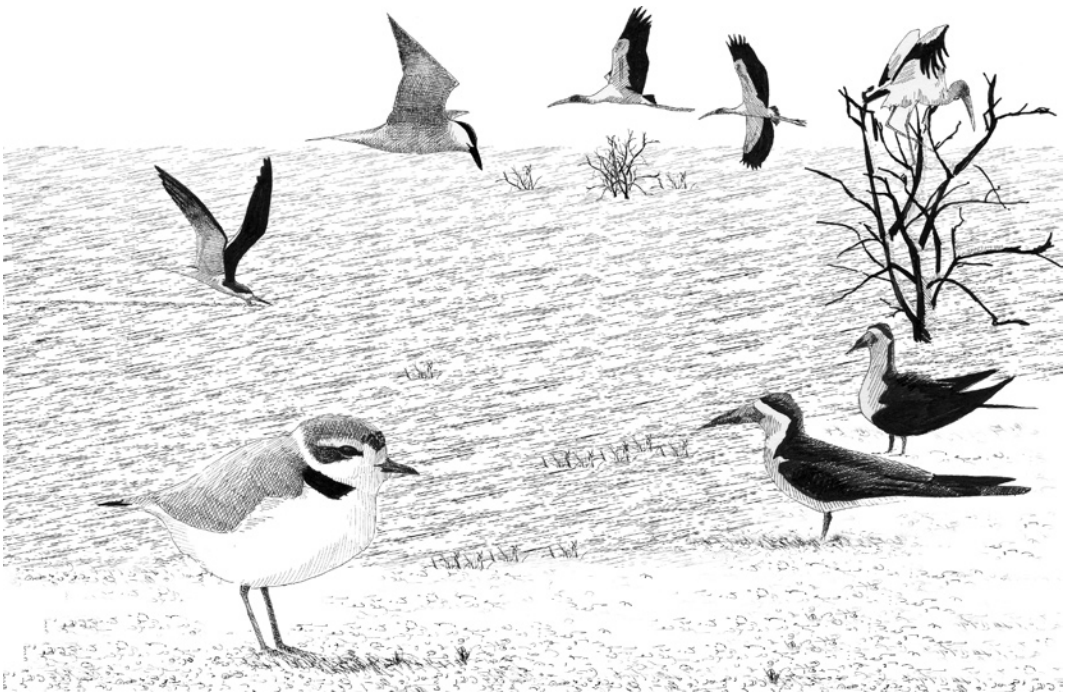


## II

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### SPECIES ACCOUNTS

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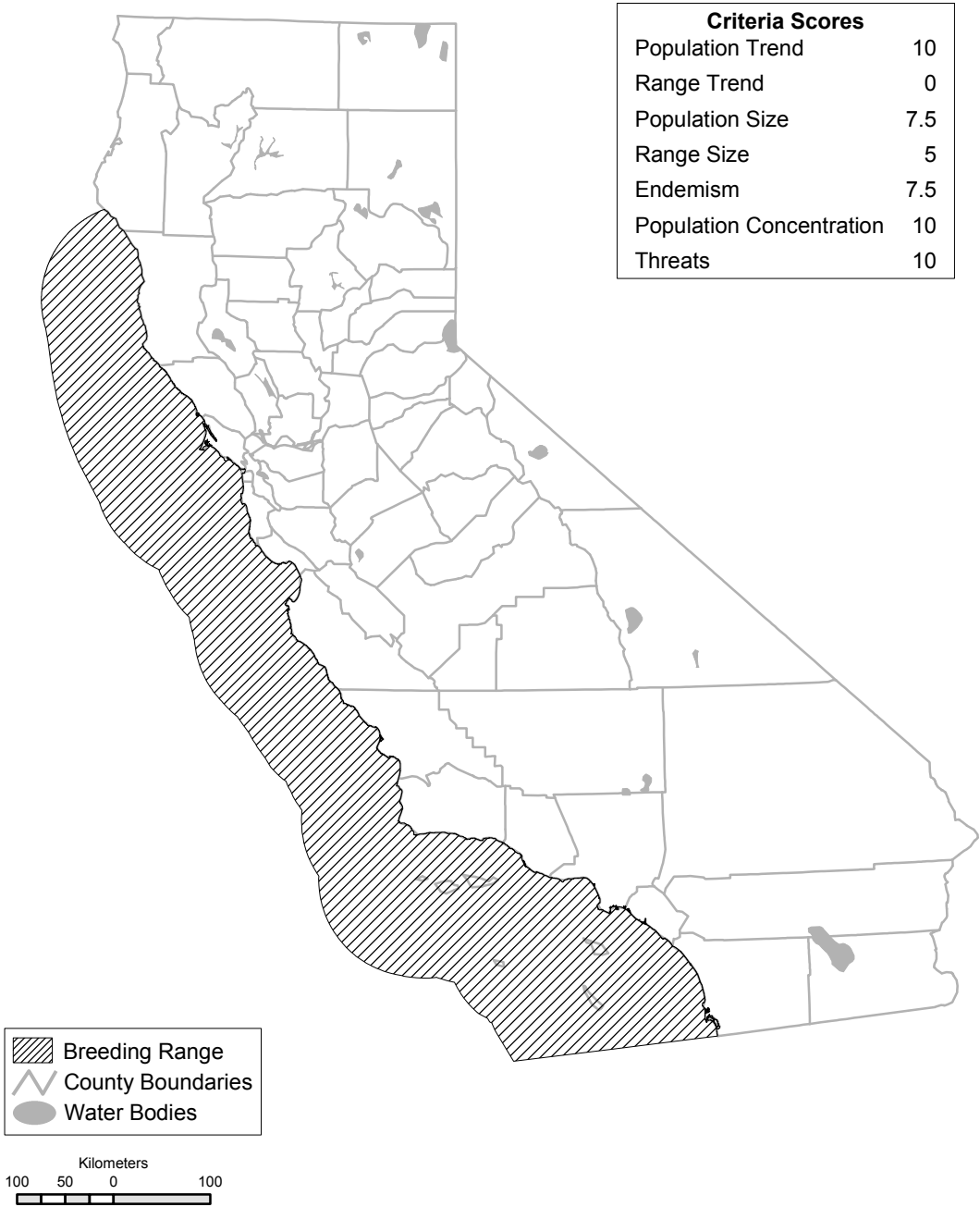
*Andy Birch*

PDF of Ashy Storm-Petrel account from:

Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

ASHY STORM-PETREL (*Oceanodroma homochroa*)

HARRY R. CARTER, WILLIAM R. McIVER, AND GERARD J. MCCHESENEY



Breeding-season range of the Ashy Storm-Petrel in California; nests on islands from central Mendocino County south to the southern Channel Islands. Historical information limited, so larger number of known colonies and extended range today apparently reflect a recent increase in survey effort. Still, numbers have decreased at least moderately since at least the 1970s, and recent status north of Marin County uncertain. At-sea distribution reflects transit to and from nesting islands and foraging areas in waters over the entire slope of the continental shelf. In fall, large numbers of birds congregate in the Monterey Bay and Cordell Bank areas.

### SPECIAL CONCERN PRIORITY

Currently considered a Bird Species of Special Concern (breeding), priority 2. Included on both prior special concern lists (Remsen 1978, 3rd priority; CDFG 1992).

### BREEDING BIRD SURVEY STATISTICS FOR CALIFORNIA

Not sampled by the BBS.

### GENERAL RANGE AND ABUNDANCE

Highly restricted breeding range and relatively small global population (approx. 10,000 birds; Ainley 1995). Breeds on islands and offshore rocks from Mendocino County, California (approx. 39° N), south to Todos Santos Islands (approx. 32° N) off northwestern Baja California, Mexico (Sowls et al. 1980, Carter et al. 1992, Everett and Anderson 1991, Ainley 1995). Breeding is nearly endemic (>95%) to California, although 2005 discoveries of a nest at Todos Santos Islands (Carter et al. 2006b) and an increase in nesting numbers at the Coronado Islands (Middle Rock) since 1989–1990 (Everett 1991; Carter et al. 1996, 2006a) indicate that breeding occurs to a greater extent and farther south in northwestern Mexico than previously known. Largest known colonies occur at the South Farallon, Santa Barbara, Prince, and Santa Cruz islands. These storm-petrels forage widely in waters seaward of the continental shelf, near islands, and near the coast within the southern California Current ecosystem (Ainley et al. 1974, Briggs et al. 1987, Mason et al. 2007, Spear and Ainley 2007). During the nonbreeding season, most birds remain within waters offshore of the breeding range, with large numbers (4000–10,000) concentrated in Monterey Bay each fall (Roberson 2002). Limited winter colony attendance has been reported at the South Farallon Islands and Prince Island (Ainley et al. 1974, Carter et al. 1992). Ashy Storm-Petrels have been recorded at sea from Humboldt County, California, to central Baja California, Mexico (Ainley 1995, Harris 2005), but most birds occur between Sonoma and San Diego counties.

### SEASONAL STATUS IN CALIFORNIA

Occurs year round in waters over and just seaward of the continental slope (Ainley 1995, Mason et al. 2007, Spear and Ainley 2007). Breeding is protracted. A wide span of egg-laying dates (mid-Mar to early Oct) plus long incubation and

chick periods results in fledging from late July to January (James-Veitch 1970; Ainley et al. 1974, 1990; McIver 2002).

### HISTORIC RANGE AND ABUNDANCE IN CALIFORNIA

The relatively recent species description (1864), and difficulties finding nests and detecting nocturnal attendance at colonies, have led to few available data of the Ashy Storm-Petrel for examining historical changes in breeding numbers or distribution. Grinnell and Miller (1944) described the species as “fairly common in spring and summer, at least locally,” with breeding reported at the Farallon Islands (since 1885; Ingersoll 1886), San Miguel Island (from prior to 1889; British Mus. #1888.10.10.3734), and Santa Cruz Island (since 1912; Wright and Snyder 1913). We also found previously unpublished evidence of nesting in Mendocino County prior to 1944. Two Ashy Storm-Petrel eggs were obtained by Franklin J. Smith, a well-known seabird egg collector in northern California, on 26 June 1926. One was “placed in a plant root in a burrow . . . on Bird rock” near Greenwood (WFFVZ #17,096). The other was “on the rocky sea coast at Caspar” near Point Cabrillo, “between boulders, built of weed stalks and feathers from the bird. . . . A gray type species small” (WFFVZ #163,093). However, given burrow nesting or nesting material (unusual for Ashy Storm-Petrels), similarities of adult plumage (if seen poorly) and egg color and measurements among medium-sized storm-petrel species, and lack of other confirmed nest records north of Marin County, we cannot fully rule out misidentification of Leach’s (*O. leucorhoa*) or Fork-tailed (*O. furcata*) storm-petrels, which also breed (usually in burrows) in northern California (Sowls et al. 1980, Carter et al. 1992). However, Smith indicated that identification was “positive” for both eggs, possibly based on handling and examining incubating adults. Smith also had collected Leach’s and Fork-tailed storm-petrel eggs at several colonies in Humboldt and Del Norte counties in several years between 1912 and 1928 (specimens in MVZ, SBMNH, SDNHM, and MCZ). Given Smith’s experience with storm-petrels, occasional use of burrows and nesting material by Ashy Storm-Petrels in certain locations (Carter et al. 1992), recent capture of an Ashy Storm-Petrel in a mist net at Van Damme Rock (Mendocino County) in 1989 (Carter et al. 1992), and little knowledge on breeding storm-petrels in Mendocino or Sonoma

counties, we judge these egg records as valid evidence of historic nesting by Ashy Storm-Petrels in Mendocino County. Nesting likely also occurred historically on the Marin County coast, on the basis of two specimens of adults collected without details at Point Reyes in April and July 1898 (British Mus. #1900.7.20.195, #1900.7.20.196). One egg also was collected at Santa Catalina Island (Ship Rock), Los Angeles County, in 1937 (WFVZ #95,994).

Ainley (1995) reported no major changes in numbers at the South Farallon Islands between 1885 and the early 1970s, though additional evidence suggests that breeding storm-petrels likely were reduced to some degree in the late 1800s. Breeding habitats were changed substantially in the 1850s to 1870s by the construction of a lighthouse, other buildings, and paths, with island rocks often used to form walls. Also, eggers harvesting Common Murre (*Uria aalge*) eggs likely trampled island habitats (Ainley and Lewis 1974, Carter et al. 2001). By the late 1880s and 1890s, Ashy Storm-Petrels were reported breeding in natural cavities under rocks and in constructed rock walls (Taylor 1887, Bryant 1888, Blankenship and Keeler 1892, Loomis 1896). Between 20 May and 3 June 1911, Dawson (1911, 1923) noted extensive use of rock walls and that this storm-petrel's numbers had either increased or been previously underestimated. Loomis (1918) also stated that A. L. Bolton found the Ashy Storm-Petrel more abundant on 19 June 1911 than during early July 1896, with "stoppage of the egg traffic apparently resulting in an increase in population." Initial rock wall construction likely reduced available habitat and caused birds to change their breeding distribution on the island. Conversely, the many sturdy rock walls may have provided protection for remaining breeding sites from collapse from trampling by humans and introduced animals.

The introduction of Black Rats (*Rattus rattus*) to Anacapa Island in the mid- to late 19th century apparently led to severe reduction of small seabirds, such as Xantus's Murrelets (*Synthliboramphus hypoleucus*) and probably Ashy Storm-Petrels, and limited breeding to cliff areas inaccessible to rats (McChesney et al. 2000a, ATTC 2001). That nesting in such habitats continued is suggested by small numbers of Ashy Storm-Petrels captured in mist nets at Anacapa Island in 1994 (H. R. Carter unpubl. data). Introduced cats (*Felis catus*) at Santa Barbara Island also may have affected breeding Ashy Storm-Petrels until cats were removed there in the 1970s (McChesney and Tershy 1998).

## RECENT RANGE AND ABUNDANCE IN CALIFORNIA

Since 1944, additional colony sites and larger numbers at several colonies have been found with more thorough surveys and the unearthing of historical records, particularly in the Channel Islands, but no change in breeding range is suspected (see map). Ashy Storm-Petrels have been confirmed to breed in California at Bird Rock and Double Point Rocks (Stormy Stack), Marin County; South Farallon Islands, San Francisco County; Bench Mark-227x, Castle Rocks and Mainland, and Hurricane Point Rocks, Monterey County; Castle Rock, Prince Island, Santa Cruz Island (Shipwreck Cave, Dry Sandy Beach Cave, Del Mar Rock, Cave of the Bird's Eggs, Diablo Rocks, Orizaba or Spitt Rock, Bat Cave, Cavern Point Cove Caves, Scorpion Rocks, and Willows Anchorage Rocks), Gull Island, Santa Barbara Island, Sutil Island, and Shag Rock, Santa Barbara County; and San Clemente Island (Seal Cove Rocks), Los Angeles County. Possible nesting was suggested by birds with brood patches captured in mist nets at Van Damme Rock, Mendocino County; Chimney Rock, Marin County; Vandenberg Air Force Base and San Miguel Island (Harris Point to Cuyler Harbor), Santa Barbara County; Anacapa Island, Ventura County; and San Clemente Island (main island), Los Angeles County (Sowls et al. 1980; Hunt et al. 1981; Carter et al. 1992; Ainley 1995; McChesney et al. 2000a, b; McIver 2002; Whitworth et al. 2002; Brown et al. 2003; H. R. Carter unpubl. data).

Sowls et al. (1980) estimated 5187 breeding birds for California in 1979–1980, with 4000 (77%) at the South Farallon Islands in 1971 and 1972 (Ainley and Lewis 1974) and most of the remainder in the Channel Islands in 1975 to 1977 (Hunt et al. 1981). Carter et al. (1992) estimated 7209 breeding birds for California in 1989–1991, reflecting higher estimates in 1991 at Channel Islands colonies (omitting numbers found later) but still using 4000 estimated birds (55%) for the South Farallon Islands. On the basis of modeling data from at-sea surveys between 1980 and 1995, Spear and Ainley (2007) estimated 7287 birds (95% CI: 4500–9070) off Sonoma to Monterey counties during spring, suggesting greater numbers occur at the South Farallon Islands than estimated using colony-based techniques (4284 breeding and nonbreeding individuals in 1992; Sydeman et al. 1998a). Given higher estimates at some Channel Islands and Mexican colonies since 1991 (McIver

2002, H. R. Carter unpubl. data) plus substantial decline at the South Farallon Islands since 1972 (see below), more than half of the small world population now appears to breed in the Channel Islands. Still, additional work is needed to refine population estimates at all colonies.

Trend data based on mist-net captures are available for the South Farallon Islands only. Sydeman et al. (1998a, b) attributed a 30%–40% decline between 1972 and 1992 (e.g., from 3402 breeding birds in 1971–1972 to about 1990 breeding birds in 1992) to heightened levels of predation by natural predators, mainly Western Gulls (*Larus occidentalis*) and Burrowing Owls (*Athene cunicularia*). Over the past 40 years, the 15,000–25,000 Western Gulls breeding at the South Farallon Islands have far exceeded numbers from the late 1800s. By the 1980s, the gulls' breeding distribution had recovered from former human decimation to cover most storm-petrel breeding habitats (Penniman et al. 1990; Sydeman et al. 1998a, b; Mills 2000), although in the past decade gull numbers have declined somewhat (W. J. Sydeman pers. comm.). Although Burrowing Owls do not breed at the Farallons, they often arrive in fall and spend the winter, feeding primarily on non-native House Mice (*Mus musculus*). These owls tend to switch to Ashy Storm-Petrels and other prey when mouse populations crash in late fall or early spring (J. Buffa unpubl. data). Breeding success of the storm-petrels remained relatively high from 1971 to 1994 but declined thereafter, with little or no effects from major El Niño events in 1983 and 1992–1993; the number of monitored sites declined after 1982 (Ainley et al. 1990; Sydeman et al. 1998a, b, 2001; PRBO unpubl. data).

Five locations at Santa Cruz Island have been monitored with standardized nest counts annually from 1994 to 2006 (McIver 2002, Carter et al. 2007). Numbers of nests at Orizaba Rock have declined since 1995, possibly from heightened predation by gulls or owls related to colony illumination from lights of squid boats, first noted in 1995. At Bat Cave, numbers of nests were fairly consistent until 2005, when the unusual occurrence of an Island Spotted Skunk (*Spilogale gracilis amphiala*) resulted in depredation of many adults (at least 70 recovered) and reproductive failure (McIver and Carter 2006). At Cavern Point Cove Caves, Cave of the Bird's Eggs, and Dry Sandy Beach Cave, nest numbers have been fairly consistent between years. Predation of Ashy Storm-Petrels by Barn Owls (*Tyto alba*) has occurred commonly at Bat Cave and Orizaba Rock but not at other locations. Little or no effects of the

major 1998 El Niño event were noted at all five locations.

Trend data are not available for most other colonies because standardized monitoring is lacking. Eradication of Black Rats at Anacapa Island in 2002 will provide better conditions for breeding and should lead to future colony growth (ATTC 2001). Despite five egg records (and one chick record) in 1912–1913 at Painted Cave (Santa Cruz Island), no breeding sites for Ashy Storm-Petrels could be found during brief searches in 1976, 1991, and 1994 (Hunt et al. 1981, Carter et al. 1992, H. R. Carter unpubl. data). At San Miguel Island (Cuyler Harbor to Harris Point), three birds were mist-netted in June 1976, but no nests were found (Hunt et al. 1981). Much suitable nesting habitat occurs on nearby main island areas, and breeding is likely, but no further efforts have been made to document use or breeding. At Hare Rock within this area, sites with the distinctive musky smell of storm-petrel have been noted (Hunt et al. 1981, H. R. Carter unpubl. data). No active breeding sites were found at Santa Catalina Island during nest searches from 1994 to 1996, but Ship Rock (with a 1937 nest record) and a rock near Silver Canyon Landing were visited by storm-petrels, based on their smell within potential sites (H. R. Carter unpubl. data). One nest was discovered and many adults were mist-netted on a rock in Seal Cove at San Clemente Island in 1994 (H. R. Carter unpubl. data); no nests had been found previously, but breeding was suspected (Hunt et al. 1981). Prince Island was used for bombing and target practice by the U.S. Navy in the 1950s, which likely reduced breeding habitat and possibly population size on this small island.

All known breeding areas still are used, although more effort is needed to confirm breeding status in Mendocino and Sonoma counties. Since 1991, surveys in Marin, Monterey, and (northern mainland) Santa Barbara counties have led to discoveries of small colonies and possible breeding locations that likely were missed during earlier major surveys (McChesney et al. 2000b, Whitworth et al. 2002, Brown et al. 2003). Additional effort is needed to confirm a possible decline in the small numbers breeding at Bird Rock, Marin County, between 1989 and 2001 (Whitworth et al. 2002).

Eggshell thinning from contaminants was documented at Santa Cruz Island in 1992, 1996, and 1997 and may have contributed to relatively low breeding success in 1995–1998 (Fry 1994, Kiff 1994, McIver 2002, D. Welsh and H. R. Carter unpubl. data). However, low breeding success also



occurred at the South Farallon Islands in the late 1990s, possibly in response to reduced prey availability or predation (Sydeman et al. 2001, unpubl. data). Eggshell thinning also was found at the South Farallon Islands in the late 1960s (Coulter and Risebrough 1973) and, to a lesser extent, in 1992 (Fry 1994), but apparently this has not greatly affected reproductive success there since 1971 (Ainley et al. 1990, Ainley 1995, Sydeman et al. 1998b). Given documented eggshell thinning and hatching failures in the 1990s, even lower breeding success and population decline may have occurred in the Channel Islands from the 1950s to 1970s, when contaminant levels were much higher, especially before the banning of DDT use in 1971. Extensive eggshell thinning, breeding failure, and population decline were well documented for Brown Pelicans (*Pelecanus occidentalis*) and Double-crested Cormorants (*Phalacrocorax auritus*; Gress et al. 1973, Gress 1995).

### ECOLOGICAL REQUIREMENTS

Ashy Storm-Petrels do not excavate burrows, but usually breed in crevices of talus slopes, rock walls, sea caves, cliffs, and driftwood, habitats that are often structurally unstable (James-Veitch 1970, Carter et al. 1992, Ainley 1995, McIver 2002). At times, they breed in burrows or crevices in close proximity to other seabird species (e.g., Barlow 1894). The Ashy Storm-Petrel diet has not been well studied, but includes euphausiids, other crustaceans, larval fish, and squid, all taken at the ocean's surface (Ainley 1995, G. J. McChesney unpubl. data). Like other storm-petrels and many other seabirds, the Ashy Storm-Petrel is considered to be a long-lived species with delayed maturity, low clutch size (a single egg), high adult survival, and low juvenile survival. Such demographic characteristics tend to lead to slow population growth and slow recovery from impacts, especially from reduced adult survival caused by extensive predation or other factors. Available information on breeding biology and demographic characteristics can be found in other sources (Ainley et al. 1974, 1990; Ainley 1995; Sydeman et al. 1998a, b; McIver 2002).

### THREATS

In addition to major demonstrated historic (or continuing) threats from habitat degradation, introduced predators, heightened levels of predation by natural predators, and contaminants (discussed above), Ashy Storm-Petrels are susceptible to a variety of minor threats. At Santa Cruz Island,

careless stepping by tourists exploring sea caves will likely degrade fragile breeding habitats among rocks and driftwood. Such activities during the breeding season may severely disturb breeding adults and even kill storm-petrel adults, chicks, and eggs. On offshore rocks and islands, breeding sites located in loose rocks are also susceptible to destruction from careless human stepping.

Oil pollution likely kills some birds, although no oiled storm-petrels have been recovered after large oil spills in California, which usually occur close to shore. However, a large oil spill could seriously impact at-sea aggregations northwest of the South Farallon Islands or off Monterey Bay (Spear and Ainley 2007), killing thousands of storm-petrels. Ashy Storm-Petrels have been recovered dead on an at-sea oil platform and at mainland locations with bright lights in Santa Barbara and Ventura counties (Carter et al. 2000) and San Francisco Bay (Ainley et al. 1990).

In the Channel Islands, squid fishing boats operating close to islands illuminate colonies at night, which may cause site abandonment and high levels of predation. No one has attempted to document potential impacts on Ashy Storm-Petrels, which we expect can be substantial. Relatively large numbers of owl-killed Xantus's Murrelets were recorded at Santa Barbara Island in 1999 during squid fishing near the island (P. W. Martin unpubl. data). The Southern California squid fishery increased dramatically in the 1990s (Vojkovich 1998). In some years during the breeding season, boats have shifted to fishing areas near major Ashy Storm-Petrel colonies at Santa Barbara, Santa Cruz, San Miguel, and Anacapa islands. While light shields and wattage regulations have attempted to reduce the amount of light reaching colonies, the close proximity of boats to islands, the multitude of lights per boat, various light heights, and boat rocking from wave and wind action likely reduce the ability of these regulations to reduce impacts to Ashy Storm-Petrels.

### MANAGEMENT AND RESEARCH RECOMMENDATIONS

- Reduce predation by Western Gulls at the South Farallon Islands (e.g., with gull exclusion or other methods to reduce gull nesting or presence in storm-petrel habitats).
- Reduce Burrowing Owl predation on storm-petrels at the South Farallon Islands by eradicating non-native House Mice, as loss of the owl's primary prey should result

in reduced owl populations on the islands.

- Maintain old rock walls at Southeast Farallon Island and create new nesting habitat widely in areas with relatively low gull numbers.
- Encourage colony growth and a wider distribution at Anacapa Island, following recent eradication of rats, by using social attraction techniques to encourage storm-petrel colonization of suitable habitats with low gull numbers.
- Install artificial nesting habitat to reduce predation and human disturbance at Orizaba Rock, Scorpion Rocks, and sea caves at Santa Cruz Island.
- Establish protective at-sea zones that ban or greatly reduce bright lights for squid fishing or other purposes around large colonies at Santa Barbara Island, Prince Island, Santa Cruz Island, and the South Farallon Islands. Similar protections also should be considered at smaller colonies (e.g., Coronado Islands, Bird Rock, Double Point Rocks, Castle Rocks and Mainland, Hurricane Point Rocks, and Anacapa Island).
- Establish year-round closures to human visitation (except for research and monitoring) at sea caves with breeding Ashy Storm-Petrels at Santa Cruz Island. Post unobtrusive signs in cave entrances to inform people of the closures.
- Educate kayakers and other tourists about human impacts to nesting birds and habitat to discourage landings at storm-petrel colonies. If possible, revise guidebooks (that currently promote cave visitations) to identify cave closures and provide reasons for closing these few of the 112 named sea caves at Santa Cruz Island.
- Investigate the effects of contaminants on breeding success and population size at colonies in the Channel and South Farallon islands.
- Investigate the effects of bright lights on predation and breeding success at colonies in the Channel Islands.
- Conduct research on different techniques, including mist-net captures and nest searches, to monitor storm-petrel populations and estimate population sizes.
- Conduct surveys to confirm status at possible breeding locations and locate small overlooked or newly established colonies along the central and northern California coasts from Point Conception to Cape Mendocino.

## MONITORING NEEDS

Colonies should be monitored annually using standardized techniques to determine trends, assess threats, and measure success of restoration efforts. At present, long-term annual monitoring of breeding success and use of nest sites has been implemented at the South Farallon Islands since 1971 and Santa Cruz Island since 1994. In addition to current efforts at the South Farallon Islands and Vandenberg Air Force Base, population monitoring using mist-net captures should be conducted at Santa Barbara Island, Prince Island, Anacapa Island, Bird Rock, Scorpion Rocks, and San Clemente Island. Pollutant monitoring should occur at Santa Cruz Island and the South Farallon Islands. Monitoring of predation levels and predator numbers should be included in monitoring efforts.

## ACKNOWLEDGMENTS

Comments on this account were provided by J. Buffa, W. D. Shuford, and an anonymous reviewer. Additional information was provided by W. Sydeman, and D. Whitworth. We thank the many agencies, organizations, and individuals who have assisted our work on Ashy Storm-Petrels, particularly D. Ainley, S. Allen, J. Boyce, E. Burkett, E. Cassano, L. Ochiikubo Chan, D. Christy, S. Fangman, J. Gilardi, D. Gilmer, R. Golightly, F. Gress, C. Hamilton, R. Helm, T. Keeney, J. Koepke, A. Little, K. Mills, G. Minnery, M. Parker, M. Pierson, G. Reetz, J. E. Takekawa, D. Welsh, D. Whitworth, and R. Young. Valuable historical information was obtained from specimens housed in various museums cited in the text.

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