

# Seabirds

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## Summary and Introduction

Among the animals of the Gulf of the Farallones, seabirds are the easiest to study. Residing above the water surface (for the most part), seabirds are readily observed by land- or boat-bound humans. They generally nest in huge colonies on islands, facilitating research on their breeding-population sizes and nesting requirements. For these reasons, seabirds are commonly used as barometers of the health of marine ecosystems. This observation is true in the gulf, where a widely varying marine environment supplies an interesting extra dimension for study.

“Seabirds” is not a technical term but refers to individuals among a hodgepodge of different bird families that share in common their ability to make a living on the ocean. In the Gulf of the Farallones there are 11 or 12 species of breeding seabirds, including common murre, Cassin’s and rhinoceros auklets, western gulls, Brant’s and pelagic cormorants, storm petrels, pigeon guillemots, and tufted puffins. Another 35 species of migrant seabirds are regular visitors to the gulf but do not breed there; examples of these species include Pacific and red-throated loons, red-necked and western grebes, black-footed albatross, pink-footed, Buller’s, and black-vented shearwaters, herring and glaucous-winged gulls, and black and surf scoters. About 25 additional species of nonbreeding seabirds have been recorded rarely or as vagrants in the gulf, including the manx shearwater, an Atlantic species that has recently been seen sporadically and could even begin to breed in the gulf.

All of the breeding species in the Gulf of the Farallones nest on the Farallon Islands, which are in the center of the gulf. Since 1968, biologists from the Point Reyes Bird Observatory have monitored the size and productivity of these populations. Only through such long-term research can a full understanding of the population dynamics of these species and of their relation to the marine environment be achieved. Some of these species also nest on cliffs and small islets along the Marin County coast, north of the Golden Gate.

The common murre typifies breeding seabirds in the Gulf of the Farallones. Before the 1850’s, an estimated 400,000 to 600,000 murre bred on Southeast Farallon Island, but this population was decimated by egg collecting in the wake of the California Gold Rush, before chickens had arrived in sufficient numbers to provide eggs for the burgeoning San Francisco populace. Other threats, such as oil spills, human disturbance on the islands, and the depletion of Pacific sardine stocks, reduced populations further until they reached a low of about 6,000 birds during the 1950’s. Southeast Farallon Island became a National Wildlife Refuge in 1969, and through protection and increased environmental awareness, populations in the Gulf of the Farallones gradually climbed to about 100,000 individuals by the year 2000.

Common murre, along with the other seabirds breeding at the Farallones, have “good years” in which 90 percent or more of the pairs successfully fledge a chick, and “bad years” in which failure rates reach 50 percent or more. These good and bad years generally reflect the strength of the California Current, the intensity of coastal upwelling, the presence and absence of “El Niño” events (see chapter on Current Patterns Over the Continental Shelf and Slope), and the effects that these processes have on juvenile rockfish, anchovies, sardines, and other food resources.

Because of the high levels of marine productivity found in the Gulf of the Farallones, many species that nest far away also come to the region during their non-breeding seasons. The most

common of these species is the sooty shearwater, which visit the Gulf of the Farallones in late summer by the hundreds of thousands, if not a million or more at a time. Every autumn there is also a great northward dispersal of organisms into the Gulf of the Farallones from the south, following the northward migration of the northern anchovy. Among the birds that follow this migration are brown pelicans, Heermann's gulls, and elegant terns. Many species of loons, grebes, ducks, gulls, and alcids (a family of diving seabirds having a stocky body, short tail and wings, and webbed feet—they include the horned puffin, the ancient murrelet, Xantu's murrelet, and the threatened marbled murrelet) take up winter residence in the Gulf of the Farallones, escaping the harsher winters of their Alaskan breeding grounds. Finally, a few species of seabirds breed to the north and winter primarily or entirely to the south of the gulf. These long-distance migrants, including phalaropes, jaegers, and Sabine's gull, can be seen passing through the Gulf of the Farallones from July to October and in April and May.

Current threats to seabird populations in the Gulf of the Farallones region include effects of contaminants from San Francisco Bay, overfishing, low-level or "chronic" oil pollution, and mortality associated with gillnetting in Monterey Bay. Declines in some seabird populations in the gulf are occurring because of these and other effects. Data on the reproductive success and survival of these seabirds, integrated with knowledge of food resources and the marine environment, can be used to assess the status and health of the Gulf of the Farallones marine ecosystem.

### **The Common Murre, a Quintessential Gulf of the Farallones Seabird**

The story of the breeding seabirds in the Gulf of the Farallones is typified by that of the common murre (figs. 1, 2), which breeds along the Pacific Coast from Alaska to central California. Before the 1850's, an estimated 400,000 to 600,000 murrelets bred on Southeast Farallon Island, but this population was decimated by egg collecting in the wake of the California Gold Rush, before chickens had arrived in sufficient numbers to provide eggs for the burgeoning San Francisco populace. Other threats, such as oil spills, human disturbance on the islands, and the depletion of Pacific sardine stocks, reduced populations further until they reached a low of about 6,000 birds during the 1950's. Southeast Farallon Island became a National Wildlife Refuge in 1969, and through protection and increased environmental awareness, populations in the Gulf of the Farallones have gradually climbed to about 60,000 to 80,000 birds by the mid-1990's. Tens of thousands of murrelets also breed along the Marin County coast in Point Reyes National Seashore.

Common murrelets nest in dense colonies on cliffs, primarily those that face northwest. Because competition for nesting space is tight and pair bonding is important, they begin to arrive at their territories during late October and early November. They maintain their territories throughout the winter, especially during springlike weather, when the sky is clear and the northwesterlies blow. Eggs are laid primarily in April and May, most chicks hatch in June, and nestlings fledge in July. When fledging, the chicks, just 3 weeks old and less than half the size of adults, travel with their fathers to the edge of the cliffs and jump into the sea. From the island, they swim toward the coast, where feeding is generally better in July and August. Common murrelets disperse along the California coast in September and October, until it is time to return to the colonies again.

Besides keeping close tabs on the occurrence patterns and population size of the common murrelet, the Point Reyes Bird Observatory has focused on variations in food resources and reproductive success, in relation to variations in the marine environment. The murrelets, along with the other seabirds breeding in the Gulf of the Farallones, have productive years, in which 90 percent

or more of the pairs successfully fledge a chick, to unproductive years, in which failure rates reach 50 percent or more. In the worst years, such as 1983, 1992, and 1998, very few birds lay eggs, and of those that try, only 5 to 10 percent fledge chicks.

These productive and unproductive years generally reflect the strength of the California Current, the intensity of coastal upwelling, and the presence or absence of El Niño events. During years in which strong northwesterlies blow from December through May, the cold oxygen-rich current is strong, nutrients are brought to the surface by upwelling, pelagic phytoplankton and zooplankton communities flourish, and the rockfish, juveniles of which the murre feed to their chicks, have high spawning rates. During these times, Point Reyes Bird Observatory studies indicate that a common murre can leave the nest and return with a juvenile rockfish in as short a time as 5 minutes. When warm periods, such as El Niños, occur, the rockfish fail to spawn on time, and the murre have to travel closer to the coast to find alternative prey, such as northern anchovies. At this time, round trips to the nest take 2 to 4 hours or more. The absence of one of the parents for such long periods thins out the colony, making it easier for predators, such as western gulls, to steal and eat the eggs or chicks.

By integrating knowledge on variation in reproductive success, food resources, and the marine environment, Point Reyes Bird Observatory data on the common murre can be used to assess the health of the Gulf of the Farallones marine ecosystem; this assessment, in turn, can lead to policy changes to improve the environment. For example, increasing populations of common murre in the Gulf of the Farallones underwent a major reversal during the mid-1980's. Studies showed that part of this reversal was natural, a result of the major 1982–83 El Niño and its deleterious effects on seabird populations. But there were also several human-related effects, including gillnetting in the Gulf of the Farallones and large oil spills in 1984 and 1986 that, together, resulted in the mortality of tens of thousands of birds. Concern for murre populations and other wildlife has since led to a ban of gillnetting in the Gulf of the Farallones.

Although the common murre is currently enjoying a population increase at the Gulf of the Farallones, other human-induced threats continue to take their toll. Major ongoing concerns include the effects of contaminants from runoff through San Francisco Bay; effects of overfishing, especially of ground fish (including rockfish); ocean warming, which could throw the marine ecosystem off balance; effects of low-level oil pollution; and continued mortality associated with gillnetting in Monterey Bay and long-line fishing within the Gulf of the Farallones. In general, declines in the numbers of seabirds of the Gulf of the Farallones are occurring because of these and other causes. Continued monitoring of seabird populations in the gulf, such as that of the common murre, will provide information necessary to recognize and understand such negative trends in the marine environment, trends that affect all of us. It is then up to society to ensure that the required steps are taken to reverse these negative trends before it is too late.

### **Other Breeding Seabirds on the Farallon Islands**

The following seabird species also breed on the Farallon Islands and along the Marin County coast, in decreasing order of abundance:

*Cassin's auklet*.—About 40,000 nocturnal Cassin's auklets breed on the Farallon Islands, laying their eggs in burrows and crevices that they carefully maintain throughout the year. Their main food source is krill, which probably fluctuate in annual abundance, similar to rockfish. Populations of Cassin's auklets (fig. 3) are currently declining, possibly because of recent increases in their main predators, western gulls and peregrine falcons.

*Western gull.*—Populations of western gulls (fig. 4) in the Gulf of the Farallones since 1950 have been aided by human activities, expanding from about 6,000 breeding birds historically to more than 25,000 birds during the early 1990's. The gulls have benefited from feeding in land-based dumpsites and fish-processing plants. Western gulls are generalists, preying on Cassin's auklets, storm petrels, and the eggs and chicks of other Farallon Island seabirds (including their own) when the opportunity presents itself. Although small colonies of gulls breed on islets along the coast, most of the nesting population resides on the Farallon Islands.

*Brandt's cormorant.*—An average of about 12,000 Brandt's cormorants breed in scattered colonies on the Farallon Islands each year, although this number shows wide interannual fluctuation, reflecting conditions in the marine environment. Likewise, the number of eggs laid and chicks fledged per pair range from 4 to 5 in productive years to 0 or 1 in unproductive years, making it a boom-or-bust species. However, enough chicks are generally produced to sustain the population over the long run, although populations have declined during the 1980's and 1990's. Brandt's cormorants feed on various marine organisms, predominantly juvenile fish, such as rockfish and midshipman. They also breed along the Marin County coast.

*Ashy, Leach's, and fork-tailed storm petrels.*—Nocturnal Ashy, Leach's, and fork-tailed storm petrels come and go at night and breed deep in burrows and crevices; thus, their population sizes are difficult to estimate. About 2,000 ashly storm petrels and 300 to 500 Leach's storm petrels breed on the Farallon Islands. Like that of Cassin's auklet, their populations seem to be declining, possibly owing to predation by western gulls. Unlike other seabirds, these species head far to the west to feed on open ocean pelagic invertebrates and fish far from the coast and are thus not as affected as other seabirds by variation in the California Current system. Recently, a few fork-tailed storm petrels (fig. 5) in breeding condition were captured on the Farallon Islands, suggesting a very small nesting population of these seabirds.

*Pigeon guillemot.*—Although as many as 2,000 pigeon guillemots breed on the Farallon Islands during productive years, this species is especially sensitive to the quality of the marine environment, sometimes failing to lay any eggs during unproductive years. Unlike the other common breeding species, most pigeon guillemots leave the Gulf of the Farallones in the winter, heading north along the coast, where supplies of their benthic food resources are more abundant. They return to the Farallon Islands in March and April, forming large rafts off the island before venturing ashore to stake out their rock-crevice nesting sites. They also breed in small numbers along the cliffs of Point Reyes National Seashore.

*Rhinoceros auklet.*—The population of hardy rhinoceros auklets has increased to 1,000 or more, after they had been eradicated as breeders from the Farallon Islands for at least 100 years. Rabbits on Southeast Farallon Island from 1855 to 1973 excluded them from nesting burrows. Rhinoceros auklets returned to breed in 1974, just a year after the rabbits were removed. These birds dive deep in outer gulf waters seeking sablefish and juvenile lingcod, among other deeper water fish species. No nesting has yet been confirmed in Marin County, but a population became established on Año Nuevo Island during the 1980's.

*Pelagic cormorant.*—As many as 800 pelagic cormorants breed on the Farallon Islands each year, but like the pigeon guillemot, these benthic feeders are highly sensitive to fluctuations in the marine environment. In approximately one third of the years no chicks are fledged. This species also commonly breeds along the cliffs of the Marin County coast, where they show a different pattern of success relative to variation in the marine environment.

*Double-crested cormorant*.—From 300 to 400 of these cormorants breed in one colony on the Farallon Islands each year. Unlike other Farallon Island breeders, double-crested cormorants forage primarily in estuarine lagoons and in San Francisco Bay. Numbers of these birds breeding on the Farallon Islands were higher during the 1800's, when they were named the "Farallon cormorant." Currently, they also breed throughout the San Francisco Bay region, especially on some of the larger bridges that span the inner bay.

*Tufted puffin*.—Only 50 or 60 tufted puffins (fig. 6) breed on the Farallon Islands each year, in deep rocky crevices within the cliffs. Where these striking birds go in the winter is unknown, evidently somewhere far out at sea. Populations of tufted puffins numbered in the thousands during the 1800's; recent declines are attributed to a degradation in the marine environment and, possibly, to the disappearance of Pacific sardines in the 1940's. The slow comeback of this fish species may result in increased populations and success of the tufted puffin and other breeding seabirds in the Gulf of the Farallones.

### **Migrant and Vagrant Seabirds in the Gulf Of The Farallones**

Because of the high levels of marine productivity in the Gulf of the Farallones, many species of seabirds that nest far and wide come to the gulf during their nonbreeding seasons. These seabirds can be categorized into several groups.

*South Polar skua*.—As the apex bird species of the ocean, the South Polar skua (fig. 7) is in a category of its own. Breeding deep in the Southern Hemisphere, skuas disperse over the oceans during the nonbreeding seasons (summer and fall in the Northern Hemisphere), as far as the Gulf of Alaska. Skuas are piratic seabirds that forcibly extract food from their victims: shearwaters, petrels, gulls, and even albatrosses. They are solitary marauders, nowhere common, but in the Gulf of the Farallones they are always a menace to visiting seabirds.

*Tubenoses*.—Many tubenoses breed in the Southern Hemisphere and migrate to the North-east Pacific during the austral (Southern Hemisphere) winter. The most common tubenose is the sooty shearwater, which breeds in Chile and New Zealand and can be found in the Gulf of the Farallones in the hundreds of thousands, if not a million or more at a time. Seen primarily in July through October, but in smaller numbers throughout the year, sooty shearwaters have recently been declining in the North Pacific, for unknown reasons. Such a significant reduction in biomass is bound to have some ecologic repercussions throughout the region. Other common tubenoses that arrive from southern waters include pink-footed, short-tailed, and Buller's shearwaters, Murphy's petrel, and black-footed albatross (fig. 8). A common but irregular tubenose that comes down from the north in winter is the northern fulmar (fig. 9). Recently, more than 1,000 fulmars were seen feeding in the slick of a dead humpback whale that was drifting through the Gulf of the Farallones. Some of the rarer tubenoses that visit the gulf include Laysan albatross (fig. 10), flesh-footed shearwater, and Wilson's storm petrel. An Atlantic species, the manx shearwater, has recently been seen sporadically and could even begin to breed in the gulf.

*The Baja California contingent*.—Every autumn, a great northward dispersal of organisms into the Gulf of the Farallones occurs from the south, mainly driven by a slight warming of ocean waters during this time of year and by the northward migration of the northern anchovy. The primary avian representative of this group is the familiar brown pelican, which invades the Gulf of the Farallones in the thousands each year. Counts of as many as 5,000 pelicans have been recorded on the Farallon Islands in late September. Along with the pelicans come Heermann's gulls, which settle for juvenile fish that the pelicans wound while diving. Black-vented shearwa-



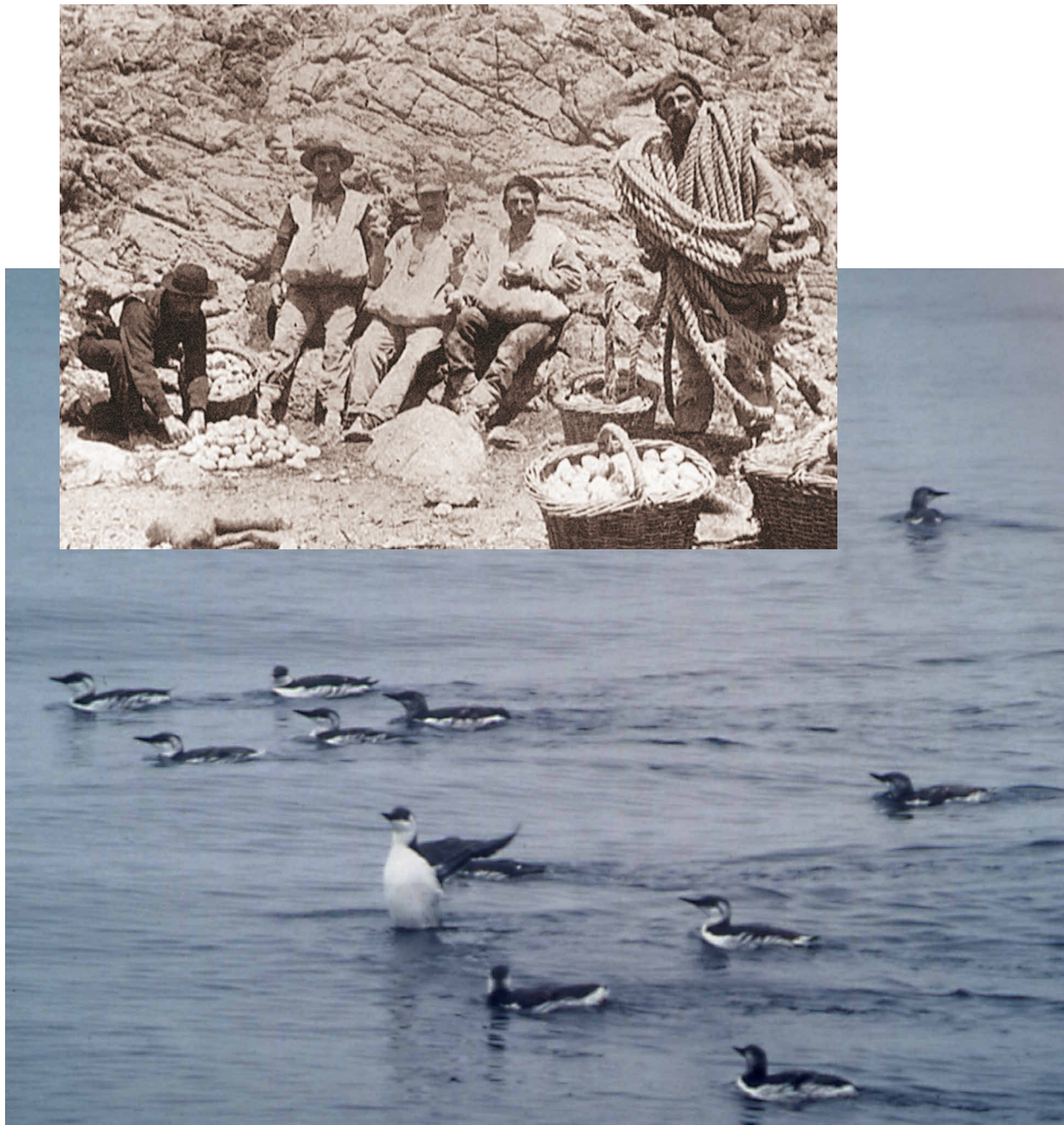
ters and elegant terns round out the common seabird members of this group, whereas uncommon visitors include black storm petrels, Xantus' and Craveri murrelets, and the occasional booby (three species), frigatebird (two species) and tropicbird (two species).

*Coastal-wintering species.*—Many species of loons, grebes, ducks, gulls, and alcids take up winter residence in the Gulf of the Farallones, having escaped the harsh winters of their Alaskan breeding grounds. Possibly the most common of these species are the Pacific loon and surf scoter, each of which winters in the thousands in the gulf. Many of these birds winter farther south, and so big pushes of migrants through the Gulf of the Farallones occur each April and November. Other common examples of wintering seabirds include red-throated loon, western and red-necked grebes, white-winged and black scoters, glaucous-winged and herring gulls, black-legged kittiwakes, and ancient murrelets. Rarer species of this group include yellow-billed loons, harlequin ducks, oldsquaw, glaucous gulls, and horned puffins.

*Long-distance migrants.*—A few species of seabirds breed to the north and winter primarily or entirely to the south. These long-distance migrants pass through the Gulf of the Farallones in August through October and April to May. Members of this group include pomarine, parasitic, and long-tailed jaegers, Sabine's gull, Arctic tern, and red-necked and red phalaropes. As with all of the seabirds, the rich marine environment of the Gulf of the Farallones results in high ocean productivity, which attracts them to the area for a necessary fueling stop.

### **Further Reading**

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**Figure 1.** The common murre, about 1 ft (30 cm) long, typifies breeding seabirds in the Gulf of the Farallones. Before the 1850's, an estimated 400,000 to 600,000 murres bred on Southeast Farallon Island, but this population was decimated by egg collecting in the wake of the California Gold Rush (see inset, courtesy of the California State Library), before chickens had been brought in sufficient numbers to provide fresh eggs for the burgeoning San Francisco populace.



**Figure 2.** An unhealthy common murre, about 1 ft (30 cm) long, on the beach, possibly the victim of contaminants or low-level oil pollution.



**Figure 3.** A Cassin's auklet, about 8 inches (20 cm) long, attempting to take off. It may be too full of krill, this species' favored food source.





**Figure 4.** Western gulls (inset shows chick) nesting on Southeast Farallon Island. Populations of western gulls in the Gulf of the Farallones since 1950 have benefited from feeding at land-based dumpsites and fish-processing plants, expanding from about 6,000 breeding birds historically to more than 25,000 birds during the early 1990's. (Photographs from Gulf of the Farallones National Marine Sanctuary.)



**Figure 5.** A fork-tailed storm petrel, about 10 inches (25 cm) long, flying low over the water surface. This tubenose, which probably breeds in low numbers on the Farallon Islands, is a visitor from the north.



**Figure 6.** A tufted puffin, about 1 ft (30 cm) long, eating a small fish. Only 50 or 60 of these birds breed on the Farallon Islands each year, in deep rocky crevices within the cliffs. Where these striking birds go in the winter is unknown, evidently somewhere far out at sea. Populations of tufted puffins numbered in the thousands during the 1800's; recent declines are attributed to a degradation in the marine environment and, possibly, to the disappearance of Pacific sardines in the 1940's. (Photograph from Gulf of the Farallones National Marine Sanctuary.)





**Figure 7.** A South Polar skua, the avian “king of the sea” with a 4-ft (1.2 m) wingspan, in search of victims.



**Figure 8.** A black-footed albatross, 3 ft (90 cm) long, swimming in the Gulf of the Farallones.



**Figure 9.** A northern fulmar, 2 ft (60 cm) long, feeding in the Gulf of the Farallones. Fulmars are irregular winter visitors from the north to the gulf.



**Figure 10.** The Laysan albatross, 3 ft (90 cm) long, is a rare visitor to the Gulf of the Farallones from the central Pacific. A black-footed albatross is in the foreground and a western gull is in the background.