metopias jubatus), California sea lion (*Zalophus californicus*), harbor seal (*Phoca vitulina*), and northern elephant seal (*Mirounga angustirostris*). Banana slugs (*Ariolimax* sp.) and an endemic subspecies of arboreal salamander (*Aneides lugubris farallonensis*) are present. The insects have not been well studied, but they include an endemic cave cricket (*Farallonophilus cavernicolus*), an endemic kelp fly (*Fucellia evermanni*), and several rather abundant beetles (tenebrionids, scarabids, coccinellids, and dermestids).

Human inhabitants, their work, and their life-styles have greatly affected the island's wildlife, especially from the early 1800s to about 1970. A lighthouse station has been present since 1854, and during the 50 years prior to that the large pinniped populations were a source of skins and meat for New England and Russian sealers. The history of human occupancy and reviews of effects on marine bird and mammal faunas are presented by Doughty (1971) and Ainley and Lewis (1974). The dogs and cats kept by the lightkeepers had potentially disruptive effects on both marine birds and landbirds. When PRBO established its research station in 1968 there were five cats, but they all disappeared not long afterwards (1972). In 1973 and 1974 the rabbits were exterminated. Since then the vegetation has become much denser and several species of plants have survived longer and formed rather large bushes. Gulls are important predators of landbirds on the island; several gull pellets have been found that contained landbird remains. During the spring, when both landbirds and gulls are present, the former tend to occur in areas free of gulls.

TERMINOLOGY AND METHODS OF ANALYSIS

One purpose of this work is to define the status and occurrence patterns of avian species on the South Farallon Islands. These definitions are based on only the eight years of census data gathered daily by the Point Reyes Bird Observatory between 3 April 1968 and 2 April 1976. Three parameters are used to define the status of any given species: the residency or length of stay, the seasonality, and the abundance of the individuals.

Residency.—The birds occurring on the Farallones are classified into two groups: residents and visitants. **Residents** are individuals known to have remained on or around the island for more than three weeks during any given season; **visitants,** on the other hand, are individuals that remained for three weeks or less. Sick or wounded individuals that remained for more than three weeks during their normal migratory period are classified as visitants. We consider the general term, visitant, to be more appropriate in describing occurrences than several more specific terms such as migrant, transient, dispersant, and vagrant. In using the latter terms, we would have had to make many more arbitrary classifications, thus greatly decreasing the value in their use.

Seasonality.—Residents may or may not breed on the island. Those that do are additionally termed **breeders.** Fifteen species (12 seabirds and three landbirds) have bred during the eight-year period analyzed here. Some, such as Black Oystercatcher and Western Gull, are present the entire year and are referred to as year-round (not permanent) residents and breeders. Others, such as Leach's Storm-Petrel and Tufted Puffin, are only present during spring and summer and are classified as spring and summer residents and breeders.

A number of species, both waterbirds and landbirds, remain on or around the

island during their nonbreeding season. The vast majority are present during the winter months and are accordingly termed winter residents. Some individuals of a given species may be present during the winter for more than three weeks while other individuals may be present for only a few days. In such cases the species is regarded as both a winter resident and a visitant. Only two nonbreeding species have been given a resident status during seasons other than winter: the Sooty Shearwater, which often appears to be resident in large flocks during the summer, and the Brown Pelican, which roosts in large numbers on the island from August (June in warm water years) to December.

Visitants, for the most part, appear during three seasons: fall, winter, and spring. For most species that do not breed or winter on the island, the separation of occurrences between spring and fall is obvious. For some, however, late spring visitants occur well into June or even early July, and fall visitants begin to arrive in late July or even earlier. The separation of spring and fall occurrences during the mid-summer months is, therefore, somewhat arbitrary. However, we have used the following guidelines to effect this classification. Individuals in, or molting into, a recognizably distinct basic (winter) plumage, and all juveniles or immatures of the year are classified as fall visitants. Individuals in breeding condition (that is, in an alternate or breeding plumage, or having enlarged gonads, a prominent cloacal protuberance, or a well developed brood patch) are classifed as spring visitants. For others, particularly waterbirds and those landbirds not classified by either of the above criteria, we used the largest break in occurrences during June or July to define the separation between spring and fall visitants. In most cases, the separation was quite distinct and presented no problems. This method results in elimination of a summer visitant class for all but two species, Starling and House Sparrow, both of which have bred on the island in recent years.

The separation of fall and winter visitants is considerably more arbitrary since winter occurrences could represent either delayed or harsh-weather southward migration or winter wandering. Since late fall occurrences for many species, even normally tropical wintering ones, exist until well into December, we chose 1 January as the arbitrary date separating fall and winter occurrences. Thus, all "valid" winter visitants occurred after 1 January and all "valid" winter residents remained until after 1 January. It should be noted that winter resident individuals that arrive in the fall are not included among the total of fall visitants.

The separation of visitants during late winter and early spring is also somewhat arbitrary. In general, a large break or a consistently timed increase in the number of occurrences is interpreted as indicating the arrival of spring visitants. Possible misclassifications between any of these seasons are mentioned within the Species Accounts.

Abundance.—As used in this work, abundance is defined by the minimum total number of individuals that have occurred in any season during the entire eight-year period. The algorithm used to determine this minimum total number for landbird species for which no banding or individual plumage data are available is: (a) all individuals present on a given day are presumed to be those present on the preceding day (unless there has been an increase in number), and (b) an individual must go unrecorded on only one day in order to establish the arrival

of a new individual. For example, if a week's census data for a given species is as follows:

Day:	1	2	3	4	5	6	7
Total present:	0	5	5	20	5	10	0
Number of arrivals:	0	5	0	15	0	5	0

it is assumed that 25 individuals occurred. It is possible, of course, that complete turnover occurred each day and that 45 individuals were involved. However, banding data (14,052 landbirds were banded on the island during the eight-year period) indicate that such complete turnover does not occur and that the daily census accounts for well over 95% of the landbirds actually present on any given day. These results supply considerable assurance that the above algorithm produces meaningful numbers. Of course, whenever banding data (capture, recapture, and sightings of banded birds) were available for any individual, or whenever distinctive individual plumage characteristics were recorded, the number of arrivals was modified accordingly.

The vast majority of landbirds tend to concentrate around the few trees, buildings, and water tanks, the top and south slope of Lighthouse Hill, the grassy marine terrace, and the two or three surge channels at the leeward (east) end of the island. These areas are readily accessible for censusing throughout the year. Visitant waterbirds, however, may occur around the entire periphery of the island, although the largest concentrations generally occur on Mussel Flat or in Mirounga Bay off the south side of the island, or on Sea Lion Flat or in Fisherman's Bay off the north side of the island. While these areas are readily censused, the shore and waters on the west side are not. Therefore, to allow for the possibility of missing waterbirds on the daily census, we relaxed the number of days on which an individual must remain unrecorded to establish the arrival of a new individual (see part b of the above algorithm) according to the following schedule: landbirds and pelagic species passing the island, 1 day; estuarine and freshwater species, shorebirds (except those preferring the rocky intertidal), and gulls, 2 days; inshore neritic diving species (loons, scoters, grebes, etc.), 3 days; and shorebirds preferring the rocky intertidal, 4 days. This method, we feel, compensates for the degree of detectability of the various species groups. In addition, this algorithm was relaxed even more during winter when resident individuals were missed but were known to be present. The actual numbers of certain rather common winter resident waterbirds, such as Surf Scoter, Black Turnstone, and Wandering Tattler, were extremely difficult to determine. These problems are dealt with individually in the Species Accounts.

We used abundance classes based upon a logarithmic scale to the base three (3). This scale provides an increasingly finer degree of classification for increasingly rarer classes. The base three was intuitively and arbitrarily chosen to meaningfully fit the quantity of data available (eight years of daily censuses of a 100-acre island). We recommend that a logarithmic scale of abundance be used whenever numerical census data are available. The abundance classes employed in this work are summarized as follows:

Log scale$_3$	Abundance classification	Code	8-yr. seasonal total of individuals	Approx. no. of individuals per season per year
1	**Extremely rare**	ER	1–3	<⅓
2	**Very rare**	VR	4–9	⅓–1
3	**Rare**	R	10–27	1–3
4	**Uncommon**	U	28–81	3–10
5	**Fairly common**	FC	82–243	10–30
6	**Common**	C	244–729	30–90
7	**Abundant**	A	730+	>90

Only two types of exceptions to this classification scheme exist. The first includes cases in which not all individuals known to have occurred on the island were identified to species (e.g., *Selasphorus* hummingbirds, *Empidonax* flycatchers). In these cases, both the absolute lower and approximate upper abundance classes are given (e.g., extremely rare to rare visitant). The second includes those species that characteristically arrive (or fly by) in large, coherent flocks. For these, abundance is reduced one class from the total number of individuals involved, or increased one class from the number of flocks involved, whichever is the lower. Fall Brant, for example, arrived in only six flocks (very rare) but included a total of 512 individuals (common). The abundance classification given this species is, therefore, rare.

We used the modifying term **sporadic** to classify species that showed marked fluctuation in seasonal abundances from one year to another. Statistically, their mean seasonal abundances have extremely high standard deviations. Application of the term is discussed within respective Species Accounts.

In the Species Accounts that follow, the numerical abundance and abundance class, the number of individuals banded, the specimen numbers for all existing specimens, and the high count and its date are given for each season. The timing of occurrences is presented both by means of the extreme seasonal dates and the timing of the peak number of arriving individuals. This peak was determined by tabulating the entire number of arriving individuals, for all eight years, in discrete ten-day intervals (e.g., early, mid-, and late April). Fall visitant status is treated first, followed by winter resident and/or visitant status, spring visitant status, and, finally, summer resident and breeding status. Old records (prior to 2 April 1968) are mentioned under the respective seasonal section. When applicable, a discussion of old breeding records and a documentation of landbird banding recoveries are presented in a final paragraph.

SPECIES ACCOUNTS

COMMON LOON—*Gavia immer*. *Fall:* rare visitant. Twenty of the 21 individuals were recorded between 12 October (1975) and 8 December (1975) with peak numbers occurring in late October and mid-November. The high count of four birds was recorded on 26 October and 12 November 1972. In addition, a single extremely early individual was present 22–24 August 1975. Interestingly, a probably flightless Common Loon was present in June 1975, and an unidentified loon was seen 6 August of that year. Possibly all three of these records represent a single summering individual. *Winter:* extremely rare visitant. A single individual was recorded 18 January 1976. *Spring:* very rare visitant. The five single individuals were recorded on 29 March 1971, 5 and 9 April and 1–2 May 1973, and 2–10 June 1975. Dawson (1911b) reported one individual on 2 June 1911.