

Longitudinal Distribution of Fishes from a Fall Sample of Island Bayou, a South-Central Oklahoma Stream

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We collected a 1997 fall sample of Island Bayou to determine the longitudinal distribution of fishes in this south-central Oklahoma stream. Seine sampling of five sites produced 3,908 individuals representing 19 species. Sunfishes (*Lepomis* spp.) and mosquitofish (*Gambusia affinis*) dominated upstream sites while downstream sites were dominated by minnows (*Cyprinella* spp. and *Pimephales vigilax*). We collected a similar number of species from each site. ©1998 Oklahoma Academy of Science

INTRODUCTION

The Red River drainage in Oklahoma is rich in habitat diversity due to a wide range of stream types. Streams of the drainage in western Oklahoma typically have high conductivity with sand or mud substrates (e.g., 1), while eastern streams often have upland characteristics with rock substrates and low turbidity (e.g., 2). Still, other streams in south-central and southeastern Oklahoma are coastal plain type including sluggish, stained water (e.g., 3), or swamp areas (e.g., 4). Some streams in the drainage consist of more than one characteristic (e.g., 5) and subsequently have different ichthyofauna associations within each. We conducted this study to determine the longitudinal distribution of fishes in Island Bayou, a 48-km, south-central Oklahoma tributary of the Red River in Bryan County.

METHODS

On October 29, 1997, we sampled five sites on the mainstream of Island Bayou. The locations of the sites from upstream to downstream were A) Highway 69/75 bridge, southwest of Calera (T7S R8E S26), B) 3.3 km north of Highway 75A (T8S R8E S1), C) Highway 78 bridge, northeast of Achille (T8S R9E S16), D) 2.8 km north of Highway 78 (T8S R10E S27), and E) 5.5 km north of Yuba (T8S R10E S13). Upstream sites consisted of isolated or connected pools, with clay as the dominant substrate. Pools connected by clay/sand runs characterized downstream sites. We collected fishes and recorded mean width, mean depth, and surface current at each site. Collections were made with a 4.5 × 1.8-m seine with 4.8-mm mesh. We sampled 100-150 m reaches for 40-60 min until no new species were collected. We released easily identified specimens and retained small minnows and darters, for which vouchers were catalogued in the Oklahoma Museum of Natural History (OKMNH), University of Oklahoma.

RESULTS and DISCUSSION

We collected 3,908 individuals representing 19 species (Table 1). The most abundant species was the mosquitofish (*Gambusia affinis*), which, along with sunfishes (*Lepomis* spp.), dominated upstream assemblages. We found minnow (*Cyprinella* spp. and *Pimephales vigilax*) abundance to increase dramatically downstream, which appeared to be associated with flow (Table 1). The number of species from all sites ranged from 10 to 13, which is similar to the mode (~11-12 species) found by Matthews (6) for local fish assemblages in temperate North American streams. The number of species showed no relation to width, depth, or flow (Table 1). We found little longitudinal variation in number of species, which suggests the general pattern of a downstream increase in fish species (6) may not apply to Island Bayou.

Mayden (7) hypothesized that a preglacial east-west Ouachita River once traversed southern Oklahoma, at least to the Blue River, which provided a means of dispersal for upland species. Since Mayden (7), reports of upland species indicate that this ancestral drainage also included the Arbuckle Mountains in the Washita system (8) and the Wichita Mountains in the upper Red River drainage (9). Island Bayou is located between the Blue and Washita Rivers, which are major

TABLE 1. Fish species collected from Island Bayou and stream characteristics of each site. See text for location of sites.

Species	Site				
	A	B	C	D	E
<i>Cyprinella lutrensis</i> ^a	2	0	1	135	579
<i>Cyprinella venusta</i> ^a	0	0	0	161	188
<i>Pimephales vigilax</i> ^a	2	2	59	170	669
<i>Minytrema melanops</i>	0	1	11	0	0
<i>Ameiurus natalis</i> ^a	0	3	0	0	0
<i>Ameiurus melas</i>	0	2	1	0	0
<i>Ictalurus punctatus</i>	0	0	2	0	3
<i>Gambusia affinis</i> ^a	403	126	423	70	229
<i>Lepomis cyanellus</i> ^a	12	22	5	1	0
<i>Lepomis gulosus</i> ^a	4	0	0	0	9
<i>Lepomis humilis</i>	1	0	0	0	2
<i>Lepomis macrochirus</i> ^a	54	59	74	1	25
<i>Lepomis megalotis</i> ^a	67	52	46	50	49
<i>Lepomis microlophus</i>	4	2	0	0	0
<i>Micropterus salmoides</i>	12	1	19	0	0
<i>Pomoxis annularis</i>	0	0	1	0	0
<i>Etheostoma gracile</i> ^a	23	11	16	4	4
<i>Percina sciera</i>	0	0	6	10	19
<i>Stizostedion vitreum</i>	0	0	0	1	0
Number of species	11	11	13	10	11
Mean Width (m)	6	3	5	4	10
Mean Depth (cm)	61	30	76	61	15
Surface Current (cm/s)	0	0	0	21	71

^a Species collected in October 1972 by Stevenson et al. from downstream Island Bayou (OKMNH, unpublished data).

tributaries of the Red River in south-central Oklahoma. However, Island Bayou lacks upland habitat and fish species found in other streams in northern Bryan County, which suggests that the ancestral stream system did not extend far enough south to include this tributary.

Sand Creek (western Bryan County), a short Red River tributary with headwaters less than 3 km west of Island Bayou's headwaters, was surveyed in 1954 and 1956 by Carl Riggs (OKMNH, unpublished data). The catalogued records for Sand Creek show assemblages different from those of Island Bayou. The sand shiner, *Notropis stramineus*; plains killifish, *Fundulus zebrinus*; and suckermouth minnow, *Phenacobius mirabilis*, have been recorded for Sand Creek, but not for Island Bayou. These fishes are common inhabitants of prairie streams with predominantly sandy, shallow habitats, which are lacking in Island Bayou yet present in Sand Creek (R. Lemmons, personal observation).

Museum searches of OKMNH and Oklahoma State University produced only one previously catalogued sample of Island Bayou fishes. In October 1972, Stevenson et al. (OKMNH, unpublished data) collected down-stream assemblages similar to our results (Table 1), which indicates long-term stability. Little has been published describing local fish assemblages of small tributaries of the mainstream Red River in Oklahoma. Our results provide an initial description of the longitudinal distribution of

fishes in Island Bayou. However, further sampling is needed to determine if our results are temporally stable.

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