

**THE TIGER SHARK, *GALEOCERDO CUVIER*, IN COASTAL SOUTHERN CALIFORNIA WATERS**JEFFREY A. SEIGEL<sup>1</sup>

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A juvenile male tiger shark, *Galeocerdo cuvier*, was caught at 1510 h on 18 September 1994 on hook and line by Mr. Rudolfo Rosolino off the end of the Manhattan Beach Pier, Los Angeles County, California (Fig. 1). The specimen is deposited in the Natural History Museum of Los Angeles County (LACM 45953-1). It was 880 mm total length (TL) when thawed and measured on 3 October 1994 by the senior author (JAS); 854 mm TL after preservation in 10% formalin and storage in 70% ethanol. Other measurements are available from JAS. This is the first reported juvenile of *G. cuvier* from California and, to our knowledge, is the only California record based on museum material.

Five weeks after the capture of this specimen, two additional juvenile tiger sharks were caught at the same place. One female was kept alive for about 12 h in the Roundhouse Marine Studies Laboratory and Aquarium (RMSL) at the end of the Manhattan Beach Pier; the other (sex unknown) was released alive by the angler (K. Tressler, RMSL, pers. comm.).

Color (from a composite of notes and photographs of the fresh specimen and observations by JAS before, during, and after preservation) was uniform dark gray on the dorsal surface of the head, extending laterally to below the eyes and posteriorly to the fourth gill slits. This faded to light gray on the body, with a darker gray,

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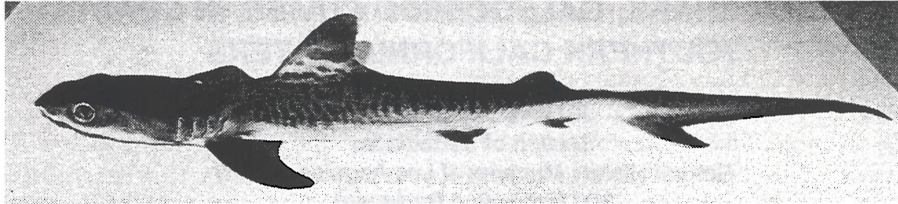


Figure 1. *Galeocerdo cuvier*, LACM 45953-1, 880 mm TL, male, caught off the Manhattan Beach Pier, Manhattan Beach, California, 18 September 1994. Photo by R. Meier, LACM.

interrupted-bar pattern dorsally and laterally to below the mid-lateral position. A series of broken bars anteriorly changed to fewer, coalesced bars on the body at about the level of the pelvic fins. The pectoral fins were uniform dark gray dorsally nearly to the axil and exhibited a broken gray pattern proximally to the axil. Both dorsal fins had a light gray ground color with a dark gray mottled bar pattern throughout the fin; the distal tip was white. The pelvic fins were dark gray to lighter gray dorsally and the anal fin was light gray basally to darker gray distally; the distal tip was white. The caudal fin was a light gray ground color with bars that became a series of sequentially smaller, round spots distally from the peduncle. The posterior edge of the upper caudal lobe was dark gray and the distal tip was black. The anterior margin of the lower caudal lobe was light gray and its posterior margin was darker gray. The specimen's venter was uniform white while the ventral surfaces of pectoral and pelvic fins were darker gray distally.

The shark was gutted after capture and the viscera discarded. The mouth and gill cavity were free of parasites. No ectoparasites were present on fins or body.

The first report of the tiger shark from California was by Jordan and Evermann (1896:32), noting the distribution as "Tropical seas ... northward to Cape Cod and to San Diego." Starks and Norris (1907) endeavored to list all fishes of the California coast south of Point Conception; however, the tiger shark was not listed. Starks (1917:5) reported a tiger shark from southern California based on a record of "... some jaws of a specimen captured near San Diego" and accounts of fishermen as occurring along the southern California coast, but does not list any further data. Subsequent authors (e.g., Barnhart 1936, Roedel and Ripley 1950, Miller and Lea 1976, Castro 1983, Compagno 1988, Randall 1992) have listed tiger sharks from southern California, presumably based on Jordan and Evermann's original report.

Scofield (1941) provided no documentation in his account of the capture of a 2.7-m female from off Oceanside, California. Miller and Collier (1981:101) noted that "...a large shark, most probably a tiger shark ..." was involved in an attack on a free diver during 1959 off La Jolla, California. This record is equivocal and the attack may be attributable to a white shark, *Carcharodon carcharias*, (R. Lea, California Department of Fish and Game, pers. comm.) A check of museum records at CAS, LACM, SDNHM, SIO, UCLA and USNM (Institutional abbreviations follow Leviton et al. [1985].) revealed that there is no known southern California tiger shark material collected prior to the 1994 Manhattan Beach Pier specimen.

Randall (1992) summarized age and growth data for the tiger shark. Clark and von Schmidt (1965) noted growth in a laboratory-pen-kept, full-term tiger shark embryo of 690 mm TL and Tester<sup>2</sup> (1969) provided growth data for a tagged and recovered juvenile tiger shark. Size at birth is 510-760 mm TL (Randall 1992). Gestation period is 13-16 months (Clark and von Schmidt 1965, Randall 1992), with mating taking place in the Northern Hemisphere during spring. Pupping takes place during the following spring and summer. Based on size and date of capture, the juvenile tiger shark caught off Manhattan Beach Pier was about 3-4 months old.

Seigel (1985) documented the use of southern California inshore areas as a pupping ground by the scalloped hammerhead, *Sphyrna lewini*. The warm-water El Niño event of 1982-1984 in the eastern Pacific may explain the northward movement of *S. lewini* into coastal southern California waters. Quinn et al. (1987) reported strong El Niño events in 1884 and 1891, possibly explaining Jordan and Evermann's (1896) initial listing of tiger sharks as occurring northward to San Diego, California. Many authors (e.g., Bigelow and Schroeder 1948, Springer 1963) have noted that excursions by tiger sharks into higher latitudes occur only during warm months. Coastal sea-surface temperatures were anomalously warm during most of 1992 and 1993, continuing at least until April 1994 (Hayward et al. 1994). Sea-surface temperature at Manhattan Beach Pier on 18 September 1994 was approximately 22°C (R. Rosolino, pers. comm.).

The capture of three juvenile tiger sharks off the Manhattan Beach Pier authenticates the presence of tiger sharks in California and provides further evidence that northward-displaced shark species are using coastal southern California as a pupping ground.

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