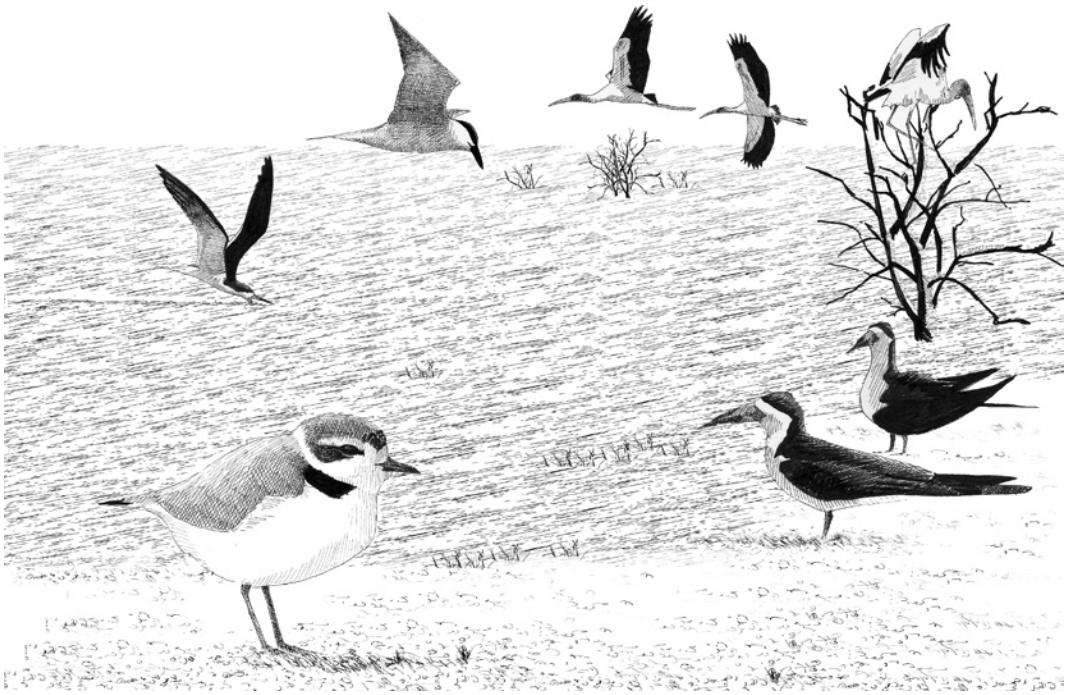
II

Species Accounts



Andy Birch

PDF of American White Pelican account from:

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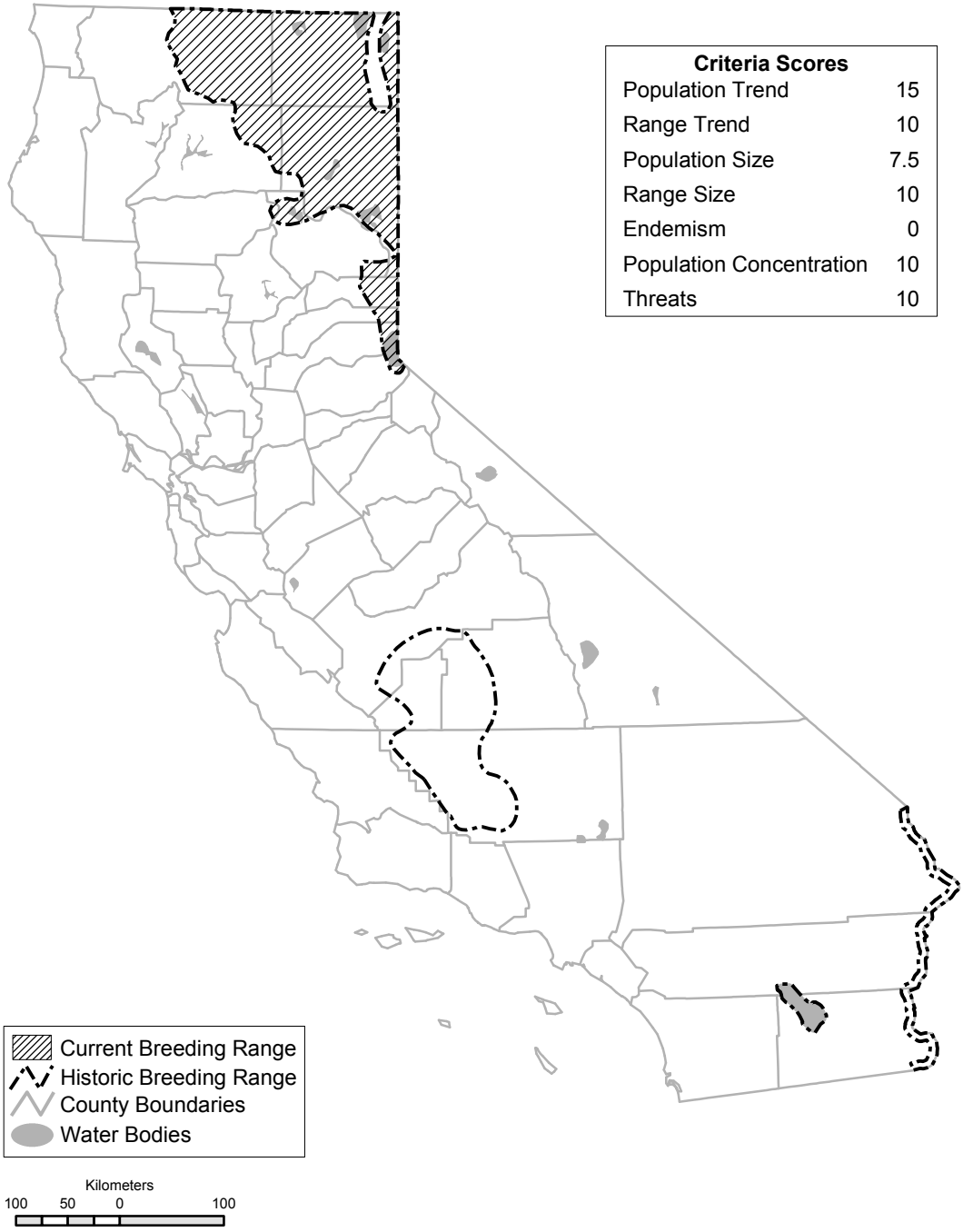
AMERICAN WHITE PELICAN (*Pelecanus erythrorhynchos*)

W. David Shuford



Current and historic (ca. 1944) breeding range of the American White Pelican in California; range outlines bound the minimal areas in the state within which pelicans are estimated to forage away from active colonies. Since 1944, numbers of breeders have declined greatly and the range has retracted moderately; currently breeds regularly in California only at (Sheepy Lake) Lower Klamath NWR and Clear Lake NWR. Occurs more widely in the state during migration and winter; in summer, some nonbreeders may occupy these areas and the general breeding range.

Special Concern Priority

Currently considered a Bird Species of Special Concern (breeding), priority 1. Included on prior special concern lists (Remsen 1978, highest priority; CDFG 1992).

General Range and Abundance

Currently breeds primarily in the interior of North America from the Canadian and U.S. prairies patchily south and west through the Intermountain West, reaching its southwestern limit in southern Oregon, northeastern California, and western Nevada (Evans and Knopf 1993, AOU 1998). Populations are divisible into two groups, one breeding and migrating east, the other west, of the continental divide. Additional small nonmigratory populations breed irregularly on the central Texas coast, on the northern Gulf coast of Mexico, and, in winter, in north-central Mexico. Estimates of the total breeding population in Canada and the United States were about 109,000 adults at 55 colonies in 1979–1981 (Sidle et al. 1985) and 134,000 at 42 colonies in 1998–2001 (King and Anderson 2005). Interpretation of the suggested increasing trend is confounded, however, by incomplete survey data and lack of standardized census protocols.

Winters primarily on the Pacific coast and lowlands from central California and southern Arizona south through Baja California and west Mexico to Nicaragua, and from Florida and the Gulf states south through the Gulf coast and central plateau of Mexico to the northern Yucatán Peninsula. Postbreeding individuals of western populations may disperse widely (many north and east) before migrating south (Yates 1999, Keith and O'Neill 2000). Small numbers of nonbreeders may summer nearly anywhere in the normal migrant and winter ranges.

Seasonal Status in California

Occurs year round, but seasonal status varies regionally. Birds found at or in the vicinity of breeding colonies in the Klamath Basin, and in the Great Basin away from nesting areas, primarily from March to October (Gaines 1992, Summers 1993). Breeds mainly from March through July (Cogswell 1977, Shuford 2005). Occurs on the coast (Bodega Bay southward) and in the Central Valley primarily from July to January (Cogswell 1977, Shuford et al. 1989) and at the Salton Sea mainly from mid-October to mid-April (Patten et al. 2003). Also occurs widely during migration, and may summer, or disperse to, nearly anywhere in the normal migrant and winter ranges.

Historic Range and Abundance in California

White pelicans formerly nested widely but locally in lakes and marshes of the Klamath Basin, Modoc Plateau, and Great Basin desert of northeastern California, in overflow lands of the Sacramento Valley, in terminal lakes in the Tulare Basin of the San Joaquin Valley, and at the Salton Sea (since the early 20th century) in the Colorado Desert. Sites of documented former nesting include Tule Lake (up to at least 1899) and Goose Lake (prior to 1879), Modoc County; Eagle Lake (up to 1932), Lassen County; the lower Sacramento Valley (up to at least 1910); Tulare Lake (up to at least 1942), Kings County; Buena Vista Lake (up to 1953), Kern County; and the Salton Sea (up to 1957), Imperial County (Thompson 1933, Grinnell and Miller 1944, Shuford 2005). It is unclear whether accounts of pelicans nesting at Lower Klamath Lake (up to at least 1915) all pertain to the Oregon, versus California, portion as suggested by the lack of reference to this site by Grinnell and Miller (1944). Although Thompson (1933) suggested Kern Lake, Kern County, and Lake Elsinore, Riverside County, were former nesting sites, Grinnell and Miller (1944) did not consider these documented breeding locales.

The anecdotal nature of most nesting reports makes it impossible to characterize accurately the abundance of breeding pelicans in California in the late 19th and early 20th centuries. Still, it is clear that during this period at least thousands of pelicans bred at Lower Klamath Lake, Clear Lake, Tule Lake, the lower Sacramento Valley, Tulare Lake, and the Salton Sea, and lesser numbers bred

Breeding Bird Survey Statistics for California

1968–2004					1968–1979			1980–2004			All data from Sauer et al. (2005)
Trend	*P*	*n*	(95% CI)	R.A.	Trend	*P*	*n*	Trend	*P*	*n*	Credibility
5.6	0.23	17	–3.2, 14.3	2.29	18.7	0.44	4	5.1	0.31	17	Medium

at Eagle Lake and Buena Vista Lake; almost nothing is known of the size of the Goose Lake colony (Neale 1932, Thompson 1933, Shuford 2005). Since the 1930s, refuge biologists have estimated numbers of nests and fledged young at the colonies at Clear Lake NWR and Sheepy Lake, Lower Klamath NWR (Shuford 2005). Variation in the methods and timing of counts, however, make them difficult to interpret. Numbers of nests at Clear Lake ranged from about 1000 to 3000 in the 1930s to early 1940s; the only count at Lower Klamath during this period was of 200 nests in 1941.

Although shooting out of fear of competition for fish, for sport, and for plumes for the millinery trade caused population reductions in the late 19th and early 20th centuries, the primary cause of declines was the loss of habitat from water diversions and land reclamation for agriculture (Thompson 1933).

Recent Range and Abundance in California

After the loss of colonies at Buena Vista Lake and the Salton Sea in the 1950s (see above), California's nesting pelicans have been confined mainly to the Klamath Basin (see map), where they currently breed regularly only at Sheepy Lake, Lower Klamath NWR (since at least 1941), Siskiyou County, and Clear Lake NWR, Modoc County (since at least 1918; Shuford 2005). Since the 1950s, numbers of breeding pelicans in the Klamath Basin seem to have decreased and have varied considerably from year to year. Most nest counts have ranged at Clear Lake from 400 to 1600 and at Sheepy Lake from 200 to 700. In four years since the early 1970s, nest counts at Clear Lake have reached 2300–2500. These high counts may reflect especially favorable nesting conditions or may be largely, or partly, an artifact of the methods used, as accurate counts from aerial photos produced the high counts in 1971, 1997, and 1999.

Pelicans have nested sporadically at Goose Lake (1976 or 1977, about 300 unattended eggs; Winkler 1982), Modoc County; Meiss Lake, Butte Valley WA (12–15 nests, 1999–2000; refuge files), Siskiyou County; and Hartson Reservoir, Honey Lake WA (1976, 200–700+ nests, Tait et al. 1978; 1990, 7000 adults, 132 eggs, J. R. Jehl Jr. in refuge files), Lassen County.

The statewide Breeding Bird Survey (BBS) trend for 1966 to 2004 was positive but not significant; although the data are considered of medium credibility (Sauer et al. 2005), BBS methods generally are inadequate for surveying colonial waterbirds (Bystrak 1981, Robbins et al. 1986).

Ecological Requirements

White pelicans are limited by the availability of remote nesting sites and rich foraging habitats. Although adapted to exploit shifting nesting and foraging sites in response to cycles of drought and flood, pelicans form the largest colonies where these resources are most predictable, and islands hosting these colonies are subject to minimal disturbance by humans or ground predators (Evans and Knopf 1993). Pelicans often breed in multispecies assemblages of colonial nesters, generally choosing sites on flats or moderate slopes, for flight access and visibility, and avoiding low-lying areas prone to flooding; island substrate is usually loose earth suitable for heaping into nest mounds (Palmer 1962, Evans and Knopf 1993). Known nesting situations in California have been on the ground on earthen, sandy, and rocky islands or (rarely) peninsulas and (locally) on floating tule-mat islands, particularly in the Klamath Basin; nests may be in the open in the sand or interspersed with or adjacent to tall weeds and open, low-stature shrubs (Thompson 1933, Smith et al. 1984, Klamath Basin refuge files, W. D. Shuford pers. obs.).

White pelicans typically forage, often cooperatively in flocks, in shallow inland waters (0.3–2.5 m deep), such as open areas in marshes and along lake or river edges; wintering and nonbreeding birds also feed in shallow coastal marine habitats (Palmer 1962, Evans and Knopf 1993, Johnsgard 1993). Fish spawning in shallow water or concentrated or stranded by dropping water levels appear to be particularly vulnerable to pelican predation (Knopf and Kennedy 1980).

Pelicans nesting at Lower Klamath and Clear Lake forage extensively in the Klamath Basin in lakes, marshes, canals, and reservoirs within 100+ km of nesting islands (Smith et al. 1984, L. A. Moreno-Matiella unpubl. data, D. Anderson in litt.). Although not attributable to colony of origin, foraging pelicans also are found widely over southeastern Oregon and northeastern California (Smith et al. 1984). Pelican populations may shift their primary foraging sites at least two to three times during the nesting season as they opportunistically select sites where fish are most readily available (Knopf and Kennedy 1980). Radiotelemetry studies indicate that round-trips for foraging of >322 km (200 mi) are common,

and fish tags suggest such trips may total almost 935 km (580 mi); breeding birds in western Nevada make repeated flights over the Sierra Nevada to forage in California's Central Valley (Yates 1999, Scoppettone et al. 2006). The diet of these pelicans is mainly "rough" fish of low economic value—predominately small (<½ bill length) schooling fish, but also larger, sluggish bottom feeders—as well as salamanders and crayfish (Palmer 1962, Smith et al. 1984, Evans and Knopf 1993, Johnsgard 1993).

Threats

Historically, white pelicans were affected primarily by the loss of foraging and nesting habitat and by human disturbance, factors still of concern today. Given the water and recreational demands of the state's rapidly expanding human population, it is unlikely that restoration efforts will enable pelicans to establish many new colonies or reoccupy much of their historic breeding range. The extreme concentration of the state's breeding population leaves it vulnerable to catastrophic losses, particularly at the Clear Lake colony. Both Klamath colonies are remote but not immune to human disturbance on an irregular basis (refuge files), to ground predators during drought years (refuge files), or to rapid transmission of disease at any time. Boellstorff et al. (1988) reported that research activities lowered reproductive success of a disturbed colony at Lower Klamath.

A reordering of water priorities in the Klamath Basin in 1995 threatens to reduce or degrade wetland habitat for pelicans. Shortages of water or inappropriate timing of delivery to wetlands on Lower Klamath NWR, particularly in summer and fall, have been occurring with increasing frequency (Shuford et al. 2004). In addition, water quality is often poor because of high background nutrient concentrations coupled with a loss of much of the natural filtering function of riparian and wetland habitats within the watershed. Water shortages in particular may potentially affect the pelican colonies at Lower Klamath NWR and Clear Lake NWR, exacerbating the effects of droughts. Fortunately the important pelican foraging grounds at Tule Lake will retain priority for summer water for remnant populations of the endangered Lost River (*Deltistes luxatus*) and Shortnose (*Chasmistes brevirostris*) suckers.

The Sheepy Lake colony is at risk from fluctuating water levels, which need to be maintained within a narrow range; when kept too high in 1999 and 2000, water saturated the tule-mat nesting islands and no pelicans nested (D. Mauser pers. comm.).

White pelicans in the Klamath Basin were susceptible to direct mortality and eggshell thinning from organochlorine pesticide contamination from the 1960s to mid-1980s (Keith 1966, Godsil and Johnson 1968, Boellstorff et al. 1985). Although pelicans initially were exposed to organochlorine pesticides in the Klamath Basin, by 1981 their exposure there was minimal; hence, birds probably accumulated these chemicals elsewhere during winter or migration. Currently, contamination is not a problem for Klamath Basin pelicans (D. Anderson in litt.).

White pelicans also are subject to catastrophic losses where large numbers congregate during migration or winter. They are particularly vulnerable at the Salton Sea and Río Colorado Delta, as most of the western population passes through these areas in the nonbreeding season (D. Anderson in litt.). High counts of white pelicans at the Salton Sea in the 1980s and 1990s ranged from about 25,000 to 33,000 birds (Shuford et al. 2002), and nearly 9000 (10–15% of the western population) died in an avian botulism disease outbreak there in 1996 (Rocke et al. 2004). At least some pelicans from the Clear Lake and Lower Klamath breeding colonies have been detected at the Salton Sea during their southward migration (D. Anderson pers. comm.).

Pelicans from the western population also are shot where they consume fish at aquaculture operations in Mexico (D. Anderson in litt.).

Management and Research Recommendations

The USFWS's (1984) management recommendations for the western population are modified here for California:

- Provide or maintain nesting islands of suitable size, substrate, and isolation. Manage water levels to avoid flooding or connecting islands to the mainland, and, if necessary, prevent erosion by planting vegetation or by other mechanical means. When peninsulas form at Clear Lake during drought, continue, as in the past, to erect temporary electric fences to deter ground predators from entering colonies (Moreno-Matiella and Anderson 2005, Klamath refuge files). As a longer-term solution, study the feasibility of physically modifying some islands in the west lobe of Clear Lake so nesting habitat

would be available at the lowest water levels (Moreno-Matiella and Anderson 2005).
- Maintain or enhance nongame fish populations for pelicans, restoring prey species at pelican foraging areas as necessary; ensure prey availability by maintaining shallow (1–2 m) water and, when feasible, drawing down levels to provide foraging opportunities.
- Minimize human disturbance at colonies by restricting access by land or boat (posting and patrolling nesting areas), prohibiting discharge of firearms nearby, and requiring aircraft to stay at least 610 m (2000 ft) from nesting islands. Review research protocols to evaluate whether expected results are worth the risks of disturbance. Researchers should avoid or minimize disturbance to nesting pelicans by entering colonies only when absolutely necessary; colonies are particularly vulnerable when eggs or small young are present, which may occur even late in the season because of subcolony asynchrony.
- Establish a task force to evaluate the feasibility and methods of restoring former nesting sites or developing new ones. Consider whether natural pioneering will be sufficient at such sites or placement of pelican decoys, playing taped vocalizations, or transplanting of young (restocking) might be needed. Assess the benefits of new nesting islands to other colonial nesters and the potential for any unintended effects on other wildlife populations.
- Educate the public about the history of population declines, pelican ecology, and the effects of human disturbance.
- Conduct a population viability analysis to see which population parameters contribute the most to limitation of the Klamath breeding population.
- Initiate detailed studies of the foraging ecology of Klamath Basin pelicans to assess how they might be affected by water quality or water allocation priorities in any year. Study the diet of pelicans in the Klamath Basin and the ecology of important fish species. Also, study pelican foraging ecology at key migratory or wintering areas.
- Conduct typical and satellite telemetry studies to determine foraging movements, dispersal patterns, and migration routes of Klamath pelicans to assess risks at foraging areas in both the breeding and nonbreeding seasons.
- Periodically evaluate pesticides and contaminants in pelicans. Continue disease reduction efforts at the Salton Sea, and study disease events there or elsewhere where pelicans concentrate in the nonbreeding season.

Monitoring Needs

Numbers of breeding pairs should be monitored by nest counts from aerial photographs taken annually at known colonies during the peak of the incubation period (early May in Klamath Basin); see Smith et al. (1984) and Shuford et al. (2004). Reproductive success also should be monitored annually via early July counts of the number of young reaching fledging age.

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