

3-1-1993

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Pezold, Frank; Douglas, Neil H.; and George, Steven G. (1993) "A Status Survey of the Western Sand Darter, *Ammocrypta clara*, in the Big Black River, Mississippi," *Southeastern Fishes Council Proceedings*: No. 27.

<https://doi.org/10.7290/sfcp27p44m>

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A Status Survey of the Western Sand Darter, *Ammocrypta clara*, in the Big Black River, Mississippi

A STATUS SURVEY OF THE WESTERN SAND DARTER, *AMMOCRYPTA CLARA*, IN THE BIG BLACK RIVER, MISSISSIPPI

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ABSTRACT

The western sand darter's occurrence in Mississippi is known from three specimens collected in the Big Black River. The last specimen was obtained in 1973. A survey of appropriate habitat in 1990 produced no additional specimens. *Ammocrypta clara* appears to be a peripheral species in Mississippi. Riparian and lotic habitat destruction would not favor the establishment of western sand darter populations in the Big Black River, and reduces suitable habitat for existing darter populations.

INTRODUCTION

The western sand darter, *Ammocrypta clara*, is known in Mississippi from three specimens collected at two sites in Madison County over a span of 26 years (Williams, 1975). The last reported capture was of a single individual taken in 1973. One hundred thirty-nine naked sand darters, *A. beani*, and 3 scaly sand darters, *A. vivax*, were collected at those same localities over the same period. Collection records (Stauffer, 1980; Williams, 1975) and personal observations suggest that *A. clara* is predominantly a species of the upper Mississippi River drainage and of streams of the western Mississippi River embayment. *Ammocrypta clara* appears to prefer or be limited to larger streams (Page, 1983). In Louisiana, it is known from Bayou Bartholomew, Sabine and Red Rivers, being replaced by *A. vivax* in the smaller rivers and creeks of those drainages. Stauffer (1980) overlooked the records for the western sand darter in Mississippi.

Two of the three previously reported specimens of *A. clara* from the Big Black River were located, MSU 3548 (erroneously reported as MSU 3549 by Williams, 1975) and TU 81744. Both specimens are subadults, measuring 32.9 and 31.6 mm SL, respectively. The third specimen appears to have been lost (R. Weill, pers. comm.). Stephen T. Ross was also unable to locate the specimen (Af2925) in a recent examination of collections in the Mississippi Museum of Natural Science. Ross's review of historical collections of Mississippi fishes revealed no other specimens of *A. clara* from Mississippi in regional museums. Other *Ammocrypta* species in the Big Black River, *A. beani* and *A. vivax* were represented in collections from that drainage (outside of Tulane University holdings) by 219 and 23 specimens respectively.

This study was initiated to determine the current status of the western sand darter in the Big Black River by intensively sampling sandy areas in the main channel of the river.

METHODS

Twelve collections were made at 10 different localities on the Big Black River from July 6 to October 10, 1990. Actual sampling time was 11.3 hrs total in the water with an average of 57 minutes per collection. July collections were made using 10 ft 3/16 in mesh and 10 ft 1/8 in mesh seines. Only the 1/8 in mesh seine was used in later collections because of its greater retention of slim-bodied *Ammocrypta* specimens.

Sample localities were chosen based upon accessibility, availability of appropriate habitat (sand substrate) and geographical location along the river. Collections were made along the length of the river to discern possible interspecific differences in longitudinal distribution. Sites chosen were below the Hwy 9 crossing S of Eupora because collections by the first author and Dr. Glenn Clemmer, housed in the Mississippi State University fish collection, showed that *Ammocrypta* species were taken infrequently and in small numbers at that locality. The 10 stations sampled (Fig. 1) and the dates of collection are listed below in upstream to downstream order.

1. Montgomery County. Big Black River 1/2 mi S of Stewart. 10 October 1990. 11:30 - 12:30.
2. Carroll County. Big Black River at Hwy 413 1 mi S of Kilmichael. 10 October 1990. 12:50 - 13:50.
3. Attala County. Big Black River at Hwy 19/440 0.5 mi E of West. 10 October 1990. 14:45 - 15:30.
4. Attala County. Big Black River at Hwy 14 E of Goodman, upstream of bridge on E bank. 6 July 1990. 14:30 - 15:20.
5. Madison County. Big Black River at Hwy 17/51 S of Picotus, about 1000 m downstream from bridge on east bank. 6 July, 13:10 - 14:10; 26 September, 13:15 - 14:20, 1990.
6. Madison County. Big Black River at Hwy 16 NNW of Canton, about 1000 m downstream from bridge on east bank. 6 July, 11:40 - 12:40; 26 September, 11:10 - 12:30, 1990.
7. Yazoo County. Big Black River at Hwy 49 NW of Flora, about 1000 m downstream of bridge on W bank. 7 July 1990. 8:35 - 9:35.
8. Warren County. Big Black River at Interstate Hwy 20, 14 mi E of Vicksburg, west bank. 15 July 1990. 13:30 - 14:00.
9. Hinds County. Big Black River at Hwy 27 about 1000 m upstream on E bank. 13 August 1990. 12:00 - 13:00.

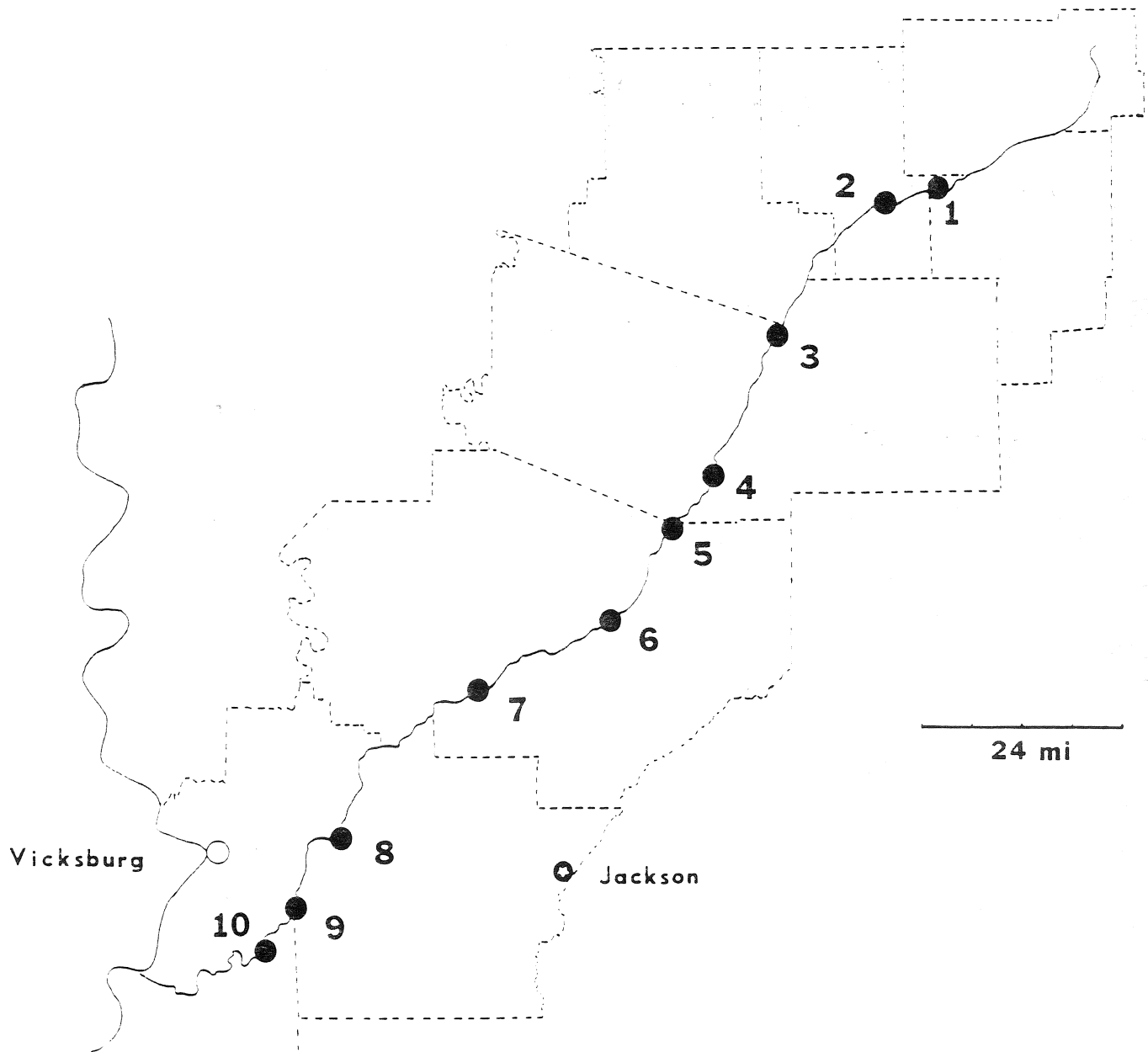


Figure 1. Map of collecting localities on the Big Black River.

10. Warren County. Big Black River at Fisher Ferry Road about 150 m upstream from road on W bank. 13 August 1990. 10:25 - 11:15.

Other sites attempted on the Big Black River, but not sampled because of inaccessibility were: Hwy 407 S of Kilmichael (Montgomery Co), Hwy 35 E of Vaiden (Carroll Co), Interstate Hwy 55 (Madison Co), Askew Ferry Road (Hinds Co), Hwy 80 (Warren Co), an unmarked crossing upstream from Hwy 61 (Warren Co) and Hwy 61 (Warren Co).

All species collected were retained. Most specimens were deposited in the NLU Museum of Zoology. Nomenclature follows Robins et al. (1991).

RESULTS AND DISCUSSION

No *Ammocrypta clara* were taken. A total of 4,510 specimens of 50 fish species and a *Cyprinella* hybrid was collected (Table 1). Both *A. beani* and *A. vivax* were well-represented in collections by 365 and 57 individuals, respectively. *Ammocrypta vivax* were taken at all sites sampled from Hwy 16 and above (Table 2). *Ammocrypta beani* were captured at all sites sampled except the Interstate 20 crossing (Table 2), but were uncommon below the Hwy 16 site. *Ammocrypta beani* were most abundant during this study in the middle reach of the Big Black River from West to Hwy 16. Large series of *A. beani*, deposited in the University of

Table 1. Relative frequencies of fish species obtained at each site. Site numbers correspond to those listed in the text. To allow comparison between sites, collection time was standardized. Collections are reported as the number of individuals collected per 10 minutes of collecting time. Actual number of specimens captured can be computed by multiplying frequency (given in this table) by the minutes of total collection time/10. Total collection times are reported in the text for each site.

Species	Sites											
	1	2	3	4	5a	5b	6a	6b	7	8	9	10
<i>Lepisosteus oculatus</i>	.	.	.	.	.	.	.	.	0.17	.	.	.
<i>Dorosoma cepedianum</i>	.	.	.	.	1.00	.	.	0.25	0.50	.	.	.
<i>Cyprinella camura</i>	7.00	4.83	2.00	.	0.33	0.31	0.33	.	.	.	.	.
<i>C. lutrensis</i>	.	.	.	0.20	.	.	0.33	.	0.33	.	.	0.60
<i>C. venusta</i>	8.17	7.17	1.78	17.00	23.17	16.62	36.00	13.62	4.83	.	2.50	0.80
<i>C. venusta x lutrensis</i>	.	.	.	.	1.17	.	1.00	0.25	1.17	.	0.83	.
<i>Hybognathus nuchalis</i>	.	.	.	.	.	.	0.17	0.12	0.33	.	0.83	3.40
<i>Lythrurus roseipinnis</i>	0.67	0.17	.	.	.	.	.	.	.	.	.	.
<i>Macrhybopsis storeriana</i>	.	.	.	.	.	.	.	.	.	.	.	0.80
<i>Notemigonus crysoleucas</i>	.	.	.	.	0.33	.	.	.	.	.	.	.
<i>Notropis amnis</i>	.	0.33	0.44	.	.	.	.	0.12	.	.	.	.
<i>N. buchanani</i>	.	.	.	.	.	.	.	.	0.17	.	.	.
<i>N. maculatus</i>	.	.	.	.	.	.	.	0.25	.	.	.	.
<i>N. sabinae</i>	0.17	0.17	3.11	4.20	6.00	21.38	7.83	7.00	0.50	.	.	.
<i>N. texanus</i>	.	4.17	0.67	.	.	.	.	.	.	.	.	.
<i>N. volucellus</i>	.	.	.	.	.	0.31	.	0.38	.	3.33	0.67	.
<i>Opsopoeodus emiliae</i>	1.17	0.83	.	.	.	.	.	.	0.17	.	.	.
<i>Pimephales notatus</i>	0.83	3.00	0.67	.	.	.	.	.	.	.	0.50	.
<i>P. vigilax</i>	54.50	33.33	30.89	4.80	14.67	66.92	11.33	65.50	3.67	16.00	2.00	1.40
<i>Ictalurus furcatus</i>	.	.	.	.	.	.	.	.	.	5.00	0.33	.
<i>I. punctatus</i>	0.33	0.17	0.22	0.20	0.17	1.85	.	3.12	0.33	6.00	0.33	.
<i>Noturus hildebrandi</i>	.	.	0.67	.	.	.	.	.	.	.	.	.
<i>N. miurus</i>	6.50	3.83	.	.	.	.	.	.	.	.	.	.
<i>N. nocturnus</i>	0.17	.	.	.	.	.	.	.	0.17	.	.	.
<i>Pylodictus olivaris</i>	.	.	.	.	.	0.15	.	.	.	.	.	.
<i>Aphredoderus sayanus</i>	0.17	.	.	.	.	.	.	.	.	.	.	.
<i>Fundulus olivaceus</i>	0.17	0.17	.	.	.	.	.	0.50	.	.	.	.
<i>Gambusia affinis</i>	15.33	4.67	1.33	1.40	5.00	2.00	0.33	11.38	5.33	0.67	1.00	1.80
<i>Labidesthes sicculus</i>	2.83	1.67	0.22	.	.	.	.	0.75	.	.	.	.
<i>Lepomis cyanellus</i>	.	.	.	.	.	.	.	.	.	1.33	.	.
<i>L. gulosus</i>	.	.	.	.	.	.	.	0.25	.	.	.	.
<i>L. humilis</i>	.	.	.	.	.	.	.	.	.	2.33	.	.
<i>L. macrochirus</i>	0.17	0.67	.	.	.	.	.	3.62	.	.	.	.
<i>L. megalotis</i>	10.83	5.50	.	1.20	1.17	.	.	0.12	2.00	.	0.17	0.20
<i>L. microlophus</i>	.	0.33	.	.	.	.	.	.	.	.	.	.
<i>Micropterus punctulatus</i>	.	.	.	0.20	0.17	.	0.17	.	0.50	.	0.17	.
<i>M. salmoides</i>	0.17	.	.	0.20	.	.	0.17	.	0.33	.	.	.
<i>Pomoxis annularis</i>	.	.	.	.	.	.	.	.	0.17	.	.	.
<i>Elassoma zonatum</i>	0.50	0.17	.	.	0.17	.	.	.	.	.	.	.
<i>Ammocrypta beani</i>	2.00	1.17	17.78	5.60	4.67	13.85	10.33	5.75	1.67	.	0.17	0.20
<i>A. vivax</i>	0.83	1.50	1.78	2.00	1.33	0.62	1.00	0.88	.	.	.	.
<i>Etheostoma chlorosomum</i>	.	0.67	.	.	0.17	.	0.50	.	0.33	.	.	.
<i>E. gracile</i>	.	0.33	.	.	.	.	.	.	.	.	.	.
<i>E. histrio</i>	.	.	.	.	.	.	.	.	.	.	0.17	.
<i>E. nigrum</i>	1.00	.	.	.	.	.	.	.	.	.	.	.
<i>E. stigmaeum</i>	4.00	0.50	.	.	.	.	.	.	.	.	.	.
<i>E. swaini</i>	0.33	0.17	0.22	.	.	.	.	.	.	.	.	.

Table 1. Continued.

Species	Sites											
	1	2	3	4	5a	5b	6a	6b	7	8	9	10
<i>E. zonale</i>	.	.	0.67	.	.	.	.	.	.	.	.	.
<i>Percina maculata</i>	0.17	0.17	.	.	.	.	.	.	.	.	.	.
<i>P. sciera</i>	2.33	1.00	2.44	0.60	0.83	0.62	.	0.12	.	.	0.17	.
<i>Aplodinotus grunniens</i>	.	.	.	.	.	.	.	.	.	.	.	0.20

Table 2. Naked sand darters, *Ammocrypta beani*, and scaly sand darters, *A. vivax*, captured in the Big Black River. Locality number corresponds to the station numbers used in Fig. 1.

Locality	<i>A. beani</i>	<i>A. vivax</i>
1. Stewart	12	5
2. Kilmichael	7	9
3. West	80	8
4. Goodman	28	10
5a. Pickens, July	28	8
5b. Pickens, September	90	4
6a. Hwy 16, July	62	6
6b. Hwy 16, September	46	7
7. Hwy 49	10	-
8. I-20	-	-
9. Hwy 27	1	-
10. Fisher Ferry Rd	1	-

Tennessee collection, were taken in the 1980's by D.A. Etnier at the Hwy 413 crossing south of Kilmichael (S.T. Ross, pers. comm.).

Ross and Brenneman (1991) reported 114 species from the Big Black River system. The relatively low species diversity obtained in this study reflected our focus on sandy mainstream habitats and collection methods that targeted *Ammocrypta*. Species most commonly associated with the sand darters were *Cyprinella venusta*, *Notropis sabinae* and *Pimephales vigilax* (Table 1).

The decrease in numbers of representatives of *Ammocrypta* species in the lower reach of the river parallels a decrease in the amount of suitable habitat due to siltation and channelization. Although siltation is a problem at many sites on the Big Black River, silt deposits were noticeably greatest in the lower section (I-20 station 8 and below). Much of the siltation may be of agricultural or forestry origin, but during the study period several bridge construction projects were the most obvious contributors. Silt deposits were noticeably greater near most bridges, even where no construction was in progress.

There is no evidence to indicate that *A. clara* has ever had a strong population in the Big Black River. Western sand darters are uncommon in Arkansas, Louisiana and Missouri (Douglas, 1974; Pflieger, 1975; Robison and Buchanan, 1988). Kuehne and Barbour (1983) noted that this species appears to be declining throughout much of its range and may soon be regarded as endangered. Records for this species in Louisiana are from the Sabine River, much of which has been impounded to form Toledo Bend Reservoir, from the Red River, which is scheduled for channelization and impoundment in the near future and from Bayou Bartholomew, an unaltered tributary of the Ouachita River.

The most suitable habitat available for *A. clara* in the Big Black River would most likely be found in the middle and lower reaches as records for this species outside of Mississippi indicate they are inhabitants of large streams. Harlan and Speaker (1956) described the habitat needs for *A. clara* as deep channels with coarse sand or gravel substrates. Kuehne and Barbour (1983) noted that *A. clara* inhabits large streams to a depth of 1.5 m, occurring most often on sand substrate in edgewater regions with little to moderate current. Additional habitat references are given by Williams (1975). Pflieger (1975) reported that the species is intolerant of heavy siltation and turbidity. If the Big Black River is to retain habitat suitable for *Ammocrypta* and other darters, siltation must be controlled. Riparian habitat destruction during bridge construction should be minimized. Channelization of the lower Big Black River also disturbs natural substrate formations.

It appears that *Ammocrypta clara* is a peripheral species in Mississippi. Considering the western sand darter's range, future efforts to locate this species in Mississippi might focus on sand bars in the Mississippi River itself.

ACKNOWLEDGMENTS

We thank J.H. Caruso (Tulane University) and M.S. Peterson (Mississippi State University) for allowing us to examine specimens in their care. R. Jones, S.T. Ross and R. Weil supplied information on other *Ammocrypta* collections from Mississippi. This study was funded by the Mississippi Wildlife Heritage Fund, Mississippi Department of Wildlife, Fisheries and Parks.

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MUSEUM NOTES

The Southern Illinois University at Carbondale Ichthyological Research Collections

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HISTORY

The Southern Illinois University at Carbondale ichthyological research collections (standard symbolic code=SIUC, Leviton et al., 1985; address correction in Leviton and Gibbs, 1988: 282) began in 1977 when the first author and curator was hired by the Department of Zoology. A small teaching collection was then available for ichthyology and fisheries courses; however, it was limited in scope, and many specimens were dehydrated and subsequently discarded.

Collections made in the late 1970s were not catalogued initially (they have been subsequently). Early collecting in earnest began in order to obtain adequate distributional information on Kentucky fishes, and the collection subsequently grew dramatically in size. From these collections it was discovered that a number of species had not yet been recorded formally from Kentucky and at least 10 unnamed Kentucky species awaited taxonomic description. Also, during this period (late 1970s), regular collections were taken from the Mississippi River and the Ozark Uplands of Missouri. Early on, space limitations became apparent and large series of common species (e.g., common carp, creek chub, bluntnose minnow, central stoneroller, green sunfish, bluegill) were not desirable and have either been discarded or donated to other institutions.

Previous to 1981, the collection was maintained in a relatively small room, but was thereafter moved to one of the largest laboratories (470 square feet) in the department. The collection is officially part of the Department of Zoology and currently is housed in a modern facility (Life Science II Building) completed in 1970 and located on Lincoln Drive on the SIUC campus. The collection is open from 8:00 to 5:00 Monday through Friday, but advance notice of visits is appreciated.

In 1977, a program was initiated on the life histories of nongame fishes, and all collections made in association with this research are now deposited in the SIUC fish collection. To date, the life history program has resulted in extensive series of specimens representing most life stages of 22 species [Cyprinidae: *Notropis* (2); Ictaluridae: *Noturus* (9); Fundulidae: *Fundulus* (1); Elasmobranchidae: *Elassoma* (1); Percidae: *Etheostoma* (7), *Percina* (1); Cottidae: *Cottus* (1)]. Seven students have received Master's degrees from autecological research on these fishes. Annual field trips with ichthyology classes and numerous, extensive trips throughout the eastern United States to obtain critical material for doctoral dissertations has added significantly to the diversity and abundance of preserved and frozen fish collections. A small cleared and stained collection was begun in 1981, and an osteological collection was initiated in 1985.

Commencing in 1978, and thus contemporaneous with the beginning of the SIUC fish collection, was the extensive drainage surveys of Kentucky fishes (Harker et al., 1979; Harker et al., 1980; Harker et al., 1981; Hannan et al., 1984) coordinated by the second author under the auspices of the Kentucky State Nature Preserves Commission (KNPC). In 1981, the entire KNPC collection of fishes was transferred to SIUC. Although it took several years to sort and catalog this material (with material still coming in), these collections effectively tripled the size of the SIUC collection. As a result, the collection now contains representatives, and in most cases extensive series from all major drainages, of all native Kentucky fishes including many voucher specimens of species otherwise unknown from the state. Major independent collecting surveys to coastal North Carolina (1983-84) and New Mexico (1990-91) and contract surveys in Alabama (Warren and Burr, 1990), North Carolina (e.g., Burr and Lee,