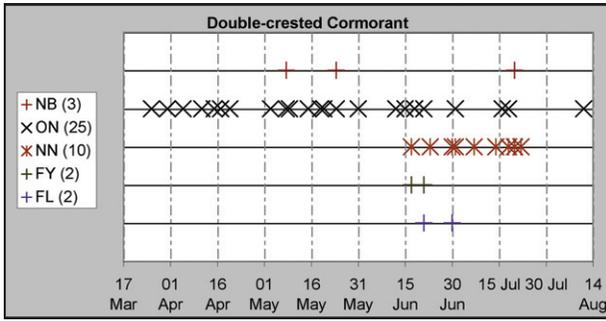


Double-crested Cormorant *Phalacrocorax auritus*

The Double-crested is our most versatile cormorant, occurring commonly as a nonbreeding visitor on water both fresh and salt. It nests near San Diego County on the Channel and Los Coronados islands and at the Salton Sea; two colonies within the county have formed only since 1988. The Double-crested Cormorant has had a difficult and contentious relationship with humanity, exploiting reservoirs and aquaculture but suffering from disturbance, pesticide contamination, and direct control as a pest. At the beginning of the 21st century, the cormorants were winning, increasing in numbers and establishing new colonies.

Breeding distribution: Double-crested Cormorants nested in two colonies during the atlas period, in the salt works at the south end of San Diego Bay (U10) and at the upper end of Sweetwater Reservoir (S13). The colony in the salt works formed in 1988, when the birds began nest-

Photo by Anthony Mercieca



ing on a mobile dredge. Since 1997, maximum numbers of nests have been 51 on 1 June 1997 (M. R. Smith) and 71 on 30 June 1999 (R. T. Patton). The dredge has remained the focus of the colony, but in some years, such as 1993 (Stadtlander 1993), 1994 (Terp and Pavelka 1999), 1999, and 2001 (R. T. Patton), some birds nest on the ground on the dikes of the salt works. Nineteen pairs nested on the ground in 1993 (Stadtlander 1993). One such nest on 18 July 2001 accounts for the cormorant appearing as a nesting bird in atlas square V10 as well as U10—the salt works straddle both squares.

At Sweetwater Reservoir, the colony first formed in 1996, the birds building in a single tree. By 8 May 1998 they had spread to nine trees with a total of 28 nests in which adults were incubating or brooding. On 24 May 2001, the colony numbered 17 occupied nests in two trees (P. Famolaro).

Nonbreeding birds are locally common at other localities through the summer: 18 at Lake Henshaw (G17) 18 June 2000 (P. Unitt), 30 at San Elijo Lagoon (L7) 12 July 1998 (B. C. Moore), 18 at San Vicente Reservoir (N13) 20 May 2001 (R. and S. L. Breisch), 34 in north San Diego Bay (S8) 26 May 2000 (R. T. Patton), 26 at Barrett Lake (S19) 4 June 2000 (R. and S. L. Breisch), and 20 at Lower Otay Lake (U13) 8 May 1999 (P. Unitt). Summering Double-

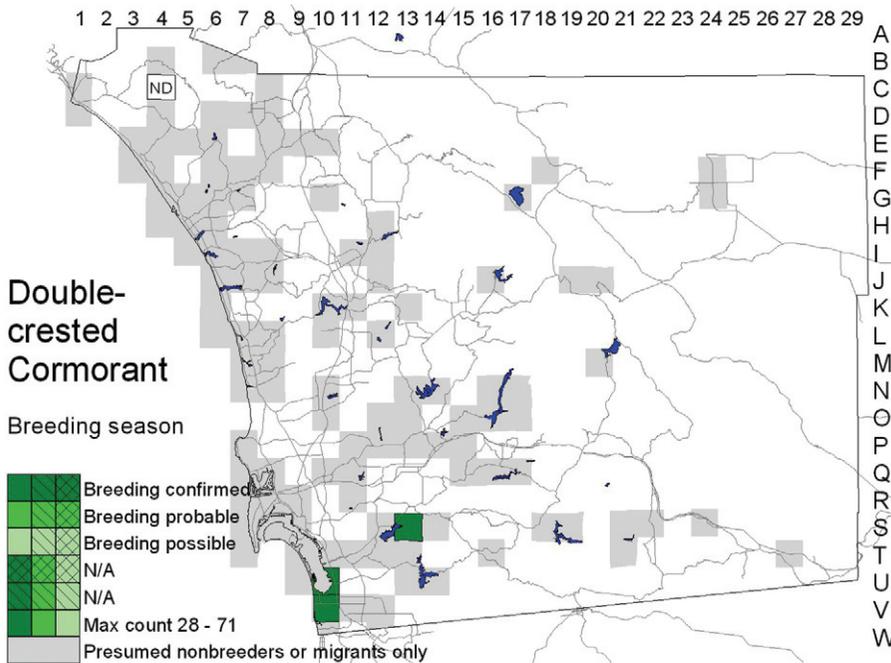
crested Cormorants are widely scattered on inland lakes, as high as Cuyamaca Lake (M20; one on 25 June 1998, A. P. and T. E. Keenan) and as far east as Tule Lake (T27; up to two on 6 June 2001, J. K. Wilson).

Nesting: The Double-crested Cormorant builds a bulky nest of sticks and debris, placing it usually in a tree surrounded by water or on the ground in a site isolated from predators. On the dredge in the salt works, some nests are well supported on sheets of metal but others are balanced precariously across two cables; some of the latter blew down in 2001. Some Double-crested Cormorant nests, however, persist for years, the pair refurbishing them annually.

Because Double-crested Cormorant nests are typically difficult to inspect closely—and vulnerable to disturbance—there are few data on their nesting schedule in San Diego County. Reports of nestlings are concentrated from late June to late July, suggesting that egg laying ranges from about mid April to mid June. In the early 20th century eggs were collected at Lake Henshaw (G17) on 15 and 30 May. Reports of occupied nests, however, range from 31 March to 11 August. In 1998, nesting at the salt works began by 3 April and continued through late July (Terp and Pavelka 1999).

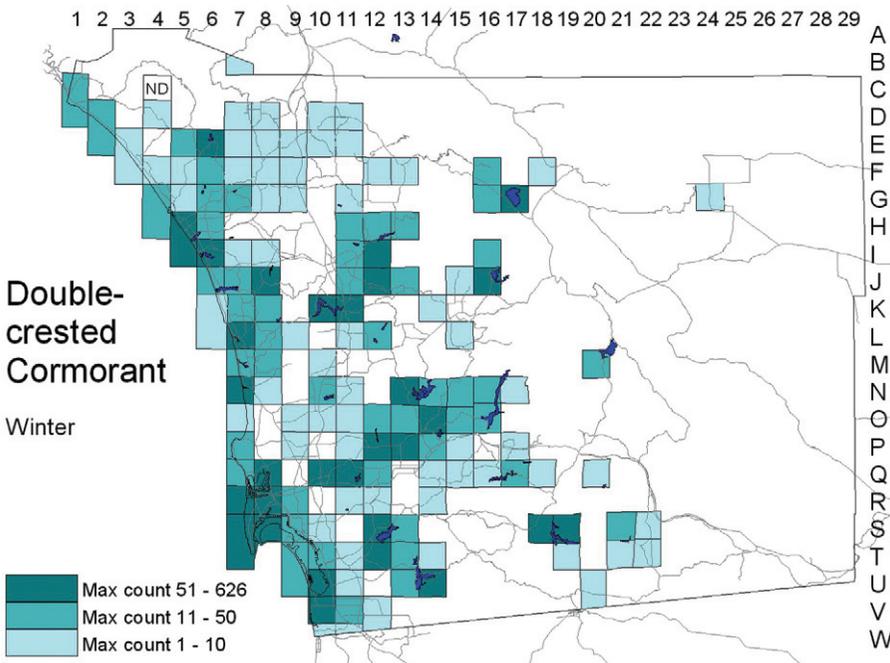
Migration: The Double-crested Cormorant is far more abundant in San Diego County in fall and winter than in spring and summer. Surveys of San Diego Bay (Mock et al. 1994, Stadtlander and Konecny 1994, Manning 1995) and San Elijo Lagoon (King et al. 1987) found cormorant numbers peaking variously from September to February and reaching their lows in June and July. In the salt works Stadtlander and Konecny (1994) recorded their maximum of 1012 on 17 November 1993.

In the Anza-Borrego Desert, the approximately 15 records range from 29 October (1991; two at the Roadrunner Club, F24, A. G. Morley) to 9 May (2001;



one at Borrego Springs, G24, P. D. Ache). All are from artificial ponds in the Borrego Valley except for a sighting of two flying over Hawk Canyon (H27) 10 April 1988 (P. D. Jorgensen). An unusual record of migrants on the coastal slope was of 44 in flight near Dulzura (T16) 21 April 2001 (S. Yamagata, T. Stands).

Winter: The Double-crested Cormorant is not only more numerous in the winter but more widespread. From 1997 to 2002 it was recorded in 47 atlas squares in winter but not the breeding season versus 16 for the converse. It occurs all along the coast, with up to 626 at Point Loma (S7) 16 December 2000 (M. W. Klein),



300 in Mission Bay (Q8) 18 December 1998 (J. C. Worley), and 300 at the San Diego River flood-control channel (R8) 28 February 1999 (B. C. Moore). It is no less common on inland lakes, with up to 218 on Lake San Marcos (J8) 27 December 1997 (J. O. Zimmer), 250 on Lake Hodges (K10) 6 December 1999 (R. L. Barber), and 300 at the Wild Animal Park (J12) 8 January 2000 (D. and D. Bylin). Wintering Double-crested Cormorants occur as high as 3900 feet at Corte Madera Lake (Q20; up to seven on 20 February 1999, G. L. Rogers) and 4600 feet at Cuyamaca Lake (up to 33 on 14 December 1999, A. P. and T. E. Keenan). In Borrego Springs (G24) we had only two records of single individuals during the atlas period (P. D. Ache), but an exceptional 59 were at the Roadrunner Club 10 January 1993 (A. G. Morley).

Conservation: The Double-crested Cormorant's numbers decreased because of persecution early in the 20th century, then because of pesticide contamination in the 1950s and 1960s, which led to nesting failure (Gress

et al. 1973). In the last quarter of the century, however, the population over much of North America increased rapidly (Hatch and Weseloh 1999). The increase included California, aided by adaptation to artificial nest sites (Carter et al. 1995). In San Diego County the Double-crested Cormorant has benefited from the building of reservoirs and the reservoirs being stocked with fish. Results of the Oceanside and Rancho Santa Fe Christmas bird counts show no great change, but the San Diego count averaged 296 Double-crested Cormorants per year from 1965 to 1974, 735 from 1997 to 2001. During its first ten years, 1986–94, the Escondido count averaged 100, but during the atlas period the

figure rose to 263.

The cormorant's career of decline and recovery is also reflected in its status as a breeding bird in San Diego County. Shortly after Lake Henshaw was created, cormorants colonized, nesting "plentifully" at least in 1928 and 1932 (J. B. Dixon in Willett 1933; two egg sets collected in each year, WFVZ). The colony was evidently soon eliminated, however; fishermen often see cormorants as competitors. For many years the Double-crested Cormorant occurred in San Diego County as a nonbreeding visitor only. The colony at the salt works began with one or two pairs in 1988 (E. Copper), increasing to 14 nests the following year (Macdonald et al. 1990). The addition of the Sweetwater Reservoir colony in 1996 will probably not be the last.

Taxonomy: *Phalacrocorax a. albociliatus* Ridgway, 1884, with the crests of breeding adults partly white, is the subspecies of the Double-crested Cormorant in and near California.