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SITE-SPECIFIC NEST DEFENSE BEHAVIOR OF BLACK SKIMMERS AND LEAST TERNS

JEROME A. JACKSON
 BERNARD E. ROWE
 MELINDA S. HETRICK
 AND
 BETTE J. SCHARDIEN

The reactions of colonial seabirds to human intrusions of their nesting areas typically consist of behavior ranging from distraction displays to defecation or physical attack on the intruder. Differences in intensity of defense have been noted among individuals (Hay, *Spirit of survival*, E. P. Dutton & Co., New York, 1974:101) and at different stages of the nesting cycle (Hardy, *Publ. Mus. Mich. State Univ. Biol. Ser.* 1:1-60, 1957). In the course of our studies of colonial seabirds on the Gulf coast of Mississippi we have noted consistent site-specific differences in the nest defense behavior of Black Skimmers (*Rynchops nigra*) and Least Terns (*Sterna albifrons*). Those birds nesting far offshore and away from human disturbance are less aggressive in their defense and more likely to give distraction displays. Birds nesting on the mainland beaches occasionally to frequently strike an intruder during a diving, defecating attack.

Jackson and Schardien made 10 or more visits to Least Tern colonies on the mainland and three or more visits to colonies on the islands each year from 1978 through 1980. The impression of site-specific differences in nest defense behavior has been consistent. For example, on 21 and 27 June 1979, Jackson, Schardien, and two assistants visited mainland Least Tern colonies in Long Beach and Gulfport, respectively. The Long Beach colony included fewer than 200 nests, the Gulfport colony approximately 2,000 nests. At each colony the terns vigorously dived at us as we measured eggs and banded young. Notebooks and clothes were generously splattered with fecal matter, and occasionally a screaming tern struck one of us. In contrast, during a visit on 23 June 1979 to a colony of approximately 2,000 Least Tern nests on a spoil island near the west end of Petit Bois Island, 13 km off the coast, the terns reacted less vigorously, screaming from a distance, rarely defecating on us, and never striking us. All colonies included nests with well-incubated eggs and young of all ages. We visited all colonies in late afternoon during clear weather, and our activities were the same at each colony.

Black Skimmers were nesting on the spoil island in 1979, but not on the mainland, so we had no opportunity to compare defense behavior at different sites that year. However, we noted that the skimmers kept 20 m or more distant and frequently gave distraction displays.

In 1980, Black Skimmers nested on the spoil island in

two areas. In one area there was a loose group of approximately 250 nests, on the other side of the island and out of sight was another group of about 100 nests. No Least Terns nested on the spoil island in 1980. On the mainland at Gulfport, approximately 100 pairs of skimmers nested at the periphery of a large Least Tern colony. Nests of these skimmers were spaced similarly to those on the spoil island (mean internest distances 5.3 m on island, 5.8 m on mainland). Jackson, Rowe, and Hetrick visited the spoil island colonies on 25 June 1980 in order to band chicks and measure eggs. Many eggs were hatching and there were many small chicks, but we found only three that were large enough to be banded. Reactions of the adults to our activity were as in 1979. On 26 June the same three of us visited the skimmer colony on the mainland to measure eggs and band young. Again, many eggs were hatching, many small young were present, but very few were old enough to band. Our activities at both colonies were the same: the three of us worked together, one banding young, one measuring eggs, and one taking notes. At the mainland colony, however, the adult skimmers responded to our presence by diving at us and frequently striking our heads with their lowered lower mandible. The strikes left bruises and, in one instance, a laceration. We saw no distraction displays. Our skimmer colony visits on 25 and 26 June were made in early morning and under overcast skies on both dates.

We feel that the behavioral differences noted here reflect the extreme differences in human visitation to these colonies: those on the mainland being violated by human intrusion frequently during each day and those on the spoil island being only rarely visited—probably at a frequency of less than once a week. Neither area is subjected to much predation by other mammal species. The spoil island has no mammals on it, though we once saw a boater bring his dog ashore during the nesting season. The mainland colonies are along the public beach, which is separated from urban developments by four-laned and very busy U.S. Highway 90. This highway is within 20 m of the colonies and acts as a barrier to any mammal attempting to cross it. An ordinance also restricts people from bringing unleashed dogs to the beach.

We assume that the intensities of nest defense noted here represent "necessary" energy expenditures by the adults to assure a "successful" nesting effort. A great deal more energy was expended at the mainland colonies—energy that might otherwise have gone into providing food for young or adults. In evaluating the effects of humans on seabird colonies we must consider this added energy expenditure as well as more evident destruction of eggs and chicks.

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Department of Biological Sciences, Box GY, Mississippi State University, Mississippi State, Mississippi 39762. Address of third author: U.S. Fish and Wildlife Service, Drawer FW, Mississippi State, Mississippi 39762. Accepted for publication 28 May 1981.