

# WESTERN BIRDS



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## DECLINE, STATUS AND PRESERVATION OF THE YELLOW-BILLED CUCKOO IN CALIFORNIA

DAVID GAINES, P.O. Box 29, Lee Vining, California 93541

STEPHEN A. LAYMON, Department of Forestry and Resource Management, 145  
Mulford Hall, University of California, Berkeley, California 94720

“In contrast with those good old days . . . the large thickets have been replaced by farms and pastures, the trees cut down, and the evergrowing population has crowded in on the old haunts of the cuckoos to such an extent that if they come here now at all they must be exceedingly rare . . .”

Wilson Hanna (1937) describing  
the San Bernardino Valley.

The Yellow-billed Cuckoo (*Coccyzus americanus*), formerly a “fairly common” breeding species in “willows of fairly old growth, often mixed with cottonwoods . . . on the broad flood-bottoms of larger streams” (Grinnell and Miller 1944), has become one of California’s rarest birds. The paucity of recent records justifies concern for its survival in the state.

Between 1 June and 10 August 1977 we conducted surveys in floodplain riparian forests throughout California where the cuckoo has been reported in the past or where habitat appeared to meet the requirements of the species. We timed the surveys to coincide with the period between the onset of courtship and the beginning of pre-basic molt, when cuckoos are most easily detected on the nesting grounds.

In this paper we present the results of the surveys and discuss the cuckoo’s past and present status and survival prospects in California. The paper is divided into geographic sections discussing the North Coast, Klamath-Modoc, Central Coast, Sacramento Valley, San Joaquin Valley, Sierra Nevada, South Coast, Mojave Desert and Lower Colorado River regions (Figure 1). Concluding sections consider causes of decline and preservation and management of existing populations.

## METHODS

Past distribution of the Yellow-billed Cuckoo was determined through a review of the literature and of specimens and egg sets in museum collections. We located extant floodplain riparian forest through examination of topographic maps and aerial photographs of river-bottoms, and through correspondence with wildlife biologists and local residents.

We surveyed areas on foot or by canoe, using tape recordings of the Yellow-billed Cuckoo's vocalizations to stimulate responses (Hamilton and Hamilton 1965; Gaines 1974a, 1974b). At each stop, calls were played at intervals of about 60 seconds for 10-30 minutes. We used Cornell Laboratory of Ornithology recordings of the "kowlp" call, recorded in New York State, until mid-July, at which time we obtained usable field recordings of the "kowlp" and "cooing" calls of the California bird.

When a Yellow-billed Cuckoo was detected, we recorded the following habitat data: (1) estimated height and percent cover of canopy foliage; (2) estimated percent cover of woody understory foliage; (3) estimated species composition of woody vegetation by percent cover; (4) presence of sloughs, creek mouths, oxbow lakes and/or marshes (exclusive of main river channel); and (5) extent of the habitat and proximity to similar areas. If a cuckoo was seen, the substrate it occupied and its behavior were noted. Most sites were photographed.

## NORTHCOAST REGION

*History of occurrence.* The Yellow-billed Cuckoo has nested in Napa and Sonoma counties. Individuals have also been observed in Humboldt, Lake and Marin counties (Table 1). In the Napa Valley, Napa Co., two cuckoos were collected in 1862 (Cooper 1870), and a nest was collected in 1881 (egg set WFVZ).

Shelton (1911) described the nesting habitat along the Laguna de Santa Rosa in Sonoma Co. as "a chain of long, rather narrow ponds" bordered by "a thick growth of willow, small ash and scrub oak" and "tangled together with an undergrowth of poison-oak, wild blackberry and various creepers, forming, as it were, an impenetrable jungle hanging far out over the water." The cuckoos arrived in early June but kept "to higher ground among the oaks and other timber, for a period of 2 or 3 weeks before retiring to the willow bottoms to breed." An effort to locate the species here on 20 July 1972 was unsuccessful (Gaines unpubl. rep).

A cuckoo at the south end of Clear Lake, Lake Co., in June 1973 may have been nesting in the willow (*Salix* sp.)-cottonwood (*Populus* sp.) habitat nearby [Am. Birds (hereafter AB) 27:915, 1973]. The Marin and Humboldt county records (Tables 1 and 2) probably pertain to transient birds.

*Results.* We conducted surveys near Willits, Mendocino Co., 1 June 1977 and at Clear Lake, Lake Co., 2 June 1977. No cuckoos were detected.

*Discussion.* The willow and willow-cottonwood forests we surveyed appear to meet the habitat requirements of the Yellow-billed Cuckoo. Possibly the forests are not extensive enough to support a viable population, or they are too isolated from other suitable habitat to be readily colonized.

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Nesting cuckoos may be found in extensive willow thickets along the immediate coast, such as those near Humboldt Bay. They have nested in similar habitats in northwestern Washington and southwestern British Columbia (Jewett et al. 1953, Godfrey 1966).

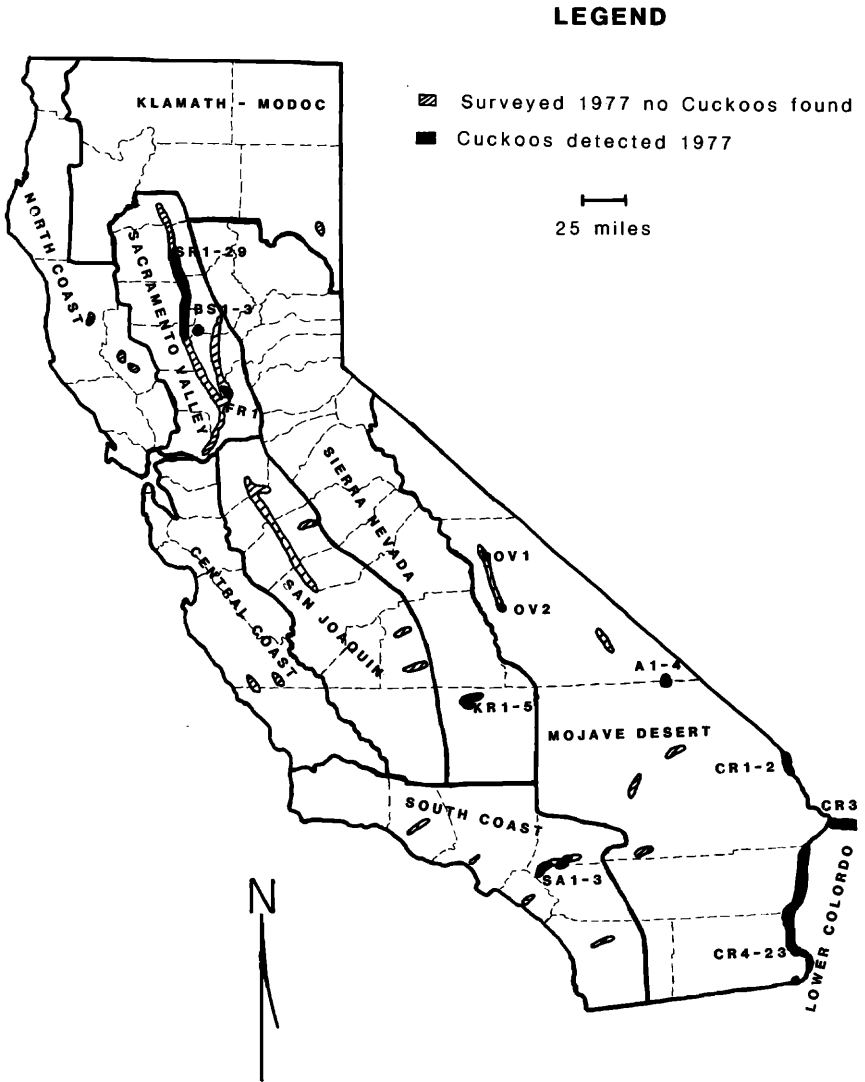


Figure 1. Areas surveyed for Yellow-billed Cuckoos in 1977.

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### KLAMATH-MODOC REGION

*History of occurrence.* The Yellow-billed Cuckoo has nested in Siskiyou Co., and has been observed in Modoc and Lassen counties (Table 1). A nest was discovered in July 1951 near the "old fish hatchery" at Mt. Shasta, Siskiyou Co. [Audubon Field Notes (hereafter AFN) 5:307, 1951]. Along the nearby Shasta River one cuckoo was collected and others observed in July 1899 (Merriam 1899). Another was seen in late May 1920 (Mailliard 1921).

Mailliard (1927) listed cuckoos as regular visitors and probable breeders in Surprise Valley, Modoc Co. Local residents said the species was present "in mid-summer, even in the village streets."

*Results.* During late July and early August 1977, Al Lapp surveyed apparently suitable habitat on Honey Lake Wildlife Area, Lassen Co. No cuckoos were detected.

*Discussion.* Scattered nesting populations may still be discovered in this region. Suitable habitat may exist along the Pit River.

### CENTRAL COAST REGION

*History of occurrence.* The Yellow-billed Cuckoo has nested in Santa Clara and San Luis Obispo counties and has been recorded in Alameda, San Benito and San Francisco counties.

A nest was discovered 10 miles north of San Jose, Santa Clara Co., in June 1899. It was situated in a "growth of young willow and maple trees" near a running stream. Cuckoos bred "sparingly" at that locality yearly (Atkinson 1899). Another nest "housed in a willow clump in the Santa Clara Valley" contained eggs at the end of May (Wheelock 1904).

A cuckoo collected near Paicines, San Benito Co., in June 1899 (CAS) is the only indication of nesting in the seemingly ideal willow-cottonwood habitat which formerly lined the San Benito and Salinas rivers. The lack of sightings may reflect the absence of ornithologists rather than of cuckoos.

A set of cuckoo eggs (SBNHM) collected in San Luis Obispo Co. indicates former nesting. A specimen was obtained near San Luis Obispo in 1921 (SBCM) and a cuckoo was recently observed near Morro Bay (Thomas Heindel pers. comm.).

*Results.* On 2 July 1977 we surveyed along the Salinas River near Bradley and along the Nacimiento River on Camp Roberts Military Reservation, Monterey Co. No cuckoos were detected. The cuckoos found on the Farallon Islands and at Lake Merced, San Francisco Co., during 1977 were undoubtedly transients.

*Discussion.* The willow-cottonwood forests along the Salinas and Nacimiento rivers, Monterey Co., appear to meet the cuckoo's habitat requirements. The recent sighting near Morro Bay raises the possibility that cuckoos nest in coastal San Luis Obispo Co. According to Eric Johnson (pers. comm.), Coon Creek in Montana de Oro State Park and the last mile or two of San Luis Obispo Creek might have suitable cuckoo habitat. All of these areas need to be surveyed.

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Table 1. Records of the Yellow-billed Cuckoo in California, 1854-1976.

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<b>NORTH COAST REGION</b>				
<u>Humboldt County</u>				
Ferndale	24 May 1958	1	T	AFN 12:383, 1958
Arcata	9 Nov 1963	1	T	Yocum & Harris 1975
Prairie Creek Redwoods State Park	2 Sep 1975	1	T	AB 30:121, 1976
<u>Lake County</u>				
S end of Clear Lake	28 Jun 1973	1	N?	AB 27:915, 1973
<u>Sonoma County</u>				
Laguna de Santa Rosa	3 Aug 1884	1	N	Specimen CAS
5 mi SE of Sebastopol	Jun-Jul pre-1910	FC	N	Shelton 1911
Petaluma	18 Jun ?	?	?	Bent 1940
Copeland Ck, Sonoma State College	May 1975	2	N?	Erik Ferry pers. comm.
<u>Napa County</u>				
Napa Valley	Summer 1862	?	N	Cooper 1870
Napa Valley	15 May 1881	?	N	Egg set WFVZ
<u>Marin County</u>				
Point Reyes	19 Jul 1919	1	?	Hansen 1919
Point Reyes	19 Jun 1976	1	?	AB (regional records)
<b>KLAMATH-MODOC REGION</b>				
<u>Siskiyou County</u>				
Edgewood	Jul 1899	several	N?	Merriam 1899
Edgewood	late May 1920	several	N?	Mailliard 1921
Sisson (Mt. Shasta City)	Jul 1916	1	T	Dawson 1923
Mt. Shasta Fish Hatchery	3 Jul 1951	?	N	AFN 5:307, 1951
<u>Modoc County</u>				
Surprise Valley	July pre-1927	FC?	N?	Mailliard 1927
<u>Lassen County</u>				
Honey Lake Wildlife Area	27 Aug 1971	1	?	Tim Manolis pers. comm.
<b>CENTRAL COAST REGION</b>				
<u>Alameda County</u>				
Oakland	pre-1927	1	?	Grinnell & Wythe 1927
Hayward	1882	1	?	Emerson 1894
Hayward	late Jul 1894	1	?	Specimen CAS
<u>Santa Clara County</u>				
Palo Alto	22 Jul 1901	1	?	Specimen CAS
10 mi N of San Jose	17 Jun 1899	UC	N	Atkinson 1899
Santa Clara Valley	pre-1904	?	N	Wheelock 1904
San Jose	6 Jun 1885	?	?	Belding 1890
<u>San Benito County</u>				
Paicines	4 Jun 1899	?	N?	Specimen CAS

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Table 1 (Cont.)

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<u>San Francisco County</u>				
SE Farallon Island	7 Aug 1965	1	T	Condor 69:582
	24 Sep 1974	1	T	AB 29:115, 1975
	Jun 1975	1	T	AB 29:1027, 1975
	19 Jun 1976	1	T	AB 30:999, 1976
<u>San Luis Obispo County</u>				
San Luis Obispo	30 Jun 1921	?	N?	Specimen SBCM
San Luis Obispo County	5 Jul 1932	?	N	Egg set SBNHM
Morro Bay	Jul 1961	1	?	Thomas Heindel pers. comm.
<u>SACRAMENTO VALLEY REGION</u>				
<u>Shasta County</u>				
Near Redding	1854	?	N?	Newberry 1857
<u>Tehama County</u>				
3 mi W of Paynes Creek Woodson Bridge St. Recr. Area	14 Jul 1930	1	?	Compton 1932
	8 Sep 1971	1	?	Laymon pers. obs.
Todd Island	12 Sep 1975	2	N?	Laymon pers. obs.
<u>Butte County</u>				
Chico	4 Jun 1884	VR	N?	Belding 1890
Butte Sink	Jun-Jul until 1950s	FC	N?	Roger Wilbur pers. comm.
E Bank of Sacramento River	16 Jun-14 Jul 1974	2	N?	Syd Thomas pers. comm.
Between Indian Fisheries Slough and mouth Big Chico Creek	17 Jun-30 Jul 1975	2	N?	AB 29:1027, 1975
Lower Butte Sink	5 Jul-2 Aug 1973	5	N?	Gaines 1974b
Wild Goose Country Club	27 Jun 1976	1	N?	AB 27:915, 1973
Gray Lodge W.A.	27 Jun 1974	1	?	Bruce Deuel pers. comm.
<u>Glenn County</u>				
W bank of Sacramento River	16 Jun-14 Aug 1974	2	N?	Louis Heinrich pers. comm.
0.5 mi N of Jacinto	11 Jun-4 Aug 1975		N?	AB 27:815, 1973
	24 May-25 Aug 1976		N?	AB 29:1027, 1975
1.5-2 mi N of Princeton	6-29 Aug 1973	2	N?	Michny et al. 1975
<u>Colusa County</u>				
Vicinity of Colusa	Jun-Jul until 1940s	FC	N?	Roger Wilbur pers. comm.
Colusa State Park	1 Sep 1963	1	?	AFN 18:70, 1964
<u>Sutter County</u>				
Vicinity of Yuba City	Jun-Jul until 1940s	FC	N?	Roger Wilbur pers. comm.
Berry Patch Gun Club	19 Jun 1974	2	N?	Bruce Deuel pers. comm.
Confluence Yuba and Feather rivers	27 Jun 1976	1	N	Bruce Deuel <i>vide</i> Jon Winter
<u>Yuba County</u>				
Vicinity of Marysville	Jun 1878	C	N	Belding 1879
	19 May-7 Jul 1884			Belding 1890
	1 May 1885			Belding 1890

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Table 1 (Cont.)

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<u>Sacramento County</u>				
Vicinity of				
Sacramento	1 May-1 Sep 1865	C	N	Cooper 1870
Orangevale	2 Jul 1962	1	?	AFN 16:504, 1962
Carmichael	23 Apr-6 May 1964	1	?	Peter Brown pers. comm.
Sacramento	1 Aug 1962	1	?	AFN 16:504, 1962
<u>Yolo County</u>				
Sacramento Bypass				
	Jul 1952	?	N	AFN 7:325, 1953
	Jun 1953	?	N	AFN 15:73, 1961
	18 Sep 1960	?	N	<i>fide</i> Betty Kimball
Yolo Bypass	4 Aug 1956	1	N?	AFN 10:407, 1956
Sacramento River	4 Jun 1941	1	N?	John Emlen pers. comm.
Clarksburg	5 Jun 1896	?	N?	Specimen MVZ
Putah Creek near Davis	28 Aug 1937	R	N?	John Emlen pers. comm.
	31 Jul, 17 Sep 1939		?	John Emlen
	25 Aug, 17 Sep 1940		?	John Emlen
	26 Jun, 6 Jul 1941		N?	John Emlen
	4 Jul 1942		N?	John Emlen
Willow Slough	29 Jun 1965	1	?	<i>fide</i> Betty Kimball
Sacramento Bypass	29 Sep 1962			Richard Stallcup pers. comm.
<u>Regionwide</u>				
15 localities Tehama -Colusa counties	18 Jun-10 Aug 1972	28	N	AB 26:898, 1972; Gaines 1974a
21 localities Tehama -Colusa counties	16 May-28 Jul 1973	29	N	Gaines 1974b, Michney et al. 1975
<u>SAN JOAQUIN VALLEY REGION</u>				
<u>Kern County</u>				
near Bakersfield	17-20 Jul 1891	C	N?	Fisher 1893
Buena Vista Lake	11 Jun-8 Jul 1921	C	N	17 specimens UCLA
	7 Jun-22 Jul 1922	C	N	Specimen SDNHM, egg set WFVZ
<u>Tulare County</u>				
Visalia	22-25 Jul 1891	?	?	Fisher 1893
<u>Fresno County</u>				
S of Clovis	10 Jul 1902	UC	N	Tyler 1913
6 mi NE Fresno	10 Jul 1907	UC	N?	Tyler 1913
San Joaquin River	4 Jul 1907	UC	N?	Tyler 1913
Mendota Pool	14 Jun 1918	C?	N	Specimen MVZ
	21 Jun 1918	C?	N	Specimen MVZ
	Jun-Aug 1950	C?	N	AFN 4:291, 1950
<u>Merced County</u>				
Gustine	Jun 1915	?	?	Specimen MVZ
Hatfield State Park	8 Aug 1971	1	?	AB 25:902, 1971

YELLOW-BILLED CUCKOO IN CALIFORNIA

Table 1 (Cont.)

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<u>Stanislaus County</u>				
Tuolumne River. Modesto	11 Jun 1914	?	N?	Specimen CAS
	17 Aug 1916	?	?	Specimen CAS
Mouth of Stanislaus River	Sep 1962	5	N	AFN 17:65, 1963
	Jun-Aug 1963	2	N	AFN 18:70, 1964
	14 Jul 1965	3	N	Betty Kimball pers. comm.
<u>SIERRA NEVADA REGION</u>				
<u>Kern County</u>				
Weldon	10 Jul 1911	?	?	Specimen MVZ
Kelso Creek 8 mi SSE of Weldon	13 Sep 1975	1	?	AB 30:127, 1976
<u>Placer County</u>				
Truckee River near Squaw Valley	18-19 Sep 1976	1	T	<i>vide</i> Phillip Schaeffer
<u>SOUTH COAST REGION</u>				
<u>Ventura County</u>				
Santa Clara River. Santa Paula	Jun 1904	?	N	Willett 1912
Mouth. Santa Clara River	18 Jul 1920	FC	N	Egg set WFVZ
	31 Jul 1921	FC	N	Egg set WFVZ
Montalvo	4 Jul 1942	?	N	Egg set WFVZ
Hueneme	4 Jul 1936	?	N	Egg set WFVZ
	21 Jul 1936	?	N	Egg set WFVZ
Sespe Canyon	24 May 1969	1	T	AB 24:645, 1970
Santa Barbara Island	1 Jun 1973	1	T	AB 27:821, 1973
<u>Santa Barbara County</u>				
Santa Barbara	30 Jun 1963	1	?	Metcalf 1967
Montecito	22 Jun 1967	1	?	Metcalf 1967
<u>Los Angeles County</u>				
E of Santa Barbara	7 Jun 1889	FC	N	Grinnell 1898
Los Angeles River. Compton	Jun-Aug pre-1918	FC	N	Jay 1911; Cookman 1915; Willett 1912. 1933: 2 specimens CAS: 3 specimens LACNHM: specimen MVZ: specimen WFVZ: 2 egg sets WFVZ
Pasadena	16 May 1895	?	?	Specimen MVZ
San Gabriel River. El Monte	12 Aug 1897	FC	N	Specimen UCLA
	16 May 1911	FC	N	Specimen UCLA
	20 Jul 1929	FC	N	Specimen UCLA
	Jun-Aug 1949	?	N?	AFN 3:251, 1949
	May 1951	?	?	AFN 5:309, 1951
San Gabriel River. Pico Rivera	5 May 1907	?	?	Jay 1911
San Gabriel River. Artesia	22 Jun 1912	FC?	N	Egg set WFVZ



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Table 1 (Cont.)

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<u>San Bernardino County</u>				
Lake Arrowhead	2 Jun 1950	1	T	Baumgardt 1951
Chino	16 May 1931	?	N	Egg set SBNHM
Santa Ana River and Warm Ck 3 mi E San Bernardino-Riverside County line	Jun-Aug until 1930s	C	N	Hanna 1937: specimens SBCM. MVZ: 7 egg sets SBCM: 6 egg sets WVZ
Rialto	5 Jul 1970	1	?	AB 24:717. 1970: specimen SBCM
<u>Riverside County</u>				
Santa Ana River. Riverside	20 Jun 1890	?	?	Specimen MVZ
	9 Jun 1888	?	?	Specimen MVZ
	Jun-Aug until 1950s	C	N	Eugene Cardiff pers. comm.
Santa Ana River. Corona	26 May 1915	?	?	Specimen SDNHM
Santa Margarita River. Temecula	18 May 1947	C	N	Specimens MVZ
	19 Jun 1948			Egg set SBCM
	Jun-Aug until 1950s			Eugene Cardiff pers. comm.
<u>Orange County</u>				
Santa Ana River. Anaheim	Jun-Jul 1899	C	N	Schneider 1899
	10 Jul 1918	?	N	Egg set WVZ
<u>San Diego County</u>				
Escondido	20-22 Aug 1896	?	N	Hatch 1896
	30 Jun 1915	?	N	Dixon 1916
	2 Jul 1932	?	N	Willett 1933: specimen MVZ
Poway Sweetwater River. Bonita	1875-1876	?	?	Belding 1890
	1 Jul 1915	?	N	Willett 1933
	3 Jul 1915	?	N	Specimen SDNHM
Tijuana River	20 Jul 1931	?	?	Von Bloeker 1931
Oceanside	23 Aug 1969	1	?	AFN 24:100
<u>MOJAVE DESERT REGION</u>				
<u>Inyo County</u>				
Bishop	11 Aug 1891	?	?	Fisher 1893
	Aug 1956	?	?	Specimen CSULA
2 mi N Independence	29 Jun 1917	?	N?	2 specimens MVZ
2 mi SW Big Pine	Jul 1968	?	N?	Steven Cardiff pers. comm.
Scotty's Castle. Death Valley	30 May 1975	1	?	AB 29:909. 1975
Furnace Creek Ranch. Death Valley	20 Jun 1891	1	?	Fisher 1893
	3 Sep 1972	1	?	AB 27:915. 1973
	29 May 1976	1	?	AB 30:891. 1976
	13 Jun 1976	1	?	AB 30:1004. 1976
Amargosa River. Tecopa	15 Jul 1976	1	N?	AB 30:1004. 1976

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Table 1 (Cont.)

<u>Locality</u>	<u>Date</u>	<u>Abundance</u>	<u>Status</u>	<u>Source</u>
<u>San Bernardino County</u>				
Mojave River, Yermo	6-7 Aug 1910	1	?	Lamb 1912
Kelso	1 Jul 1976	1	?	AB 30:1004, 1976
Morongo Valley	27 Jun 1964	1	?	AFN 18:536, 1964
<u>LOWER COLORADO RIVER REGION</u>				
<u>San Bernardino County</u>				
Needles	Jun 1902	FC?	N?	Stephens 1903
Earp	27 Jun 1968	1	T	Guy McCaskie pers. comm.
<u>Imperial County</u>				
Potholes, 1 mi N of Laguna Dam	8 Jun-20 Jun 1930	FC?	N?	4 specimens SDNHM
Laguna Dam	24 Jun 1930	FC?	N?	5 specimens SDNHM
	26-28 Jun 1952	FC?	N?	5 specimens SDNHM
Bard	22 Jun-3 Jul 1915	FC?	N?	2 specimens SDNHM
Above Laguna Dam	18-19 Jul 1964	10	N?	Guy McCaskie pers. comm.
	Jun-Jul 1965	12	N?	Guy McCaskie
	25 Jun 1966	1	N?	Guy McCaskie
	16 Jun 1967	3	N?	Guy McCaskie
	Jun-Jul 1968	10	N?	Guy McCaskie
	14-15 Jun 1969	3	N?	Guy McCaskie
	Jun-Jul 1970	4	N?	Guy McCaskie
	5 Jul 1971	2	N?	Guy McCaskie
	24 Jun 1972	4	N?	Guy McCaskie
	Jun-Jul 1975	?	N?	Guy McCaskie
Colorado River, Davis Dam to Morelos Dam, Mexico	Jun-Jul 1975-1976	244	N	Bertin Anderson pers. comm.
Bill Williams River Delta	Jun-Jul 1975-1976	114	N	Ken Rosenberg pers. comm.
Near Blythe, Yuma County, Arizona	15 Jun 1929	?	N	Egg set SBCM

<u>Status</u>	<u>Source</u>
T Transient	AFN Audubon Field Notes
N Positive nesting	AB American Birds
N? Suspected nesting	WFVZ Western Foundation of Vertebrate Zoology
? Status unknown	CAS California Academy of Sciences
	SBCM San Bernardino County Museum
	SBNHM Santa Barbara Natural History Museum
	MVZ Museum of Vertebrate Zoology
	UCLA University of California, Los Angeles
	SDNHM San Diego Natural History Museum
	LACNHM Los Angeles County Natural History Museum
	CSULA California State University, Los Angeles
<u>Abundance</u>	
FC Fairly common	
UC Uncommon	
VR Very rare	
C Common	
R Rare	
? Abundance unknown	

## SACRAMENTO VALLEY REGION

*History of occurrence.* The Yellow-billed Cuckoo has been recorded in every county in this region with the exception of Placer. Breeding has been verified in Tehama, Butte, Glenn, Colusa and Yolo counties (Tables 1 and 2).

Early reports suggest that the cuckoo was formerly numerous along most, if not all, of the wooded streams and sloughs of the Sacramento Valley. Between 1 May and 1 September 1865, Cooper (1870) found them "quite common" in large cottonwoods near Sacramento. Belding (1879) found them "common in willow and poplar thickets at Marysville in June 1878."

Roger Wilbur, a naturalist and long-time resident of Colusa County, observed cuckoos in Colusa, Butte, Sutter and Yuba counties during the 1920s and 1930s. He considered them to be fairly common during the summer. He often found cuckoos in peach and prune orchards where they "were evidently feeding on tent caterpillars and canker worms." He found a nest in a small willow thicket "surrounded by tules and weeds" in the Butte Basin, and another in a shrub overhanging Butte Creek (Wilbur pers. comm.).

Cuckoos bred in Yolo County until the 1950s. Between 1937 and 1942 John T. Emlen (pers. comm.) recorded the species along Putah Creek and the Sacramento River. At least one pair nested in the Sacramento Bypass in 1952 and probably in 1953 (*vide* Betty Kimball, AFN 7:325, 1953). Individual birds were recorded from this and adjacent areas from 1956 to 1965 (AFN 10:407, 1956; 15:73, 1961; *vide* Betty Kimball). None have been found since.

By 1970 most authorities believed that Yellow-billed Cuckoos had been extirpated from the Sacramento Valley. On 16 June 1971 the discovery of an individual near the mouth of Big Chico Creek revived hope that a few might still nest along the upper Sacramento River (AB 25:902, 1971).

During the summers of 1972 and 1973, Gaines surveyed riparian habitat throughout the Sacramento Valley. In 1972, he found 28 cuckoos at 15 sites along the Sacramento River between Todd Island, Tehama Co. and Colusa State Park, Colusa Co. (Gaines 1974a, 1974b). The following year 29 cuckoos were detected at 21 sites along this same stretch (Gaines 1974b, Michny et al. 1975), and five additional birds were detected along Sanborn Slough in the Butte Sink, Butte Co. (Gaines 1974b). From 1974 to 1976 additional observations were made in these areas. Birds were also sighted along the Feather River near Nicolaus, Sutter Co., in July 1977 (AB 29:898, 1975) and at the confluence of the Feather and Yuba rivers, Yuba Co., in June 1976 (Bruce Deuel *vide* Jon Winter).

*Results.* Surveys were conducted along the Sacramento River on 20 days between 5 June and 31 July 1977; the Butte Sink on 3 days between 15 June and 31 July; along the Feather River on 26 June and in the Sacramento-San Joaquin Delta on 27 June.

We detected 54 cuckoos at 33 sites: 44 at 29 sites along the Sacramento River, 9 at 3 sites in the Butte Sink (Figure 2), and 1 near Nicolaus, Sutter Co., along the Feather River (Figure 3). We did not find cuckoos on the Sacramento River south of Colusa or in the Delta.

Of the 57 times cuckoos were actually seen, 68% were in willows, 26% in cottonwoods, 4% in English Walnuts, and 2% in Box Elders (*Acer*

*negundo*). Habitat used by the cuckoo varied from dense willow-cottonwood forests to marshy bottomlands with scattered thickets of willows. Canopy height ranged from 5 to 25 m, canopy cover from 20 to 90%, and understory cover from 30 to 90%. Willows and open water were common to all sites.

At most sites habitat was relatively extensive, being at least 100 m in width and 25 ha in surface area. Where the habitat was more confined, it was usually close to other more extensive patches of similar vegetation.

The cuckoos occurred in very low densities. In all but three areas only a single bird or pair was found. The exceptions were site SR7, with five cuckoos in 50 ha, sites SR11-13, with six individuals in 600 ha, and sites BS1-3 with nine cuckoos in 550 ha.

We detected cuckoos at about 50% of the sites that were thoroughly surveyed and that appeared to meet the habitat requirements delineated by Gaines (1974b). The Sacramento River from Red Bluff to Woodson Bridge, Tehama Co., is a good example of an area with considerable habitat but few cuckoos. Only four were found (sites SR1-3) despite two surveys of the area.

*Discussion.* When the 1972-73 survey results are compared with those of 1977, the raw figures indicate that the cuckoo has maintained or increased its population, at least along the Sacramento River. If the amount of coverage each year is taken into account, however, the opposite conclusion is plausible.

Only one cuckoo was detected along the Feather River in 1977, at the same site where one was reported in 1972, despite the existence of extensive and seemingly suitable habitat.

In the Butte Sink, nine cuckoos were found at three sites in 1977 compared to five at two sites in 1973. In the earlier survey only the habitat east of Butte Creek was searched. In 1977 the entire area was surveyed and one pair was found west of Butte Creek (site BS2). In the areas checked both years, there was an increase of two birds.

Along the Sacramento River from Todd Island to Colusa State Park, 44 cuckoos at 29 sites were found in 1977 compared to 44 at 28 sites in 1972-73. These totals seem identical but are misleading; only about half of the stretch was surveyed in 1972-73, whereas the entire stretch was surveyed in 1977. If the new areas covered in 1977 are deleted, the results drop to 32 cuckoos at 22 sites, suggesting a substantial decline. A decline of this magnitude is possible, but far from certain. Two factors need to be considered: the reliability of the survey technique and the year to year site attachment of breeding cuckoos.

In the absence of wind or rain, the tape recorded calls have proven reliable in eliciting a response from most cuckoos from the onset of courtship in mid-June until the pre-basic molt begins in early August (Gaines 1974a). Since every site where cuckoos were found in 1972-1973 was thoroughly surveyed in 1977, it is improbable that cuckoos were missed at 11 of these sites. Either the birds and their progeny at 11 sites died since 1972-73, or they emigrated to other sites. In 1977 cuckoos were found at five sites that had been surveyed without success in 1972-73. These findings indicate that cuckoos may not breed in precisely the same location every year.

## YELLOW-BILLED CUCKOO IN CALIFORNIA



Figure 2. Scattered willow thickets at Site BS3, Butte County, are typical of the habitat of the Yellow-billed Cuckoo in the Butte Sink.



Figure 3. The forest along the Feather River at Site FR1, Sutter County, is typical of the tall, very dense old-growth willows and cottonwoods inhabited by the Yellow-billed Cuckoo in the Sacramento Valley.

YELLOW-BILLED CUCKOO IN CALIFORNIA

The combined 1972-73 total must be re-examined. Some sites occupied in 1972 may not have been occupied in 1973 and vice versa. The 1972-73 total may overestimate the population. Of the eight sites surveyed in both 1972 and 1973, six had cuckoos both years. If the totals are reduced by 25% the combined total is 33 cuckoos at 21 sites, almost identical to the 1977 totals, suggesting no decline.

The total cuckoo population along the Sacramento River was estimated at 96 pairs as a result of the 1972-73 survey based on 10 ha per pair, 1200 ha of suitable habitat, and 80% occupancy (Gaines 1974b). The 1977 survey suggests that this figure is too high. The main problem lies in the occupancy rate of 80%, which was derived from the percent of occupied sites that were thoroughly surveyed under favorable weather conditions. It was then assumed that the entire river would have the same occupancy rate. The riparian areas in Tehama County have a much lower occupancy rate than the rest of the valley. This area was surveyed under less than optimum conditions in 1972-73 and was not used in occupancy calculation. If this area is included, the occupancy rate drops to 60%, which is close to the 50% rate found in the 1977 survey.

When the 50% figure is used, the 1972-73 population estimate for the Sacramento River drops from 96 to 60 pairs. In 1977, 15 pairs and 14 solitary birds were found. If all solitary birds were mated, the minimum Sacramento River population is 29 pairs and the maximum is 60 pairs. If the Butte Sink and Feather River birds are added, the regional estimate is 35 to 68 pairs.

Table 2. Records of the Yellow-billed Cuckoo in California during 1977.

Locality	Site No.	Date(s)	Total	Status	Principal Observer
<b>NORTH COAST REGION</b>					
Point Reyes, Marin Co.	---	2 Jul	1	T	Binford
<b>CENTRAL COAST REGION</b>					
SE Farallon Island, San Francisco Co.	---	2 Jul	1	T	Point Reyes Bird Observatory
Lake Merced, San Francisco Co.	---	7 Oct	1	T	Metropolous
<b>SACRAMENTO VALLEY REGION</b>					
Sacramento River					
Red Bluff to Woodson Bridge, Tehama Co.					
Mooney Island	SR1	29 Jul	1	N?	Laymon
Unnamed island 1.6 mi S of Tehama Bridge	SR2	7 Jun	1	N?	Gaines
Kopka Slough, Woodson Bridge State Park	SR3	7 Aug	2	N?	Laymon
Woodson Bridge to Hamilton City, Tehama and Glenn Counties					
Mouth of Jewett Ck W bank 0.5 mi S of McIntosh Landing	SR4	8 Jun	1	N?	Gaines
	SR5	2 Jul	1	N?	Laymon

YELLOW-BILLED CUCKOO IN CALIFORNIA

Table 2 (Cont.)

<u>Locality</u>	<u>Site No.</u>	<u>Date(s)</u>	<u>Total</u>	<u>Status</u>	<u>Principal Observer</u>
<u>Hamilton City to Ord Ferry Bridge, Glenn and Butte Counties</u>					
Pine Ck 1.0 mi above Sacramento River	SR6	11 Jul	1	N?	Laymon
Inside of bend 0.5 to 1.5 mi W of mouth of Pine Ck	SR7	11 Jul	5	N?	Laymon
Indian Fishery	SR8	9 Jul	1	N?	Laymon
Mouth of Indian Fishery Slough	SR9	11 Jul	1	N?	Laymon
Mouth of Big Chico Ck	SR10	25 Jun 20 Aug	2	N?	Thomas
W bank 0.6 mi SW of mouth Big Chico Ck	SR11	29 Jun	3	N?	Laymon
E bank 0.7 mi S of mouth Big Chico Ck	SR12	12 Jul	2	N?	Laymon
E bank 1.3 mi S of mouth Big Chico Ck	SR13	12 Jul	1	N?	Laymon
Slough on W bank N of Ord Ferry	SR14	14 Jun	2	N?	Gaines
<u>Ord Ferry Bridge to Butte City, Butte and Glenn Counties</u>					
E bank 0.2 mi S of Ord Ferry Bridge	SR15	22 Jul	1	N?	Snowden
W bank across from Parrott Landing	SR16	14 Jun	2	N?	Gaines
W bank 0.2-0.5 mi N of Jacinto	SR17	10 Jun 18 Jul	2	N?	Heinrich
Jacinto (Hawaiian Gardens) Unnamed Island N of Hartley Island	SR18 SR19	14 Jun 18 Jul	1 2	N? N?	Gaines Laymon
E bank NE of Hanson Island 0.2 mi N of river mile 171	SR20	18 Jul	1	N?	Laymon
E end of Hanson Island	SR21	18 Jul	1	N?	Laymon
E bank near river mile 170 0.8 mi N of Butte City	SR22	25 Jul	1	N?	Snowden
W bank below Hanson Island 0.3 mi NW of Butte City	SR23	18 Jul	1	N?	Laymon
<u>Butte City to Colusa, Colusa Co.</u>					
S end of Packer Lake	SR24	18 Jul	1	N?	Laymon
W bank 1.5-2.0 mi N of Princeton (W.C.B. site)	SR25	23 Jul	1	N?	Laymon
E bank 0.7 mi N of Glenn- Colusa Co. line	SR26	23 Jul	1	N?	Laymon
W bank 0.5 mi SSE of Stegeman	SR27	23 Jul	1	N?	Laymon
0.6 mi NE of Hamilton Bend	SR28	23 Jul	2	N?	Laymon
W bank 0.5 mi N of Colusa (Colusa State Pk)	SR29	31 Jul	2	N?	Laymon
<u>Butte Sink, Butte County</u>					
0.8 mi S of Sanborn Slough Gun Club	BS1	31 Jul	1	N?	Laymon
Angel Slough 0.4 mi E of White Mallard Hunting Club	BS2	24 Jul	2	N?	Laymon
1.0 mi WNW of Wild Goose Country Club	BS3	15 Jun 24 Jul	6 6	N? N?	Gaines Laymon

YELLOW-BILLED CUCKOO IN CALIFORNIA

Table 2 (Cont.)

<u>Locality</u>	<u>Site No.</u>	<u>Date(s)</u>	<u>Total</u>	<u>Status</u>	<u>Principal Observer</u>
<u>Feather River, Sutter County</u>					
Slough on E bank 0.1 mi N of Garden Highway (SW of Nicolaus)	FR1	25 Jun	1	N?	Gaines
<u>SIERRA NEVADA REGION</u>					
<u>South Fork Kern River, Kern County</u>					
0.2 mi E of bridge on road to Onyx Ranch	KR1	13 Jul	1	N?	Gaines
0.5 mi E of bridge on road leading N of Weldon	KR2	4 Jul	1	N?	Gaines
0.5 mi E of Sierra Way Bridge	KR3	4 Jul	1	N?	Gaines
Sierra Way Bridge	KR4	3 Jul	2	N?	Gaines
0.2-1.3 mi W of Sierra Way Bridge	KR5	14 Jul	4	N?	Gaines
		31 Jul			
<u>SOUTH COAST REGION</u>					
<u>Santa Ana River, Riverside County</u>					
S of sewage disposal plant 1.5 mi SSW of Rubidoux (Santa Ana Regional Park)	SA1	20 Jul	1	N?	Gaines
Prado Co. Park 0.5 mi W of River Rd (on Willow Flat Nature Trail)	SA2	20 Jul	1	N?	Gaines
Prado Flood Control Basin 0.9 mi N of Prado Dam	SA3	24 Jul	1	N?	Gaines
<u>MOJAVE DESERT REGION</u>					
<u>Owens Valley, Inyo County</u>					
Owens Valley Ranch 2.0 mi SW of Big Pine	OV1	16 Jul	3	N	Gaines
Hogback Creek 6.0 mi NW of Lone Pine	OV2	16 Jul	1	N?	Gaines
<u>Amargosa River, Inyo and San Bernardino Counties</u>					
Amargosa River 0.3-0.9 mi S of Tecopa	A1	17 Jul			
		31 Jul	2	N?	Gaines
0.5 mi W of Willow Spring	A2	2 Sep	1	?	Tarble
China Ranch	A3	31 Jul	2	N?	Tarble
Confluence of Amargosa River and Willow Creek	A4	18 Jun	1	N?	Henderson
Furnace Creek Ranch, Death Valley N.M., Inyo Co.	---	4 Jun	2	?	Heindel
Fort Piute, NW of Needles, San Bernardino Co.	---	25 May	1	?	Bailey
<u>LOWER COLORADO RIVER REGION</u>					
<u>San Bernardino County</u>					
Willow Valley Estates, 5.0 mi N of Needles, AZ	CR1	Jun-Aug	+	N?	Anderson
Havasu NWR (Topock Swamp) and vicinity 2.0-4.5 mi SE of Needles, CA-AZ	CR2	Jun-Aug	+	N?	Anderson
		31 Jul	7	N?	Gaines
		1 Aug			
Bill Williams River from its mouth to Planet Ranch, AZ	CR3	Jun-Aug	+	N	Anderson
		30 Jul	11		Gaines
Deer Island, CA-AZ	CR4	Jun-Aug	+	N?	Anderson



YELLOW-BILLED CUCKOO IN CALIFORNIA

Table 2 (Cont.)

<u>Locality</u>	<u>Site No.</u>	<u>Date(s)</u>	<u>Total</u>	<u>Status</u>	<u>Principal Observer</u>
<u>Riverside County</u>					
NW of Lost Lake Resort, CA	CR5	Jun-Aug	+	N?	Anderson
Unnamed island 5.0 mi SW of Poston, CA-AZ	CR6	Jun-Aug	+	N?	Anderson
Inside of bend 1.5 mi SE of Waterwheel Camp, CA	CR7	Jun-Aug 29 Jul	+	N?	Anderson Gaines
0.7 mi N of Blythe Boat Club (Clark Ranch), CA	CR8	Jun-Jul	2	N?	Clark
E bank 2.0 mi SE of Palo Verde Dam, AZ	CR9	Jun-Aug	+	N?	Anderson
Backwater at end of 10th Ave., 3.0 mi ENE of Blythe (Big Hole), CA	CR10	2 Aug	2	N?	Gaines
Backwater 0.8 mi N of Ehrenberg, AZ	CR11	Jun-Aug	2	N	Anderson
Backwaters 2.2-3.6 mi S of Ehrenberg Bridge (Goose Flats), CA	CR12	Jun-Aug 1 Aug	+	N?	Anderson Gaines
<u>Imperial County</u>					
0.6 mi S of 35th St. Horace Miller Co. Park, CA-AZ	CR13	Jun-Aug 28 Jul	+	N?	Anderson Gaines
E of Oxbow Lake, AZ	CR14	Jun-Aug	+	N?	Anderson
0.3 to 2.6 mi N of Paymaster Landing (Walter's Camp), CA-AZ	CR15	Jun-Aug 28 Jul	+	N?	Anderson Gaines
Gilmore's Landing, CA	CR16	5 Aug	1	N?	Gaines
Walker Lake to N end of Draper Lake, Imperial NWR, CA-AZ	CR17	4 Aug	10	N?	Gaines
Inside of bend NW of Taylor Lake, Picacho St. Recr. Area and opposite bank, Imperial NWR, AZ	CR18	5 Aug	8	N?	Gaines
W bank and islands from Picacho Mill 0.6 mi S, Picacho State Recr. Area and Imperial NWR, CA-AZ	CR19	27 Jul 5 Aug	3	N?	Gaines
Ferguson Lake, CA	CR20	26 Jul	1	N?	Gaines
E of Imperial Rd. 2.0 mi N of Laguna Dam and 0.3 mi S of Ferguson Rd., CA	CR21	26 Jul	3	N?	Gaines
0.4-0.8 mi S of Laguna Dam between Imperial Rd. and Laguna Settling Basin (Shantytown), CA	CR22	25 Jul 26 Jul	6	N?	Gaines
1.7 mi W of Winterhaven, CA	CR23	26 Jul	1	N?	Gaines

Status

- N nesting
- N? suspected nesting
- T transient
- ? probable transient

## YELLOW-BILLED CUCKOO IN CALIFORNIA

### SAN JOAQUIN VALLEY REGION

*History of occurrence.* The Yellow-billed Cuckoo has been recorded in every county in the San Joaquin Valley region except Kings Co. (Table 1). Breeding has been verified in San Joaquin, Stanislaus, Fresno and Kern counties.

Early reports vary in the assessment of cuckoo abundance. In mid-July 1891 Fisher (1893) found them "common" near Bakersfield, Kern Co., in the willows and cottonwoods which then lined the Kern River. They must have been numerous at the mouth of the Kern River in the early 1920s, for Van Rossem collected 17 specimens (UCLA) at Buena Vista Lake.

In Fresno Co., according to Tyler (1913), the Yellow-billed Cuckoo could not "be called common" but "their retiring habits" made "it difficult to determine in what numbers they are present." He described the cuckoo as a summer resident in the "tangles of willow brush and vines" along the San Joaquin River and "a number of the larger canals." A nest which held two newly hatched young on 10 July 1902 was situated in a "small, somewhat isolated willow" at the edge of an irrigation ditch.

Cuckoos continued to breed along the San Joaquin River through at least the 1940s. In 1950 three pairs were located on 30 acres of open willow brush and marshland at Mendota Pool, Fresno Co. (AFN 4:291, 1950).

The records suggest that cuckoos formerly nested along most of the wooded streams and sloughs of this region. The lack of sightings along the Tule, Kings and Merced rivers probably reflects an absence of ornithologists.

Observations during the 1960s and 1970s suggest that a few cuckoos may still breed in the region. At the mouth of the Stanislaus River, San Joaquin and Stanislaus counties, the cuckoo was observed in 1962, 1963, 1965, 1972 and 1973. The numbers at this site fell gradually from five to one (AFN 17:65, 1963; 18:20, 1964; AB 26:878, 1972; 27:915, 1973; Betty Kimball pers. comm.).

*Results.* We surveyed nine sites along the San Joaquin River between South County Park, San Joaquin Co., and Mendota Pool, Fresno Co., from 29 June to 1 July 1977. We surveyed the Stanislaus River from Caswell State Park to its mouth, San Joaquin and Stanislaus counties, on 29 and 30 June; the Merced River from Snelling to Merced Falls, Merced Co., on 30 June; the Kaweah River below Lake Kaweah, and the Tule River below and above Lake Success, Tulare Co., on 3 July. No cuckoos were found.

*Discussion.* If Yellow-billed Cuckoos still breed in the San Joaquin Valley, the population is very small. Little habitat is extant, and that which remains may be too confined or widely scattered to support a viable population.

### SIERRA NEVADA REGION

*History of occurrence.* Within the Sierra Nevada region, the Yellow-billed Cuckoo has occurred in Kern and Placer counties. A cuckoo was collected along the South Fork Kern River near Weldon, Kern Co., in 1911 (specimen MVZ). The only other pre-1977 records are of probable transients.

## YELLOW-BILLED CUCKOO IN CALIFORNIA

*Results.* We surveyed the South Fork Kern River between Bloomfield Ranch and Isabella Reservoir, Kern Co., on 3-4, 12-14 and 31 July 1977. Nine cuckoos—two pairs and five individuals—were observed at five sites.

All sites were situated in the extensive, continuous and relatively broad strip of cottonwood-willow forest along the South Fork Kern River from Bloomfield Ranch west to Isabella Reservoir, a distance of 16 km (Figure 4). At its broadest point the strip is 1000 m wide and is probably the largest contiguous cottonwood-willow forest extant in California.

We observed cuckoos in the foliage of willows on 13 occasions and in cottonwoods on 2. Canopy height ranged from 10 to 18 m, canopy cover from 10% to 70% and understory cover from 50% to 80%. Water was present at sites KR1-3, but not at sites KR4 and 5. At site KR5, we heard three cuckoos cooing simultaneously within about 120 ha of forest.

*Discussion.* Grinnell and Miller (1944) include the “vicinity of Weldon” in the Yellow-billed Cuckoo’s breeding range, based on the specimen collected in 1911. This survey substantiates the presence of a nesting population in this area.

At sites KR4 and KR5, cuckoos were found in the immediate vicinity of the dry riverbed. The lack of surface water was attributed to the drought conditions of the previous two years. Surface water is normally present.



Figure 4. The forest of willows and cottonwoods at Site KR5, Kern County, is typical of the habitat of the Yellow-billed Cuckoo along the South Fork of the Kern River near Weldon and Onyx.

A thorough survey is needed to assess the density of this population. Two pairs and five solitary cuckoos were detected. Assuming the solitary birds were mated, seven pairs were present. Adjusting this total to take into account areas that were not surveyed yields an estimate of 17 pairs. Observations at Site KR5 suggest that a pair requires a territory of about 40 ha. At this density, the forest could support 25 pairs if all the habitat were occupied. If the adjusted survey total is considered a minimum, and the calculated total a maximum, a tentative population estimate is 17 to 25 pairs.

## SOUTH COAST REGION

*History of occurrence.* The Yellow-billed Cuckoo has occurred in every county in the South Coast Region. Numerous nesting records imply that the coastal lowlands of Ventura, Los Angeles, San Bernardino, Riverside, Orange and probably San Diego counties were once a stronghold of the species (Table 1). Grinnell (1898) and Willett (1912, 1933), for example, considered cuckoos "fairly common" in the region.

Six egg sets from Ventura Co. indicate that a population of cuckoos nested along the Santa Clara River and in the marshy coastal bottomlands between its mouth and Port Hueneme until at least 1942. The nests, found between 4 June and 31 July, were situated in willow thickets (Willett 1912; egg sets WFVZ).

Jay (1911) studied the cuckoo near the Los Angeles River, Los Angeles Co., "within a few miles of the ocean." The birds inhabited "swampy places and river bottoms surrounded by willows." In some groves they were common, whereas none were found in others. Between 1900 and 1910, 40 nests were found in willows less than 4.2 m tall. Nesting was at its peak from mid-June through mid-July.

Between 1919 and 1930 Hanna (1937) discovered 24 cuckoo nests along Warm Creek and the Santa Ana River in the San Bernardino Valley, San Bernardino Co. The nests were concealed in "damp willow thickets mixed with cottonwood trees and with heavy underbrush of nettles, wild grape vines and cattails." All but two were in willows at an average height of 4 m. Breeding reached its peak in late June and early July.

Additional nesting records from throughout the region indicate the widespread breeding distribution of the cuckoo in the coastal lowlands.

The cuckoo's decline in southwest California has been attributed to habitat destruction. Soon after the turn of the century, the clearing of willows along the Los Angeles River became a threat to local populations (Jay 1911). During the 1920s and 1930s, Hanna (1937) watched the "miles of cottonwood and willows" where he studied the species give way to "farms and pastures."

Cuckoos were present until the early 1950s. Nests were located along the Santa Clara River, Ventura Co., in 1942 (egg set WFVZ), along the Santa Margarita River near Temecula, Riverside Co., in 1948 (egg set SBCM), and along the San Gabriel River near El Monte, Los Angeles Co., in 1949 and 1951 (AFN 3:251, 1949; 5:309, 1951).

Decline of the cuckoo along the Santa Ana River between Riverside and Corona, Riverside Co., cannot be attributed to habitat destruction. Between 1 and 11 June 1963 Hamilton and Hamilton (1965) intensively surveyed

## YELLOW-BILLED CUCKOO IN CALIFORNIA

this area without success. They found the habitat reduced from Hanna's times, but "considerable stretches of seemingly favorable habitat" remained. Eugene Cardiff found the cuckoo common in this area until the early 1950s, when it declined and disappeared abruptly without obvious cause. During this period the riverbottom was repeatedly sprayed with pesticides, probably DDT, by county mosquito abatement authorities (E. Cardiff pers. comm.).

Despite increasingly thorough coverage by field ornithologists, the cuckoo was observed only six times in the region from 1952 to 1976. Only an individual at Rialto, San Bernardino Co., in July 1970 raised hope that cuckoos might be breeding along the nearby Santa Ana River (AB 24:717, 1970).

*Results.* We surveyed along the Santa Clara River, Ventura Co., 22 July 1977; at Harbor Park, Los Angeles Co., 7 August; on the San Joaquin Marsh Preserve, University of California, Irvine, Orange Co., 23 July; along the San Luis Rey River near Bonsall, San Diego Co., 24 July; and along the Santa Ana River and in the Prado Basin, Riverside Co., 20, 21 and 24 July and 8 August.

On 20 July we found two cuckoos at two sites along the Santa Ana River between Riverside and Corona, Riverside Co. On 24 July we found a third cuckoo in the Prado Flood Control Basin north of Prado Dam. All three sites were situated in willow forest in the floodplain of the Santa Ana River between Riverside and Prado Dam, a distance of 19 km. The forest varies in width from 100 to 1000 m along the river and broadens to 5 km in the Flood Control Basin. It is the largest continuous willow forest in California.

Cuckoos were observed only in willows, the dominant tree at all sites. Vegetation varied from low dense thickets with intervening open ground (site SA1) to continuous forest (sites SA2 and SA3). Canopy height ranged from 5-10 m and canopy cover from 70% to 90%. At sites SA2 and 3, willows and blackberries (*Rubus* spp.) formed leafy understories with 80% cover. Open water and emergent marsh plants were present within 30 m of all sites.

Despite intensive coverage of identical areas, we found no other cuckoos along the Santa Ana River. Sites SA1 and SA2 were resurveyed 24 July and 8 August without success.

*Discussion.* The scarcity of Yellow-billed Cuckoos in this region is attributable to the loss of suitable habitat. Of the sites surveyed, only the Santa Ana River still supports a continuous growth of willow more than 50 m in width or 10 ha in area.

Low densities of cuckoos along the Santa Ana River, however, cannot be attributed to lack of habitat. In 18 hours afield, we found only three individuals in 3400 ha of suitable habitat. Eugene Cardiff (pers. comm.) says the vegetation has not changed appreciably since he and Wilson Hanna found "good numbers" of cuckoos in the area during the 1940s. Since that time, despite relatively thorough coverage, cuckoos were not found again until this year. Their reappearance suggests that the species may be resettling this extensive area.

Some possible suitable habitat was not surveyed, e.g., along the San Luis Rey River and at Camp Pendleton, San Diego Co. Even if these areas support cuckoos, the region's population is very low.

## MOJAVE DESERT REGION

*History of occurrence.* The Yellow-billed Cuckoo has been recorded in Owens Valley, Death Valley and near Tecopa, Inyo Co., and at Yermo, Morongo Valley, Kelso and Fort Piute, San Bernardino Co. (Table 1). Most of these records are of transients. Between 1972 and 1976 cuckoos were reported four times in Death Valley and once in nearby Tecopa (AB 27:915, 1973; 29:909, 1975; 30:891, 1004, 1976). These records suggest that a scattered population of cuckoos breeds in isolated pockets of suitable habitat across the deserts of the Great Basin.

During July 1968 a cuckoo was heard cooing near Big Pine in the Owens Valley (Steven Cardiff pers. comm.). Its behavior and site attachment suggested it was nesting in the vicinity.

*Results.* We conducted surveys in the Owens Valley, Inyo Co., on six days between 5 July and 10 August 1977; in Death Valley, Inyo Co., 17 July; along the Amargosa River near Tecopa, Inyo Co., on 17 July; along the Mojave River at Afton Canyon, San Bernardino Co., on 17 July; along the Mojave River south of Mojave Narrows, San Bernardino Co., on 18 July; and at Morongo Valley, San Bernardino Co., on 18 and 19 July.

Between 25 May and 2 September we found a total of 14 cuckoos at nine sites in this region. Six at four sites near Tecopa and four at two sites in the Owens Valley were nesting, whereas the remaining birds were probably transients.

We found three cuckoos at site OV1 southwest of Big Pine, Inyo County, on 16 July. Two appeared to be a mated pair; they were carrying twigs and long-horned grasshoppers (Tettigoniidae), but no nest was located. The same day we found a fourth cuckoo at site OV2 northwest of Lone Pine.

Groves of willows were dominant at both Owens Valley sites, with boggy meadows interspersed among the groves. Canopy height ranged from 10-13 m, canopy cover from 40% to 50%, and understory cover from 50% to 70%. Habitat was extensive, but isolated from similar stands of willows by many miles of desert vegetation. At site OV1 three birds were found in 40 ha, and at site OV2 one bird was in 120 ha of willow groves and moist meadows. No cuckoos were detected in the more open willow groves along the Owens River.

We observed six cuckoos in the dense willow and mesquite (*Prosopis juliflora*) thickets south of Tecopa, Inyo and San Bernardino counties. This corridor of mesic habitat covers 480 ha along 10 km of the Amargosa River and 3 km of its tributary, Willow Creek. About 30% of the suitable habitat was surveyed.

Two cuckoos were found at site A1, where willow and mesquite formed impenetrable thickets about 5 m high. The thickets covered 70% of the canyon bottom and were watered by the cattail-lined Amargosa River and by many springs.

We found no cuckoos in seemingly suitable habitat along the Mojave River, San Bernardino County. This area warrants further study.

*Discussion.* The existence of nesting populations in the Owens Valley and near Tecopa indicates that cuckoos are able to colonize "islands" of mesic

## YELLOW-BILLED CUCKOO IN CALIFORNIA

habitat within the desert. These habitat islands are characterized by surface water and dense groves of willows dispersed over several hundred contiguous hectares. Only a few widely scattered localities meet these requirements. Aside from those surveyed, the following areas might qualify: in Inyo Co., the area around Bishop and along the Owens River to Big Pine, the Owens River near Lone Pine Station, and Saline Valley; and Zzyxx Spring in San Bernardino Co.

In contrast, the narrow bands of willow which line small streams in many desert canyons have not been found to support nesting cuckoos. Morongo Valley and Fort Piute, San Bernardino Co., for example, have both been surveyed intensively, but only transient cuckoos have been found.

### COLORADO RIVER REGION

*History of occurrence.* The Yellow-billed Cuckoo has been recorded along most of the portion of the Colorado River that forms a boundary between California and Arizona (Table 1). Sightings in San Bernardino and Imperial counties and in Arizona are included in this discussion.

Early records for the region are few. Grinnell and Miller (1944) cite only Stephen's (1903) observation of several cuckoos near Needles, San Bernardino Co., in 1902. Specimens were collected in Imperial Co. in 1915, 1930 and 1952 (SDNHM), and an egg set was collected near Blythe 15 June 1929 (SBCM). The paucity of historical data probably reflects an absence of observers at the proper time of year.

Since 1974, B.W. Anderson, R.D. Ohmart and their co-workers have been censusing bird densities along the Lower Colorado River. By extrapolation of their data, they estimated a population of 244 cuckoos between Davis Dam and the Mexican border (Anderson pers. comm.) and an additional 114 near the mouth of the Bill Williams River (Ken Rosenberg pers. comm.).

Centers of population are on the west side of Topock Swamp and near the mouth of the Bill Williams River, Havasu National Wildlife Refuge, California and Arizona, and on the Imperial National Wildlife Refuge and Picacho State Recreation Area, Imperial Co., California (Ken Rosenberg, Tim Brush, Paul Mack and Bertin Anderson pers. comm.). Another substantial population was found by Guy McCaskie (pers. comm.) north of Laguna Dam, Imperial Co., during the 1960s and 1970s.

*Results.* We conducted surveys from 25 July to 5 August 1977, and found 65 cuckoos at 16 sites scattered along the river. Between June and August, other field ornithologists found cuckoos at seven additional sites.

Of the 51 cuckoos actually sighted, 79% were perched in willows, 11% in mesquite, 8% in cottonwood and 2% in salt cedar (*Tamarix* sp.) Fledglings were observed at sites CR2, 10, 11 and 22.

The seven cuckoos found in Topock Swamp area (site CR2) occupied a large expanse of Arrowweed (*Pluchea sericea*), salt cedar, willow and mesquite 3-4 m high. Willows 7-9 m tall formed an open overstory. Canopy cover varied from 10% to 20%, and understory cover, from 80% to 90%.

Habitat at sites CR10-16 from 5 km north of Blythe, Riverside Co., to Gilmore Landing, Imperial Co., and sites CR20-23 from Ferguson Lake to 3

km west of Winterhaven, Imperial Co., was similar to that at Topock Swamp. Canopy height varied from 8-13 m, canopy cover from 20% to 40%, and understory cover from 60% to 90%. The highest cuckoo density was at site CR22, 0.8-1.3 km north of Laguna Dam, Imperial Co. At least three pairs were found in 12 ha. Similar uncensused habitat stretches east and northeast 2-3 km to Mittry Lake National Wildlife Refuge in Arizona.

We also found high population densities on Imperial National Wildlife Refuge and in Picacho State Park (sites CR17-19), with 21 cuckoos in 120 ha of dense willows. The canopy varied from 4-10 m and canopy cover from 80% to 90%. The willow groves formed 70 m wide strips along the river channel.

The forests on the Bill Williams River floodplain (site CR3), Mojave Co., Arizona, supported the highest density of cuckoos. We detected 11, including 8 in about 12 ha of willows and cottonwoods. The canopy height of 17 m and canopy cover of 80% exceeded that of any other Colorado River site.

In general, sites inhabited by cuckoos were characterized by at least 20% willow cover, dense shrub or understory foliage, and open water or marsh within 100 m. Cuckoos were found at every site which had these characteristics. Even patches of as little as 2 ha at times harbored the species.

Only at Site CR7, a scrub forest of mesquite, salt cedar and Arrowweed in Riverside County, was a cuckoo found in the absence of willows. No cuckoos were found in areas dominated by salt cedar.

*Discussion.* The survey supports Anderson's and Rosenberg's estimate of 358 Yellow-billed Cuckoos along the lower Colorado River. There is no evidence that suitable habitat is not being used, suggesting that habitat availability is limiting the population in this region.

Willows and cottonwoods were formerly more widespread along the lower Colorado. When Grinnell (1914) studied the river in 1910, the entire floodplain was densely wooded. The Palo Verde Valley was covered by 40,000 ha of forest. The cottonwood trees south of Blythe extended 8 km inland from the river in 1920 (Heath Angelo pers. comm.).

The loss of these forests to agriculture, channelization and reservoirs has been accompanied by the encroachment of salt cedar, a native of northern Africa and Eurasia. Arriving in the southwest in the late 1800s, it has spread into riverbottoms "at the expense of nearly all the native plant life" (Robinson 1965). Salt cedar's ability to out-compete willow is not well understood, but lack of flooding and increase in soil salinity may be responsible.

Survival of the cuckoo in this region will require preservation of habitat. Sites such as CR4-16 and 21-23 are vulnerable to agricultural development and channelization projects. In 1974, for example, 5200 ha were cleared on the Fort Mojave Indian Reservation. Willow habitat near Cibola and Three Finger Lakes has been lost to channelization during the last 10 years (James Snowden, Gordon Gould pers. comm.). Fortunately, three of the major cuckoo population centers are on national wildlife refuge or state park lands. Even here, salt cedar control may be necessary to maintain the habitat. The fourth center near Laguna needs protection.



## CAUSES OF DECLINE

The Yellow-billed Cuckoo is at a critically low population level, not only in California, but in the northern Rocky Mountains, the Great Basin, and the Pacific Northwest as well (Tom Lund, Hugh Kingery pers. comm.). Declines are suspected in other parts of North America. The closest population to California that has not declined in recent years is in the riverbottoms of southern Arizona (Richard Stallcup pers. comm.).

It is unlikely that the cuckoo's decline has been caused by factors affecting its migratory route or wintering habitat in southern Brazil and Argentina. The clearing of forests in Latin America has probably favored the cuckoo by fostering the second-growth thickets it prefers (De Schaunsee 1970). Maintenance of populations in portions of North America suggests that the decline in California was caused by local changes.

Loss of habitat is the most important cause of decline. By the late 1800s, large tracts of floodplain forest had already been cut or cleared for fuel or agriculture (Cronise 1868, Thompson 1961). Probably the density of cuckoos was even greater than the early literature suggests. Reclamation, flood control and irrigation projects accelerated this loss over the past 80 years, leading to only remnant riparian habitat in 1977.

DDT and other chlorinated hydrocarbon pesticides may have hastened the cuckoo's decline during the 1940s and 1950s when aerial spraying became common in fields, orchards and riverbottoms (Greib 1948, Eugene Cardiff pers. comm.). These sprayings undoubtedly affected non-target insect populations as well as the crop pests and mosquitos for which they were intended. This reduction in food might have caused an immediate decline in cuckoo populations already stressed by loss of habitat. The critical role of food supply as well as the abrupt disappearance of cuckoos from the Santa Ana River area during the 1950s supports this theory.

## PRESERVATION AND MANAGEMENT

The presence of breeding populations of Yellow-billed Cuckoos in five regions of California gives hope that with preservation, enhancement and appropriate management of habitat, cuckoos will continue to nest at these localities and to recolonize other suitable habitat.

To formulate a management strategy it is necessary to understand the factors that limit the cuckoo's population density. The few published studies and the data presented in this paper suggest that dense foliage, high humidity, extensive habitat and adequate food are conditions that must be met before a cuckoo will nest.

*Vegetation.* Groves of broad-leaved deciduous hardwoods, especially willows and cottonwoods, are characteristic of the cuckoo's habitat throughout California. Height and dispersion of trees seem less important than foliage density. Yellow-billed Cuckoos occupy scattered groves and thickets as well as unbroken expanses of forest. Saplings 3-10 m in height and old-growth trees 10-27 m in height are both used. Dense foliage, especially within 10 m of the ground, is common to all areas. Forests with

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Table 3. Habitat analysis of selected Yellow-billed Cuckoo sites in California during summer 1977.

	Sacramento River	Butte Sink	Feather River	Kern River	Santa Ana River	Owens Valley	Amargosa River	Colorado River
Number of sites	24	2	1	5	3	2	1	20
Canopy height (m) range: mean	10-27:22.5	5-7:6	23	10-17:13	5-10:8	10-13:12	5	3-17: 9
Canopy cover (%) range: mean	20-90:60	30:30	90	10-70:44	70-90:83	40-50:45	70	10-90:35
Understory cover (%) range: mean	0-90:78	---	80	50-80:70	0-80:53	50-70:60	---	0-90:71
% cover range: mean								
Willow	30-80:58	20-30:25	70	30-70:48	70-90:80	50-70:60	40	0-90:33
Cottonwood	30-80:49	---	30	0-30:14	---	---	---	0-40: 4
Box Elder	0-30: 6	---	10	---	---	---	---	---
White Alder <sup>a</sup>	0-20: 3	---	---	---	---	---	---	---
Blackberry	0-10: 0	---	20	---	0-60:30	---	---	---
Grape ( <i>Vitis</i> sp.)	0-30: 3	---	---	---	---	---	---	---
Buttonwillow <sup>b</sup>	---	0-20:10	---	---	---	---	---	---
Mule Fat	---	---	---	0-40:26	0-10: 3	---	---	---
Mesquite	---	---	---	---	---	---	20	0-50:10
Saltbush <sup>c</sup>	---	---	---	---	---	---	10	---
Salt Cedar	---	---	---	---	---	---	---	0-60:25
Arrowweed	---	---	---	---	---	---	---	0-50:10
% near slough or marsh	67	100	100	60	67	100	100	80
% near similar extensive habitat	67	100	100	100	100	0	100	75

<sup>a</sup>*Alnus rhombifolia* <sup>b</sup>*Cephalanthus occidentalis* <sup>c</sup>*Baccharis viminea* <sup>d</sup>*Atriplex* sp.

taller trees have well-developed leafy understories. Dense low-level foliage is an important factor in the selection of nesting territories.

Willows and cottonwoods are primarily riparian trees dependent on ground water near streams. An ample supply of subsurface water not only keeps their foliage green throughout the long summer dry period, but promotes high productivity. These trees thrive on unstable floodplains of meandering, aggrading streams. On the outside of curves such streams undercut their banks, dislodging soil and toppling trees. On the inside of curves they deposit sediment and form bars where new trees can germinate. Under these conditions, copious seed production, wind dispersal, and rapid sapling growth favor willows and cottonwoods. When streams are channelized or their flows modified by dams, the more stable conditions and/or lower water tables may favor other species of trees not utilized by the Yellow-billed Cuckoo.

Dense groves of willow need to be maintained. It is essential to assure that extant habitat is not cleared. Once a preserve has been established, it may also be necessary to manage the vegetation in the interests of the cuckoo. Periodic flooding may be requisite to a dense growth of willows. If flooding is impossible, cultivation and selective removal of competing trees may be a viable alternative. The ecology of California willows needs further study.

Reforestation warrants serious consideration. The Yellow-billed Cuckoo is not restricted to old-growth willows and cottonwoods, but inhabits young trees as well. At 54% of the analyzed sites, canopy height was 10 m or less. Under favorable conditions, willows and cottonwoods attain this height in 10 to 15 years. In many areas, as along the rivers of the Central Valley, the Santa Clara River in Ventura Co., the San Luis Rey River in San Diego Co., and the Owens River in the Owens Valley, planting willows would create additional habitat in a relatively short time. Along the Colorado River, methods for controlling the spread of salt cedar, and for restoring conditions that favor more desirable native trees, need to be developed.

*Humidity.* Throughout the arid west, breeding populations of the Yellow-billed Cuckoo are restricted to riverbottoms, ponds, swampy places and damp thickets where humidity is relatively high. In 1977 we detected the species only where surface water was usually present. Sloughs, creek mouths, oxbow lakes and marshes further increased local humidity at 74% of the analyzed sites.

In eastern North America, where the species probably evolved, the cuckoo occurs in deciduous forests which are consistently humid during the summer. Hamilton and Hamilton (1965) suggest that such conditions may be necessary to prevent cuckoo eggs from desiccating. Colonization of western North America may have been possible only because riverbottoms offered sufficiently humid habitat.

Surface water, such as oxbows, sloughs and marshes, needs to be maintained. Maintenance of water will not pose a problem along the Sacramento, Colorado and other large rivers as long as they are employed for commercial water transport. Other areas, especially the Owens Valley, must be closely monitored.

Wetland habitat is in greater danger. Channelization and flood control have stopped rivers from changing their courses, thus arresting the process by which riparian oxbows and marshes are formed. This process, which provides ideal habitat for the cuckoo, is occurring only during "hundred-year floods" or not at all. Hence it may be necessary to maintain existing oxbows through dredging or manipulation of water levels.

Dredging of new oxbows also deserves consideration. In conjunction with willow plantings, such a project holds promise of restoring viable habitat for the cuckoo.

*Habitat Breadth.* Habitat breadth may be another important factor in the selection of nesting territories. In California, very few cuckoos were found where suitable vegetation was less than 100 m wide and under 10 ha in surface area (Gaines 1974b). A study of avian distribution patterns on forest "islands" in New Jersey suggests that cuckoos are very rare or absent on patches of under 24 ha (Galli et al. 1976).

The Yellow-billed Cuckoo occupied 2 to 11 ha, a larger area than most birds of comparable size (Platt 1975, Ken Rosenberg pers. comm.). In acquiring preserves or undertaking habitat restoration or enhancement, priority should be given to areas with over 25 ha of contiguous habitat. Wherever possible, discontinuous parcels should be joined by acquiring or restoring habitat corridors between them (MacClintock et al. 1977).

*Food Supply.* Fluctuations in Yellow-billed Cuckoo breeding densities from place to place and year to year have been attributed to cycles in the abundance of caterpillars, cicadas and other large insects on which they subsist (Clay 1929, Forbush 1927, Nolan and Thompson 1975). Hamilton and Hamilton (1965) postulate a nomadic phase prior to breeding during which the cuckoos appraise local food resources before establishing territories and laying eggs.

The cuckoo may have adaptations for exploiting windfall outbreaks of suitable prey. In proportion to body weight, the eggs of *Coccyzus* cuckoos are among the heaviest of any nidicolous bird (Lack 1968). Energy cost of egg production may be as high as 30 percent of the female's daily intake (Nolan and Thompson 1975). These energy-expensive eggs facilitate rapid development of both embryos and nestlings (cf. Schifferli 1973). The 17-day combined incubation and nestling period is shorter than that of any other known species (Hamilton and Hamilton 1965, Skutch 1976). Eggs may be laid at irregular intervals during a relatively prolonged breeding season. Clutch size, usually three to four, frequently varies from one to five and sometimes more depending on level of food supply (Hanna 1937, Bent 1940, Nolan and Thompson 1975). Hence the cuckoo can raise more young during years of abundant food.

Because incubation begins with the initiation of egg-laying, nests may harbor eggs and nestlings at strikingly different stages of development. This phenomenon, termed asynchronous hatching, permits survival of the oldest nestlings in the event that food supply proves inadequate to nourish the entire brood (Hamilton and Hamilton 1965).

A healthy environment should produce an adequate supply of the large insects on which the cuckoo depends. Steps should be taken to assure that

pesticides sprayed on adjacent agricultural lands do not affect the vegetation in which cuckoos forage. Under no circumstances should spraying in riparian areas be allowed.

Because of fluctuations in food supply, the Yellow-billed Cuckoo may not nest in the same areas every year. Importance of habitat must be judged over an extended period of time. Large-sized preserves will increase the probability that pockets of food abundance will provide the conditions for optimal reproductive success.

*Research Needs.* Past studies of cuckoos in California provide virtually no data on home range, foraging substrates and food sources. This information is needed for successful preserve design and habitat management. Hence a habitat use study involving radio telemetry should be undertaken.

Knowledge of the context of the Yellow-billed Cuckoo's calls and displays would augment the value of the surveys. Hamilton and Hamilton (1965) attribute the "cooing" call to unmated males and the "kowlp" series to territorial pairs. This information, if valid, would permit estimates of the numbers of mated and unmated birds. Such estimates could be confirmed by the type of study proposed above.

## SUMMARY

Between June and August 1977 we attempted to locate the breeding populations and describe the habitats of the Yellow-billed Cuckoo in California. Historic occurrences were researched through published literature and museum records. Surveys were conducted where the species nested historically or where habitat appeared suitable. We detected a total of 141 cuckoos in six widely separated parts of the state: 54 in the Sacramento Valley, Tehama, Butte, Glenn, Colusa, and Sutter counties (estimated total 35 to 68 pairs); 9 along the South Fork Kern River near Weldon, Kern Co. (estimated total 17 to 25 pairs); 3 along the Santa Ana River, Riverside Co.; 4 in Owens Valley, Inyo Co.; 6 along the Amargosa River south of Tecopa, Inyo and San Bernardino counties; and 65 along the Colorado River (including the Arizona side) between the Nevada line and the Mexican border (estimated total 180 pairs). Most sites were characterized by willows, dense low-level or understory foliage, high humidity and suitable foraging space in excess of 120 m in width and 10 ha in area. Cuckoos were found to have undergone a major contraction of range and decline in numbers in the past 80 years. Based on the surveys and a review of the literature, we discuss management and preservation of the Yellow-billed Cuckoo and its habitat.

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Sketch by Tim Manolis