

or have spent long periods on the Farallones: American Kestrel, Mourning Dove, Long-eared Owl, Common "Red-shafted" Flicker, Ash-throated Flycatcher, Black Phoebe, Barn Swallow, Mockingbird, Western Meadowlark, and White-crowned Sparrow. All are regular in occurrence and range from uncommon to abundant. Conditions on the Farallones may be almost, but not quite, adequate for breeding for some of them. For instance, the swallow has been observed frequenting deserted buildings and may need only a little fine-grained mud for nest-building before it would breed. Five others (Red-winged Blackbird, Brewer's Blackbird, Black-headed Grosbeak, Lesser Goldfinch, and Chipping Sparrow) have occurred commonly to abundantly but most individuals have not remained for very long, indicating that conditions must not be as suitable as they are on the Channel Islands. According to Grinnell and Miller (1944), they prefer complex habitats not currently available on the Farallones. The Hutton's Vireo is rare on the Farallones but also requires more complex habitats, e.g., live oaks (Grinnell and Miller 1944).

The 11 Channel Island breeding species not yet discussed (the three large raptors, Barn Owl, White-throated Swift, Costa's and Anna's Hummingbirds, Acorn Woodpecker, Bushtit, Blue-gray Gnatcatcher, and Hooded Oriole) occur extremely to very rarely, if at all, on the Farallones (Anna's Hummingbird excepted—rare to uncommon), and spend very little time there. Of the preceding species the Barn Owl seems the most likely eventually to breed on the Farallones. Should a male and female ever occur together, the three critical requirements described by Grinnell and Miller (1944) for breeding seem to be present: (1) open hill sides productive of small mammals, (2) brush thickets or buildings for daytime roosting, and (3) cavities for nesting (e.g., holes in earth banks).

SUMMARY

The South Farallon Islands are a group of rocky islets, 0.41 km² in area, situated 32 km off the coast of Marin County in central California. Birds arriving on or near the island were censused every day, weather permitting, for eight years, from 3 April 1968 to 2 April 1976. Museum collections and the extensive Farallon literature, including about 70 sources dating back to the 1850s, were searched for other records of bird occurrences. In all, 331 species of birds, including 216 normally of land or freshwater habitats, were documented through 2 April 1976. Fifteen additional species, recorded through 2 October 1979, are mentioned in the Addenda. Thus 346 of the 496 species known to have occurred in northern California are documented from the Farallones. Details of first state records of four species are published for the first time. Eight other species are relegated to hypothetical status. For each species, seasonal status, total number of individuals that visited, high counts, timing of peak arrivals, and extreme arrival and departure dates are given. The breeding and residence history of each species, where appropriate, is also reviewed. The intensive census data, summarized for the eight recent years, provide a concise description of the migratory periods for each species' movements through central coastal California.

The greatest density and diversity of visitant species occurs during fall. Shorebirds, rocky intertidal species predominating, begin arriving in July and gradually increase to maximum visitation rates in September, when the generally rare estuarine and freshwater species also occur. Pelagic seabirds likewise reach max-

imum diversity during September although maximum numbers of Sooty Shearwaters often occur during summer, and phalaropes are often most abundant in August. The breeding seabirds, however, are mostly absent from the island during fall.

Landbird migrants, primarily species breeding in western North America and wintering in the tropics, begin arriving in early August and also reach maximum visitation rates in September. Nocturnal migrants greatly predominate. Vagrant landbirds, primarily from Canada and eastern North America, begin to appear in early September and occur in maximum numbers from mid-September to early October. The maximum diversity of visitants usually occurs at this time; 122 species were recorded on 27 September 1974. The maximum number of individuals visit in late September or early October, when the major arrival of landbirds wintering in coastal California occurs; nearly 10,000 visitants were estimated on 2 October 1972. Most were *Zonotrichia*. Landbird visitants decline during late October and dwindle to very low numbers by late November. Neritic seabirds, including those species inhabiting both inshore and offshore waters, begin arriving in very late September or October and reach maximum diversity during November, although fall resident nonbreeding Brown Pelicans are present in maximum numbers in October.

Besides the year-round resident breeding seabirds, substantial populations of neritic seabirds, particularly Eared Grebes, Surf Scoters, and large *Larus* gulls, frequent the waters around the island during winter. Rocky intertidal shorebirds also winter in some numbers, although other shorebirds, estuarine and freshwater species, and pelagic seabirds are generally very rare. Comparatively few landbirds, other than Starlings, winter on the island; those that do are species that prefer rather open, treeless habitats. Some individuals appear to return year after year to the island. Most arrive during the fall migration period, primarily October and November, and depart in March and April.

Early spring migrants may first appear in late February but usually arrive in March. Spring migration is generally quite sporadic and unpredictable, especially during March and April. At this time, however, the immense numbers of breeding seabirds begin their nesting activities. Nearly all waterbirds, including most pelagic and neritic seabirds and virtually all estuarine and freshwater species and shorebirds, are very rare during the spring migration. Large numbers of small gulls and phalaropes, however, sometimes pass by the island.

One and occasionally two major waves of visitant landbirds usually occur in early and/or late May. Different populations are probably involved in each of these flights but most are of species that breed in western North America and winter in the tropics; Wilson's Warbler is generally the most numerous species. Very few western landbirds visit after late May or very early June. Spring vagrant landbirds may first appear in mid-May but reach maximum diversity during the first half of June. There are times in early or mid-June when individuals of eastern species actually outnumber those of western species.

The breeding landbird community is small in numbers of species and individuals, probably because of the island's small size and depauperate, simple plant community. All naturally occurring, native, breeding landbirds are those that normally prefer rocky habitats having sparse vegetation and little fresh water. These species are among the few that also breed on all or most of the Channel

Islands farther south. The populations of four breeding landbirds (Common Raven, Rock Wren, Starling, and House Sparrow) have been changed by human interference during the last 70 years. Based on nine complete surveys made between 1888 and 1974, the species turnover has ranged from 14 to 100%, with a mean turnover of 52% per mean survey interval of 11.6 years, or 6.12% per year. Variation in turnover rate would probably lessen if the island had a more complex habitat and thus a more diverse avifauna.

Censuses of landbirds on the Farallones provide a measure of the immigrant pool potentially available for colonization of offshore California islands. The breeding species of the Channel Islands, islands much larger and more complex than the Farallones, are reviewed in terms of their rates of occurrence on the Farallones. Species that have endemic forms on the Channel Islands either occur infrequently or never on the Farallones, or have a high propensity to subspeciate in California. Several other species that breed on the Channel Islands occur frequently and remain for long periods on the Farallones, suggesting that conditions are nearly, but not exactly, right for breeding. Others that breed on the Channel Islands occur frequently on the Farallones but do not remain. These species prefer complex habitats. A few Channel Island breeding species, namely the Scrub Jay, Bewick's Wren, Bushtit, and Rufous-crowned Sparrow, are among a group of birds that have never been present naturally on the Farallones, and are among a subgrouping of species we expect will never arrive by overwater flight because of their sedentary habits.

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