

ELEGANT TERNS BREEDING IN ORANGE COUNTY, CALIFORNIA

by Charles T. Collins,
William A. Schew, and Esther Burkett

THE ELEGANT TERN (*STERNA ELEGANS*) occurs commonly to abundantly on the southern and central California coast, particularly from July to October, when it ranges north as far as Monterey Bay, San Francisco Bay, and Point Reyes (Small 1974, Harrison 1983, A.O.U. 1983, Shuford *et al.* 1989). It also occurs, less commonly, still farther north in Oregon (Fix and Heintz 1990), and rarely in Washington and British Columbia (Godfrey 1986). The Elegant Tern's winter range extends south along the Pacific coast as far as Ecuador, Peru, and Chile (Harrison 1983; A.O.U. 1983). Despite its extensive range there have been, in recent years, only two known breeding colonies of this species: a very large colony of about 10,000 pairs on Isla Raza, Gulf of California (Wilbur 1987, Walker 1965) and, since 1959, a smaller one of 600-860 pairs on the salt pond dikes of southern San Diego Bay, California (Unitt 1984, Schaffner 1985). Previously recorded colonies, particularly on Isla Cerralvo in the Gulf of California (Banks 1963) and at Laguna Ojo de Liebre and Isla San Roque on the

Pacific coast of Baja California (Bancroft 1927), have not been active breeding sites in recent years (Wilbur 1987, Schaffner 1986).



Adult Elegant Tern in breeding plumage with young. Bolsa Chica Ecological Reserve.

Over the past decade there has been an increase in the number of spring records of adults on the California coast, particularly in Orange, Los Angeles, Ventura, and Santa Barbara counties in southern California, suggesting that a further

expansion of the Elegant Tern's breeding range might be expected (Garrett and Dunn 1981:192). We report here the establishment of a breeding population in Orange County, California, approximately 73 kilometers northwest of the only other United States breeding colony located in San Diego Bay.

In the late spring and summer of 1986 a flock of 200-250 Elegant Terns was present at the Bolsa Chica Ecological Reserve, Orange County. The 530-acre reserve is a saltmarsh environment managed by the California Department of Fish and Game. During June the terns often spent time on the ground in dense aggregations on both North and South Islands, two sand-fill islands that were created in 1978 as nesting sites for the endangered California Least Tern (*Sterna antillarum browni*). The two islands are located in a part of the reserve which has a muted tidal regime. These aggregations closely resembled nesting assemblages, and ground courtship displays were frequently observed throughout this period. Although the terns made numerous shallow scrapes in the sand, we could find no eggs or other evidence of actual breeding. In 1987, we observed similar aggregations, particularly on North Island, and thirty-one pairs laid eggs in a single cluster on the edge of, and slightly intermixed with, a group of nesting Caspian Terns (*S. caspia*). Most of these eggs were destroyed by two or three non-breeding Western Gulls (*Larus occidentalis*) that frequented North Island that summer and preyed on Caspian and Elegant tern eggs. At least one fledgling Elegant Tern was raised that season.

In 1988, the breeding population of Elegant Terns increased to 450 pairs, again nesting on North Island in hexagonally packed aggregations, typical of several species of "crested" terns (Buckley and Buckley 1977). There were approximately 1200



Densely packed nests, containing single eggs, of Elegant Terns. Bolsa Chica Ecological Reserve 1989.

breeding pairs of Elegant Terns on North Island in 1989, and 1075 in 1990. In the latter two years, the nests were divided into three to five clusters of highly synchronized nests. In 1988-1990 there was substantial breeding success with up to 850 late-stage chicks being banded in 1989, and 430 in 1990. Each chick was banded with a United States Fish and Wildlife Service numbered aluminum band which was also wrapped with colored tape. Substantial numbers of fledglings were seen later in the summer of each year, some of which returned to breed.

The Elegant Terns usually nested in tight unispecific groups but sometimes with a few Caspian Terns along the outer periphery. In 1988-1990, from two to ten pairs of Royal Terns (*S. maxima*) were also present and nested within the clusters of Elegant Terns.

The rapid increase in size of the breeding population of Elegant Terns at Bolsa Chica closely resembles the pattern of colony growth that occurred in San Diego Bay following the first nesting in 1959 (Unitt 1984). The Elegant Tern population at Bolsa Chica seems to have stabilized, at least temporarily, at about 1100 pairs. They now share North Island with similarly expand-

ing populations of Black Skimmers (*Rynchops niger*) and Forster's Terns (*S. forsteri*) as well as Caspian and Royal terns; the smaller Least Terns have relocated their nesting activities to nearby South Island. With continued successful reproduction the Elegant Tern population could increase in coming years.

The establishment and growth of the breeding colony of Elegant Terns at Bolsa Chica is unquestionably related to the dramatic increase in its overall range, seasonal occurrence, and abundance along the Pacific coast, particularly since the 1970s. Prior to 1950, Elegant Terns occurred rarely and irregularly as far north as San Francisco Bay (Grinnell and Miller 1944). Within the last three decades, their post-breeding dispersal has taken them north frequently to the Point Reyes area of Marin County (Shuford *et al.* 1989), occasionally to Humboldt Bay (Morlan and Erickson 1988), and southern Oregon (Fix and Heintz 1990). Major northward flights took substantial numbers of Elegant Terns to Washington (Washington Bird Records Committee 1989) and British Columbia (Godfrey 1986) in 1983, and to Washington in 1990 (Tweit and Fix 1991). There has also been a marked increase in late spring and early summer records in

California (Garrett and Dunn 1981, Shuford *et al.* 1989). Elegant Terns now regularly occur at other sites on the southern California coast in April each year, sometimes in groups of several dozen. Much courtship activity and even copulations have been observed, but none remain to nest (K.L. Garrett, pers. comm.). Late summer peak abundances of typically 2000-3000, and rarely 6000 Elegant Terns have been recorded in the Point Reyes area (Shuford *et al.* 1989) and up to 400 - 450 birds at Humboldt Bay (Fix and Heintz 1990). They have occurred in small numbers of up to a few dozen in four of the last seven years in southern Oregon (Fix and Heintz 1990). There are fewer than 15 records of Elegant Terns in Washington (Washington Bird Records Committee 1989). Since 1950, during the period of rapid increase in Elegant Tern numbers and range, Royal Tern populations have decreased markedly and have withdrawn almost entirely from central California (Cogswell 1977; Garrett and Dunn 1981). Roberson (1985) cites only six records of Royal Terns during the past two decades from Monterey County.

In both cases the changes in the population status of these two terns seems directly related to changes in their fish food stocks. The Northern



Nesting aggregation of Elegant and Caspian terns. Bolsa Chica Ecological Reserve 1990.

Anchovy (*Engraulis mordax*), a principal food item of the Elegant Tern, has greatly increased in abundance and range, particularly in northern California in the late summer (Smith and Epley 1982). The Pacific Sardine (*Sardinops sagax*), a principal food item of the Royal Tern, has decreased to near-extinction levels since 1950 (MacCall 1979, 1984). There is some indication of an increase in their numbers in recent years. The probably causal relationship between the change in range and abundance of these two coastal foraging terns and their principal fish prey items has been previously pointed out by Schaffner (1985, 1986). Schaffner (1985) also noted that the prior establishment of nesting colonies of the more aggressive, predator mobbing, Caspian Terns, with which these terns appear to selectively nest, may have been a precondition for the establishment of new Elegant and Royal tern colonies in coastal southern California. It is probably not coincidental that the establishment of a nesting colony of Elegant Terns at Bolsa Chica coincided with that of Caspian Terns which first bred at Bolsa Chica in 1986.

Numerous deserted Elegant Tern eggs from the Bolsa Chica colony have been deposited with the Western Foundation of Vertebrate Zoology. Specimens of adults and chicks which were found dead are housed in the ornithological collections of California State University, Long Beach. Photographic documentation of the breeding aggregations and nests has been contributed to VIREO.

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—Department of Biology, California State University, Long Beach, CA 90840 (Collins and Schew) and California Department of Fish and Game, 11862 MacGill, Garden Grove, CA 92641 (Burkett)