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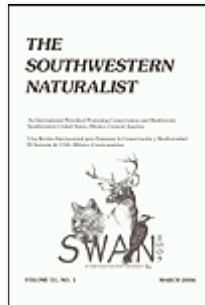
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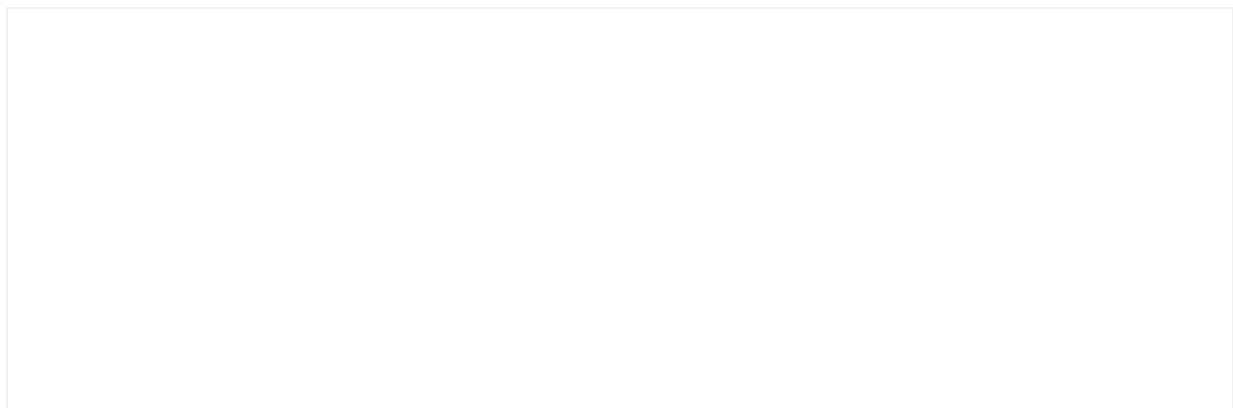
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FORAGING PATTERNS OF THE LEAST TERN (*STERNA ANTILLARUM*) IN NORTH-CENTRAL OKLAHOMA

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ABSTRACT—Because the interior least tern (*Sterna antillarum*) is piscivorous, locations of colony sites and reproductive success are strongly influenced by distance to bodies of water with available forage. We examined foraging patterns and success of the least tern nesting on a salt flat in north-central Oklahoma during the 1992 and 1993 breeding seasons. Our objectives were to 1) estimate whether there were limited quantities of forage available to breeding least terns, 2) examine least tern use of bodies of water adjacent to the salt flat, and 3) identify fish species brought to colony sites and in bodies of water adjacent to the salt flat. Chicks were fed smaller fish than were brooding adults and chicks were offered more fish than they consumed. Adults did not forage away from the salt flat during incubation and brooding (peak hatching). Foraging success of terns observed fishing away from the salt flat from May to June was increased by fingerlings available at a fish hatchery approximately 12 km from the salt flat. During incubation, brooding, and fledging (July), the only location away from the salt flat where terns were observed feeding was the eastern shoreline of the Great Salt Plains Reservoir. Collections of fish dropped and left uneaten by least terns in colony sites contained six species. These collections served as an index of species selected by the least tern. The six species of dropped fish were present in all samples seined from adjacent waterways. Sizes of fish in seine samples and of fish brought to nests were smaller than those of fish found dropped and uneaten in colony sites. These uneaten fish may have been too big to consume. Quantity and quality of fish available to least terns during our study were adequate and did not appear to limit reproductive success. Forage availability may only be a limiting factor to reproductive success during drought years.

The endangered, interior population of the least tern (*Sterna antillarum*) nests on sandy islands, sandbars, and shorelines of inland waterways, and a small percentage (7%; Sidle and Harrison, 1990; R. L. Boyd, in litt.) nests on alkaline flats in Kansas and Oklahoma. The least tern is piscivorous, only occasionally feeding on invertebrates (McDaniel and McDaniel, 1963; Wilson et al., 1993). Locations of colony sites and reproductive success are strongly influenced by distance to bodies of water with available forage (Moseley, 1976; Atwood and Kelly, 1984; Carreker, 1985). Factors determining prey availability include fish size, behavior, and quantity.

In general, adult least terns consume fish ranging in size from 2.0 to 9.0 cm long (Massey, 1974; Moseley, 1976; Atwood and Kelly, 1984), and chicks <10 days old are fed smaller fish from 1.5 to 4.0 cm long (Moseley, 1976; Atwood and Kelly, 1984). In addition to length, fish rotundity

or body depth influences availability of fish to terns (Courtney and Blokpoel, 1980). Fish with body depths >1.5 cm were considered unsuitable by Atwood and Kelly (1984) because the maximum horizontal gape width of adult least terns was 1.5 cm. Hulsman (1981) found a strong positive association between width of gape and size of prey consumed by terns.

Species of fish captured by the least tern tend to be surface schoolers (Wilson et al., 1993) that are found in shallow water. Consequently, shallow-water habitats are primary foraging sites (Atwood and Minsky, 1983; Carreker, 1985). L. A. Hill studied the availability of fish to the least tern population nesting on the salt flat of Salt Plains National Wildlife Refuge (NWR) in north-central Oklahoma during her thesis research, and published her findings in a final report for the U.S. Fish and Wildlife Service (L. G. Talent and L. A. Hill, in litt.). She found that least

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