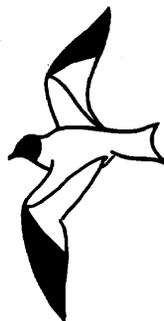


# CALIFORNIA BIRDS



Volume 1, Number 4, 1970

## THE OCCURRENCES OF FOUR SPECIES OF PELECANIFORMES IN THE SOUTHWESTERN UNITED STATES

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### INTRODUCTION

The Brown Pelican *Pelecanus occidentalis*, Blue-footed Booby *Sula nebouxii*, Brown Booby *Sula leucogaster*, and Magnificent Frigatebird *Fregata magnificens* have all occurred in the interior portions of the southwestern United States. The frequency of occurrences, and the times of the year these birds appear is far from clear in the current literature. Also, the status of the Magnificent Frigatebird along the Pacific coast is somewhat confused; we learn from one source that it regularly ranges along the entire California coast, and from another that it is only an occasional wanderer to southern California. In the hopes of gaining a clearer understanding of the status of these birds in the Southwest, all the records of each species have been gathered together. The localities at which most appear, the times of the year most occur, and the age groups involved, become very clear from the accumulated records, and it is easier to speculate on the true status of each species.

### BROWN PELICAN

The Brown Pelican occurs along both coasts of North and Central America. *Carolinensis* is the race occurring along the Atlantic seaboard and in the Gulf of Mexico, and *californicus* is the race occurring along Calif. Birds 1: 117-142, 1970

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the Pacific coast of California and Mexico. Palmer (1962) indicates breeding colonies of *californicus* north to the head of the Gulf of California in Mexico, and to Monterey County in California. Schreiber and DeLong (1969) review the history of all the colonies from the Los Coronados Islands northward, and indicate a drastic decline in breeding success. The northernmost colony at Point Lobos was first used in 1927 and has never been very large. Willett (1933) indicates the breeding sites on the Channel Islands were always used irregularly, although that on Anacapa was in use during most years, and the colony on the Los Coronados Islands appears to be the northernmost receiving annual use. After breeding, adults and young disperse from the colonies, with many pushing far northward along the coast. It occurs annually to Oregon; Jewett et al. (1953) indicate it is an irregular late summer to early winter visitor to the coast of Washington, and Godfrey (1966) cites seven records, all in the late summer to early winter period, for coastal British Columbia.

Palmer (1962) indicates only four interior records for the Southwest; however, there are many more (fig. 1). It is now of annual occurrence at the Salton Sea; it is somewhat regular along the Colorado River Valley; there are a scattering of records throughout much of Arizona, and one from Lake Elsinore in Riverside County, California. Woodbury (1937) reports he saw one along the southeast shore of Great Salt Lake, Utah, on 28 April 1934; however, the accompanying description could well



Figure 1. Distribution of Brown Pelican records in the interior of the Western United States. Solid dots indicate late summer and fall reports. Open circles indicate spring records, all of which are somewhat questionable.

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apply to a soiled White Pelican *Pelecanus erythrorhynchos*. Linsdale (1936) reports he saw one near Stillwater, Nevada, on 20 May 1934, but there are only skimpy details accompanying the record. Monson (1963b) refers to a total of nine individuals reported from three localities in New Mexico during April 1963; no details accompany the report other than the statement that one was definitely recognizable as a soiled White Pelican when seen at close range in good light, and this naturally casts suspicion on the identity of the others. Mailliard (1913) saw three together at Rancho Dos Rios, Stanislaus County, in the central valley of California on 19 September 1913, and was well aware of the significance of the record.

Brown Pelicans have been found on the Salton Sea during each of the past eight years; however, coverage was poor prior to this time, and there are only two additional records (1951 and 1952). Along the Colorado River Valley it has twice wandered north to Lake Mead in Nevada (2 September 1946, and 10 June 1959); farther south it has occurred at least five times on Havasu Lake, twice around Parker, five times in the vicinity of Imperial and Laguna Dams, and once near Yuma. There are no records from along the Colorado River prior to 1935, and most were recorded in the 1950's when coverage was at its best.

Vorhies and Phillips (1937) cite six occurrences in Arizona away from the Colorado River Valley (2 around Flagstaff in Coconino County, 1 in Pinal County, 2 in Pima County, and 1 in Cochise County). Phillips et al. (1964) cite two more records for the Flagstaff area (Flagstaff and Tolani Lake); Monson (1953) gives a record for the Phoenix area, and Snider (1967a and 1967b) cites two additional records for the same area.

Virtually all the birds recorded in the interior are immatures. Phillips et al. (1964) state "there is no record of an adult in Arizona". Of the nearly 100 individuals seen on the Salton Sea only three have been adults (1 on 18 November 1966, and 2 on 11 October 1969), and no other adults have been reported elsewhere from the interior of California.

Most of the birds occur during the late summer and early fall, with the peak in August and September (fig. 2). Three on Mormon Lake Arizona, on 7 June 1936, and a single bird at the Salton Sea on 7 June 1969 are the earliest arrivals. A lone bird at the Salton Sea in "mid November 1953", and seven there in early November 1966 with two still present on the 24th, are the latest these birds have lingered. All but one of the October records are from the Salton Sea, and all probably pertain to birds staying from September or earlier. Aside from the reports from Utah, New Mexico, and central Nevada, there appear to be only two other occurrences in the interior that do not fall in the June-November period.

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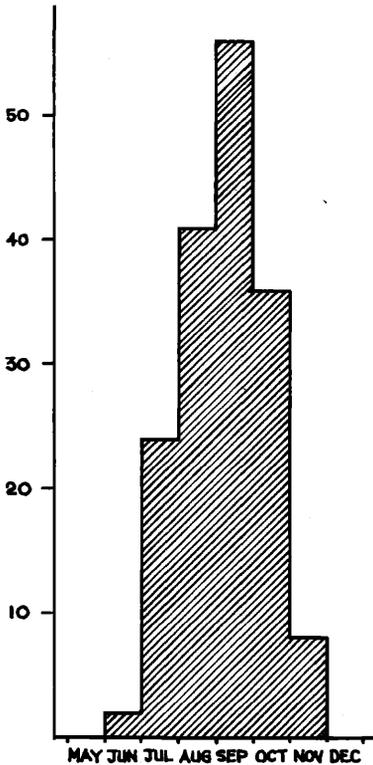


FIGURE 2. The seasonal occurrence of Brown Pelicans in the interior of the Southwestern United States. The number of individuals present each month is indicated (the dubious records were not included). Unpublished data of the author and others were included in computing the numbers present at the Salton Sea each month. An influx of birds into the area is responsible for the steady climb from June to September, but the continued occurrence is merely the result of individuals remaining in the area for extended periods of time. A flock of 23 birds at the Salton Sea in October 1969 is responsible for the large number present in that month.

Vorhies and Phillips (1937) refer to a flock of nine seen circling over the Baboquivari Mountains of Arizona on 23 March 1925, and Monson (1944) refers to a mounted specimen of one found dead in Somerton, Yuma County, Arizona, in the "spring of 1941". The flock could possibly have been White Pelicans, and the date on the Somerton bird is far from clear ("spring" could possibly mean as late as June).

### BLUE-FOOTED BOOBY

The Blue-footed Booby occurs in the warm waters along the west coast of the Americas from northern Mexico south to northern Peru, with a distinct population, *S. n. excisa*, around the Galapagos Islands. It is considered non-migratory; however, there is dispersal from the breeding colonies after nesting, and non-breeding birds may wander considerable distances. The A.O.U. (1957) and Palmer (1962) indicate Consag Rock

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and George Island, near the head of the Gulf of California, are the northernmost breeding colonies. It is common throughout the Gulf of California, but a specimen reported by Gifford (1913) from San Benito Island (15 July 1905) appears to be the only record for the west coast of Baja California away from the immediate vicinity of Cabo San Lucas.

In the United States the Blue-footed Booby is a rare to casual wanderer, with the majority occurring in southeastern California and western Arizona. The single record from the coast of California (Point Loma, San Diego County, 3 September 1969) more likely pertains to a bird wandering northwestward from the Gulf of California than to one flying northward up the Pacific coast of Baja California. Jewett et al. (1953) reports one collected in the Puget Sound near Everett, Washington, on 23 September 1935; this is far to the north of any other record, and assisted passage on a boat should be considered; however, it appeared at the same time of the year others wander northward.

In southern California and western Arizona a total of 61 Blue-footed Boobies have been recorded in twelve different years, but 32 of these occurred in 1969. Most of the records come from the Salton Sea (42) and the Colorado River Valley (6). There are eight records (10 individuals) from the area to the northwest of the Salton Sea including the Coachella Valley (Thousand Palms and Whitewater), lakes and reservoirs in the San Bernardino area (Big Bear Lake, Puddingstone Reservoir and Lake Mathews), and the northeastern portion of Los Angeles (Sierra Madre and Pasadena). Elsewhere, one was found as far east as Phoenix, Arizona, and three have been recorded to the west of the Salton Sea (Ocotillo, Escondido and Point Loma). The result is a peppering of records north and westward from the head of the Gulf of California (fig. 3).

These birds are arriving in the late summer, and their arrival is apparently the result of post breeding dispersal from nesting colonies in the Gulf of California. The earliest arrival date is 24 July 1965 (north end of the Salton Sea), and most appear during August and early September (fig. 4). This species is able to survive for long periods of time when it arrives in areas where food is available. One was at Havasu Lake on the Colorado River from at least "late November 1958" to 11 April 1959 (4½ months), and two were at Puddingstone Reservoir, Los Angeles County, between at least "early October 1964" and "late May 1965" (7½ months). The individual seen on Lake Mathews, Riverside County, on 22 May and 19 July 1965 was clearly able to feed (known to be present for 2 months), and had most likely arrived on the lake the previous

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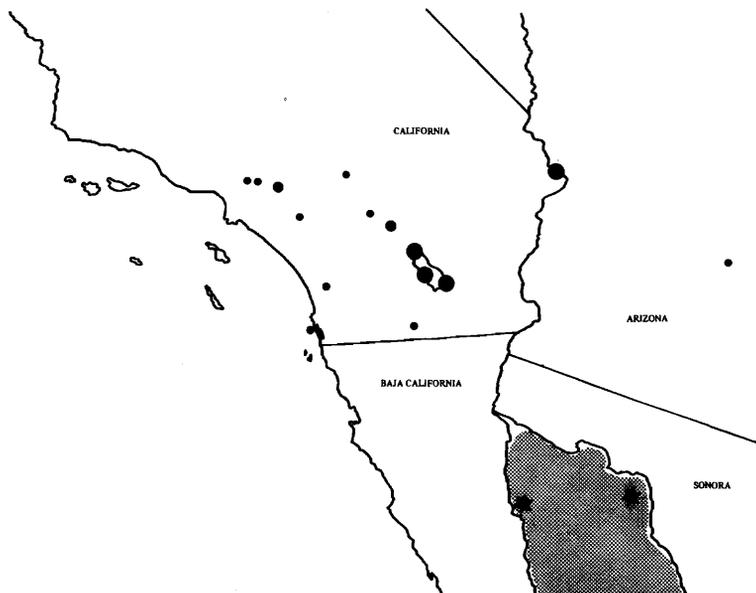


Figure 3. Solid dots indicate localities from which Blue-footed boobies have been recorded. The size of the dots suggest the number of individuals involved, but it is not possible to show the true situation for the Salton Sea in this manner. The two breeding colonies at the head of the Gulf of California are indicated with a star, and the area of normal occurrence is shaded.

fall, a fall which produced records of two other individuals in the same general area. Birds first noted in October and November have all been in areas where food was available, and it is possible all had been present locally since August or September. Edge (1934) states the one on Big Bear Lake had been present for several days prior to 1 November 1933, when it was shot.

There are seven records (8 individuals) of birds found away from water, and all fall between 29 July and 20 September, which is probably the period of normal occurrence in the Southwest. Five of these birds were picked up dead or dying on highways (Pasadena, Sierra Madre, Escondido, Ocotillo and Phoenix); two were seen flying north along Interstate Highway 10 near Thousand Palms on 3 September 1965, and another was seen flying north along the same highway near Whitewater on

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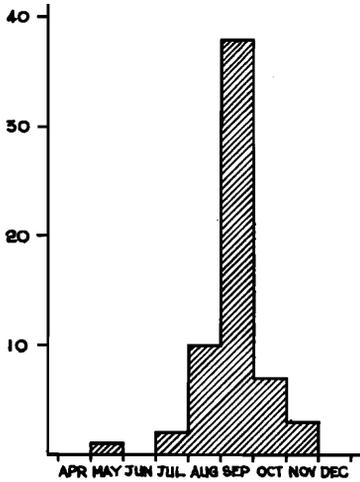


FIGURE 4. The seasonal occurrence of Blue-footed Boobies in the Southwestern United States. The month in which each individual was first reported is indicated, to show the time of the year these birds are appearing. Birds first noted after September could all have been present, and unreported, for at least a month. The bird found in May is likely to have been present since the previous fall. The sharp peak in September represents the arrival of 32 individuals in 1969.

20 September 1965. These records may indicate highway pavements are mistaken for water by these birds.

There appears to be much variation in the plumage characters of the Blue-footed Boobies occurring on the Salton Sea; some are heavily washed with brown about the head and neck, have pinkish-gray feet and legs, and are clearly immatures; others are much whiter about the head and neck, have bright blue feet and legs, and are assumed to be adults. Birds in intermediate plumages are probably sub-adults, and it is assumed the species takes more than two years to acquire full adult plumage. It is apparent that immatures are much more frequent than adults, but adults do occur, and one (#37266, San Diego Natural History Museum) found at the north end of the Salton Sea on 14 September 1969 is an adult female.

### BROWN BOOBY

The Brown Booby is the commonest and most widespread member of the *Sulidae*. It occurs throughout most of the tropical and subtropical waters of the Pacific, Atlantic, and Indian Oceans. It is normally considered non-migratory, but non-breeding birds wander far from the nesting colonies. The two races occurring in North America are the nominate race along the Atlantic coast, and *brewsteri* along the Pacific

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coast. The A.O.U. (1957) and Palmer (1962) indicate *brewsteri* breeds on islands throughout the Gulf of California southward to Nayarit, Mexico. On the Pacific coast of Baja California there are but three records away from the immediate vicinity of Cabo San Lucas. Huey (1924) reported one collected near East San Benito Island on 7 August 1923, Van Rossem (1945) saw an immature at 31°31' N. 117° 0' W. (about 50 miles W.S.W. of Ensenada) on 3 July 1925, and an immature female (#17091, S.D.N.H.M.) was taken 12 miles south of the Los Coronados Islands on 12 August 1935.

The Brown Booby is a casual wanderer to the southwestern United States, with most appearing along the Colorado River Valley and at the Salton Sea (fig. 5). A single adult, most likely the same individual returning year after year, was on Prince Islet at the northeast end of San Miguel Island during the summers of 1961, 1965, and 1968, and represents the only acceptable record from the coastal region.

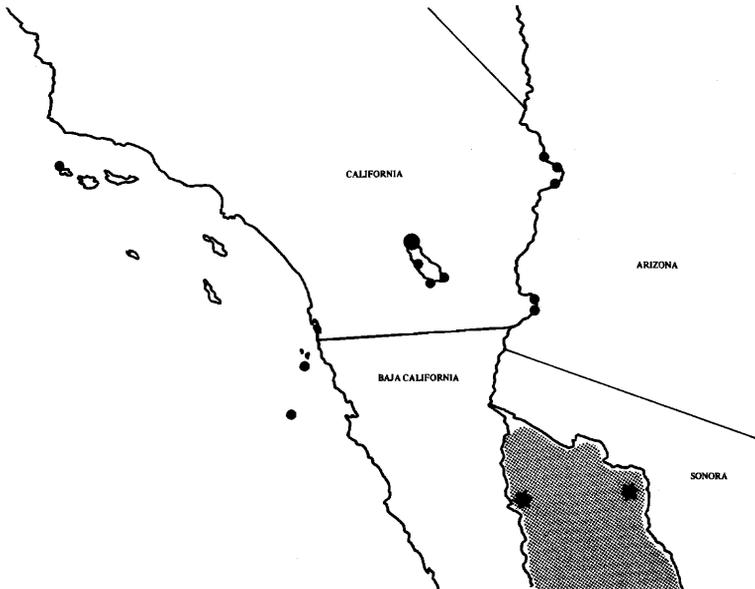


Figure 5. Solid dots indicate localities from which Brown Boobies have been recorded. The size of the dots suggest the number of individuals involved. The two breeding colonies at the head of the Gulf of California are indicated with a star, and the area of normal occurrence is shaded.

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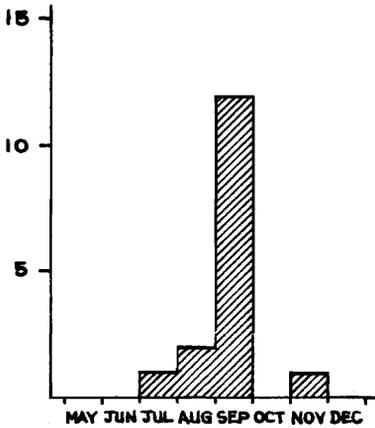


FIGURE 6. The seasonal occurrence of Brown Boobies in the Southwestern United States. The month in which each individual was first reported is indicated, to show the time of the year these birds arrive. Birds first noted in November are likely to have been present for some weeks. The peak in September is due to the appearance of eight individuals in 1969.

At least 16 individuals have been recorded at the Salton Sea and along the Colorado River Valley since 1943, but half of these occurred in 1969. Most of the birds are young of the year; however, among the eight at the Salton Sea in 1969 there was one sub-adult and three adult plumaged individuals. It is apparent these birds are arriving in the late summer, and their occurrence is the result of post-breeding dispersal from nesting colonies in the Gulf of California. An immature at the north end of the Salton Sea on 28 July 1966 is the earliest arrival date on record, and most have appeared in September (fig. 6). Phillips et al. (1964) report one continuously present for 25 months (5 September 1958 to 7 October 1960) at Martinez Lake on the Colorado River. Such records illustrate how long individuals can survive away from their normal habitat, and also serve to point out *arrival dates* are sometimes difficult to determine and are not necessarily anywhere close to the dates on which birds are found. The adult seen at the north end of the Salton Sea on 25 April 1970 had most likely been present on the sea from the previous fall; however, no adults had been reported from there since 11 October 1969.

### MAGNIFICENT FRIGATEBIRD

The Magnificent Frigatebird occurs in the tropical and sub-tropical waters along both coasts of the Americas, and also in a limited area along the west coast of Africa. It is considered a permanent resident within its breeding range, but non-breeding individuals wander considerable dis-

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tances from the nesting colonies. In the Pacific, Grinnell (1928) indicates it occurs regularly north to latitude  $26^{\circ}$  on the west coast of Baja California, and throughout all but the extreme northern portion of the Gulf of California. Palmer (1962) indicates it regularly ranges north to the Oregon border, but he cites no records to substantiate this; he also indicates no interior occurrences for the Southwest.

Along the Pacific coast of the United States the Magnificent Frigatebird is a very rare late summer straggler to extreme southern California, occurring casually north to Santa Barbara County, and accidentally north of there. It has also occurred casually around the Salton Sea and along the Lower Colorado River Valley, and accidentally elsewhere in the Southwest (fig. 7).

By the end of 1970 there were at least 30 records (six records lacking complete data are excluded) from the coast of southern California (13 in San Deigo, 2 in Orange, 6 in Los Angeles, 1 in Ventura, and 7 in Santa Barbara Counties, and 1 on Catalina Island). Most of these records pertain to single individuals, but there are six instances of two being seen together (Santa Barbara, 16 August 1969; Carpinteria, 12 August 1912; Long Beach, 13 June 1911; La Jolla, 29 August 1935, 26 July 1940, and 16 July 1966). It has been recorded annually since 1964, occurring north to Santa Barbara County in four of these years. With more observers afield, and an increase in communications with fisher-



Figure 7. Solid dots indicate localities from which Magnificent Frigatebirds have been recorded. It is evident the species is rare in southern California, and does not normally wander north of Santa Barbara county.

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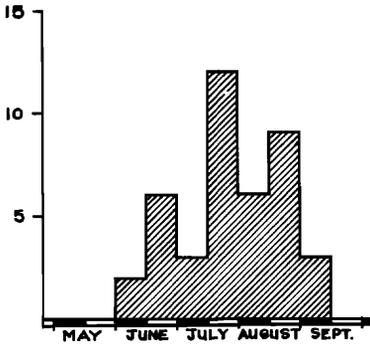


FIGURE 8. The seasonal occurrence of Magnificent Frigatebirds along the southern California coast. Each sighting of every individual is indicated according to the half-month in which it occurred. Records north of Santa Barbara County are considered accidental, and are not included.

men, we can expect an increase in records; however, this species is large and conspicuous and remains along the coastline, so very few can pass unnoticed.

Magnificent Frigatebirds appear in southern California in the late summer, with most occurring in July and August (fig. 8). The earliest arrival date is 13 June, and one near Oceanside on 9 September 1940 is the latest. Most of the birds of known age have been white headed immatures. Two exceptions are an adult female seen at Seal Beach, Orange County, on 27 June 1956, and an adult female seen at La Jolla, San Diego County, on 10 August 1968.

In northern California there is one record for Monterey County (12 January 1953), two for Marin County (20 June 1905 and 13 August 1968), and one for Humboldt County (5 October 1888). All were immatures except for the 13 August bird which was reported as an "adult (sex?)". Jewett (1935) reported an immature collected at Tillamook Rock, Clatsop County, Oregon, on 18 February 1935, which constitutes the northernmost occurrence on the west coast. It is interesting to note that three of these records are for dates much later than any for southern California.

There are seven records from the area of the Salton Sea and the lower Colorado River Valley. All but two of the records are of single individuals seen on one day only. Three immatures were seen flying north along the Colorado River between Laguna Dam and Imperial Dam on 20 July 1968. Single immatures were seen at various points on the Salton Sea on four dates in the late summer of 1968 (20 and 29 July, 3 August, and 1 September), and two were seen together there on 10 August of the same year. Two birds remaining around the Salton Sea for six weeks could account for the sightings, but the 10 August birds were watched

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as they circled to a great height above the southeast corner of the sea, then flew in a straight line towards the Gulf of California, and appeared to be departing from the area.

As is the case along the coast, this species is most frequently noted in July and August (fig. 9). One near Palm Springs on 24 June 1961 represents the earliest arrival date, and an individual over Havasu Lake on the Colorado River on 8 September 1955 is the latest.

In southeastern Arizona, Phillips et al. (1964) report one seen at Tamacacori National Monument on 18 June 1953, and another seen at Picacho Reservoir on 29 August 1962. In New Mexico, Zimmermann (1968) reports an adult female recently dead near Silver City on 1 October 1967; Hubbard (1970) reports photographs are on file of an adult female at Bitter Lake National Wildlife Refuge on 4 – 6 October 1955 (photo checked by author), and he reports an immature was seen at Las Cruces on 1 February 1969. Zimmermann (1968) felt the 1967 bird had come from the Gulf Coast of Texas, and it is possible the other two New Mexican birds also came from the east; however, a west coast origin is just as likely, and there will be no way of knowing from which coast these birds wandered.

Oberholser (1917) stated the Greater Frigatebird *Fregata minor* occurred on both coasts of California and Lower California, and Swarth (1933) believed *Fregata minor* occurred on the Lower California coast. Neither backed up their statements by specimens, and it appears there was much confusion about the identity and distribution of *magnificens* and *minor* in those early years. Eisenmann (1955) and others do much

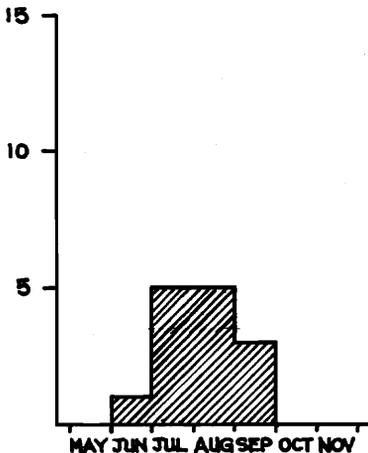


FIGURE 9. The seasonal occurrence of Magnificent Frigatebirds around the Salton Sea and along the Colorado River Valley. Each sighting of every individual is indicated according to the month in which it occurred.

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to perpetuate the rumored occurrences along the west coast. Friedmann et al. (1950) indicate no records for the west coast of Mexico, Land (1970) cites none for Guatemala, and Monroe (1968) knew of none for Honduras. A breeding population on the Revilla Gigedo Islands, far off the coast of Mexico, appears to be the closest point of occurrence to California. Zimmermann (1968) cast doubt on the identity of the two frigatebirds reported by Phillips et al. (1964) as being possibly *minor*. While on the subject of these two sightings it is interesting to note that Monson (1953) reported the individual seen at Tumacacori National Monument was either "a female or immature", indicating the subtle differences between *magnificens* and *minor* were probably not noted, and Monson (1963a) reported the immature seen at Picacho Reservoir was believed "very likely *F. magnificens* by the observer".

### DISCUSSION

Figure 10 summarizes the number of individuals of each species occurring inland in the Southwest in recent years. It is evident numbers vary from year to year. Brown Pelicans are the most numerous, and are now occurring every year; however, numbers are greatest in years when boobies are also present. Blue-footed Boobies are more numerous than Brown Boobies, and there are definite flight years for these birds (1953, 1966, and 1969 being the most obvious). It appears to be rare for Brown Boobies to occur without Blue-footed Boobies also occurring. Early September 1969 saw the greatest influx of boobies and Brown Pelicans on record, with numbers of boobies equaling all those previously recorded in the area. Magnificent Frigatebirds are rarest, and their occurrences are not correlated with flight years for boobies as evidenced by the fact they occurred in four years when no boobies were reported, and when numbers of Brown Pelicans were small or nonexistent. 1968 was the only year numbers of these birds appeared in the Southwest; this was a poor year for Brown Pelicans and only two Blue-footed Boobies were found.

The post breeding dispersal of Brown Pelicans is well known to anyone who spends much time on the coast. During the nesting season (March to May) the Brown Pelican is relatively scarce away from the vicinity of the colonies, but in late summer becomes relatively common along the entire coast with some pushing far to the north. It would not be surprising to learn that boobies also have a strong urge to push north after the nesting season. Such an urge could well push some individuals northward from the head of the Gulf of California, and consequently

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Year	Blue-ftd. Booby	Brown Booby	Magnificent Frigatebird	Brown Pelican
1950				1
1951				1
1952				1
1953	7	1	1	3
1954	3		1	3
1955			2	2
1956				
1957		1		
1958	1	2		
1959				2
1960				
1961			1	
1962			1	
1963				7
1964	3			12
1965	4			16
1966	5	1	1	19
1967			1	3
1968	2		8	10
1969	32	8		25
1970	1	1		4

Figure 10. A chart showing the number of each of the four species discussed occurring in the interior Southwest each year since 1950. This indicates boobies occur in years when Brown Pelicans are most numerous, and frigatebirds frequently occur when Brown Pelicans are scarce.

bring Brown Pelicans and the two species of boobies to southeastern California and western Arizona. It is reasonable to assume that the post breeding dispersal of Brown Pelicans is responsible in part for the appearance of this species in the interior portions of the Southwest, and it is also likely this factor is responsible for the appearance of boobies in the same area.

Brown Pelicans and boobies feed in similar fashion, diving into the water after living prey. Frigatebirds steal food from other birds, pick up fish from the water surface, and eat carrion. A shortage of food for boobies and pelicans would not necessarily mean a shortage of food for frigatebirds, for the differences in feeding behavior between the two are such that the one might prosper while the other is starving (a heavy die-off of fish would help frigatebirds but would make life difficult for pelicans and boobies). It is very likely the availability of food in the Gulf

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of California is a factor influencing the numbers of these birds occurring in the Southwest each year, but nothing appears to be written on the subject. An increase in the number of birds competing for food as the summer progresses, due to the addition of young to the population, may be such that some individuals are pressured into moving northward in search of new feeding areas. Undoubtedly there are factors affecting fluctuations in the fish population numbers in the Gulf of California, and there are indications that there might be a die-off of marine life there following spells of hot weather. This is being investigated. A lack of live fish would certainly drive pelicans and boobies elsewhere in search of food.

### SUMMARY

The occurrence of the Brown Pelican, Blue-footed Booby, Brown Booby, and Magnificent Frigatebird in the interior portions of the southwestern United States is discussed. It is evident the former is of regular occurrence at the Salton Sea, and all are of casual to accidental occurrence throughout a large area of the Southwest. Most occur at the Salton Sea and along the lower Colorado River Valley. Most are immatures, and virtually all occur in the late summer and early fall. These birds evidently come from the Gulf of California, and it is suggested a combination of post-breeding dispersal and temporary lack of food in the Gulf are the factors driving these birds northward. There are obviously flight years when numbers of these birds appear in the Southwest. Boobies and pelicans appear together in certain years, but frigatebirds tend to occur in years when few if any of the former species are present.

In addition, the status of Magnificent Frigatebird on the Pacific Coast is discussed; it is a very rare late summer straggler to extreme southern California, occurring casually north to Santa Barbara, and accidentally north of there. Also, the rumored occurrence of *minor* is mentioned and dismissed.

### ACKNOWLEDGEMENTS

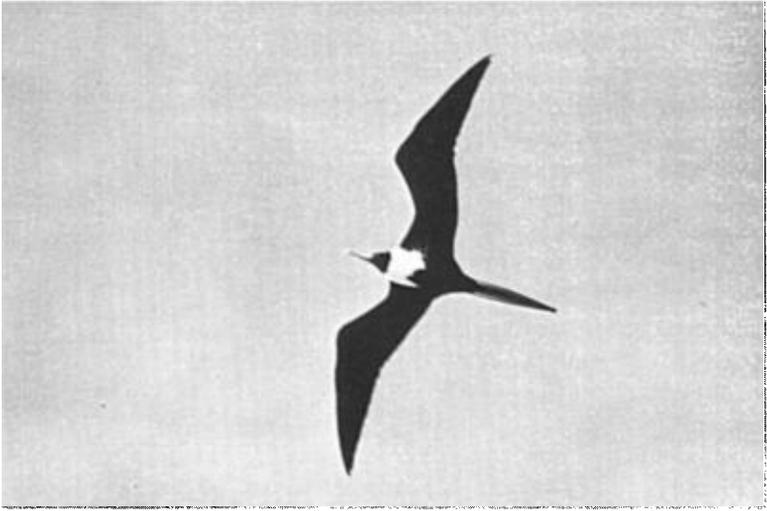
The New Mexico Ornithological Society supplied me with information on Magnificent Frigatebirds in New Mexico. Pierre Devillers read an early version of this paper, and gave many useful suggestions.



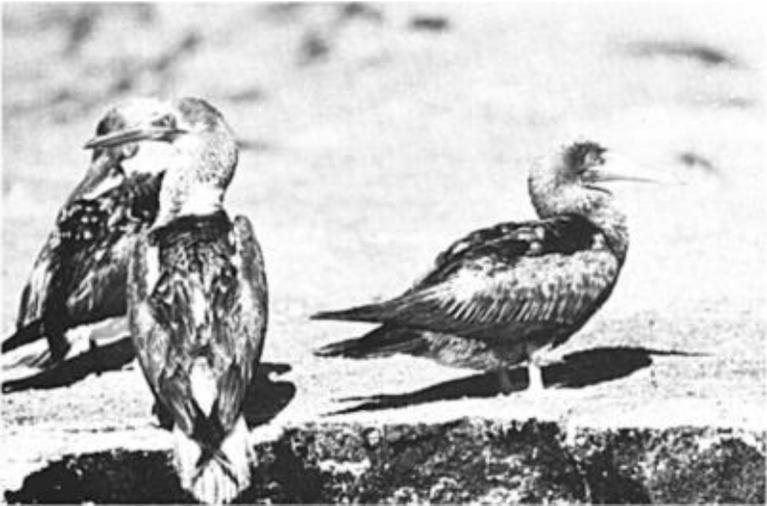
An adult plumaged Blue-footed Booby *Sula nebouxii* at Salton City on the Salton Sea, November 1969. *Photo by Herbert Clarke.*



Two Blue-footed Boobies *Sula nebouxii* at Salton City on the Salton Sea, November 1969. The light headed bird is judged to be an adult, but the dark headed bird has not yet acquired full adult plumage. *Photo by Herbert Clarke.*



An adult female Magnificent Frigatebird *Fregata magnificens* flying overhead at Mazatlan, Mexico, December 1964. The immature has an entirely white head as well as the white breast. *Photo by Herbert Clarke.*



Two Blue-footed Boobies *Sula nebouxii* and an immature Brown Booby *Sula leucogaster* at Salton City on the Salton Sea, November 1969. The immature Brown Booby has pale yellow legs and feet. *Photo by Herbert Clarke.*



An adult Brown Booby *Sula leucogaster* at Prince Islet, off San Miguel Island, California, 3-5 July 1965. The pale coloration about the head is characteristic of *brewsteri*. Photo by Herbert Clarke.



A young Brown Pelican *Pelecanus occidentalis*, Marina del Rey, September 1968. First year birds have the head and neck a much darker brown than on this individual. Photo by Herbert Clarke.



Two Blue-footed Boobies on the mudflats at the north end of the Salton Sea, 6 August 1966. The erect bird has bright blue legs and feet, and is judged to be an adult. The bird preening has pinkish legs and feet, and is judged to be an immature. *Photo by Guy McCaskie.*



A flock of boobies at Salton City on the Salton Sea, 28 September 1969. There are five Blue-footed Boobies *Sula nebouxii* and an immature Brown Booby *Sula leucogaster* present. *Photo by Ron LeValley. from Audubon Field Notes*

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### APPENDIX

The specific records used in the analysis of the four species in the Southwest are listed. All the records are from California unless otherwise indicated. The records are listed in chronological order by species, and the coastal records are held separate from the interior ones. In those cases where the record is documented by a specimen, and the record is either unpublished or is mentioned only in Audubon Field Notes, the catalogue number and deposition of the specimen is given. In addition, reports of questionable validity, and those accompanied by inadequate information as to date or locality, are mentioned.

#### BROWN PELICAN

1 nr. Laguna Dam, Arizona, 14 Aug. 1950 (Monson, 1950); 1 Salton Sea, Imperial Co. 27 Aug. 1951, and 10 Oct. 1952 (Small and Pyle, 1953); 1 Parker, Arizona, 1 Aug. 1953, and 1 Goodyear, Arizona, 2 Aug. 1953 (Monson, 1953); 1 Salton Sea, Imperial Co. mid-Nov. 1953 (Small, 1954); 1 Flagstaff, Arizona, 3 Aug. 1954 (Phillips et al. 1964); 1 Crossroads, San Bernardino Co. 13 Aug. 1954, and 1 Parker Dam, Arizona, 16 Aug. 1954 (Monson, 1954b); 1 nr. Imperial Dam, Arizona, 16 Aug. 1955, and 1 Laguna Dam, Imperial Co. 18-24 Aug. 1955 (Monson, 1956); 1 Boulder Beach, Nevada, 10 June 1959, and 1 Havasu Lake, Arizona, 28-31 July 1959 (Monson, 1959d); 2-7 Salton Sea, Riverside Co. 1-14 Sept. 1963 (McCaskie, pers. obs.); 3-10 Salton Sea, Riverside and Imperial Cos. 8 Aug. to 13 Sept. 1964 (McCaskie and Pugh, 1964b and 1965); 1-15 Salton Sea, Riverside and Imperial Cos. 10-24 July 1965 (Pugh, 1965); 1 Salton Sea, Riverside Co. 21 Aug. 1965 (McCaskie, 1966a); 3-10 Salton Sea, Riverside Co. 28 July to 18 Nov. 1966, and 1-7 Salton Sea, Imperial Co. 3 Sept. to 24 Nov. 1966 (McCaskie, 1966b and 1967a); 1 Phoenix, Arizona, 1-3 Sept. 1966, and 1 Havasu Lake, Arizona, 9 Oct. 1966 (Snider, 1967a); 1 Salton Sea, Riverside Co. 29 July to 4 Sept. 1967, and 1 Lake Elsinore, Riverside Co. 18 Sept. 1967 (McCaskie, 1967b and 1968a); 1 Phoenix, Arizona, 4 Aug. 1967 (Snider, 1967b); 3-10 Salton Sea, Riverside Co. 3 July to 8 Sept. 1968 (McCaskie, 1968b and 1969a); 1-23 Salton Sea, Riverside and Imperial Cos. 7 June to 11 Oct. 1969 (McCaskie, 1969b and 1970); 1 Ramer Lake, Imperial Co. 8-30 Aug. 1970, and 1-3 Salton Sea, Imperial Co. 30 Aug. to 26 Sept. 1970 (McCaskie, pers. obs.).

1 Los Banos, Merced Co. 30 Dec. 1968 (Audubon Field Notes 23:413, 1969) was seen briefly in poor light by observers who were not aware of the unusualness of the record.

#### BLUE-FOOTED BOOBY

1 Salton Sea, Riverside Co. 1-11 Nov. 1929 (Clary, 1930); 1 Big Bear Lake, San Bernardino Co. 1 Nov. 1933 (Edge, 1934); 1 Sierra Madre, Los Angeles Co. 18 Aug. 1947 (#20523, Los Angeles County Museum); 1 Phoenix, Arizona, 29

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July 1953, and 1 Havasu Lake, Arizona 19 Sept. 1953 (Phillips et al. 1964) and 2 more there 5 Oct. 1953 (Monson, 1954a); 3 Salton Sea, Riverside Co. 18 Oct. 1953 with 1 still present 31 Oct. 1953 (Small, 1954, and Smart, pers. comm.); 1 Havasu Lake, Arizona, 13 Aug. 1954 (Monson, 1954b), and another there 4-10 Sept. 1954 (Monson, 1955); 1 Pasadena, Los Angeles Co. 17 Sept. 1954 (Stultz, 1955); 1 Havasu Lake, Arizona, late Nov. 1958 to 11 April 1959 (Monson, 1959b and 1959c); 2 Puddingstone Reservoir, Los Angeles Co. early Oct. 1964 to late May 1965 (McCaskie and Pugh, 1965 and McCaskie 1965); 1 Lake Mathews, Riverside Co. 22 May and 19 July 1965 (McCaskie, 1966a); 1 Salton Sea, Riverside Co. 24 July and 21 Aug. 1965 (Pugh, 1965 and McCaskie, 1966a); 2 Thousand Palms, Riverside Co. 3 Sept. 1965, and 1 nr. Whitewater, Riverside Co. 20 Sept. 1965 (McCaskie, 1966a); 2-5 (1 collected 13 Aug. 1966, #3844, San Bernardino County Museum) Salton Sea, Riverside Co. 4 Aug. to 16 Oct. 1966 (McCaskie, 1966b and 1967a); 1 Ocotillo Wells, Imperial Co. 4 Aug. 1968 (#36707, San Diego Natural History Museum); 1 Salton Sea, Riverside Co. 10 Aug. to 1 Sept. 1968 (McCaskie, 1968b and 1969a); 1-30 (1 collected 14 Sept. 1969, #37266, S.D.N.H.M. and 2 collected 28 Sept. 1969, #4642 and #4643, S.B.C.M.) Salton Sea, Riverside and Imperial Cos. 31 Aug. to 23 Nov. 1969; 1 Point Loma, San Diego Co. 3 Sept. 1969, and 1 (#37566, S.D.N.H.M.) nr. Escondido, San Diego Co. 8 Sept. 1969 (McCaskie, 1970); 1 Salton Sea, Riverside Co. 15 Aug. 1970 (Cardiff, pers. comm.).

An unidentified booby between Anaheim Landing and Sunset Beach, Orange Co. 25 Oct. 1921 (Van Rossem, 1922) has been treated under this species (Grinnell and Miller, 1944). 1 (#17171, S.D.N.H.M.) found on a street in San Diego, San Diego Co. 28 Jan. 1936 is soiled and worn, and is probably an escapee from the zoo.

### BROWN BOOBY

1 Havasu Lake, Arizona, 13-14 Aug. 1943 (Monson, 1946); 1 Imperial Dam, Imperial Co. 20 Sept. 1946 (McMurry, 1948); 1 Havasu Lake, Arizona, 5 Sept. 1953 (Phillips et al., 1964); 1 Headgate Rock Dam, San Bernardino Co. 20 Nov. 1957 (Huey, 1959); 1 Martinez Lake, Arizona, 5 Sept. 1958 to 7 Oct. 1960 (Monson, 1959a and 1961); 1 Imperial Dam, Imperial Co. 20 Sept. 1958 (Monson, 1959a); 1 (#3845, S.B.C.M.) Salton Sea, Riverside Co. 28 July to 13 Aug. 1966 (McCaskie, 1966a); 1-8 Salton Sea, Riverside and Imperial Co. 6 Sept. to 26 Oct. 1969 (McCaskie, 1970), and what was probably one of these birds still there 25 April 1970 (Cardiff, pers. comm.); 1 Salton Sea, Imperial Co. 15-22 Aug. 1970 (Cardiff, pers. comm. and McCaskie, pers. obs.).

1 San Miguel Island, Santa Barbara Islands, 25-26 July 1961, 3-5 July 1965, and 5 June and 20 July 1968 (Small, 1961b, Pugh, 1965, and McCaskie, 1968). A record from Point Loma, San Diego Co. (Small, 1960) lacks sufficient details.

### MAGNIFICENT FRIGATEBIRD

1 35 miles below Boulder Dam, Nevada, 2 Sept. 1946 (Baldwin, 1947); 1 Havasu Lake, Arizona, 13 Aug. 1954 (Monson, 1954b); 1 Havasu Lake, Arizona, 8 Sept. 1955 (Monson, 1956); 1 Palm Springs, Riverside Co. 24 June 1961 (Small, 1961a); 1 Salton Sea, Riverside Co. 13 Aug. 1966 (McCaskie, 1966b); 3 Imperial

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Dam, Imperial Co. 20 July 1968 (Snider, 1968); 1-2 Salton Sea, Riverside and Imperial Cos. 20 July to 1 Sept. 1960 (McCaskie, 1968b and 1969a).

1 Humboldt Bay, Humboldt Co. 5 Oct. 1888 (Grinnell and Miller, 1944); 1 San Pablo Bay, Marin Co. 20 June 1905 (Gifford, 1905); 1 Alamitos Bay, Los Angeles Co. 17 June 1906 (Willett, 1912); 2 Carpinteria, Santa Barbara Co. 12 Aug. 1912, and 1 13 miles west of Santa Barbara, Santa Barbara Co. 27 Aug. 1912 (Dawson, 1912) – the same birds are referred to as seen on 12 and 24 Aug. 1912 (Dawson, 1923); 2 Long Beach, Los Angeles Co. 13 June 1911 (Linton, 1911); 1 Catalina Island, Channel Islands, 29 June 1913 (Howell, 1917); 1 nr. Hueneme, Ventura Co. 29 July 1925 (Hoffmann, 1926); 1 San Diego, San Diego Co. 27 June 1927 (Abbott, 1927); 1 Redondo Beach, Los Angeles Co. 30 July 1928 (Willett, 1933); 2 La Jolla, San Diego Co. 29 Aug. 1935 (Miller, 1936); 1 Carlsbad, San Diego Co. 9-13 July 1940, 2 La Jolla, San Diego Co. 26 July 1940, and 1 25 miles west of Oceanside, San Diego Co. 9 Sept. 1940 (Abbott, 1941); 1 nr. Gaviota, Santa Barbara Co. 11 July 1941 (Bond, 1941); 1 Newport, Orange Co. 12 July 1951 (Pyle, 1951); 1 Point Lobos, Monterey Co. 12 Jan. 1953 (Legg, 1954); 1 Seal Beach, Orange Co. 27 June 1956 (Small, 1956); 1 Zuma Beach, Los Angeles Co. 16 June 1958 (Small, 1958); 1 Point Loma, San Diego Co. 19 Aug. 1964 (McCaskie and Pugh, 1965); 1 San Pedro, Los Angeles Co. 26 Aug. 1965, and 1 La Jolla, San Diego Co. 6 Sept. 1965 (McCaskie, 1966a); 1-2 La Jolla, San Diego Co. 16-23 July 1966 (McCaskie, 1966b); 1 nr. Gaviota, Santa Barbara Co. 17 July 1966 (McCaskie, 1967a); 1 Santa Barbara, Santa Barbara Co. 5 Sept. 1967 (McCaskie, 1968a); 1 San Pedro, Los Angeles Co. 20 June 1968, 1 La Jolla, San Diego Co. 24 July 1968, and 1 nr. Carpinteria, Santa Barbara Co. 5 Aug. 1968 (McCaskie, 1968b); 1 La Jolla, San Diego Co. 10 Aug. 1968 (McCaskie, 1969a); 1 Rodeo Lagoon, Marin Co. 13 Aug. 1968 (Chandik and Baldrige, 1968); 1 San Diego, San Diego Co. 17-18 July 1969, and 1 Imperial Beach, San Diego Co. 29 July 1969 (McCaskie, 1969b); 1-2 nr. Santa Barbara, Santa Barbara Co. 16-23 Aug. 1969 (McCaskie, 1970); 1 San Diego area, San Diego Co. 30 July to 25 Aug. 1970 (Jehl, Devillers and Saddington, pers. comm.).

1 (skull found) Farallon Islands; 1 (collected) "Santa Clara-San Francisco" – no date; 1 (collected) North Pasadena, Los Angeles Co. "about August 1892"; 3 nr. Los Angeles, Los Angeles Co. "December 1897"; 1 (collected) Huntington Beach, Orange Co. "early September 1925" (Grinnell and Miller, 1944); 1 Manhattan Beach, Los Angeles Co. "July 1952" (Small and Pyle, 1952), and 1 Catalina Island "September 1963" (not November as printed) (McCaskie and Pugh, 1964a) – all vague records as far as specific localities or dates are concerned. 1 (collected) Hueneme, Ventura Co. "about 1895" (Willett, 1912) and "in 1915" (Hoffmann, 1926) are suspected to refer to the same individual.

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