TRENDS IN THE STATE LIST OF CALIFORNIA BIRDS

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It is hardly surprising that California, with its large size, seacoasts, and varied topography would harbor one of the most diverse assemblages of birdlife of any state. The number of species recorded within its boundaries is exceeded only by that of Texas—and the difference is small. Grinnell and Miller (1944) recognized 427 species as having occurred naturally. Adjusted for the inclusion of introduced species, shifts in taxonomic concepts (AOU 1957, 1973, 1976), and critical reexamination of some early records (McCaskie et al. 1970), the 1944 list contains 431 species. In the subsequent 3½ decades the state list has continued to increase at an astonishing rate and by the end of 1979 stood at approximately 535 species, a 24% increase.

Species recorded in the state for the first time since 1944 are listed in Table 1. In Table 2 I have divided this time period into several intervals and attempted to discern the probable source area for each of the additions: North American, Mexican, Arctic/Asian, or Pelagic. These categories are broad and, occasionally, overlap. It is easy to allocate species such as Blackpoll and Prothonotary Warbler as North American (and probably from the eastern half of the country). But did the Gyrfalcon arrive from North America or the Siberian Arctic (Arctic/Asian)? Several North American species (e.g., Little Blue Heron, Yellow-crowned Night Heron) are considered Mexican as they almost certainly represent post-breeding wanderers from south of the border. Is the same true of Cassin's Sparrow—or did it stray westward from the Arizona grasslands? The Brown Booby, though a seabird, is also considered Mexican, as the source of these birds is the Gulf of California (McCaskie 1970). For most species, the assignments are clear-cut and I have not given them individually. In any event, the shift of a few species between categories does not affect the general pattern.

As would be predicted, the largest number of additions has been derived from the North American contingent (50 species, 48%; Table 2). In the past decade, however, that contribution has dropped sharply and from 1975-present only two new species have been added. Numbers and proportions of Mexican species have remained fairly consistent since 1945, whereas the contribution of the Arctic/Asian fauna has shown an increase. Pelagic species have also shown a continued increase, especially in the past decade; from 1975-79 seven species were added, accounting for 47% of the number of new species in that interval.

Table 1. Additions to the State List of California Birds since 1944, as accepted by the California Bird Records Committee. An asterisk indicates that acceptance of the record is pending.

1945 Snow Bunting
1946 Cardinal
Brown Booby
Least Grebe
Baikal Teal
1947 Tropical Kingbird
Cerulean Warbler
1948 Gyrfalcon
Inca Dove
Tufted Duck
1949 McCown's Longspur
1950 Blue Jay
1952 Coues' Flycatcher
1953 Prothonotary Warbler
1954 Black-headed Gull
Blue-winged Warbler
Reddish Egret
1955 Bronzed Cowbird
1956 Parula Warbler
Bay-breasted Warbler
1957 Dickcissel
1958 Hooded Warbler
Connecticut Warbler
1959 Hepatic Tanager
1960 Semipalmated Sandpiper
Worm-eating Warbler
Golden-winged Warbler
1961 Blackpoll Warbler
Purple Gallinule
Canada Warbler
Broad-billed Hummingbird
1962 Ruff
Prairie Warbler
Blackburnian Warbler
1963 Yellow-throated Vireo
Clay-colored Sparrow
Yellow-crowned Night Heron
1964 Cattle Egret
Little Blue Heron
Great-tailed Grackle
White-tailed Tropicbird
Thick-billed Murre
Red-throated Pipit
1965 Black-billed Cuckoo
Philadelphia Vireo
Thick-billed Kingbird
1966 Curlew Sandpiper
Pine Warbler
Grace's Warbler
Broad-winged Hawk
1967 Wandering Albatross
Great Crested Flycatcher
Wood Thrush
Yellow-billed Loon
1968 Whip-poor-will
Kentucky Warbler
Mourning Warbler
Black Skimmer
Bar-tailed Godwit
Little Gull
Olivaceous Flycatcher
1969 Galapagos Storm-Petrel
White-eyed Vireo
White-rumped Sandpiper
Field Sparrow
Yellow-throated Warbler
Cassin's Sparrow
Baird's Sparrow
Common Grackle
1970 Red-faced Warbler
Gray-cheeked Thrush
LeConte's Sparrow
1971 Pyrrhuloxia
Olivaceous Cormorant
Piping Plover
Wheatear
Red-headed Woodpecker
Golden-cheeked Warbler
1972 Garganey
White Wagtail
1973 Hudsonian Godwit
Rufous-backed Robin
1974 Rufous-necked Sandpiper
Dotterel
Sulphur-bellied Flycatcher
Veery
Eastern Wood Pewee
Sprague's Pipit
Groove-billed Ani
1975 Bewick's Swan
Red-footed Booby
Streaked Shearwater
1976 Mottled Petrel
Violet-crowned Hummingbird
1977 Masked Booby
Blue-throated Hummingbird
1978 Lesser Black-backed Gull
White-winged Crossbill*
Yellow Wagtail*
Common Skylark
1979 Greater Shearwater*
Red-tailed Tropicbird*
Crested Auklet*
Cook's Petrel*

Table 2. Source areas of species added to the California list since 1944.

Area	1945-59 No. (%)	1960-69 No. (%)	1970-present No. (%)	Predicted No. (%)
North American	12 (50)	27 (59)	11 (32)	8 (31)
Mexican	8 (33)	9 (20)	8 (23)	3 (12)
Arctic/Asian	4 (17)	6 (13)	9 (26)	11 (42)
Pelagic	—	3 (7)	7 (20)	4 (15)

The growth of the list is plotted in Figure 1. Since the pool of untapped species is finite, and since most of the "easy" species should occur early, the theoretical growth curve should show a rapid rise followed by a gradual tapering off. Yet, that has not been the case. Indeed the data points are best fitted by two straight lines. From 1945-1959 the list increased by an average of 1.60 species/year. From 1960-present, the increase has also been linear, but the average rate (4.00 species/year through 1978) is 2½ times that of the earlier period.

That the current rate has persisted for nearly 2 decades is quite surprising, especially since most of the species that would be expected to occur (the North American component) have already been found. Yet, the growth continues and has shown only a hint of abating in recent years, the slack being taken up by species from other areas. Given this history, a statistically inclined investor might do well to wager that at least four species will occur for the first time in 1980.

Several factors have been important in maintaining this high rate of increase including: 1) the increasing number and sophistication of birders; 2) recognition that vagrancy is a widespread and regular phenomenon in birds; 3) an appreciation of the concentrating effects of desert oases and certain coastal "hot spots," which are birded constantly during migration periods; 4) the establishment of a research station on the Farallon Islands; and 5) the increasingly patchy nature of environments attractive to a wide variety of birds, which (as in 3, above) act to concentrate migrants.

The first three of these, and indirectly the fourth, in my opinion, can be traced to the influence—the leadership and teaching—of Guy McCaskie. It is no coincidence that the sharp increase began about 1960, shortly after his arrival in the state. He has participated in the discovery of at least 22 species and between 1962-1966 accounted for 14 of 20 additions. His knowledge has been widely transmitted, resulting in increased expertise among California birders in general. As a result, the growth of the list has shifted from a one-man operation to a self-perpetuating and expanding process.

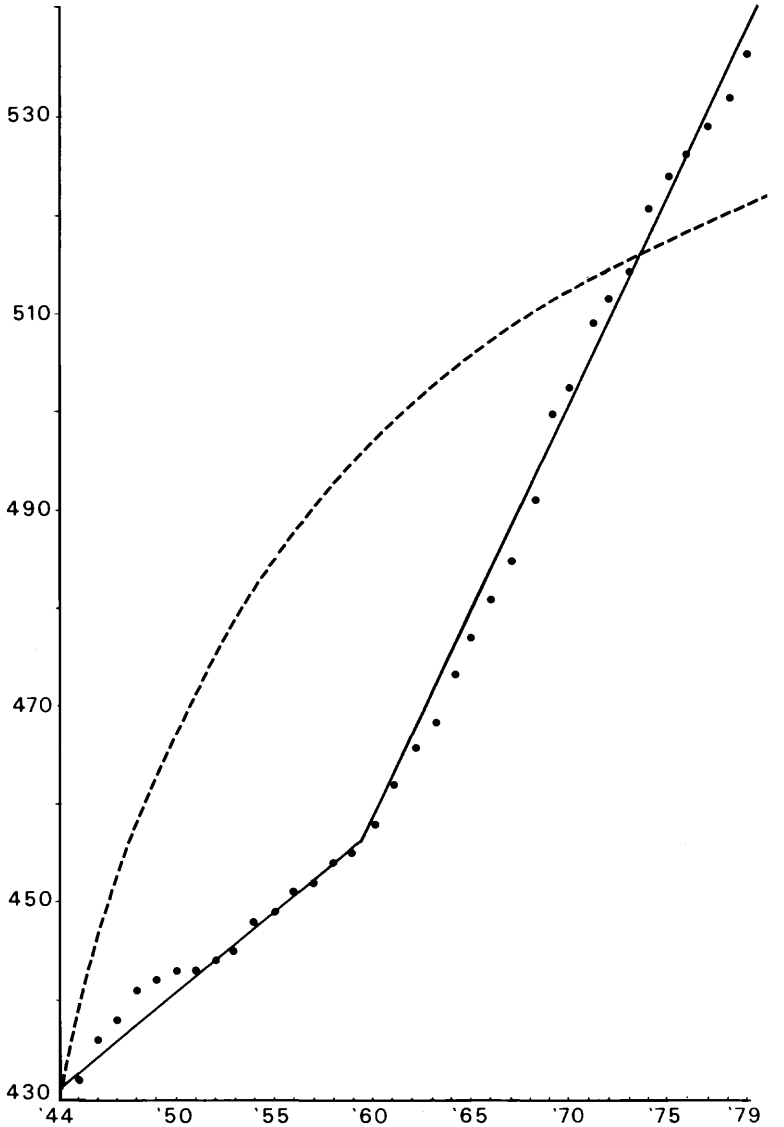

Figure 1. The growth of the California State List from 1944 to 1979. Growth rates for 1945-1959 and 1960-present were determined by least squares regression. A theoretical growth curve is shown by the dashed line.

The increasing representation of pelagic birds since 1960 deserves comment. One might be tempted to associate the increase with expanded interest in pelagic birds and greater availability of pelagic trips. It is true that no pelagics were added in 1945-59, when interest was low. Yet, the correlation is weak at best. Of the 9 added since, only 4 were discovered at sea, the remainder being seen from land or found washed up on the beach. (The Galapagos Storm-Petrel was found in a garage!)

What of the future? At considerable risk to their egos and reputations, five well-informed field ornithologists consented to predict the next ten species that would be added to the list. (The interested reader may wish to pause here and make his own predictions. For those who may consider this an easy task, refer to Table 1 and honestly consider whether you would have predicted *any* of the 11 species listed for 1977-79.) A total of 26 species was mentioned (Table 3). Smith's Longspur was listed by all five consultants. The next most common choices were Swainson's Warbler (4), Common Black Hawk (4), Mongolian Plover (3), Wood Sandpiper (3), and Short-billed Marsh Wren (3). The consultants uniformly agree that the geographic origins of the predicted species will differ from those of the most recent period (Table 2) with a smaller number (3, 12%) of Mexican origin and the largest number (11, 42%) of Arctic/Asian derivation.

It is highly likely that some of the predicted species have already occurred, and will continue to occur regularly. Yet, as the ability and willingness to document records via scientific collecting declines, it will be extremely difficult to convince many of the occurrence of such species as Alder, Acadian, and Yellow-bellied flycatchers.

Long ago, Joseph Grinnell (1922), dean of California ornithologists stated: "It is only a matter of time theoretically until the list of California birds will be identical with that for North America as a whole." DeBenedictis (1971) remarked that "this prediction is rapidly being fulfilled" (see also Winter 1971) . The rate at which both are growing would probably surprise both writers. At present the North America list includes approximately 815-820 species, a figure which will be reached in California in slightly more than 70 years if the current rate can be sustained. Whether California will be able to narrow the gap remains to be seen.

Table 3. Species predicted to occur in California by a panel of experts. Each participant was asked to predict the next 10 additions. Areas of origin are: NA = North American; M = Mexican; A/A = Arctic/Asian; and P = Pelagic.[1]

L.C. BINFORD	J.DUNN	P.LEHMAN	G.McCASKIE	R. STALLCUP
Smith's Longspur-NA	Smith's Longspur	Smith's Longspur	Smith's Longspur	Smith's Longspur
Swainson's Warbler-NA	Swainson's Warbler	Black-browed Albatross-P	Swainson's Warbler	Swainson's Warbler
Cook's Petrel-P	Common Black Hawk-M	Common Black Hawk	Common Black Hawk	Common Black Hawk
Mongolian Plover-A/A	Mongolian Plover	Mongolian Plover	Smew-A/A	Common Eider-A/A
Wood Sandpiper-A/A	Wood Sandpiper	Wood Sandpiper	Red-legged Kittiwake-A/A	Wedge-tailed Shearwater-P
Brambling-A/A	Brambling	Brambling	Black-capped Vireo-NA	Black-capped Vireo
Sooty Tern-P	Polynesian Tattler-A/A	Short-billed Marsh Wren-NA	Short-billed Marsh Wren	Short-billed Marsh Wren
White-eared Hummingbird-M	Cook's Petrel	Eastern Meadowlark-NA	Eastern Meadowlark	White-eared Hummingbird-M
Yellow-bellied Flycatcher-NA	Rustic Bunting-A/A	Long-toed Stint-A/A	Yellow-bellied Flycatcher	Rivoli's Hummingbird-M
Arctic Warbler-A/A	Indian Tree Pipit-A/A	Alder Flycatcher-NA	Alder Flycatcher	Acadian Flycatcher-NA

[1]These predictions were made in early October 1979. Within a matter of days, the occurrence of Cook's Petrel was fully documented.

ACKNOWLEDGMENTS

I greatly appreciate the cooperation of Laurence C. Binford, Jon Dunn, Paul Lehman, Guy McCaskie and Rich Stallcup for daring to predict the impossible. Special thanks are due Guy McCaskie for providing much unpublished information on which Table 1 is based, and to John Luther for making the recent deliberations of the California Bird Records Committee available to me. The manuscript benefitted from the comments of L.C. Binford.

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Accepted 14 April 1980