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Abstract

(December 1994) - Notes on the Status and Life History of the Northern Madtom, *Noturus stigmosus*, in Mississippi. By G.R. Parson, 3 pp.

New Distribution Records of Gulf Slope Drainage Fishes in the Ocmulgee River System, Georgia. By H.L. Bart, et al., 7 pp.

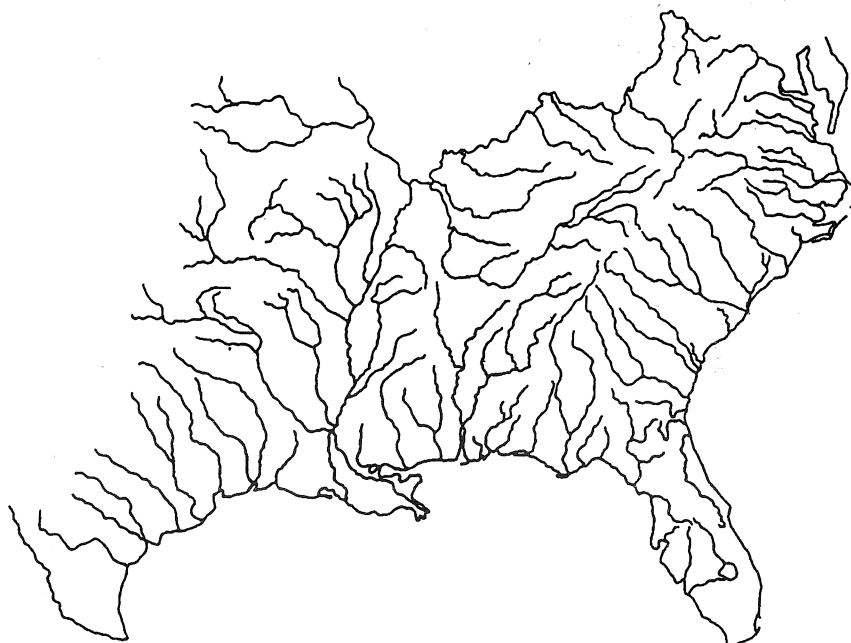
Minutes, Regional Reports, Announcement.

Keywords

northern madtom, noturus stigmosus, mississippi, gulf slope drainage, ocmulgee river

Southeastern Fishes Council **PROCEEDINGS**

DEDICATED TO THE PRESERVATION OF SOUTHEASTERN FISHES



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NOTES ON THE STATUS AND LIFE HISTORY OF THE NORTHERN MADTOM, *NOTURUS STIGMOSUS*, IN MISSISSIPPI

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INTRODUCTION

The northern madtom, *Noturus stigmosus*, occurs throughout the tributaries of the Mississippi River. Rhode (1980) reported the species being found in western Mississippi and Tennessee, north throughout much of the Ohio River basin to northern Indiana and extreme western Pennsylvania. It has also been collected in the western Lake Erie drainage in Ohio, Indiana and Michigan. In Kentucky, Burr and Warren (1986) reported the species as sporadic/uncommon in the upper Green, upper Kentucky, and upper Big Sandy rivers and occasional/locally common in the Salt and Licking river drainages. In the state of Mississippi, the species has been reported from the Big Black drainage, the Lower Mississippi North drainage (in north Mississippi this includes the Wolf and Hatchie Rivers) and the Yazoo River drainage (Ross and Brenneman 1991). The distributional map in Rhode (1980) shows the species distributed in northern Mississippi but the exact locations are not given.

The northern madtom is wide-ranging but apparently very uncommon. Taylor (1969) reported that the species is never very common and in western Tennessee occupies small rivers and creeks. All specimens taken to date have been large and were scattered over considerable distances. The northern madtom is currently listed as rare and/or threatened in the State of Mississippi by the Mississippi Department of Wildlife, Fisheries, and Parks.

I initiated a survey to more clearly determine the distribution and abundance of the northern madtom in the State of Mississippi. The almost complete lack of information concerning the biology of this species and the continuing loss of aquatic habitat in the state of Mississippi made this survey a high priority.

MATERIALS AND METHODS

From March to September 1988 and March to October 1989, we sampled the Tuscumbia, Hatchie, and Wolf River drainages of northern Mississippi by electroshocking with a back-pack electroshocker. We sampled in an upstream direction while an assistant, following close behind, collected the stunned fish with a dip net. We electroshocked at each site for approximately one hour, covering a distance of 50 to 100 m. Because some *Noturus* spp. prefer cover and are substrate oriented, stream banks, undercuts, leaf litter, and riffle areas were targeted. A small boat was used to sample at sites other than road crossings. Water temperature and

dissolved oxygen were measured at each site using a Yellow Springs Instruments temperature/dissolved oxygen meter. In addition, current, turbidity, substrate type, water depth and stream width were recorded.

RESULTS

A total of 59 collections from 38 different sites was made during the survey (Fig. 1). Five sites were sampled in the Tuscumbia River drainage, 12 sites in the Wolf River drainage, and 21 sites in the Hatchie River drainage. Seven specimens of *N. stigmosus* (75 to 90 mm TL, total length) were collected along approximately 100 m of the Hatchie River at the State Highway 4 crossing on 10 and 20 June 1988 (Fig. 1, site #1). An additional specimen (95 mm TL) was collected on the same day approximately 5 km downstream from the Highway 4 crossing (Fig. 1, site #2). On 26 August 1989 a single specimen (46 mm TL) was collected in the Hatchie River at the first road crossing north of State Highway 72 (Fig. 1, site #4). Collections from the Wolf River drainage on 28 August and 15 September 1988 produced 3 specimens of *N. stigmosus* (Fig. 1, site #3). At the above localities, temperature ranged from 20 to 26°C, dissolved oxygen ranged from 4.6 to 8.5 ppm, current velocity was slow to moderate, the substrate was a composite of sand and mud, and water clarity was from very clear to turbid (Table 1). Specimens were found in association with stream banks and/or benthic aggregates of leaf litter.

DISCUSSION

The northern madtom normally occurs in low numbers throughout its range. The examination of low density species is important because they may be particularly sensitive to environmental changes, both natural and those caused by man's activities. While few specimens of *N. stigmosus* were collected during this study, valuable information concerning distribution, habitat, and status was obtained.

This study confirms the occurrence of *N. stigmosus* in the Hatchie River drainage as reported by Rohde (1980). In addition the species was collected from the Wolf River drainage and represents a new distributional record for the state. No specimens were collected in the Tuscumbia River which has been extensively channelized creating high current speeds, steep banks, and very deep water. These conditions are not conducive to collection by back-pack electroshocker and after the first year of the study, surveys in the Tuscumbia

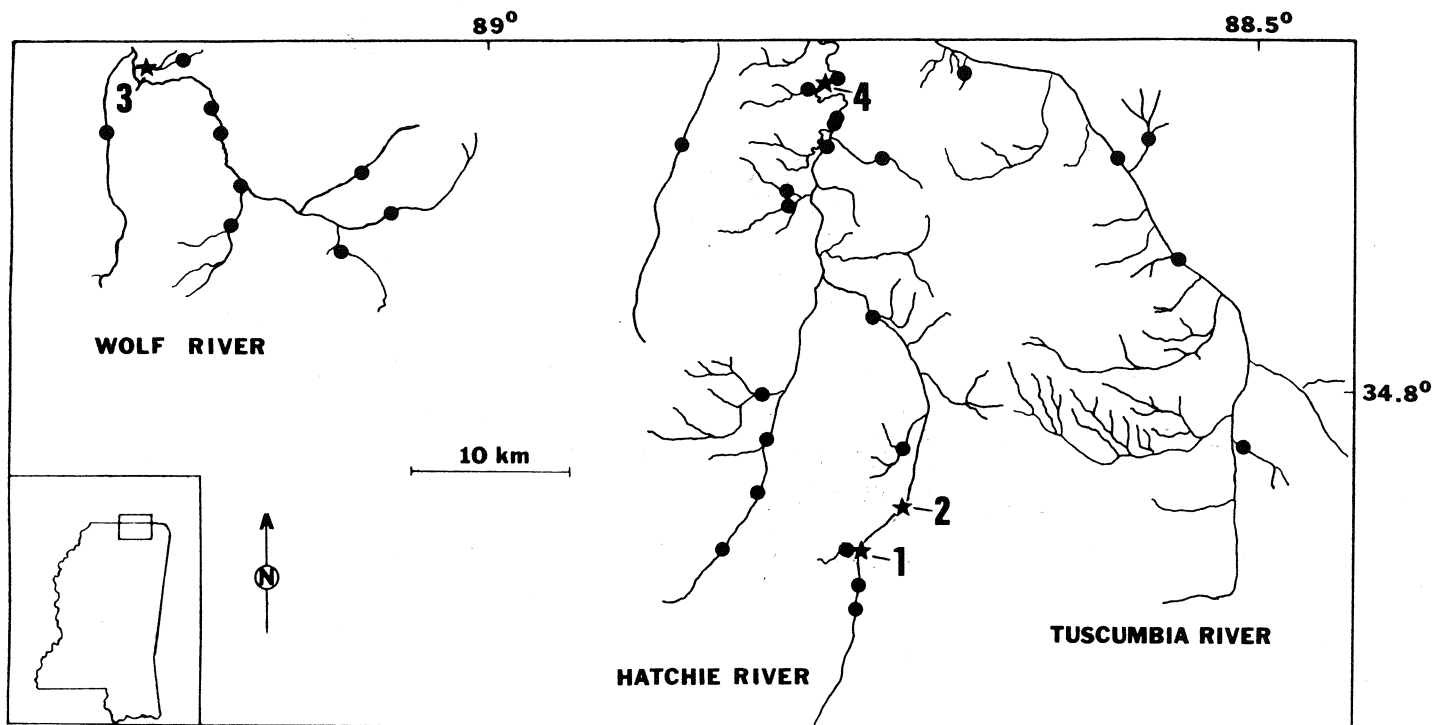


Figure 1. A map of localities surveyed for the northern madtom, *Noturus stigmosus*, on the Wolf, Hatchie and Tuscumbia Rivers of Mississippi. The circles are sites where the species was not found and the stars correspond to locations where the species was collected. The numbers indicate locations according to the following key: Number 1-the Hatchie River/Mississippi Highway #4 crossing. Number 2-the Hatchie River about 4.8 km N.E. of Location 1. Number 3-91.4 m upstream from the Indian Creek/Mississippi Highway #7 crossing. Number 4-the first road crossing on the Hatchie River north of Mississippi Highway #72.

Table 1. A summary of data recorded at sites where *N. stigmosus* were collected.

Location (see Fig. 1)	Number Collected	Date	Total Length (mm)	Water Temp. (°C)	Dissolved Oxygen (ppm)	Water Clarity	Depth (cm)	Current	Substrate Type
1	2	6/10/88	85-90	20	8.5	clear	15	moderate	sand/mud
1	5	6/20/88	75-80	22	8.0	muddy	50	slow	sand/mud
2	1	6/20/88	95	22	8.0	clear	<15	slow	sand/mud
3	1	8/28/88	100	25	6.2	clear	<50	moderate	sand/mud
3	2	9/15/88	58-108	26	6.5	clear	<50	moderate	sand/mud
4	1	8/26/89	46	26	4.8	muddy	30	slow	sand/mud

River were discontinued. It is possible that further collecting may eventually reveal the presence of this species in that drainage. However, the type of habitat that is apparently preferred by the northern madtom, i.e. benthic aggregates of leaf litter, may be less common in this drainage due to the increased transport of materials that accompanies channelization.

While many species of madtoms prefer fast moving riffles, *N. stigmosus* was never collected in these areas. The current velocity at sites where the species was collected was relatively slow. Indeed, at the most southerly site on the Hatchie River (Fig. 1) several specimens were found in pools downstream of the faster moving riffles. This is in contrast to specimens taken from the Huron River in Michigan where

they were found concentrated on riffle areas over which a fast current flowed (Taylor, 1969). All specimens were collected at sites with a sand/mud substrate. This may be significant since Taylor (1969) reports that all specimens from western Tennessee have been collected in areas of shifting sand and mud. Leaf litter, snags, roots, undercuts, and limbs were present in streams where the species was found. Most specimens were found associated with leaf litter. At many sites that appeared to be good madtom habitat, no *N. stigmosus* were found although other *Noturus* species (particularly *N. phaeus* and *N. hildebrandi*) were collected.

During the first year of this study *N. stigmosus* specimens were collected from two sites, with several coming from the same site. Despite intensive sampling at these sites during the second year of the study, no specimens were found. This suggests that aggregations of these fish, when they occur, are short term. This is in agreement with Taylor (1969) who noted that the few specimens that have been collected were scattered over considerable distances suggesting a lack of congregation of individuals. The results of this study confirm that *N. stigmosus* is an uncommon species in the State of Mississippi and suggest that it may be a candidate for rare and/or endangered species status.

ACKNOWLEDGMENTS

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NEW DISTRIBUTION RECORDS OF GULF SLOPE DRAINAGE FISHES IN THE OCMULGEE RIVER SYSTEM, GEORGIA

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ABSTRACT

Recent fish surveys in the Ocmulgee River system (Altamaha River drainage) in central Georgia by biologists from the Georgia Department of Natural Resources (GDNR) have revealed new distribution records for eight primarily Gulf Slope Drainage species: the eastern blacktail shiner *Cyprinella venusta cercostigma*, blacktip shiner *Lythrurus atrapiculus*, silverjaw minnow *N. buccatus*, longnose shiner *N. longirostris*, weed shiner *N. texanus*, flathead catfish *Pylodictus olivaris*, longear sunfish *Lepomis megalotis*, and shoal bass *Micropterus* sp. The five cyprinids are lowland species confined primarily to Coastal Plain streams in the southern portions of their ranges, except in the Chattahoochee and Flint river systems where the species extend significantly above the Fall Line. New records for most of the cyprinids are centered on western tributaries of the Ocmulgee River system in upland, Piedmont portions of the watershed. These western Ocmulgee River tributaries lie in close proximity to eastern tributaries of the upper Flint River, which are suggested as the source of the transfer. Whether the transfer was natural or the result of "bait-bucket" introduction can not be ascertained from available information. Flathead catfish and shoal bass were introduced into the Ocmulgee River in the mid-1970's by GDNR personnel. The source of the population of longear sunfish is unknown. Several of the new record species have close congeners in the Ocmulgee River with which they could conceivably hybridize or compete. Occurrences of a number of native bullhead, sucker and sunfish species are lower in the presence of flathead catfish. We hypothesized that flathead catfish are reducing their populations through direct predation.

INTRODUCTION

Recent fish surveys in the Ocmulgee River system (Altamaha River drainage) in central Georgia (Evans, 1991; Schleiger, in preparation) have revealed new distribution records for eight primarily Gulf Slope Drainage species: the eastern blacktail shiner *Cyprinella venusta cercostigma*, blacktip shiner *Lythrurus atrapiculus*, silverjaw minnow

Notropis buccatus, longnose shiner *N. longirostris*, weed shiner *N. texanus*, flathead catfish *Pylodictis olivaris*, longear sunfish *Lepomis megalotis*, and shoal bass *Micropterus* sp. The eastern blacktail shiner, blacktip shiner, weed shiner, flathead catfish, longear sunfish and shoal bass were formerly known only from streams draining into the Gulf of Mexico and (in the case of the weed shiner, flathead catfish and longear sunfish) southern tributaries of the Great Lakes. Ocmulgee River system records for these species are the first for an Atlantic Slope drainage basin. Ramsey (1965: Table 1) listed the longnose shiner as occurring in the Altamaha Drainage and is cited by Dahlberg and Scott (1971) and Gilbert and Burgess (1980) who also include the Altamaha River drainage in the longnose shiner's range. No other details on the source of the record are provided. The silverjaw minnow is primarily confined to drainages of the Gulf of Mexico and southern Great Lakes, but also occurs in the lower Susquehanna and upper Rappahannock rivers, Atlantic Slope drainages well to the north of the Altamaha River drainage (Gilbert, 1980).

MATERIALS AND METHODS

The surveys on which the new distribution records are based were conducted between July 1988 and November 1990 by biologists from the Georgia Department of Natural Resources (GDNR), Wildlife Resources Division (JWE, SLS and WC). Fish samples were taken at a total of 149 sites in Piedmont and upper Coastal Plain regions of the Ocmulgee River system between Lake Jackson and the southern limit of the Fall Line Hills physiographic province near Hawkinsville, GA (Fig. 1). Sample gears included seines and three types of electrofishing units: backpack electrofisher, boat electrofisher and a low frequency electrofishing unit (Custom Electronic Design, Model-3A) specially designed for catfish (use of the latter two electrofishing gears was confined to ten sites on the main channel of the Ocmulgee River; Evans, 1991). The collections were sorted and identified by the senior author and student workers (MST and JTH) at the Auburn University Museum Fish Collection. Representative lots of each of the identified species were deposited at the GDNR office at Fort Valley for use as a reference collection. The remainder of the

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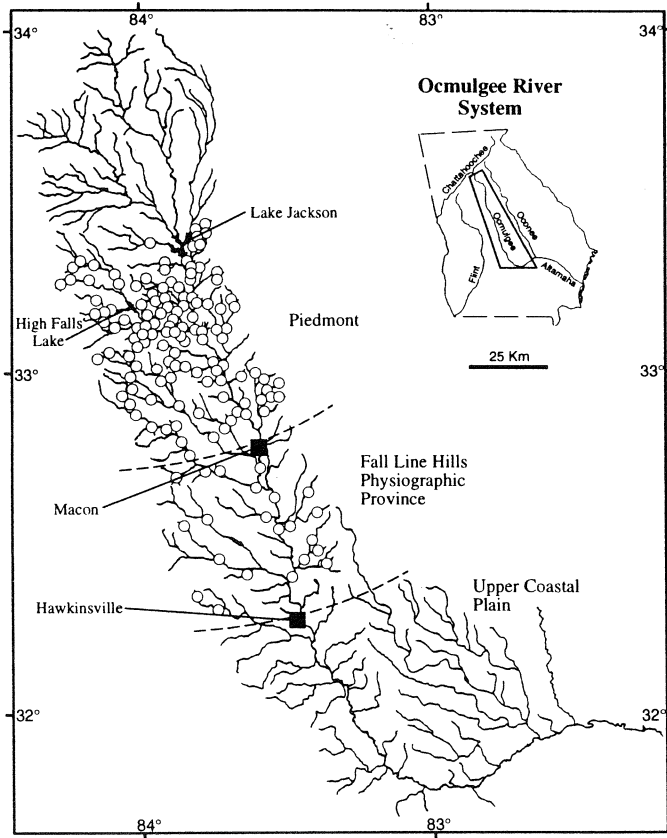


Figure 1. Map of the Ocmulgee River drainage system showing sampling stations for recent GDNR collections (open circles) in relation to physiographic provinces, and the locations of cities and lakes referred to in the text.

specimens are to be deposited in the University of Georgia, Museum of Natural History Fish Collection for permanent record. Names of species follows Robins et al. (1991).

RESULTS

The silverjaw minnow was the most widespread and abundant of the species reported herein as new to the Ocmulgee River system. The species was represented by a total of 659 specimens from 51 of the 149 sampling sites (Fig. 2). New distribution records for three of the remaining cyprinids (eastern blacktail, blacktip shiner and weed shiners) are centered mainly on the Towaliga River system above High Falls Lake on the western side of the Ocmulgee River watershed. A total of 28 blacktail shiners was collected at two sites: one on the Towaliga River and one on a tributary, Indian Creek, just upstream from its confluence with the Towaliga River (Fig. 3). The blacktip shiner was represented by 16 specimens from the headwaters of the Towaliga River system: two on the Towaliga River proper and one on Troublesome Creek, a small tributary (Fig. 4). The weed shiner was represented by 158 specimens from seven sites. Six of the sites were in the Towaliga River system (all five of

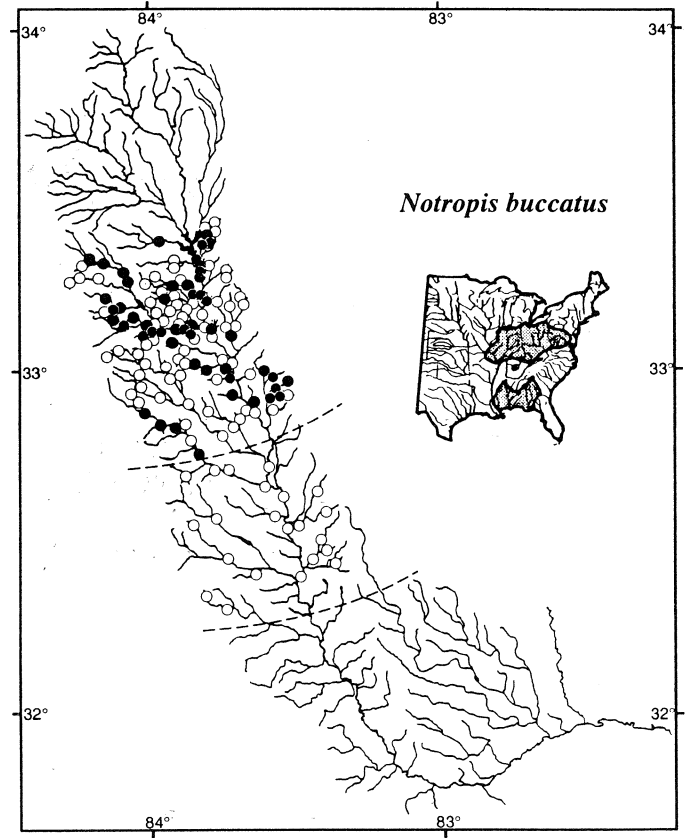


Figure 2. Ocmulgee River system distribution of the silverjaw minnow, *Notropis buccatus* (solid circles) based on recent GDNR collections. Inset map is the species revised overall distribution.

the above sites plus Buck Creek, a slightly more southern tributary which also enters High Falls Lake). The seventh site was on Tobesofkee Creek, a direct tributary of the Ocmulgee River well to the south of the Towaliga River (Fig. 5). Six longnose shiners were collected at a single locality on Tussahaw Creek above Lake Jackson (Fig. 6).

Distribution records for the flathead catfish, longear sunfish and shoal bass are centered on the main channel of the Ocmulgee River. Flathead catfish were collected at six Ocmulgee River sites (98 specimens total), and one site on Sabbath Creek (one specimen), a small tributary, near its confluence with the Ocmulgee River (Fig. 6). Longear sunfish were collected at four sites (20 specimens total) in the recent GDNR survey: Tussahaw Creek above Lake Jackson, and three sites on the Ocmulgee River below Lake Jackson (Fig. 4). Additional records in the Auburn University Museum Fish Collection (not shown in Fig. 4) place the species in Lake Jackson as early as 1973 (AUM 18388), in the Ocmulgee River below Lloyd Shoals Dam (south of the GA Hwy 16 crossing) as early as 1977 (AUM 15641), and, more recently, in Falling Creek east of Juliette (AUM 26146). The shoal bass was collected at eight of ten main river sites (81 specimens) plus 17 sites on tributaries of varying sizes (61 specimens, Fig. 7).

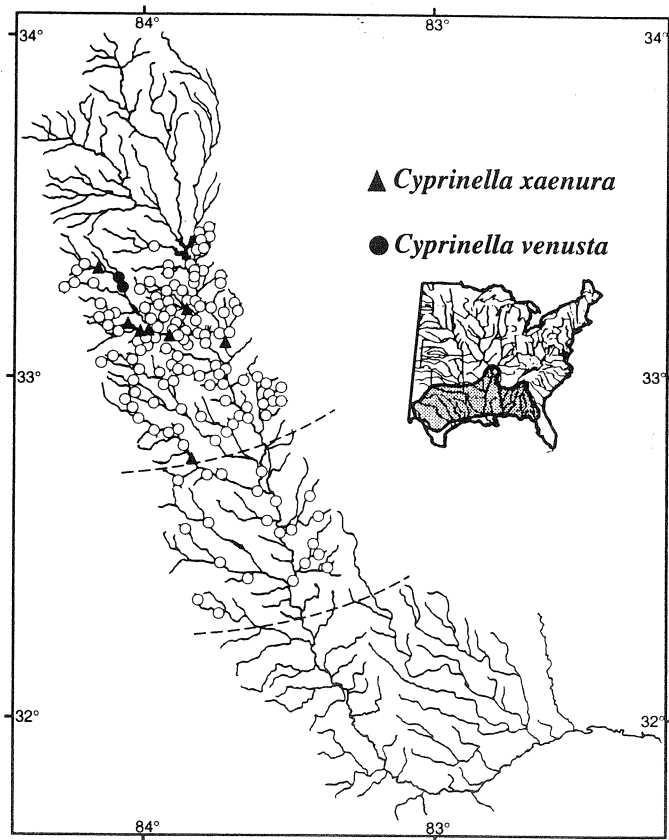


Figure 3. Ocmulgee River system distributions of the blacktail shiner *Cyprinella venusta* (solid circles) and Altamaha shiner *C. xanura* (solid triangles) based on recent GDNr collections. Inset map is revised overall distribution for the blacktail shiner.

DISCUSSION

The five cyprinid species herein reported as new to the Ocmulgee River system are lowland species that are primarily confined to Coastal Plain streams throughout most of the southern portions of their ranges. However, all of these species extend significantly above the Fall Line into the Piedmont Physiographic Province in the Chattahoochee and Flint river systems (Apalachicola River drainage). The new records are all from upland, Piedmont portions of the Ocmulgee River watershed (i.e., above the upper boundary of the Fall Line Hills Physiographic Province, Figs. 1-6), so the transfer likely involved populations from upland portions of the Chattahoochee and/or Flint river systems. Tributaries of the Chattahoochee and Flint rivers, particularly eastern headwater tributaries of the Flint River, lie in close proximity to western tributaries of the Ocmulgee River (see inset map in Fig. 1). Flint River specimens of the weed shiner differ from more western populations in having deeper bodies and higher numbers of body circumferential scales (Suttkus and Raney, 1955), and Ocmulgee River system specimens exhibit these

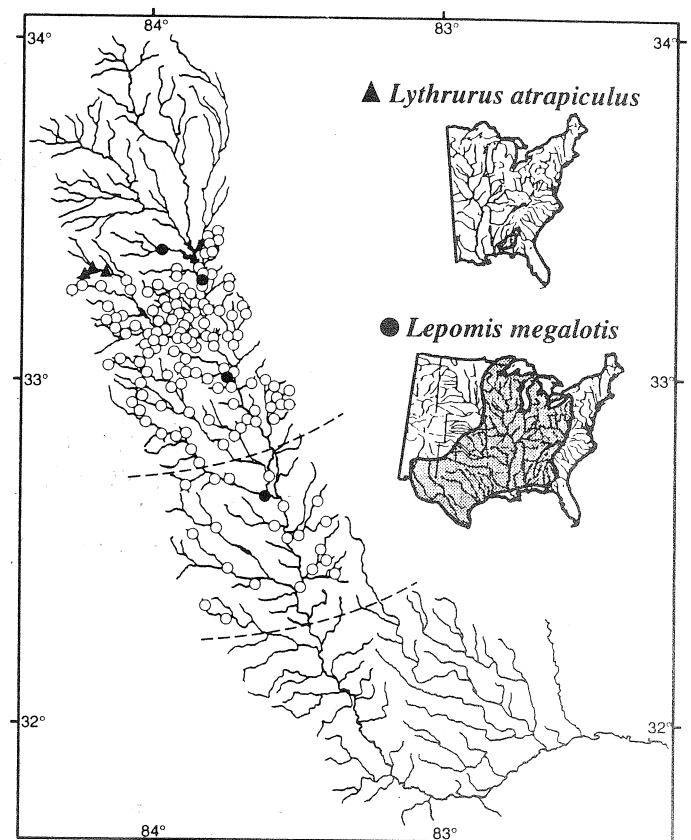


Figure 4. Ocmulgee River system distributions of the blacktip shiner *Lythrurus atrapiculus* (solid triangles) and the longear sunfish *Lepomis megalotis* (solid circles) based on recent GDNr collections and (longear sunfish) records in the Auburn University Museum fish collection. Inset maps are revised overall distribution maps for the two species.

characteristics.

It is unclear whether the cyprinids entered the Ocmulgee River system at the same or different times, or whether the transfer was natural or the result of "bait-bucket" introduction. The restricted occurrences of two of the species (eastern blacktail and blacktip shiners), and the concentration of collections of a third (the weed shiner), in streams of the Towaliga River system above High Falls Lake suggests that the upper Towaliga River was involved in the transfer of these species into the Ocmulgee River system. The dam that formed High Falls Lake was constructed in 1904 (GDNr, pers. comm.). We consider it most likely that the above cyprinids entered the upper Towaliga River after this time and that High Falls dam is preventing downstream dispersal of two of the species (*Cyprinella venusta* and *Lythrurus atrapiculus*). If the above scenario is correct for all three species, then the weed shiner has dispersed downstream across High Falls Reservoir to at least one other part of the Ocmulgee River watershed since its introduction.

A similar scenario, but with much wider subsequent dispersal, could account for the Ocmulgee River distribution of the silverjaw minnow. However, this explanation is com-

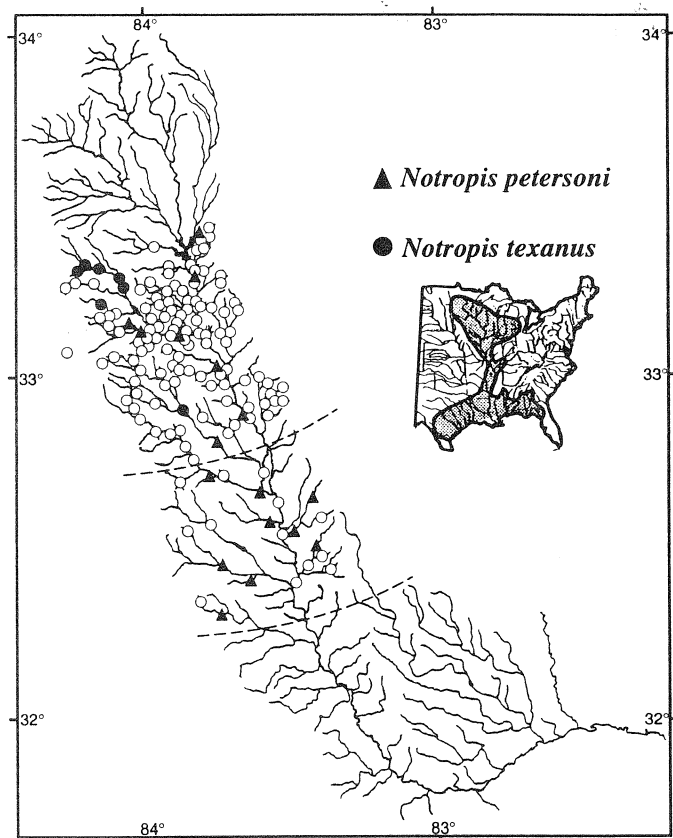


Figure 5. Ocmulgee River system distributions of the weed shiner *Notropis texanus* (solid circles) and coastal shiner *N. petersoni* (solid triangles) based on recent GDNr collections. Inset map is revised overall distribution for the weed shiner.

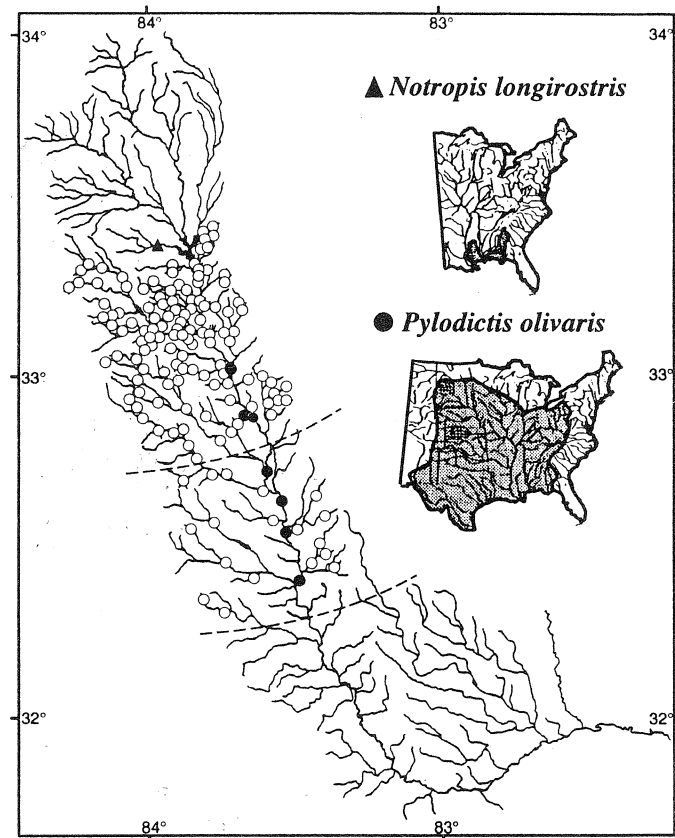


Figure 6. Ocmulgee River system distributions of the longnose shiner *Notropis longirostris* (solid triangles) and the flathead catfish *Pylodictis olivaris* (solid circles) based on recent GDNr collections. Inset maps are revised overall distribution maps for the two species.

plicated by the occurrence of the silverjaw minnow in Tussahaw Creek above Lake Jackson (Fig. 2). Lloyd Shoals Dam which formed Lake Jackson was completed in 1910 and would have posed a barrier to colonization of Tussahaw Creek by direct upstream movement after this time. If the silverjaw minnow entered the Ocmulgee River system prior to 1910, it would have had access to other streams in the upper portion of the watershed above the present Lake Jackson. The species is not listed as occurring anywhere in the Altamaha River system in Dahlberg and Scott's (1971) report on the freshwater fishes of Georgia, which included several collections from the Ocmulgee River system. Moreover, the silverjaw minnow was not recorded in GDNr surveys of the South and Yellow rivers (Hess et al., 1978; 1979), two of the three main Ocmulgee River tributaries above Lake Jackson. We consider it unlikely that previous workers overlooked such a distinctive species. Thus, the most plausible explanations for the silverjaw minnow's present Ocmulgee River system distribution based on available information are: a) entry into the system below Lake Jackson after 1971 with subsequent widespread dispersal to unimpounded sections of the Ocmulgee River system, and independent establishment above Lake Jackson in Tussahaw Creek; or b) entry above Lake Jackson

after the late 1970's with widespread dispersal below the lake, and as yet undocumented occurrence above Lake Jackson, except in Tussahaw Creek.

The longnose shiner was taken only in Tussahaw Creek above Lake Jackson. Previous reports of the species' occurrence in the Altamaha River drainage are based on Ramsey's (1965) listing, which apparently is not based on museum records. The species was not reported from the South and Yellow rivers above Lake Jackson by Hess et al. (1978, 1979). Available information suggests that the longnose shiner's point of entry into the Ocmulgee River system was Tussahaw Creek and that Lake Jackson is currently serving as a barrier to its dispersal to other parts of the watershed. Although the silverjaw minnow and the longear sunfish also occur below Lake Jackson, their occurrence in Tussahaw Creek may be related to the longnose shiner's occurrence there.

Flathead catfish and shoal bass were introduced into the Ocmulgee River in the mid-1970's by GDNr personnel. Flathead catfish were introduced into the Ocmulgee River near the GA Hwy 96 bridge in 1973 from previously introduced stock in the upper Flint River (Evans, 1991). The flathead catfish is not native to the Flint River and is believed to have

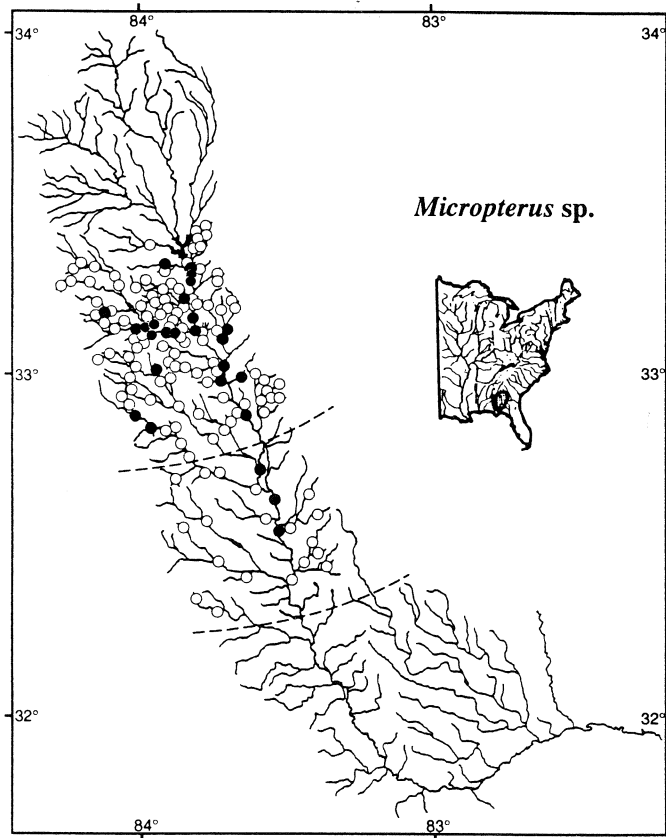


Figure 7. Ocmulgee River system distribution of the shoal bass *Micropterus* sp. (solid circles) based on recent GDNr collections. Inset map is the species' revised overall distribution.

been introduced there by angler stocking in about 1950 (Quinn, 1988). The Ocmulgee River population has since expanded downstream into the lower Altamaha River, and upstream as far as the low head dam at Juliette which is apparently posing a barrier to further upstream movement. The species has also recently been taken in the Oconee River from its confluence with the Ocmulgee River up to the GA Hwy 22 crossing at Milledgeville, GA (Evans, in preparation), and it is known to inhabit High Falls Lake on the Towaliga River, apparently having been independently established there (Evans, 1991). We expect the flathead catfish to eventually extend up the Ocmulgee River as far as Lloyd Shoals Dam below Lake Jackson.

Shoal bass from the upper Flint River were introduced into the upper Ocmulgee River below Lake Jackson in 1975. The species has since spread throughout Piedmont portions of the watershed. The source of the introduced population of longear sunfish in the Ocmulgee River system is unclear. Swift et al. (1986) list the species as "suspected but without museum records or other substantiation" for the Chattahoochee River. There are several records of longear sunfish from the Apalachicola River drainage in the Auburn University Museum Fish Collection, however all are from western tributaries of the Chattahoochee River. We know of no

records from eastern tributaries of the Chattahoochee River, the Chattahoochee River proper, or the Flint River, so the transfer (natural or unnatural) likely did not involve nearby streams.

The possibilities of hybridization or competitive displacement are perhaps greatest in cases where the newly recorded species have close congeners with similar ecologies in the Ocmulgee River system. Three congeners of the blacktail shiner, *C. callisema*, *C. leedsi* and *C. xenura*, are native to the Ocmulgee River system. The Altamaha shiner *C. xenura* is endemic to upper reaches of the Oconee and Ocmulgee river systems. The latter species has recently been listed as "endangered" in the state of Georgia. The species was collected at eight sites in the recent survey, all in the upper Piedmont section of the watershed, but none syntopic with *C. venusta*. The Ocmulgee shiner *C. callisema*, a species largely confined to the Altamaha River system, is apparently widespread and abundant in the Ocmulgee River system. A total of 946 individuals was taken from 35 mostly Piedmont sites during the recent survey. The species was syntopic with *C. venusta* at one of two Towaliga River sites. The bannerfin shiner *C. leedsi*, a more widespread species ranging along the lower Coastal Plain from the Ochlocknee and Suwannee river drainages to the lower Savannah River, was taken primarily in the lower main channel of the Ocmulgee River in the recent surveys. Altamaha River drainage populations of all three of the native *Cyprinella* could conceivably be negatively impacted through hybridization or competitive displacement if the blacktail shiner expands below High Falls Reservoir.

The coastal shiner *Notropis petersoni*, a member of the *texasus* species group (Swift 1970), extends well inland onto the Piedmont along the Atlantic Slope. However, over most of the Eastern Gulf Slope, the coastal shiner's distribution is complementary to that of the weed shiner where the two species are sympatric, suggesting the possibility of competitive avoidance. The coastal shiner was common in GDNr collections from both Piedmont and upper Coastal Plain regions of the Ocmulgee River system. The species was collected near sites where weed shiners were collected, but the two species were never collected syntopically. Spread of the weed shiner to other parts of the Ocmulgee River system could restrict coastal shiner populations to lower Coastal Plain portions of the watershed as seen in Gulf Slope drainages to the west.

There is correlative evidence that flathead catfish are negatively impacting populations of several native fish species in the Ocmulgee River. Occurrences and abundances of silver redhorse *Moxostoma anisurum*, smallfin redhorse *M. robustum*, snail bullhead *Ameiurus brunneus*, flat bullhead *A. platycephalus*, and redbreast sunfish *Lepomis auritus*, were negatively correlated with flathead catfish occurrence and abundance (Evans, 1991). The mechanism of interference may be direct predation. Suckers and catfish of a variety of species are common items in the diet of flathead catfish (Minckley and Deacon, 1959; Edmundson, 1974; Davis, 1985). The greatest impact appears to be on snail and flat bullhead. Combined electrofishing catch-per-unit-efforts for

these species reached 70 per hour above Juliette Dam but were zero below the dam where flathead catfish were present (Evans, 1991).

There are concerns that shoal bass are hybridizing with redeye bass *Micropterus coosae*, a native bass in the upper Ocmulgee River system. The results of two independent genetic investigations addressing this issue (D. Philipp, Illinois Natural History Survey, personal communication and R. Dunham et al., in preparation) are in conflict. Redeye bass were identified from a total of 29 sites in the upper Ocmulgee River system, including 13 of the 17 sites where shoal bass were taken, with no apparent evidence of hybridization between the two species. The two species occur sympatrically in the Chattahoochee River system, with the redeye bass generally favoring upland streams, and the shoal bass occupying lowland streams and the Fall Line Hills transition area.

The redbreast sunfish *Lepomis auritus*, a species native to the Ocmulgee River system and considered by many to be the Atlantic Slope equivalent of the longear sunfish, occurred syntopically with the longear sunfish at three of the four sites where the latter species was collected. The redbreast sunfish was the numerically dominant sunfish at two of the syntopic sites. The longear sunfish was the dominant sunfish only in Tussahaw Creek. The dollar sunfish *Lepomis marginatus*, another native and closely related sunfish species occurred syntopically with the longear sunfish at one site in the Fall Line Hills transition zone. However, competition should be less of a concern here because the latter two species are ecologically isolated and coexist over a large portion of their native ranges.

ACKNOWLEDGMENTS

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MINUTES

Business Meeting 20th Annual Meeting Southeastern Fishes Council

The Executive Committee of the Southeastern Fishes Council (SFC) met at noon on Thursday, 14 April 1994 at Ming Cort Restaurant on International Drive in Orlando, Florida. In attendance at this meeting were Chairman David Heins, immediate past Chairman Bruce Bauer, Chair-Elect Steve Walsh, and Secretary/Treasurer Hank Bart. Chairman Heins called the meeting to order at 12:30 local time. The first item of discussion was the Constitution and Bylaws. Chairman Heins stated that he wanted to simplify the structure of these documents, deleting committees that apparently were never formed and changing the structure of others to make them more effective. Heins suggested separating the Secretary/Treasurer into two separate positions, and giving the Secretary responsibility for local arrangements and publicity. Heins also wanted to explore ways of getting the Chair-Elect more involved in responsibilities of governing the Council. He suggested that regional reports be submitted early in the year and published in the issue of the *Proceedings* preceding the annual meeting. This way, issues raised in the reports can be discussed and appropriate actions taken, rather than dominating the business meeting with readings of the reports. The suggestion was also made that resolutions and other actions requiring approval of the Executive Committee and/or the membership be publicized prior to the meeting so that they can be discussed during the business meeting, and if approved, acted upon shortly after the meeting.

The second item of discussion was the nagging issue of tax exempt status. The Secretary/Treasurer presented a letter from a CPA in New Orleans who offered to file the necessary papers for federal tax exempt status for a fee of \$1,000 plus out-of-pocket expenses. The suggestion was made that the fee be fixed at a maximum of \$1,100, in effect limiting out-of-pocket expenses to \$100. The third and final item for discussion was a suggestion by Mel Warren that the SFC co-sponsor a symposium with the American Fisheries Society on imperiled freshwater fishes in the southeastern U.S. All agreed that this would be a very good activity for the SFC. Chairman Heins said that the symposium and the proposal concerning resolution of our tax-exempt status would be brought to the floor of the business meeting as Executive

Committee motions. The Executive Committee meeting adjourned at 1 p.m. local time.

The business meeting was held in the afternoon on Thursday, 14 April 1994, in Salon 5 of the Clarion Plaza Hotel in Orlando, FL. Chairman Heins called the meeting to order at 4:30 PM local time. The minutes of the 1993 Business Meeting appeared in *Proceedings* Issue #29. They were approved without corrections. It was reported that the artwork for the 20th Annual Meeting button (featuring the imperiled and soon to be described Pearl darter) was produced by Pamela Caruso for Royal Suttikus, who graciously consented to allow us to use it. In response to a request for artwork for future buttons, Mark Sabaj of the Illinois Natural Survey provided copies of his drawings of the frecklebelly darter (*Percina stictogaster*) and the snail darter. The latter illustration, which was penned especially for the SFC, will be used for a special 20th Anniversary button in 1995.

The Treasurer's Report was read and approved (see below). It was then reported that a letter had been received from a CPA in New Orleans who offered to file the necessary papers for tax exempt status for a fee of \$1,000 plus out-of-pocket expenses. Chairman Heins introduced an Executive Committee motion that the SFC pay the CPA a maximum of \$1,100 for settling the SFC's tax status with the IRS. The discussion that followed was focused mainly on the large size of the fee. It was pointed out that the CPA's normal fee was \$70.00 per hour, and considering the length of time the SFC has been in existence, the job of filing and responding to inquiries from the IRS could easily take 25 hours or more. The CPA had agreed to cap his fee at \$1,000. Stephen Ross felt that the expense was justified because it would settle an issue that has plagued the SFC far too long, and because of the fund-raising opportunities tax-exempt status would afford. The motion was voted upon and passed.

Continuing with Executive Committee business, David Heins mentioned Mel Warren's interest in organizing a joint SFC-AFS symposium on imperiled southeastern fishes for the AFS meeting in Tampa in 1995. An executive committee motion that the SFC co-sponsor the symposium passed. Chairman Heins also mentioned planned changes to the Constitution and Bylaws and requested input. Steve Walsh agreed to Chair the Nominating Committee for the election to be held in 1995. Dave Etnier, Chair of the Resolutions Committee, reported that resolutions opposing chip mills in the Tennessee River Valley and landfills on the Etowah and Conasauga rivers were forwarded in 1993, and that all three

were effective. Etnier read a new resolution opposing the Corps of Engineers plans to dredge the lower Pearl River for navigation purposes. The resolution was approved and has been acted upon by the Secretary/Treasurer. The Secretary/Treasurer read a report on the *Proceedings* from co-editors Michael Stevenson and George Sedberry (see below). Steve Walsh read a report prepared by the Historian, Don Cloutman (also printed below). A number of the items mentioned in the report have since been located or addressed.

There was no other old business. Under new business, Jim Williams suggested that the SFC draft a letter or resolution of support for the Auburn University fish collection in the hopes that this might help convince the administration to hire a permanent curator. The Secretary/Treasurer agreed to do this. Williams also announced that the Corps of Engineers is planning to dredge the Sunflower River (Mississippi). He suggested that the SFC consider drafting a resolution against this project because the Sunflower is home to many fishes and supports an abundant mussel fauna. The last item of business was regional reports which were hastily read in an effort to conclude the business meeting by 6 p.m.. Fritz Rohde delivered his report on the northeast region. Noel Burkhead's report on the southeast region was read by the Secretary/Treasurer. Peggy Shute delivered hers and Dave Etnier's report on the north-central region. Chairman Heins read Bernie Kuhajda's report on the south-central region. Bruce Bauer read John Harris' report on the northwest region, and Steve Walsh read Bob Cashner's report on the southwest region. The meeting was adjourned at 6:20 p.m. local time.

Respectfully submitted,
Hank Bart, Secretary/Treasurer

REPORTS

Treasurer's Report:

It was reported that the mailing list contained 29 institutions and 157 individuals as of the business meeting. In May of 1993 letters were sent to members whose dues were not current through the last business meeting (April 1993), the deadline for payment of annual dues. The letters requested that annual dues be paid by June 15th of 1994. Of 59 individual members notified, 29 responded with payments and are now current through the 1994 business meeting. In November of 1993, letters were sent to institutions notifying them of our new policy to charge institutions (including libraries) a subscription fee equal to the membership fee. Of the 29 institutions notified, nine responded with payment and are now current through 1994. Additional individuals and institutions would be delinquent as of the end of the 1994 business meeting. Following policy adopted at the 1993 business meeting, all of these members/subscribers will be notified by letter and asked to respond with payment of dues/subscription fees by June 15th 1994. Those not responding will be removed from the mailing list. Thus, the

mailing list will contain only paid members by the time of the next mailing of the *Proceedings*.

The 1993 Treasurer's Report which appeared in issue #28 of the *Proceedings* contained errors which are corrected as follows: dues and other contributions which appeared as \$1,070 through 4/2/92, should have read \$1,467 through 4/2/93. Expenses listed as through 4/2/92 should have read through 4/2/93. The amount shown as paid to the Postmaster, which appeared as \$30.95, should have read \$30.85.

Accounting through 4/11/94	
Checking Account Balance as of 4/7/93	\$2,296.20
Dues and Contributions 4/7/93 through 4/11/94	1,642.50
Dividends on Checking 4/7/93 through 4/11/94	46.05
Expenses	
Bank Charge	3.00
<i>Proceedings</i> #28	620.10
TN Dept. of State	20.00
Knox City Registrar	6.29
Cabelas	41.30
Postmaster	30.27
<i>Proceedings</i> #29	620.10
TN Secretary of State	270.00
	(1,611.06)
Checking Account Balance as of 4/11/94	2,373.69
Paine Webber Cash Fund 3/31/94	2,323.73
TOTAL ASSETS	\$4,697.73

Editors' Report:

Co-editors Michael Stevenson and George Sedberry send regrets for their not being able to attend the business meeting. Steve and George also deeply regret printing Don Cloutman's name as David G. Cloutman (a clerical error) on the cover of issue 29 of the *Proceedings*. They wish to extend personal apologies to Don and report that they will do everything possible to avoid such errors in the future.

With the publication of issues 28 and 29, the co-editors feel that they have accomplished improvements to the quality of the *Proceedings* which were the spirit of recommendations contained in the survey report of the Ad Hoc Committee on the *Proceedings*. Comments and other suggestions of improvements are welcome.

Steve reports that there are presently four manuscripts in various stages of review for future issues of the *Proceedings*.

Historian's Report:

Materials were added to the archives as they became available, and an inventory of the archives was conducted.

There still seems to be some question about the sale of the original corporate charter. Handwritten minutes of the 12 April 1978 board meeting (Item 3) state that the SFC was then reincorporated under separate charter. No money exchanged hands between SFC and the restaurant involved. There is no copy of a new charter in the archives. The original copy of our original charter was never relinquished to the restaurant.

It is in our archives.

A copy of the amended constitution (19 June 1977: this is merely the original constitution with changes penciled in.) is in the archives. Does anyone remember if these changes were ever typed up? Also, two changes were recommended in a letter dated 2 September 1980 by Herb Boschung. Does anyone remember if these changes were ever voted on or ratified?

A copy (Form SS-4) of the Federal Tax Number is still lacking from the archives. Does anyone remember the origin of the Employer Identification Number (EIN) 62-1133894 referred to by IRS on our Paine Webber Account?

Receipts and bank statements for 1980-1986 are still missing from the archives. Does anyone know their whereabouts?

Minutes of the 1980-1986 annual board and membership meetings are still missing. Does anyone know of their whereabouts?

Member lists for 1975-77 and 87 are in the archives; 1978-1986 and 88-92 are missing.

No copies of resolutions are available in the archives.

A complete set of Proceedings is in the archives.

Fish buttons depicting the frecklebelly madtom, cypress darter, bluenose shiner, barrens topminnow, spring pygmy sunfish, Cape Fear shiner, and pygmy sculpin are in the archives. The Maryland darter and rustyside sucker are missing. Does anyone have a copy of these buttons they could donate to the archives.

The history of the Southeastern Fishes Council has been updated through 1993 and will soon be published.

REGIONAL SFC REPORTS

REGION I - Northeast

Bob Jenkins at Roanoke College is working on redhorses, still. He organized an intensive sampling effort in May 1993 on the Pee Dee River around the NC/SC border searching for *Moxostoma robustum*. Electroshocking boats from Carolina Power and Light, North Carolina Division of Environmental Management, North Carolina Wildlife Resources Commission, and South Carolina Wildlife Resources Commission participated with assistance from REJ and FCR. No *robustum* were taken. Commercial fishermen working the area had not seen any either for a number of years. REJ, Bud Freeman, and two Roanoke College students canoed the river in the fall and seined at appropriate habitats for juveniles, but none were captured. REJ has been reviewing the extensive gray literature (primarily power company and environmental consulting firm reports) for the Pee Dee from Blewett Falls Dam down to Cheraw, SC. He's not sure that *robustum* lives anymore except in the Oconee River in Georgia. Several disturbing observations have resulted from the *robustum* searches. Large introduced catfishes, *Ictalurus furcatus* and

Pyloodictis olivaris, have apparently decimated the native riverine *Ameiurus* populations. I have also seen this occurring in the lower Cape Fear River. *Pyloodictis* was introduced into the Pee Dee in 1978 and is now flourishing. *Ictalurus furcatus* is also plentiful and is getting help from the SC hatchery in Cheraw. The state has released 123,772 in the Pee Dee River over 30 years, mostly in the last 15 years. Another downer was the capture of mostly introduced fishes in the upper Yadkin last May by REJ, BJB, and Don Cloutman. *Cyprinella lutrensis* could become or already is a weed there. Bob has applied for a grant to study the sicklefin redhorse, an undescribed species found in the Little Tennessee River, lower Tuckaseegee River, and Brasstown Creek in the southwestern NC and adjacent GA. This fish could be of hybrid origin. REJ with student Brian Kopia will conduct a status survey and reproductive behavior study on *Etheostoma osburni* in VA. It currently is known from only two streams and appears to be disappearing in VA and probably WV. It seems deserving of federal endangered status.

Paul Angermeier at VPI and Roy Smoger are developing recovery plans for Virginia state endangered fishes. The plan for *Phoxinus tenneseensis* is almost finished. Next will be *Enneacanthus chaetodon*, then *Etheostoma acuticeps* and *E. variatum*. The South Fork Holston River site for *E. acuticeps* was snorkeled but none were seen. Paul has two students working on logperches. One student is studying recolonization dynamics and habitat use in *Percina rex*. The second study on *P. burtoni* in the Holston and Clinch rivers is looking at associations with habitat configuration. Paul has finished a two-year study of the Clinch River above Norris Reservoir using IBI (Index of Biotic Integrity) to identify if a region is good or bad and where the problem areas are.

Sue Bruenderman of Virginia Dept. of Game and Inland Fisheries, Nongame Section, is setting up long-term monitoring sites for rare fishes. Initial study was on Copper Creek. Virginia has put out a publication geared to land owners - "Copper Creek - a valuable resource" by J. Flynn, D.L. Weigmann, and S. Bruenderman. They canoed Copper Creek and identified threats to landuse patterns. After three years of sampling, they found a five mile reach where *Noturus flavipinnis*, dusky darter, and hellbender are hanging on. They resurveyed TVA's mussel sites and found them wiped out. On the positive side, Sue reports that the range of *Percina rex* has been extended up the North Fork Roanoke River by Mark Ferguson. She is moving to Missouri this summer where she will work with Bill Pflieger on a re-survey of Missouri fishes.

Eugene Maurakis has relocated at St. Pauls College in Lawrenceville, VA. He is continuing his work with Bill Woolcott on *Semotilus* and has several papers in review. St. Pauls College is starting up an aquaculture program with research, teaching, and grow-out facilities. Last summer, Gene taught three courses in Greece where he found time to collect fish. This led to new distribution records and range extensions.

John Alderman of North Carolina Wildlife, Nongame Section, is completing a survey of *Notropis mekistocholas*.

John is looking at basic life history and, in particular, spawning periodicity this spring. The species appears to be in better shape than originally thought. It is found in the Deep River from Coleridge in Randolph County down to the headwaters above Buckhorn Dam; in the lower Rocky River below NC 902; in Bear Creek; and a small population exists in the Haw River below Bynum and above US 15-501. Overall fish diversity and abundance is low in the Haw River and there has been a big decline in mussels. The Cape Fear shiner is no longer extant in Fort Creek nor the Cape Fear River below Buckhorn. *Cyprinella monacha* is doing well in the Little Tennessee. One area surveyed had 30+ individuals with three or four age classes present.

Jerry West at Western Carolina University has a student who just finished a thesis on the life history of *Clinostomus funduloides* subspecies: growth rates and reproduction. Jerry has a video of *Notropis leuciodus* spawning in *Nocomis micropogon* nests. He will be investigating the timing and behavior further.

Alvin Braswell of North Carolina State Museum of Natural Sciences hopes to publish soon the endangered fishes report. He reports that the NC Wildlife Resources Commission has been working on definitions of critical habitat for the three species of federally-listed fishes: *C. monacha*, *N. mekistocholas*, and *Menidia extensa*.

Fritz Rohde of NC Division of Marine Fisheries and Rudy Arndt at The Richard Stockton College of New Jersey (formerly Stockton State College) have been conducting status surveys on various NC state-listed fishes. In 1993, they searched for *Noturus flavus*, *E. acuticeps*, and *P. burtoni*. The range of *E. acuticeps* is farther up the North Toe River than previously thought; a paper is in press. *Percina burtoni* appears to occur only in the South Toe River. It is a difficult fish to capture with traditional methods. Snorkeling may be the answer. *Noturus flavus* is restricted to the Cane River. Work continues on the distribution of fishes in the upper Dan River, NC and VA. The spotted form of *Noturus insignis* was found at several locations just below Pinnacles Powerhouse down to the NC/VA border. FCR and RGA are starting work on the distribution of freshwater fishes in South Carolina and would appreciate collection data that anyone may have.

F. Rohde

REGION II - Southeast

South Carolina -- Gary Meffe, Savannah River Ecology Laboratory, and Ron Carroll, University of Georgia, just completed a book entitled "Principles of Conservation Biology," (Sinauer Press, Inc., 559 pages, 106 illustrations, \$33.95 paper, \$66.00 cloth). Gary will likely sojourn at the National Biological Survey (NBS) fish lab (ex-National Fisheries Research Center) in Gainesville, FL for a six month sabbatical. He plans to work on community ecology

conservation problems in the Etowah River, complete some postponed projects, and to simply hang around some ichthyologists who know more than three species of fish.

Georgia -- There are numerous conservation issues and activities occurring in Georgia that are of interest to SFC. The Division of Fisheries, Georgia DNR, is planning an artificial propagation experiment of the seriously imperiled, and hopefully soon-to-be-listed, robust redhorse, *Moxostoma robustum*. The apparent sole surviving population of this large sucker occurs in the upper Coastal Plain of the Oconee River below Sinclair Dam in Georgia. Historically, this species apparently ranged from the middle or upper Piedmont of the Pee Dee River in North Carolina to the same physiographic regions of the Altamaha River drainage, Georgia. Demographic data suggest that the Oconee population is composed mostly of old individuals, and there is no evidence of any reproductive success in the past 6 to 8 years. Jimmy Evans, GA Division of Fisheries, is orchestrating the propagation efforts. The offspring from these spawning efforts will be stocked in yet-to-be-selected rivers in Georgia, within the probable native range of *M. robustum*. Bob Jenkins, Roanoke College, Virginia, and Bud Freeman, University of Georgia, are nearing the completion of the tome detailing (and I mean *detailing*) the correct identity of *M. robustum*, and providing a name for the sucker species that was misconstrued to be *M. robustum*.

The Tri-State water project (a plan to divert water from the Coosa River system, Alabama and Georgia, to the Apalachicola River system, for use by Atlanta) is lumbering along, gaining its own inertia as is typical of such projects. It appears that only cursory attention is being paid to environmental concerns. Some good work may come of this project. For example, Mary Freeman, NBS National Ecology Center office in Auburn, is using IFIM methods to characterize all available fish habitats at selected study sites in Coosa and Apalachicola tributaries. Rather than attempting to characterize habitat curves for selected species, Mary is attempting to collect data on all microhabitats in the river reaches she is studying. At given discharges, she hopes to be able to predict total habitat complexity and availability for a given stretch of river. Mary also indicates she and Bud have made some progress on the analysis of new *Percina* from the Apalachicola, but need to create a block of time devoted to the study to complete the description.

Perhaps the Etowah River should be recognized as the real crowning jewel of the upper Coosa system. At least one new *Ulocentra* was recently discovered in the upper Etowah; it is tentatively dubbed the "mountain darter." This is the second *Ulocentra* discovered in the system (the Cherokee darter was the first). The species (or complex) will be described by Noel Burkhead, Steve Walsh (NBS, Gainesville), and Bud Freeman. The mountain darter may be confined to the upper Etowah River system, and if this tentative assumption is correct, the number of Etowah system endemic fishes would be three (Cherokee, Etowah, and mountain darters), a rather incredible indigenous diversity for a river that is only 165 river miles in length. Currently, we consider

the Etowah River ichthyofauna to have been composed of about 80 species (10 fishes and possibly 65% of the estimated 50 species mussel fauna are extirpated). The number of listed or candidate species is also high: four fishes, five mussels, three snails, and one mayfly. In addition to being threatened by one of the largest cities in the south (Atlanta), the Etowah suffers from the typical litany of degrading forces besieging rivers of Southern Appalachia.

Bob Jenkins and Bud Freeman, nearly simultaneously discovered yet another new redhorse, a falcate-finned beast that may be an upland replacement of *M. carinatum* sequestered in the upper Little Tennessee and Hiwassee river systems. Dave Etnier (University of Tennessee) and I actually collected the redhorse while on a *Cyprinella monacha* survey in the late 1970s -- if we had only pulled the teeth! It is not surprising that many of the recently discovered fishes are cryptic taxa, but it is amazing that we are still finding some large fish that have eluded scientific recognition for about 240 years.

Steve Vives (Southern Georgia University) and students are conducting an ichthyofaunal survey of Ft. Stewart Army Base in south Georgia. Initially, the survey focused on *Enneacanthus chaetodon* and *Etheostoma parvipinne*, but Steve indicates they are thoroughly surveying all sampling sites. Other survey work in Georgia includes initiation of an ichthyofaunal survey on Ft. Benning (Jim Williams, NBS, Gainesville), and conservation status surveys for *E. brevirostrum* and *E. tricella* (Noel Burkhead), and for *Cyprinella callitaenia* (Bud Freeman).

Florida -- Carter Gilbert (University of Florida) and Jim Williams are making slow but steady progress on the Florida fishes book project. Given the wisdom of their respective ages, they refuse to offer an ETC--estimated time of completion.

As many of you know, the NBS is a reality, and as a federal agency, it should make significant contributions to the conservation of southeastern aquatic faunas. Basically, the NBS is modeled after the old Bureau of Biological Survey and its primary missions are endangered species research, survey, monitoring, and biological sciences research. As with any new federal agency, it is suffering growing pains, but should emerge as an agency highly focused on stewardship and conservation of the nations vast natural resources. In a sense, the staff at the NBS lab in Gainesville feel like they have come out of the closet, and can openly practice systematics, zoogeography, faunal survey, environmental physiology, and conservation biology of southeastern aquatic species.

The NBS (ex fisheries) lab in Gainesville has active studies on Gulf slope freshwater mussels, headed by Jim Williams, and includes Jayne Brim-Box (distribution and ecology of Apalachicola mussels), Hannah Hamilton and Ricardo Lattimore (laboratory growth studies), and Anne Keller and Leslie Straub (toxicology and artificial propagation). Fish research activities are diverse. Bill Smith-Vaniz and Jim Williams have a proposal under consideration to conduct work towards a monograph on the fishes of the Florida Keys. Leo Nico, relatively new to the lab, is

responsible for studies of non-indigenous fishes and plans projects in south Florida and the Tampa Bay area. Steve Walsh and Dennis Haney are conducting thermal physiology research on southern Appalachian spring and mountain species, and ion physiology on catfishes in the Suwannee River drainage. In addition to his physiology work, Steve is collaborating with Noel Burkhead and Bud Freeman on a variety of conservation studies of Etowah River fishes, and on patterns of imperilment of southern Appalachian fishes. The long awaited and in-press-so-long-that-the-publication-date-could-be-1980-something-to-1990-something book, *Freshwater Fishes of Virginia*, by Bob Jenkins and Noel Burkhead, finally was published on 12 April 1994. It, however, beat the not-yet-but-surely-soon-to-be-published *Fishes of Tennessee*.

Farther south, Buck Snelson (University of Central Florida) reports that he is not working on freshwater fishes, but he may wander inland sometime in the near future. Lastly, Walt Courtenay (Florida Atlantic University), is continuing his efforts on non-indigenous species problems.

N. Burkhead

REGION III - North-Central

In comparison with the report at last year's meeting in Virginia Beach, this year, we can say that the Tennessee fish book is more than a virtual reality, but is not in our hands yet. Problems with the color separation for the xx color plates have delayed publication until....., but we certainly will have the book in hand by the next year's meeting.

We began our report last year with newly recorded species in the Tennessee system. This year, we can report that *Menidia berylina* is now widespread in Kentucky Reservoir and into the lower Cumberland River. This species has probably invaded from the lower Ohio, and not via the TENN/TOM.

TVA is still in the process of producing models and NEPA documentation for various scenarios of releases from Tims Ford Reservoir to accommodate trout fishing interests in the tailwaters and improving habitat conditions for *Etheostoma wapiti* and other rare aquatic species (mussels) farther downstream. Although Scott Mette and Pat O'Neil (Alabama Geological Survey) reported collecting (and releasing) several boulder darters in the Alabama portion of the mainstream Elk River, attempts at collecting boulder darters (for captive propagation) in the Tennessee portion of the river and in Richland Creek were futile. The species is certainly existing in low numbers, if present in that portion at all.

AL Geological Survey biologists (Stuart McGregor et al.) found slackwater darters at several new localities in the Flint River system. They also noted that spawning in this area seemed to occur in the stream (like a fish should!) in submergent vegetation instead of the wetland areas typically used by the species in Cypress Creek and other localities.

They are continuing their monitoring this year (last year of it?).

TVA, under its newly outlined "Clean Water Initiative", has designated several River Action Teams (RATs). These teams are groups of biologists and other resource personnel who will work within a designated subwatershed in the Tennessee River drainage. They are intended to be permanent teams who will identify important natural (and other) resources within their watersheds and work to conserve these, as well as to improve degraded situations. The first RATs to be designated are Hiwassee, Holston, Clinch/Powell and Wheeler/Elk. Ed Scott was with the Elk team in the headwater tributary and recently collected *Etheostoma luteovinctum* there. The latter two teams were designated relatively recently. Therefore, they haven't yet accomplished much field work, but the Hiwassee and Holston teams have been busy with reconnaissance surveys.

Noel Burkhead and a crew from Gainesville intensively surveyed all of the known *Erimystax cahni* localities last summer (1993). They were unable to collect any. Before the species is written off as extinct, there are plans to repeat the effort this summer 1994, in an effort to lower the "dotted line" in Etnier's scenario of "detecting and collecting" southeastern fishes.

Brooks Burr and a recent UTX graduate, David Eisenhower, were also unable to collect any additional specimens of the *Noturus elegans*-type madtom that was originally collected by Charlie Saylor and crew in Little Chucky Creek (Greene Co., TN), a Nolichucky tributary a few years ago. Burr and Jim Grady are under contract with FWS to work out the taxonomic relationships between this animal, the one in the mid-upper Duck and the Buffalo.

TN Ecological Services Division, Water Pollution Control Board personnel required a survey of the locality in the lower Duck River where some I-40 roadwork was being done. They required this to determine current status of the state-threatened *Etheostoma aquali* at the site. Charlie Saylor assisted in this collection, and they turned up several *Noturus stanauli*, including adults and YOY. This is a new locality for the species in the Duck River (other locality is lower, at the mouth of Hurricane Creek) and the first collection in the Duck River since the late 1970's.

Etnier and his Regional Faunas class last fall made a float trip on the main-channel Mississippi River in Tennessee (somewhat post-flood) and found several interesting things. They collected *Macrohybopsis meeki* at two localities: two miles downstream of Doyall Landing, Tipton Co., TN; and further upstream near mouth of Obion River. They also got the first record of *Percina sciera* from the main channel, and collected both *Noturus nocturnus* and *Noturus flavus* (or the taxon with very small eyes). Etnier brought copies of species lists for his MS River collections.

CFI released 160 captively-bred (!) and propagated *Phoxinus cumberlandensis* into No Business Creek, Cambell Co., TN. There were no previous records of the species from No Business Creek, but it is reported from the system. Some were kept for a captive population, and the remainder (100)

were put into Mud Creek, in Whitley Co., KY, as the adult animals had come from Kentucky.

Duskytailed darters, *Etheostoma (Catonotus)* sp., were reintroduced (for the first stocking) into Abrams Creek, Great Smoky Mountains National Park, Blount Co., TN, in summer 1993. A huge NPS shocking crew doing depletion sample in one of the reintroduction sites turned up none of the stocked duskytails, but did collect a smoky madtom (probably had been stocked there 4 months earlier).

Yellowfin madtoms were reintroduced into the lower portion of Citico Creek for the first time in fall of 1993. There was HEAVY flooding in this area a few weeks ago, and we don't yet know the effect of this on these rare fishes.

P. Shute and D. Etnier

REGION IV - South-Central

Pledger Moon from the U.S. Fish and Wildlife Service Office in Panama City, FL, made the catch of the year when he and two co-workers captured an Alabama sturgeon in the Alabama River. Pledger also reports netting, radio-tagging, and collection of genetic material of gulf sturgeon is ongoing in several gulf drainages, as does Doug Fruge' at the Ocean Springs office.

Carl Couret in the Service's Daphne, AL, office reports that work in tailwaters below dams on the Coosa and Tallapoosa rivers to study flow pattern affects on ichthyofauna are continuing. Instream flow surveys in Locust Fork of the Black Warrior River are ongoing to determine optimum flow for tailwaters below the proposed dam. Work on *Tulotoma* continues, and Carl's office is working with the Forest Service to protect mussels on federal lands.

Bud Freeman reports that the bad news for the Etowah River System is the construction of landfills and dams that threaten the Cherokee darter, which is proposed for listing as threatened. Good news is range extensions for *Percina antesella* and *Percina lenticula*. Bud is building a database of all fishes ever collected in the Apalachicola-Chattahoochee-Flint Rivers project area. He also wanted everyone to know that *Etheostoma etowahae* is proposed for listing as an endangered species.

Mary Freeman at Auburn University is directly involved in the tri-state water use study by collecting data on discharge flow and habitat characteristics in Georgia and Alabama, which will be used in the habitat modeling for the project. She also has a student working on the life history of the Halloween darter.

Hank Bart at Tulane University reports that the upland goldstripe darter was extant in a ditch as of two weeks ago and that the description is coming along, as is that of the two species of the subgenus *Cottogaster*. He and Dr. Suttkus are naming them the coal darter (Alabama) and the pearl darter (Mississippi). The description of the Yazoo, Tombigbee, and

Alabama snubnose darters is in page proof. Hank and Sut are still gathering data on carp and buffalo suckers, and Hank's study on fish diversity is continuing. Some bad news is a plan by the Corps to dredge the lower Pearl River, which may imperil the pearl darter, *Percina lenticula*, *Noturus munitus*, and Louisiana *Pteronotropis signipinnis*. David Heins, Tulane University, continues to work with John Baker, University of Arkansas, on life-history patterns of fishes that produce multiple clutches, including *Cyprinella venusta*, *Etheostoma lynceum*, and *Etheostoma caeruleum*. David and John also are studying three-spine stickleback from Alaska, so their work in the southeast faces competition from afar.

Randy Haddock of the Cahaba River Society reports that a comprehensive management plan for the Cahaba River drainage is being undertaken to identify major problems and try to determine which entities are charged with addressing these problems. Greenways to establish buffer zones around the Cahaba are being built in the Birmingham area, and an Alabama State Rivers Coalition is being formed to help establish other river groups like the Cahaba River Society.

Scott Mattee of the Alabama Geological Survey just finished a report on water quality and its affects on the invertebrate and fish fauna of the upper Cahaba River System. He is collecting information on the life history of the Alabama shad, and work is continuing on the status of *Etheostoma boschungi*. Scott is initiating surveys of mussels and gastropods in selective Mobile Basin drainages, and later this year will publish a status report on *Notropis cahabae*.

Melvin Warren with the U.S. Forest Service Hydrology Lab in Oxford, MS, has been working on fish and mussel community structure in the Sipsey Fork of the Black Warrior River and on fish communities in channelized and unchannelized streams in the upper Tallahatchie River. Life history data has been collected on the Yazoo shiner, and he and Brooks Burr have the palezone shiner description in press. Bob Butler, Paul Hartfield, and Wendell Haag are working on the description of a unique superconglutinate on a federally threatened mussel; its glochidia are at the end of a long gelatinous fishing line in the form of two "minnows" with eyespots and myomeres.

Steve Ross at the University of Southern Mississippi is still working on fishes in floodplains of Pascagoula River drainages. His state fish book is further along that last year, but not finished. He is working on the status of *Phoxinus erythrogaster* in Mississippi and the affect of rapid erosion in Bayou Pierre on *Etheostoma rubrum*.

Mark Peterson at Mississippi State has been examining habitat preference of *Enneacanthus gloriosus* in several Mississippi coastal streams, and in studying the salinity tolerance of young largemouth bass. He just ended a study on the abundance and size of larval fish and how this interacts with the survivorship of stocked walleye (the unique Tombigbee population). From this study, Mark has built a larval fish collection of over 14,000 specimens.

Carol Johnston of the U.S. Forest Service Hydrology Lab in Oxford, MS, is working on the sound production in stream fishes. She is also working on the life histories of the

Yazoo darter and *Notropis boops*, and along with Charles Knight on *Pteronotropis welaka* ecology.

Malcolm Pierson of Alabama Power reports that, along with Art Bogan and Paul Hartfield, has completed surveys of aquatic gastropods in the Coosa and Cahaba river systems in Alabama and Georgia. Out of the original 78 species which occurred in the Coosa River, three genera and 26 species are presumed extinct. The Cahaba River has fared much better; 32 species historically occurred in the system, and 24 species are still extant. In 1994 work will continue in the Alabama, Black Warrior, and Tallapoosa river systems.

Chuck Lydeard at the University of Alabama will be examining the taxonomic relationships of several species of snails in the family Pleuroceridae and several mussels using DNA sequencing of mitochondrial genes. Herb Boschung continues to work on a state fish book for Alabama along with Rick Mayden. Rick is continuing a status survey of *Etheostoma tuscumbia* and is also studying the effects of malathion on a upper Tombigbee River tributary. He and Bernie Kuhajda reevaluated the systematics and taxonomy of the Alabama sturgeon, and they assure everyone that it is a distinct species.

Bernie Kuhajda

REGION V - Northwest

Conservation Issues

Efforts by the Saline County (AR) Rural Development Authority to impound the North Fork of the Saline River (Ouachita River Drainage) for public water supply to the City of Denton have been at least temporarily stymied. The Arkansas Department of Pollution Control and Ecology denied a request by the Saline County RDA to change the water quality designation of the North Fork Saline River from ecologically sensitive to a less restrictive category. The Pollution Control and Ecology Commission overwhelmingly denied the request. The Saline County RDA is in the process of deciding whether to appeal in court. The North Fork Saline River is home to the Ouachita madtom (*Noturus lachneri*) and a threatened freshwater mussel (Arkansas fatmucket). The proposed project would impound approximately eight river miles of the North Fork Saline.

The Arkansas Game and Fish Commission is developing plans to impound Sullivan Creek, a tributary of the White River near Batesville, Independence County, Arkansas. The impoundment would serve north-central Arkansas as a public recreation lake. The Corps of Engineers, Little Rock District has requested that an Environmental Impact Statement be prepared to assess impacts of the proposed Sullivan Creek project. The additional costs of EIS preparation may render the project economically unfeasible.

A proposal to divert water from the White River (near DeValls Bluff, Prairie County, Arkansas) to the eastern

Arkansas rice country during summer drought is currently being reviewed by regulatory agencies. The Grand Prairie region of Arkansas has experienced significant reductions in ground water level over the past 20 years due to irrigation pumping for rice. The agricultural community and its associated lobbyists are sponsoring this project. (A summary of the proposed project as presented in the Corps of Engineers Public Notice will be attached to the formal report.)

The Fish and Wildlife Service is conducting a status review of *Notropis ozarcanus* (Ozark shiner) throughout its range (AR, MO) to determine if protective status is warranted. The status review is slated for completion in December, 1995.

Taxonomy/Systematics

Henry Robison reports two additions to the Arkansas state fauna: 1) the recently described *Notropis suttkusi* (rocky shiner) occurs in Red River tributaries in Arkansas and Oklahoma, and 2) the occurrence of *Notropis wickliffi* has been validated from Mississippi River specimens collected in northeast Arkansas.

Wayne Starnes and Henry Robison continue to work on the upper Ouachita River form of *Notropis umbratilus*. Bruce Thompson and Henry Robison are continuing work on the *Percina nasuta* complex. Biochemical analyses of the *nasuta* complex have confirmed that the Ouachita River form is a distinct, undescribed species. Other interesting anomalies were discovered in White River *nasuta* populations and there are currently being resolved.

Odds and Ends

Robinson reports that Bill Pflieger intends to revise the *Fishes of Missouri*. Several attempts to reach Pflieger could not confirm that work is in progress.

Arkansas and Missouri continue to track the spread of the Zebra mussel (*Dreissena polymorpha*) and monitor population levels. It is known to occur in the Missouri and Arkansas River mainstems, and is likely to spread to any tributaries with barge traffic (barges have been documented as the primary vector for dispersal). A recent, unconfirmed report has placed the Zebra mussel in the White River at DeValls Bluff, Arkansas. Efforts to educate the public and prevent introductions to other drainages continue in both states.

John L. Harris

With the notable exceptions of Royal Suttkus and Henry Robinson, who sent their regrets, those assembled at the Workshop represented those ichthyologists with the greatest experience and knowledge of Louisiana freshwater fishes. By consensus, 43 species were listed in six categories. Five species, *Scaphirhynchus albus*, *Alosa alabamae*, *Phenacobius mirabilis*, *Percina* cf. "copelandi" and *Percina lenticula*, were evaluated as endangered in Louisiana waters.

At this time, museum records of the 43 target species are being entered into a MUSE database. All Louisiana collections of freshwater fishes from the UMMZ, Cornell and the University of New Orleans have been recorded (nearly 2,000 entries). The LSU and Tulane materials are currently being entered and that task should be completed by the end of May. Data from collections at Northeast Louisiana University should be entered by mid-summer.

B. Cashner

ANNOUNCEMENT

An invited symposium, jointly sponsored by the SFC and the Endangered Species Committee of the American Fisheries Society (AFS), and dealing with changes in southeastern fish communities inferred from long-term data sets, is being planned for the 125th Annual AFS Meeting in Tampa, FL in August 1995. Mel Warren is organizing the event. A contributed paper session featuring papers on endangered species recovery efforts and other topics related to the symposium theme is also being planned for the meeting. SFC members are encouraged to attend the symposium and submit abstracts for the contributed paper session. For additional information on the symposium please contact Mel Warren at the U.S. Forest Service Hydrology Lab, Oxford MS 38655. Please contact the AFS for information about the meeting.

REGION VI - Southwest

The Rare and Endangered Freshwater Fishes of Louisiana Workshop was held at the University of New Orleans on 25-26 February. Bruce Thompson and I were co-conveners. Mel Warren, U.S. Forest Service, and Carter Gilbert, University of Florida, were featured speakers and offered valuable information on how to initiate a state project on rare and endangered species. Both suggested forming partners with state agencies and conservation organizations.

Southeastern Fishes Council PROCEEDINGS

Information For Contributors

The primary purpose of the PROCEEDINGS is to publish research papers, critical reviews of activities, area reports and other pertinent information pertaining to the biology and conservation of Southeastern fishes

Manuscripts should be submitted in duplicate. A good guide for manuscript preparation is the Fifth Edition of the *CBE Style Manual* available from the Council of Biology Editors, One Illinois Center, Suite 200, 111 East Wacker Drive, Chicago, IL 60601-4298.

The entire manuscript including the abstract (required for feature articles only), text, Literature Cited, tables, headings and legends must be double-spaced. The title, author's name and author's address should be centered on the first page. Indicate a suggested running head of less than ten words at the bottom of the first page. An abstract (if necessary) will be placed at the beginning of the text. Acknowledgements will be cited in the text immediately before the Literature Cited. All references cited in the paper will follow the standard format of using the last name of the author(s) followed by the year of publication of the paper. In the Literature Cited, the references will be alphabetical by the author's last name and chronological under a single authorship. The entire reference should be given with the complete name of the journal spelled out if possible.

Tables should be typed on a separate page, consecutively numbered and should have a short descriptive heading. Figures (to include maps, graphs, charts, drawings and photographs) should be consecutively numbered and if grouped as one figure each part block lettered in the lower left corner. In general, high quality prints or photocopies are preferred to the original line art. Legends for figures must be on a separate sheet and each figure must be identified on the back. The desired location of each table or figure should be indicated in the margin of the manuscript.

Manuscripts will subject to editing and will be reviewed by at least two anonymous persons knowledgeable in the subject matter. The edited manuscript and page proofs ("galley") will be furnished to the author. Upon returning the reviewed and corrected manuscript to the editor, a PC disk copy of the final form is also requested. Specific formatting information for the disk will be sent to the author with the edited manuscript. Reprints will be available at a nominal cost.

Regional reports, new notes and other short communications will also be edited and included when possible in the next number.

Only manuscripts from members of The Southeastern Fishes Council will be considered for publication. There is no charge for publishing in the PROCEEDINGS. All manuscripts and short communications should be sent to the editor:

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