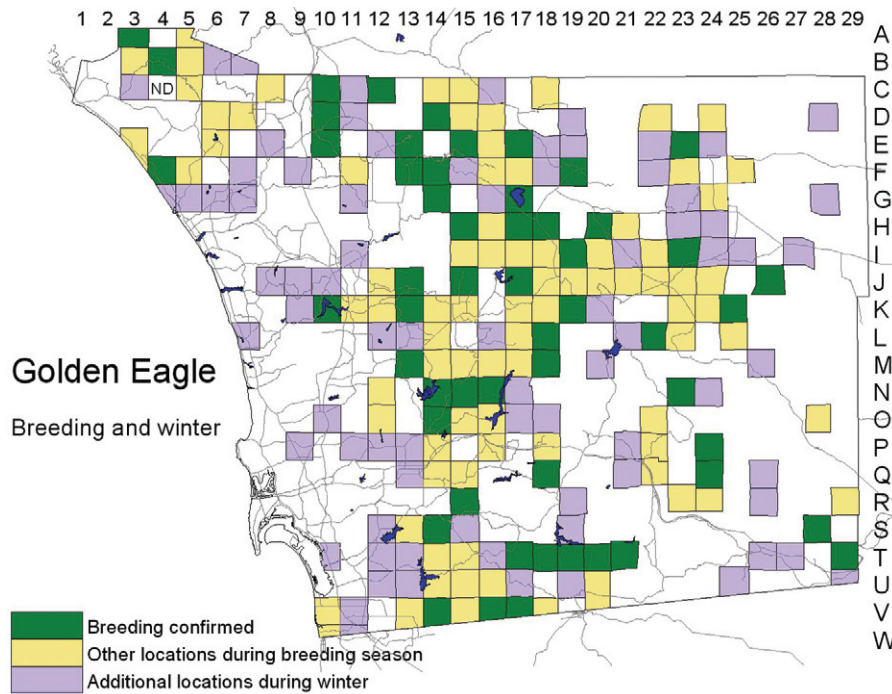


Golden Eagle *Aquila chrysaetos*

As a top predator, the Golden Eagle has the largest territory and the lowest population density of any San Diego County bird. Pairs remain in their territories year round, though the young disperse widely. Most pairs nest on cliff ledges, the rest in trees on steep slopes, hunting in nearby grassland, sage scrub, or broken chaparral. San Diego County's Golden Eagle population has dropped from an estimated 108 pairs at the beginning of the 20th century to about 53 pairs at the century's end, mainly as a result of urban development of foraging habitat. Many of the territories persisting at the beginning

Photo by Anthony Mercieca



checked some inaccessible nest sites via helicopter. This account is based largely on data kindly provided by Bittner.

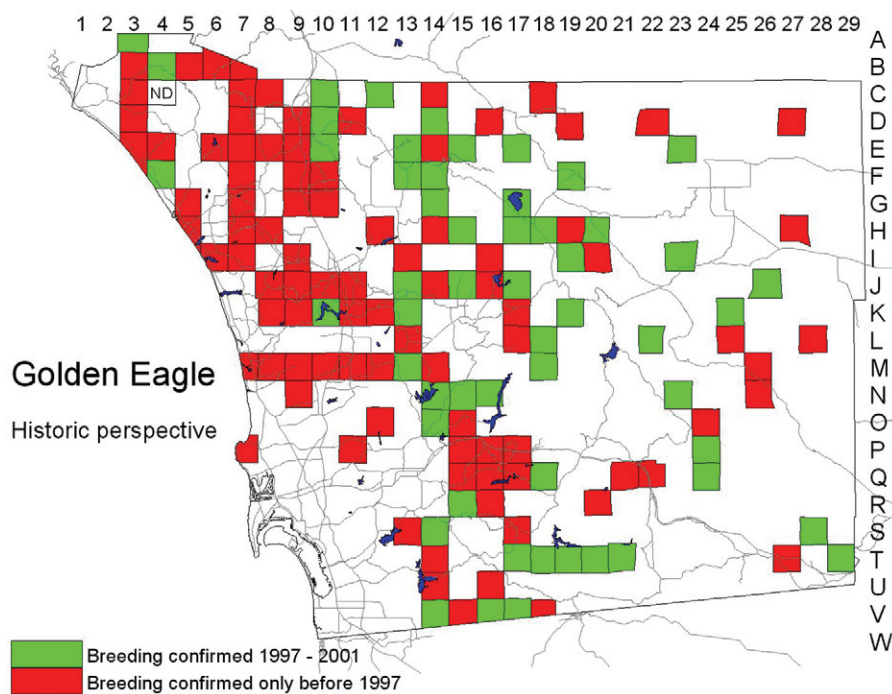
From 1997 to 2001, about 50–55 pairs nested in the county. Fewer than 20 pairs fledged young each year, averaging 1.5 young per successful nest. Only four of these territories lie west of Interstate 15: three in Camp Pendleton, one around Lake Hodges (K10). Most of the remaining pairs nest within a band 20 to 25 miles wide through the foothills. In southern San Diego County, San Miguel Mountain (S13/S14) and Otay Mountain (U15/V14/V15) mark the western limit of the current breeding range.

In and along the edges of the Anza–Borrego Desert there are 10 known nest sites or clusters of

of the 21st century lie near the edge of the urban growth front, a shadow over the future of the capstone of San Diego County’s ecosystem.

Breeding distribution: The Golden Eagle’s distribution in San Diego County is known better through history than that of any other bird, thanks to study by generations of San Diegans: James B. Dixon, John Colton, John Oakley, Thomas A. Scott, David Bittner, and their collaborators through the Wildlife Research Institute. Since 1988, Bittner and Oakley have organized a team of observers to monitor the county’s nesting eagles annually and have

nest sites, though some of these went unused during the entire atlas study, even following the wet winter of 1997–98. Only seven of these territories were active during the atlas period 1997–2001, and at most three were active in any given year. In some nests (D27, L28) new material was added but no eggs were laid; these squares are shown as occupied only before 1997. Since 1998, drought has suppressed numbers of the eagle’s principal prey in the Anza–Borrego Desert, the black-tailed jackrabbit. Only two young eagles fledged in the Anza–Borrego Desert in 2003 (D. Bittner).



The Golden Eagle is absent from some surprisingly large yet little disturbed areas of San Diego County, such as Cuyamaca Mountains and the Campo Plateau between Lake Morena and Jacumba.

The map of the species’ breeding distribution somewhat overrepresents its abundance. A few pairs straddle two atlas squares. Nesting in three squares (F19, M13, R15) has ceased since 1997.

Nesting: Scott (1985) found about 80% of San Diego County’s Golden Eagle nests built on cliff ledges, 20% in trees, usually on steep slopes. A pair typically rotates among several nest sites, including both cliff and tree nests. Many of the cliff sites have been in regular use since the early 20th century and undoubtedly long before that. Though

the giant stick nests are reused for years, the birds refurbish them annually. In San Diego County, fallen yucca leaves, with their tough fibers, are a common ingredient in the nest's lining (Dixon 1937, D. Bittner).

The Golden Eagle's schedule of nesting in San Diego County is also supported by abundant data. Nest building begins with the first heavy rain of fall (Dixon 1937). Copulation begins as early as 5 January (D. Bittner). Dates of 407 egg sets collected or observed from 1891 to 1957 range from 2 February to 26 April, except for one on 7 May and another on 16 June. The mean date is 4 March, standard deviation 17 days. Eggs laid after the first week of March, however, are probably replacement clutches (Dixon 1937). During his recent surveys, Bittner has found most eggs laid in mid February, most chicks hatching in late March or early April, and most young fledging in June. Occasionally, however, he encounters nestlings on dates suggesting they hatched from eggs laid in mid January (e.g., chicks five weeks old on 15 April 2004).

Migration: Once a Golden Eagle acquires a mate and a territory, it remains with them year round, except for occasional swapping (Kochert et al. 2002). Young birds, however, may disperse considerable distances: birds banded in San Diego County have been recovered in Ojai, Ventura County, in Apple Valley, San Bernardino County, in Utah, in the Grand Canyon, Arizona, and near Guadalajara in central Mexico (T. A. Scott, D. Bittner).

Winter: In spite of the mobility of immatures and nonterritorial adults, the nonbreeding distribution of the Golden Eagle in San Diego County does not differ greatly from the breeding distribution. In southern San Diego County a few birds often spread west to the Otay and Tijuana River valleys, accounting for the near regularity of the eagle on the San Diego Christmas bird count (noted on 16 of 20 counts 1983–2002). One on the fill north of the Sweetwater River mouth, National City (T10), 15 December 2001 (S. M. Wolf) was our only sighting during the atlas period of a Golden Eagle that must have flown several miles over developed areas. The count circles other than San Diego include at least one nesting territory. Our maximum winter count per atlas square per day was three, all within a few miles of nest sites.

Conservation: Following studies by Dixon (1937) and Scott (1985), David Bittner and John Oakley (pers. comm.) estimate the Golden Eagle population of San Diego County in 1900 at 108 pairs. It remained near 100 pairs until the rapid growth of the county's human popu-

lation following World War II. In the 1970s, following the building of the interstate highways and the spread of avocado and citrus orchards along Interstate 15, the decline became precipitous. By 2004, the population had dropped to about 53 pairs, with some uncertainty because of a few territories straddling the county line and long vacancy of some territories in the Anza–Borrego Desert. Since 1988, the surveys organized by the Wildlife Research Institute have located about 15 previously unknown pairs in remote parts of the county, accounting for the variation from the estimate of 40–50 pairs reported by Unitt (1984) on the basis of studies by T. A. Scott (pers. comm.).

The eagles abandoned four territories just within the five-year atlas period, and the Wildlife Research Institute estimates that nine more are in imminent danger of abandonment. Without better planning for habitat conservation, the institute estimates the county's eagle population could be halved again by 2030.

The most important factor in this decrease has been urban sprawl covering former foraging habitat. From 1900 to 1936, when eagle territories still filled northwestern San Diego County, Dixon (1937) found the territories of 27 pairs in that region to range from 19 to 48 square miles and average 36 square miles. Thus the area needed to support the species is considerably greater than for any other San Diego County bird. The viability of territories that become isolated from the main block of the species' range is also questionable. Of the 27 territories mapped by Dixon (1937), only nine were occupied at the beginning of the 21st century.

Other factors affecting the eagle are human disturbance, especially rock climbing on nesting cliffs, but also shooting (both recreational and for military training on Camp Pendleton), and agriculture (avocado orchards planted near nest sites). Electrocution on power lines is now the biggest source of mortality: 37 of 55 dead eagles picked up in and near San Diego County 1988–2003 and reported to Bittner had been electrocuted. The Golden Eagle was less subject to poisoning by insecticides like DDT than other birds of prey but has suffered poisoning by scavenging prey killed by rodenticides. Three of the 55 dead birds recovered had been killed through such secondary poisoning. Ever more prolonged droughts could depress the population further, a factor Hoffman and Smith (2003) suggested as affecting raptors throughout the western United States.

Taxonomy: *Aquila c. canadensis* (Linnaeus, 1758) is the only subspecies of the Golden Eagle in North America.