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Number 43 (February 2002)

Abstract

(February 2002) - Louisiana's inland fisheries: a quarter century of change. By Neil H. Douglas and Robyn J. Jordan

Minutes, Business Meeting, 27th Annual Meeting, Southeastern Fishes Council Regional Southeastern Fishes Council Reports

Book Review: Dangerous Wildlife in the Southeast: A Guide to Safe Encounters at Home and in the Wild, by Lynn F. Bachleda, as reviewed by Martin O'Connell

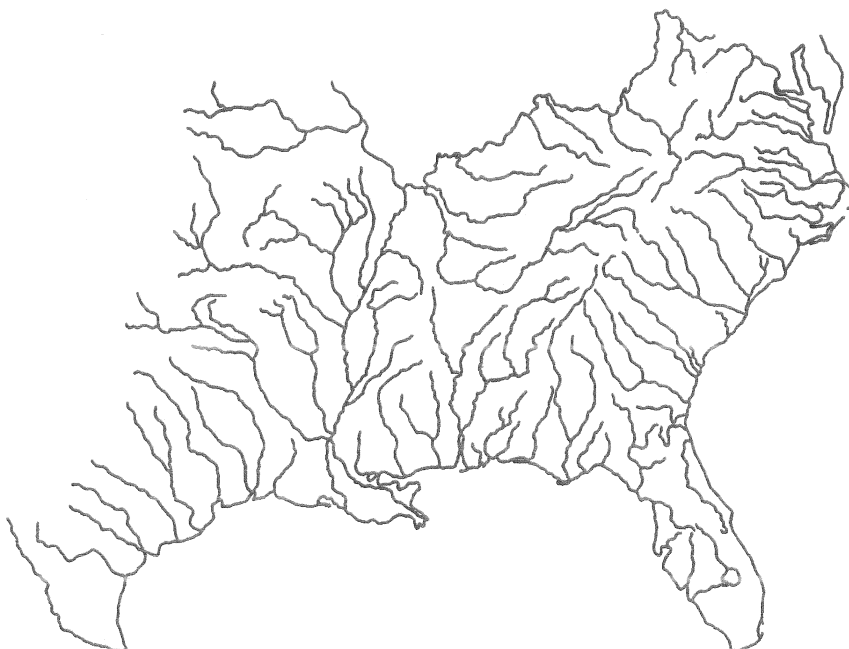
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DEDICATED TO THE CONSERVATION OF SOUTHEASTERN FISHES



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28th Annual Meeting, Southeastern Fishes Council

The SFC will meet with the Southern Division of the American Fisheries Society in Little Rock, Arkansas. The SDAFS meeting is 21-24 February 2002. SFC will meet Saturday, 23 February, in the Palisades Room at the Doubletree Hotel. Additional information on the SDAFS meeting can be found at:

<http://www.sdafs.org/meetings/02sdafs/2002home.htm>

Gibbs Award for Excellence in Systematic Ichthyology

Nominations are invited for the American Society of Ichthyologists and Herpetologists (ASIH) Robert H. Gibbs, Jr. Memorial Award for Excellence in Systematic Ichthyology. The prize is awarded for an outstanding body of published work in systematic ichthyology to a citizen of a Western Hemisphere nation who has not been a recipient of the award. The award is offered annually and consists of an appropriate plaque and a cash award (approximately \$7500). The award recipient is announced at the annual meeting of the American Society of Ichthyologists and Herpetologists. The award for 2001 was presented to Lawrence M. Page, Illinois Principal Scientist, Illinois Natural History Survey, for his outstanding contributions to our knowledge of North and South American freshwater fishes, percid systematics, graduate education in systematic ichthyology, and support of systematic collections.

Nominations may be made by any ichthyologist, including self-nominations, and should include the nominee's curriculum vitae, details of the nominee's specific contributions and their impacts on systematic ichthyology. Nominations should be submitted by 1 March 2002 in order for the nominee to be eligible for that year's award. Nominations will be effective for three award periods (2002-2004). Four copies of each nomination should be sent to Dr. Maureen A. Donnelly, Department of Biological Sciences, Florida International University, 3000 NE 151st St., North Miami, FL 33181-3000.

LOUISIANA'S INLAND FISHES: A QUARTER CENTURY OF CHANGE

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ABSTRACT

Louisiana inland waters include 25 families, 66 genera and 170 species. This is an increase from 22 families, 54 genera, and 148 species listed more than 25 years ago (Douglas, 1974). Two of the new families, Osmeridae and Salmonidae, are represented by transients and the third, Cichlidae, is an introduction. Most of the new genera are the result of systematic revisions. The species new to Louisiana include six newly described species, seven transient species, five introductions, and one range extension.

INTRODUCTION

Freshwater Fishes of Louisiana was published nearly two and one half decades ago (Douglas, 1974). Since that time fish guides have been published for nearby states that provide additional documentation of the ichthyofauna of the lower Mississippi Basin (Pflieger, 1975; Robinson and Buchanan, 1988; Etnier and Starnes, 1993). Also since that time, taxonomy of our state's fishes has undergone major revisions (Coburn and Cavender, 1992; Mayden, 1989; Parenti, 1981). Louisiana inland waters now include 25 families, 66 genera and 170 species (Table 1). An attempt is made herein to incorporate recent zoogeographic and taxonomic information with collection records from the University of Louisiana at Monroe (ULM), Museum of Natural History (Zoology) and provide a comprehensive overview of changes to the Louisiana inland ichthyofauna (Table 2).

The collection of fishes at ULM was initiated in the spring of 1962 as a teaching collection. The start consisted of a mere "trailer full" of specimens collected in and brought from Oklahoma. Since then the original teaching collection has grown into a research collection of impressive proportions. The collection of fishes now possesses voluminous data, documentation and specimens (some of which are valued as rare, unique, and irreplaceable) due largely to active and progressive field investigations during the past 35 years.

Recently, the ULM collection of fishes was listed as a regional center and cited as one of the four fastest growing collections in North America (Poss and Collette, 1995). Collections at the Los Angeles County Museum, Tulane University, National Museum of Natural History and ULM had grown the most since an initial survey in 1976 (Collette and Lachner, 1976). The ULM collection was listed as the fifth largest in terms of total number of specimens with over 1.5 million. Among educational institutions, only Tulane University and the University of Michigan have larger collections.

In ranking North American ichthyological resource centers, weighted categories were used to establish an index number for 117 collections. Categories included the following: total number

of specimens, total number of lots, holdings of type specimens, visitors, loan activity, exchanges, number of species, computerization, educational function, geographic coverage, staff size, and others. Thus, with an index number of 81, the ULM collection was designated a regional center and was ranked 15th of all national, state (province), private and university collections and was ranked first in the number of students receiving MS degrees (55) in collection-based research (Poss and Collette, 1995).

The collection now houses over 77,000 lots, at least 1750 species and secondary types for 31 species. In 1979, the collection of fishes received as a gift many specimens originally cataloged in the early collections of the American Museum of Natural History and the United States National Museum. Many specimens were collected in the Pacific Ocean by the Research Vessel Albatross and others from the freshwaters of Africa, South America and Asia in the early 1900's. These valuable specimens were discovered among the ruins and debris of an abandoned storage facility of a biological supply company. Collectors of this salvaged material included ichthyological legends David Starr Jordan, Charles Henry Gilbert, and Seth Eugene Meek. Permission was granted to catalog these historic specimens into the collection of fishes at ULM.

The Museum of Natural History at ULM has recently had placed in its care the larval fish collection of the Tennessee Valley Authority (TVA). This collection represents one of the largest such collections in North America and is represented by more than 6 million specimens housed in 19,000 vials. The fishes were obtained during a twelve year study involving waters within the TVA jurisdiction which included all or parts of the states of Tennessee, Mississippi, Alabama, Georgia, North Carolina, Virginia, and Kentucky.

RECENTLY DESCRIBED SPECIES

Pteronotropis hubbsi, bluehead shiner

Abundance of this species fluctuates substantially in the riverine backwaters of northeast Louisiana. This highly distinctive and beautiful minnow was described by Bailey and Robison (1978). A single specimen was collected from the mainstream of the Ouachita River in 1976, eleven years prior to its description. Extensive collecting from this locality and backwaters nearby produced only two additional specimens from 1968 to 1983. However, from these same waters (isolated backwater pools of the Ouachita River near Lazard Point in West Monroe) nearly 1000 specimens were collected from 1984 to 1991, but none from 1992 to 1995. The prolonged increase in bluehead shiner abundance during 1984-1991 and the later decrease following regional flooding suggests that populations may have been responding to hydrological factors. The ULM Museum of Natural History provided specimens for its

description with six lots (126 specimens) listed as paratypes.

Cycleptus meridionalis, southeastern blue sucker

This catostomid represents the most recent addition to the fish fauna of Louisiana. It was separated and described as a new species from populations of the monotypic *C. elongatus*, blue sucker, that were found in the mainstream reaches of major rivers of gulf slope drainages (Burr and Mayden, 1999). It differs from *C. elongatus* by having more scales, more dorsal-fin rays, a longer snout and a more elongate dorsal-fin base (Burr and Mayden, 1999). Specimens from the ULM collection were used in its description and a single specimen was designated a paratype.

Fundulus blairae, western starhead topminnow

This topminnow, long incorporated in the synonym of *F. notti*, bayou topminnow, was described by Wiley and Hall (1975). It differs from *F. notti* in lacking vertical bars on the sides of the body and in having a G-type head squamation pattern. Specimens used in its description were provided by the ULM collection of fishes. It is more commonly found in the backwaters and shoreline vegetation of rivers and lakes. In Louisiana, *F. blairae* is found statewide with the exception of the Ouachita River drainage.

Fundulus euryzonus, broadstripe topminnow

This topminnow was recognized as a distinct species by Suttkus and Cashner (1981) from Lake Pontchartrain tributaries in Louisiana and Mississippi. This species differs from its close sympatric relatives *F. notatus*, blackstripe topminnow, and *F. olivaceus*, blackspotted topminnow, by having a wider lateral stripe, fewer dorsal rays and fewer gill rakers (Suttkus and Cashner, 1981). It is endemic to the Tangipahoa and Amite rivers in Louisiana and Mississippi.

Percina aurora, pearl darter

This percid was confused with *P. copelandi*, channel darter, until its description by Suttkus et al. (1994). It possesses the following characters: large average body size, lack of tubercles, heavy pigmentation of breeding males, high number of marginal spines on the modified belly scales of breeding males and fully scaled cheeks (Suttkus et al., 1994). The ULM collection of fishes provided specimens used in its description with eight lots (23 specimens) designated as paratopotypes (Suttkus et al., 1994). *Percina aurora* is known from the Pearl River drainage in Louisiana and from the Pascagoula River drainage in Mississippi. Exhaustive collecting efforts in recent years in Louisiana have yielded no specimens of this species and it is now considered extirpated in Louisiana (H. Bart and B. Thompson, pers. comm.).

Percina suttkusi, gulf logperch

This species was reported as *P. caprodes*, logperch, (Douglas, 1974) following the work of Hay (1881). However, studies conducted by Thompson (1997) distinguished *P. suttkusi* from *P. caprodes* in that the former species has an entirely scaled nape, no scales between the eyes, no tubercles on scales or fins and a lateral pattern of thin vertical bars. It further differs

from *P. caprodes* by possessing a narrow red band in the spinous dorsal fin (Thompson, 1997). Specimens from the ULM museum were used in its description and a single lot of five specimens was designated paratypes. In Louisiana this species occupies waters of the Pearl River and Lake Pontchartrain drainages.

NOMENCLATURAL CHANGES

It is perhaps not surprising that many of the scientific name changes of fishes occurring in the inland waters of Louisiana during the last quarter century have occurred in the most speciose and taxonomically challenging freshwater family: Cyprinidae, the minnows and carps. Most revisions were in the minnow groups popularly known as shiners and chubs. Minnows are problematic when compared with other speciose taxa that are physically larger (sunfishes, bullhead catfishes) or more distinctly pigmented (darters, topminnows).

Since 1974, five subspecies have been elevated to species status. *Notropis wickliffi*, channel shiner, was considered a subspecies of *N. volucellus*, the mimic shiner (Trautman, 1931), but after considerable study was elevated to full species status (Etnier and Starnes, 1993). Adults possess a larger eye, deeper caudal peduncle, bigger mouth and a less deepened body (Trautman, 1931), a less arched back and a poorly defined dorsal blotch (Etnier and Starnes, 1993). It is one of the most abundant minnows in the lower Mississippi River including Louisiana (B. Thompson, pers. comm.).

Macrhybopsis aestivalis, speckled chub, was a complex group with six subspecies. Recently *Macrhybopsis hyostoma*, shoal chub, was elevated to species status after considerable morphological work (Eisenhour, 1999). *Macrhybopsis hyostoma* occurs west of the Mississippi River in Louisiana. The division of the *M. aestivalis* complex is unclear east of the Mississippi River (D. Eisenhour, pers. comm.).

Fundulus dispar, northern starhead topminnow, previously synonymized with *F. notti*, was resurrected by Wiley (1977). All specimens have a subocular teardrop and are without a cleithral stripe or distinct pigment aggregations on the pectoral fin base. Males and females differ in ventral and lateral pigmentation from *F. notti* and the pectoral and pelvic fins of both sexes are without pigment blotches (Wiley, 1977). Again, specimens from the ULM collection were used in its redescription. Like other starhead topminnows, it is more abundant in the heavily vegetated shorelines of lakes and rivers. In Louisiana it is found only in the Ouachita River drainage.

Warren (1992) showed conclusively that two species comprised the *Lepomis punctatus* complex: *L. punctatus*, blackspotted sunfish, and *L. miniatus*, redspotted sunfish. *Lepomis miniatus* differs from *L. punctatus* in having red-orange coloration on the sides of breeding males, larger scales and shorter, thicker gill rakers (Warren, 1992). The ULM museum provided specimens for its redescription. The centrarchid originally referred to as *L. punctatus* in Louisiana is now reassigned as *L. miniatus*. It is present in all river drainages in Louisiana.

Etheostoma lynceum, brighteye darter, was formerly one of two recognized subspecies of *E. zonale*, banded darter (Tsai and

Raney, 1974). More than a decade later, Etnier and Starnes (1986) removed this species from the synonymy of *E. zonale*. It differs from *E. zonale* in possessing larger scales and in the intensity of its lateral pigmentation (Etnier and Starnes, 1986). In Louisiana this darter is found in riffles of flowing waters in the Lake Pontchartrain and Pearl River drainages.

Most of the shiner species were originally split among several genera by the great ichthyologists of the 19th century (e.g., Rafinesque, Girard, Jordan) and this taxonomic structure held for almost 100 years (Gilbert, 1978). Then most genera were lumped into the large and taxonomically awkward genus *Notropis* based on some broad and inconsistent morphological characters. However, the "big-genus" *Notropis* lasted for only three or four decades before many of the original genera were reinstated. The cladistic and genetic works of Mayden (1989) were critical in reestablishing these taxa.

The shiners are typically minnows that are morphologically fusiform to somewhat terete in body shape. They are with soft-rayed fins and without barbels. They are most often found swimming in large schools in the mid-water column.

Cyprinella, previously treated as a subgenus of *Notropis*, was elevated to genus (Mayden, 1989). Four Louisiana shiners were transferred to *Cyprinella*: *C. camura*, bluntface shiner; *C. lutrensis*, red shiner; *C. venusta*, blacktail shiner and *C. whipplei*, steelcolor shiner. Since *Cyprinella* is feminine, *C. camurus* and *C. venustus* were amended accordingly to *C. camura* and *C. venusta*. *Luxilus*, also formerly a subgenus of *Notropis*, was elevated to genus by Mayden (1989). Only *L. chrysocephalus*, striped shiner, is found in Louisiana. Similarly the shiners *Lythrurus fumeus*, ribbon shiner, *L. roseipinnis*, cherryfin shiner, and *L. umbratilis*, redbfin shiner, were reassigned from *Notropis* to *Lythrurus* (Mayden, 1989). Following the work of Mayden (1989) the genus *Pteronotropis* now comprises the species *P. hubbsi*, bluehead shiner; *P. signipinnis*, flagfin shiner and *P. welaka*, bluenose shiner. All *Pteronotropis* in Louisiana share the characters of bright orange, red or blue colors and a very broad lateral stripe.

The chubs and minnows are typically morphologically terete (nearly cylindrical in cross section and usually tapered). They have soft-rayed fins (except carps) and many have barbels. They are frequently found on or near the bottom of the water column. *Macrhybopsis*, another cyprinid taxon, has been resurrected by Coburn and Cavender (1989) for selected barbeled minnows and replaces the former genus *Hybopsis* for the species *M. aestivalis*, speckled chub, and *M. storeriana*, silver chub, in Louisiana. Another cyprinid, currently *Notropis winchilli*, clear chub, was formerly placed in *Hybopsis* (Robins et al., 1991). *Notropis bucattus*, silverjaw minnow, has historically been placed in the monotypic genus *Ericymba*, but has been reassigned to *Notropis* and its gender changed from *E. bucatta* to *N. bucattus* (Coburn and Cavender, 1992; Raley and Wood, 2001). Still another cyprinid, the flathead chub, long known as *Hybopsis gracilis* is now reassigned to the monotypic genus *Platygobio* (Mayden, 1989).

The darters are usually terete in body shape. They possess two completely separate dorsal fins; the anterior spinous and the posterior soft-rayed. The lateral and ventral fins may be enlarged for station holding in strong current and the species are typically

benthic and solitary.

The crystal darter has historically been placed in the genus *Ammocrypta*, but Simons (1991) offered conclusive evidence to resurrect the genus *Crystallaria* for this percoid. Thus *C. asprella* is known in Louisiana from the Ouachita and Pearl River drainages. Another darter, *Percina vigil*, saddleback darter, was previously referred to as *P. ouachitae* (Suttkus, 1985).

The catfishes have also undergone taxonomic change. *Ameiurus*, previously thought to be an invalid genus, was resurrected for the bullhead catfishes and thus separated from *Ictalurus* (Lundberg, 1989). Three species, *A. melas*, black bullhead, *A. natalis*, yellow bullhead, and *A. nebulosus*, brown bullhead, were transferred from *Ictalurus* to *Ameiurus*.

The alligator gar has for decades been listed as *Lepisosteus spatula*. Recent studies have disclosed several unique characters and therefore this species is now assigned to *Atractosteus* (Wiley, 1976).

The rainbow trout, historically long referred to as *Salmo gairdneri*, is now known as *Oncorhynchus mykiss*. Smith and Stearly (1989) hypothesized that this and other western trouts are more closely allied to *Oncorhynchus* than to *Salmo* and disclosed that it was first assigned the trivial name *mykiss*.

Menidia beryllina, inland silverside, replaces *M. audens*, Mississippi silversides, as the freshwater form in Louisiana (Chernoff et al., 1981). Other researchers insist, however, that *M. audens* is present in the lower Mississippi drainage of Louisiana from the Sabine River drainage east to the Pearl River drainage (B. Thompson, pers. comm.)

The shadow bass, *Ambloplites ariommus*, has been identified as a full species apart from the previously listed *A. rupestris*, rock bass, (Cashner and Suttkus, 1977). The latter is now considered a species of the northeast United States, whereas *A. ariommus* ranges into Louisiana where it is confined to the Florida parishes.

At least two changes have occurred in the taxonomy of higher taxa of North American freshwater fishes in recent years. The topminnows, genus *Fundulus* are now placed in the family Fundulidae (Parenti, 1981) and are fully separated from Cyprinodontidae in which they have long been placed. The temperate basses, genus *Morone*, are now assigned as members of the family Moronidae (Johnson, 1984) thus replacing Percichthyidae for the freshwater forms.

Several changes have also occurred in the common names of Louisiana's freshwater fishes. *Hybognathus nuchalis*, formerly know as the silvery minnow is now correctly called the Mississippi silvery minnow. *Fundulus notti*, is now correctly referred to as the bayou topminnow, thus replacing starhead topminnow as its common name. *Campostoma anomalum*, is now the central stoneroller instead of stoneroller, while *Esox americanus* is now known as the grass pickerel rather than the redbfin pickerel. Lastly, *Gambusia affinis* is correctly called the western mosquitofish, replacing mosquitofish.

Controversy surrounds *Elassoma*, pygmy sunfish. Some include it as part of the Centrarchidae (Robins et al., 1991). We follow Branson and Moore (1962) and will continue to use the family Elassomatidae as stated in more recent works (Jenkins and Burkhead, 1994; Etnier and Starnes, 1993; Page and Burr, 1991).

INTRODUCTIONS, RANGE EXTENSIONS, AND OTHER CHANGES

Three large, pelagic, Asian minnows reside and are evidently established in the waters of Louisiana (Douglas et al., 1996). *Ctenopharyngodon idella*, grass carp, was first discovered decades ago in Louisiana waters, and juveniles and adults are now found in every major river in the state. *Hypophthalmichthys nobilis*, bighead carp, and *H. molitrix*, silver carp, native to southern and central China, are documented in collections made from 1980 to present. In Louisiana records of bighead and silver carp are all from the Ouachita and Red River drainages. All three species spawn in rising, fast-flowing, turbid rivers and the larvae migrate to adjacent slack water. Collections of larval *Hypophthalmichthys* from a backwater outlet of the Black River near Jonesville, Louisiana totaled 12 specimens in 1992 (a low water year) to over 1600 specimens in 1994 (a high water year) indicating potentially high reproduction during floods. Impacts of these planktivorous minnows on native fishes are unknown, but monitoring populations is advisable. Because of their large size and powerful swimming abilities, these species are not susceptible to traditional fishing and sampling techniques. Occurrence may be documented, however, as bycatch of commercial fishermen and the spawning success from samples of larval fish assemblages.

The introduction and establishment of *Cichlasoma cyanoguttatum*, Rio Grande cichlid, has become apparent in and around the New Orleans area. It was first collected in 1996, but has since taken up residence and established a reproducing population (Fuentes and Cashner, 2002). *Lepomis auritus*, redbreast sunfish, a native of Atlantic coast drainages, are well-established in Toledo Bend Reservoir of the Sabine River. ULM museum records indicate two individuals were taken from the Ouachita River in 1972, but unlike the Toledo Bend population, there is no evidence of a reproducing population in the Ouachita Basin (M. Wood, pers. comm.).

Northern fishes with access to the Mississippi River may occasionally be displaced far south of their normal geographic ranges. Such fishes are considered transients or waifs and may find their way into the state of Louisiana. They are unlikely to reproduce successfully or to establish permanent populations.

Six such species are documented in collections made from the Mississippi River in Louisiana or Mississippi. They are *Osmerus mordax*, rainbow smelt, which normally occurs in the colder waters of the northeastern United States, but has recently been found near St. Francisville, West Feliciana Parish (Suttkus and Conner, 1980) and near Burnside, Ascension Parish (Douglas, pers. obs.); *Macrhybopsis gelida*, sturgeon chub, (Robison and Buchanan 1988; Page and Burr, 1991) which normally ranges from the Missouri River basin to the mid-Mississippi River, has been found near Lake Providence, East Carroll Parish; *M. meeki*, sicklefin chub (Ross and Brenneman, 1991; Page and Burr, 1991) with a normal range similar to *M. gelida* has been found near Vicksburg; *Oncorhynchus mykiss*, rainbow trout, (Ross and Brenneman, 1991) native to the Pacific slope of North America, but widely introduced elsewhere, has been taken in the Mississippi River very near Louisiana and *Noturus flavus*, stonecat, (Guillory, 1978) which ranges widely

throughout northern and central United States has been found impacted on a power plant intake screen near New Orleans. *Acipenser fulvescens*, lake sturgeon, was captured in an auxiliary canal near the old river control structure off the Mississippi River in 1994 (D. Walther, USFWS, pers. comm.).

Moxostoma duquesnei, black redhorse, and *Percina uranidea*, stargazing darter, (Douglas, pers. obs.) have been found in recent years in the extreme northern reaches of the Ouachita River basin in Louisiana. The single specimen of *M. duquesnei* obviously represents a waif that has drifted far southward from established populations from the Ouachita River in southwest Arkansas. However, the several specimens of *P. uranidea* taken in Bayou Bartholomew represent individuals from the southernmost limits of its normal range.

Ammocrypta clara, western sand darter, exhibited a significant eastward extension of its range in Louisiana from the Red River drainage to the Ouachita River drainage. Prior to 1974 no records of this species were noted east of the Red River drainage. Later, Hutchins (1988) reported taking four specimens from Bayou Bartholomew (Morehouse Parish) in the late 1980's. More recent collecting indicates that it is now common in the sand and gravel substrate in the lower reaches of Bayou Bartholomew. There it occurs sympatrically with *A. vivax*, scaly sand darter, and *Crystallaria asprella*, crystal darter.

Replacement of certain species of fishes has become increasingly evident in waters of northeast Louisiana during the last several decades as environmental alterations accelerate. Our collection records and research conducted by the United States Army Corps of Engineers, Waterway Experiment Station, Vicksburg, Mississippi, indicate an almost complete reversal of relative abundance of two closely-related cyprinids. This faunal change has occurred during the last twenty five years in four of five northeast Louisiana rivers.

Historical records for the period of 1965 to 1974 indicate *Cyprinella venusta*, blacktail shiner, comprised 31% of all minnows from Bayou Bartholomew, Bayou Macon, Big Creek, Boeuf River and Tensas River. No specimens of *C. lutrensis*, red shiner, were collected from these waters during that time. Since 1975, however, a stable population of *C. venusta* has persisted only in Bayou Bartholomew, whereas *C. lutrensis* now comprises 86% of all minnows in the other four rivers in northeast Louisiana. These reversals in relative abundance may be related to habitat changes associated with flood control projects. Stable substrates and minimal physical alterations contribute to population stability in Bayou Bartholomew. However, the remaining rivers in northeast Louisiana have been previously channelized and the area is intensively cultivated, creating conditions suitable to more tolerant taxa such as *C. lutrensis* (Douglas, 1990).

Effects of channelization are further supported by recent studies (Douglas, 1991) on the partially altered Tensas River, the easternmost tributary of the Ouachita River. In the channelized reaches, *C. lutrensis* is now numerically dominant, but in the few unchannelized reaches *C. venusta* is still the most abundant minnow.

DISCUSSION

Since 1974, there have been ten species described as new or elevated to species status. At least thirty-three taxa have been revised. Five exotic species have been established and at least seven species have displaced far downstream from their normal range. There have been significant range extensions and a displacement of one species by another.

What will the next quarter century hold? Undoubtedly, new species will continue to be "discovered," but at a slower rate, and most of these will be very similar to existing species that have been missed by earlier researchers. Also, taxa considered to be subspecies will be elevated to full species based on new findings.

Nomenclatural changes have occurred, are occurring, and will continue to occur in future years. Additional taxa may be split or lumped depending on current trends. In recent years the trend has been quite strong to split. Traditional meristic and morphometric methods of identification were supplemented by statistical analysis of morphometric variables, allozyme electrophoresis, presumptive gene loci and outgroup comparison and parsimony. However, Page and Burr (1991) insist the sand darters (Percidae) be lumped into the genus *Etheostoma*, thus negating *Ammocrypta* as a genus. This action has been viewed as premature by others (Etnier and Starnes, 1993). Continued disagreement will persist among investigators and taxonomic stability will be sought, but not achieved.

We can speculate that there will be additional introductions. However, species will become established only if environmental conditions are suitable. From time to time we find an occasional representative of exotic species such as pacu or tilapia in our inland waters, but to date no evidence of an established population.

The discovery of additional Mississippi River waifs will undoubtedly occur especially from studies conducted during periods of high water. In addition, range extensions and displacement of species are expected as environmental parameters change and species tolerant to wide-ranging conditions become dominant.

Streams that are relatively unaltered and have high species diversity (e.g. Bayou Bartholomew) should be recognized and conservation measures implemented to ensure long-term habitat quality. Restoration of altered streams may also lead to the re-establishment of sensitive species, such as wetland fishes, that have been extirpated or whose numbers have been depleted.

In this day of increasing environmental degradation, emphasized each passing year by accelerated practices of clear cutting timber, draining wetlands, clearing land, damming and channelizing rivers and polluting air and water with increasingly complex materials, man is determining the fate of many of our living creatures. As environments continue to be altered at an alarming rate, the ecology likewise changes. It seems inevitable that increasingly more species of animals will be hurried into an early extinction and denied their rightful place within the fauna of the world. Unfortunately, it will never be known just how many forms of life are forced into extinction through the thoughtlessness of man even before they are discovered, described, and made known to science.

Sadly, in most instances, funding for establishing and maintaining natural history collections is near the bottom of most prioritized lists. It is essential that these collections be maintained and financially supported. It is possible that in the future, collections of preserved and documented animals (and plants) in biological museums will offer the only evidence of living forms that once occurred, perhaps even prospered, but are now gone.

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Table 1. Checklist for the inland fishes of Louisiana. The AFS checklist was followed for most taxonomic decisions (Robins et al., 1991). Deviations are explained in the text.

FAMILY PETROMYZONTIDAE—LAMPREYS

- Ichthyomyzon castaneus*—chestnut lamprey
Ichthyomyzon gagei—southern brook lamprey

FAMILY ACIPENSERIDAE—STURGEONS

- Acipenser fulvescens*—lake sturgeon
Acipenser oxyrinchus—Atlantic sturgeon
Scaphirhynchus albus—pallid sturgeon
Scaphirhynchus platyrhynchus—shovelnose sturgeon

FAMILY POLYODONTIDAE—PADDLEFISHES

- Polyodon spathula*—paddlefish

FAMILY LEPISTOSTEIDAE—GARS

- Atractosteus spatula*—alligator gar
Lepisosteus oculatus—spotted gar
Lepisosteus osseus—longnose gar
Lepisosteus platostomus—shortnose gar

FAMILY AMIDAE—BOWFINS

- Amia calva*—bowfin

FAMILY HIODONTIDAE—MOONEYES

- Hiodon alosoides*—goldeye
Hiodon tergisus—mooneye

FAMILY ANGUILLIDAE—FRESHWATER EELS

- Anguilla rostrata*—American eel

FAMILY CLUPEIDAE—HERRINGS

- Alosa alabamae*—Alabama shad
Alosa chrysochloris—skipjack herring
Dorosoma cepedianum—gizzard shad
Dorosoma petenense—threadfin shad

FAMILY CYPRINIDAE—CARPS AND MINNOWS

- Camptostoma anomalum*—central stoneroller
Carassius auratus—goldfish
Ctenopharyngodon idella—grass carp
Cyprinella camura—bluntnose shiner
Cyprinella lutrensis—red shiner
Cyprinella venusta—blacktail shiner
Cyprinella whipplei—steelcolor shiner
Cyprinus carpio—common carp
Hybognathus hayi—cypress minnow
Hybognathus nuchalis—Mississippi silvery minnow
Hypophthalmichthys molitrix—silver carp
Hypophthalmichthys nobilis—bighead carp
Luxilus chrysocephalus—striped shiner
Lythrurus fumeus—ribbon shiner
Lythrurus roseipinnis—cherryfin shiner
Lythrurus umbratilis—redfin shiner
Macrhybopsis aestivalis—speckled chub
Macrhybopsis gelida—sturgeon chub
Macrhybopsis hyostoma—shoal chub

FAMILY CYPRINIDAE (continued)

- Macrhybopsis meeki*—sicklefin chub
Macrhybopsis storeriana—silver chub
Nocomis leptcephalus—bluehead chub
Notemigonus crysoleucas—golden shiner
Notropis amnis—pallid shiner
Notropis atherinoides—emerald shiner
Notropis atrocaudalis—blackspot shiner
Notropis blennioides—river shiner
Notropis boops—bigeye shiner
Notropis buchanani—ghost shiner
Notropis chalybaeus—ironcolor shiner
Notropis longirostris—longnose shiner
Notropis maculatus—taillight shiner
Notropis potteri—chub shiner
Notropis sabinae—Sabine shiner
Notropis shumardi—silverband shiner
Notropis texanus—weed shiner
Notropis volucellus—mimic shiner
Notropis wickliffi—channel shiner
Notropis winchelli—clear chub
Opsopoeodus emiliae—pugnose minnow
Phenacobius mirabilis—suckermouth minnow
Pimephales notatus—bluntnose minnow
Pimephales promelas—fathead minnow
Pimephales vigilax—bullhead minnow
Platygobio gracilis—flathead chub
Pteronotropis hubbsi—bluehead shiner
Pteronotropis signipinnis—flagfin shiner
Pteronotropis welaka—bluenose shiner
Semotilus atromaculatus—creek chub

FAMILY CATOSTOMIDAE—SUCKERS

- Carpionotus carpio*—river carpsucker
Carpionotus cyprinus—quillback
Carpionotus velifer—highfin carpsucker
Cycleptus elongatus—blue sucker
Cycleptus meridionalis—southeastern blue sucker
Erimyzon oblongus—creek chubsucker
Erimyzon sucetta—lake chubsucker
Erimyzon tenuis—sharpfin chubsucker
Hypentelium nigricans—northern hog sucker
Ictiobus bubalus—smallmouth buffalo
Ictiobus cyprinellus—bigmouth buffalo
Ictiobus niger—black buffalo
Minytremma melanops—spotted sucker
Moxostoma carinatum—river redhorse
Moxostoma duquesnei—black redhorse
Moxostoma poecilurum—blacktail redhorse

FAMILY ICTALURIDAE—BULLHEAD CATFISHES

- Ameiurus melas*—black bullhead
Ameiurus natalis—yellow bullhead
Ameiurus nebulosus—brown bullhead

Table 1. Continued.

FAMILY ICTALURIDAE (continued)

Ictalurus furcatus—blue catfish
Ictalurus punctatus—channel catfish
Noturus flavus—stonecat
Noturus funebris—black madtom
Noturus gyrinus—tadpole madtom
Noturus leptacanthus—speckled madtom
Noturus miurus—brindled madtom
Noturus munitus—frecklebelly madtom
Noturus nocturnus—freckled madtom
Noturus phaeus—brown madtom
Pylodictis olivaris—flathead catfish

FAMILY ESOCIDAE—PIKES

Esox americanus—grass pickerel
Esox niger—chain pickerel

FAMILY OSMERIDAE—SMELTS

Osmerus mordax—rainbow smelt

FAMILY SALMONIDAE—TROUTS

Oncorhynchus mykiss—rainbow trout

FAMILY APHREDODERIDAE—PIRATE PERCHES

Aphredoderus sayanus—pirate perch

FAMILY FUNDULIDAE—TOPMINNOWS

Fundulus blairae—western starhead topminnow
Fundulus chrysotus—golden topminnow
Fundulus dispar—starhead topminnow
Fundulus euryzonus—broadstripe topminnow
Fundulus notatus—blackstripe topminnow
Fundulus notti—bayou topminnow
Fundulus olivaceus—blackspotted topminnow

FAMILY POECILIIDAE—LIVEBEARERS

Gambusia affinis—western mosquitofish
Heterandria formosa—least killifish
Poecilia latipinna—sailfin molly

FAMILY ATHERINIDAE—SILVERSIDES

Labidesthes sicculus—brook silverside
Menidia beryllina—inland silverside

FAMILY SYNGNATHIDAE—PIPEFISHES

Syngnathus scovelli—gulf pipefish

FAMILY MORONIDAE—TEMPERATE BASSES

Morone chrysops—white bass
Morone mississippiensis—yellow bass
Morone saxatilis—striped bass

FAMILY CENTRARCHIDAE—SUNFISHES

Ambloplites ariommus—shadow bass
Centrarchus macropterus—flier
Lepomis auritus—redbreast sunfish

FAMILY CENTRARCHIDAE (continued)

Lepomis cyanellus—green sunfish
Lepomis gulosus—warmouth
Lepomis humilis—orangespotted sunfish
Lepomis macrochirus—bluegill
Lepomis marginatus—dollar sunfish
Lepomis megalotis—longear sunfish
Lepomis microlophus—reardear sunfish
Lepomis miniatus—redspotted sunfish
Lepomis symmetricus—bantam sunfish
Micropterus punctulatus—spotted bass
Micropterus salmoides—largemouth bass
Pomoxis annularis—white crappie
Pomoxis nigromaculatus—black crappie

FAMILY ELASSOMATIDAE—PYGMY SUNFISHES

Elassoma zonatum—banded pygmy sunfish

FAMILY PERCIDAE—PERCHES

Ammocrypta beani—naked sand darter
Ammocrypta clara—western sand darter
Ammocrypta vivax—scaly sand darter
Crystallaria asprella—crystal darter
Etheostoma asprigene—mud darter
Etheostoma caeruleum—rainbow darter
Etheostoma chlorosomum—bluntnose darter
Etheostoma collettei—creole darter
Etheostoma fusiforme—swamp darter
Etheostoma gracile—slough darter
Etheostoma histrio—harlequin darter
Etheostoma lynceum—brighteye darter
Etheostoma parvipinne—goldstripe darter
Etheostoma proeliare—cypress darter
Etheostoma stigmaeum—speckled darter
Etheostoma swaini—gulf darter
Etheostoma whipplei—redfin darter
Percina aurora—pearl darter
Percina caprodes—logperch
Percina copelandi—channel darter
Percina lenticula—freckled darter
Percina macrolepida—bigscale logperch
Percina maculata—blackside darter
Percina nigrofasciata—blackbanded darter
Percina sciera—dusky darter
Percina shumardi—river darter
Percina suttkusi—gulf logperch
Percina uranidea—stargazing darter
Percina vigil—saddleback darter
Stizostedion canadense—sauger
Stizostedion vitreum—walleye

FAMILY SCIAENIDAE—DRUMS

Aplodinotus grunniens—freshwater drum

FAMILY CICHLIDAE—CICHLIDS

Cichlasoma cyanoguttatum—Rio Grande perch

Table 2. Changes to the inland fishes of Louisiana.

1974	NAME CHANGES 2001
FAMILY ACIPENSERIDAE-STURGEONS	
<i>Scaphirhynchus albus-pallid</i> sturgeon	<i>S. albus</i> -pallid sturgeon
FAMILY LEPISOSTEIDAE-GARS	
<i>Lepisosteus spatula</i> -alligator gar	<i>Atractosteus spatula</i> -alligator gar
FAMILY CYPRINIDAE-CARPS AND MINNOWS	
<i>Campostoma anomalum</i> -stoneroller	<i>C. anomalum</i> -central stoneroller
<i>Notropis camurus</i> -bluntnose shiner	<i>Cyprinella camura</i> -bluntnose shiner
<i>Notropis lutrensis</i> -red shiner	<i>Cyprinella lutrensis</i> -red shiner
<i>Notropis venustus</i> -blacktail shiner	<i>Cyprinella venusta</i> -blacktail shiner
<i>Notropis whipplei</i> -steelcolor shiner	<i>Cyprinella whipplei</i> -steelcolor shiner
<i>Hybognathus nuchalis</i> -silvery minnow	<i>H. nuchalis</i> -Mississippi silvery minnow
<i>Notropis chrysocephalus</i> -striped shiner	<i>Luxilus chrysocephalus</i> -striped shiner
<i>Notropis fumeus</i> -ribbon shiner	<i>Lythrurus fumeus</i> -ribbon shiner
<i>Notropis roseipinnis</i> -cherryfin shiner	<i>Lythrurus roseipinnis</i> -cherryfin shiner
<i>Notropis umbratilus</i> -redfin shiner	<i>Lythrurus umbratilus</i> -redfin shiner
<i>Hybopsis aestivalis</i> -speckled chub	<i>Macrhybopsis aestivalis</i> -speckled chub
<i>Macrhybopsis aestivalis</i> -speckled chub	<i>Macrhybopsis hyostoma</i> , shoal chub,
<i>Hybopsis storeriana</i> -silver chub	<i>Macrhybopsis storeriana</i> -silver chub
<i>Ericymba buccata</i> -silverjaw minnow	<i>Notropis bucattus</i> -silverjaw minnow
<i>Notropis volucellus</i> -wickliffi-mimic shiner	<i>Notropis wickliffi</i> -channel shiner
<i>Hybopsis winchelli</i> -clear chub	<i>Notropis winchelli</i> -clear chub
<i>Hybopsis gracilis</i> -flathead chub	<i>Platygobio gracilis</i> -flathead Chub
<i>Notropis signipinnis</i> -flagfin shiner	<i>Pteronotropis signipinnis</i> -flagfin shiner
<i>Notropis welaka</i> -bluenose shiner	<i>Pteronotropis welaka</i> -bluenose shiner
FAMILY ICTALURIDAE-BULLHEAD CATFISHES	
<i>Ictalurus melas</i> -black bullhead	<i>Ameiurus melas</i> -black bullhead
<i>Ictalurus natalis</i> -yellow bullhead	<i>Ameiurus natalis</i> -yellow bullhead
<i>Ictalurus nebulosus</i> -brown bullhead	<i>Ameiurus nebulosus</i> -brown bullhead
FAMILY CYPRINODONTIDAE FAMILY FUNDULIDAE-TOPMINNOWS	
<i>Fundulus notti</i> -starhead minnow	<i>F. notti</i> -bayou topminnow
<i>Fundulus notti</i> -starhead topminnow	<i>F. dispar</i> -northern starhead topminnow
FAMILY POECILIIDAE-LIVEBEARERS	
<i>Gambusia affinis</i> -mosquitofish	<i>G. affinis</i> -western mosquitofish
FAMILY ATHERINIDAE-SILVERSIDES	
<i>Menidia audens</i> -Mississippi silverside	<i>M. beryllina</i> -inland silverside
FAMILY CENTRARCHIDAE-SUNFISHES	
<i>Ambloplites rupestris</i> -rock bass	<i>A. ariommus</i> -shadow bass
<i>Lepomis punctatus</i> -blackspotted sunfish	<i>L. miniatus</i> -redspotted sunfish
FAMILY PERCIDAE-PERCHES	
<i>Ammocrypta asprella</i> -crystal darter	<i>Crystallaria asprella</i> -crystal darter
<i>Etheostoma zonale</i> -banded darter	<i>E. lynceum</i> -brighteye darter
<i>Percina ouachita</i> -darter	<i>Percina vigil</i> -saddleback darter

Table 2. Continued.

INTRODUCTIONS

FAMILY CYPRINIDAE-CARPS AND MINNOWS

Ctenopharyngodon idella-grass carp*Hypophthalmichthys molitrix*-silver carp*Hypophthalmichthys nobilis*-bighead carp

FAMILY CENTRARCHIDAE-SUNFISHES

Lepomis auritus-redbreast sunfish

FAMILY CICHLIDAE-CICHLIDS-New family for Louisiana

Cichlasoma cyanoguttatum-Rio Grande cichlid

RANGE EXTENSIONS AND TRANSIENTS

FAMILY ACIPENSERIDAE-STURGEONS

Acipenser fulvescens-lake sturgeon-transient

FAMILY CYPRINIDAE-CARPS AND MINNOWS

Macrhybopsis gelida-sturgeon chub-transient*Macrhybopsis meeki*-sicklefin chub-transient

FAMILY CATOSTOMIDAE-SUCKERS

Moxostoma duquesnei-black redhorse-transient

FAMILY ICTALURIDAE-BULLHEAD CATFISHES

Noturus flavus-stonecat-transient

FAMILY OSMERIDAE-SMELTS-New family for Louisiana

Osmerus mordax-rainbow smelt-transient

FAMILY SALMONIDAE-TROUTS-New family for Louisiana

Oncorhynchus mykiss-rainbow trout-transient

FAMILY PERCIDAE-PERCHES

Percina uranidea-stargazing darter-range extension

NEW SPECIES AND FAMILY

FAMILY CYPRINIDAE-CARPS AND MINNOWS

New species

Pteronotropis hubbsi-bluehead shiner

FAMILY CATOSTOMIDAE-SUCKERS

Split *Cycleptus elongatus*-blue sucker*C. meridionalis*-southeastern blue sucker

FAMILY CYPRINODONTIDAE

Split *Fundulus notti*-starhead topminnow

New species

FAMILY FUNDULIDAE-TOPMINNOWS

F. blairae-western starhead topminnow*Fundulus euryzonus*-broadstripe topminnow

FAMILY PERCICHTHYIDAE

FAMILY MORONIDAE-TEMPERATE BASSES

FAMILY PERCIDAE-PERCHES

Split-*Percina copelandi*-channel darterSplit-*Percina caprodes*-logperch*P. aurora*-pearl darter*P. suttkusi*-gulf darter

MINUTES

Business Meeting 27th Annual Meeting Southeastern Fishes Council

The 2001 meeting of the Southeastern Fishes Council (SFC) was called to order by Chairman Steve Ross at 5:17 PM on April 5, 2001. The meeting was held in the Cypress Room of the Radisson Hotel in New Orleans, Louisiana. Executive Committee members attending were Stephen T. Ross (Chair), Gerald R. Dinkins (Secretary), Peggy Shute (Treasurer), and Mary Freeman (Chair-elect).

SECRETARY'S REPORT

Minutes from the 2000 SFC business meeting held in the Marriot Hotel and Convention Center in Chattanooga, Tennessee were distributed by Secretary Dinkins for review. A motion was made to accept the minutes as written, and was carried by voice vote.

TREASURER'S REPORT

The treasurer's report was distributed for review by Peggy Shute, who noted debt and cost of publishing bulletin by Mel Warren et al. Peggy urged everyone to check their status of payment of membership dues to SFC. Chairman Ross noted 2001 button of Altamaha shiner, drawn by Gini Knight. A motion was made to accept the treasurer's report as printed, which was carried by voice vote. Chairman Ross acknowledged Peggy's efforts as treasurer for the recent term.

COMMITTEE REPORTS

Nominating Committee

Chairman Ross acknowledged efforts of the nominating committee, composed of Mary Freeman, Peggy Shute, Gerry Dinkins, and Steve Walsh, to procure nominees for Executive Committee offices. Agreeing to run for Chairman of SFC were Hank Bart and Rick Mayden. Chris Skelton and Peggy Shute were running unopposed for secretary and treasurer, respectively. Election ballots were then distributed to the business meeting attendees.

Editorial Committee

No report.

Technical Advisory Committee

Chairman Ross thanked Mel Warren, co-chair of the Technical Advisory Committee, and his co-authors for preparing the article on diversity, distribution, and conservation status of native freshwater fishes of the southern United States.

Resolutions Committee

No report from Resolutions Committee, but Chairman Ross acknowledged ongoing efforts on the Needmore Tract Resolution.

Other Committees

Chairman Ross described efforts of Steve Walsh, Noel Burkhead, himself, and others relative to organizing a new conservation organization dedicated to fish conservation in the southeastern United States. The "Southeastern Imperiled Fishes Organization" would do more than just SFC because it would be deeply involved with outreach, advocacy, and education, and would constitute a broad coalition from NGO's, Federal and State agencies, industry, and academia. SFC would contribute much of the fish expertise to this new group.

OLD BUSINESS

Chairman Ross noted Resolution on Rodman Dam removal has been sent to Governor Jeb Bush of Florida.

NEW BUSINESS

Chairman Ross noted next year that SFC will meet with Southern Division of American Fisheries Society (SDAFS) in Little Rock, AR. This meeting is the result of last year's vote, which showed split results between staying with ASB and going with AFS. There was a general discussion about the special symposium to be held at the SDAFS in Little Rock, Arkansas. Ross noted the death of David Lindquist, a long-time, active member of SFC and SEASIH. He stated that a letter will be sent to Dave's wife, Donna, on behalf of the SFC. An obituary will be written by Peggy Shute and published in the Proceedings. Ross also commented on the passing of Robert K. Johnson, another very active southeastern member of ASIH.

Ross commented on the pending retirement of David A. Etnier of the University of Tennessee, with a celebration in Knoxville on Saturday, June 9.

Mary Freeman announced the results of the SFC Executive Committee election: Hank Bart was elected chair, Chris Skelton was elected Secretary, and Peggy Shute was re-elected treasurer.

REGIONAL REPORT

Regional reports were not presented. Attendees were referred to the SFC webpage where the reports will be posted.

Chairman Ross concluded the 2001 business meeting by stating it was an honor to have served as Chairman of SFC the last two years, and acknowledged Mary Freeman as incoming chair of SFC. Chairman Ross wished Mary success in her position.

After accepting a motion adjourn meeting, the meeting ended at 5:40 PM.

Respectfully submitted,
Gerald R. Dinkins, Secretary

Southeastern Fishes Council Treasurer's Report, April 2001

Checking Account Balance, 3 April 2001 \$3,767.69

Dues and Contributions,

21 March 2000 through 3 April 2001:

Dues	\$4,039.00
Button sales (old buttons)	\$200.00
Sale of SFC <i>Proceedings</i> back issues	\$12.50
Ear-marked* contributions	\$250.00
*for the Warren et al. <i>Fisheries</i> publication)	
TOTAL	\$4,641.50

Expenditures, March 2000 through 3 April 2001:

Proceedings # 40, printing cost	\$2,410.44
Proceedings # 40, postage	\$264.00
Proceedings # 41, printing cost	\$1,656.78
Proceedings # 41, postage	\$205.70
TN Secretary of State (annual report)	\$20.00
Council of Aquatic Sciences (annual dues)	\$100.00
Returned check & fee	\$25.00
TOTAL:	\$4,656.92

Checking Account Balance as of 21 March 2000: \$3,767.69

Paine Webber Cash Fund as of 29 December 2000: \$3,250.37

Reported Fund, 31 December 1999	\$3,067.76
Earned interest and adjustments, 1998	\$182.61

Total Assets \$7,018.06

Notes:

Membership on 21 March 2000 was 170 individuals or organizations, distributed as follows:

Paid through 1997:	7
Paid through 1998:	14
Paid through 1999:	28
Paid through 2000:	64
Paid through 2001	52
Paid through 2002 and lifetime members:	8

Respectfully submitted,
Peggy W. Shute

Regional SFC Reports

REGION I - Northeast

The fishes unit at the North Carolina State Museum of Natural Sciences is plugging along and attempting to weather the state's massive budget shortfall. The struggle to curate and data base the tremendous backlog of collections which accrued from the combination of the UNC Institute of Marine Science, Duke U., and several other collections over the past few years

continues, as well as trying to keep abreast of day-to-day acquisitions and requests. The most recent sizeable acquisition was Rudy Arndt's Stockton State University collection of fishes from New Jersey and other areas. With this accession added to previous, NCSM now has among the strongest representations of fishes from the middle Atlantic states, particularly New Jersey, Maryland, North and South Carolina, as well as West Virginia. The data base is fully modified and operational. Fish folks are especially proud of the NCSM drainage hierarchy (for U.S. & portions of other regions) data base and taxonomic data base which are linked to cataloging for quality control. Data based lots are approaching four thousand. Only perhaps another 80,000 or more to go! The outcome of an NSF proposal to support data basing fishes and other collections at NCSM is being anxiously awaited.

The outcome of the funding request is especially important as the fishes unit will be losing both of its technicians soon. Lynn Womack, after five years of service, has elected to pursue a career in teaching and will depart the unit at the end of April; she will be missed. The current temporary technician, Chris Wood, will depart in June to begin a masters program at Appalachian State. With the aforementioned state budget crisis, permanent positions are frozen so replacing one or both of these folks may be a long time in coming. Gabriela Hogue continues to do a sterling job of developing and managing the data base as well as the collections. Our former technician, Morgan Raley, who did doctoral work on molecular systematics of minnows and darters with Rob Wood at St. Louis U., has moved down the street to the NCSU Vet school where we have established, as a joint venture, a fledgling molecular lab to pursue biodiversity questions in the regional fauna. He has begun sequencing work with a few fishes, mussels, and land snails as funding permits.

As for research and field work, Wayne Starnes finally returned the post-review emended version of a large manuscript on historical analysis and biotic integrity of fishes in the lower Potomac near D.C. to be published in the *Proceedings of Biological Society of Washington's* historic series on Plummer's Island area biota (a hanging project from Smithsonian days). He is collaborating with Joe Nelson and Mel Warren on a paper discussing and espousing the capitalization (it's coming, see below!) of fish names (for *Fisheries* journal) and is trying to pursue some other projects on both freshwater and marine fishes. But curatorial responsibilities stemming from the backlog and databasing effort weigh in heavily these days when added to other time demands. Field work this year will focus on a funded survey aimed at identifying fish hosts for an endangered mussel (the Carolina heelsplitter) and characterizing fish communities where they occur. Other work will be aimed at further surveys for the undescribed "Carolina Redhorse" and, hopefully, searching for additional populations of the Bridled Shiner, *Notropis bifrenatus*, which was recently rediscovered in a NC Division of Water Quality collection from the lower Neuse basin (known previously in NC from a single record in 1961). Funding for survey work and genetic studies work on both of these species has been requested.

There will also probably be another multi-agency assault on the Pee Dee River this spring seeking additional Robust Redhorse specimens. A total of three are recorded since 2000 between Blewett Falls dam in NC and Cheraw, SC. Several

specimens of the rare "Carolina Redhorse" have turned up with Carolina Power & Light's fish monitoring efforts in Blewett Falls Reservoir, as well as one in the tailwater, yielding some optimism for persistence of this species in the Pee Dee. Otherwise, its only known stronghold is the lower Deep River, tributary to the Cape Fear in North Carolina. The existence of a reproducing population of Flathead Catfish was confirmed in that reach of the Deep this past year. The implications of this find with respect to the future of redhorses are a concern.

Some tidbits, several species, none surprising, have been recently documented for the first time from North Carolina waters (so far as known to us at NCSM). Collections from the upper Savannah basin in NC, connected with masters thesis surveys of Jason Robinson of North Carolina State University, yielded first vouchered occurrences in the state of the Blackbanded Darter, *Percina nigrofasciata*, a new Savannah basin record (in NC) for the Margined Madtom, *Noturus insignis*, as well as additional specimens of several species known previously only from very few specimens (e.g., *Etheostoma inscriptum*). Morgan Raley and Bob Jenkins may have the dubious distinctions of documenting the first western mosquito fish, *Gambusia affinis*, in NC as well as new basin and regional (in NC) record for *Pimephales notatus* from Hiwassee River tributaries.

Fritz Rohde

REGION II - Southeast

Conservation Notes:

Clearly the most significant news in the Southeast is the tentative, "unanimous agreement" to the Tri-State Water Compact, which delineates water allocation and interbasin transfer between the Apalachicola and Mobile river drainages, affecting Alabama, Florida, and Georgia. The sometimes-contentious compact, finally signed on 15 January, is (at this writing) open to the public for comment for 60 days, after which it must be signed by the governors of the three states. It will then undergo a final, thorough review by the Federal Commissioner before becoming a binding agreement.

Population growth and future water supply for Atlanta was a primal force driving the compact. Obviously, the states had specific concerns relative to water availability for commerce, industry, recreation, and natural resources. Florida's principal concern seemed centered on maintaining sufficient water in Apalachicola Bay to support the profitable oyster and shrimp fisheries, whereas Alabama's primary concern appears to be equability of water allocation with Georgia. The latter concern is valid: thirsty Atlanta plans to construct a "ring of reservoirs" to supply the megalopolis with water. In terms of wielding influence, Atlanta is very much a city-state, an irony given the predisposition of Georgians to naming their cities in honor of Greco-Roman civilization.

The U.S. Fish and Wildlife Service bears the onerous task of devising a plan to protect the high number of listed aquatic species in the taxa in these watersheds. It is hoped that these

plans will indirectly protection to the large number of aquatic endemics). Protection of listed species is based on the caveat of creating opportunities for recovery, as mandated by the Endangered Species Act. In summary, manipulation of complicated plumbing is supposed to offset the negative effects of increased impoundment and system fragmentation, and increased degradation of lotic systems from the cascading effects of growth and landscape transfiguration. Obviously, the "C" in compact doesn't stand for conservation.

While the Fish and Wildlife Service is often criticized, maligned, and even sued by conservation groups, the small, understaffed federal agency tackled this complex problem with tenacity and conviction. Actually, the Fish and Wildlife Service was hamstrung by insufficient time and funding to conduct the background studies needed to understand the basic problems created by the compact. While "doing the best they could" is as unsatisfying as kissing your sister, the FWS represented the resource responsibly. Kudos.

The reality is that no biologist understands the array of habitat requirements of all the listed aquatic taxa in these basins. While variability of river discharges over time is intuitively recognized as an important model criterion, it is difficult to translate into engineering models. When rivers become regulated by dams, the question "How much water do species-communities-processes need?" seems to be a perfectly logical approach to managing a regulated systems for biodiversity. In the absence of information, the fall back position tends to argue for as much water as possible relative to the base flows of regulated rivers. Based on her work in the Tallapoosa River system, Mary Freeman observed that extraordinarily low flows during droughts might be important to the dispersal of little fishes. Perhaps such periods are important to maintaining intraspecific heterogeneity among tributary species. Yet, in developing compacts for water allocation, do "we" really want to say that 7Q10 flows are occasionally desirable?

It is difficult to think of successively impounded river reaches as the long-term state of those systems, yet planners appear to assume long-term maintenance of these dams is a given. Is it realistic, however, to assume that society will maintain these edifices 100, 200, and especially 500 years from now? Therein lies the rub between the biologist thinking about what is needed to maintain diversity and an engineer thinking about projected water demands. While the example is simple, its application is not. An engineering concept that throttles biological mindsets is that of "excess water," i.e., the flowing water that is not being put to "work." That is analogous to stating that the earth has excess atmosphere, i.e., any that is not used for respiration or to provide a thermal buffer is excess. In facing the intense pressure to "give up" water, the Fish and Wildlife Service had to adopt the position that protecting listed species will also protect most diversity, and the simplest and best way to accomplish this was to get as much water as possible.

A different, but potentially insidious threat is the rapidly expanding population of the red shiner (*Cyprinella lutrensis*) in the upper Coosa River. Fish surveys made during 1989 to 1993 only found the red shiner in the lower Etowah River. While spread of the aggressive red shiner was a point of concern, no evidence of its spread was detected until Summer 2000. At that time it was discovered to have spread throughout the Oostanaula

River and to have entered the lower reaches of the Conasauga and Coosawattee rivers, and to be causing a massive hybrid swarm with the "Mobile" blacktail shiner *C. stigmatura*. The red shiner is spreading in river mainstems at an estimated rate of 30.4 rkm/yr. At this rate, it will contact the lowermost populations of the threatened blue shiner *C. caerulea* in three years or less. This spring and summer, it will be determined if the red shiner will hybridize with the blue shiner in large current tanks.

Research Notes:

Mary Freeman spent the last two summers sampling fishes in streams on the lower Georgia Piedmont that are affected by water withdrawals or water-supply reservoirs, as part of a USGS-State Partnership Program with the GA DNR - Wildlife Resources Division. Our objectives are to relate fish community composition and integrity to potential for low-flow depletion. I'm still engrossed in data analysis, but we can say that all sites below water supply reservoirs scored fair to poor in terms of IBI, a finding of some concern given the proliferation of proposals for new reservoirs in response to the continuing drought. These sights can also be sources of nonindigenous species introductions.

Mary's compatriot, Bud, is a CO-PI with Laurie Fowler (UGA Institute of Ecology and Law School) on an effort to develop habitat community profiles for imperiled fishes in the Etowah basin. They have received the first funding of a 3-year project, motivated by the astronomic urban growth occurring in the basin, near areas of persisting species diversity. This type of study is likely needed in aquatic basins throughout the southeast, in streams representing the array of landform (geologic and physiographic) diversity.

Steve Walsh, USGS, Florida Caribbean Science Center, Gainesville, has been contracted by the Florida Park system to survey the magnitude 1 springs in the state for fishes. It is not often that one gets to sample these startlingly beautiful springs; consequently, his trips are popular and well supported by laboratory personnel. In contrast, Leo Nico's fieldwork in South Florida canals, for nonindigenous fishes, remains the least popular trips among lab personnel.

Welcome: Walt Courtenay, retired Professor Emeritus et seq., has taken a position as a Biological Technician at the USGS lab, Gainesville (yet another ichthyologist). Walt has become a regular fixture at the lab. Yet, he can be easily recognized as an "emeritus scientist" by virtue of color coordination and the cell phone belt holster. Needles to say, Carter Gilbert is jealous of both. Walt, Pam Fuller, Leo Nico, and Jim Williams are the organizers for the nonindigenous species symposium at the forthcoming ASIH meetings in Kansas. Other Gainesvillians: Howard Jelks, with ex-gator cum Jesuit (Loyola University of New Orleans) Frank Jordan, are continuing work on Okaloosa darters, entering their seventh year of monitoring darter populations. Research by N. Burkhead is focusing on the "axis of evil" red shiner and its misbehavior with congeners in the upper Coosa River system.

Apology: Due to the late preparation, and somewhat sparse response by Region II contacts, the regional report is atypically short and concise.

Noel Burkhead

REGION III - North-Central

Status surveys and other interesting finds

Bill McLarney reported an interesting find as a result of surveys in the Little Tennessee River system upstream of Fontana Reservoir. He noted that surveys conducted during September-November of 2000 and 2001 have shown a hitherto unsuspected migration of the threatened spotfin chub, *Erimonax* (= *Cyprinella*) *monachus* up tributaries of the Little Tennessee River in Swain and Macon Counties, North Carolina. The conventional wisdom has been that this species is almost exclusively a mainstem inhabitant. A very few individuals, mostly juveniles, have been found in three tributary streams during the spring and summer: Over a period of 12 years (1990-2001), 32 summer IBI samples in the lower reaches of 18 tributaries to the reach of the Little Tennessee known to harbor this species have turned it up on just one occasion. However it has recently been shown that in the fall, spotfin chubs may penetrate tributary streams to a distance of three miles or more upstream of their mouths. Occasionally they are found in surprising numbers; a single seine haul in a pool in Brush Creek in October 2000 turned up an estimated 300 individuals. More usually they are found in modest numbers. So far, all six Little Tennessee tributaries downstream of Porters Bend Dam at Franklin, NC (the upper limit of spotfin chub range in the river) with watershed areas of more than four square miles have been sampled in the fall; all contained spotfin chubs. In addition, six of eight tributaries with watershed areas of two to four square miles have been searched, with small numbers of spotfin chubs reported from three streams.

In every case, including those streams where spotfin chubs were not found and one still smaller tributary, large numbers of the whitetail shiner (*Cyprinella galactura*) were taken. While it is not unusual to take individual whitetail shiners in small tributaries during the summer, it is also considered to be a "river fish", and is never taken in large numbers from small tributaries. In one instance, numbers of both species were such (at a distance of over two miles above the river), that both species could be taken from shallow runs with every pass of a dip net. These findings illustrate a significant and unstudied biotic interchange between mainstem and tributaries.

Three each of the larger and smaller tributaries join the Tennessee on the 4,600 acre Needmore Tract, owned by Crescent Resources. Both the Macon and Swain County Commissions, along with many conservation organizations, have supported the acquisition of the Needmore Tract as a conservation priority. The focus has been on the Little Tennessee River, but these findings suggest the importance of fully protecting tributary watersheds on the Needmore Tract as well as the river corridor.

The lake sturgeon restoration project is continuing in the French Broad River downstream of Douglas Dam. Cooperators include the Southeast Aquatic Research Center (SARI), TVA, Tennessee Wildlife Resources Agency (TWRA), U.S. Fish & Wildlife Service (FWS), and the Tennessee Cooperative Fisheries Research Unit. Rick Bivens (TWRA) and Ed Scott (TVA) reported four lake sturgeon recovered by boat electrofishing & net surveys in tail-water surveys summer 2001.

Charlie Saylor reported that TVA completed IBI fish

surveys at 194 sites during 2001, but he had no range-extensions or other items of interest to report. TVA will continue to do IBI surveys at 180-200 sites in 2002. Charlie did comment that, in comparison with the results of IBI surveys five years ago, the results of the 2001 surveys there were more sites that had improved than got worse. Their theory is the improvements are likely due to the low rainfall (and therefore, less non-point-source runoff) we've had in the Valley the past few years.

Chris Skelton (GA Natural Heritage Program) reported that he and Rex Strange (SE Missouri State Univ.) have received monies from Region 5 FWS to survey for blackside dace (*Phoxinus cumberlandensis*) in the Powell River system in VA, where Chris had recently discovered a population in Cox Creek. In addition to surveying for additional populations, they will also be comparing genetic make-up of the known Powell population with upper Cumberland populations in an attempt to determine if those occurring in the Powell are the result of bait bucket introduction, or natural exchange. They will begin surveys in spring 2002.

Rick Bivens (TWRA) reported several state records. They collected five specimens of what he thinks may be mountain redbelly dace (*Phoxinus oreas*) from Laurel Creek in Johnson Co, TN in September 2001. Laurel Creek is a tributary of the South Fork Holston River near Damascus VA. Their survey site was located approximately 0.8 miles upstream of the TN/VA state line. These fish were not present at the same location in 1993 (when they used the 3-pass depletion survey, same as in 2001). Rick sent photos to Bob Jenkins and Wayne Starnes, and both agreed that they were *P. oreas*. So, although the species is known from the watershed in VA (see Jenkins' and Burkhead's book) this tentatively, represents a new record for TN. Another state record was the first recorded white catfish (*Ameiurus catus*) from Tennessee collected in the Pigeon River at Hartford, Cocke County, 21 June 2000. It is catalogued as UT 48.1014.

Rick also reported collecting three blue suckers (*Cyprinus elongatus*) from two localities on the Nolichucky River (river miles 30.9 and 39.1) in the summer of 2001. One fish measured 698 mm TL and all were released.

Jim Herrig (U.S. Forest Service) reported using a habitat model to predict the occurrence of Tennessee dace (*Phoxinus tennesseensis*) in eight previously unsurveyed National Forest streams. Their crews found populations of Tennessee dace in four of the eight streams, and an additional population in a stream that had not met the model criteria. This single season of directed effort increased the known populations on the Cherokee National Forest from 20 to 25. He suspects there may be several others in the vicinity, but off National Forest lands. In 1990 he used the same criteria on the Daniel Boone NF to search for streams with blackside dace (*Phoxinus cumberlandensis*). Then, they found four (three in a single day!) previously unknown populations in 12 streams predicted by the model. The model seems to work pretty well for *Phoxinus*. He is working on refining it for as many of the 120 species of fish documented on the Forest. All of the parameters used in the model are derived from maps. He says field measurements would surely increase the predictability of the model, but if you're in the field anyway, why not just survey for the fish?

Jeff Powell (USGS) reported that the U.S. Geological Survey sampled 25 streams across the lower Tennessee Valley

in 2001, and 32 streams in 2000, as part of the Lower Tennessee River NAWQA project. Streams were of similar size (30-60 square miles) and were concentrated primarily in the Eastern (EHR) and Western Highland Rim (WHR) ecoregions (level 4). Fish, invertebrate, and algae collections were made, along with extensive instream, land use, and water chemistry assessments. Results from these efforts are being used to evaluate biotic community response to land use (primarily agriculture) at the ecoregion scale, thus providing policy makers with a predictive tool that is scientifically based.

Listed below are a few of the highlights of these two years worth of surveys. Streams in the WHR, which are less impacted by agriculture, averaged more than 30 species per site, while streams in the EHR averaged 21 species. Chisholm Creek (tributary to Shoal Creek in Wayne Co., TN) had the highest diversity (43 species), including 12 darter species.

The federally threatened slackwater darter (*Etheostoma boschungii*) was collected in Limestone Creek (Madison Co., AL) in 2000 (possibly new record). Blotchside logperch (*Percina burtoni*) were frequently collected throughout the WHR (seven sites). Flame chubs (*Hemimetrema flammea*) and blotched chubs (*Erimystax insignis*) were also frequently collected, along with a single spring cavefish (*Chologaster agassizi*) collected in Beans Creek (Franklin Co., TN).

A number of crayfish collections were also made in support of Jen Buhay's (University of Alabama) dissertation work on crayfish genetics in the Tennessee and Cumberland Rivers.

As reported last year, improvements in the water quality of the Pigeon River (French Broad watershed, Sevier Co., TN), prompted Tennessee Department of Environment & Conservation (TDEC) biologists (and many other cooperators) to begin a long-term project to restore native fishes to the Pigeon River. To start the project, the group came up with a list of relatively common fishes that could be collected in large numbers elsewhere in the French Broad system.

Jonathan Burr (TDEC) and John Taylor and Joyce Coombs (UT) reported that, this project has resulted in the release of 347 gilt darters (*Percina evides*), 243 bluebreast darters (*Etheostoma camurum*), and 139 blueside darters (*E. jessiae*), to date. All fish have been tagged by injection of small amounts of fluorescent elastomer dye in the dorsal area. Once tagged the fish are transported to the Pigeon, acclimated, and released. UT graduate students will attempt to track the survival and movement of the released fish over the course of the next two years. Electroshocking and snorkeling surveys in late summer of 2001 documented survival and apparent health of gilt darters tagged and released in May and June of that year. In 2002, they hope to add to the numbers of stocked and tagged fishes of the species listed above, so that overall totals are in the 500-1000 range, depending on species. Then, they will begin looking for successful reproduction in the reintroduced populations. Also, they hope to begin moving at least two additional species this year: mountain madtom (*Noturus eleutherus*) and stargazing minnow (*Phenacobius uranops*). Longer-term goals include possibly propagating some of the more rare species that can't be collected in large enough numbers for reintroduction.

Once again, Pat Rakes and J.R. Shute (Conservation Fisheries, Inc, CFI) surveyed many places, and spent many hours of unsuccessful observations (both nets and snorkeling) looking

for slender chubs (*Erimystax cahni*) in the Clinch and Powell rivers. However, they did document new localities for yellowfin madtoms (*Noturus flavipinnis*) in the Powell River: several miles downstream of Buchanan Ford at first bridge crossing; several miles above Buchanan Ford at the mouth of Mulberry Creek. Also, Jess Jones (Virginia Division of Game & Inland Fish) and Steve Fraley (TVA) also reported yellowfin madtoms for the first time in Virginia's portion of the Powell River as they saw three individuals during snorkel surveys for mussels at Fletcher Ford. Pat and J.R. noted excellent yellowfin madtom habitat at Fletcher Ford, and plan to return there in summer 2002.

Pat Rakes reported that CFI's 2001 observations indicate that all three of the federally listed fishes appear to be doing very well in Citico Creek. Record numbers of smoky and yellowfin madtoms (*N. baileyi* and *N. flavipinnis*) were observed this year. The entire range of the yellowfin madtom in Citico Creek (a little over three stream miles) was surveyed on two nights only a few days after 9/11/01. The observation of 93 individuals (including 10 young-of-year) on those two dates was one of the best things we could have done at that time! Water conditions were perfect, low, warm, and clear. Eleven adults were collected for morphometric and meristic data for taxonomic work by Nick Lang (a student of Rick Mayden's at the University of St. Louis). Lang has also been provided with tissue samples from Copper Creek and Powell River yellowfin madtom populations.

Other CFI observations as a result of the Clinch and Powell surveys include the observation of blotchside logperch (*Percina burtoni*) in the Clinch River at Horton Ford (Hancock Co., TN). This locality is several miles downstream of the TN/VA state line. Although the record isn't too surprising, it represents a new locality for the species. They also saw several *P. burtoni* while snorkeling in the Clinch River about one stream mile downstream of Speers Ferry. Etnier also reported a snorkel observation from Bob Butler (FWS) of *P. burtoni* in the Big South Fork.

Another interesting find resulted in the collection of egg clusters of unknown species while snorkeling Frost Ford on the Clinch River, on May 3, 2001. The eggs—100-200—were large (~2.5-3 mm diameter), and stuck together in a cluster. They brought the cluster to CFI to rear. On 6 June a similar cluster was found in Citico Creek. This one was located beneath a palm-sized rock, in an open crevice on downstream side of the rock. These were also brought to CFI for rearing. They both turned out to be sawfin shiners. Apparently, they, like Cahaba shiners, are egg clusters (no parental care).

Pat Rakes (CFI) reported that he surveyed appropriate habitats for Barrens topminnows (*Fundulus julisia*) throughout Duck River portion of the species' range with no success. Tyler Sykes reported conservation efforts for this species (see below).

Tyler Sykes, of the Cookeville office of FWS, reported that a new survey for the federally threatened blackside dace (*Phoxinus Cumberlandensis*) will begin in summer 2002. Dr. Hayden Mattingly, a new professor at Tennessee Technological University, and his graduate student(s) will be assessing the present distribution and status of the species, seasonal movements, and potential impacts of land uses on populations within this range. Findings should help the Service direct recovery efforts, and better assess the potential impacts of proposed projects within the range of the species.

Rakes also reported a CFI survey of the Buffalo River for spotfin chubs. They floated the river from the first stream crossing upstream of Natchez Parkway (BRM 105) downstream to about BRM 100. Spotfin chubs (*Erimonax monachus*) were again found in the Buffalo River at the mouth of Grinders Creek, where spotfin chubs have been reported previously by many collectors. They were also found at a site several miles upstream of this locality, at the Natchez Trace parkway bridge, and then at about BRM 102. This is an upstream range extension for the species in the Buffalo River. These will be used for propagating individuals to eventually stock into Shoal Creek. Rakes noted that much bedrock was observed at this site, and that it looks similar to areas CFI surveyed in Shoal Creek where the fish is proposed for reintroduction.

Tyler also reported that the FWS is continuing work conducted by Jeff Simmons, a graduate student from the Tennessee Cooperative Fisheries Research Unit, to look at the structure and stability of all known occurrences of the bluemark darter [*Etheostoma (Doration)* sp.]. To date, he has collected and measured over 1,000 individuals, and indicates that habitat in the Collins River is good and bluemark darter populations appear to be thriving. In 2002, he will concentrate his efforts in the Calfkiller and Rocky rivers, and Cane Creek. He will determine status, movements, and habitat preferences there.

Etnier reported that Mike Dosey finished his Master's project on the fishes of the Little Pigeon River. Deuce is back in NJ working several days a week at AMNH (for free, but he has to pay for his travel).

Etnier also reported that the UT fish collection and Etnier's office has moved to White Ave Annex, at the junction of White Ave (1 block n of Cumberland) and James Agee St., across from the U.T. Law School. Ets will bring corrections/additions copies (free) that were incorporated in the 2nd printing, Fishes of TN, 10pp. for those of you who have the first printing.

Captive propagation, reintroduction, and other management activities

Pat Rakes and J.R. Shute (CFI) reported results of the Abrams Creek project in the Great Smoky Mountains National Park, (Blount County, TN). As reported previously, duskytail darters (*Etheostoma percnurum*) are spawning in Abrams Creek, although 2001 survey efforts were planned to ensure little interference with nesting fishes. However, one survey in the spawning season (May 4) resulted in the find of a nest. Ten young-of-year duskytail darters are also indicative of ongoing reproductive success for this reintroduced population. These young were seen in two or three areas that haven't been stocked since 1993. Either they were established from them, or are dispersing from upstream. Good news either way. This year's observation resulted in 47 duskytail darters in 27 hrs. effort, for a new high fish/observation index of 1.74.

Only three smoky madtoms (*Noturus baileyi*) were observed in Abrams Creek in summer 2001, but smoky madtom observations were less likely during the 2001 field season because most individuals are seen during spawning season surveys. Eight yellowfin madtoms (*N. flavipinnis*) were observed during 2001 field surveys in Abrams Creek. Two of these were wild-spawned, young-of-year individuals; one fish observed was a one-plus year-old with no tag. All 2000 year-class fish stocked in spring 2001 were tagged. Four of these

yellowfin madtoms were found in sites that have never been stocked, indicating the species is dispersing, at least one or two pools downstream of stocked sites within the creek. The yellowfin madtom fish/observation effort index for 2001 surveys in Abrams Creek, 0.3, is good. Several hundred tagged spotfin chubs (*Erimonax monachus*) were stocked in Abrams Creek in July 2001, but no observations of this species were made in 2001 surveys. CFI plans to place more emphasis on Abrams Creek monitoring in the 2002 field season. The National Park Service is hoping to get a graduate student to help do this work.

Rakes and Shute also reported that they collected yellowfin madtom nests from Copper Creek. Individuals reared from these nests will be used for managing that population and to maintain captive pop. During the 2001 surveys to collect these nests, they observed 16 yellowfin madtoms at one site in Copper Creek. They also reported collecting slackwater darters (*Etheostoma boschungii*) for propagation research. They found the darters easily in the North Fork Buffalo River at Gum Springs Branch, Lawrence Co., TN, and collected eight (October 2001). On the same day, they also collected 12 individuals in Little Shoal Creek at a racetrack (Dooley Rd.), where there was almost no water. Since January 2002, the males have been highly colored in CFI aquaria.

Tyler Sykes (FWS) reported that conservation efforts are proceeding nicely for the extremely rare Barrens topminnow (*Fundulus julisia*). In summer 2001, topminnows (captive propagated by CFI) were released into six restored spring sites within the historic range of the species. These fish were all marked with Elastomer tags for a long-term study that was initiated in summer 2001. A graduate student at Tennessee Technological University will use these tags to help monitor the success of the releases. These efforts are garnering attention from local and state media outlets. Newspaper articles were generated from the releases and Tennessee Wildlife Resources Agency's television show "Tennessee Wild Side" will be airing a segment on the topminnow in spring 2002. The Barrens topminnow Working Group continues to meet on an annual basis to discuss progress to date and future plans.

Tyler also reported the publication of a proposal to designate nonessential experimental population (NEP) status under section 10(j) of the Endangered Species Act of 1973, as amended, and to reintroduce two endangered fishes—the duskytail darter (*Etheostoma percnurum*) and smoky madtom (*Noturus baileyi*)—and two threatened fishes—the yellowfin madtom (*Noturus flavipinnis*) and spotfin chub (*Erimonax monachus*)—into the Tellico River between the backwaters of the Tellico Reservoir (approximately Tellico River mile (TRM) 19 and TRM 33, near the Tellico Ranger Station, in Monroe County, TN. It is anticipated that this rule will be finalized some time in 2002. As a result, personnel with CFI will step up propagation efforts for all four fish to provide adequate numbers for reintroductions to the Tellico River. They will also subsequently monitor these reintroduction efforts for success.

Peggy W. Shute and David A. Etnier

REGION IV - South-Central

Frank Parauka of the U.S. Fish and Wildlife Service in Panama City, Florida reports that personnel from his office and John Allen of the National Fish Hatchery, Mississippi, spent 34 boat days of effort in 2001 attempting to capture *Scaphirhynchus suttkusi* in the Alabama River. Over 1600 fishes representing 24 species were collected using sinking gill nets and baited trot lines, with *Carpiodes velifer*, *C. cyprinus*, and *Aplodinotus grunniens* accounting for 65% of the catch. No Alabama sturgeon were collected, but two *Acipenser oxyrinchus desotoi* were collected in May with gill nets 4.8 m deep. One fish escaped during retrieval, but the other was radio tagged and monitored moving upstream for two days. Attempts to relocate this fish in late May, June, and August were unsuccessful. Other work with Gulf sturgeon included a survey in the lower Choctawhatchee River in October and November to coincide with the fall migration to the marine environment. Sinking gill nets were set perpendicular to the bank, covering about 75% of the river. A total of 188 sturgeon were collected, PIT and Floy tagged, and released, with fish ranging from 52-229 cm TL and 0.45-72.9 kg. Sub-adults (< 18 km) represented 44% of the catch while large fish (> 45 kg) accounted for 8%, these data are similar to previous years surveys. A similar survey in Brothers River, a tributary of the Apalachicola River, captured 61 specimens ranging from 98-224 cm and 1.5-67.5 km. During these two surveys and a survey in the Yellow River, eight adult Gulf sturgeon were equipped with pop-up archival tags programmed to record depth, temperature, and light and downloadable to a satellite on a given date. These fish and nine others were also fitted with sonic tags. Two of the pop-up tags gave real time location of the fishes, one in Choctawhatchee Bay (tagged in Choctawhatchee River) and the other in the Gulf of Mexico east of Panama City (tagged in Yellow River). Sonic tag detection confirmed these localities, and located three other sonic tagged sturgeon in the Gulf of Mexico, ranging from 1.6-4 km off shore at a depth of 2.7-5 m. The two tags failed to release data on the pop-up date. Frank also reports that a survey for potential spawning habitat for Gulf sturgeon in the panhandle region identified 152 sites, with most of these in Alabama along the Conecuh, Pea, and Choctawhatchee rivers.

Carol Johnston at Auburn University reports that she is continuing her studies with sound production in fishes. This includes geographic variation of sound in *Cyprinella* and sound production in *Scaphirhynchus* with Cathy Nordfelt, and examining possible sound production in cavefish with Jon Armbruster and Carrie Allison. Other studies include a status survey of *Pteronotropis euryzonus* and the reproductive biology of *Centrarchus macropterus* with Michelle Castro and population viability of *Etheostoma boschungii* and *E. brevirostrum* with Wendi Hartup. Carol and Bryan Phillips are examining the recovery gradients of streams from small impoundments by using historical data from Bear Creek that Wall presented in his 1968 thesis. Other studies include surveys of Alabama streams and predicting diversity and density by physiographic region, the recovery of a swamp system after severe drought, and the status of *E. phytophilum*.

Bob Stiles at Samford University reports that he and Paul Blanchard have just finished a status survey of *Etheostoma*

phytophilum in the Turkey Creek watershed of Locust Fork of the Black Warrior River. They found a small population in a spring fed creek located just upstream of Penny Spring; but none within Penny Spring proper, a historic site. The dominant darter in both locations was *E. nuchale*, which is non-native and was transplanted into the spring some years ago. In May 2001 no specimens were collected at the type locality (along Alabama Hwy 79), but resampling in October revealed a robust population. Bob and Paul also surveyed the historic site at Cove Spring in upper Locust Fork where one specimen was taken in 1975. Though the spring and the associated extensive wetland appear to be ideal habitat, none were found. Other news from Samford includes the first record of *Percina sciera* in the Cahaba River, collected by Mike Howell and his vertebrate zoology class at County Road 24 in Shelby County. This site includes a spring-fed swamp, and *Elassoma zonatum*, not seen here for a decade, was also collected.

Scott Mettee reports that the Geological Survey of Alabama in Tuscaloosa (Pat O'Neil, Tom Shepard, and Stuart McGregor) continues with the sonic tracking of several species of riverine fishes in the Alabama River. A survey of Locust Fork documented the distributions of *Notropis cahabae*, *Percina brevicauda*, and *Etheostoma douglasi* within the drainage. Sampling at 39 stations produced Cahaba shiners in 61 river miles of the main channel from the first shoal upstream of the embayment of Bankhead Lake upstream to Nectar in Blount County. Cahaba shiners were also taken in the lowermost 5 miles of Blackburn Fork. Coal darters were taken in the same 61-mile range of the main channel of Locust Fork, but in only the lower 4 miles of Blackburn Fork. *Etheostoma douglasi* was taken over 70 river miles from the first shoal upstream of the Bankhead Lake embayment upstream to Swann Covered Bridge in the main channel of Locust Fork, as well as in Turkey Creek, Gurley Creek, and Blackburn Fork. A survey for these three species in the Mulberry Fork system as well as evaluating biological conditions using the IBI is ongoing. Thus far, 51 collections have produced no records of *N. cahabae* or *P. brevicauda* in Mulberry Fork, and *E. douglasi* was found only in upper Sipsey Fork, Brushy Creek, and Blackwater Creek. The Geological Survey completed a forth year of sampling of tributaries of the upper Tombigbee River and the first of several years of sampling in the main channel of the Tombigbee for listed and candidate species of freshwater mussels. A GSA report of results of sampling in the Tombigbee tributaries is in preparation with assistance from U.S. Forest Service Hydrology Lab in Oxford, Mississippi. Mussel research published, in press, or presented at meetings includes the current status of mussels in the vicinity of Muscle Shoals on the Tennessee River, changes in the mussel fauna of Bear Creek in northwestern Alabama and northeastern Mississippi, and mussel fauna of the Sipsey River and the Cahaba River. Lastly, GSA is continuing to monitor populations of Alabama cave shrimp, *E. tuscumbia*, and associated water quality parameters at Redstone Arsenal, Madison County.

Mark Peterson at the Gulf Coast Research Lab in Ocean Springs, Mississippi, is working on the spatial and temporal distribution, species associations, and trophic interactions of invasive tilapiine fishes with recreational freshwater fishes in south Mississippi along with Todd Slack of the Mississippi

Museum of Natural Science in Jackson. Mark has begun several estuarine projects, including identifying essential fish habitat in the Grand Bay National Research Reserve (with C. Rakocinski), using otolith microchemistry to determine important geographic sources of juvenile nursery habitat (B. Comyns, C. Rakocinski, and A. Shiller), and examining the improvement of sustainability and nekton utilization in coastal salt marshes by gapping material levees (D. Reed). Additionally, Mark, along with Steve Ross at the University of Southern Mississippi in Hattiesburg, will begin mapping coastal habitat parameters in the Pascagoula River estuary as a tool to protect and preserve coastal habitat diversity and sustainability. Other mapping projects include coast-wide mapping of the highly invasive common reed, *Phragmites australis*, and mapping and quantifying shoreline habitat types in association with coastal and estuarine waterfront development (with B. Comyns). Recent publications by Mark include field growth responses of juvenile *Cynoscion arenarius* to continuous variation in physical habitat conditions, reproductive biology and differences among estuaries of female *C. nebulosus* in the northern Gulf of Mexico, the status and habitat characteristics of *Fundulus jenkinsi* in eastern Mississippi and western Alabama coastal bayous, and the use of Bryozoa as an ephemeral estuarine habitat and a larval transport mechanism for mobile benthos and young fishes in the north-central Gulf of Mexico.

David Etnier at the University of Tennessee in Knoxville reports that graduate student Ben Keck is redoing the fishes of the Hatchie River system. Ben has added *Ameiurus nebulosus* and *Ctenopharyngodon idella* to the Hatchie fauna so far. Dave and his regional faunas class collected the Mississippi River in the Dyersburg, Tennessee to Carruthersville, Missouri area in October. Significant finds included a juvenile *Notropis boops* from a seine sample, *Macrhybopsis meeki* from a small trawl, and *Scaphirhynchus albus* (or a hybrid) from a gill net. Dave promised the 20+ participants a fish fry, but by week's end only three small channel catfish had been collected. Not to be deterred, a 35-lb *Hypophthalmichthys nobilis* and a 25-lb *C. idella* were chunked into appropriate sizes, corn-mealed, and cooked in deep fat fryer, both ranked as better than the channel catfish cooked the same way. Ets recommends completely removing the red streak; bones were so big that they were no problem.

Pat Rakes reports that Conservation Fisheries, Inc. (CFI) of Knoxville, Tennessee, continues its successful propagation of *Notropis cahabae* and *Percina aurolineata* from the Mobile Basin. These listed species are needed by the EPA to conduct toxicity studies as part of an effort to evaluate the protectiveness of water quality criteria for the Cahaba River ecosystem in Alabama. Techniques were developed and refined to deal with egg recovery and incubation and the extremely small size of both species' larvae. Larvae of Cahaba shiners (1,300) were successfully shipped to EPA last year, but no larvae of goldline darters survived any mode of shipping attempted. The pelagic behaviors and microhabitat requirements of the darter larvae were likely responsible for this mortality. Potential refinements will be tested next year with the goldline darter to address these shortcomings. Pat also reports that CFI observed the normal numbers of rare species (*Cyprinella caerulea*, *Etheostoma brevirostrum*, *Percina jenkinsi*, and *P. sp. cf. macrocephala*) in a Conasauga River survey for the Cherokee National Forest.

At the University of Alabama Steve Powers appears to have an undescribed species of *E. pyrrhogaster* endemic to the Forked Deer River in western Tennessee. Steve also has preliminary data indicating genetic partitioning among disjunct populations within *E. cinereum*. David Neely continues his work on North American sculpins, with an emphasis on Mobile Basin forms. Phil Harris has submitted papers on molecular relationships of the Moxostomatini with Rick Mayden at Saint Louis University, and molecular relationships within Centrarchidae, within *Lepomis*, and within *Ambloplites* with Rick and Kevin Roe (SLU). David, Phil, and Rick are also looking at the genetic variation within the *Noturus munitus* complex. Other projects at Alabama include a status survey of *Etheostoma* sp. cf. *zonistium* within Bear Creek and intra-specific variation within species of Scaphirhynchinae.

Bernie Kuhajda

REGION VI - Southwest

Fish biologists in the southwestern region were responsible for a surge in habitat studies, and for the development of several databases during the past year. Several ventured beyond the confining taxonomic borders of traditional ichthyology to study aquatic organisms other than fish.

Henry Robison reports that he and Rudy Miller are working on a second edition of the "Fishes of Oklahoma" for University of Oklahoma Press. It will be in the same field guide style as the first edition in 1973, but completely updated. Rob is also working on a "Crayfish Database for Arkansas" for the Arkansas Game and Fish Commission and adding records to the Arkansas Fishes Database continually.

Steve Filepek, Darrell Bowman, Dave Evans, Stephen O'Neal, and Phil Penny, members of the Arkansas Game and Fish Commission Stream Team, are evaluating angled rock vanes as a method for rehabilitating streams. Adapting technology from the US Army Corps of Engineers, hydrologists are working with fisheries biologists now to show how the use of upstream angled rock vanes, along with topical use of boulders, can be a significant tool in slowing bank erosion while providing instream fish habitat. Much less rock (a.k.a. rip rap) is used than in traditional stabilization efforts, streambanks are stabilized, currents can be redirected when necessary, while streambank cover and diversity are maintained and velocity refugia and feeding stations are established. Several of these upstream angled rock vanes have been used in Arkansas on various sized rivers with good results.

Biology students Mark Antwine and Jimmy Alley, along with faculty Frank Pezold, Peter Aku and Anna Hill, from the University of Louisiana at Monroe (ULM) are conducting field surveys of fish and freshwater mussel diversity for the Arkansas and Louisiana field offices of the Nature Conservancy in Bayou DeLoutre and Bayou Bartholomew. Surveys are under the auspices of the ULM Museum of Natural History. Mark and students Jamie Hardage, Valerie Alley, Brian Lynch, Amy Matthews, John White, Joe Schlossman are also working with

David Byrd of the Kisatchie National Forest on a project studying fish-habitat associations in forest streams. In addition, Frank, Mark, and other biology students will be assisting the La Natural Heritage Program with a status survey of sensitive fish populations in north Louisiana. A review of the spinycheek sleepers (Eleotridae: *Eleotris*) of the Western Hemisphere has been completed with Bryan Cage of the University of Mississippi and is in press (Tulane Studies in Zoology and Botany). ULM undergraduate, Chris Davis, has been collecting morphological data on Western Hemisphere and West African species of fat sleepers (Eleotridae: *Dormitator*). Both genera have species native to oligohaline estuaries of the southeastern United States and may be obtained in freshwater. Peter Aku and student Li Yong are using stable isotopes to study the aquatic food web in an urban wildlife refuge, Black Bayou Lake, on the edge of Monroe.

ULM's extensive fish, reptile, and amphibian records (and specimens) have long been freely available to researchers, but soon those records will be even more readily accessible. All 77,000+ fish records of the ULM Museum of Natural History's Zoology Division are now in a computer database and the approximately 55,000 reptile and amphibian records are in the process of being entered. Substantial progress has been made with snakes, frogs and toads. Frank Pezold reports that he and his colleagues are developing a program that will allow online access to the fish records that will hopefully be in place by the end of this year. For access to the museum and more information, please visit the web site: <http://www.ulm.edu/~pezold/welcome.htm>.

One last item of note from ULM: Professor Emeritus Neil Douglas has updated his classic book "Freshwater Fishes of Louisiana." The update, written with Robyn Jordan as an article for this volume of the SFC Proceedings, is titled "Louisiana's inland fishes: a quarter century of change." In 1974, Neil documented 148 species in 22 families. According to his most recent account, 168 species in 25 families are now known from the waters of Louisiana. Neil has also been very active in the numerous field projects and in curating the many specimens collected with biologists from the Waterways Experiment Station (WES).

Six members of the WES Fish Team conducted active research in the region: full-time personnel Jack Killgore, Jan Hoover, Steven George, Bradley Lewis, and Catherine Murphy, along with part-time adjuncts Neil Douglas and William Lancaster. Sponsored by the U.S. Army Engineer District in Vicksburg, the WES Fish Team completed field studies of proposed habitat restoration projects in three streams that are degraded: Bayou Desiard, Louisiana, with noxious aquatic plants; Bayou Macon, Louisiana, by seasonal de-watering; and the Ouachita River, Arkansas (below Rammel Dam) by daily pulses of cold water. Weirs of different designs are being considered for these streams that will allow periodic drawdowns for plant control, provide pooling during low water, and create slower, shallow water to facilitate warming. With funding from the Corps of Engineers Ecosystem Management and Restoration Research Program, the WES Fish Team also continued studies of small floodplain pools of Bayou Meto, Arkansas. Fish and amphibian assemblages there will be compared with pool communities in central Mississippi. Bowfin collected last year

from a Bayou Meto floodplain pool were used in swimming endurance tests; they are currently retired from their careers as professional swimmers but their role in primitive fish research continues as growth rates are monitored in laboratory aquaria.

The WES Fish Team, with sponsorship from the U.S. Army Engineer Mississippi Valley Division, is also continuing studies of shovelnose and pallid sturgeons in the lower Mississippi River. More than 1200 sturgeon have been sampled from Memphis to Donaldsonville, Louisiana. Data are collected on macro- and micro-habitats, fish size structure, morphometric characters, and most recently on food habits. A technique for safe and gentle gut sampling (i.e., colonic flushing) was developed and has proven very successful for obtaining fecal samples from which prey are identified and enumerated. Preliminary results indicate that in winter pallid sturgeon and shovelnose sturgeon both feed on caddisworms, burrowing mayflies, and larval midges, but that pallid sturgeon also consume large quantities of cyprinids.

Smaller streams of east Mississippi are also under study by the WES fish team. In cooperation with the Mississippi Department of Environmental Quality, delta streams that were sampled for flood control studies in 1989-1994 are being re-sampled so that fish-based indices of environmental quality can be developed. Also, upland streams of the Yazoo Drainage are being sampled in conjunction with geo-morphological studies in an effort to relate the sediment transport dynamics and stream channel evolution to fish communities.

Jan Hoover

BOOK REVIEW

DANGEROUS WILDLIFE IN THE SOUTHEAST: A GUIDE TO SAFE ENCOUNTERS AT HOME AND IN THE WILD. Lynn F. Bachleda. 2001. Menasha Ridge Press, Birmingham, Alabama. ISBN 0-8973-2335-1. 231 p., \$22.95 (soft-cover).— F. Lynn Bachleda's *Dangerous Wildlife in the Southeast: A Guide to Safe Encounters at Home and in the Wild* deserves a better title. A suitable replacement would be: *You Have Very, Very Little to Fear in Nature*. This sentiment, in the author's own words from the Introduction, is a more accurate reflection of the overall philosophy of this guidebook on dealing with potentially dangerous wildlife. Bachleda wisely combines very recent evidence, scientific data, and personal accounts to instill the idea that Nature is not as scary as most people think. The main strength of this guidebook is its presentation of timely facts that clarify or completely debunk the many assumptions about the dangers of venturing into the wild. While there are some problems with consistency and a few sections where the scientific matter could be stronger, the information in the guidebook still provides valuable peace-of-mind to those who regularly work or play outdoors.

Although very few of the animals described are aquatic, southeastern ichthyologists and fish biologists will still find many useful and relevant sections in the guidebook. Browsing through the chapters, the fish-oriented reader cannot help but

reflect upon his or her own disastrous fieldwork mishaps and exciting "encounters with nature." For example, it is not uncommon to find alligator snapping turtles (page 49) and cottonmouths (page 29) in hoopnets set for fishes. Proper removal of these by-catch animals is important to all parties involved. Seemingly innocuous activities, such as changing batteries in a remote data-logger, can become painfully memorable, especially if a misplaced ladder is combined with an underground yellow jacket nest (page 85). Then there are those field incidents that generate thought-provoking questions: "I wonder if this pronounced cephalic swelling I'm experiencing is caused by a reaction to multiple mosquito bites (page 105) or my copious use of bug spray (page 114)?" Events like these will always plague field biologists, but Bachleda's guidebook offers calming and logical advice for handling such situations.

The guidebook is organized in typical field guide format with each chapter beginning with general information on the taxa covered and ending with specific accounts of organisms. Because of the wide-breadth of life forms discussed (from viruses to plants to sharks), the reader may notice inconsistencies in coverage among chapters. The overall impression is that Bachleda has acted as an editor for various expert sources, "cutting and pasting" information into a final product. This approach might explain the redundancy found in some of the species accounts and the inclusion of information not relevant to Southeastern wildlife (e.g., a description of elk (?) biology is nearly a page long yet the same attention is not given the much more common white tail deer). A typical problem involves the helpful "similar species" section of a species account. Although this section is included for mammalian species, there is no such information provided for insects, arachnids, or other invertebrates (though it is needed). Unfortunately irregularities like this raise doubts in the reader's mind about the validity of the information being provided and whether thorough research has been applied to all the subjects covered.

Even with these problems, Bachleda's guidebook should prove useful to any Southeastern field biologist. The objective description of outdoor products and first aid procedures makes the book worth buying. Bachleda's coverage of the snakebite treatment debate is especially even-handed and informative. Admittedly, there are sections in the guidebook that might frustrate some biologists, such as the mosquito-control suggestion to stock ponds with "top minnow [sic] *Gambusia affinis* or the common goldfish". In general, though, *Dangerous Wildlife in the Southeast* is a good source of practical and up-to-date information on human-wildlife interactions. Perhaps most beneficial is the guidebook's goal to inform non-scientist readers about the realities of interacting with Nature. If readers can grasp the philosophy "that every snake is not a venomous snake, and for that matter, every venomous snake does not automatically deserve to die," then the people and wildlife of the Southeast will have a brighter future of coexistence.

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Southeastern Fishes Council Proceedings

Information For Contributors

The primary purpose of the *Proceedings* is to publish peer-reviewed research papers and critical reviews of activities; regional reports and notes; and other pertinent information pertaining to the biology and conservation of southeastern fishes. The *Proceedings* is also an outlet for range extensions, distributions, and status papers, covering ecology and conservation ichthyology. Life history studies, faunal surveys, management issues, behavior, genetics and taxonomy of southeastern fishes are appropriate topics for papers in the *Proceedings*. Review papers or information on imperiled waters or fishes are particularly appropriate.

Manuscripts should be submitted in duplicate. A good guide for manuscript preparation is the Sixth 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 longer articles), Introduction, Methods, Results, Discussion, Acknowledgments, Literature Cited, Appendices, Tables, and Figure Legends must be double-spaced. The title, author's name and author's address (including fax number and email address for corresponding author) 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. Acknowledgments 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. Literature cited should be standardized and abbreviated, using the *World List of Aquatic Sciences And Fisheries Serial Titles* or guidelines in *CBE Manual for Authors, Editors, and Publishers 6th ed.* for journals not included in the *World List*.

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. Computer-generated graphics should be high quality prints; for drawings, 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. When possible, tables and figures will be reduced to one column width (3.5 in), so lettering on figures should be of appropriate size. Color figures can be printed at the author's expense.

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