albany.

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Historic Records

Chattahoochee River Drainage. **GEORGIA: Muscogee County:** UMMZ 23248 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 94072 (5) Chattahoochee River near Columbus. **Randolph County:** UMMZ 166413 (3) Cemochechobee Creek about 2 mi S of Coleman, 20 June 1945.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 64407 (6) Cowarts Creek near Cowart; UMMZ 138469 (8) Cowarts Creek near Florida state line; UMMZ 138476 (2) Spring Creek near Madrid, Aug. 1916; UMMZ 138492 (5) Cowarts Creek near Dothan, June 1916; UMMZ 138504 (28) Big Creek near Taylor, Aug. 1916; UMMZ 139209 (1) Big Creek Lake near Madrid, Aug. 1916; UMMZ 139222 (13) Cowarts Creek near Cowart, June 1916; UMMZ 139234 (4) Big Creek near Florida state line, Aug. 1916. **FLORIDA: Jackson County:** FLMNH 458 (12) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 4928 (7) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 5014 (16) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FMNH 89938 (1) Marshall Creek 8 mi W of Malone.

Flint River Drainage. **GEORGIA: Crisp County:** FLMNH 4999 (5) Cedar Creek, Cordele (Sta. 1710). **Dooly County:** UMMZ 56662 (7) Flint River drainage (a stream) 6 mi NW of Vienna. **Dougherty County:** CM 618353 (1) Flint River near Albany; FLMNH 2677 (4) Flint River at U.S. Rt 82 in Albany; FLMNH 226132 (9) Flint River near Albany; MCZ 191478 (2) Flint River at U.S. Rt 82 in Albany; UMMZ 54073 (3) Flint River near Albany; UMMZ 94088 (2) Flint River near Albany; UMMZ 94090

(6) Flint River near Albany; UMMZ 94099 (1) Flint River near Albany. **Taylor County:** UMMZ 43107 (6) Patsiliga Creek; UMMZ 65198 (2) Patsiliga Creek; UMMZ 94361 (2) Patsiliga Creek; UMMZ 169790 (3) Patsiliga Creek near Butler, 15 Sept. 1948. **Webster County:** UMMZ 94092 (5) Kinchafoonee Creek 1 mi W of Preston.

Present Records

Flint River Drainage. **GEORGIA: Baker County:** JCB92-047 (1) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Crisp County:** JCB92-066 (4) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele. **Decatur County:** JCB92-035 (2) Spring Creek at Georgia Rt 84 in Brinson; JCB92-205 (1) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Lee County:** JCB92-158 (3) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg; JCB92-159 (260) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Sumter County:** JCB92-152 (4) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus. **Terrell County:** JCB92-157 (6) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-160 (2) Ichawaynochaway Creek at U.S. Rt 82/Georgia Rt 50 ca. 9.5 air mi W of Dawson; JCB92-162 (52) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Webster County:** JCB92-155 (28) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (14) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB92-059 (6) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-061 (1) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970. **Gadsden County:** EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FLMNH 29743 (1) Apalachicola River at NM 105.3 rock shoal below Jim Woodruff Dam, 15 Jan. 1981; FLMNH 37826 (5) Apalachicola River near Chattahoochee, 20 May 1981; FLMNH uncat. (31) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 June 1954; FSU C-60 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 Aug. 1965; FSU C-632 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (4) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; MCZ 190281 (18) Apalachicola River near Chattahoochee, 24 Aug. 1954; MCZ 191599 (2) Apalachicola River near Chattahoochee, July 1953; MCZ 280486 (5) Apalachicola River near Chattahoochee, 20 May 1981; MFM 5119 (18) Apalachicola River near Chattahoochee, 24 Aug. 1954; OSUM 28848 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 5 Aug. 1986; OSUM 29246 (2) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 31 July 1986; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 215427 (7) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; UMMZ 227531 (6) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 May 1965; WHH75-005 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 1975; WHH77-001 (1) Apalachicola River near Chattahoochee, 1977. **Jackson County:** FLMNH 37823 (2) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 May 1981; GWP76-001 (1) Apalachicola River (at the Scholz Steam Plant) 3.5 mi SE of Sneads, 1976; MCZ 280490 (2) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 May 1981; OSUM 52198 (4) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 May 1982; PWP77-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, July 1977; PWP86-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, Sept. 1986.

Chattahoochee River Drainage. **GEORGIA: Muscogee County:** MCZ 186951 (5) Chattahoochee River near Columbus; MCZ uncat (2) Chattahoochee River near Columbus; USNM 83977 (2) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 2792 (1) Chipola River, Dead Lake; MCZ 190111 (2) Chipola River 2.5 mi SE of Chason; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988; WJC56-154 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown. **Gulf County:** MCZ 85898 (4) Chipola River, Dead Lake, 24 April 1915; USNM 381938 (2) Chipola River, Dead Lake, 15 May 1930; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988.

Flint River Drainage. **GEORGIA: Baker County:** CM 6111719 (2) Branch of Flint River; FLMNH uncat. (2) Flint River drainage; FMNH 52429 (1) Flint River drainage; MCZ 189794 (5) Flint River; MCZ 189795 (5) Flint River drainage; MCZ 235944 (11) Flint River near Newton, 27 Nov. 1958; MFM 7993 (11) Flint River near Newton, 27 Nov. 1958; UMMZ 96644 (4.5) Branch of Flint River. **Coweta County:** HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981. **Crawford County:** MCZ 250868 (1) Flint River 1 mi W of Nakomis, Sept. 1962. **Crisp County:** UMMZ 178519 (1) Flint River at U.S. Rt 280 near Cordele, 11 Oct. 1950. **Decatur County:** CM 1955-2 (1) Flint River at U.S. Rt 27 in Bainbridge; FLMNH 66768 (1) Flint River at U.S. Rt 27 in Bainbridge; FLMNH 67010 (1) Flint River U.S. Rt 27 in Bainbridge; MCZ 190279 (17) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 190280 (1) Flint River near Bainbridge, 1 Sept. 1954; MCZ 191112 (3) Flint River near Recovery, 1 Sept. 1954; MFM 5126 (7) Flint River near Bainbridge, Oct. 1954; UMMZ 184229 (14) Flint River near Bainbridge, 1 Sept. 1954; WHH75-011 (1) Flint River at U.S. Rt 27 in Bainbridge, 1975. **Dougherty County:** FLMNH uncat. (1) Flint River near Albany; UMMZ 96645 (1) Flint River near Albany; USNM 84099 (3) Flint River near

Albany. **Lee County:** WHH75-010 (1) Flint River at Georgia Rt 32, 10 mi E of Leesburg, 1975. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MCZ 280489 (3) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; MFM 7905 (4) Flint River 9.7 mi S of Oglethorpe, 11 Oct. 1958; OSUM 52224 (3) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; USNM 84100 (1) Flint River.

Present Records

Apalachicola River Drainage. **FLORIDA: Franklin County:** JCB91-094 (2) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Gadsden County:** JCB91-028 (11) Apalachicola River at NM 105.2 Race Bluff/Race Shoals 0.6 RM S of Jim Woodruff Dam; JCB91-029 (2) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam; JCB91-030 (11) Apalachicola River between NM 100.1 and NM 100.4, 0.25 mi N of I-10. **Jackson County:** JCB91-026 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **Liberty County:** JCB91-019 (6) Apalachicola River at NM 92.5 just S of Rock Bluff Landing; JCB91-020 (2) Apalachicola River at NM 86.1 between and along rock dike and man-made dike.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-007 (1) Flint River above Lamar ca. 16 mi NNE of Bainbridge; JCB91-132 (5) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB91-137 (1) Flint River ca. 1 RM below Dry Creek. **Crawford County:** JCB92-197 (1) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds. **Decatur County:** JCB92-198 (18) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-199 (11) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-200 (13) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-201 (2) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/CR394 (Cocktown Rd). **Dooly County:** JCB92-055 (1) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus. **Dougherty County:** JCB91-139 (11) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals; JCB91-142 (5) Flint River 0.7 mi above Dry Creek at spring above and across from Turtle Shoals. **Lee County:** JCB91-141 (20) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek. **Macon County:** JCB92-090 (9) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma; JCB92-119 (7) Flint River at Georgia Rt 26 in Montezuma; JCB92-196 (1) Flint River ca. 4 air mi below Georgia Rt 96 ca. 1 RM below Fraser Branch ca. 12.5 air mi N of Montezuma. **Mitchell County:** JCB91-130 (6) Flint River at hairpin bend ca. 10 air mi below Georgia Rt 37; JCB91-134 (8) Flint River ca. 4 RM above Georgia Rt 37 near Newton; JCB91-135 (2) Flint River at confluence of Raccoon Creek; JCB91-136 (1) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Sumter County:** JCB92-054 (6) Flint River at confluence of Mountain Creek along large rock bluff on the west bank ca. 7.75 air mi SE of Andersonville; JCB92-056 (2) Flint River at island ca. 1.5 RM below Reeves Landing ca. 13.75 air mi ENE of Americus. **Worth County:** JCB91-140 (14) Flint River at confluence of Abrams Creek; JCB92-063 (1) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

Glebula rotundata

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970; GTW88-001 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988; MCZ 190394 (1) Apalachicola River near Blountstown, 31 Aug. 1954; RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988; WHH75-006 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 1968; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Franklin County:** UMMZ 247161 (1) Apalachicola River 1 mi W of Apalachicola on U.S. 98, 11 July 1964. **Gadsden County:** RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987. **Gulf County:** UMMZ 107551 (1) Lake Wimico.

Chipola River Drainage. **FLORIDA: Calhoun County:** HGL74-002 (1) Chipola River, Dead Lake, 1974; MCZ 190393 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; UMMZ 138373 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138395 (1) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** EPK82-001 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 31 July 1982; EPK84-004 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 31 Aug. 1984; FLMNH 214637 (5) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 229776 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 10 July 1988; FLMNH 243974 (58) Chipola River, 14 Aug. 1988; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; WHM88-002 (3) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-079 (44) Hageman Ditch ca. 0.5 mi above confluence of Apalachicola River NM 55.9; JCB91-080 (6) Apalachicola River at confluence of Hageman Ditch near NM 56; JCB91-082 (33) Apalachicola River at NM 50.7 in backwater area. **Franklin County:** JCB91-094 (27) Apalachicola River near NM 21.8 at

north tip and in back channel of Brickyard Island; JCB91-096 (38) Apalachicola River at NM 17.7 confluence of Smith Creek; JCB91-097 (1) Apalachicola River at NM 15.0 just S of Dike 2 along west bank; JCB91-098 (8) Little Brothers Creek ca. 100 m above confluence of Brothers River (near confluence of Apalachicola River NM 12.2); JCB91-101 (31) Bearman Creek at N29:53.51/W85:02.41 (near southwest end of Forbes Island W of Apalachicola River NM 15.5) at north end of teardrop island; JCB91-102 (5) Harrison Creek at first 180-degree bend above confluence of Brothers River along north side of bend (W of Apalachicola River NM 14.8); JCB91-103 (27) St. Marks River 40 m above confluence of Apalachicola River NM 10.3 along south bank; JCB91-105 (1) Four Tree Cutoff along northeast bank of bend (E of Apalachicola River NM 3.1); JCB91-107 (8) St. Marks River at N29:48.69/W85:01.09 (just S of East River Cutoff) confluence of backwater along west bank; JCB91-109 (26) Apalachicola River near NM 15.3 at south end of Bloody Bluff Island's back channel. **Gadsden County:** JCB91-029 (1) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam. **Gulf County:** JCB91-095 (5) Apalachicola River near NM 20.7 in north pass to Brickyard Cutoff at west end of island ca. 10 m to south pass confluence; JCB91-099 (30) Brothers River at N29:57.06/W85:03.03 (W of Apalachicola River NM 21.2) "Three Fingers" area just N of Brickyard Cutoff; JCB91-110 (32) Apalachicola River at NM 7.9 confluence of Hoffman Creek. **Liberty County:** JCB91-084 (8) Florida River ca. 0.3 mi above confluence of Apalachicola River NM 43.1; JCB91-087 (24) River Styx above confluence of Apalachicola River NM 35.4, 100 m up into second fork along north bank; JCB91-089 (1) Apalachicola River near NM 28.8, 100 m into south channel of Battle Bend; JCB91-092 (1) Apalachicola River at NM 24.5 Lower Elbow along east bank.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-128 (3) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-038 (3) Chipola River Cutoff at second large bend (near the Apalachicola River side); JCB91-039 (4) Chipola River Cutoff along edge of bend near Florida Rt 22A; JCB91-040 (12) Whites River S of Wewahitchka; JCB91-041 (1) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-045 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-090 (25) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank; JCB91-091 (15) Chipola River ca. 2 mi above confluence of Apalachicola River NM 27.9 in major fork along east bank; JCB91-093 (3) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987.

Lampsilis binominata

Historic Records

Chattahoochee River Drainage. **GEORGIA: Chattahoochee County:** IL1863d (1) Chattahoochee River at Uchee Bar. **Muscogee County:** FLMNH 65469 (1) Chattahoochee River near Columbus; MCZ 224097 (5) Chattahoochee River near Columbus; OSUM 9411 (1) Chattahoochee River near Columbus; UMMZ 83825 (2) Chattahoochee River drainage near Columbus; USNM 84883 (8) Chattahoochee River drainage near Columbus. **Troup County:** MFM 368 (1) Chattahoochee River near West Point, March 1942.

Flint River Drainage. **GEORGIA: Coweta County:** MFM 11979 (3) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 5 Nov. 1964. **Crawford County:** OSUM 53870 (1) Flint River 3.0 mi E of Reynolds, 6+ mi W of Fort Valley, 4 Nov. 1971. **Meriwether County:** MFM 12154 (3.5) Flint River 5 mi E of Alvaton, 17 Aug. 1965; MFM 16715 (3) Flint River at Flat Shoals 6.5 km SE of Gay, 15 Oct. 1967; OSUM 53560 (1) Flint River near Warm Springs, April 1976. **Pike County:** MFM 16732 (1) Flint River 7.7 km SE of Alvaton, 15 Oct. 1967.

Lampsilis straminea claibornensis

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FSU C-784 (7) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 2 Aug. 1968. **Gadsden County:** FLMNH 8441 (6) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; MCZ 190369 (1) Apalachicola River near Chattahoochee, 12 Sept. 1954; MCZ 190385 (6) Apalachicola River near Chattahoochee, 24 Aug. 1954; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; UMMZ 215389 (2) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10; UMMZ 218191 (2) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 24 May 1964.

Chattahoochee River Drainage. **GEORGIA: Muscogee County:** OSUM 9823 (1) Chattahoochee River drainage near Columbus; USNM 25717a (2) Chattahoochee River drainage near Columbus; USNM 30438 (2) Chattahoochee River drainage near Columbus; USNM 86142 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** CM 6111951 (2) Big Creek Lake near Madrid; FLMNH 395 (2) Big Creek Lake near Madrid, May 1912; HV40-013 (1) Cowarts Creek near Madrid; MCZ 190307 (2) Big Creek Lake near Madrid, May 1912; UMMZ 138465 (1) Cowarts Creek near Florida state line; UMMZ 139212 (1) Big Creek Lake near Madrid, Aug. 1916. **FLORIDA: Calhoun County:** EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; HGL74-003 (1) Chipola River 2 mi E of Clarksville, 19 May 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; UMMZ 138398 (2) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138450 (4) Chipola River near Altha. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; FLMNH 3442 (1) Chipola River, 10 July 1930; FLMNH 65360 (1) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek, July 1918; FMNH 89938 (1) Marshall Creek 8 mi W of Malone; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km

W of Malone, 30 Sept. 1967; HV40-015 (2) Spring Creek 2.5 mi SE of Marianna; MCZ 112044 (1) Chipola River near Marianna; MCZ 190382 (2) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 190383 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 190384 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; OSUM 13921 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 24 March 1965; RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-005 (1) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna, 10 Oct. 1987; RSB87-008 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; RSB88-009 (2) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 138417 (7) Chipola River near Marianna, July 1918; UMMZ 215388 (1) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna.

Flint River Drainage. **GEORGIA: Baker County:** MFM 8001 (2) Ichawaynochaway Creek at Georgia Rt 91, 12 mi SSW of Newton, 27 Nov. 1958. **Crawford County:** FLMNH 20711 (2) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds, 22 Sept. 1969; MCZ 237445 (9) Flint River 1 mi W of Nakomis, Sept. 1962; OSUM 24324 (1) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 21 Feb. 1970. **Crisp County:** MCZ 111332 (3) Flint River 10 mi W of Cordele, 1929; SLY76-001 (1) Flint River, Lake Blackshear near Cordele; UMMZ 56731 (3) Flint River 10 mi W of Cordele. **Decatur County:** FLMNH 178 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; FLMNH 373 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 383 (6) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 4974 (2) Lake Seminole in Spring Creek arm ca. 1 mi below Georgia Rt 253, 8 June 1954; MCZ 190366 (11) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190374 (14) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 191589 (7) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; MFM 5131 (5) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 1964; MFM 5140 (11) Flint River near Bainbridge, 1 Sept. 1954; RSB88-001 (1) Spring Creek at Georgia Rt 84 in Brinson, 16 Oct. 1988; UMMZ 184225 (2) Flint River near Recovery, Aug. 1954. **Dougherty County:** MCZ 111502 (1) Flint River 10 mi S of Albany, 1929; USNM 86141 (4) Flint River near Albany. **Macon County:** AE91-002 (1) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma, 9 June 1961; AE91-005 (5) Flint River 2 mi below Georgia Rt 127 N of Montezuma, 10 Aug. 1961; EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; HGL86-006 (1) Flint River at Georgia Rt 26 in Montezuma, 1986; MCZ 280494 (3) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; MFM 7909 (6) Flint River 9.7 mi S of Oglethorpe, 11 Oct. 1958. **Seminole County:** MCZ 190081 (2) Spring Creek 2.5 mi S of Reynoldsville. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982. **Worth County:** MCZ 98427 (1) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 23 Aug. 1933.

Present Records

Apalachicola River Drainage. **FLORIDA: Franklin County:** JCB91-094 (1) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Liberty County:** JCB91-086 (1) Apalachicola River at NM 40.4, confluence of Swift Slough.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-112 (2) Chipola River at RM 37.5 ca. 8 RM N of Florida Rt 71. **Gulf County:** JCB91-090 (1) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank. **Jackson County:** JCB91-119 (1) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-123 (9) Chipola River at RM 74.8, 0.5 RM above I-10 confluence of unnamed creek along east bank; JCB91-124 (8) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-126 (6) Chipola River at RM 79.8 ca. 2 mi S of U.S. Rt 90/Florida Rt 10 along west bank; JCB91-127 (6) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek; JCB94-002 (NR) Baker Creek about 7 air mi NNW of Marianna; JCB94-073 (NR) Spring Creek 200 m below Merritt's Mill Pond dam.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-047 (3) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton; JCB92-048 (2) Ichawaynochaway Creek at Georgia Rt 200 ca. 9.5 air mi WSW of Newton; JCB94-070 (NR) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Coweta County:** JCB92-110 (1) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia. **Crawford County:** JCB92-197 (1) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds. **Crisp County:** JCB92-194 (2) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park; JCB94-074 (NR) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB91-017 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-035 (1) Spring Creek at Georgia Rt 84 in Brinson; JCB92-051 (3) Spring Creek at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB94-076 (NR) Spring Creek at Georgia Rt 84 in Brinson. **Lee County:** JCB92-192 (7) Lake Blackshear ca. 100 m W of entrance to Cedar Creek arm ca. 9 air mi WSW of Cordele. **Macon County:** JCB92-090 (3) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma; JCB92-196 (1) Flint River ca. 4 air mi below Georgia Rt 96 ca. 1 RM below Fraser Branch ca. 12.5 air mi N of Montezuma. **Miller County:** JCB92-037 (6) Spring Creek at U.S. Rt 27 in Colquitt. **Sumter County:** JCB92-193 (1) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Terrell County:** JCB92-157 (5) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson. **Webster County:** JCB92-155 (1) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston.

Lampsilis subangulata

Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** FLMNH 4985 (4) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; MCZ 190080 (6) Mosquito Creek 1 mi S of Chattahoochee; MFM 4397 (4) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; MFM 9479 (5) Mosquito Creek below dam 1 mi E of Chattahoochee, 25 Jan. 1962.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** MCZ 218101 (20) Cowikee Creek 6 mi N of Eufaula, 4 Sept. 1955; MFM 5735 (20) Cowikee Creek 6 mi N of Eufaula, 4 Sept. 1955. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; FLMNH 69034 (1) Uchee Creek near Nuckols, 26 June 1915; JJJ73-001 (2) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 1972; JJJ73-002 (3) Uchee Creek at CR39, 3.2 mi NW of Ft. Mitchell, 27 Oct. 1972; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-007 (1) Little Uchee Creek above U.S. Rt 431, 7.5 mi NE of Seale, 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; MFM 5822 (5) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 24 Sept. 1955; UMMZ 163770 (2) Uchee Creek near Nuckols, June 1915. **GEORGIA: Fulton County:** USNM 85081 (2) Chattahoochee River near Roswell. **Muscogee County:** CM 61745 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; FLMNH uncat. (1) Mill Branch near Columbus [this may be Mill Creek in Phenix City, Russell Co., AL]; MCZ 190345 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 240350 (1) Chattahoochee River near Columbus; UMMZ 23276 (3) Chattahoochee River drainage near Columbus; UMMZ 89108 (5.5) Chattahoochee River near Columbus; USNM 25459 (6) Chattahoochee River near Columbus; USNM 85078 (4) Chattahoochee River drainage near Columbus

Chipola River Drainage. **ALABAMA: Houston County:** HV40-011(2) Cowarts Creek near Dothan; UMMZ 139273 (4) Cowarts Creek near Cowart, June 1916; UMMZ 183461 (6) Cowarts Creek near Florida state line, 1916. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; FLMNH 418 (8) Chipola River 2 mi E of Clarksville, 30 Aug. 1964; FLMNH 427 (11) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 3282 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 19 May 1974; FSU C-97 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 24 Sept. 1965; FSU C-418 (6) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 12 May 1967; GTW80-002 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 23 Aug. 1980; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL67-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 26 June 1967; HGL74-003 (1) Chipola River 2 mi E of Clarksville, 19 May 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 19038 (11) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MCZ 112042 (6) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; MCZ 112043 (2) Chipola River near Altha, July 1918; MCZ 190325 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 190326 (27) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 3 Aug. 1954; MCZ 191993 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MFM 4809a (7) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, May 1955; RSB88-005 (1) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-011 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1988; RSB88-012 (3) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138369 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138403 (26) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138454 (6) Chipola River near Altha, July 1918; UMMZ 218179 (6) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 29 July 1964; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WJC56-147 (1) Chipola River 2.5 mi SE of Chason. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; EPK81-005 (1) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 15 June 1981; FLMNH 390 (6) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; FLMNH 436 (7) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FLMNH 464 (2) Marshall Creek 8 mi W of Malone, 2 Sept. 1954; FLMNH 3279 (6) Spring Creek 2.5 mi SE of Marianna, 22 Nov. 1932; FLMNH 3282 (17) Spring Creek 2.5 mi SE of Marianna, 28 Feb. 1933; FLMNH 3284 (11) Spring Creek 3 mi SE of Marianna, 17 May 1933; FMNH 89938 (2) Marshall Creek 8 mi W of Malone; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; MCZ 190094 (5) Chipola River system (a creek [probably Rocky Creek]) 2.4 mi NNW of Sink Creek, Oct. 1953; MCZ 190327 (6) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 190329 (7) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 190330 (8) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 191448 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 1954; MCZ 191591 (1) Chipola River 3 mi S of Marianna, 17 July 1953; MCZ 191980 (2) Cowarts Creek 6 mi W of Malone, 1954; MCZ 191981 (1) Chipola River 1 mi N of Marianna, 1954; OSUM 23442 (2) Marshall Creek near Florida Rt 2, 1 mi SW of Sills, 30 Sept. 1967; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-008 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; RSB88-009 (3) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 57440 (15) Spring Creek 2.5 mi SE of Marianna; UMMZ 57452 (3) Spring Creek 3 mi SE of Marianna; UMMZ 138413 (5) Chipola River near Marianna, July 1918; UMMZ 247312 (3) Spring Creek 2.5 mi SE of Marianna.

Flint River Drainage. **GEORGIA: Baker County:** CM 6111882 (5) Flint River at Georgia Rt 37 in Newton; FLMNH 389 (5) Flint River at Georgia Rt 37 in Newton; MCZ 111315 (4)

Cooleewahee Creek near Newton, 1929; MCZ 111479 (1) Ichawaynochaway Creek 10 mi SW of Newton, 1929; MCZ 190295 (5) Flint River at Georgia Rt 37 in Newton; MFM 7981 (54) Cooleewahee Creek 0.9 mi NE of Newton, 27 Nov. 1958; MFM 8000 (3) Ichawaynochaway Creek at Georgia Rt 91, 12 mi SSW of Newton, 27 Nov. 1958. **Coweta County:** HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; MFM 11976 (16) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 15 Nov. 1964; MFM 14457 (5) Line Creek 6 km E of Haralson, 27 Nov. 1966. **Crisp County:** MCZ 234192 (1) Gum Creek 1 mi N of Cordele, 27 Aug. 1961. **Decatur County:** MCZ 190324 (2) Flint River near Bainbridge, 1 Sept. 1954; RSB88-001 (5) Spring Creek at Georgia Rt 84 in Brinson, 16 Oct. 1988; UMMZ 98118 (8) Flint River. **Dougherty County:** CM 618927 (2) Flint River at U.S. Rt 82 in Albany; MCZ 6058 (4) Flint River near Albany; MCZ 186995 (2) Flint River near Albany; MCZ 191762 (2) Flint River at U.S. Rt 82 in Albany; MCZ 203076 (7) Flint River near Albany; UMMZ 89112 (3) Flint River near Albany. **Early County:** UMMZ 49755 (1) Dry Creek 2 mi NE of Jakin; UMMZ 68828 (0.5) Dry Creek. **Macon County:** HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981. **Meriwether County:** MFM 12152 (21) Flint River 5 mi E of Alvaton, 17 Aug. 1965. **Pike County:** EPK81-003 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 May 1981; MFM 16731 (1) Flint River 7.7 km SE of Alvaton, 13 Oct. 1967; OSUM 25054 (2) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 24 Sept. 1968. **Seminole County:** MCZ 190087 (2) Spring Creek 2.5 mi S of Reynoldsville, 10 Oct. 1953; MCZ 191587 (4) Spring Creek below dam at Reynoldsville 10 mi WSW of Bainbridge, 27 June 1953. **Spalding County:** MFM 14472 (6) Flint River at Long Creek Rd 17 km W of Griffin, 24 Nov. 1966. **Taylor County:** MCZ 52060 (2) Patsiliga Creek near Butler; MCZ 186953 (11) Patsiliga Creek; UMMZ 89109 (3) Patsiliga Creek; UMMZ 89117 (3) Flint River drainage; USNM 85080 (3) Flint River drainage. **Webster County:** USNM 134491 (2) Flint River drainage near Preston. **Worth County:** MCZ 98412 (3) Jones Creek 2 mi S of Oakfield, 23 Aug. 1933; MCZ 98422 (1) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 1933; UMMZ 58287 (12) Jones Creek 2 mi S of Oakfield; UMMZ 58294 (1) Abrams Creek 5 mi S of Oakfield; UMMZ 58303 (2) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB92-136 (2) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale. **GEORGIA: Early County:** JCB92-041 (1) Kirkland Creek at U.S. Rt 84/Georgia Rt 38, 1.75 air mi WNW of Jakin; JCB94-064 (2) Sawhatchee Creek at Georgia Rt 273 bridge about 0.25 air mi W of Cedar Springs.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-036 (2) Chipola River at Peacock Springs above RM 55, 0.1 RM N of CR274; JCB91-044 (3) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-113 (1) Chipola River at RM 41.3 ca. 3 RM S of Florida Rt 20. **Jackson County:** JCB91-124 (1) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-127 (1) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-045 (5) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-046 (8) Chickasawhatchee Creek at CR121 ca. 9 air mi NW of Newton; JCB92-047 (3) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Coweta County:** JCB92-110 (2) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Decatur County:** JCB92-035 (4) Spring Creek at Georgia Rt 84 in Brinson; JCB92-205 (2) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Lee County:** JCB92-158 (1) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg. JCB92-159 (6) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Miller County:** JCB92-037 (3) Spring Creek at U.S. Rt 27 in Colquitt; JCB92-049 (2) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin; JCB92-050 (1) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Pike County:** JCB92-125 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon. **Spalding County:** JCB92-123 (1) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin. **Terrell County:** JCB92-157 (3) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (1) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Webster County:** JCB92-155 (11) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970; DC70-004 (1) Apalachicola River ca. 2.6 mi below J. R. Landing, 1970; MCZ 115330 (1) Apalachicola River near Blountstown, 15 May 1935; MCZ 191848 (5) Apalachicola River near Blountstown, 31 Aug. 1954; RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Gadsden County:** CM 46863 (2) Apalachicola River at NM 106 below Jim Woodruff dam; DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FLMNH 172 (1) Apalachicola River near Chattahoochee, 15 July 1954; FLMNH 174 (5) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1953; FLMNH 454 (5) Apalachicola River near Chattahoochee, 12 Sept. 1954; FLMNH 461 (4) Apalachicola River near Chattahoochee, 24 Aug. 1954; FLMNH 4989 (4) Mosquito Creek 1 mi S of Chattahoochee, Oct. 1953; FLMNH 8442 (3) Mosquito Creek near Chattahoochee; FLMNH 8446B (37) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; FLMNH 30109 (4) Apalachicola River near Chattahoochee, 28 Aug. 1979; FLMNH 37827 (3) Apalachicola River near Chattahoochee, 20 May 1981; FLMNH 47363 (9)

Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 21 June 1975; FLMNH 47365 (4) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 18 May 1974; FLMNH 213787 (1) Apalachicola River near Chattahoochee, 4 June 1977; FLMNH 213788 (2) Apalachicola River near Chattahoochee, 21 July 1977; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; MCZ 191845 (2) Apalachicola River at NM 106 below Jim Woodruff Dam; MCZ 191849 (1) Mosquito Creek 1 mi above confluence of Apalachicola River, 25 Aug. 1954; MCZ 191856 (1) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191858 (7) Apalachicola River near Chattahoochee, 12 Sept. 1954; MCZ 191860 (9) Apalachicola River near Chattahoochee, 24 Aug. 1954; MCZ 280496 (3) Apalachicola River near Chattahoochee, 20 May 1981; OSUM 14227 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 May 1965; OSUM 29249 (7) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 31 July 1986; OSUM 47002 (1.5) Apalachicola River 0.3 mi S of U.S. Rt 90/Florida Rt 10, 1.1 mi SW of Chattahoochee, 18 Aug. 1979; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 184214 (2) Apalachicola River at NM 106 below Jim Woodruff Dam; UMMZ 218192 (6) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 24 May 1964; UMMZ 247281 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952. **Jackson County:** HGL74-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 1974; HGL75-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 June 1975; LAA87-001 (1) Apalachicola River NM 105.9, 1986; OSUM 47007 (3) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 28 Aug. 1979; OSUM 52200 (4) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 May 1981; PWP77-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, July 1977; PWP86-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, Sept. 1986. **Liberty County:** FLMNH 1923 (2) Apalachicola River below Florida Rt 20 bridge, 31 Aug. 1954.

Chattahoochee River Drainage. **ALABAMA: Houston County:** WHH64-001 (1) Chattahoochee River at U.S. Rt 84/Alabama Rt 12, 3 mi SE of Gordon, 1964. **Russell County:** JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972. **GEORGIA: Clay County:** UMMZ 58218 (1) Chattahoochee River near Fort Gaines, 24 Aug. 1933. **Muscogee County:** FLMNH 65702 (10) Chattahoochee River near Columbus; MCZ 37513 (20.5) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 435 (5) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 451 (4) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 468 (5) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; HV40-022 (17) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; HV40-023 (6) Chipola River at Pole Bluff Landing 7.1 km E of Kinard; MCZ 191851 (4) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 191859 (7) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MCZ 191864 (17) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 47249 (2) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; FLMNH 214640 (2) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 243992 (8) Chipola River, 14 Aug. 1988; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; HV40-024 (24) Chipola River, Dead Lake; OSUM 23456 (5) Chipola River 3 mi N of dam at Wewahitchka, 30 Sept. 1967; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; OSUM 23443 (2) Marshall Creek near Florida Rt 2, 1 mi SW of Sills, 30 Sept. 1967.

Flint River Drainage. **GEORGIA: Baker County:** MCZ 111477 (1) Ichawaynochaway Creek 10 mi SW of Newton, 1929; MCZ 191581 (1) Flint River near Newton, 30 June 1953. **Crawford County:** OSUM 24325 (3.5) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 21 Feb. 1970; OSUM 24384 (6) Flint River at Rt 6, 1 mi W of Nakomis, 1964; OSUM 39965 (1) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 17 July 1976; UMMZ 234188 (7) Flint River W of Nakomis, 1964. **Crisp County:** MCZ 111333 (11) Flint River 10 mi W of Cordele, 1929; SLY76-001 (1) Flint River, Lake Blackshear near Cordele. **Decatur County:** FLMNH 176 (4) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; FLMNH 377 (4) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 378 (9) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 Aug. 1954; FLMNH 47242 (1) Lake Seminole at Jim Woodruff Dam, 18 May 1974; HGL74-004 (2) Lake Seminole at Jim Woodruff Dam, 1974; MCZ 191862 (9) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 191865 (19) Flint River near Bainbridge, 1 Sept. 1954; USNM 665767 (1) Flint River near Bainbridge, 7 Aug. 1958. **Dougherty County:** MCZ 111501 (5) Flint River 10 mi S of Albany, 1929; MCZ 115673 (1.5) Flint River near Albany, 1929. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; FLMNH 20708 (2) Flint River 4 mi E of Garden Valley, 22 Sept. 1969; FLMNH 46995 (1) Flint River at Georgia Rt 26 in Montezuma, 16 May 1981; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MCZ 280495 (4) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981. **Seminole County:** MCZ 190078 (2) Spring Creek 2.5 mi S of Reynoldsville; MCZ 191585 (23) Spring Creek below dam at Reynoldsville 10 mi WSW of Bainbridge, 27 June 1953; UMMZ 184202 (3) Spring Creek near Reynoldsville, 1953. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-034 (9) Apalachicola River at NM 90.0; JCB91-079 (3) Hageman Ditch ca. 0.5 mi above confluence of Apalachicola River NM 55.9; JCB91-080 (2) Apalachicola River at confluence of Hageman Ditch near NM 56; JCB91-082 (7) Apalachicola River at NM 50.7 in backwater area. **Franklin County:** JCB91-094 (6) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island; JCB91-096 (1) Apalachicola River at NM 17.7 confluence of Smith Creek; JCB91-100 (3) Brothers River at N29:55.46/W85:03.21 (west side of Forbes Island) southeast corner of dogleg between Brickyard Cutoff and Howard Creek; JCB91-101 (2) Bearman Creek at N29:53.51/W85:02.41 (near southwest end of Forbes Island W of Apalachicola River NM 15.5) at north end of teardrop island; JCB91-103 (1) St. Marks River 40 m above confluence of Apalachicola River NM 10.3 along south bank; JCB91-109 (8) Apalachicola River near NM 15.3 at south end of Bloody Bluff Island's back channel. **Gadsden County:** JCB91-018 (27) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; JCB91-027 (3) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10; JCB91-028 (1) Apalachicola River at NM 105.2 Race Bluff/Race Shoals 0.6 RM S of Jim Woodruff Dam; JCB91-029 (49) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam; JCB91-031 (3) Apalachicola River at NM 99.6 mouth of Flat Creek just N of dirt boat ramp 0.4 RM below I-10; JCB92-206 (54) Apalachicola River at NM 106 below Jim Woodruff Dam. **Gulf County:** JCB91-083 (1) Apalachicola River at NM 47.4 ca. 20 m from west bank between the dikes; JCB91-095 (4) Apalachicola River near NM 20.7 in north pass to Brickyard Cutoff at west end of island ca. 10 m to south pass confluence. **Jackson County:** JCB91-026 (41) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **Liberty County:** JCB91-020 (2) Apalachicola River at NM 86.1 between and along rock dike and man-made dike; JCB91-021 (2) Apalachicola River at NM 83 at end of dike on sandy spoil site; JCB91-024 (1) Apalachicola River at NM 75.7 and U.S. Army COE marker 108, 1.7 RM S of Blountstown gage; JCB91-086 (3) Apalachicola River at NM 40.4 confluence of Swift Slough.

Chattahoochee River Drainage. **FLORIDA: Jackson County:** JCB91-049 (2) Chattahoochee River at NM 24.5 confluence of Irwin Mill Creek just above Florida Rt 2/Georgia Rt 91; JCB92-203 (2) Chattahoochee River above Lake Seminole ca. 50 m below NM 23.7, 0.25 mi below Florida Rt 2/Georgia Rt 91 along steep west bank. **GEORGIA: Seminole County:** JCB91-050 (2) Chattahoochee River above rock shoal at NM 31; JCB92-202 (1) Chattahoochee River above Lake Seminole 100 m below NM 19.9 along east bank; JCB92-204 (2) Lake Seminole at island near NM 8.1 at end of Georgia Rt 253.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-115 (1) Chipola River at RM 49.8, 5.5 RM above Florida Rt 20. **Gulf County:** JCB91-038 (11) Chipola River Cutoff at second large bend (near the Apalachicola River side); JCB91-039 (6) Chipola River Cutoff along edge of bend near Florida Rt 22A; JCB91-040 (1) Whites River S of Wewahitchka; JCB91-041 (25) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-045 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-046 (12) Chipola River Cutoff at confluence of Chipola River; JCB91-090 (3) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank; JCB91-091 (1) Chipola River ca. 2 mi above confluence of Apalachicola River NM 27.9 in major fork along east bank; JCB91-093 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-007 (2) Flint River above Lamar ca. 16 mi NNE of Bainbridge; JCB91-009 (1) Flint River 14 mi NNE of Bainbridge; JCB91-132 (1) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB91-133 (2) Flint River ca. 2 RM above Georgia Rt 37; JCB91-137 (1) Flint River ca. 1 RM below Dry Creek. **Crisp County:** JCB92-190 (2) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park; JCB92-191 (1) Lake Blackshear in Cedar Creek arm ca. 200 m W of Georgia Rt 358 (Coney Rd) ca. 7.5 air mi SW of Cordele; JCB92-194 (11) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB91-001 (18) Flint River above Big Slough ca. 4.5 air mi N of Bainbridge; JCB91-002 (4) Flint River 4 air mi N of Bainbridge; JCB91-003 (3) Flint River at confluence of Big Slough Creek above Bainbridge; JCB91-004 (7) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-006 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB91-011 (2) Flint River just above Bainbridge; JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB91-013 (3) Lake Seminole in Spring Creek arm ca. 1 mi below Georgia Rt 253; JCB91-016 (1) Lake Seminole in river channel of Flint River arm at Georgia Rt 310 (Hutchinson Ferry Rd); JCB91-017 (4) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-198 (5) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-199 (4) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-200 (2) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-201 (7) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/CR394 (Cocktown Rd). **Dooly County:** JCB92-055 (1) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus; JCB92-057 (1) Flint River in backwater area (across from "Campers Haven" boat ramp and park) ca. 0.5 RM S of Georgia Rt 27 ca. 11 air mi WSW of Vienna. **Dougherty County:** JCB91-139 (3) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals. **Fayette County:** JCB95-100 (1) Whitewater Creek at Georgia Rt 85 crossing below Starrs Mill dam. **Lee County:** JCB92-192 (1) Lake Blackshear ca. 100 m W of entrance to Cedar Creek arm ca. 9 air mi WSW of Cordele. **Mitchell County:** JCB91-130 (2) Flint River at hairpin bend ca. 10 air mi below Georgia Rt 37; JCB91-131 (2) Flint River ca. 3 RM below Georgia Rt 37. **Sumter County:** JCB92-193 (3) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore.

Lasmigona subviridis

Historic Records

Flint River Drainage. **GEORGIA: Meriwether County:** MFM 15038 (1) Flint River at Flat Shoals 6.5 km SE of Gay, 23 April 1967.

Chattahoochee River Drainage. **GEORGIA: Muscogee County:** UMMZ 23324 (1) Chattahoochee River, Columbus.

Medionidus penicillatus

Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** MCZ 190302 (1) Apalachicola River near Chattahoochee, 24 Aug. 1954.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972. **GEORGIA: Early County:** FLMNH 1944 (5) Sawhatchee Creek 14 mi NW of Donaldsonville, 29 June 1953; MCZ 191629 (5) Sawhatchee Creek 14 mi NW of Donaldsonville, 29 June 1953. **Fulton County:** RIJ77-012 (1) Chattahoochee River near Atlanta, 1977. **Harris County:** WJC56-114 (1) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of Mountain Hill. **Muscogee County:** MCZ 186927 (1) Chattahoochee River; MCZ 288355 (1) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 6621 (2) Cowarts Creek near Cowart; FLMNH 66218 (2) Cowarts Creek near Cowart, June 1916; MCZ 112050 (2) Cowarts Creek near Cowart, June 1916; UMMZ 138494 (1) Cowarts Creek near Dothan, June 1916; UMMZ 138501 (1) Big Creek near Taylor, June 1916; UMMZ 139210 (2) Cowarts Creek near Madrid, Aug. 1916; UMMZ 139217 (56) Cowarts Creek near Cowart, June 1916; UMMZ 139228 (13.5) Spring Creek near Florida state line, Aug. 1916; UMMZ 139237 (2) Big Creek near Florida state line, 1 Aug. 1916. **FLORIDA: Calhoun County:** FLMNH 407 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MCZ 190098 (1) Chipola River 2.5 mi SE of Chason, 19 Oct. 1952; MCZ 190303 (3) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 190308 (10) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MCZ 191479 (10) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988. **Jackson County:** FLMNH 395 (23) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; FLMNH 398 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 420 (15) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FLMNH 4149 (3) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 4161 (8) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 8398 (8) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 8400 (1) Spring Creek 3 mi SE of Marianna, 28 Feb. 1933; FLMNH 57384 (1) Waddells Mill Creek 5.3 mi N of Marianna; FLMNH 231227 (3) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FMNH 89928 (3) Cowarts Creek 6 mi W of Malone, 15 March 1957; FMNH 89936 (25.5) Marshall Creek 8 mi W of Malone; FMNH 89937 (2) Chipola River 1 mi N of Marianna; FMNH 89938 (0.5) Marshall Creek 8 mi W of Malone; FSU C-107 (2) Chipola River at Florida Rt 167, 2 km N of Marianna, 24 Sept. 1965; MCZ 190118 (1) Rocky Creek 2.4 mi NNW of Sink Creek, 9 Oct. 1953; MCZ 190304 (23) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 190305 (15) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 190307 (23) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 57434 (52) Spring Creek 2.5 mi SE of Marianna; UMMZ 57453 (10) Spring Creek 3 mi SE of Marianna; UMMZ 57475 (1) Chipola River system 5 mi NE of Marianna [headwaters of Spring Creek (Blue Spring)]; UMMZ 138387 (14) Chipola River near Marianna, July 1918; UMMZ 138410 (1) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 1918; UMMZ 138420 (1) Chipola River near Marianna, July 1918; UMMZ 139242 (1) Spring Creek near Alabama state line, Aug. 1916; WHH75-001 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 1975.

Flint River Drainage. **GEORGIA: Baker County:** CM 618985 (6) Flint River drainage; CM 6111878 (8) Flint River drainage; FLMNH 939 (3.5) Flint River; FLMNH uncat. (8) Flint River drainage; FMNH 50466 (8) Flint River; MCZ 20156 (1) Flint River drainage; MCZ 47061 (1) Flint River; MCZ 190296 (6) Flint River drainage; MFM 1847 (7) Flint River drainage; MFM 7997 (1) Flint River near Newton, 27 Nov. 1958; UMMZ 62166 (1) Flint River; UMMZ 68827 (4) Ichawaynochaway Creek; USNM 159963 (2) Flint River. **Coweta County:** HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; MFM 11984 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 15 Nov. 1964. **Crisp County:** MCZ 111400 (3) Gum Creek 2 mi N of Cordele, 1929; MCZ 189803 (3) Cedar Creek 6 mi SW of Cordele, 1929; SLY76-001 (1) Flint River, Lake Blackshear near Cordele; UMMZ 56737 (1) Cedar Creek 6 mi SW of Cordele; UMMZ 56738 (2) Gum Creek 2 mi N of Cordele. **Decatur County:** FLMNH 411 (13) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 414 (12.5) Flint River near Bainbridge, 1 Sept. 1954; MCZ 1903 (12.5) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190306 (13) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; UMMZ 98513 (1) Spring Creek. **Dooly County:** MCZ 111309 (5.5) Sandy Mount Creek 6 mi N of Vienna; UMMZ 56736 (3) Flint River drainage (a stream [probably Turkey Creek]) 6 mi NW of Vienna. **Dougherty County:** MCZ 5742 (5) Flint River near Albany; USNM 84142 (7) Flint River near Albany. **Meriwether County:** MFM 12153 (7) Flint River 5 mi E of Alvaton, 17 Aug. 1965. **Pike County:** MFM 16730 (2) Flint River 7.7 km SE of Alvaton, 15 Oct. 1967. **Taylor County:** UMMZ 98472 (3) Patsiliga Creek. **Worth County:** MCZ 98411 (4) Jones Creek 2 mi S of Oakfield, 23 Aug. 1933; MCZ 98423 (8) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond; MFM 16511 (4) Mill Creek 8 mi S of Oakfield 5 km above

Mercer Mill Pond, 11 Nov. 1978; UMMZ 58288 (14.5) Jones Creek 2 mi S of Oakfield; UMMZ 58295 (1) Abrams Creek 5 mi S of Oakfield; UMMZ 58304 (11.5) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Chattahoochee River Drainage. **GEORGIA: Early County:** JCB92-042 (1) Sawhatchee Creek at Georgia Rt 273 ca. 0.25 air mi W of Cedar Springs ca. 7.25 air mi NW of Jakin; JCB95-038 (NR) Kirkland Creek at U.S. Rt 84/Georgia Rt 38 1.75 air mi WNW of Jakin.

Chipola River Drainage. **FLORIDA: Jackson County:** JCB94-002 (NR) Baker Creek on unnamed dirt road near Jenkins Pond ca. 7 air mi NNW of Marianna.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-046 (1) Chickasawhatchee Creek at CR121 ca. 9 air mi NW of Newton. **Crisp County:** JCB92-065 (1) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (1) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele. **Dougherty County:** JCB91-139 (1) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals. **Fayette County:** JCB95-099 (NR) Whitewater Creek at CR275 ca. 2.75 air mi SW of Fayetteville. **Lee County:** JCB92-159 (1) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Terrell County:** JCB92-157 (2) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (3) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Webster County:** JCB92-155 (2) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston. JCB95-033 (NR) Kinchafoonee Creek at Georgia Rt 41, 1.1 mi SSW of Preston.

Megalonaias nervosa

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988. **Gadsden County:** DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FLMNH 59 (5) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; FLMNH 66 (4) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; FLMNH 359 (3) Apalachicola River near Chattahoochee, 24 Aug. 1954; FLMNH 26604 (22) Apalachicola River near Chattahoochee; FLMNH 37828 (2) Apalachicola River near Chattahoochee, May 1981; FLMNH 94744 (4) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; FLMNH 213798 (3) Apalachicola River near Chattahoochee, 24 Aug. 1977; FLMNH 243928 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 14 June 1986; FSU C-56 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 Aug. 1965; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; MCZ 190291 (8) Apalachicola River near Chattahoochee, 24 Aug. 1954; MFM 9481 (1) Mosquito Creek below dam 1 mi E of Chattahoochee, 25 Jan. 1962; OSUM 29245 (3) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 31 July 1986; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 227532 (3) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 May 1965; WHH75-004 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 1968. **Jackson County:** DC70-002 (1) Apalachicola River at NM 101.6, 1970; GWP76-001 (1) Apalachicola River (at the Scholz Steam Plant) 3.5 mi SE of Sneads, 1976; HGL75-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 21 June 1975; PWP77-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, July 1977; PWP86-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, Sept. 1986.

Chattahoochee River Drainage. **ALABAMA: Lee County:** OSUM 54714 (1) Halawakee Creek at Lake Harding 1.3 mi S of Jester, 13 Sept. 1984. **Russell County:** JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972. **GEORGIA: Cobb County:** AE91-001 (0.5) Chattahoochee River above B. L. House Landing off Power's Ferry Rd SE of Marietta, 15 May 1960; MCZ 226937 (2) Chattahoochee River between Power's Ferry Rd and Johnson's Ferry Rd ESE of Marietta, 8 Oct. 1959. **Fulton County:** FLMNH 47001 (6) Chattahoochee River at Johnson's Ferry Rd 13 mi N of Atlanta, March 1967; HGL67-006 (35) Chattahoochee River at Johnson's Ferry Rd 13 mi N of Atlanta, March 1967; UMMZ 208384 (1) Chattahoochee River at U.S. Rt 41 near Atlanta, 30 April 1961. **Heard County:** UMMZ 99742 (6) Chattahoochee River near Franklin just above West Point Lake, 1904. **Muscogee County:** CM 611051 (4) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 141087 (2.5) Chattahoochee River near Columbus; MCZ 141088 (20.5) Chattahoochee River drainage near Columbus; MCZ 191472 (4) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 191775 (4) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 191813 (4) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 99741 (1) Chattahoochee River drainage near Columbus; USNM 11089 (2) Chattahoochee River drainage near Columbus; USNM 83903 (3) Chattahoochee River drainage near Columbus. **Quitman County:** MFM 5738 (0.5) Chattahoochee River near Georgetown, 4 Sept. 1955. **Troup County:** FLMNH 22305 (2) Chattahoochee River, Oct. 1973; MCZ 186883 (59) Chattahoochee River 1 mi N of West Point, 24 Sept. 1955; MCZ 222421 (1) Chattahoochee River, 22 Sept. 1956; MFM 5808 (59) Chattahoochee River 1 mi N of West Point, 24 Sept. 1955; MFM 6665 (14) Chattahoochee River, 22 Sept. 1956.

Chipola River Drainage. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; FLMNH 354 (2) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954;

FLMNH 235578 (1) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 189645 (2) Chipola River, Dead Lake, 24 Aug. 1924; MCZ 190288 (10) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MFM 5123 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; UMMZ 99750 (1) Chipola River, 24 Aug. 1924; UMMZ 99754 (4) Chipola River, Dead Lake, 24 April 1915; UMMZ 138364 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138402 (1) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 183360 (1) Chipola River, April 1931; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 57 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 24 Aug. 1924; FLMNH 1480 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 24 Aug. 1924; FLMNH 4055 (4) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 24 Aug. 1924; FLMNH 214631 (3) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; MCZ 85897 (3) Chipola River, Dead Lake; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; USNM 381937 (2) Chipola River, Dead Lake, 15 May 1930; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH 4054 (1) Blue Springs Run 3 mi E of Marianna.

Flint River Drainage. **GEORGIA: Baker County:** MCZ 235952 (6) Flint River near Newton, 27 Nov. 1958; MFM 7992 (6) Flint River near Newton, 27 Nov. 1958. **Coweta County:** MFM 14451 (20) Line Creek 6 km E of Haralson, 27 Nov. 1966. **Crawford County:** MCZ 237450 (6) Flint River 1 mi W of Nakomis, Sept. 1962; OSUM 24382 (2) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 1964. **Crisp County:** FLMNH 185194 (2) Flint River at U.S. Rt 280 near Cordele, 11 Oct. 1950; UMMZ 178520 (1) Flint River at U.S. Rt 280 near Cordele, 11 Oct. 1950. **Decatur County:** FLMNH 357 (2) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 366 (2) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190289 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 190290 (7) Flint River near Bainbridge, 1 Sept. 1954. **Dougherty County:** FLMNH 365 (1) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; FLMNH 129472 (1) Flint River near Albany; MCZ 111504 (3) Flint River 10 mi S of Albany, 1929; MCZ 190286 (2) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; MFM 5134 (2) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; UMMZ 22715 (2) Flint River drainage near Albany; UMMZ 56628 (2) Flint River near Albany; UMMZ 56629 (1) Flint River 10 mi S of Albany; UMMZ 99744 (1) Flint River near Albany; UMMZ 99748 (1) Flint River near Albany; UMMZ 100051 (1) Flint River near Albany; UMMZ 100950 (3) Flint River 10 mi S of Albany. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; EPK (1) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; FLMNH 20707 (2) Flint River 4 mi E of Garden Valley, 22 Sept. 1969; FLMNH 30657 (2) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; FLMNH 46992 (2) Flint River at Georgia Rt 26 in Montezuma, 16 May 1981; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MFM 7906 (6) Flint River 9.7 mi S of Oglethorpe, 11 Oct. 1958. **Meriwether County:** FLMNH 25013 (2) Flint River 5.6 mi SE of Gay, Aug. 1978; MFM 14957 (7) Flint River at Flat Shoals 6.5 km SE of Gay, 23 April 1967. **Pike County:** MCZ 276397 (24) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 Aug. 1965; MFM 12144 (24) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 Aug. 1965; MFM 16726 (3) Flint River 7.7 km SE of Alvaton, 10 May 1967; OSUM 24359 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson 10.75 air mi NW of Zebulon, 24 Sept. 1968; OSUM 25052 (13) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 24 Sept. 1968. **Spalding County:** MFM 14465 (5) Flint River at Long Creek Rd 17 km W of Griffin, 24 Nov. 1966. **Taylor County:** CC82-005 (100) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 7 Aug. 1982; FLMNH 22193 (1) Flint River at U.S. Rt 19/Georgia Rt 3 ca. 11 air mi N of Butler, 21 Oct. 1973. **Upson County:** MFM 7146 (1) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston, 28 April 1957; USNM 710449 (2) Flint River E of Woodbury.

Present Records

Apalachicola River Drainage. **FLORIDA: Franklin County:** JCB91-094 (7) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island; JCB91-109 (5) Apalachicola River near NM 15.3 at south end of Bloody Bluff Island's back channel. **Gadsden County:** JCB91-028 (9) Apalachicola River at NM 105.2 Race Bluff/Race Shoals 0.6 RM S of Jim Woodruff Dam; JCB91-029 (3) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam; JCB91-030 (16) Apalachicola River between NM 100.1 and NM 100.4, 0.25 mi N of I-10. **Jackson County:** JCB91-026 (3) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **Liberty County:** JCB91-020 (1) Apalachicola River at NM 86.1 between and along rock dike and man-made dike; JCB91-086 (1) Apalachicola River at NM 40.4 confluence of Swift Slough; JCB91-087 (11) River Styx above confluence of Apalachicola River NM 35.4, 100 m up into second fork along north bank.

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB92-138 (8) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-042 (10) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); JCB91-044 (1) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-128 (3) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Gulf County:** JCB91-045 (6)

Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987; JCB91-091 (1) Chipola River ca. 2 mi above confluence of Apalachicola River NM 27.9 in major fork along east bank; JCB91-093 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-007 (1) Flint River above Lamar ca. 16 mi NNE of Bainbridge; JCB91-132 (1) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB91-137 (1) Flint River ca. 1 RM below Dry Creek. **Coweta County:** JCB92-110 (8) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia. **Crisp County:** JCB92-190 (2) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park. **Decatur County:** JCB91-006 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB91-017 (3) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-198 (1) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-199 (7) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-200 (6) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-201 (3) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/CR394 (Cocktown Rd). **Dougherty County:** JCB91-139 (9) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals; JCB91-142 (5) Flint River 0.7 mi above Dry Creek at spring above and across from Turtle Shoals. **Lee County:** JCB91-141 (1) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek. **Macon County:** JCB92-090 (1) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma; JCB92-119 (1) Flint River at Georgia Rt 26 in Montezuma. **Mitchell County:** JCB91-134 (3) Flint River ca. 4 RM above Georgia Rt 37 near Newton; JCB91-136 (3) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Pike County:** JCB92-126 (3) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon. **Spalding County:** JCB92-123 (1) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin. **Sumter County:** JCB92-193 (3) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Taylor County:** JCB92-095 (8) Flint River at U.S. Rt 19/Georgia Rt 3 ca. 11 air mi N of Butler. **Upson County:** JCB92-101 (12) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston; JCB92-128 (12) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston; JCB92-131 (4) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston.

Pleurobema pyriforme

Historic Records

Apalachicola River Drainage. **FLORIDA: Jackson County:** GWP76-001 (1) Apalachicola River (at the Scholz Steam Plant) 3.5 mi SE of Sneads, 1976.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; MFM 5831 (1) Uchee Creek at Alabama Rt 165 near Ft. Mitchell, 24 Sept. 1955. **GEORGIA: Early County:** MCZ 191688 (2) Sawhatchee Creek 14 mi NW of Donaldsonville. **Muscogee County:** FLMNH uncat. (1) Chattahoochee River near Columbus; MCZ 178808 (2) Chattahoochee River drainage near Columbus; MCZ 186972 (2) Chattahoochee River near Columbus; UMMZ 80863 (1) Chattahoochee River drainage near Columbus; UMMZ 81003 (1) Randall Creek near Columbus; UMMZ 81032 (1) Chattahoochee River drainage near Columbus; USNM 84781 (6) Chattahoochee River drainage near Columbus; USNM 84786 (12) Chattahoochee River drainage near Columbus; USNM 84787 (4) Chattahoochee River 10 mi above Columbus; USNM 84797 (7) Chattahoochee River drainage near Columbus; USNM 123307 (4) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 66768 (1) Cowarts Creek near Cowart, June 1916; FLMNH 67010 (1) Cowarts Creek near Cowart, June 1916; FMNH 89486 (2) Cowarts Creek near Cowart, June 1916; MCZ 112094 (16) Cowarts Creek near Cowart, June 1916; MCZ 112095 (2) Cowarts Creek; UMMZ 54415 (1) Cowarts Creek near Cowart; UMMZ 138466 (14) Cowarts Creek near Florida state line, 1916; UMMZ 138472 (64) Rocky Creek near Pansey, Aug. 1916; UMMZ 138500 (23) Big Creek near Taylor, June 1916; UMMZ 139204 (1) Spring Creek near Madrid, Aug. 1916; UMMZ 139208 (11) Cowarts Creek near Madrid, Aug. 1916; UMMZ 139215 (109) Cowarts Creek near Cowart, June 1916; UMMZ 139224 (29) Spring Creek near Florida state line, Aug. 1916; UMMZ 139229 (23) Big Creek near Florida state line, Aug. 1916. **FLORIDA: Calhoun County:** EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; FLMNH 244007 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 25 Sept. 1993; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 191927 (11) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 191928 (6) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; RSB88-007 (3) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-012 (4) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; WHH75-002 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 1975; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987. **Gulf County:** GTW88-002 (1) Chipola River ca. 2.5 mi above Florida Rt 71 N of Wewahitchka, 23 Aug. 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 28 Aug. 1988. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; FLMNH 413 (1) Chipola River at

Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; FLMNH 68675 (2) Marshall Creek near Alabama state line, Aug. 1916; FLMNH 68684 (1) Spring Creek near Alabama state line, Aug. 1916; FLMNH 214594 (6) Baker Creek about 7 air mi NNW of Marianna, 22 July 1990; FLMNH uncat. (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FMNH 23168 (4) Chipola River system near Marianna; MCZ 190114 (1) Rocky Creek 2.4 mi NNW of Sink Creek, 1953; MCZ 190384 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 191904 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; RSB87-006 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 21 Nov. 1987; RSB88-009 (5) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; UMMZ 139241 (8) Spring Creek near Alabama state line, Aug. 1916.

Flint River Drainage. **GEORGIA: Baker County:** CM 6111770 (2) Flint River; FLMNH uncat. (2) Flint River; MFM 7986 (11) Cooleewahee Creek 0.9 mi NE of Newton, 27 Nov. 1958; UMMZ 80887 (2) Flint River drainage. **Crisp County:** MCZ 111370 (1) Cedar Creek 6 mi SW of Cordele, 1929; MCZ 115615 (7) Gum Creek 2 mi N of Cordele; MCZ 191905 (1) Cedar Creek S of Cordele, 23 Aug. 1954; MCZ 234193 (3) Gum Creek 1 mi N of Cordele, 27 Aug. 1961; UMMZ 56780 (3) Gum Creek 2 mi N of Cordele; UMMZ 56782 (1) Cedar Creek 6 mi SW of Cordele; WJC56-039 (1) Swift Creek 12 mi SW of Cordele. **Decatur County:** BHW99-001 (20) Spring Creek. **Dooly County:** MCZ 111307 (1) Sandy Mount Creek 6 mi N of Vienna, 1929; WJC56-035 (1) Flint River drainage (a stream) 6 mi N of Vienna. **Dougherty County:** MCZ 5035 (1) Flint River near Albany. **Early County:** UMMZ 68826 (3) Dry Creek. **Lee County:** MCZ 11280 (2) Flint River drainage (a creek) near Chokee and DeSoto; UMMZ 56781 (1) Flint River drainage (a creek) near Chokee and DeSoto. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MFM 7914 (12) Flint River 9.7 mi S of Oglethorpe, 11 Oct. 1958. **Meriwether County:** JJJ73-023 (1) Flint River near Gay, Aug. 1973; MFM 12156 (1) Flint River 5 mi E of Alvaton, 17 Aug. 1965. **Taylor County:** MCZ 5915 (2) Little Patsiliga Creek; MCZ 186970 (3) Patsiliga Creek; UMMZ 79648 (5) Patsiliga Creek near Butler; UMMZ 79650 (1) Flint River drainage; UMMZ 81004 (7) Little Patsiliga Creek near Butler; USNM 84573 (8) Flint River drainage. **Webster County:** MCZ 234109 (1) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961. **Worth County:** MCZ 98413 (12) Jones Creek 2 mi S of Oakfield, 1933; MCZ 98416 (1) Abrams Creek 5 mi S of Oakfield, 23 Aug. 1933; MCZ 98420 (11) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 23 Aug. 1933; UMMZ 58291 (32) Jones Creek 2 mi S of Oakfield; UMMZ 58298 (1) Abrams Creek 5 mi S of Oakfield; UMMZ 58307 (14) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Chattahoochee River Drainage. **GEORGIA: Early County:** JCB92-042 (2) Sawhatchee Creek at Georgia Rt 273 ca. 0.25 air mi W of Cedar Springs ca. 7.25 air mi NW of Jakin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-042 (9) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); JCB91-044 (26) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-128 (1) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Jackson County:** JCB91-119 (1) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-120 (1) Chipola River at RM 67.2 confluence of Dry Creek; JCB91-125 (3) Chipola River at RM 84.5, 200 m above Florida Rt 167 along west bank; JCB94-002 (NR) Baker Creek on unnamed dirt road near Jenkins Pond ca. 7 air mi NNW of Marianna.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-045 (1) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton. **Coweta County:** JCB92-109 (6) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan. **Lee County:** JCB92-159 (4) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Miller County:** JCB92-037 (1) Spring Creek at U.S. Rt 27 in Colquitt. **Spalding County:** JCB92-123 (1) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin. **Terrell County:** JCB92-157 (1) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (24) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Webster County:** JCB92-155 (11) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (5) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston.

Pyganodon cataracta

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970. **Gadsden County:** DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; EPK81-004 (1) Apalachicola River at Chattahoochee boat ramp, just S of U.S. Rt 90/Florida Rt 10, 15 June 1981; FLMNH 37821 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 20 May 1981; FSU C-70 (3) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; UMMZ 215391 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; UMMZ 234738 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 4 Aug. 1963.

Chattahoochee River Drainage. **ALABAMA: Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; MCZ 6504 (4) Uchee Creek. **GEORGIA: Muscogee County:** FLMNH 63907 (1) Chattahoochee River near Columbus; FLMNH uncat. (1) Chattahoochee River near Columbus;

MCZ 146972 (1) Chattahoochee River drainage near Columbus. *Chipola River Drainage.* **FLORIDA: Gulf County:** FLMNH 214641 (7) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988. **Jackson County:** FLMNH 3547 (1) Spring Creek 3 mi SE of Marianna, Nov. 1932; FLMNH 214616 (1) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990.

Present Records

Chipola River Drainage. **FLORIDA: Gulf County:** JCB91-090 (1) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank.

Flint River Drainage. **GEORGIA: Coweta County:** JCB95-106 (NR) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan. **Decatur County:** JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253. **Fayette County:** JCB95-100 (NR) Whitewater Creek at CR275 ca. 2.75 air mi SW of Fayetteville.

Pyganodon grandis

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** MCZ 267517 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee; RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Gadsden County:** GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; MCZ 280493 (2) Apalachicola River near Chattahoochee, 20 May 1981; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 215391 (1) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10. **Jackson County:** GTW86-002 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 14 June 1986.

Chattahoochee River Drainage. **ALABAMA: Russell County:** MCZ 111379 (1) Uchee Creek 6 mi NE of Seale, 1929; MCZ 186915 (2) Uchee Creek. **GEORGIA: Muscogee County:** UMMZ 103777 (1) Chattahoochee River near Columbus.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 1903 (13) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 1921 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 21817 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 21817 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 191815 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MCZ 191888 (12) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 191909 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; UMMZ 138372 (4) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138425 (2) Chipola River, June 1918; UMMZ 138435 (2) Chipola River near Blountstown, June 1918; UMMZ 138456 (6) Chipola River near Altha. **Gulf County:** HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; UMMZ 138446 (3) Chipola River, June 1918. **Jackson County:** FLMNH 1922 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 1924 (4) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FLMNH 3547 (3) Spring Creek 3 mi SE of Marianna, Nov. 1932; FLMNH 3548 (6) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 3556 (1) Spring Creek 2.5 mi SE of Marianna, 17 May 1933; FLMNH 8373 (1) Spring Creek 3 mi SE of Marianna, 17 May 1933; FSU C-562 (1) Chipola River at Florida Rt 167, 2 km N of Marianna; MCZ 191762 (7) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 191786 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; RSB88-010 (1) Sinkhole next to Blue Hole Spring 5.6 km NNW Marianna, 16 Oct. 1988; UMMZ 57430 (9) Spring Creek 2.5 mi SE of Marianna; UMMZ 57443 (2) Spring Creek 3 mi SE of Marianna; UMMZ 138386 (9) Chipola River near Marianna, July 1918; UMMZ 138415 (4) Chipola River near Marianna, July 1918.

Flint River Drainage. **GEORGIA: Coweta County:** MCZ 288376 (1) Line Creek; UMMZ 103855 (1) Line Creek. **Crawford County:** MCZ 237462 (3) Flint River 1 mi W of Nakomis, Sept. 1962. **Crisp County:** EPK87-004 (1) Lake Blackshear in Swift Creek arm at Georgia Rt 300 ca. 11.5 mi SW of Cordele, 26 Aug. 1987; FLMNH 47002 (3) Lake Blackshear in Swift Creek arm at Georgia Rt 300 ca. 11.5 mi SW of Cordele, 30 June 1967; OSUM 23451 (4) Swift Creek at Lake Blackshear 11 mi SW of Cordele, 30 June 1967. **Decatur County:** EPK81-001 (1) Lake Seminole near U.S. Army COE recreation area N of Chattahoochee, 14 June 1981; FLMNH 1866 (14) Fourmile Creek 3 mi S of Bainbridge, 28 June 1953; MCZ 190106 (7) Fourmile Creek 3 mi SW of Bainbridge, 10 Oct. 1953; MCZ 191764 (1) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; RSB88-001 (1) Spring Creek at Georgia Rt 84 in Brinson, 16 Oct. 1988; UMMZ 103943 (13) Flint River. **Dooly County:** HGL67-004 (1) Flint River, Lake Blackshear at Georgia Rt 27 W of Vienna, 1967. **Dougherty County:** EPK87-001 (1) Flint River just upstream of Albany State College on Broad Avenue in Albany, 25 Aug. 1987. **Seminole County:** MCZ 190107 (2) Spring Creek near Reynoldsville, 10 Oct. 1953. **Terrell County:** MCZ 234106 (2) Kinchafoonee Creek 4 mi N of Bronwood, 8 Sept. 1961. **Webster County:** MCZ 234107 (13) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-032 (3) Apalachicola River at NM 93.9 above Ocheesee Landing 6.2 RM S of I-10. **Franklin County:** JCB91-096 (3) Apalachicola River at NM 17.7 confluence of Smith Creek; JCB91-102 (7) Harrison Creek at first 180-degree bend above confluence of Brothers River along north side of bend (W of Apalachicola River NM 14.8); JCB91-107 (1) St. Marks River at N29:48.69/W85:01.09 (just S of East River Cutoff) confluence of backwater along west bank. **Gadsden County:** JCB91-031 (2) Apalachicola

River at NM 99.6 mouth of Flat Creek just N of dirt boat ramp 0.4 RM below I-10. **Jackson County:** JCB91-026 (7) Apalachicola River below Jim Woodruff Dam near Chattahoochee.

Chattahoochee River Drainage. **ALABAMA: Henry County:** JCB91-059 (1) Lake Walter F. George at U.S. Army COE Fish Attractor #F7 near NM 77 along west shore ca. 200 m east of a park and boat ramp. **Russell County:** JCB91-070 (2) Chattahoochee River at NM 131.2; JCB92-135 (1) Uchee Creek at Uchee Creek Recreational Area and Marina at Ft. Benning ca. 6.5 air mi ESE of Nuckols ca. 11.5 air mi SSE of Phenix City; JCB92-136 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale. **GEORGIA: Clay County:** JCB91-061 (1) Lake Walter F. George 0.25 mi E of Georgia Rt 39, Pataula Creek arm (near NM 82.2). **Seminole County:** JCB92-202 (1) Chattahoochee River above Lake Seminole 100 m below NM 19.9 along east bank.

Chipola River Drainage. **FLORIDA: Gulf County:** JCB91-041 (1) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-090 (3) Chipola River 0.1 mi above confluence of Apalachicola River NM 27.9 along east bank.

Flint River Drainage. **GEORGIA: Crisp County:** JCB92-065 (1) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-190 (1) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park; JCB92-194 (7) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB91-013 (3) Lake Seminole in Spring Creek arm ca. 1 mi below Georgia Rt 253; JCB91-016 (6) Lake Seminole in river channel of Flint River arm at Georgia Rt 310 (Hutchinson Ferry Rd); JCB91-017 (2) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-038 (1) Big Slough Creek at Mills Rd (off Georgia Rt 97) ca. 3.5 air mi NE of Bainbridge; JCB92-039 (15) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge; JCB92-205 (1) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-055 (1) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus; JCB92-087 (1) Sandy Mount Creek below unnamed impoundment directly E of CR111 ca. 1.25 air mi NNW of Vienna. **Lee County:** JCB92-064 (10) Lee Creek at CR23 ca. 12.5 air mi E of Smithville. **Sumter County:** JCB92-153 (4) Muckaloochee Creek at CR238 directly below Wells Millpond ca. 10.75 air mi S of Americus.

Quincuncina infucata

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** DC70-003 (1) Apalachicola River ca. 0.26 mi above Ocheesee Landing, 1970; MCZ 190359 (1) Apalachicola River near Blountstown, 31 Aug. 1954; RSB88-015 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 26 Aug. 1988; WHH75-006 (1) Apalachicola River at Ocheesee Landing 2.2 mi E of Ocheesee, 1968. **Gadsden County:** FLMNH 231 (2) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; FLMNH 453 (6) Apalachicola River near Chattahoochee, 24 Aug. 1954; FLMNH 8329 (3) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10, 10 June 1954; FLMNH uncat. (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 June 1954; FSU C-392 (9) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; FSU C-1026 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee; MCZ 190082 (4) Mosquito Creek 1 mi S of Chattahoochee, 9 Oct. 1953; MCZ 190347 (10) Apalachicola River near Chattahoochee, 24 Aug. 1954; MCZ 191592 (2) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 16 July 1953; MCZ 191593 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 27 June 1953; UMMZ 215423 (15) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; UMMZ 218206 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; WHH75-004 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 1968; WHH75-008 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 1968. **Jackson County:** GWP76-001 (1) Apalachicola River (at the Scholz Steam Plant) 3.5 mi SE of Sneads, 1976. **Liberty County:** UMMZ 215416 (1) Apalachicola River at Florida Rt 20, 0.5 mi W of Bristol.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** UMMZ 163281 (2) Bear Creek near Batesville, April 1917; UMMZ 163764 (2) Cowikee Creek near Batesville, April 1917; WJC56-014 (1) Cowikee Creek 6 mi N of Eufaula. **Henry County:** UMMZ 163779 (2) Abbie Creek near Abbeville, April 1917. **Houston County:** WHH64-001 (1) Chattahoochee River at U.S. Rt 84/Alabama Rt 12, 3 mi SE of Gordon, 1964. **Lee County:** JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-020 (1) Halawakee Creek below U.S. Rt 29, 7.6 mi NE of Opelika, 6 Feb. 1972; MCZ 293283 (5) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 2 Feb. 1973; OSUM 33543 (10) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 11 Sept. 1972. **Russell County:** CM 618621 (1) Uchee Creek near Ft. Mitchell; CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; EPK83-005 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, Sept. 1984; FLMNH 68684 (1) Uchee Creek near Ft. Mitchell; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; JJJ73-010 (1) Little Uchee Creek below U.S. Rt 80, 6.7 mi W of Phenix City, 6 Oct. 1972; UMMZ 77049 (1) Uchee Creek 6 mi NE of Seale; UMMZ 206607 (6) Chattahoochee River near Phenix City, 12 June 1960. **GEORGIA: Clay County:** CM 6113000 (2) Chattahoochee River near Fort Gaines; FLMNH 413 (2) Chattahoochee River near Fort Gaines. **Cobb County:** MCZ 72857 (3) Chattahoochee River. **Fulton County:** MCZ 228979 (2) Chattahoochee River near Roswell, 1960; USNM 84036 (2) Chattahoochee River drainage near Roswell. **Harris County:** MCZ 217365 (4) Chattahoochee River 1 mi S of West Point, 24 Sept. 1955; MCZ 217370 (13) Mulberry Creek (at Mitchell Bridge) 3 mi SSE of

Mountain Hill, 5 Sept. 1955. **Heard County:** MCZ 218115 (13) Chattahoochee River near Franklin just above West Point Lake, 9 Sept. 1955. **Muscogee County:** MCZ 72859 (14) Chattahoochee River near Columbus; MCZ 87968 (15) Chattahoochee River drainage near Columbus; MCZ 186799 (2) Chattahoochee River near Columbus; MCZ 189630 (3) Chattahoochee River near Columbus; MCZ 221727 (3) Randall Creek near Columbus; MCZ 254695 (1) Chattahoochee River near Columbus; OSUM 15504 (1) Chattahoochee River drainage near Columbus; OSUM 15507 (0.5) Bull Creek near Columbus; OSUM 24898 (3) Chattahoochee River near Columbus, 1960; UMMZ 23903 (1) Chattahoochee River drainage near Columbus; UMMZ 77012 (13) Chattahoochee River drainage near Columbus; UMMZ 77040 (2) Chattahoochee River drainage near Columbus; UMMZ 163309 (2) Chattahoochee River near Columbus; USNM 48224 (1) Chattahoochee River near Columbus; USNM 58224 (3) Chattahoochee River near Columbus; USNM 84040 (1) Chattahoochee River drainage near Columbus; USNM 84042 (1) Chattahoochee River drainage near Columbus. **Troup County:** MCZ 217368 (5) Chattahoochee River 1 mi N of West Point, 24 Sept. 1955; MCZ 218113 (8) Chattahoochee River near West Point, 5 Sept. 1955; MCZ 222422 (11) Chattahoochee River, 22 Sept. 1956.

Chipola River Drainage. **ALABAMA: Houston County:** UMMZ 138464 (1) Cowarts Creek near Florida state line, 1916; UMMZ 138502 (1) Big Creek near Taylor, June 1916; UMMZ 139235 (1) Big Creek near Florida state line, Aug. 1916. **FLORIDA: Calhoun County:** EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; FLMNH 409 (2) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 422 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 190344 (6) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MCZ 190346 (3) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MCZ 190348 (4) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; RSB88-005 (1) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138399 (2) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 47251 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; FLMNH 243996 (1) Chipola River, 27 Aug. 1988; HGL67-003 (1) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-014 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH 194121 (1) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FMNH 89938 (1) Marshall Creek 8 mi W of Malone; FSU C-848 (3) Chipola River at Florida Rt 167, 2 km N of Marianna; MCZ 190345 (4) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 190354 (10) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 190356 (2) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; RSB87-008 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; UMMZ 138384 (2) Chipola River near Marianna, July 1918.

Flint River Drainage. **GEORGIA: Calhoun County:** UMMZ 68824 (3) Ichawaynochaway Creek. **Coweta County:** EPK85-001 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan, 28 April 1985; EPK85-002 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 1985; HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981. **Crawford County:** FLMNH 19613 (4) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds; FLMNH 233309 (2) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds, 22 Sept. 1995; MCZ 237461 (33) Flint River 1 mi W of Nakomis, Sept. 1962; OSUM 24322 (8) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 21 Feb. 1970; OSUM 24383 (4.5) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 1964; OSUM 39963 (1) Flint River at Georgia Rt 96, 1 mi W of Nakomis, 17 July 1976; OSUM 53868 (2) Flint River 3 mi E of Reynolds 6+ mi W of Fort Valley, 4 Nov. 1971; UMMZ 234119 (5.5) Flint River 1 mi W of Nakomis, 1964. **Crisp County:** MCZ 11339 (24) Flint River 10 mi W of Cordele, 1929; UMMZ 48736 (13) Flint River 10 mi W of Cordele; UMMZ 56892 (14) Flint River 10 mi W of Cordele. **Decatur County:** FLMNH 424 (8) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Sept. 1954; FLMNH 465 (4) Flint River near Bainbridge, 11 Sept. 1954; FLMNH 466 (13) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190343 (20) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 190350 (1) Flint River near Bainbridge, 1 Sept. 1954; UMMZ 184190 (3) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954. **Dougherty County:** MCZ 5467 (1) Flint River near Albany; MCZ 111507 (2) Flint River 10 mi S of Albany, 1929; MCZ 115672 (2) Flint River near Albany, 1929; MCZ 190349 (2) Flint River at river bend 8 mi S of Albany, 24 Aug. 1954; OSUM 34322 (0.5) Flint River at U.S. Rt 82 in Albany, 26 Nov. 1972; UMMZ 56793 (1) Flint River 10 mi S of Albany; UMMZ 77048 (2) Flint River near Albany; USNM 84034 (4) Flint River near Albany; UMMZ 112720 (3) Flint River 10 mi S of Albany; UMMZ 112721 (2) Flint River near Albany. **Lee County:** WHH75-010 (1) Flint River at Georgia Rt 32, 10 mi E of Leesburg, 1975. **Macon County:** EPK (19) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; FLMNH 20710 (9) Flint River 4 mi E of Garden Valley, 22 Sept. 1969; FLMNH 30658 (5) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; FLMNH 37824 (6) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; FLMNH 47000 (6) Flint River at Georgia Rt 26 in Montezuma, 16 May 1981; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; MCZ 280499 (10.5) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; MCZ 294823 (1) Flint River near Montezuma 1 mi ENE of Oglethorpe, 17 May 1981; OSUM 39597 (19) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; OSUM 52223 (6)

Flint River near Montezuma 1 mi ENE of Oglethorpe. **Meriwether County:** MCZ 276408 (7) Flint River 5 mi E of Alvaton, 17 Aug. 1965. **Pike County:** EPK81-003 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 May 1981; EPK84-001 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 27 Aug. 1984; FLMNH 61682 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 30 Sept. 1973; OSUM 24360 (13) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 3 Feb. 1965; OSUM 25053 (5) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 24 Sept. 1968. **Seminole County:** MCZ 190099 (1) Spring Creek near Reynoldsville, 10 Oct. 1954. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982; MCZ 186994 (2) Little Patsiliga Creek near Butler; MCZ 189631 (14) Little Patsiliga Creek near Butler; MCZ 203075 (3) Patsiliga Creek near Butler; OSUM 9759 (2) Patsiliga Creek near Butler; OSUM 24900 (7) Patsiliga Creek, 1960; UMMZ 77011 (2) Flint River; UMMZ 77041 (1) Flint River drainage near Butler. **Upson County:** USNM 794944 (1) Flint River at U.S. Rt 80, 15 mi SE of Thomaston, 25 June 1978; USNM 794973 (1) Potato Creek ca. 3 mi NW of Thomaston, 25 June 1978. **Webster County:** UMMZ 77018 (1) Flint River drainage near Preston. **Worth County:** MCZ 98428 (11) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 23 Aug. 1933; UMMZ 58308 (11) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-078 (1) Apalachicola River at NM 61.2 at confluence of a creek. **Franklin County:** JCB91-094 (1) Apalachicola River near NM 21.8 at north tip and in back channel of Brickyard Island. **Liberty County:** JCB91-086 (2) Apalachicola River at NM 40.4 confluence of Swift Slough. **GEORGIA: Decatur County:** JCB92-040 (1) Mosquito Creek at Georgia Rt 97 ca. 20 air mi SW of Bainbridge.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JCB94-053 (NR) Little Uchee Creek below CR77 below Meadows Mill Pond ca. 7 air mi NW of Crawford ca. 11 air mi SE of Opelika. **Russell County:** JCB95-028 (NR) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale. **GEORGIA: Early County:** JCB95-062 (NR) Sawhatchee Creek at Georgia Rt 38/84 bridge ca. 5 air mi NNW of Jakin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-042 (18) Chipola River, Dead Lake at ca. RM 24, 4.5 RM S of Florida Rt 71 (Scotts Ferry); JCB91-044 (6) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-115 (2) Chipola River at RM 49.8, 5.5 RM above Florida Rt 20. **Gulf County:** JCB91-041 (4) Chipola River 5.75 mi SSE of Wewahitchka near RM 5.75; JCB91-046 (6) Chipola River Cutoff at confluence of Chipola River. **Jackson County:** JCB91-123 (4) Chipola River at RM 74.8, 0.5 RM above I-10 confluence of unnamed creek along east bank.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-007 (3) Flint River above Lamar ca. 16 mi NNE of Bainbridge; JCB91-137 (1) Flint River ca. 1 RM below Dry Creek; JCB92-045 (1) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-047 (5) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Calhoun County:** JCB92-163 (2) Pachitla Creek at CR153 ca. 2.75 air mi S of Morgan. **Coweta County:** JCB92-110 (3) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crawford County:** JCB92-197 (2) Flint River along east bank 6 left bends above confluence of Fraser Branch below Georgia Rt 96 E of Reynolds. **Crisp County:** JCB92-194 (1) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB91-003 (1) Flint River at confluence of Big Slough Creek above Bainbridge; JCB91-017 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-198 (1) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank); JCB92-199 (1) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-200 (1) Flint River ca. 2 air mi above boat ramp at end of CR345 ca. 6 air mi above U.S. Rt 84 (in Bainbridge) at bend with large limestone outcrop; JCB92-201 (3) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/CR394 (Cocktown Rd). **Dooly County:** JCB92-055 (38) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus; JCB92-057 (3) Flint River in backwater area (across from "Campers Haven" boat ramp and park) ca. 0.5 RM S of Georgia Rt 27 ca. 11 air mi WSW of Vienna. **Dougherty County:** JCB91-139 (21) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals. **Lee County:** JCB91-141 (15) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek; JCB92-158 (3) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg; JCB92-159 (16) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Macon County:** JCB92-085 (17) Buck Creek at Georgia Rt 240 ca. 3.75 air mi W of Montezuma; JCB92-090 (42) Flint River at Georgia Rt 127 ca. 2.25 air mi SW of Marshallville ca. 4.75 air mi N of Montezuma; JCB92-119 (8) Flint River at Georgia Rt 26 in Montezuma; JCB92-120 (1) Flint River at boat ramp near Georgia Rt 49 in Montezuma; JCB92-195 (1) Flint River at confluence of Fraser Branch ca. 3 air mi S of Georgia Rt 96 ca. 13.5 air mi N of Montezuma; JCB92-196 (5) Flint River ca. 4 air mi below Georgia Rt 96 ca. 1 RM below Fraser Branch ca. 12.5 air mi N of Montezuma. **Marion County:** JCB92-156 (1) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Mitchell County:** JCB91-131 (1) Flint River ca. 3 RM below Georgia Rt 37; JCB91-134 (4) Flint River ca. 4 RM above Georgia Rt 37 near Newton. **Pike County:** JCB92-125 (4) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon. **Spalding County:** JCB92-123 (1) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin. **Sumter County:** JCB92-054 (26) Flint River at confluence of Mountain Creek along large rock bluff on the west bank ca. 7.75 air mi SE of Andersonville; JCB92-056 (14) Flint River at island ca. 1.5 RM below Reeves Landing ca. 13.75 air mi ENE of Americus; JCB92-152 (1) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus. **Terrell County:**

JCB92-157 (17) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-160 (2) Ichawaynochaway Creek at U.S. Rt 82/Georgia Rt 50 ca. 9.5 air mi W of Dawson; JCB92-161 (22) Ichawaynochaway Creek at CR167 ca. 6 air mi W of Herod ca. 7.5 air mi SW of Dawson. **Upson County:** JCB92-128 (1) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston; JCB92-131 (1) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (3) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (5) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB91-140 (11) Flint River at confluence of Abrams Creek; JCB92-062 (1) Mill Creek at CR4 ca. 8 air mi S of Oakfield.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986.

Chattahoochee River Drainage. **ALABAMA: Russell County:** CC82-004 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 8 Aug. 1982. **GEORGIA: Muscogee County:** USNM 86212 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** UMMZ 138467 (1) Cowarts Creek near Florida state line, 1916. **FLORIDA: Calhoun County:** FLMNH 21817 (2) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; UMMZ 138376 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH 4996 (2) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 5007 (1) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH uncat. (2) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; MCZ 19189 (1.5) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 191473 (3) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 191988 (2) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988.

Flint River Drainage. **GEORGIA: Calhoun County:** MCZ 234103 (2) Ichawaynochaway Creek 3 mi NE of Morgan, 9 Sept. 1961. **Meriwether County:** FLMNH 25018 (2) Flint River 5.6 mi SE of Gay, Aug. 1978. **Terrell County:** MCZ 234102 (2.5) Kinchafoonee Creek 4 mi N of Bronwood, 8 Sept. 1961.

Present Records

Chattahoochee River Drainage. **ALABAMA: Russell County:** JCB94-045 (NR) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale.

Flint River Drainage. **GEORGIA: Coweta County:** JCB92-108 (1) Little White Oak Creek at CR547 (Gordon Rd) ca. 3 air mi NW of Haralson ca. 5 air mi SW of Senoia; JCB95-098 (NR) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan; JCB95-108 (NR) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Fayette County:** JCB95-105 (NR) Whitewater Creek at CR275 ca. 2.75 air mi SW of Fayetteville. **Marion County:** JCB92-156 (3) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Sumter County:** JCB92-152 (1) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus. **Webster County:** JCB92-172 (1) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston; JCB95-114 (NR) Kinchafoonee Creek at Georgia Rt 41, 1.1 mi SSW of Preston.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** OSUM 23446 (1) Apalachicola River near Florida Rt 20, 2.7 mi E of Blountstown, 26 June 1967; RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Gadsden County:** FLMNH 1935 (18) 0.5 mi E of Chattahoochee (Sta. 1642); FLMNH 1936 (24) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; FLMNH 5015 (2) Mosquito Creek below dam 1 mi E of Chattahoochee, 12 Sept. 1954; FLMNH 26600 (31) Mosquito Creek below dam 1 mi E of Chattahoochee; MCZ 191487 (32) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191488 (1) Apalachicola River near Chattahoochee, 24 Aug. 1954; MCZ 191689 (2) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 16 July 1953; MCZ 191717 (45) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 27 June 1953; OSUM 24329 (7) Mosquito Creek below dam 1 mi E of Chattahoochee, 25 Jan. 1962; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988. **GEORGIA: Decatur County:** MCZ 190117 (3) Mosquito Creek 2 mi SW of Recovery, 8 Oct. 1953.

Chattahoochee River Drainage. **ALABAMA: Houston County:** FLMNH 64164 (4) Golf Creek near Smyrna, Aug. 1916; MCZ 148830 (4) Golf Creek near Smyrna, Aug. 1916; UMMZ 163751 (1) Omusee Creek tributary near Smyrna, July 1916; UMMZ 163757 (35) Golf Creek near Smyrna, June 1916. **Lee County:** IJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; MCZ 293285 (5) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 21 Feb. 1973. **Russell County:** FLMNH 68277 (3) Uchee Creek near Nuckols, 26 June 1915; IJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of

Seale, 29 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972. **GEORGIA: Early County:** FLMNH 1867 (7) Sawhatchee Creek 14 mi NW of Donaldsonville, 29 June 1953; MCZ 191713 (20) Sawhatchee Creek 14 mi NW of Donaldsonville, 29 June 1953. **Muscogee County:** CM 618466 (2) Chattahoochee River near Columbus; FLMNH 969 (2) Chattahoochee River near Columbus; MCZ 28428 (2) Chattahoochee River near Columbus; FLMNH 57227 (1) Chattahoochee River near Columbus; FLMNH 64104 (9) Chattahoochee River near Columbus; FLMNH 65702 (1) Chattahoochee River near Columbus; MCZ 191478 (2) Chattahoochee River near Columbus; MCZ 203080 (4) Chattahoochee River drainage near Columbus; MCZ 231247 (1.5) Chattahoochee River near Columbus; MCZ 293273 (2) Chattahoochee River drainage near Columbus; UMMZ 98225 (7) Chattahoochee River near Columbus; USNM 85273 (2) Chattahoochee River drainage near Columbus; USNM 85274 (3) Chattahoochee River drainage near Columbus; USNM 85278 (2) Chattahoochee River drainage near Columbus; USNM 123200 (2) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** CM 6111950 (4) Big Creek Lake near Madrid; FLMNH 390 (4) Big Creek Lake near Madrid; MCZ 47062 (1.5) Cowarts Creek near Madrid, May 1912; MCZ 190327 (4) Big Creek Lake near Madrid; UMMZ 62202 (1) Cowarts Creek near Madrid, May 1912; UMMZ 138463 (1) Cowarts Creek near Florida state line, 1916; UMMZ 138468 (1) Cowarts Creek near Florida state line, 1916; UMMZ 138475 (38) Rocky Creek near Pansey, Aug. 1916; UMMZ 139202 (1) Spring Creek near Madrid, Aug. 1916; UMMZ 139203 (1) Spring Creek near Madrid, Aug. 1916; UMMZ 139211 (2) Cowarts Creek near Madrid, Aug. 1916; UMMZ 139220 (1) Cowarts Creek near Cowart, June 1916; UMMZ 139221 (11) Cowarts Creek near Cowart, June 1916; UMMZ 139232 (44) Big Creek near Florida state line, Aug. 1916. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; FLMNH 1932 (35) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 1938 (9) Chipola River 2 mi E of Clarksville, 30 Aug. 1954; FLMNH 1940 (29) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 68228 (10) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; FLMNH 68229 (4) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; FLMNH 125062 (1) Chipola River 2 mi E of Clarksville, 5 Dec. 1968; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 112047 (4) Chipola River near Clarksville; MCZ 112048 (10) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard; MCZ 191479 (106) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; MCZ 191484 (47) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 191485 (9) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; MCZ 234101 (10) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; RSB88-005 (1) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-008 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 June 1988; RSB88-011 (5) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1988; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138374 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138392 (51) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138396 (2) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138426 (1) Chipola River; UMMZ 138429 (43) Chipola River near Blountstown, June 1918; UMMZ 184304 (50) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 47253 (2) Chipola River, Dead Lake along Florida Rt 71, 3 mi N of Wewahitchka, 30 Sept. 1967; FLMNH 214638 (5) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 214639 (1) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; UMMZ 138448 (18) Chipola River, June 1918. **Jackson County:** FLMNH 1861 (9) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 1919 (21) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; FLMNH 3901 (1) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 3904 (1) Spring Creek 2.5 mi SE of Marianna, 28 Feb. 1933; FLMNH 59064 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 19 Jan. 1974; FLMNH 68417 (4) Spring Creek near Alabama state line, Aug. 1916; FLMNH 68437 (1) Spring Creek near Alabama state line, Aug. 1916; FLMNH 197709 (1) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 214599 (1) Baker Creek about 7 air mi NNW of Marianna, 22 July 1990; FLMNH 225942 (9) Blue Spring run near Marianna; FLMNH uncat. (11) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FMNH 89928 (1) Cowarts Creek 6 mi W of Malone, 15 March 1957; FMNH 89938 (4) Marshall Creek 8 mi W of Malone; MCZ 111318 (22) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 111321 (7) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 111405 (13) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 190119 (1) Chipola River 1 mi W of Sink Creek, 9 Oct. 1953; MCZ 191478 (58) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 191483 (3) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 191491 (11) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; OSUM 24188 (4.5) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 24 March 1965; RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-006 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 21 Nov. 1987; UMMZ 52461 (3) Blue Spring run near Marianna; UMMZ 52473 (7) Chipola River system 5 mi NE of Marianna; UMMZ 55483 (2) Blue Spring run near Marianna; UMMZ 56638 (3) Chipola River system (a stream) 1.5+ mi N of Campbellton; UMMZ 56643 (3) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; UMMZ 56647 (1) Chipola River system (a

stream) 1.5+ mi N of Campbellton; UMMZ 56649 (6) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna; UMMZ 56652 (7) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna; UMMZ 57444 (8) Spring Creek 3 mi SE of Marianna; UMMZ 57445 (1) Spring Creek 3 mi SE of Marianna; UMMZ 57446 (16) Spring Creek 3 mi SE of Marianna; UMMZ 57468 (1) Blue Spring run near Marianna; UMMZ 138385 (1) Chipola River near Marianna, July 1918; UMMZ 138411 (2) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 1918; UMMZ 138421 (2) Chipola River near Marianna, July 1918; UMMZ 138482 (1) Chipola River system near Marianna, July 1918; WHM89-001 (1) Carter's Mill Branch (run of Blue Hole Spring) at Florida Caverns State Park, 1989.

Flint River Drainage. **GEORGIA: Baker County:** USNM 159954 (4) Flint River drainage. **Calhoun County:** FLMNH 125067 (2) Creek 2 mi E of Leary; MCZ 111430 (3) Flint River drainage (a creek) 4.5 mi NE of Morgan, 1929; MCZ 234101 (26) Ichawaynochaway Creek 3 mi NE of Morgan, 9 Sept. 1961. **Coweta County:** EPK85-001 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan, 28 April 1985; FLMNH 46991 (3) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; UMMZ 98243 (7) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia. **Crisp County:** FLMNH 251871 (16) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele, 26 Aug. 1995; MCZ 111327 (19) Gum Creek 2 mi N of Cordele, 1929; MCZ 111371 (18) Cedar Creek 6 mi SW of Cordele, 1929; MCZ 111416 (3) Swift Creek 12 mi SW of Cordele, 1929; MCZ 234098 (4) Gum Creek 1 mi N of Cordele, 27 Aug. 1961; UMMZ 56639 (5) Cedar Creek 6 mi SW of Cordele; UMMZ 56648 (12) Gum Creek 2 mi N of Cordele. **Decatur County:** CM 6111877 (7) Flint River; FLMNH 1865 (7) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1933; FLMNH 1868 (4) Spring Creek near Brinson, 29 June 1953; FLMNH 4978 (23) Fourmile Creek 4 mi S of Bainbridge, 8 Oct. 1953; FLMNH 65702 (7) Flint River; FLMNH 251632 (2) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank), 17 June 1995; FLMNH uncat. (11) Spring Creek near Brinson, 29 June 1953; FLMNH uncat. (1) Fourmile Creek 4 mi SW of Bainbridge, 8 Oct. 1953; MCZ 89440 (1) Flint River; MCZ 111291 (2.5) Fourmile Creek 3 mi S of Bainbridge, 1929; MCZ 190116 (103) Fourmile Creek 4 mi S of Bainbridge; MCZ 191482 (1) Lake Seminole 7.5 mi W of Recovery, 12 Sept. 1954; MCZ 191497 (6) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; MCZ 191714 (11) Spring Creek near Brinson, 29 June 1953; MCZ 191715 (4) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; RSB88-001 (5) Spring Creek at Georgia Rt 84 in Brinson, 16 Oct. 1988; UMMZ 62199 (4) Flint River; UMMZ 98244 (33) Flint River; UMMZ 99295 (1) Spring Creek; USNM 85295 (2) Blue Springs 1.5 mi S of Byronville; USNM 665765 (2) Flint River near Bainbridge, 7 Aug. 1958. **Dooly County:** HGL67-004 (1) Flint River, Lake Blackshear at Georgia Rt 27 W of Vienna, 1967; MCZ 111306 (2) Sandy Mount Creek 6 mi N of Vienna, 1929; UMMZ 56640 (1) Flint River drainage (a stream) 6 mi NW of Vienna. **Dougherty County:** FLMNH 64135 (2) Flint River at U.S. Rt 82 in Albany; FLMNH 64151 (1) Flint River near Albany; MCZ 5425 (8) Flint River near Albany; UMMZ 56637 (2) Flint River drainage (a creek) 6 mi W of Albany; MCZ 111350 (1) Flint River 2 mi N of Albany, 1929; UMMZ 56641 (1) Flint River 2 mi N of Albany; USNM 85280 (2) Kiokee Creek at Georgia Rt 234, 11 air mi W of Albany. **Fayette County:** FLMNH 129660 (3) Creek 3.2 mi SW of Senoia. **Lee County:** MCZ 11284 (11) Flint River drainage (a creek) near Chokee and DeSoto, 1929; MCZ 111322 (23.5) Flint River drainage (a small creek) 7 mi NW of Albany, 1929; MCZ 111353 (8) Flint River drainage (a creek) 6 mi N of Albany, 1929; UMMZ 56636 (3) Flint River drainage (a creek) near Chokee and DeSoto; UMMZ 56642 (10) Flint River drainage (a small creek) 7 mi NW of Albany. **Meriwether County:** EPK84-003 (1) Line Creek at confluence of Flint River N of Georgia Rt 362 ca. 15 mi WSW of Griffin, 27 Aug. 1984. **Pike County:** EPK (18) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon, 17 July 1976; EPK81-003 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 May 1981; EPK84-001 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 27 Aug. 1984; OSUM 39969 (18) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon, 17 July 1976. **Seminole County:** FLMNH 1862 (15) Spring Creek near Reynoldsville, 27 June 1953; FLMNH 4962 (10) Spring Creek 2.5 mi S of Reynoldsville, Oct. 1953; FLMNH uncat. (1) Spring Creek 2.5 mi S of Reynoldsville, Oct. 1953; FLMNH uncat. (94) Spring Creek below dam at Reynoldsville 10 mi WSW of Bainbridge, 27 June 1953; MCZ 190115 (17) Spring Creek 2.5 mi S of Reynoldsville, 1953; MCZ 191719 (94) Spring Creek below dam at Reynoldsville 10 mi WSW of Bainbridge, 27 June 1953. **Taylor County:** CC82-005 (1) Flint River at N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982; UMMZ 99713 (2) Little Patsiliga Creek; USNM 85281 (2) Flint River drainage. **Terrell County:** MCZ 111302 (15.5) Kiokee Creek 15 mi SE of Dawson, 1929; MCZ 111411 (2) Chickasawhatchee Creek 5 mi SE of Dawson, 1929; MCZ 234096 (3) Kinchafoonee Creek 4 mi N of Bronwood, 8 Sept. 1961; MCZ 234097 (8) Kinchafoonee Creek 9 mi NE of Dawson, 9 Sept. 1961; UMMZ 56645 (1) Chickasawhatchee Creek 5 mi SE of Dawson; UMMZ 56646 (7) Kiokee Creek 15 mi SE of Dawson. **Webster County:** MCZ 234095 (6) Hog Branch 4 mi E of Preston, 11 Sept. 1961; MCZ 234099 (58) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961; MCZ 234100 (21) Kinchafoonee Creek 1 mi W of Preston, 11 Sept. 1961; UMMZ 98239 (2) Kinchafoonee Creek near Preston; USNM 150137 (2) Flint River drainage near Preston. **Worth County:** FLMNH 251878 (8) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 26 Aug. 1995; MCZ 98426 (2) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 1933; MCZ 112046 (1) Abrams Creek 3 mi W of Doles, 1929; UMMZ 58286 (3) Jones Creek 2 mi S of Oakfield; UMMZ 58292 (22) Abrams Creek 5 mi S of Oakfield; UMMZ 58299 (7) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-032 (1) Apalachicola River at NM 93.9 above Ocheesee Landing 6.2 RM S of I-10. **Jackson County:** JCB91-026 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **GEORGIA: Decatur County:** JCB92-040 (7) Mosquito Creek at Georgia Rt 97 ca. 20 air mi SW of Bainbridge.

Chattahoochee River Drainage. **ALABAMA: Henry County:** JCB91-060 (1) Lake Walter F. George at U.S. Army COE Fish Attractor #F9 near NM 77 along west shore ca. 400 m NE of park and boat ramp. **Lee County:** JCB92-139 (1) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika. **GEORGIA: Early County:** JCB92-041 (13) Kirkland Creek at U.S. Rt 84/Georgia Rt 38, 1.75 air mi WNW of Jakin. **Seminole County:** JCB92-202 (1) Chattahoochee River above Lake Seminole 100 m below NM 19.9 along east bank. **Stewart County:** JCB92-176 (2) Lime Spring Branch at CR148 ca. 6.25 air mi SE of Westville ca. 7 air mi SE of Lumpkin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-044 (5) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-112 (1) Chipola River at RM 37.5 ca. 8 RM N of Florida Rt 71; JCB91-128 (1) Chipola River, Dead Lake 300 m S of Magnolia Lodge along west shore at the confluence of a small creek near the middle of Dead Lake near the county line. **Jackson County:** JCB91-124 (2) Spring Creek 200 m below Merritt's Mill Pond dam.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-047 (1) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton; JCB92-048 (9) Ichawaynochaway Creek at Georgia Rt 200 ca. 9.5 air mi WSW of Newton. **Coweta County:** JCB92-110 (2) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crisp County:** JCB92-065 (11) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (73) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele. **Decatur County:** JCB91-004 (2) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-013 (1) Lake Seminole in Spring Creek arm ca. 1 mi below Georgia Rt 253; JCB92-035 (32) Spring Creek at Georgia Rt 84 in Brinson; JCB92-038 (1) Big Slough Creek at Mills Rd (off Georgia Rt 97) ca. 3.5 air mi NE of Bainbridge; JCB92-051 (1) Spring Creek at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB92-205 (9) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-067 (4) Sandy Mount Creek at Georgia Rt 90 ca. 2.5 air mi NW of Vienna. **Dougherty County:** JCB92-053 (1) Kiokee Creek at Georgia Rt 234, 11 air mi W of Albany; JCB92-164 (1) Cooleewahee Creek at Georgia Rt 62 ca. 4.75 air mi W of junction Georgia Rt 91/Georgia Rt 62 ca. 9.5 air mi SW of Albany. **Early County:** JCB92-178 (1) Spring Creek at CR282 (Christ Missionary Church Rd) ca. 3.5 air mi SE of Bluffton ca. 10.25 mi NE of Blakely. **Fayette County:** JCB92-150 (5) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (6) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Lee County:** JCB92-064 (9) Lee Creek at CR23 ca. 12.5 air mi E of Smithville; JCB92-158 (8) Kinchafoonee Creek at Georgia Rt 32 ca. 1.2 air mi SW of Leesburg; JCB92-159 (2) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Macon County:** JCB92-086 (8) Hogcrawl Creek at Georgia Rt 329 ca. 4 air mi E of Montezuma. **Marion County:** JCB92-156 (3) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Meriwether County:** JCB92-116 (4) White Oak Creek at CR312 (Oakland Rd) old covered bridge ca. 2.25 air mi SE of Alvaton 4 air mi NNE of Gay; JCB92-117 (4) Red Oak Creek at Georgia Rt 109 ca. 2.25 air mi WSW of Gay. **Miller County:** JCB92-037 (1) Spring Creek at U.S. Rt 27 in Colquitt; JCB92-049 (1) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin; JCB92-050 (71) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Pike County:** JCB92-125 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon; JCB92-126 (5) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon; JCB92-127 (4) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon. **Spalding County:** JCB92-123 (3) Flint River at CR502 ca. 8.75 air mi SW of Sunny Side ca. 9.5 air mi WNW of Griffin; JCB92-124 (1) Flint River at Georgia Rt 16 ca. 9.5 air mi W of Griffin. **Sumter County:** JCB92-088 (7) Lime Creek at CR53 (Spring Creek Church Rd/Joe Stewart Rd) ca. 14.25 air mi ESE of Americus; JCB92-152 (1) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus; JCB92-154 (3) Chokee Creek at U.S. Rt 280/Georgia Rt 30 ca. 2.25 air mi E of Leslie. **Talbot County:** JCB92-146 (1) Lazer Creek at Georgia Rt 41 ca. 3 air mi S of Woodland ca. 4.5 air mi NNW of Talbotton. **Terrell County:** JCB92-157 (2) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (20) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Upson County:** JCB92-098 (3) Auchumpkee Creek at CR174 (Allen Rd) ca. 10.5 air mi SE of Thomaston; JCB92-131 (1) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (8) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (2) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB92-058 (50) Mill Creek at Georgia Rt 300 ca. 7.5 air mi SSW of Oakfield; JCB92-059 (20) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-062 (35) Mill Creek at CR4 ca. 8 air mi S of Oakfield; JCB92-063 (10) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

Uniomerus carolinianus

Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** CM 1955-6 (1) Mosquito Creek near Chattahoochee; DC70-001 (1) Apalachicola River between U.S. Rt 90/Florida Rt 10 and Jim Woodruff Dam, 1970; FLMNH 399 (1) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; FLMNH 5015 (1) Mosquito Creek below dam 1 mi E of Chattahoochee, 12 Sept. 1954; FLMNH 68440 (1) Mosquito Creek near Chattahoochee; FSU C-1038 (1) Mosquito Creek below dam 1 mi E of Chattahoochee, 19 March 1970; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; OSUM 5665 (1) Apalachicola River tributary near Chattahoochee, 9 Feb. 1962; OSUM 24328 (6.5) Mosquito Creek below dam 1 mi E of Chattahoochee, 25 Jan. 1962; RSB87-001 (2) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987.

Chattahoochee River Drainage. **ALABAMA: Henry County:** FLMNH 68189 (6) Vann Mill Creek near Abbeville, April 1917. **Houston County:** UMMZ 163756 (3) Omusee Creek tributary

near Smyrna, July 1916. **Russell County:** FLMNH 68224 (5) Uchee Creek near Nuckols, 26 June 1915; JJJ73-006 (1) Uchee Creek at Alabama Rt 51, 2.3 mi S of Marvin, 24 Oct. 1972; MCZ 202924 (2) Mill Creek near Phenix City. **Muscogee County:** CM 61985 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; CM 6113268 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; FLMNH 420 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; FLMNH 2759 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; FLMNH 68209 (5) Chattahoochee River near Columbus; FLMNH 68225 (6) Chattahoochee River near Columbus; MCZ 28482 (4) Chattahoochee River drainage near Columbus; MCZ 190305 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 190345 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; MCZ 202921 (4) Chattahoochee River drainage near Columbus; MCZ 202927 (2) Chattahoochee River drainage near Columbus; MCZ 252218 (2) Chattahoochee River drainage near Columbus; OSUM 10560 (2) Chattahoochee River drainage near Columbus; OSUM 24638 (1) Chattahoochee River drainage near Columbus; UMMZ 133083 (10) Chattahoochee River near Columbus; UMMZ 73221 (4) Chattahoochee River drainage near Columbus; UMMZ 73222 (4) Chattahoochee River drainage near Columbus; USNM 30408 (4) Chattahoochee River drainage near Columbus; USNM 85369 (2) Chattahoochee River near Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** MCZ 112076 (1) Cowarts Creek; UMMZ 138458 (4) Cowarts Creek near Florida state line; UMMZ 138486 (1) Cowarts Creek near Cottonwood, Aug. 1916; UMMZ 139236 (1) Big Creek near Florida state line, Aug. 1916; WHM88-004 (1) Cowarts Creek at Alabama Rt 53 ca. 19 mi SE of Dothan, 1988. **FLORIDA: Calhoun County:** UMMZ 138375 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** FLMNH 214636 (1) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138440 (1) Chipola River, June 1918; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** CM 46862 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; FLMNH 1936 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; HV40-003 (1) Chipola River system near Marianna; MCZ 191487 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; OSUM 13920 (3) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 24 March 1965; RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-007 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 10 Oct. 1987; UMMZ 57442 (4) Spring Creek 2.5 mi SE of Marianna; UMMZ 162405 (1) Dry Creek 5.5 mi S of Marianna, 27 Nov. 1941; UMMZ 234984 (2) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna, 25 May 1963. **GEORGIA: Decatur County:** FLMNH 4965 (1) Spring Creek at Georgia Power and Light Co. Dam near Reynoldsville (Sta. 1048).

Flint River Drainage. **GEORGIA: Calhoun County:** MCZ 111390 (15) Ichawaynochaway Creek 5.5 mi NE of Morgan, 1929; MCZ 111431 (2) Flint River drainage (a creek) 4.5 mi NE of Morgan, 1929; UMMZ 56798 (2) Ichawaynochaway Creek 3 mi NE of Morgan; UMMZ 56800 (10) Ichawaynochaway Creek 5.5 mi NE of Morgan; UMMZ 73210 (6) Ichawaynochaway Creek 5.5 mi NE of Morgan; UMMZ 73262 (7) Ichawaynochaway Creek 5.5 mi NE of Morgan. **Crisp County:** SLY76-001 (1) Flint River, Lake Blackshear near Cordele. **Decatur County:** MCZ 235582 (1) Flint River near Bainbridge, 1 Sept. 1954. **Dooly County:** FLMNH 15370 (3) Pennahatchee Creek near Vienna, July 1929; HGL86-005 (1) Turkey Creek at Georgia Rt 230 W of Vienna, 1986; MCZ 111376 (1) Pennahatchee Creek near Vienna, 1929; MCZ 202935 (6) Cedar Creek 11 mi NE of Vienna, 1929; UMMZ 56803 (2) Cedar Creek 11 mi NE of Vienna. **Dougherty County:** MCZ 111406 (1) Flint River 2 mi N of Albany, 1929; UMMZ 56799 (2) Flint River 2 mi N of Albany. **Macon County:** USNM 85005 (2) Flint River at Georgia Rt 26 in Montezuma.

Flint River Drainage. **GEORGIA: Randolph County:** MCZ 234108 (1) Flint River drainage (a creek) 3 mi N of Shellman, 9 Sept. 1961. **Taylor County:** UMMZ 73226 (1) Little Patsiliga Creek. **Webster County:** MCZ 234105 (1) Hog Branch 4 mi E of Preston, 11 Sept. 1961. **Worth County:** UMMZ 58309 (1) Mill Creek at CR4 ca. 8 air mi S of Oakfield.

Present Records

Apalachicola River Drainage. **FLORIDA: Franklin County:** JCB91-096 (1) Apalachicola River at NM 17.7 confluence of Smith Creek; JCB91-103 (1) St. Marks River 40 m above confluence of Apalachicola River NM 10.3 along south bank. **Gadsden County:** JCB91-029 (7) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam. **Gulf County:** JCB91-095 (2) Apalachicola River near NM 20.7 in north pass to Brickyard Cutoff at west end of island ca. 10 m to south pass confluence.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JCB92-139 (1) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika.

Chipola River Drainage. **FLORIDA: Gulf County:** JCB91-093 (2) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-124 (18) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-127 (1) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek.

Flint River Drainage. **GEORGIA: Baker County:** JCB91-132 (2) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion; JCB92-045 (1) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton. **Crisp County:** JCB92-065 (1) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele. **Decatur County:** JCB91-003 (1) Flint River at confluence of Big Slough Creek above Bainbridge; JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB92-039 (24) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge. **Dougherty County:** JCB92-052 (2) Dry

Creek at U.S. Rt 19/Georgia Rt 300/Georgia Rt 3 ca. 8.75 air mi SSE of Albany; JCB92-053 (15) Kiokee Creek at Georgia Rt 234, 11 air mi W of Albany; JCB92-164 (2) Cooleewahee Creek at Georgia Rt 62 ca. 4.75 air mi W of junction Georgia Rt 91/Georgia Rt 62 ca. 9.5 air mi SW of Albany. **Early County:** JCB92-178 (5) Spring Creek at CR282 (Christ Missionary Church Rd) ca. 3.5 air mi SE of Bluffton ca. 10.25 mi NE of Blakely. **Mitchell County:** JCB91-136 (1) Flint River ca. 3 RM below Dry Creek ca. 3 RM above Raccoon Creek. **Seminole County:** JCB92-036 (31) Dry Creek at CR86 ca. 2.75 air mi NE of Iron City. **Sumter County:** JCB92-153 (1) Muckaloochee Creek at CR238 directly below Wells Millpond ca. 10.75 air mi S of Americus. **Terrell County:** JCB92-161 (1) Ichawaynochaway Creek at CR167 ca. 6 air mi W of Herod ca. 7.5 air mi SW of Dawson. **Worth County:** JCB92-061 (6) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-062 (2) Mill Creek at CR4 ca. 8 air mi S of Oakfield; JCB92-063 (16) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

Utterbackia imbecillis

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Gadsden County:** FLMNH 1926 (4) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1953; FLMNH 1930 (16) Mosquito Creek near Chattahoochee, 12 Sept. 1954; FLMNH 5006 (2) Mosquito Creek near Chattahoochee; FLMNH 47241 (2) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 18 May 1974; FLMNH 251637 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 18 June 1995; GTW86-001 (1) Apalachicola River 0.25 mi S of Jim Woodruff Dam, 31 July 1986; HGL86-002 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 14 June 1986; HGL86-003 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 28 June 1986; MCZ 191817 (9) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 27 June 1953; MCZ 191845 (21) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; OSUM 14226 (5) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 31 May 1965; OSUM 24326 (8) Mosquito Creek below dam 1 mi E of Chattahoochee, 25 Jan. 1962; OSUM 51105 (4) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 29 Oct. 1981; RSB87-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 10 Oct. 1987; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988; UMMZ 184214 (3) Mosquito Creek, Chattahoochee; UMMZ 215410 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; UMMZ 218201 (3) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 24 May 1964; UMMZ 247231 (2) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952; USNM 801323 (2) Mosquito Creek below dam 1 mi E of Chattahoochee. **Jackson County:** HGL74-001 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee, 1974. **Liberty County:** OSUM 33799 (1) Apalachicola River at Torreya State Park 10 mi N of Bristol, 26 May 1972.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-020 (1) Halawakee Creek below U.S. Rt 29, 7.6 mi NE of Opelika, 6 Feb. 1972; MCZ 293288 (3) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 21 Feb. 1973; OSUM 33542 (4) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 11 Sept. 1972. **Russell County:** JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; MCZ 186882 (7) Chattahoochee River at dam near Phenix City; UMMZ 103883 (1.5) Uchee Creek; UMMZ 206606 (2) Chattahoochee River near Phenix City, 12 June 1960. **GEORGIA: DeKalb County:** AE91-004 (2) Peachtree Creek (north fork) at I-285 and I-85 in Atlanta, 26 July 1986.

Chipola River Drainage. **ALABAMA: Houston County:** HV40-007 (100) Big Creek near Madrid; WHM88-004 (1) Cowarts Creek at Alabama Rt 53 ca. 19 mi SE of Dothan, 1988. **FLORIDA: Calhoun County:** FLMNH 64039 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 5 Sept. 1935; FLMNH 64040 (3) Chipola River near Blountstown, July 1918; UMMZ 138370 (33) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138393 (25) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138430 (34) Chipola River near Blountstown, June 1918; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988. **Gulf County:** HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; HV40-024 (74) Chipola River, Dead Lake; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988. **Jackson County:** HV40-015 (3) Spring Creek 2.5 mi SE of Marianna.

Flint River Drainage. **GEORGIA: Coweta County:** FLMNH 233144 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 29 Sept. 1973. **Crisp County:** EPK87-004 (1) Lake Blackshear in Swift Creek arm at Georgia Rt 300 ca. 11.5 mi SW of Cordele, 26 Aug. 1987; UMMZ 178525 (4) Flint River at U.S. Rt 280 near Cordele, 11 Oct. 1950. **Decatur County:** FLMNH 1937 (4) Fourmile Creek 3 mi S of Bainbridge, 28 June 1953. **Seminole County:** FLMNH 1941 (2) Spring Creek near Reynoldsville, 27 June 1954.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** JCB91-032 (1) Apalachicola River at NM 93.9 above Ocheesee Landing 6.2 RM S of I-10; JCB91-079 (3) Hageman Ditch ca. 0.5 mi above confluence of Apalachicola River NM 55.9. **Franklin County:** JCB91-102 (1) Harrison Creek at first 180-degree bend above confluence of Brothers River along north side of bend (W of Apalachicola River NM 14.8). **Gadsden County:** JCB91-018 (7) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam; JCB91-027 (2) Apalachicola River at Chattahoochee boat ramp just S of U.S. Rt 90/Florida Rt 10. **Jackson County:** JCB91-026 (2) Apalachicola River below Jim Woodruff Dam near Chattahoochee. **Liberty County:** JCB91-087 (1) River Styx

above confluence of Apalachicola River NM 35.4, 100 m up into second fork along north bank.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** JCB91-063 (1) Lake Eufaula at confluence of small creek along south shore of Cowikee Creek arm S ca. 0.25 mi east of the marina at Lakepoint Resort State Park; JCB91-065 (1) Chattahoochee River at U.S. Army COE Fish Attractor #F46 near NM 107 across from the confluence of Rood Creek. **Henry County:** JCB91-059 (7) Lake Walter F. George at U.S. Army COE Fish Attractor #F7 near NM 77 along west shore ca. 200 m east of a park and boat ramp; JCB91-060 (5) Lake Walter F. George at U.S. Army COE Fish Attractor #F9 near NM 77 along west shore ca. 400 m northeast of park and boat ramp. **Lee County:** JCB91-181 (11) Lake Harding in Halawakee Creek arm off CR87 at Jim Bishop's Fish Camp; JCB91-182 (32) Lake Harding at west end of Halawakee Creek arm along edge of dam at confluence of unnamed creek S of Halawakee Creek; JCB91-184 (9) Lake Harding in Halawakee Creek arm 300 m NE of railroad trestle at rock outcropping; JCB91-192 (20) Lake Harding above and below Bartletts Ferry Dam at Sandy Point Landing. **Russell County:** JCB91-070 (1) Chattahoochee River at NM 131.2; JCB92-135 (1) Uchee Creek at Uchee Creek Recreational Area and Marina at Ft. Benning ca. 6.5 air mi ESE of Nuckols ca. 11.5 air mi SSE of Phenix City. **FLORIDA: Jackson County:** JCB92-203 (1) Chattahoochee River above Lake Seminole ca. 50 m below NM 23.7, 0.25 mi below Florida Rt 2/Georgia Rt 91 along steep west bank. **GEORGIA: Harris County:** JCB91-187 (5) Lake Harding at Idle Hour Park (near north end of Lake Harding) just S of confluence of Mountain Oak Creek. **Seminole County:** JCB92-202 (1) Chattahoochee River above Lake Seminole 100 m below NM 19.9 along east bank.

Chipola River Drainage. **FLORIDA: Gulf County:** JCB91-039 (1) Chipola River Cutoff along edge of bend near Florida Rt 22A; JCB91-040 (1) Whites River S of Wewahitchka. **Jackson County:** JCB91-124 (1) Spring Creek 200 m below Merritt's Mill Pond dam.

Flint River Drainage. **GEORGIA: Coweta County:** JCB92-111 (7) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crisp County:** JCB92-065 (6) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-190 (1) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park; JCB92-191 (4) Lake Blackshear in Cedar Creek arm ca. 200 m W of Georgia Rt 358 (Coney Rd) ca. 7.5 air mi SW of Cordele; JCB92-194 (6) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB91-004 (1) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-017 (1) Lake Seminole along south shore of Flint River arm between Dry Creek and Sanborn Creek (NM 16.5); JCB92-039 (7) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge; JCB92-205 (2) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-087 (1) Sandy Mount Creek below unnamed impoundment directly E of CR111 ca. 1.25 air mi NNW of Vienna. **Sumter County:** JCB92-152 (8) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus; JCB92-154 (1) Chokee Creek at U.S. Rt 280/Georgia Rt 30 ca. 2.25 air mi E of Leslie; JCB92-193 (3) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Worth County:** JCB92-061 (22) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-063 (1) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** MCZ 191845 (10) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954.

Chipola River Drainage. **ALABAMA: Houston County:** UMMZ 138495 (29) Big Creek Lake near Madrid. **FLORIDA: Calhoun County:** FLMNH 1950 (11) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 1955 (2) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 20743 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 64039 (9) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 5 Sept. 1935; FLMNH 64046 (2) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; FLMNH 64047 (3) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; MCZ 112067 (2) Chipola River near Blountstown, June 1918; MCZ 112068 (3) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, June 1918; MCZ 191837 (24) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; MCZ 235175 (17) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; RSB88-011 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1988. **Gulf County:** RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; UMMZ 138442 (43) Chipola River, June 1918. **Jackson County:** FLMNH 214617 (1) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; MCZ 111296 (8) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; RSB88-010 (1) Sinkhole next to Blue Hole Spring 5.6 km NNW Marianna, 16 Oct. 1988; UMMZ 52459 (1) Blue Spring run near Marianna; UMMZ 56634 (3) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; UMMZ 57429 (3) Spring Creek 2.5 mi SE of Marianna; UMMZ 162404 (9) Dry Creek 5.5 mi S of Marianna, 27 Nov. 1941.

Flint River Drainage. **GEORGIA: Decatur County:** FLMNH 1937 (4) Fourmile Creek 3 mi S of Bainbridge, 28 June 1953; FLMNH 1952 (1) Blue Springs 1.5 mi S of Byronville, 12 Sept. 1952; MCZ 91826 (3) Flint River near Bainbridge, 1 Sept. 1954; MCZ 190103 (8) Fourmile Creek 3 mi SW of Bainbridge, 8 Oct. 1953; MCZ 191693 (2) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; MCZ 191838 (2) Lake Seminole 7.5 mi W of Recovery, 12 Sept. 1954. **Seminole County:** MCZ 190104 (3) Spring Creek 2.5 mi S of Reynoldsville, 10 Oct. 1953; MCZ 190105 (6) Spring Creek near Reynoldsville, 10 Oct. 1953. **Spalding County:** MFM 14460 (2) Flint River at Long Creek Rd 17 km W of Griffin, 27 Nov. 1967.

Present Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:**

JCB91-079 (2) Hageman Ditch ca. 0.5 mi above confluence of Apalachicola River NM 55.9. **Jackson County:** JCB91-026 (1) Apalachicola River below Jim Woodruff Dam near Chattahoochee.

Flint River Drainage. **GEORGIA: Clayton County:** JCB92-121 (1) Flint River at CR1334 (McDonough Rd) ca. 4.75 air mi SSW of Jonesboro ca. 9 air mi SSW of Morrow. **Crisp County:** JCB92-065 (3) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-190 (1) Lake Blackshear ca. 0.3 air mi above dam in front of Loron William Park; JCB92-191 (1) Lake Blackshear in Cedar Creek arm ca. 200 m W of Georgia Rt 358 (Coney Rd) ca. 7.5 air mi SW of Cordele; JCB92-194 (4) Lake Blackshear ca. 0.3 air mi S of U.S. Rt 280/Georgia Rt 30 just W of swimming area at Georgia Veterans Memorial State Park. **Decatur County:** JCB92-038 (3) Big Slough Creek at Mills Rd (off Georgia Rt 97) ca. 3.5 air mi NE of Bainbridge; JCB92-039 (10) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge. **Dooly County:** JCB92-055 (3) Flint River in backwater area ca. 300 m above Reeves Landing ca. 13.25 air mi ENE of Americus. **Fayette County:** JCB92-150 (1) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (4) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Marion County:** JCB92-156 (2) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Pike County:** JCB92-126 (29) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon. **Spalding County:** JCB92-124 (1) Flint River at Georgia Rt 16 ca. 9.5 air mi W of Griffin. **Sumter County:** JCB92-088 (1) Lime Creek at CR53 (Spring Creek Church Rd/Joe Stewart Rd) ca. 14.25 air mi ESE of Americus; JCB92-193 (2) Lake Blackshear 96 m below U.S. Rt 280/Georgia Rt 30 next to marina on west shore. **Worth County:** JCB92-059 (3) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-061 (29) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** MCZ 191407 (1) Apalachicola River near Blountstown, 31 Aug. 1954. **Gadsden County:** FLMNH 1933 (4) Mosquito Creek below dam 1 mi E of Chattahoochee, 12 Sept. 1959; FLMNH 1947 (4) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1953; FLMNH 5015 (3) Mosquito Creek below dam 1 mi E of Chattahoochee, 12 Sept. 1954; MCZ 191142 (6) Mosquito Creek near Chattahoochee; MCZ 191408 (2) Apalachicola River near Chattahoochee, 12 Sept. 1954; MCZ 191697 (1) Apalachicola River below U.S. Rt 90/Florida Rt 10, 1 mi W of Chattahoochee, 16 July 1953; MCZ 191698 (5.5) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 27 June 1953. **GEORGIA: Decatur County:** MCZ 190120 (3) Mosquito Creek 2 mi SW of Recovery, 8 Oct. 1953.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** MCZ 218101 (3) Cowikee Creek 6 mi N of Eufaula, 4 Sept. 1955; MFM 5735 (3) Cowikee Creek 6 mi N of Eufaula, 4 Sept. 19. **Chambers County:** JJJ73-022 (1) Halawakee Creek above CR57, 4.2 mi SSW of Cusseta, 14 Oct. 1972. **Henry County:** EPK81-006 (1) Chattahoochee River drainage at Alabama Rt 10 E of Abbeville, 18 June 1981. **Houston County:** CM 618493 (2) Golf Creek 3.5 mi E of Dothan; FLMNH 68287 (10) Golf Creek 3.5 mi E of Dothan, Aug. 1913; FLMNH 68411 (3) Golf Creek 3.5 mi E of Dothan, Aug. 1913; FLMNH 68675 (2) Golf Creek 3.5 mi E of Dothan; FLMNH 68962 (3) Golf Creek 3.5 mi E of Dothan, Aug. 1913; FLMNH 68967 (2) Golf Creek 3.5 mi E of Dothan, Aug. 1913; MCZ 29955 (2) Golf Creek near Smyrna; MCZ 144640 (6) Golf Creek near Smyrna, Aug. 1916; UMMZ 84127 (15) Golf Creek 3.5 mi E of Dothan. **Lee County:** JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-014 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-016 (1) Little Uchee Creek at CR36, 4.1 mi SW of Salem, Sept. 1972; JJJ73-017 (1) Little Uchee Creek at CR32, 8 mi SE of Opelika, 1972; JJJ73-018 (1) Halawakee Creek just above mouth of unnamed tributary 6.9 air mi NNE of Salem 10.2 air mi ENE of Opelika, 1972; JJJ73-019 (1) Halawakee Creek at CR63, 8.3 mi NE of Opelika, 31 Aug. 1972; JJJ73-020 (1) Halawakee Creek below U.S. Rt 29, 7.6 mi NE of Opelika, 6 Feb. 1972; MCZ 293284 (5) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 21 Feb. 1973. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; FLMNH 68440 (7) Uchee Creek near Nuckols, 26 June 1915; FLMNH 233695 (1) Uchee Creek, 28 Sept. 1973; JJJ73-003 (1) Uchee Creek at U.S. Rt 431/Alabama Rt 1 ca. 6 air mi NE of Seale, 16 June 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-007 (1) Little Uchee Creek above U.S. Rt 431, 7.5 mi NE of Seale, 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; MCZ 111380 (2) Uchee Creek 6 mi NE of Seale, 1929; UMMZ 84146 (1) Uchee Creek near Hyram; UMMZ 89199 (NR) Uchee Creek 6 mi NE of Seale. **GEORGIA: Early County:** MCZ 191696 (1) Sawhatchee Creek 14 mi NW of Donaldsonville, 29 June 1953. **Muscogee County:** CM 618491 (2) Chattahoochee River near Columbus; CM 618492 (2) Chattahoochee River near Columbus; FLMNH 1919 (2) Chattahoochee River near Columbus; FLMNH 65702 (1) Chattahoochee River near Columbus; FLMNH 68314 (14) Chattahoochee River near Columbus; FLMNH 68346 (15) Chattahoochee River near Columbus; FLMNH 68379 (2) Chattahoochee River near Columbus; MCZ 37319 (11) Chattahoochee River near Columbus; MCZ 191478 (2) Chattahoochee River near Columbus; MCZ 191941 (2) Chattahoochee River near Columbus; MCZ 203745 (5) Chattahoochee River drainage near Columbus; MCZ 203746 (5) Chattahoochee River drainage; MCZ 203747 (3) Chattahoochee River near Columbus; MCZ 203749 (10.5) Bull Creek near Columbus; MCZ 231239 (7) Chattahoochee River drainage near Columbus; MCZ 254696 (2) Chattahoochee River drainage near Columbus; MCZ 293271 (4)

Chattahoochee River near Columbus; UMMZ 23374 (2) Chattahoochee River drainage near Columbus; UMMZ 84142 (1.5) Chattahoochee River near Columbus; USNM 85090 (0.5) Chattahoochee River drainage near Columbus; USNM 85095 (29) Chattahoochee River drainage near Columbus; USNM 85259 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 68285 (16) Rocky Creek near Pansey, Aug. 1916; FLMNH 68316 (6) Cowarts Creek near Cowart, June 1916; FLMNH 68390 (3) Big Creek near Florida state line, Aug. 1916; FLMNH 68400 (11) Cowarts Creek near Dothan; MCZ 111399 (2) Chipola River system 13 mi SE of Dothan, 1929; MCZ 112058 (9) Rocky Creek near Pansey, Aug. 1916; MCZ 112059 (16) Spring Creek near Madrid, Aug. 1916; MCZ 112060 (8) Cowarts Creek near Cowart, June 1916; MCZ 112061 (4) Cowarts Creek near Madrid; MCZ 112096 (5) Big Creek near Florida state line, Aug. 1916; WHM88-004 (1) Cowarts Creek at Alabama Rt 53 ca. 19 mi SE of Dothan, 1988. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; EPK83-002 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 31 Aug. 1983; FLMNH 4929 (7) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 4993 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 5024 (15) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 5026 (9) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 38512 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1967; FLMNH 68318 (10) Chipola River near Altha, July 1918; FLMNH 68388 (1) Chipola River near Altha; FLMNH 68414 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; FLMNH 243884 (7) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; HGL67-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 26 June 1967; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 112057 (10) Chipola River near Altha, July 1918; MCZ 112081 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard; MCZ 191939 (18.5) Chipola River 2 mi E of Clarksville; MCZ 191944 (9) Chipola River; MCZ 191945 (16) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola; RSB88-005 (1) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-011 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1988; UMMZ 138377 (9) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138401 (14) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138428 (7) Chipola River, June 1918; UMMZ 138432 (20) Chipola River near Blountstown, June 1918; UMMZ 138451 (22.5) Chipola River near Altha; UMMZ uncat. (10) Chipola River near Blountstown, June 1918; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 19. **Gulf County:** FLMNH 244011 (5) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138447 (11) Chipola River, June 1918. **Jackson County:** EPK78-001 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 27 Aug. 1978; EPK81-005 (1) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 15 June 1981; EPK83-004 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 31 Aug. 1983; FLMNH 1502 (8) Spring Creek 3 mi SE of Marianna, 29 Feb. 1933; FLMNH 1504 (4) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 1506 (6) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 17 May 1933; FLMNH 2785 (12) Spring Creek 3 mi SE of Marianna, 28 Feb. 1933; FLMNH 2786 (8) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 2787 (18) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 3338 (9) Spring Creek 3 mi SE of Marianna, 22 Nov. 1932; FLMNH 5018 (2) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FLMNH 5022 (15) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 5027 (12) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 63261 (1) Spring Creek 3 mi SE of Marianna, 28 Feb. 1933; FLMNH 68312 (2) Blue Spring run near Marianna, 15 June 1901; FLMNH 68315 (15) Spring Creek 200 m below Merritt's Mill Pond dam, July 1918; FLMNH 68437 (1) Spring Creek near Alabama state line, Aug. 1916; FLMNH 197710 (1) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 214597 (4) Baker Creek about 7 air mi NNW of Marianna, 22 July 1990; FLMNH 229365 (2) Spring Creek near Alabama state line, Aug. 1916; FMNH 23391 (5) Blue Spring run near Marianna; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; MCZ 111294 (11.5) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 111319 (1.5) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 190108 (16) Chipola River 1 mi W of Sink Creek; MCZ 190114 (2) Chipola River system (a creek) 2.4 mi NNW of Sink Creek, 1953; MCZ 191142 (2) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; MCZ 191411 (2) Chipola River 3 mi S of Marianna, 17 July 1953; MCZ 191941 (13) Chipola River at Florida Rt 167, 2 km N of Marianna, 2 Sept. 1954; MCZ 191980 (1) Cowarts Creek 6 mi W of Malone, 1954; MCZ 240035 (1) Chipola River 12 mi SSE of Marianna; RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-006 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 21 Nov. 1987; RSB87-007 (1) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 10 Oct. 1987; RSB87-008 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 10 Oct. 1987; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; RSB88-013 (1) Waddells Mill Creek at bridge 9.1 km S of Sills, 10 July 1988; UMMZ 52454 (11) Spring Creek 3 mi SE of Marianna; UMMZ 52464 (1) Blue Spring run near Marianna; UMMZ 55492 (3) Blue Spring run near Marianna; UMMZ 56749 (5) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna; UMMZ 57435 (3) Spring Creek 2.5 mi SE of Marianna; UMMZ 57436 (19) Spring Creek 2.5 mi SE of Marianna; UMMZ 57476 (2) Chipola River system 5 mi S of Marianna; UMMZ 57477 (4) Chipola River system 5 mi NE of Marianna; UMMZ 138380 (18) Chipola River near Marianna, July 1918; UMMZ 138405 (16) Chipola

River at CR278 (Peacock Bridge) near Sink Creek, 1918; UMMZ 138412 (23) Chipola River near Marianna, July 1918; UMMZ 138480 (1) Chipola River system near Marianna, July 1918; UMMZ 139240 (32) Spring Creek near Alabama state line, Aug. 1916; UMMZ 162408 (2) Dry Creek 5.5 mi S of Marianna, 27 Nov. 1941; UMMZ 215384 (11) Chipola River at U.S. Rt 90/Florida Rt 10, 1 km E of Marianna; UMMZ 215393 (6) Chipola River at Florida Rt 167, 2 km N of Marianna; UMMZ 218196 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 4 July 1964; UMMZ 234946 (NR) Chipola River 1 mi N of Marianna, 25 May 1963.

Flint River Drainage. **GEORGIA: Baker County:** FLMNH 30662 (1) Chickasawhatchee Creek at Elmodel, 18 May 1981; MCZ 111317 (6) Cooleewahee Creek near Newton, 1929; UMMZ 56745 (1) Cooleewahee Creek near Newton; UMMZ 56750 (2) Cooleewahee Creek near Newton. **Calhoun County:** MCZ 111497 (1) Ichawaynochaway Creek 5.5 mi NE of Morgan, 1929; MCZ 234094 (5) Ichawaynochaway Creek 3 mi NE of Morgan, Sept. 1961; UMMZ 68823 (1) Ichawaynochaway Creek. **Coweta County:** HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; UMMZ 54816 (2) Line Creek; UMMZ 84138 (6) Line Kiln Creek; UMMZ 164112 (3) Line Creek. **Crawford County:** MCZ 237449 (14) Flint River 1 mi W of Nakomis, Sept. 1962. **Crisp County:** FLMNH 251874 (4) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele, 26 Aug. 1995; MCZ 11368 (5.5) Cedar Creek 6 mi SW of Cordele, 1929; MCZ 111328 (12) Gum Creek 2 mi N of Cordele, 1929; MCZ 111329 (9) Gum Creek 2 mi N of Cordele, 1929; MCZ 111335 (3) Flint River 10 mi W of Cordele, 1929; MCZ 111369 (1) Cedar Creek 6 mi SW of Cordele, 1929; MCZ 111414 (4) Swift Creek 12 mi SW of Cordele, 1929; MCZ 191413 (2) Cedar Creek S of Cordele, 23 Aug. 1954; MCZ 234190 (5) Gum Creek 1 mi N of Cordele, 27 Aug. 1961; UMMZ 56744 (2) Swift Creek 12 mi SW of Cordele; UMMZ 56748 (7) Gum Creek 2 mi N of Cordele; UMMZ 56749 (4) Gum Creek 2 mi N of Cordele; UMMZ 56754 (2) Cedar Creek 6 mi SW of Cordele; UMMZ 56755 (2) Flint River 10 mi W of Cordele. **Decatur County:** FLMNH 1951 (2) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 4971 (7) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Sept. 1954; FLMNH 5021 (9) Flint River near Bainbridge, 1 Sept. 1954; MCZ 20150 (2) Spring Creek; MCZ 191409 (6) Flint River near Bainbridge, 1 Sept. 1954; MCZ 191694 (9) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 15 July 1953; MCZ 191870 (6) Flint River near Recovery, 1954; UMMZ 86240 (4) Spring Creek. **Dooly County:** HGL86-005 (1) Turkey Creek at Georgia Rt 230 W of Vienna, 1986; MCZ 111288 (7) Little Pennahatchee Creek 4 mi NW of Vienna, 1929; MCZ 111289 (3) Little Pennahatchee Creek 4 mi NW of Vienna, 1929; UMMZ 56740 (2) Little Pennahatchee Creek 4 mi NW of Vienna; UMMZ 56757 (3) Little Pennahatchee Creek 4 mi NW of Vienna. **Dougherty County:** MCZ 5690 (1) Flint River near Albany; MCZ 16471 (9.5) Flint River near Albany; UMMZ 56746 (1) Flint River 10 mi S of Albany; UMMZ 86268 (1) Flint River near Albany; UMMZ 247569 (2) Flint River 10 mi S of Albany. **Early County:** UMMZ 49755 (1) Dry Creek 2 mi NE of Jakin. **Lee County:** MCZ 111278 (3) Flint River drainage (a creek) near Chokee and DeSoto, 1929; MCZ 111279 (7.5) Flint River drainage (a creek) near Chokee and DeSoto, 1929; UMMZ 56741 (2) Flint River drainage (a creek) near Chokee and DeSoto; UMMZ 56752 (3) Flint River drainage (a creek) near Chokee and DeSoto. **Macon County:** EPK (1) Flint River at Georgia Rt 26 in Montezuma, 17 July 1976; FLMNH 233258 (1) Flint River 4 mi E of Garden Valley, 22 Sept. 1969; HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981; USNM 85089 (1) Flint River. **Meriwether County:** FLMNH 233679 (2) White Oak Creek 3 mi NW of Alvaton, 30 Sept. 1973. **Miller County:** EPK90-001 (1) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin, 22 April 1990. **Pike County:** EPK84-001 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 27 Aug. 1984; FLMNH 61749 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 30 Sept. 1973; OSUM 24362 (9) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 24 Sept. 1968. **Seminole County:** FLMNH 1927 (14) Spring Creek near Reynoldsville, 27 June 1953; FLMNH 1953 (1) Spring Creek below dam at Reynoldsville 10 mi WSW of Bainbridge, 27 June 1953; FLMNH 4963 (1) Spring Creek 2.5 mi S of Reynoldsville; MCZ 190109 (4) Spring Creek 2.5 mi S of Reynoldsville; MCZ 190110 (2) Spring Creek near Reynoldsville. **Sumter County:** MCZ 234093 (4.5) Muckalee Creek 1 mi NW of Americus, 4 Sept. 1961. **Taylor County:** CC82-005 (1) Flint River N32:40.77/W84:10.92, 4.5 mi below U.S. Rt 19/U.S. Rt 80/Georgia Rt 3/Georgia Rt 22, 1982. MCZ 37566 (1) Little Patsiliga Creek; MCZ 63261 (1) Little Patsiliga Creek, 15 May 1915; UMMZ 85358 (4) Patsiliga Creek. **Terrell County:** MCZ 111413 (9) Chickasawhatchee Creek 5 mi SE of Dawson, 1929; MCZ 234091 (10) Kinchafoonee Creek 9 mi NE of Dawson, 9 Sept. 1961; MCZ 234092 (5) Kinchafoonee Creek 4 mi N of Bronwood, 8 Sept. 1961; UMMZ 56743 (3) Chickasawhatchee Creek 5 mi SE of Dawson. **Upson County:** MCZ 236089 (4) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston, 23 Aug. 1959. **Webster County:** MCZ 234087 (1) Kinchafoonee Creek 1 mi W of Preston, 11 Sept. 1961; MCZ 234089 (1) Hog Branch 4 mi E of Preston, 11 Sept. 1961; MCZ 234090 (15) Kinchafoonee Creek 2 mi SE of Preston, 9 Sept. 1961; OSUM 24880 (7) Kinchafoonee Creek at Georgia Rt 41, 1.1 mi SSW of Preston, 9 Sept. 1961; UMMZ 84135 (5) Flint River drainage near Preston; UMMZ 84148 (1) Flint River drainage near Preston; UMMZ 86271 (1) Flint River drainage near Preston; UMMZ 230550 (15) Kinchafoonee Creek 2 mi S of Preston; USNM 134607 (1) Flint River drainage near Preston. **Worth County:** EPK87-002 (1) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 25 Aug. 1987; FLMNH 251883 (1) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield, 26 Aug. 1995; MCZ 98410 (3.5) Jones Creek 2 mi S of Oakfield, 1933; MCZ 98419 (3) Abrams Creek 5 mi S of Oakfield, 1933; MCZ 98425 (2) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond, 23 Aug. 1933; MCZ 111403 (3) Abrams Creek 3 mi W of Doles, 1929; UMMZ 56742 (1) Abrams Creek 3 mi W of Doles; UMMZ 58289 (6) Jones Creek 2 mi S of Oakfield; UMMZ 58305 (3) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond; UMMZ 58796 (5) Abrams Creek 5 mi S of Oakfield.

Present Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** JCB91-029 (1) Apalachicola River at NM 104.6 in channel between island and east bank 1.6 RM S of Jim Woodruff Dam. **GEORGIA: Decatur County:** JCB92-040 (19) Mosquito Creek at Georgia Rt 97 ca. 20 air mi SW of Bainbridge.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** JCB92-169 (5) South Fork Cowikee Creek near CR79 ca. 1.3 air mi NE of Batesville ca. 12.5 air mi NW of Eufaula. **Lee County:** JCB92-139 (2) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika. **Russell County:** JCB92-136 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale; JCB92-166 (2) Hatchechubbee Creek at U.S. Rt 431/Alabama Rt 1 ca. 8 air mi S of Seale. **GEORGIA: Chattahoochee County:** JCB91-071 (1) Shell Creek ca. 0.5 mi above Chattahoochee River NM 133.4. **Clay County:** JCB92-179 (21) Hog Creek at Georgia Rt 266 ca. 5.5 air mi ENE of Fort Gaines. **Early County:** JCB92-042 (3) Sawhatchee Creek at Georgia Rt 273 ca. 0.25 air mi W of Cedar Springs ca. 7.25 air mi NW of Jakin. **Randolph County:** JCB92-177 (13) Pumpkin Creek at CR27 ca. 6.5 air mi WSW of Benevolence ca. 7.5 air mi NW of Cuthbert. **Stewart County:** JCB92-176 (100) Lime Spring Branch at CR148 ca. 6.25 air mi SE of Westville ca. 7 air mi SE of Lumpkin.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-036 (2) Chipola River at Peacock Springs above RM 55, 0.1 RM N of CR274; JCB91-044 (2) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank; JCB91-114 (1) Chipola River at RM 49.9 confluence of Tenmile Creek ca. 5.6 RM above Florida Rt 20. **Jackson County:** JCB91-119 (3) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-120 (2) Chipola River at RM 67.2 confluence of Dry Creek; JCB91-124 (12) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-126 (2) Chipola River at RM 79.8 ca. 2 mi S of U.S. Rt 90/Florida Rt 10 along west bank.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-045 (7) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton. **Calhoun County:** JCB92-163 (8) Pachitla Creek at CR153 ca. 2.75 air mi S of Morgan. **Coweta County:** JCB92-108 (3) Little White Oak Creek at CR547 (Gordon Rd) ca. 3 air mi NW of Haralson ca. 5 air mi SW of Senoia; JCB92-109 (1) Line Creek at Georgia Rt 34/Georgia Rt 54 ca. 4.5 air mi NE of Sharpsburg ca. 11 air mi E of Newnan; JCB92-110 (2) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia; JCB92-111 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia. **Crawford County:** JCB92-096 (16) Spring Creek at CR160 ca. 5 air mi SSW of Roberta; JCB92-097 (4) Ucohatchee Creek at U.S. Rt 80/Georgia Rt 22 ca. 6.25 WNW of Roberta. **Crisp County:** JCB92-065 (6) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (7) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele. **Decatur County:** JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB92-035 (18) Spring Creek at Georgia Rt 84 in Brinson; JCB92-051 (26) Spring Creek at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB92-205 (48) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-067 (1) Sandy Mount Creek at Georgia Rt 90 ca. 2.5 air mi NW of Vienna. **Early County:** JCB92-044 (4) Spring Creek at Georgia Rt 62 ca. 9.5 air mi ENE of Blakely. **Fayette County:** JCB92-150 (15) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (5) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Lee County:** JCB92-064 (1) Lee Creek at CR23 ca. 12.5 air mi E of Smithville; JCB92-159 (4) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg. **Macon County:** JCB92-086 (3) Hogcrawl Creek at Georgia Rt 329 ca. 4 air mi E of Montezuma. **Marion County:** JCB92-156 (35) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Meriwether County:** JCB92-116 (3) White Oak Creek at CR312 (Oakland Rd) old covered bridge ca. 2.25 air mi SE of Alvaton 4 air mi NNE of Gay; JCB92-117 (6) Red Oak Creek at Georgia Rt 109 ca. 2.25 air mi WSW of Gay; JCB92-118 (3) Cane Creek at Georgia Rt 85W in Raleigh ca. 4.75 air mi NE of Warm Springs. **Miller County:** JCB92-037 (1) Spring Creek at U.S. Rt 27 in Colquitt; JCB92-049 (2) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin; JCB92-050 (2) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Pike County:** JCB92-125 (2) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon; JCB92-127 (2) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon. **Sumter County:** JCB92-088 (9) Lime Creek at CR53 (Spring Creek Church Rd/Joe Stewart Rd) ca. 14.25 air mi ESE of Americus; JCB92-152 (18) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus; JCB92-154 (1) Chokee Creek at U.S. Rt 280/Georgia Rt 30 ca. 2.25 air mi E of Leslie. **Talbot County:** JCB92-133 (2) Hackasofkee Creek at CR2 (Smith Rd) ca. 11.25 air mi ENE of Talbotton; JCB92-146 (3) Lazer Creek at Georgia Rt 41 ca. 3 air mi S of Woodland ca. 4.5 air mi NNW of Talbotton. **Terrell County:** JCB92-157 (45) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-160 (1) Ichawaynochaway Creek at U.S. Rt 82/Georgia Rt 50 ca. 9.5 air mi W of Dawson; JCB92-161 (2) Ichawaynochaway Creek at CR167 ca. 6 air mi W of Herod ca. 7.5 air mi SW of Dawson; JCB92-162 (12) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Upson County:** JCB92-098 (14) Auchumpkee Creek at CR174 (Allen Rd) ca. 10.5 air mi SE of Thomaston; JCB92-099 (3) Tobler Creek at CR420 (Wymanville Rd) ca. 6.5 air mi ESE of Thomaston; JCB92-101 (3) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston; JCB92-128 (1) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston; JCB92-129 (3) Flint River at end of CR96 (Sprewell Rd) at Sprewell Bluff Park ca. 9.25 air mi WSW of Thomaston; JCB92-130 (3) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston; JCB92-131 (5) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (37) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (92) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB92-058 (9) Mill Creek at Georgia Rt 300 ca. 7.5 air mi SSW of Oakfield; JCB92-059 (13) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-063 (3) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

Villosa vibex

Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** FLMNH 5017 (1) Stafford Creek 3 mi N of Blountstown, 31 Aug. 1954; MCZ 191977 (2) Stafford Creek 3 mi N of Blountstown,

1954. **Gadsden County:** FLMNH 180 (4) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1953; MCZ 191472 (5) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191597 (9) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 27 June 1953; RSB87-001 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 10 Oct. 1987; UMMZ 24987 (2) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952; UMMZ 248810 (2) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 2 May 1952.

Chattahoochee River Drainage. **ALABAMA: Barbour County:** UMMZ 163279 (1) Bear Creek near Batesville, April 1917. **Henry County:** UMMZ 163405 (6) Vann Mill Creek near Abbeville, April 1917. **Houston County:** FLMNH 68962 (1) Golf Creek 3.5 mi E of Dothan, Aug. 1913; FLMNH 69082 (5) Golf Creek near Smyrna, Aug. 1916; FLMNH 229327 (2) Golf Creek 3.5 mi E of Dothan; MCZ 111375 (1) Chattahoochee River drainage 10 mi E of Dothan, 1929; MCZ 144633 (6) Golf Creek near Smyrna, Aug. 1916; UMMZ 163754 (18) Omusee Creek tributary near Smyrna, July 1916; UMMZ 163755 (12) Omusee Creek tributary near Smyrna, July 1916; UMMZ 163760 (18) Golf Creek near Smyrna, June 1916; UMMZ 163761 (12) Golf Creek near Smyrna, June 1916. **Lee County:** JJJ73-012 (1) Little Uchee Creek above CR79, 2.8 mi NNE of Crawford, 1972; JJJ73-013 (1) Little Uchee Creek above CR12, 5.9 mi NNW of Crawford, 1972; JJJ73-015 (1) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 1972; JJJ73-016 (1) Little Uchee Creek at CR36, 4.1 mi SW of Salem, Sept. 1972; JJJ73-017 (1) Little Uchee Creek at CR32, 8 mi SE of Opelika, 1972; JJJ73-018 (1) Halawakee Creek just above mouth of unnamed tributary 6.9 air mi NNE of Salem 10.2 air mi ENE of Opelika, 1972; JJJ73-019 (1) Halawakee Creek at CR63, 8.3 mi NE of Opelika, 31 Aug. 1972; JJJ73-020 (1) Halawakee Creek below U.S. Rt 29, 7.6 mi NE of Opelika, 6 Feb. 1972; JJJ73-021 (1) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika, 1972; OSUM 33547 (13) Little Uchee Creek below CR77, 6.2 mi NNW of Crawford, 11 Sept. 1972. **Russell County:** CC82-003 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 7 Aug. 1982; FLMNH 68440 (1) Uchee Creek near Nuckols, 26 June 1915; FLMNH 69034 (1) Uchee Creek near Nuckols, 26 June 1915; JJJ73-002 (1) Uchee Creek at CR39, 3.2 mi NW of Ft. Mitchell, 27 Oct. 1972; JJJ73-004 (1) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale, 28 Sept. 1972; JJJ73-005 (1) Uchee Creek at CR23, 7.6 mi NNW of Seale, 7 Sept. 1972; JJJ73-008 (1) Little Uchee Creek 7.2 mi NE of Seale 7.3 mi SE of Crawford, 10 Nov. 1972; JJJ73-009 (1) Little Uchee Creek at CR28, between two former bridges, ca. 6 air mi SE of Crawford ca. 8.5 air mi NNE of Seale, 1972; UMMZ 91154 (1) Uchee Creek; UMMZ 163772 (2) Uchee Creek near Nuckols, June 1915. **GEORGIA: Cobb County:** AE91-003 (4) Chattahoochee River off Power's Ferry Rd SE of Marietta, 15 May 1960. **Muscogee County:** FLMNH 65702 (1) Chattahoochee River near Columbus; FLMNH 68943 (4) Chattahoochee River near Columbus; FLMNH 68951 (4) Chattahoochee River near Columbus; UMMZ 23282 (1.5) Chattahoochee River drainage near Columbus; UMMZ 89084 (4) Chattahoochee River near Columbus; UMMZ 89098 (3) Chattahoochee River drainage near Columbus; UMMZ 91155 (1) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; UMMZ 255253 (2) Chattahoochee River near Columbus; USNM 84974 (2) Chattahoochee River at U.S. Rt 80/U.S. Rt 280 in Columbus; USNM 85090 (16) Chattahoochee River drainage near Columbus.

Chipola River Drainage. **ALABAMA: Houston County:** FLMNH 68937 (20) Big Creek near Florida state line, Aug. 1916; FLMNH 68938 (14) Cowarts Creek near Dothan; FLMNH 69006 (23) Cowarts Creek near Cowart, June 1916; FLMNH 69015 (18) Big Creek near Madrid, Aug. 1916; MCZ 112072 (20) Cowarts Creek; MCZ 112073 (20) Big Creek near Florida state line, Aug. 1916; MCZ 112098 (14) Spring Creek near Madrid, Aug. 1916; UMMZ 138460 (18) Cowarts Creek near Florida state line, 1916; UMMZ 138473 (37) Rocky Creek near Pansey, Aug. 1916; UMMZ 138478 (1) Spring Creek near Madrid, Aug. 1916; UMMZ 138485 (13) Cowarts Creek near Cottonwood, Aug. 1916; UMMZ 138490 (44) Cowarts Creek near Dothan, June 1916; UMMZ 138496 (6) Big Creek Lake near Madrid, June 1916; UMMZ 138505 (21) Big Creek near Taylor, June 1916; UMMZ 139200 (16) Spring Creek near Madrid, Aug. 1916; UMMZ 139206 (26) Cowarts Creek near Madrid, Aug. 1916; UMMZ 139218 (42) Cowarts Creek near Cowart, June 1916; UMMZ 139226 (29) Spring Creek near Florida state line, Aug. 1916; UMMZ 139231 (55) Big Creek near Florida state line, Aug. 1916; UMMZ 163041 (28) Big Creek near Taylor, May 1916; UMMZ 163776 (1) Limestone Creek near Hodgesville; UMMZ 163778 (3) Chipola River system near Webb, June 1916. **FLORIDA: Calhoun County:** EPK81-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 15 June 1981; FLMNH 4993 (12) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 3 Sept. 1954; FLMNH 5010 (4) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; FLMNH 5013 (7) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 38507 (2) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1967; FLMNH 68939 (12) Chipola River near Altha, July 1918; FLMNH 68996 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; FLMNH 243885 (2) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 28 June 1986; GTW90-001 (1) Chipola River 1 km above Florida Rt 71, 11.8 mi SSW of Blountstown, 29 Aug. 1990; HGL67-002 (1) Chipola River at Wayside Park near Florida Rt 20, 1 mi E of Clarksville, 26 June 1967; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 112069 (3) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; MCZ 112075 (1.5) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; MCZ 112099 (10) Chipola River near Altha, July 1918; MCZ 191945 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 1954; MCZ 191983 (6) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 1954; MCZ 191991 (11) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 1954; MCZ 191993 (15) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 30 Aug. 1954; OSUM 23452 (4) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1967; RSB88-005 (3) Chipola River at Abe Springs Landing 5.4 km E of Frink, 26 June 1988; RSB88-007 (1) Chipola River at Pole Bluff Landing 7.1 km E of Kinard, 26 June 1988; RSB88-008 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 June 1988; RSB88-011 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 26 June 1988; RSB88-012 (1) Chipola River near Florida Rt 71 (Scott's Ferry) 16.4 km N of Iola, 26 June 1988; UMMZ 138365 (33) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, July 1918; UMMZ 138400 (29) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 138424 (2) Chipola River, June 1918;

UMMZ 138431 (21) Chipola River near Blountstown, June 1918; UMMZ 138452 (14) Chipola River near Altha; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988; WHM89-003 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 19 Feb. 1989. **Gulf County:** FLMNH 214639 (14) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; FLMNH 244012 (3) Chipola River, 14 Aug. 1988; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138444 (23) Chipola River, June 1918; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** FLMNH 2783 (2) Blue Spring run near Marianna, 8 June 1930; FLMNH 2787 (5) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 3307 (17) Spring Creek 2.5 mi SE of Marianna, 28 Feb. 1933; FLMNH 4992 (7) Cowarts Creek at Florida Rt 2, 10 km W of Malone, 2 Sept. 1954; FLMNH 5007 (6) Chipola River 1 mi N of Marianna, 2 Sept. 1954; FLMNH 5011 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; FLMNH 8341 (1) Spring Creek 3 mi SE of Marianna, 17 May 1933; FLMNH 47293 (2) Marshall Creek near Florida Rt 2, 1 mi SW of Sills, 30 Sept. 1967; FLMNH 57224 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 30 Aug. 1979; FLMNH 59064 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 19 Jan. 1974; FLMNH 68942 (6) Spring Creek 200 m below Merritt's Mill Pond dam, July 1918; FLMNH 69055 (2) Spring Creek near Alabama state line, Aug. 1916; FLMNH 180658 (6) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek; FLMNH 197699 (11) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 214613 (3) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH 214615 (2) Waddells Mill Creek 0.8 mi above confluence of Chipola River, 15 June 1990; FLMNH uncat. (1) Blue Spring 3 mi E of Marianna, 8 June 1930; FMNH 89928 (1) Cowarts Creek 6 mi W of Malone, 15 March 1957; FMNH 89938 (4) Marshall Creek 8 mi W of Malone; HGL67-005 (1) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 30 Sept. 1967; MCZ 19192 (2) Marshall Creek at Florida Rt 2, 13.5 km W of Malone, 2 Sept. 1954; MCZ 111295 (1.5) Spring Creek at Merritt's Mill Pond 3 mi E of Marianna, 1929; MCZ 111356 (2) Chipola River system (a stream) 1.5+ mi N of Campbellton, 1929; MCZ 112097 (5) Merritts Bridge at Marianna, July 1918; MCZ 190113 (2) Chipola River system (a creek) 2.4 mi NNW of Sink Creek, 1953; MCZ 191980 (4) Cowarts Creek 6 mi W of Malone, 1954; MCZ 191981 (12) Chipola River 1 mi N of Marianna; RSB87-004 (1) Chipola River at Florida Rt 167, 2 km N of Marianna, 10 Oct. 1987; RSB87-006 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 21 Nov. 1987; RSB88-009 (1) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 26 June 1988; RSB88-013 (1) Waddells Mill Creek at bridge 9.1 km S of Sills, 10 July 1988; UMMZ 55494 (2) Blue Spring run near Marianna; UMMZ 56775 (2) Chipola River system (a stream) 1.5+ mi N of Campbellton; UMMZ 57437 (24) Spring Creek 2.5 mi SE of Marianna; UMMZ 57455 (10) Spring Creek 3 mi SE of Marianna; UMMZ 57478 (8) Chipola River system 5 mi NE of Marianna; UMMZ 138379 (24) Chipola River near Marianna, July 1918; UMMZ 138406 (13) Chipola River at CR278 (Peacock Bridge) near Sink Creek, 1918; UMMZ 138414 (13) Chipola River near Marianna, July 1918; UMMZ 138481 (3) Chipola River system near Marianna, July 1918; UMMZ 162407 (1) Dry Creek 5.5 mi S of Marianna, 27 Nov. 1941; UMMZ 234894 (1.5) Dry Creek at Florida Rt 73, 8.8 km S of Marianna, 9 Feb. 1963; UMMZ 246989 (2) Spring Creek 2.5 mi SE of Marianna; WHM89-001 (1) Carter's Mill Branch (run of Blue Hole Spring) at Florida Caverns State Park, 1989.

Flint River Drainage. **GEORGIA: Baker County:** CM 6111884 (2) Flint River drainage; MCZ 190382 (2) Flint River drainage; UMMZ 89035 (11) Flint River drainage; UMMZ 89091 (2.5) Flint River drainage; UMMZ 91102 (4) Flint River drainage. **Calhoun County:** FLMNH 208956 (2) Chickasawhatchee Creek 4 mi E of Leary, 22 Oct. 1973; UMMZ 56739 (3) Flint River drainage (a creek) 4.5 mi NE of Morgan; UMMZ 56771 (1) Ichawaynochaway Creek 5.5 mi NE of Morgan; UMMZ 56777 (1) Flint River drainage (a creek) 4.5 mi NE of Morgan; UMMZ 68825 (2) Ichawaynochaway Creek; UMMZ 91098 (5) Ichawaynochaway Creek 6 mi NE of Morgan; UMMZ 91099 (6) Flint River drainage (a creek) 4.5 mi NE of Morgan. **Coweta County:** EPK85-002 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 1985; HGL81-001 (1) Line Creek at Georgia Rt 16 ca. 4.5 air mi SE of Senoia, 17 May 1981; UMMZ 83799 (2) Line Creek; UMMZ 89099 (1) Line Kiln Creek. **Crisp County:** FLMNH 251874 (1) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele, 26 Aug. 1995; SLY76-001 (1) Flint River, Lake Blackshear near Cordele; UMMZ 56761 (16) Gum Creek 2 mi N of Cordele; UMMZ 56764 (5) Cedar Creek 6 mi SW of Cordele; UMMZ 56769 (4) Swift Creek 12 mi SW of Cordele. **Decatur County:** FLMNH 1902 (7) Flint River at Georgia Rt 310 (Hutchinson's Ferry Rd) near Recovery, 25 Aug. 1954; FLMNH 1920 (1) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 4976 (2) Flint River near Bainbridge, 1 Sept. 1954; FLMNH 251633 (2) Flint River ca. 5.5 mi above U.S. Rt 84 (in Bainbridge) above row of houses (along west bank), 17 July 1995; UMMZ 89104 (4) Flint River. **Dooly County:** UMMZ 6767 (4) Little Pennahatchee Creek 4 mi NW of Vienna; UMMZ 56763 (7.5) Flint River drainage (a stream) 6 mi NW of Vienna. **Dougherty County:** FLMNH 68994 (3) Flint River at U.S. Rt 82 in Albany; FLMNH 69025 (2) Flint River near Albany; UMMZ 56768 (4) Flint River drainage (a creek) 6 mi W of Albany; UMMZ 89086 (10) Flint River drainage (a creek) 6 mi W of Albany; UMMZ 89100 (1) Flint River near Albany; UMMZ 206604 (4) Flint River drainage (a creek) 7.4 mi W of Albany, 25 March 1961. **Early County:** UMMZ 68829 (1) Dry Creek. **Lee County:** UMMZ 56762 (7) Flint River drainage (a creek) near Chokee and DeSoto; UMMZ 56772 (3) Flint River drainage (a small creek) 7 mi NW of Albany. **Macon County:** HGL81-002 (1) Flint River 1 mi W of Montezuma, in the eastern of 2 channels, 16 May 1981. **Miller County:** EPK90-001 (1) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin, 22 April 1990. **Pike County:** EPK81-003 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 17 May 1981; EPK84-001 (1) Flint River at Georgia Rt 362 ca. 8.5 air mi W of Williamson ca. 10.75 air mi NW of Zebulon, 27 Aug. 1984. **Seminole County:** FLMNH 1856 (2) Spring Creek near Reynoldsville, 27 June 1953. **Taylor County:** UMMZ 89088 (4) Patsiliga Creek. **Upson County:** FLMNH 31228 (1) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston, 21 May 1981; FLMNH 134625 (1) Potato

Creek 2.3 mi WNW of Thomaston, 21 Oct. 1973. **Webster County:** UMMZ 44800 (NR) Flint River drainage near Preston. **Worth County:** UMMZ 56765 (5) Abrams Creek 3 mi W of Doles; UMMZ 58290 (6) Jones Creek 2 mi S of Oakfield; UMMZ 58297 (4) Abrams Creek 5 mi S of Oakfield; UMMZ 58306 (3) Mill Creek 8 mi S of Oakfield 5 km above Mercer Mill Pond.

Present Records

Apalachicola River Drainage. **GEORGIA: Decatur County:** JCB92-040 (10) Mosquito Creek at Georgia Rt 97 ca. 20 air mi SW of Bainbridge.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JCB91-191 (1) Osanippa Creek at CR87 E of Blanton. JCB92-139 (4) Halawakee Creek at CR69 ca. 6.75 air mi NE of Opelika. **Russell County:** JCB92-136 (2) Uchee Creek at Alabama Rt 169 ca. 5.5 air mi N of Seale. **GEORGIA: Harris County:** JCB91-188 (1) Flat Shoals Creek at Georgia Rt 103 SE of West Point. **Stewart County:** JCB92-176 (24) Lime Spring Branch at CR148 ca. 6.25 air mi SE of Westville ca. 7 air mi SE of Lumpkin. **Randolph County:** JCB92-177 (1) Pumpkin Creek at CR27 ca. 6.5 air mi WSW of Benevolence ca. 7.5 air mi NW of Cuthbert.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-044 (3) Chipola River at RM 31.5, 2 RM N of Florida Rt 71 (Scotts Ferry) along west bank. JCB91-115 (1) Chipola River at RM 49.8, 5.5 RM above Florida Rt 20. **Gulf County:** JCB91-093 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987. **Jackson County:** JCB91-119 (1) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-124 (7) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-125 (1) Chipola River at RM 84.5, 200 m above Florida Rt 167 along west bank; JCB91-127 (1) Chipola River at RM 76.2 ca. 2 RM above I-10 confluence of Spring Creek.

Flint River Drainage. **GEORGIA: Baker County:** JCB92-045 (13) Coolewahee Creek at Georgia Rt 91, 2.0 road mi NW of junction Georgia Rt 37/Georgia Rt 91 in Newton; JCB92-047 (2) Ichawaynochaway Creek at Georgia Rt 216, 4.8 road mi WNW of junction Georgia Rt 37/Georgia Rt 216 ca. 13.25 air mi WNW of Newton. **Calhoun County:** JCB92-163 (1) Pachitla Creek at CR153 ca. 2.75 air mi S of Morgan. **Coweta County:** JCB92-110 (2) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia. **Crawford County:** JCB92-096 (15) Spring Creek at CR160 ca. 5 air mi SSW of Roberta. **Crisp County:** JCB92-065 (1) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-066 (3) Swift Creek at CR105 ca. 6.5 air mi W of Arabi ca. 9.5 air mi SW of Cordele. **Decatur County:** JCB91-004 (2) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB91-012 (1) Spring Creek 100 m N of Georgia Rt 253; JCB91-013 (1) Lake Seminole in Spring Creek arm ca. 1 mi below Georgia Rt 253; JCB92-035 (7) Spring Creek at Georgia Rt 84 in Brinson; JCB92-051 (2) Spring Creek at CR391, 1.3 road mi W of junction Georgia Rt 310/CR391, 13 air mi NW of Bainbridge; JCB92-199 (1) Flint River 96 m above boat ramp at end of CR345 ca. 3.9 air mi above U.S. Rt 84 (in Bainbridge); JCB92-201 (2) Flint River at bend ca. 8.5 air mi above U.S. Rt 84 (in Bainbridge) ca. 1.75 air mi ESE of junction Georgia Rt 253/CR394 (Cocktown Rd); JCB92-205 (12) Lake Seminole in Spring Creek arm ca. 1 RM above Smith Landing Rd ca. 10 air mi W of Bainbridge. **Dooly County:** JCB92-067 (1) Sandy Mount Creek at Georgia Rt 90 ca. 2.5 air mi NW of Vienna. **Dougherty County:** JCB91-139 (1) Flint River ca. 0.5 RM above Dry Creek ca. 480 m above Goat Island at Turtle Shoals. **Early County:** JCB92-178 (3) Spring Creek at CR282 (Christ Missionary Church Rd) ca. 3.5 air mi SE of Bluffton ca. 10.25 mi NE of Blakely. **Fayette County:** JCB92-150 (1) Antioch Creek at CR186 (Malone Rd) ca. 2.5 air mi S of Woolsey ca. 3.25 air mi NNE of Brooks; JCB92-151 (1) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Lee County:** JCB91-141 (1) Flint River 0.5 mi above Georgia Rt 32 at confluence of Philema Creek; JCB92-159 (14) Muckalee Creek at Georgia Rt 195 ca. 3.5 air mi NE of Leesburg; JCB92-192 (1) Lake Blackshear ca. 100 m W of entrance to Cedar Creek arm ca. 9 air mi WSW of Cordele. **Macon County:** JCB92-086 (3) Hogcrawl Creek at Georgia Rt 329 ca. 4 air mi E of Montezuma. **Marion County:** JCB92-156 (25) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Meriwether County:** JCB92-116 (1) White Oak Creek at CR312 (Oakland Rd) old covered bridge ca. 2.25 air mi SE of Alvaton 4 air mi NNE of Gay; JCB92-117 (1) Red Oak Creek at Georgia Rt 109 ca. 2.25 air mi WSW of Gay. **Miller County:** JCB92-049 (3) Spring Creek at CR190, 0.4 road mi W of junction CR191/CR190 ca. 2.5 air mi SW of Boykin; JCB92-050 (2) Aycocks Creek at CR190 ca. 3.25 air mi WSW of Boykin ca. 5.75 air mi S of Colquitt. **Pike County:** JCB92-126 (2) Flint River at CR246 (Flat Shoals Rd) ca. 5.25 air mi WSW of Concord ca. 10.75 air mi WSW of Zebulon; JCB92-127 (1) Flint River at Georgia Rt 18/Georgia Rt 74/Georgia Rt 109 ca. 2.25 air mi SW of Molena ca. 13.25 air mi SW of Zebulon. **Sumter County:** JCB92-088 (2) Lime Creek at CR53 (Spring Creek Church Rd/Joe Stewart Rd) ca. 14.25 air mi ESE of Americus; JCB92-152 (1) Muckalee Creek at Georgia Rt 30 ca. 1.5 air mi WNW of Americus. **Talbot County:** JCB92-146 (1) Lazer Creek at Georgia Rt 41 ca. 3 air mi S of Woodland ca. 4.5 air mi NNW of Talbotton. **Taylor County:** JCB92-095 (1) Flint River at U.S. Rt 19/Georgia Rt 3 ca. 11 air mi N of Butler. **Terrell County:** JCB92-157 (8) Kinchafoonee Creek at Georgia Rt 49 ca. 10 air mi NNE of Dawson; JCB92-162 (51) Chickasawhatchee Creek at CR130 ca. 4.5 air mi SW of Chickasawhatchee ca. 8.5 air mi S of Dawson. **Upson County:** JCB92-099 (1) Tobler Creek at CR420 (Wymanville Rd) ca. 6.5 air mi ESE of Thomaston; JCB92-101 (7) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston; JCB92-128 (1) Flint River near end of CR49 (Dripping Rock Rd) at Gerald I. Lawhorn Canoe Base at BSA Camp Thunder ca. 13.25 air mi NW of Thomaston; JCB92-129 (1) Flint River at end of CR96 (Sprewell Rd) at Sprewell Bluff Park ca. 9.25 air mi WSW of Thomaston; JCB92-130 (2) Potato Creek at Georgia Rt 74 ca. 2.25 air mi WNW of Thomaston; JCB92-131 (2) Flint River at CR419 (Po Biddy Rd) ca. 8 air mi SSW of Thomaston. **Webster County:** JCB92-155 (18) Kinchafoonee Creek at Georgia Rt 45 ca. 5.5 air mi SW of Plains ca. 8.5 air mi SE of Preston; JCB92-172 (24) Kinchafoonee Creek at CR123 ca. 5.25 air mi NW of Preston. **Worth County:** JCB92-059 (2) Abrams Creek at Georgia Rt 300 ca. 4.25 air mi SSW of Oakfield; JCB92-061 (10) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-062 (28) Mill Creek at CR4 ca. 8 air mi S of Oakfield.

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Historic Records

Apalachicola River Drainage. **FLORIDA: Calhoun County:** RSB88-004 (1) Johnson Creek at confluence of Apalachicola River near Ocheesee Landing, 26 Aug. 1988; WHM88-003 (1) Ocheesee Creek near Ocheesee Landing 9 mi NNE of Blountstown, 1988. **Gadsden County:** FLMNH 1954 (2) Mosquito Creek below dam 1 mi E of Chattahoochee, 27 June 1933; FLMNH 5015 (1) Mosquito Creek below dam 1 mi E of Chattahoochee, 12 Sept. 1954; FSU C-1029 (1) Mosquito Creek at U.S. Rt 90/Florida Rt 10, 1 mi E of Chattahoochee, 19 March 1970; MCZ 191472 (2) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191775 (2) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191813 (2) Mosquito Creek at dam near Chattahoochee, 12 Sept. 1954; MCZ 191889 (5) Mosquito Creek below dam 1 mi E of Chattahoochee, 1953; OSUM 5666 (1) Apalachicola River near Chattahoochee, 9 Feb. 1962; OSUM 24330 (4) Mosquito Creek below dam 1 mi E of Chattahoochee, 24 Jan. 1962; RSB88-002 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam, 27 June 1988.

Chattahoochee River Drainage. **ALABAMA: Houston County:** OSUM 43425 (1) Chattahoochee River near Columbia.

Chipola River Drainage. **FLORIDA: Calhoun County:** FLMNH 1942 (4) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 5013 (1) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; FLMNH 68414 (2) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; HGL74-002 (1) Chipola River, Dead Lake, 1974; HGL86-004 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 28 June 1986; MCZ 191998 (10) Chipola River, Dead Lake near Chipola Park 20 mi S of Blountstown, 3 Sept. 1954; UMMZ 138371 (19) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis; UMMZ 138394 (38) Chipola River near Pole Bluff Landing ca. 7.1 km E of Kinard, June 1918; UMMZ 184302 (2) Chipola River at RM 44.3, 30 m above Florida Rt 20 along west bank, 30 Aug. 1954; WHM80-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 23 Aug. 1980; WHM87-001 (1) Chipola River at Florida Rt 71 (Scott's Ferry) 11.0 km NW of Lewis, 26 July 1987; WHM88-001 (1) Chipola River, Dead Lake at Magnolia Lodge near Gulf County line, 13 Aug. 1988; WHM89-003 (1) Chipola River at Florida Rt 20, 1 mi SE of Clarksville, 19 Feb. 1989. **Gulf County:** FLMNH 214639 (20) Chipola River 3.5 mi E of Wewahitchka, 6 Aug. 1988; HGL90-001 (1) Chipola River, Dead Lake near Wewahitchka, 13 Oct. 1990; RSB88-006 (1) Chipola River, Dead Lake at Gates Fish Camp 8.5 km SSE of Kinard, 10 July 1988; RSB88-014 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 27 Aug. 1988; UMMZ 138443 (32) Chipola River, June 1918; WHM88-002 (1) Chipola River, Dead Lake just below Florida Rt 22A, where dam was located prior to 1987, 14 Aug. 1988. **Jackson County:** RSB87-003 (1) Spring Creek at U.S. Rt 90/Florida Rt 10 (Merritts Mill Bridge) 2 mi SE of Marianna, 21 Nov. 1987; RSB88-010 (1) Sinkhole next to Blue Hole Spring 5.6 km NNW Marianna, 16 Oct. 1988; UMMZ 162406 (6) Dry Creek 5.5 mi S of Marianna, 17 Nov. 1941. **GEORGIA: Crisp County:** UMMZ 178523 (3) Flint River at U.S. Rt 280 near Cordele, 11 Oct. 1950. **Decatur County:** CM 6110498 (2) Spring Creek; FLMNH 4986 (5) Spring Creek at Georgia Rt 84 in Brinson; MCZ 29997 (21) Spring Creek; MCZ 134094 (51) Spring Creek; MCZ 191472 (2) Spring Creek; UMMZ 91140 (9) Spring Creek. **Dooly County:** FLMNH 251856 (2) Turkey Creek 0.5 mi S of Byronville, 25 Aug. 1995.

Present Records

Apalachicola River Drainage. **FLORIDA: Gadsden County:** JCB91-018 (1) Apalachicola River at U.S. Rt 90/Florida Rt 10 below Jim Woodruff Dam.

Chattahoochee River Drainage. **ALABAMA: Lee County:** JCB92-140 (1) Little Uchee Creek below CR77 below Meadows Mill Pond ca. 7 air mi NW of Crawford ca. 11 air mi SE of Opelika.

Chipola River Drainage. **FLORIDA: Calhoun County:** JCB91-117 (1) Chipola River at RM 44.3, 30 m above Florida Rt 20 along west bank. **Jackson County:** JCB91-119 (2) Chipola River at RM 62.5 confluence of Sink Creek along east bank; JCB91-124 (4) Spring Creek 200 m below Merritt's Mill Pond dam; JCB91-126 (1) Chipola River at RM 79.8 ca. 2 mi S of U.S. Rt 90/Florida Rt 10 along west bank.

Flint River Drainage. **Georgia: Baker County:** JCB91-132 (1) Flint River ca. 2.5 mi S of Georgia Rt 37 across from huge mansion. **Coweta County:** JCB92-110 (1) Line Creek at Georgia Rt 74/Georgia Rt 85 ca. 2.25 air mi NE of Senoia. **Crisp County:** JCB92-065 (5) Cedar Creek at CR20 (Byrds Mill Rd) ca. 4.75 air mi SW of Cordele; JCB92-191 (4) Lake Blackshear in Cedar Creek arm ca. 200 m W of Georgia Rt 358 (Coney Rd) ca. 7.5 air mi SW of Cordele. **Decatur County:** JCB91-004 (1) Flint River below Big Horseshoe Bend (NM 22.9) 4.5 air mi S of Bainbridge; JCB92-039 (10) Fourmile Creek at Georgia Rt 97 ca. 4 air mi SSW of Bainbridge. **Fayette County:** JCB92-151 (3) Woolsey Creek at CR192 (Fletcher Ford Rd) ca. 1 air mi S of Woolsey ca. 2.5 air mi S of Inman. **Marion County:** JCB92-156 (4) Kinchafoonee Creek at CR96 ca. 9.25 air mi SSW of Buena Vista. **Sumter County:** JCB92-154 (9) Chokee Creek at U.S. Rt 280/Georgia Rt 30 ca. 2.25 air mi E of Leslie. **Talbot County:** JCB92-146 (4) Lazer Creek at Georgia Rt 41 ca. 3 air mi S of Woodland ca. 4.5 air mi NNW of Talbotton. **Upson County:** JCB92-101 (2) Flint River at Georgia Rt 36 ca. 6.5 air mi SW of Thomaston. **Worth County:** JCB92-061 (21) Abrams Creek tributary (unnamed) at CR123 below an impoundment ca. 6.25 air mi SSE of Oakfield; JCB92-063 (3) Mill Creek tributary (unnamed) at CR12 below Mercer Mill Pond ca. 7.25 air mi SSW of Oakfield.

ADDENDUM

During the preparation of this manuscript, a new species of *Fusconaia* was discovered in pre-Columbian archaeological sites in the Apalachicola Basin. The new species, *Fusconaia apalachicola* (Apalachicola ebonyshell), was fairly common in archaeological samples in the Apalachicola Basin, but only one individual was found in a sample from the Chattahoochee River in Houston County, Alabama. This species is apparently extinct, as it was not found during our survey of the Apalachicola

Basin. The distribution, abundance, and probable extinction was discussed by Williams and Fradkin (1999).

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