# WESTERN BIRDS

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**WESTERN BIRDS**

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WESTERN BIRDS

Volume 14, Number 1, 1983

# FIFTH REPORT OF THE CALIFORNIA BIRD RECORDS COMMITTEE

JOHN S. LUTHER, College of Alameda, 555 Atlantic Avenue, Alameda, California 94501

GUY McCASKIE, 954 Grove Street, Imperial Beach, California 92032

JON DUNN, 17437 Rancho Street, Encino, California 91316

This report contains recent decisions of the California Bird Records Committee (CBRC). It officially adds the following species to the state list of California: Greater Shearwater (*Puffinus gravis*), Cook's Petrel (*Pterodroma cookii*), Stejneger's Petrel (*Pterodroma longirostris*), Band-rumped (Harcourt's) Storm-Petrel (*Oceanodroma castro*), Red-tailed Tropicbird (*Phaethon rubricauda*), Mongolian Plover (*Charadrius mongolus*), Sandwich Tern (*Sterna sandvicensis*), Crested Auklet (*Aethia cristatella*), Yellow-bellied Flycatcher (*Empidonax flaviventris*), Sedge (Short-billed Marsh) Wren (*Cistothorus platensis*), Dusky Warbler (*Phylloscopus fuscatus*), and White-winged Crossbill (*Loxia leucoptera*). These bring the state list to 539 species. Jones et al. (West. Birds 12:57-82, 1981) updated the state list; this Records Committee report was prepared earlier and differs from their list in a few instances.

The committee consists of Laurence C. Binford (Vice-Secretary), Jon Dunn, Richard Erickson, Kimball Garrett, Lee Jones, Paul Lehman, Guy McCaskie, Joseph Morlan, Benjamin D. Parmeter (Secretary) and Richard Webster. David DeSante, Arnold Small, Richard Stallcup, Phil Unitt and John Luther also worked on the records reported in this paper. The present committee and former members acknowledge the cooperation and support from those observers who have taken the time and effort to submit their records. Without them the committee could not function. Please continue to support your committee in your documentation of rare birds as they occur in California.

Western Birds 14: 1-16, 1983

The comments following each species are those of the authors and not of the CBRC. The file number assigned to each species is given in parentheses. All records are on file with the Secretary and are available for examination by interested persons. All records are sight records unless otherwise noted. The initials of those persons who submitted documentation for a record follow each accepted record. If the person or persons finding a bird submitted a report, their initials are given first and are separated from those of other observers by a semicolon.

## ACCEPTED RECORDS

YELLOW-BILLED LOON (*Gavia adamsii*). One immature (87-1978) 12 Feb 1978, Monterey Bay, Monterey Co. (VR).

This species occurs annually along the coast of California (Remsen and Binford, West. Birds 6:7-20, 1975).

GREATER SHEARWATER (*Puffinus gravis*). One (17-1979) 24 Feb 1979, Monterey Bay, Monterey Co. (JD, KG: FF, SSa, BSh).

This is not only the first of this species to be identified off the coast of California but also the first in the North Pacific. This species breeds on islands in the south Atlantic and ranges over most of the Atlantic including the waters off Tierra del Fuego. An individual straying into the Pacific around Tierra del Fuego could then occur anywhere in that large ocean.

SHORT-TAILED SHEARWATER (*Puffinus tenuirostris*). Two (44-1978) 15 Jan 1977, Cordelle Banks, Marin Co. (GMcC). Eighteen (69-1978) 5 Feb 1978, Monterey Bay, Monterey Co. (JM,DR). One (86-1978) 20 Mar 1978, Monterey Bay, Monterey Co. (DR).

This species has proven to be of regular occurrence in mid-winter off the coast of California and is no longer reviewed by the CBRC.

COOK'S PETREL (*Pterodroma cookii*). One (122-1980) 3 Oct 1979, 36 miles west northwest of Point Arena, Mendocino Co. (GF). Two (71-1979) 17 Nov 1979 between 40 and 60 miles offshore from Cambria, San Luis Obispo Co. (GMcC, JD, RAE, DR, RS); photo on file.

These sightings are the first for California waters. This species breeds on islands around New Zealand and wanders over much of the Pacific during the non-breeding season, having been recorded off Baja California (Loomis, Proc. Calif. Acad. Sci., 4th ser., vol. 2, pt. 2:1-187, 1918) and the extreme north Pacific (Wahl, West. Birds 9:45-66, 1978). The very closely related *P. defilipiana*, considered by many authorities to be a subspecies of *P. cookii*, is probably indistinguishable in the field from *P. cookii* and is not excluded here. *P. defilipiana* breeds on the Juan Fernandez Islands off Chile, but has not been collected north of Central Peru.

STEJNEGER'S PETREL (*Pterodroma longirostris*). One (72-1979) 17 Nov 1979 about 50 miles offshore from Cambria, San Luis Obispo Co. (GMcC, JD, RAE, DR, RS).

This is the first record for California. This species was collected in Nov 1906 about 600 miles west of San Francisco (Loomis, Proc. Calif. Acad. Sci., 4th ser., vol. 2, pt. 2:1-187, 1918).

WILSON'S STORM-PETREL (*Oceanites oceanicus*). At least one (possibly three) (124-1978) 30 Sep 1978, Monterey Bay, Monterey Co. (JM).

This species is now recorded in Monterey Bay each year during the Sep-Oct period, but remains virtually unknown elsewhere in the North Pacific.

GALAPAGOS STORM-PETREL (*Oceanodroma tethys*). One (57-1976) 18 Aug 1976, 20 miles south of Anacapa Island, Los Angeles Co. (VR; VE, LH, IMacG, JMcD, SS).

One specimen from Carmel, Monterey Co., 21 Jan 1969 (Yadon, Auk 87:588-589, 1970) and one seen on Monterey Bay between 24 Sep and 9 Oct 1977 (Am. Birds 32:251, 1978) are the only ones previously recorded in California waters. The Carmel bird was of the small southern race *kelsalli* which nests on islands along the coast of Peru.

BAND-RUMPED STORM-PETREL (*Oceanodroma castro*). One (103-1973) 12 Sep 1970, about 25 miles west of San Diego, San Diego Co. (GMcC; JA, SS, RW).

This is the first to be recorded from California. The nearest known nesting localities are in the Hawaiian and Galapagos islands, but this species clearly wanders widely over the warmer ocean waters.

RED-TAILED TROPICBIRD (*Phaethon rubricauda*). One (32-1979) 3 Jul 1979, S. E. Farallon Island, San Francisco Co. (PMG, LS).

This is the first to be recorded in California. This is the common tropicbird over much of the Pacific, regularly wandering into the eastern Pacific, with a specimen taken about 250 miles WSW (31°39'N, 123°22'W) of San Diego on 13 Feb 1967 (Gould et al., Smithsonian Contr. Zool. 158: 206-231, 1974).

BROWN BOOBY (*Sula leucogaster*). One subadult (50-1978) 19 Aug-30 Nov 1977, Lake Havasu, San Bernardino Co. (GMcC).

This is a casual late summer wanderer to the southwestern United States (McCaskie, Calif. Birds 1:117-142, 1970).

REDDISH EGRET (*Egretta rufescens*). One adult (45-1978) 24 Apr-14 May 1977, Imperial Beach, San Diego Co. (GMcC). One (115-1977) 22 May 1977, Point Mugu marshes, Ventura Co. (LJ). One immature (57-1978) 8-17 Oct 1977, San Diego River Flood Control Channel, San Diego Co. (GMcC). Three immatures (57-1978) 15Oct-13 Nov 1977 (with one or two remaining through the winter, and one still present on 30 Jun 1978), near Imperial Beach, San Diego Co. (GMcC).

This species is of annual occurrence along the coast of southern California south of Los Angeles, with most found in the San Diego area, and is no longer reviewed by the CBRC.

YELLOW-CROWNED NIGHT-HERON (*Nyctanassa violacea*). One adult (46-1978) 11 May 1977, Irvine, Orange Co. (DH; GMcC); photo on file.

This is only the seventh to be recorded in California.

WHITE IBIS (*Eudocimus albus*) One adult (49-1978) 25 June-14 Jul 1977, south end Salton Sea, Imperial Co. (GMcC).

There are only three previous records for California: one (specimen) in San Diego 20 Nov 1935, another in Marin Co. 14 May-9 Sep 1977 (not yet reviewed by the CBRC), and the third on the Salton Sea 10 Jul-5 Aug 1976.

TRUMPETER SWAN (*Cyngus buccinator*). One adult (16-1979) 24 Feb 1979, Tule Lake, Lake Co. (SL, KVV).

There are only about 15 records of this species for California since 1900 (Roberson, Rare birds of the West Coast, 1980).

EMPEROR GOOSE (*Chen canagica*). One adult (85-1978) 1 Jan-20 Mar 1978, Moss Landing, Monterey Co. (DR). One immature (75-1979) 28 Oct 1978, Lower Klamath National Wildlife Refuge, Siskiyou Co. (BD).

This is an annual visitor to California and is no longer reviewed by the CBRC.

GARGANEY (*Anas querquedula*). One male (19-1979) 21 Mar-4 Apr 1979, Lake Elsinore, Riverside Co. (RP; JD, RAE, GMcC, DR).

This is only the second to be found in California. However, a specimen taken near Mt. Vernon, Washington, during Mar 1961 (Larry Spear pers. comm.) and two others seen at Iona Island in British Columbia 14-28 May 1977 and 8-12 Jun 1979 (Roberson, Rare birds of the West Coast, 1980), along with the previous record for California (Luther et al., West. Birds 10:169-187, 1979), suggest that the species may be more regular than thought along the West Coast in spring.

TUFTED DUCK (*Aythya fuligula*). One immature male (78-1978) 12 Jan-11 Feb 1978, Limantour area, Marin Co. (JM, VR). One adult male (63-1978) 30 Jan-5 Feb 1978, Lake Hennessey, Napa Co. (JP; JM). One adult male (13-1979) 2 Dec 1978-13 Jan 1979, Oakland, Alameda Co. (JM). One immature male (12-1979) 29 Dec 1978-25 Feb 1979, Limantour area, Marin Co. (JM)

This species is now being recorded along the coast of California each winter. These records, along with records from Oregon, Washington and British Columbia, indicate small numbers are regularly wintering along the west coast of North America.

AMERICAN OYSTERCATCHER (*Haematopus palliatus*). One (97-1978) 20-21 Apr 1978, Pt. Loma, San Diego Co. (RAE, PU). One (9-1979) 22 Dec 1978-14 Jan 1979, Pt. Fermin, Los Angeles Co. (DHo, JD, KG, GMcC).

These are only the second and third records from the mainland coast of California in over 100 years; the first during that period was of one (photographed) on the coast of San Luis Obispo Co. 25 Oct 1964-20 Feb 1965 (Aud. Field Notes 19:416, 1965). There is an inland record of three birds at the Salton Sea and apparently there are resident birds on the Channel Islands.

MONGOLIAN PLOVER (*Charadrius mongolus*). One juvenile (176-1980) 13-19 Sep 1980, Moss Landing, Monterey Co. (DD; GMcC, RAE, RS, BU); photo on file.

This is the first to be recorded in California. However, this Asiatic breeder regularly strays into western Alaska and has occurred twice in fall along the Oregon coast (Roberson, Rare birds of the West Coast, 1980).

WILSON'S PLOVER (*Charadrius wilsonia*). One (58-1979) 21 Apr-24 Jun 1979, Pt. Mugu, Ventura Co. (RW; JD, KG, DR).

This is only the third to occur in California in over 50 years. The others were a nesting pair at the Salton Sea 20 May 1948 and one at McGrath State Beach 27-29 Jun 1977 (Am. Birds 31: 1189, 1977).

UPLAND SANDPIPER (*Bartramia longicauda*). One (71-1976) 13 Sep 1976, Lake Talawa, Del Norte Co. (BM). One (59-1979) 28 May 1979, Deep Springs, Inyo Co. (RW; PL).

There are only about 10 records of this species in California equally split between spring and fall.

SHARP-TAILED SANDPIPER (*Calidris acuminata*). One (73-1976) 6-9 Oct 1976, Arcata Bottoms, Humboldt Co. (DRu). One (121-1978) 14-30 Oct 1978, Carmel River, Monterey Co. (RS; FB, JM, DR); photo on file. One (10-1979) 13 Nov 1978, Bolinas, Marin Co. (SGe; LSt). One (76-1979) 27 Oct 1979, Moss Landing, Monterey Co. (RS). One (77-1979) 31 Oct 1979, Pt. Reyes, Marin Co. (RS).

This species occurs along the California coast in small numbers every fall and is no longer reviewed by the CBRC. All of the records above are of juvenile birds as have been all previous records.

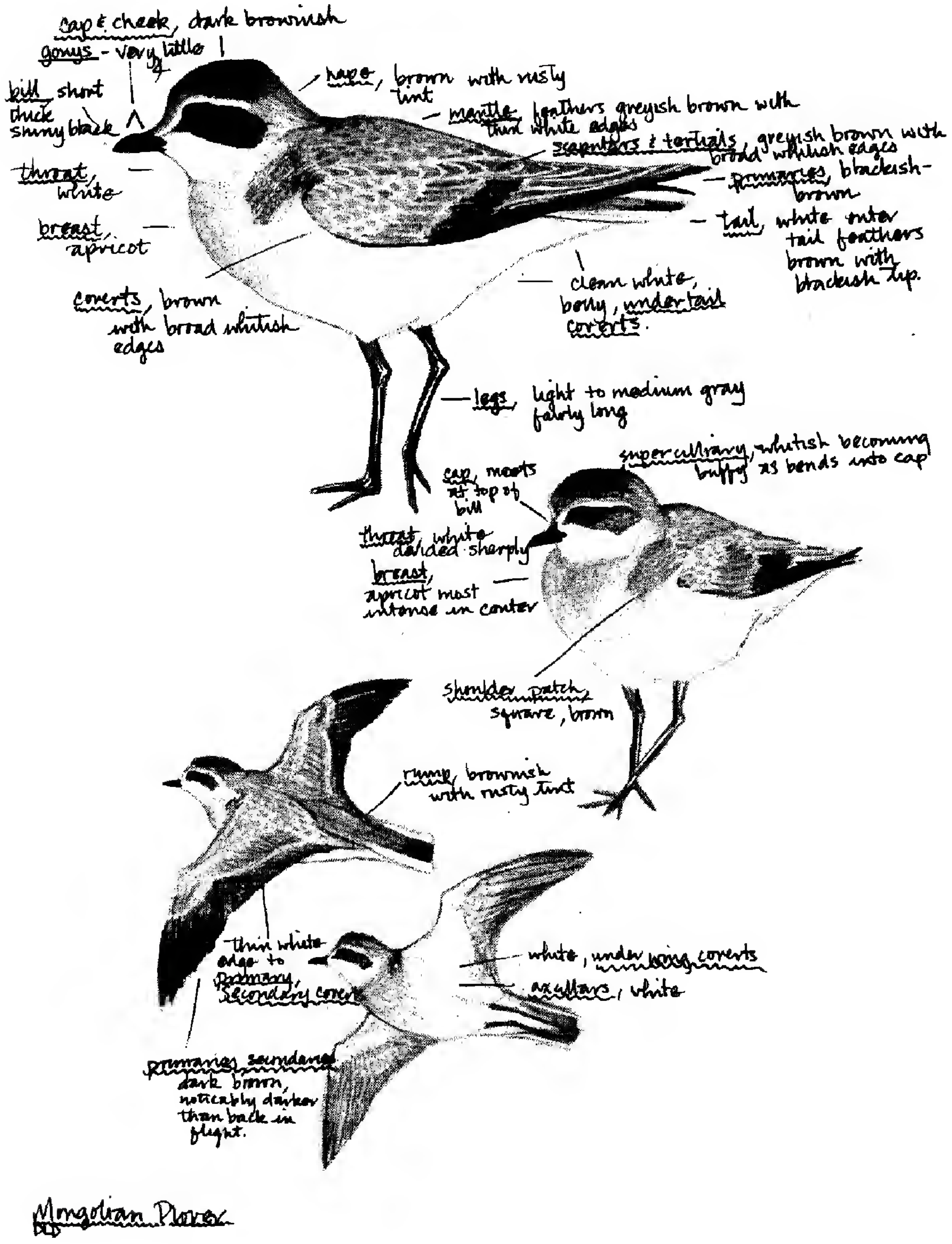

Figure 1. Mongolian Plover (*Charadrius mongolus*) (176-1980) 13 Sep 1980, Moss Landing, Monterey Co., California. *Sketches by Donna Dittmann*

WHITE-RUMPED SANDPIPER (*Calidris fuscicollis*). One (89-1978) 2-7 Jun 1978, Carmel River, Monterey Co. (JL; BE, RLeV, JM, VR, SW); photos on file. One (95-1978) 11 Jun 1978, Kehoe Beach, Marin Co. (RLeV).

There are only two previous reports of this species in California, both from the Salton Sea during the first half of Jun.

SEMIPALMATED SANDPIPER (*Calidris pusilla*). One juvenile (84-1977) 5 Aug 1977, Limantour Estero, Marin Co. (SJ, GP). One juvenile (119-1978) 9 Sep 1978, Ferndale Bottoms, Humboldt Co. (RAE, LE); photo on file. One juvenile (24-1979) 10 Sep 1978, Tijuana River Valley, San Diego Co. (DH, GMcC); photo on file. One juvenile (66-1979) 13 May 1979, Kern National Wildlife Refuge, Kern Co. (RW). One juvenile (67-1979) 24-27 May 1979, Tecopa, Inyo Co. (KVV). One juvenile (68-1979) 8 Aug 1979, Moss Landing, Monterey Co. (DR).

Increased interest in studying shorebirds has indicated that this species is a regular migrant through California in both spring and fall. The species is no longer reviewed by the CBRC.

BUFF-BREASTED SANDPIPER (*Tryngites subruficollis*). Eleven (104-1978) 26-31 Aug 1978, Tomales Point, Marin Co. (TAB; AG, JM); photo on file. One (99-1978) 26-28 Aug 1978, Bodega Bay, Sonoma Co. (RAH, DAH; RAE, JM, BDP); photo on file. One (53-1979) 12 Sep 1979, Bodega Bay, Sonoma Co. (BDP). One (54-1979) 22 Sep 1979, Point Reyes, Marin Co. (BDP).

This species is a rare to casual fall visitor to the coast of California between late August and mid-October. All the records are of juvenile birds.

RUFF (*Philomachus pugnax*). One (82-1976) 16-17 Sep 1976, Eel River Bottoms, Humboldt Co. (DRu). One (120-1978) 3-4 Sep 1978, Limantour Natural Area, Marin Co. (AG, JM); photo on file. One (69-1979) 8-17 Sep 1979, Watsonville Sewage Plant, Santa Cruz Co. (DR). One (70-1979) 25 Sep-11 Oct 1979, Zmudowski State Beach, Monterey Co. (DR; GMcC); photo on file.

All of the records above are of juvenile birds. This species has proven to be a rare but regular fall migrant and winter visitant to California and is no longer reviewed by the CBRC.

BLACK-HEADED GULL (*Larus ridibundus*). One adult (67-1978) 19-26 Feb 1978, Mad River Slough, Humboldt Co. (JD, GMcC, VR, DR). One adult (20-1979) 20-30 Mar 1979, Stockton Sewage Ponds, San Joaquin Co. (DR; JD, RAE, KG, GMcC, JM, BDP); photo on file.

This gull is still an extremely rare straggler anywhere along the west coast of North America south of Alaska. The Humboldt Co. bird is only the sixth recorded in California and the San Joaquin Co. bird the seventh.

LITTLE GULL (*Larus minutus*). One adult (68-1978) 21-26 Feb 1978, Humboldt Bay, Humboldt Co. (JD, RAE, GMcC, VR, DR). One adult (108-1978) 7 Oct 1978, Humboldt Bay, Humboldt Co. (CH). One subadult (21-1979) 20 Mar-2 Apr 1979 and the next three winters, Stockton Sewage ponds, San Joaquin Co. (RAE; JD, KG, GMcC, JM, DR); photos on file.

This species is most likely reaching the west coast of North America by an overland route from small widely scattered breeding colonies in central and eastern Canada. There are only seven records of this gull in California prior to 1978 and the species continues to be a rare straggler to the state.

SANDWICH TERN (*Sterna sandvicensis*). One adult (80-1980) 11-15 May 1980, San Diego Bay, San Diego Co. (JD, GMcC, PU).

This is the first to be recorded in California (Schaffner, West. Birds 12:181-182, 1981). The species normally breeds around the Gulf of Mexico and along the southern parts of the Atlantic coast. However, some move across Central America in fall to winter on the Pacific coast, suggesting the route followed by the California bird. This bird was in an Elegant Tern nesting colony and was seen attempting to present fish to Elegant Terns.

CRESTED AUKLET (*Aethia cristatella*). One adult male specimen (Calif. Acad. Sci. 71070) (33-1979) 16-17 Jul 1979, Bolinas, Marin Co. (FW; BS); photos on file.

This is the first recorded in California (Weyman, Condor 82:472, 1980). The species breeds on islands in the extreme northern Pacific, casually straying as far south as northern Japan in winter. The only other records along the Pacific coast of North America south of the general breeding areas in Alaska are a specimen (British Columbia Provincial Museum 11915) collected in the winter of 1892-1893 offshore from the northwestern part of Vancouver Island and the observation of an adult on 7 Jul 1980 near Cedros Island 300 miles south of the United States-Mexican border (Pitman et al., West. Birds 14:47-48', 1983).

GROOVE-BILLED ANI (*Crotophaga sulcirostris*). One (23-1979) 13-17 Sep 1978, Anaheim, Orange Co. (DW; JD, DH, GMcC); photos on file.

This is only the second to be found in California; the first was near Lakeview, Riverside Co., 4-16 Nov 1974 (Am. Birds 29:122, 1975).

SNOWY OWL (*Nyctea scandiaca*). One (61-1978) 24 Nov-2 Dec 1977, Humboldt Bay, Humboldt Co. (CH, GMcC); photos on file. Two (65-1978) 8 Jan-28 Feb 1978, Manila, Humboldt Co. (JD, LE, JM, DR, HS); photos on file.

It is evident from reports along the northern Pacific coast (Am. Birds 32:249 and 392, 1978) that a number of Snowy Owls moved south along the Pacific coast during the late fall of 1977 and wintered as far south as extreme northern California.

Figure 2. White-rumped Sandpiper (*Calidris fuscicollis*) (89-1978) 2 Jun 1978, Carmel River, Monterey Co., California. *Photo by Ron Branson*

BROAD-BILLED HUMMINGBIRD (*Cynanthus latirostris*). One male (54-1978) 20-23 Sep 1977, Tijuana River Valley, San Diego Co. (GMcC). One male (84-1978) 9 Dec 1977-25 Jan 1978, Marina del Rey, Los Angeles Co. (JJ).

This species is now being recorded in California every year and it is becoming evident that small numbers regularly stray westward to California during fall to winter in the southern portion of the state.

SULPHUR-BELLIED FLYCATCHER (*Myiodynastes luteiventris*). One (131-1978) 6-9 Oct 1978, Goleta, Santa Barbara Co. (LB; JD, PL, BSc); photo on file.

This is only the second to be found in California. The first remained in Point Mugu State Park, Ventura Co., 22 Sep-5 Oct 1974 (Am. Birds 29:122, 1975).

EASTERN PHOEBE (*Sayornis phoebe*). One (59-1978) 29-30 Oct 1977, Oasis, Mono Co. (GMcC).

This species has proven to be a regular visitor to California during fall and winter and is no longer reviewed by the CBRC.

YELLOW-BELLIED FLYCATCHER (*Empidonax flaviventris*). One banded (13-1977) 16 Sep 1976, S. E. Farallon Island, San Francisco Co. (RLeV); photos on file.

This is the first to be recorded in California. This species breeds west to northeastern British Columbia, but normally migrates through the eastern portion of the United States. One collected in Tucson, Arizona, on 22 Sep 1956 (Phillips et al., The birds of Arizona, 1964) is the only other documented record for the southwestern United States west of extreme eastern New Mexico.

LEAST FLYCATCHER (*Empidonax minimus*). One (71-1977) 24 May 1977, Scotty's Castle, Death Valley, Inyo Co. (DR). One (53-1978) 15 Sep 1977, Pt. Loma, San Diego Co. (BC, GMcC). One (56-1979) 6-7 Oct 1979, Pt. Reyes, Marin Co. (RS; AG, BDP); photos on file.

This species is now recorded in small numbers every year, with most during fall. It is no longer reviewed by the CBRC.

GREATER PEWEE (*Contopus pertinax*). One (129-1978) 25 Nov 1978-1 Mar 1979, Parker Dam, San Bernardino Co. (JD, DR).

One or two of these birds are found wintering in California most years. The record above is undoubtedly the same individual (21-1978) as published in the Fourth Report of the CBRC (Luther, West. Birds 11:161-173, 1980).

BLUE JAY (*Cyanocitta cristata*). One (62-1978) 31 Dec 1977-8 Jan 1978, Willow Creek, Humboldt Co. (LE, RAE); photo on file. One (66-1978) mid Jan-9 Mar 1978, Fieldbrook, Humboldt Co. (JD, RAE, JM, GMcC, VR, DR); photo on file. One (109-1978) 7 Oct 1978, north spit Humboldt Bay, Humboldt Co. (CH).

There are now eight records of this species in California (Roberson, Rare birds of the West Coast, 1980).

SEDGE WREN (*Cistothorus platensis*). One (230-1980) 4 and 8 Nov 1980, Bolinas Lagoon, Marin Co. (DDeS; DN, PP, RS); photos on file.

This is the first to be recorded in California. This species breeds west to central Saskatchewan, but moves southeastward in fall. It is previously unrecorded west of extreme eastern New Mexico in fall and winter.

WOOD THRUSH (*Hylocichla mustelina*). One (128-1978) 25-26 Oct 1978, Tijuana River Valley, San Diego Co. (JD, KG, DR).

This is only the fourth to be found in California (Roberson, Rare birds of the West Coast, 1980).

GRAY-CHEEKED THRUSH (*Catharus minimus*). One (46-1975) 25 Sep 1974, S. E. Farallon Island, San Francisco Co. (DDeS, RS); photos on file.

This species is a casual fall straggler to California, with fewer than 10 acceptable records.

DUSKY WARBLER (*Phylloscopus fuscatus*). One immature female specimen (*P. f. fuscatus;* Calif. Acad. Sci. 70314) (229-1980) 27 Sep 1980, S. E. Farallon Island, San Francisco Co. (RB, PP); photos on file.

This is the first to be recorded in California. There are only three previous occurrences of this Asiatic species reported for North America, one on St. Lawrence Island, Alaska, on 6 June 1977 (King et al., Am. Birds 32:158-160, 1978), and two birds on Shemya Island, Alaska, on 18 Sep 1978 (one, *P. f. fuscatus*, collected; the other was present through 23 Sep) (Gibson, Condor 83:65-77, 1981).

WHITE WAGTAIL (*Motacilla alba*). One first winter bird (130-1978) 9-11 Oct 1978, Goleta, Santa Barbara Co. (LB; JD, KG, PL, GMcC, DR); photo on file. One adult female (55-1979) 7 Aug-22 Sep 1979 and again from 20 Jul-21 Sep 1980, Watsonville sewage plant, Santa Cruz and Monterey cos. (CF; SA, JD, RAE, AG, KG, GMcC, JM, BDP, DR); photos on file.

These sightings establish the third and fourth records for California. The previous records were also during the fall (Oct).

The recently published paper by Morlan (Continental Birdlife 2:37-50, 1981) gives a detailed analysis of the distribution and identification of the two types of White Wagtail that have occurred in western North America, *M. a. ocularis* and *M. a. lugens*. Morlan reviews the systematics of the White Wagtail and presents evidence that *lugens* and *ocularis* are specifically distinct from one another (based on Soviet studies in which the two are said to breed sympatrically). Morlan concludes that the Watsonville adult is definitely referable to *lugens*, while the Goleta bird and the previous two accepted California records could not be assigned to subspecies. He concludes that, on the basis of all West Coast records, *lugens* is the more likely type to occur in California.

The AOU Committee on Classification and Nomenclature has split these two types into distinct species (Auk 99(3): Suppl., 1982). The CBRC will reevaluate the previously accepted records.

SPRAGUE'S PIPIT (*Anthus spragueii*). One (60-1978) 22 Nov 1977, Tijuana River Valley, San Diego Co. (GMcC).

This is a casual straggler to California. The previous records are also from coastal southern California in fall.

RED-THROATED PIPIT (*Anthus cervinus*). One (58-1978) 13-15 Oct 1977, Tijuana River Valley, San Diego Co. (and crossed into Mexico) (GMcC). One (18-1979) 28 Sep 1978, San Nicolas Island, Ventura Co. (LJ; JD, RAE). Three (111-1978) 7-13 Oct 1978, Pt. Reyes, Marin Co. (LCB, AG, JM, BDP); photos on file.

This species is now found almost annually in the fall in very small numbers. All records to date are from the coast and most are from southern California.

WHITE-EYED VIREO (*Vireo griseus*). One (91-1978) 18-21 May 1978, Pt. Reyes, Marin Co. (JD, JM, VR). One singing male (63-1979) 31 May-2 Jun 1979, Oasis, Mono Co. (PL; GMcC).

These are the third and fourth records for California. The previous are also in late spring (early Jun).

YELLOW-THROATED VIREO (*Vireo flavifrons*). One (127-1978) 28-30 May 1978, Oasis, Mono Co. (DR, PU). One (96-1978) 3 Jun 1978, Pt. Reyes, Marin Co. (KL, JM).

This is a casual straggler to California, although it has been annual in recent years. Most records are for the spring.

YELLOW-GREEN VIREO (*Vireo flavoviridis*). One (110-1978) 22-25 Oct 1978, Lake Merced, San Francisco Co. (LCB, AG, JM, BDP, DR); photo on file.

This is the first record of this species for northern California. There are about 10 fall records from southern California. Most authorities now regard the Yellow-green Vireo as conspecific with the Red-eyed Vireo (*V. olivaceus;* Auk 99(3): Suppl., 1982).

PHILADELPHIA VIREO (*Vireo philadelphicus*). One (8-1979) 30 Dec 1978-12 Jan 1979, Palos Verdes Peninsula, Los Angeles Co. (LH; JD, KG, GMcC). One (64-1979) 26 Oct 1979, Carmel River mouth, Monterey Co. (DR).

This species is now noted annually in California, with the great majority of records in fall. The bird on the Palos Verdes Peninsula is the first winter record of this species in California.

PROTHONOTARY WARBLER (*Protonotaria citrea*). One male (48-1978) 6-7 Jun 1977, Tijuana River Valley, San Diego Co. (GMcC). One female (41-1979) 30 Dec 1978-10 Mar 1979, Santa Barbara, Santa Barbara Co. (KG; JD, PL). One (60-1979) 23 May 1979, Oasis, Mono Co. (KVV, PL).

This species is now recorded annually in both the late spring and fall. The sighting from Santa Barbara is the first of a wintering bird in California.

WORM-EATING WARBLER (*Helmitheros vermivorus*). One (94-1978) 11-21 Jul 1978, Tilden Park, Contra Costa Co. (PG; JM, VR, DR). One (106-1978) 5-8 Oct 1978, Pt. Reyes, Marin Co. (AG, JM, BDP, JW); photo on file.

This is a casual vagrant to California, with most records being in fall. The Tilden Park sighting is the second midsummer record in California.

GOLDEN-WINGED WARBLER (*Vermivora chrysoptera*). One male (28-1979) 24 May 1979, Scotty's Castle, Death Valley, Inyo Co. (KVV; PL, DR); photo on file.

This is a casual vagrant to California, with records being about equally divided between late spring and fall.

CERULEAN WARBLER (*Dendroica cerulea*). One (113-1978) 15-17 Oct 1978, Pt. Reyes, Marin Co. (JW; DH, AG, JM, SW); photos on file. One female (116-1978) 27 Oct 1978, Carmel River mouth, Monterey Co. (SFB). One female (46-1979) 26-27 May 1979, Pt. Loma, San Diego Co. (CE; PU). One male (62-1979) 25 Oct 1979, Carmel River mouth, Monterey Co. (DR).

There are only three previous California records of this species. The Pt. Loma sighting is only the second spring record for California.

YELLOW-THROATED WARBLER (*Dendroica dominica*). One male (48-1979) 19-21 May 1978, Long Beach, Los Angeles Co. (JA; JD). One (122-1978) 2 Sep 1978, Red Bluff, Tehama Co. (SL). One male (47-1979) 29 Apr 1979, Encinitas, San Diego Co. (L and SS). One male (31-1979) 23 Jun-3 Jul 1979, Pt. Reyes, Marin Co. (JM, PU).

The above records are referable to the white-lored subspecies, *D. d. albilora*. In recent years this species has been reported annually. Most records are for spring and from southern California.

GRACE'S WARBLER (*Dendroica graciae*). One (55-1978) 24-25 Sep 1977, Tijuana River Valley, San Diego Co. (GMcC).

This species is a casual straggler to California. Three of the six previous occurrences were also of fall birds from coastal San Diego Co.

PINE WARBLER (*Dendroica pinus*). One male (36-1979) 4-26 Feb 1978, Regina, Imperial Co. (KG; JD, GMcC).

This is a casual straggler to California (fewer than 10 records). All previous records have been from fall (mostly October) and most have been from southern California. The above record is the first for the winter period and the first interior record. Fall Blackpoll Warblers continue to be confused with the Pine Warbler. Observers are therefore urged to use extreme caution before reporting this species in California.

CONNECTICUT WARBLER (*Oporonis agilis*). One (43-1979) 14 Sep 1978, San Diego, San Diego Co. (RR). One (115-1978) 22 Oct 1978, Santa Cruz, Santa Cruz Co. (DP).

This is a casual vagrant to California. Almost all records of this species are coastal and the majority are for the fall period. The Santa Cruz record above is the latest record for the state.

RED-FACED WARBLER (*Cardellina rubrifrons*). One (47-1978) 21-24 May 1977, Pt. Loma, San Diego Co. (DH, GMcC); photo on file. Two (39-1979) 17 Jun-3 Jul 1978, San Gabriel Mts., Los Angeles Co. (JA, KG); photo on file.

These are the fourth and fifth records of this species for California. The Pt. Loma sighting is the first coastal record accepted by the CBRC. The record from the San Gabriel Mts. is from a plausible breeding locality. It was unclear as to whether or not these birds represented a mated pair (neither bird was identified to sex).

HOODED WARBLER (*Wilsonia citrina*). One male (123-1978) 14 Nov-7 Dec 1978, Muir Woods, Marin Co. (RAE, AG, JM); photo on file. One female (56-1978) 17 Dec 1977-27 Jan 1978, San Diego, San Diego Co. (GMcC).

This species is now noted annually in California in very small numbers (mostly in spring) and is no longer being reviewed by the CBRC. The San Diego sighting is the first winter record for California, although there is a winter record from Washington.

CANADA WARBLER (*Wilsonia canadensis*). Two (51, 52-1978) 11-13 Sep 1977, Tijuana River Valley, San Diego Co. (GMcC). One (117-1978) 10 Sep 1978, Pt. Saint George, Del Norte Co. (RAE). One male (112-1978) 12-22 Oct 1978, Pacific Grove, Monterey Co. (VY; JM).

This species is now being found every fall in very small numbers. The great majority of these records are from the immediate coastal slope. There are also a few spring records. This species is no longer being reviewed by the CBRC.

COMMON GRACKLE (*Quiscalus quiscula*). One (27-1979) 25 May 1979, West Pittsburg, Contra Costa Co. (RAE, SF).

This species is a casual straggler to California (about 10 previous records). The date of the above sighting fits the pattern of late spring occurrences of this species, but the sighting represents one of the few records from northern California. As expected, all of the California records appear to pertain to the "Bronzed" subspecies, *Q. q. versicolor.*

SCARLET TANAGER (*Piranga olivacea*). One male banded (78-1979) 15 Oct 1979, Bolinas, Marin Co. (RS).

This species is a very rare straggler to California, but has been recorded annually in recent years. The majority of records are from rather late in the fall period and are from southern California.

WHITE-WINGED CROSSBILL (*Loxia leucoptera*). Flock of 12 (5-1979) 1 Sep 1978, Mosquito Lake, Trinity Co. (GG, PG).

This is the first record for California. This erratic species staged an invasion in the winter of 1977-78 into Washington and Oregon with observations continuing through the spring, summer and fall of 1978.

CASSIN'S SPARROW (*Aimophila cassinii*). Up to 15 singing males (126-1978) 21 May-7 Jun 1978, Lanfair Valley, San Bernardino Co. (DR).

The occurrence of the above concentration coincided with an invasion by this species into the Southwest in spring 1978 (Am. Birds 32:1043, 1978). There are only eight previous records of this species for California, all of single birds. Additional records from spring 1978 from elsewhere in southern California are currently circulating through the CBRC.

SHARP-TAILED SPARROW (*Ammospiza caudacuta*). One (79-1978) 8 Feb 1978, Palo Alto, Santa Clara Co. (AG, JM, MW); photos on file. Two (22-1979) 10 Jan 1979 (one bird) and 27 Jan 1979 (two birds), Dumbarton Marsh, Alameda Co. (RAE). One (14-1979) 25 Jan-24 Feb 1979, Palo Alto, Santa Clara Co. (JM).

This species regularly winters in very small numbers at a few of the larger coastal estuaries.

SNOW BUNTING (*Plectrophenax nivalis*). One male (107-1978) 11 May 1978, Cape Mendocino, Humboldt Co. (CH); photo on file. One (7-1979) 14 Nov-2 Dec 1978, MacKerricher Beach, Mendocino Co. (JP, KVV); photos on file. One (35-1979) 23-27 Dec 1978, Kelso Valley, Kern Co. (JD, KG).

This species is now recorded annually in the late fall and early winter in northern California and is no longer being reviewed by the CBRC. The sighting from Cape Mendocino establishes the first spring record for the state and must be one of the latest records for the lower contiguous 48 states. The Kelso Valley sighting is the third record for southern California.

## UNACCEPTED RECORDS, Identification uncertain

YELLOW-BILLED LOON (*Gavia adamsii*). One (52-1976) 5-9 May 1976, Pt. Mugu, Ventura Co.

LEAST GREBE (*Tachybaptus dominicus*). One (38-1979) 1 Oct 1978, Salton City, Imperial Co.

CAPE PETREL (*Daption capense*). One (33-1974) 13 Mar 1974, Monterey Bay, Monterey Co.

WILSON'S STORM-PETREL (*Oceanites oceanicus*). One (58-1976) 9 Oct 1976, Monterey Bay, Monterey Co.

WHITE-BELLIED STORM-PETREL (*Fregetta grallaria*). One (43-1978) 1 Oct 1977, Monterey Bay, Monterey Co.

YELLOW-CROWNED NIGHT-HERON (*Nyctanassa violacea*). One (102-1978) 5 Jul 1977, Tomales Bay, Marin Co.

## UNACCEPTED RECORDS, Identification uncertain (Cont.)

TRUMPETER SWAN (*Cyngus buccinator*). Five (41-1977) 31 Dec 1967, Santa Rosa, Sonoma Co.

ZONE-TAILED HAWK (*Buteo albonotatus*). One (52-1979) 8 Sep 1979, Watsonville, Santa Cruz Co.

HARRIS' HAWK (*Parabuteo unicinctus*). One (37-1979) 24 Sep 1978, north of Blythe, Riverside Co.

GREAT CRESTED FLYCATCHER (*Myiarchus crinitus*). One (165-1977) 25 Aug 1972, near Rodeo Lagoon, Marin Co.

EASTERN PHOEBE (*Sayornis phoebe*). One (32-1977) 7 Sep 1971, Yucca Valley, San Bernardino Co. One (86-1976) 29 Aug 1976, Lafayette, Contra Costa Co.

LEAST FLYCATCHER (*Empidonax minimus*). One (58-1977) 27 May 1977, Scotty's Castle, Inyo Co.

EASTERN WOOD-PEWEE (*Contopus virens*). One (93-1976) 5 Jun 1969, Pacific Grove, Monterey Co.

GRAY CATBIRD (*Dumetella carolinensis*). One (75-1978) 2 Oct 1977 Pacific Grove, Monterey Co.

VEERY (*Catharus fuscescens*). One (26-1979) 10 May 1979, San Rafael, Marin Co.

NORTHERN WHEATEAR (*Oenanthe oenanthe*). One (101-1978) 14 Dec 1977, Death Valley National Monument, Inyo Co.

YELLOW WAGTAIL (*Motacilla flava*). One (93-1978) 2 Dec 1977, Mare Island area, Solano Co.

RED-THROATED PIPIT (*Anthus cervinus*). One (42-1978) 4 Sep 1977, Pt. Reyes, Marin Co. One (103-1978) 28 Sep 1977, Grizzly Island, Solano Co. One (73-1979) 7 Nov 1979, Auburn, Placer Co.

PHILADELPHIA VIREO (*Vireo philadelphicus*). One (134-1977) 23 Aug 1973, Cow Creek, Death Valley, Inyo Co. One (49-1979) 22 Oct 1978, Pt. Loma, San Diego Co.

PLAIN CHACHALACA (*Ortalis vetula*). One (57-1979) 28 Nov 1976, Bakersfield, Kern Co.

YELLOW RAIL (*Coturnicops noveboracensis*). One (74-1978) 4 Feb 1978, Santee Lakes, San Diego Co.

GREATER GOLDEN-PLOVER (*Pluvialis apricaria*). One (3-1979), 2 Jan 1966, near Dillon Beach, Marin Co.

JACK SNIPE (*Lymnocryptes minimus*). One (76-1978) 23 Jan 1977, Oakland, Alameda Co.

## UNACCEPTED RECORDS, Identification uncertain (Cont.)

SHARP-TAILED SANDPIPER (*Calidris acuminata*). One (46-1977) 3 Sep 1968, Abbott's Lagoon, Marin Co. One (48-1977) 19 Oct 1973, Limantour Estero, Marin Co. Three (119-1977) 25 Oct 1977, Lake Talawa, Del Norte Co.

SEMIPALMATED SANDPIPER (*Calidris pusilla*). Two (52-1977) 6-10 Aug 1975, Arcata bottoms, Humboldt Co. One (78-1976) 23 Aug 1975, Wister Unit, Imperial Wildlife Area, Imperial Co. One (51-1979) 15 Jun 1979, Pajaro River, Santa Cruz Co.

RUFF (*Philomachus pugnax*). One (96-1977) 12 Sep 1977, Lake Talawa, Del Norte Co. One (36-1978) 20 Sep 1977, Goleta, Santa Barbara Co. One (42-1979) 20 Dec 1978, Tecopa Hot Springs, Inyo Co.

SNOWY OWL (*Nyctea scandiaca*). One (25-1978) 20 Nov 1972, near Samoa, Humboldt Co. One (77-1978) 17 Jun 1976, near Oakland, Alameda Co.

Figure 3. Dusky Warbler (*Phylloscopus fuscatus*) (229-1980) 27 Sep 1980, S. E. Farallon Island, San Francisco Co., California. *Photo by Bob Boekelheide*

## UNACCEPTED RECORDS, Identification uncertain (Cont.)

RIVOLI'S HUMMINGBIRD (*Eugenes fulgens*). One (34-1979) 4 May 1978, near Riverside, Riverside Co.

CERULEAN WARBLER (*Dendroica cerulea*). One (45-1979) 22 Oct 1978, Pt. Loma, San Diego Co.

PINE WARBLER (*Dendroica pinus*). One (108-1977) 25 Sep 1977, Pacific Grove, Monterey Co.

CONNECTICUT WARBLER (*Oporornis agilis*). One (154-1977) 12 Sep 1973, Paradise, Butte Co. One (133-1977) 6 Oct 1977, Pt. Reyes, Marin Co.

COMMON GRACKLE (*Quiscalus quiscula*). One (10-1978) 13 Oct 1977, Hayward, Alameda Co.

SHARP-TAILED SPARROW (*Ammospiza caudacuta*). One (152-1977) 24 Dec 1973, Pt. Reyes, Marin Co.

## UNACCEPTED RECORD, Origin uncertain (identification accepted)

HARRIS' HAWK (*Parabuteo unicinctus*). One (72-1978) 16 Jan 1978, Mecca, Riverside Co.

Figure 4. Snow Bunting (*Plectrophenax nivalis*) (107-1978) 11 May 1978, Cape Mendocino, Humboldt Co., California. *Photo by Craig Hohenberger*

## CONTRIBUTORS

Steve Allison (SA), Aileen Anderson (AA), Jon Atwood (JA), Stephen F. Bailey (SFB), Bernice Barnes (BBa), Fred Barry (FB), Louis Bevier (LB), Laurence C. Binford (LCB), Tupper Ansel Blake (TAB), Robert Boekelheide (RB), Betty Boyd (BB), Bruce Broadbooks (BBr), Elizabeth Copper (EC), Bart Cord (BC), Brian Daniels (BDa), David DeSante (DDeS), Bruce Deuel (BD), Donna Dittmann (DD), Jon Dunn (JD), Claude Edwards (CE), Bruce Elliot (BE), Victor Emanuel (VE), Linda Erickson (LE), Richard A. Erickson (RAE), Jules Evens (JE), Kurt Fankhauser (KF), L. P. Farrar (LF), Fran Floyd (FF), Steven Foreman (SF), Carolyn Frederiksen (CF), Gary Friedrichsen (GF), Jeff Froke (JF), Kimball Garrett (KG), Steve Gellman (SGe), Stephen R. Getty (SRG), Al Ghiorso (AG), Doug Gomke (DG), Geoff Gordon (GG), Philip Gordon (PG), L. W. Gralapp (LWG), V. Lee Grover (LG), Pamela M. Gunther (PMG), Linda Hale (LH), Roger Harris (RH), Andreas Helbig (AH), Phil Henderson (PH), Norman Hill (NH), Don Hoechlin (DH), R. W. Hoellwarth (RWH), Craig Hohenberger (CH), Dave Holdridge (DHo), David A. Holway (DAH), Richard A. Holway (RAH), Jerome A. Johnson (JJ), Stu Johnston (SJ), Lee Jones (LJ), Abigail King (AK), Kathleen Lackey (KL), Jeri Langham (JL), Steve Laymon (SL), Paul Lehman (PL), Ron LeValley (RLeV), Ian MacGregor (IMacG), Alayne MacMillan (AM), Bill Marshall (BM), Robert E. Maurer (REM), G. Charles Mayes (GCM), Guy McCaskie (GMcC), J.E. McDonald (JMcD), Joan Mills (JMi), Joseph Morlan (JM), Scott Moorhouse (SM), Dan Nelson (DN), Gary Page (GP), Dennis Parker (DP), Benjamin D. Parmeter (BDP), John Parmeter (JP), Joyce Parry (JPa), Raphael Payne (RP), Elizabeth Phinney (EP), William Pursell (WP), Peter Pyle (PP), William Reese (WR), Van Remsen (VR), Patricia M. Righter (PMR), Don Roberson (DR), Raymond Robinson (RR), Dave Rudholm (DRu), Luis and Suzanne Santaella (L and SS), Starr Saphir (SSa), Buzz Scher (BSh), Brad Schram (BSc), Genevieve Sears (GS), John Smail (JS), Arnold Small (AS), Bruce Sorrie (BS), Larry Spear (LS), Richard Stallcup (RS), Lynn Stenzel (LSt), Robert M. Stewart (RMS), Shumway Suffel (SS), Gerald Tolman (GT), Blaine Ulmer (BU), Philip Unitt (PU), Kent Van Vuren (KVV), Richard Webster (RW), Fred O. Weyman (FW), Ralph S. Widrig (RSW), Mike Wihler (MW), Douglas R. Willick (DW), Steve Wilson (SW), Vernal Yadon (VY).

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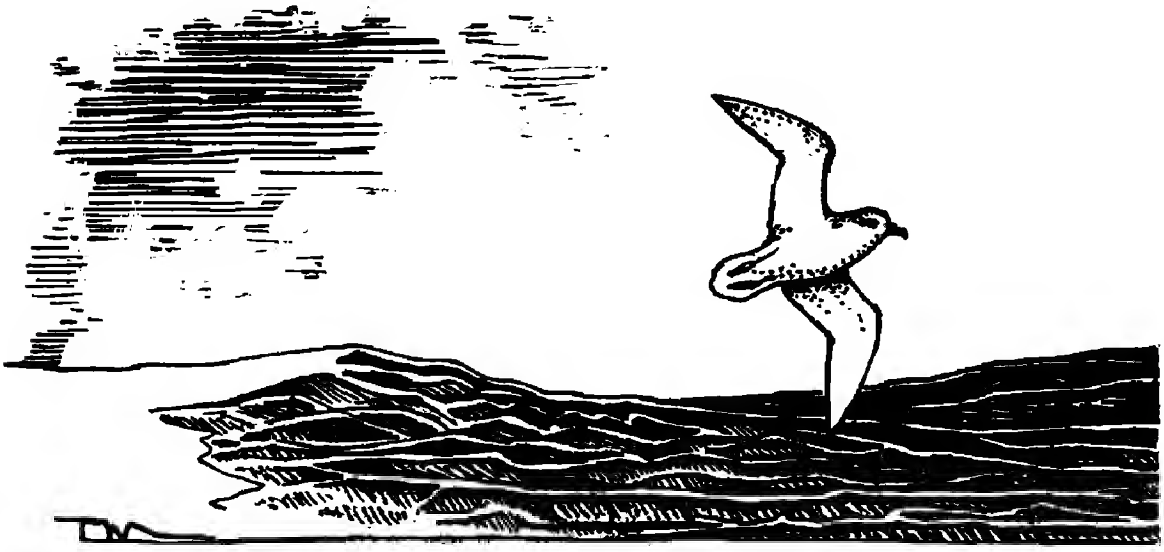


Cook's Petrel *Sketch by Tim Manolis*

# HYBRIDIZATION OF A BLUE-THROATED HUMMINGBIRD IN CALIFORNIA

FRANK A. BALDRIDGE, LLOYD F. KIFF, SUSAN K. BALDRIDGE, and ROBERT B. HANSEN, Western Foundation of Vertebrate Zoology, 1100 Glendon Avenue, Los Angeles, California 90024

A relatively large number of North American hybrid hummingbirds have been described (Banks and Johnson 1961, Short and Phillips 1966, Mayr and Short 1970), representing at least 12 hybrid combinations, mostly intergeneric (Wells et al. 1978). Nearly all known hybrids have been adult males, and the evidence for their presumed hybrid origin has been based primarily upon the external characters of specimens.

In late December 1977 a female Blue-throated hummingbird (*Lampornis clemenciae*) was discovered visiting a feeder near Three Rivers, Tulare County, California. This bird, the first of the species recorded in California (Luther et al. 1979), subsequently nested twice in the vicinity. Because of the apparent absence of a male Blue-throated Hummingbird, as well as certain characteristics of the young, we believe that these nesting attempts involved hybridization. In the following account the nesting attempts and the resultant offspring are described, and the possible identity of the male parent is discussed. We are unaware of a previous report of a hummingbird hybridization discovered during the nesting stage.

## THE BLUE-THROATED HUMMINGBIRD IN CALIFORNIA

The female Blue-throated Hummingbird was first seen about 28 December 1977 by Gertrude Schuckert at a feeder at her home on Heidi Road, 3 km S of Three Rivers. The bird returned to the feeder daily and was photographed on 16 January 1978 by F.A.B. It remained in the vicinity throughout the winter, and on 30 April it was captured, photographed, measured and released by F.A.B. and R.B.H. It was last seen in the area on 27 May 1978.

The species normally breeds from the southwestern United States south to the state of Oaxaca, Mexico (AOU 1957). Within the United States the subspecies *L. c. bessophilus* breeds in isolated mountain ranges of southeastern Arizona (Phillips et al. 1964) and extreme southern New Mexico (Hubbard 1978). The nominate race ranges north to southwestern Texas and probably breeds there, although actual nesting has not been documented (Oberholser 1974). The species normally winters in the Mexican lowlands (AOU op cit.).

The two races can probably be separated only by the intensity of the green coloration of the dorsum and the gray coloration of the underparts, *bessophilus* being generally paler (Mayr and Short 1970). After examining large series of Blue-throated Hummingbird skins in the Museum of Vertebrate Zoology (University of California, Berkeley), California Academy of Sciences and

Western Foundation of Vertebrate Zoology, we agree with Van Tyne (1953) that measurements are of little use in distinguishing the two forms. As we did not have comparative material available when the Three Rivers blue-throat was in hand, its subspecific identity could not be determined and inferences about its region of origin therefore could not be drawn.

## STUDY AREA

The female blue-throat wintered on the canyon floor of the South Fork of the Kaweah River, 3 km S of Three Rivers, where the elevation is about 300 m. Sycamores (*Platanus racemosa*), Fremont Cottonwoods (*Populus fremontii*), and Valley and Interior Live oaks (*Quercus lobata* and *Q. wislizenii*) dominate the overstory; the understory is primarily scattered Whiteleaf Manzanitas (*Arctostaphylos viscida*) and Wedgeleaf Ceanothus (*Ceanothus cuneatus*). This riparian woodland is associated with Digger Pine (*Pinus sabiniana*)-oak woodlands of central California. Marshall (1957) noted a basic similarity of the breeding avifauna of the pine-oak woodlands of southeastern Arizona and the Digger Pine-oak woodlands of central California. Certainly the canyon is physiognomically similar to the canyons of southeastern Arizona where the blue-throat is a summer resident.

Average annual rainfall in the area is 331 mm (records from nearby Kaweah Lake), but is highly variable. The winter of 1976-1977 was the driest on record, whereas the winter of 1977-1978 was the wettest. Minimum temperatures recorded in January and February 1978 were significantly higher than those recorded in 1977.

## BEHAVIORAL OBSERVATIONS

The Blue-throated Hummingbird's wintering activity was centered about an Interior Live Oak in which a feeder was suspended. The feeder and the live oak in which the blue-throat normally perched and roosted usually were defended. The bird's sugar solution diet was supplemented by insects, which were relatively abundant because of the wet, mild winter. She collected insects near the feeder tube and in short erratic flights, similar to those described by Wagner (1946), over an adjacent small marsh.

During late February and early March the female was observed less often in the vicinity of the feeder. The reason for the bird's frequent absences became apparent on 12 March when it was found on a nest 270 m NW of the feeding station. The nest was built around a telephone wire approximately 3 m off the ground under the west-facing eaves of a residence (Figure 1). The house is situated on a dry, steep hillside above the belt of riparian vegetation where the bird had confined its winter activities. Observations were made intermittently at the site throughout the nesting period, often with a second observer stationed at the riparian feeding station.

Figure 1. Female Blue-throated Hummingbird (*Lampornis clemenciae*) feeding young of first clutch, Three Rivers, Tulare Co., California, 13 April 1978. Mirror above was used to check development of young.

*Photo by Frank Baldridge*

When found, the nest contained two eggs, although it was as yet unlined. During the remainder of the incubation period, the bird added a lining, consisting of bits of thread and feathers from her own abdomen. Details of the bird's incubation behavior are summarized in Table 1. Constancy of incubation was calculated to be 84% (Skutch 1962), somewhat higher than the figures the same author reported for five neotropical hummingbird species (range 65-81%). During her absences from the nest, the female usually visited the riparian feeding station for periods ranging from 2 to 7 minutes. Three days prior to hatching of the eggs, the amount of time spent at the feeders per visit declined from a mean of 3.75 minutes (S.D. ± 1.9) to a mean of 1.91 minutes (S.D. ± 0.67), as the bird began spending relatively more time foraging for insects near the nest. Furthermore, the female appeared to be more restless while she was on the nest during the late stages of incubation. She was also more aggressive towards other birds in the immediate vicinity of the nest, especially near a *Ceanothus* shrub where she perched regularly.

The first egg hatched before 1045 on 26 March. At that time the female was unusually aggressive at the nest, and the site was not visited again until 28 March. By then the second egg had hatched, and the size difference between the young suggested that hatching was asynchronous.

Table 1. Incubation behavior and weather conditions during first and second nesting attempts of a Blue-throated Hummingbird at Three Rivers, California.

| | First Clutch | Second Clutch |
|---|---|---|
| Incubation behavior | | |
| Attentive periods (min) | | |
| Mean | 35.0 | 52.6 |
| N | 11 | 23 |
| S.D. | ±15.1 | ±38.8 |
| Range | 15-61 | 22-179 |
| Inattentive periods (min) | | |
| Mean | 6.6 | 10.0 |
| N | 11 | 23 |
| S.D. | ±6.5 | ±12.2 |
| Range | 2-16 | 1-63 |
| Time attentive (%) | 81 | 84 |
| Weather conditions during observation periods | | |
| Temperature range (C°) | 16-22 | 10-37 |
| Precipitation | | |
| Days | 7 | 0 |
| Amount (mm) | 70 | 0 |
| Observation periods | 4 | 11 |
| Total hours observed | 10.8 | 28.5 |

Aspects of the female's care of the young are summarized in Table 2. Midday brooding ceased on the 10th day after the first young hatched, and early morning brooding was not observed after the 16th day, when the young were well feathered. Our limited data suggest that the rate at which the young were fed did not change significantly during the nesting period, thus agreeing with Wagner's (1952) observations of nesting Blue-throated Hummingbirds in Mexico.

On 16 April the nestlings were removed from the nest, photographed, banded, marked on the back with red and blue paint, respectively (cf. Stiles and Wolf 1973), and returned to the nest. They fledged on the following day, 21 days after the first young hatched. This is markedly shorter than the nestling periods of 24-29 days recorded by Wagner (1952) for this species in Mexico. On the day of hatching two hummingbird feeders were placed about 30 m from the nest site, and the female blue-throat ceased visiting the riparian feeding station. After fledging, the young remained in nearby shrubs, where they were fed by the female. Within a week they were exploring the general vicinity and apparently gleaning insects from vegetation, but they were still being fed periodically by the female. By 29 April both nestlings were using the feeders that had been placed near the nest site.

Table 2. Parental care during first nesting attempt of female Blue-throated Hummingbird.

| | Week #1 | Week #2 | Week #3 |
|---|---|---|---|
| Midday brooding behavior | | | |
| Attentive periods (min) | | | |
| Mean | 26.0 | 6.4[1] | |
| N | 11 | 4 | |
| S.D. | ±13.0 | ±7.4 | |
| Range | 15-60 | 4-18 | |
| Inattentive periods (min) | | | |
| Mean | 15.0 | 27.3 | |
| N | 11 | 4 | |
| S.D. | ±5.6 | ±15.8 | |
| Range | 7-24 | 16-48 | |
| Time attentive (%) | 48 | 19 | |
| Midday feeding intervals (min) | | | |
| Mean | 46.0 | 34.3 | 48.9 |
| N | 10 | 6 | 7 |
| S.D. | ±14.6 | ±14.5 | ±13.3 |
| Range | 40-75 | 19-52 | 26-65 |
| Total minutes observed | 597 | 155 | 396 |

[1] Midday brooding ceased on day 10.

The young were recaptured on 30 April and photographed. On this date two rectrices were removed from the tail of each fledgling for diagnostic purposes; these are now on deposit at the Western Foundation of Vertebrate Zoology. One of the young was last seen in the nesting area on 11 May, whereas the other remained until at least 17 May.

Four days after the first brood fledged, the blue-throat began refurbishing the nest with bits of green moss. Ten days later (2 May) the first egg of a second clutch was laid. Incubation did not commence until a second egg was laid on 4 May. Hatching of the two eggs was asynchronous, occurring on 20 and 21 May after 17 and 18 days of incubation, respectively. Identical incubation periods were found for this species in Mexico by Wagner (1952). As with the first clutch, the female continued to add various material, including thread, bits of wool from a discarded blanket, and her own feathers, to the nest lining throughout the incubation period.

Percent attentiveness was identical during the two incubation periods, but there was significant ($p = 0.05$) variation in the length of attentive and inattentive periods between the two clutches (Table 1). Unusually long periods of incubation and inattentiveness occurred in the late afternoons during the second period, coinciding with temperatures of over 35° in the nest vicinity. During the same period, the blue-throat employed different insect foraging methods. Whereas insects had previously been collected while the bird hovered over *Ceanothus* flowers, during this period foliage gleaning and several successful attempts at hawking alfalfa butterflies (Pieridae) were observed. On 21 May the female revisited the riparian feeding station area after a long absence and was observed collecting insects there.

During the first 2 days of the second nestling period, intervals between feedings averaged significantly longer (59 vs. 46 minutes) than those observed with the first brood (Table 2), and this may have been a further indication of insect scarcity in the area at that time. On 24 May an unusually long inattentive period was observed at the nest, and the female did not appear at the nest site at all on 25 May. Examination of the nest on that date revealed that the nestlings had died probably 1-3 days after hatching. The female blue-throat continued to visit the riparian feeding station at half hour intervals until 27 May; she was not seen thereafter in the Three Rivers area.

## DESCRIPTION OF OFFSPRING FROM FIRST NESTING

When the hybrid offspring from the first nesting were recaptured on 30 April the red-marked fledgling had an exposed culmen length of 15.6 mm, a wing chord of 54.5 mm, and it weighed 3.2 g. The blue-marked bird had an exposed culmen of 16.7 mm, a wing chord of 57.1 mm, and it weighed 3.5 g. The ramphotheca of the upper mandible of both birds exhibited the corrugations that are diagnostic of juvenile hummingbirds (Ortiz-Crespo 1972).

The markings on the side of the head and throat varied in intensity between the two fledglings and between the sides of the head on each individual. The red-marked bird had a definite white postocular dot with an indistinct white postocular line which was partly obscured by darker auricular feathers. A faint rictal line formed by the off-white dorsal margins of the malar feathers was also present. The blue-marked bird lacked a rictal line on the left side of the head, but showed a distinct postocular stripe on that side. The pattern was essentially reversed on the right side of the head with a definite rictal line being present, but with the postocular stripe being indistinct.

The throat of each bird was dark gray with the central portion of these feathers being green under proper light. Each throat feather had a well-defined thin white margin. The breasts and abdomens of the birds were lighter gray than the throat with scattered bronzy green flecks on the grayish flanks. The undertail coverts were gray with whitish edges. There was no rufous on the underparts or on the rectrices. None of the remiges or rectrices exhibited the sort of emargination that is typical of the genera *Calypte* or *Archilochus*.

The blue-marked bird was recaptured 21 October, by which time it had nearly completed the post-juvenal molt. On that date the bird weighed 3.52 g, had a wing chord of 58.0 mm, exposed culmen of 20.2 mm, and a tail length of 30.0 mm (Table 3). By this time it lacked the bill corrugations observed in April. Rectrices 3, 4 and 5 were collected from the bird on this date and were also deposited in the WFVZ collection for identification purposes. The markings on the side of the head were similar to those observed in April with the rictal line still lacking on the left side, but with a broad, distinct postocular stripe. On the right side only a postocular dot was distinct. An indistinct whitish line extended posteriorly from the dot and was mostly obscured by auricular feathers. Two white malar feathers formed a rictal dot below the lores. The appearance of the underparts was little changed from the juvenal plumage observed in April; there was still no rufous on the underparts or tail.

In general, the fledglings resembled the adult female Blue-throated Hummingbird in color, although the head markings were indistinct in some areas. However, the young were strikingly smaller than the female parent (Table 3), offering strong support to our assumption that the mating was hybrid in nature. At the time of its recapture the blue-marked bird had been observed intermittently at the riparian feeding station for several days. In confrontations with other hummingbirds, it was invariably subordinate. The hybrid had a markedly slow wingbeat, apparently the result of its relatively long wings and small body size, and its flight was somewhat butterfly-like.

## IDENTIFICATION OF THE MALE PARENT

Juvenile hummingbirds often are difficult to identify and establishing the parentage of juvenile hybrids is potentially even more difficult. Male secondary sexual characteristics, which have generally been used to detect previous hybrids, were lacking in the offspring of the first hybrid nesting, and the young from the second nesting did not survive long enough to develop any recognizable characters. Furthermore, the size discrepancy between the Blue-throated Hummingbird and all potential mates of other species makes measurements and weights of the offspring virtually useless for diagnostic purposes. Therefore, we have relied mainly on known distribution, breeding phenology, and minor plumage characteristics in attempting to identify the male parents of the hybrid offspring. The following discussion is restricted to hummingbird species that normally breed in California.

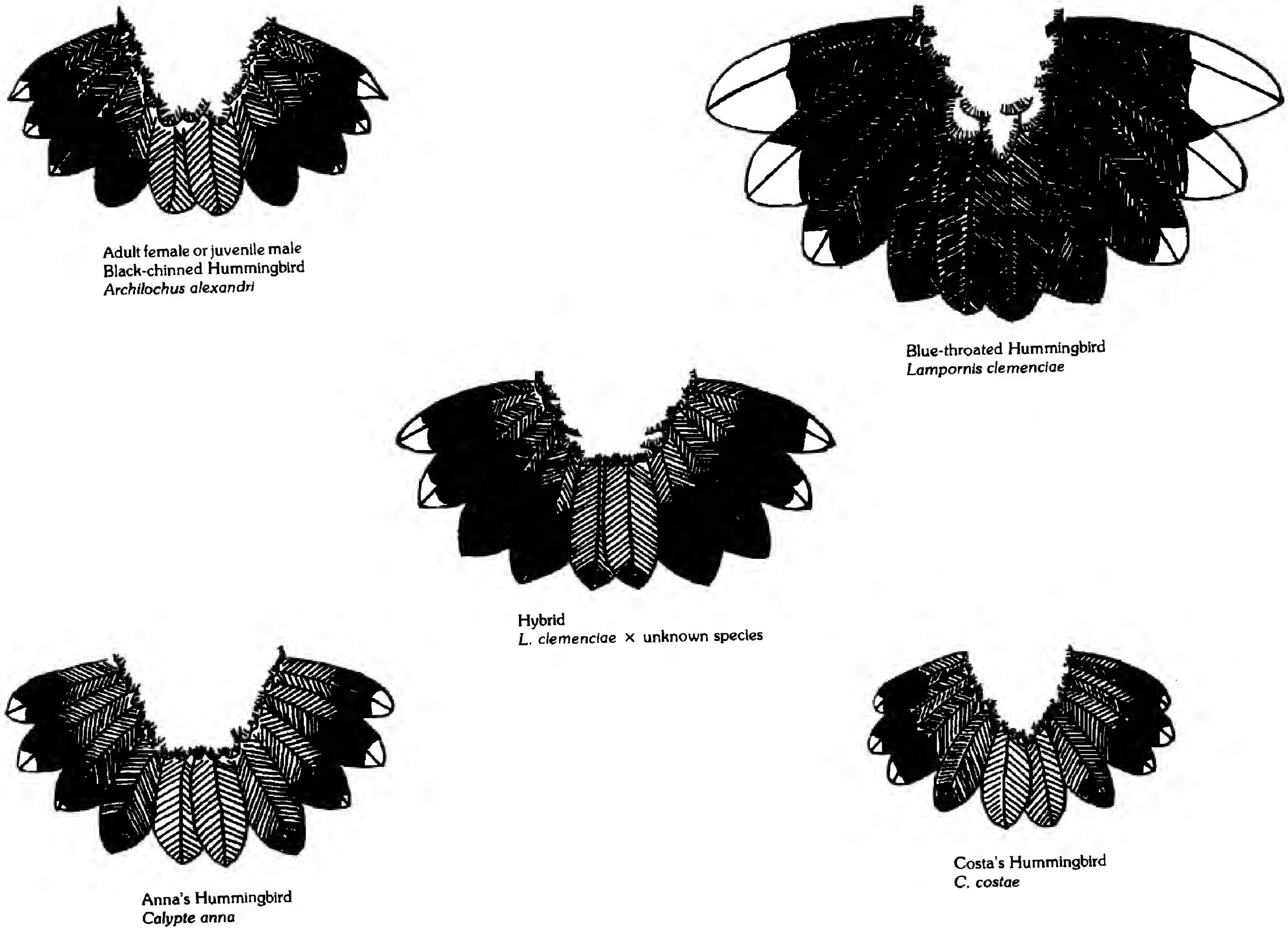
*Calypte anna*: Anna's Hummingbird is the most common local hummingbird species, and it is the only one that is a permanent resident in the Three Rivers area. The species breeds as early as December in California (Stiles 1973) and at the time of the first hybrid nesting, local male Anna's Hummingbirds were establishing breeding territories.

The hybrid offspring resembled *Calypte anna* in the color of the interramal region and underparts, and the tails of the hybrids were similar to Anna's in color and shape (Figure 2). However, the hybrids lacked the shallow "W" indentation typical of the tip of the adult secondaries of Anna's Hummingbirds (Williamson 1956), and they weighed 0.2 g less than the lightest *Calypte anna* weighed locally under similar conditions (Table 3, Figure 3).

*Calypte costae*: Costa's Hummingbird has not been recorded at Three Rivers, and we know of only three records for Tulare County. However, one is of an adult male that wintered in 1978-1979 in Dinuba, 35 mi NW of Three Rivers. There are no breeding records for the general area. Elsewhere in the state, Costa's Hummingbirds breed from about January to March in desert areas and from late March to May in coastal chaparral habitats (Stiles, pers. comm.). The hybrids were similar in color to juvenile Costa's Hummingbirds, although the latter species is generally somewhat paler on the underparts. The hybrids weighed slightly more than normal Costa's Hummingbirds (Table 3, Figure 3).

A *Lampornis clemenciae* × *Calypte costae* hybrid has been reported previously (Mayr and Short 1970). This bird is a juvenile male (University of Arizona 9359) that was found in a mummified condition in the Huachuca Mountains in southeastern Arizona on 26 April 1968. We examined this specimen and found that its measurements (wing chord 59 mm, exposed culmen 20.3 mm) are virtually identical to those of the blue-marked hybrid from Three Rivers (Table 3).

*Archilochus alexandri*: The Black-chinned Hummingbird is a common summer resident in the Three Rivers area, but it arrives later (about the first week of April) than the date of the first hybrid nesting. No Black-chinned Hummingbirds were seen in the study area until after the first clutch had hatched. There is nothing about the color of the hybrids that is incompatible with black-chin parentage, and the weight of the blue-marked bird was very close to mean black-chin weight (Table 3, Figure 3). The acuteness of the outer rectrices of the hybrids relative to those of the adult female blue-throat may be due to the influence of *A. alexandri*. However, the emargination of



Adult female or juvenile male
Black-chinned Hummingbird
*Archilochus alexandri*

Blue-throated Hummingbird
*Lampornis clemenciae*

Hybrid
*L. clemenciae* × unknown species

Anna's Hummingbird
*Calypte anna*

Costa's Hummingbird
*C. costae*

Figure 2. Tails of the female Blue-throated Hummingbird, the hybrid, and females of possible parental species.

these feathers, characteristic of adult female and juvenile male Black-chinned Hummingbirds (Baldridge 1983), was not evident. Other factors in addition to the timing of the first nesting attempt tend to rule out a black-chin parent, especially the short bill length of the blue-marked hybrid in October (Figure 3).

During the period when the blue-throat was refurbishing the nest in preparation for the second nesting attempt, Black-chinned Hummingbirds were the most common species in the area. On several occasions during this period, individual male black-chins were seen displaying to the perched female blue-throat. However, the nestlings of this second attempt died before enough plumage had developed to permit identification of the male parent.

*Selasphorus* and *Stellula* species: Though it is possible that male *Selasphorus* hummingbirds might occur in the study area at about the time of the first hybridization, a Rufous Hummingbird (*Selasphorus rufus*) then would be unusually early (Short and Phillips 1966) and an Allen's Hummingbird (*Selasphorus sasin*) would be a vagrant (Phillips 1975). Calliope Hummingbirds (*Stellula calliope*) normally arrive in the southern Sierra Nevada later than the first nesting attempt (Grinnell and Miller 1944) and have not been recorded in the Three Rivers area. Perhaps more importantly, some rufous coloration has been evident in the tails of all known hybrids involving *Selasphorus* or *Stellula* parentage (Banks and Johnson 1961, Lynch and Ames 1970), and these genera can probably be eliminated from consideration on this basis alone.

Table 3. Mensural characteristics of the female *Lampornis clemenciae*, hybrid (X18371, 21 October 1978), and females of possible parental species.

| | *L. clemenciae* | Hybrid | *C. anna* | *A. alexandri* | *C. costae*[1] |
|---|---|---|---|---|---|
| Weight (gm) | | | | | |
| N | 1 | 1 | 24 | 17 | 25 |
| x̄ | 7.5 | 3.52 | 4.27 | 3.56 | 3.25 |
| S.D. | | | ±0.42 | ±0.31 | ±0.26 |
| Wing chord (mm) | | | | | |
| N | 1[2] | 1 | 16 | 17 | 25 |
| x̄ | 80.0 | 58.0 | 49.78 | 46.17 | 44.72 |
| S.D. | | | ±1.56 | ±0.92 | ±0.88 |
| Exposed culmen (mm) | | | | | |
| N | 1 | 1 | 20 | 16 | 25 |
| x̄ | 26.3 | 20.2 | 18.23 | 20.46 | 17.56 |
| S.D. | | | ±0.74 | ±0.69 | ±0.62 |
| Tail length (mm) | | | | | |
| N | 0 | 1 | 25 | 25 | 25 |
| x̄ | | 30.0 | 25.42[1] | 26.53[1] | 23.30 |
| S.D. | | | ±0.94 | ±0.87 | ±1.00 |

[1] Stiles 1971

[2] Study skin, WFVZ

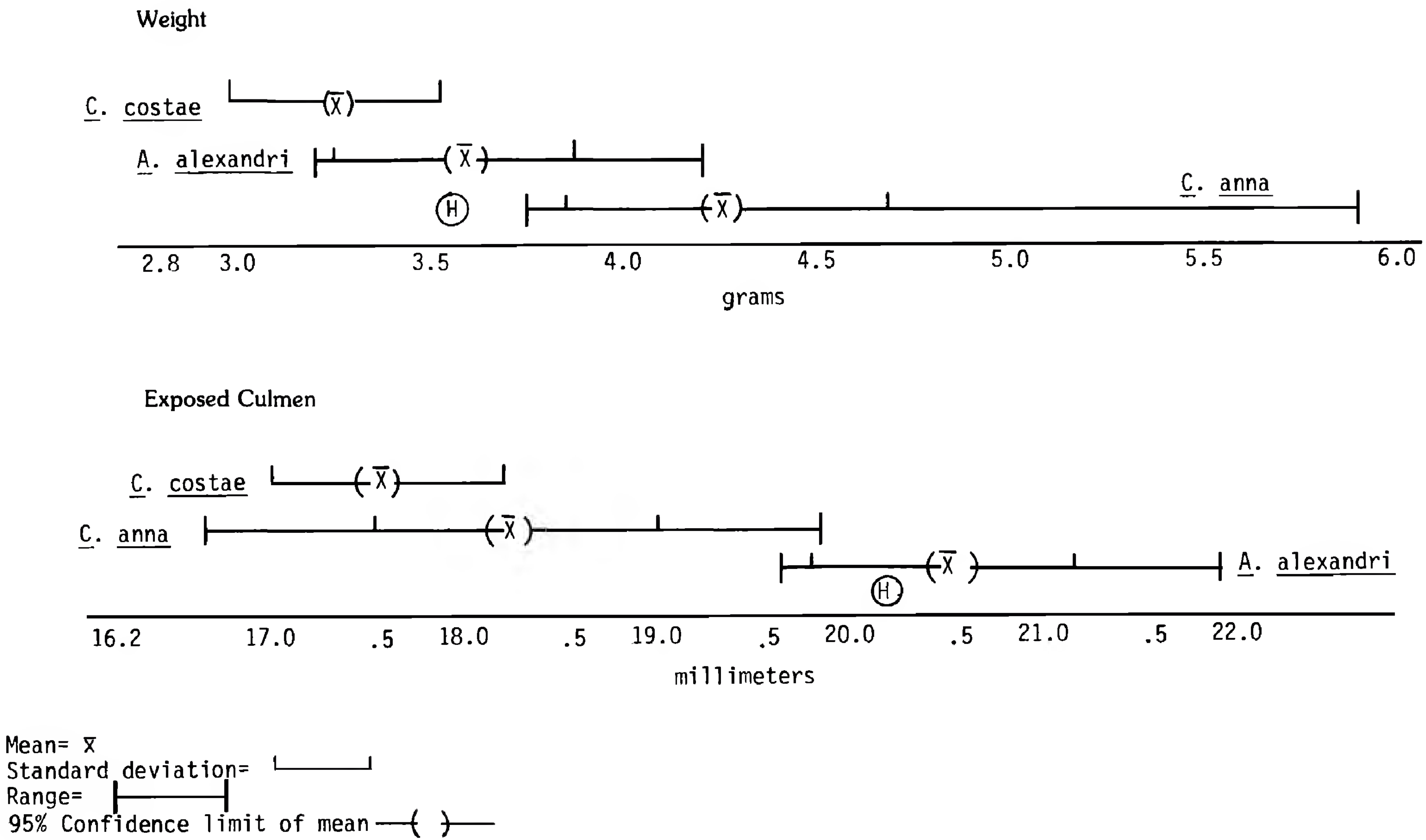


Figure 3. Comparison of weight/exposed culmen of hybrid (21 October 1978) and of females of possible parental species.

## DISCUSSION

Of the three types of information—color, known distribution, and breeding phenology—available to us for determining the identity of male parents involved in the nesting attempts, color is useful only in eliminating the genera *Selasphorus* and *Stellula* from consideration. Usual distribution patterns probably eliminate another species, Costa's Hummingbird, although the possibility of a vagrant male Costa's occurring in the area cannot be totally discounted.

Of the two remaining species, one, Anna's Hummingbird, was common and breeding in the study area during the first nesting attempt, and for this reason it is the most likely male parent for the first nesting, the light weight of the hybrids notwithstanding. Similarly, the most abundant hummingbird locally at the beginning of the second nesting attempt was the Black-chinned Hummingbird, and individuals of this species were actually seen displaying to the female blue-throat. We suggest that this species is a likely candidate for the second parent along with Anna's Hummingbird, which presumably was reproductively active throughout the spring.

Banks and Johnson (1961) noted that "once a specimen is determined to be a natural hybrid, assumptions as to the natural parentage of such a bird are only 'best guesses' and cannot, except in rare instances, be established with certainty." Despite the fact that in the present instance one parent involved in the hybridizations is known with certainty, the identity of its hybrid mates must still remain a matter of the "best guess."

## SUMMARY

A female Blue-throated Hummingbird, the first recorded in California, was discovered in Three Rivers, Tulare County, in late December 1977. The bird remained in the vicinity until late May 1978. During its stay it nested twice. Two young were successfully produced from the first nesting attempt, but the second attempt failed in the early nestling stage. Because of the apparent lack of a conspecific male and the appearance of the young from the first nesting attempt, we believe these attempts were hybridizations. Although the male parents involved could not be identified unequivocally, we suggest that Anna's Hummingbird was the most likely parent in the first nesting and that either an Anna's or Black-chinned Hummingbird was the male parent in the second attempt.

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Blue-throated Hummingbird *Sketch by Keith Hansen*

# FORAGING ECOLOGY OF THE RED-FACED WARBLER DURING THE BREEDING SEASON

KATHLEEN E. FRANZREB, Endangered Species Office, U.S. Fish and Wildlife Service, 1230 N Street, Sacramento, California 95814

BARBARA J. FRANZREB, 4 Surrey Lane, Rancho Palos Verdes, California 90274

The Red-faced Warbler (*Cardellina rubrifrons*) is primarily a Mexican species which breeds from central Arizona and southwestern New Mexico south through the mountains of northwestern Mexico. During the breeding season it inhabits montane forests; nests are constructed on the ground and are well concealed by vegetation. Although not shy, this species is relatively quiet and inconspicuous in spite of its striking coloration, and little is known about its ecology.

In 1973 and 1974 we studied the Red-faced Warbler to analyze quantitatively its foraging behavior during the nesting season. Such information should add to our understanding of the ecology of this little-studied species.

## STUDY AREA AND METHODS

The Willow Creek watershed is located approximately 80 km south of Springerville in the Apache-Sitgreaves National Forest, Greenlee County, White Mountains, Arizona. Elevation ranges from 2682-2805 m. The watershed is covered by a mixed-coniferous forest composed predominantly of Douglas-fir, Ponderosa Pine and Southwestern White Pine. We established a 15.5 ha study plot using a system of 9 parallel, flagged transect lines 390 m in length and 50 m apart.

### *Vegetation Analysis*

We sampled the vegetation using the plotless point-quarter method (Cottam and Curtis 1956); 400 mature trees (diameter at breast height greater than or equal to 7.6 cm) were measured. Dominance values were based on basal area estimations. We estimated the height of each tree using a clinometer. Results were segregated into 3 m height intervals and provided frequency data for each height class. Additional details of the methods used in the vegetation analysis are available in Franzreb (1978).

### *Foraging Behavior*

We obtained foraging data on Red-faced Warblers from mid-May through August in 1973 and 1974 by systematically traversing transect lines. Observations were taken under skies that were generally clear to less than 30% overcast; wind conditions varied from no wind to light wind (Beaufort scale 0 to 2). Although we collected data throughout the day, the majority of observations were made during morning hours (0600-1000).

We collected foraging data for eight niche dimensions: method of prey procurement, stance, perch type, perch diameter, distance from the branch tip to the perch site, tree species preferences, tree height, and bird location in the tree relative to the ground. One observation per bird per sighting was taken to reduce sampling bias.

Method of foraging referred to the manner in which food was collected. Categories included glean, hover, hawk (sallying from a branch to catch flying insects), and peck-probe. Stance employed while foraging was either standing upright, hanging upside down, or clinging in a sideways position. Birds observed on the trunk were recorded as being in the sideways position.

We denoted the kind of material on which the bird perched as perch type. We further categorized each observation in the branch and twig perch class on the basis of perch diameter. The bird's position relative to the branch tip was categorized by subdividing the branch into thirds. The height and species of tree and the bird's distance from the ground were recorded for each observation.

Table 1. Vegetation analysis of mixed-coniferous forest, White Mountains, Arizona.

| Species | Density[1] #/ha | Relative density | Relative dominance | Relative frequency |
|---|---|---|---|---|
| Ponderosa Pine (*Pinus ponderosa*) | 112.7 | 18.0 | 30.5 | 19.3 |
| Southwestern White Pine (*Pinus strobiformis*) | 109.6 | 17.5 | 10.6 | 18.6 |
| Douglas-fir (*Pseudotsuga menziesii*) | 194.1 | 31.0 | 35.2 | 26.1 |
| Alpine Fir (*Abies lasiocarpa*) | 3.1 | 0.5 | 0.3 | 0.7 |
| White Fir (*Abies concolor*) | 51.7 | 8.3 | 7.6 | 8.6 |
| Blue Spruce (*Picea pungens*) | 12.5 | 2.0 | 0.7 | 2.5 |
| Engelmann Spruce (*Picea engelmanni*) | 31.3 | 5.0 | 2.7 | 5.4 |
| Quaking Aspen (*Populus tremuloides*) | 50.1 | 8.0 | 4.1 | 8.2 |
| Snag (dead tree) | 61.1 | 9.8 | 8.3 | 10.7 |
| Total | 626.2 | 100.0% | 100.0% | 100.0% |

[1] Total density of all species = unit area/(mean plant-to-point distance)$^2$.

Foraging behavior diversity was calculated using Shannon's (1948) formula. Evenness (Pielou 1975) values were then calculated ($J' = H'/H'_{max}$) and indicated the degree of foraging specialization for each dimension. Evenness values range from 0 to 1, with values approaching 1 indicating more even utilization of available resource categories, hence, a species that is more of a generalist with regard to that particular foraging trait.

## RESULTS

### *Vegetation*

Douglas-fir was the dominant tree comprising the highest density (194.4 trees/ha) and being the most common (Table 1). In this mixed-coniferous forest Ponderosa Pine and Southwestern White Pine were also substantial components of the vegetative community. Total tree density was estimated at 626.2 tree/ha.

Trees 9 m or less in height constituted 46.2% of the total tree composition (Table 6). The tallest trees on the watershed (e.g., greater than 27 m) occurred with only a 6.3% frequency. Additional details of the vegetation analysis may be found in Franzreb (1978) and Franzreb and Ohmart (1978).

### *Foraging Behavior*

Gleaning was the predominant foraging method (89.4%) (Table 2). Virtually all foraging (130 observations) occurred on branches/twigs (99.2%) rather than on trunks (0.8%), leaves (0%), or cones (0%). Over 75% of the branches selected were 1.3 cm or less in diameter (Table 3). Warblers tended to use the third of the branch closest to the tip more often than either the middle portion or that closest to the trunk (Table 4).

Red-faced Warblers foraged most frequently in Douglas-fir (40.8% of observations) and Southwestern White Pine (26.1%) (Table 5). Considering the number and size of Ponderosa Pines, they were little used (8.4%).

Table 2. Method of foraging of Red-faced Warblers during the breeding season.

| Method | Number and Percent of Observations | |
|---|---|---|
| Glean | 126 | 89.4% |
| Hover | 12 | 8.5% |
| Hawk | 3 | 2.1% |
| Total | 141 | 100.0% |

Table 3. Diameter of perch utilized by foraging Red-faced Warblers.

| Perch Diameter | Number and Percent of Observations | |
|---|---|---|
| > 5.1 cm | 5 | 4.7% |
| > 2.5 ≤ 5.1 cm | 6 | 5.6% |
| > 1.3 ≤ 2.5 cm | 13 | 12.1% |
| ≤ 1.3 cm | 83 | 77.6% |
| Total | 107 | 100.0% |

Table 4. The portion of the branch used by Red-faced Warblers while foraging.

| Distance From Branch Tip | Number and Percent of Observations | |
|---|---|---|
| 0 - 33% | 51 | 39.2% |
| > 33 - 66% | 43 | 33.1% |
| > 66% | 36 | 27.7% |
| Total | 130 | 100.0% |

Table 5. Tree species selected by foraging Red-faced Warblers.

| Species | Number and Percent of Observations | |
|---|---|---|
| Ponderosa Pine | 12 | 8.4% |
| Southwestern White Pine | 37 | 26.1% |
| Douglas-fir | 58 | 40.8% |
| Alpine Fir | 2 | 1.4% |
| White Fir | 4 | 2.8% |
| Blue Spruce | 5 | 3.5% |
| Englemann Spruce | 13 | 9.2% |
| Quaking Aspen | 9 | 6.4% |
| Snag | 2 | 1.4% |
| Total | 142 | 100.0% |

Table 7. Distance from ground of Red-faced Warbler foraging sites.

| Height from Ground | Number and Percent of Observations | |
|---|---|---|
| ≤ 9 m | 74 | 55.6% |
| > 9 ≤ 18 m | 55 | 41.4% |
| > 18 ≤ 27 m | 4 | 3.0% |
| > 27 ≤ 36 m | 0 | 0 |
| > 36 m | 0 | 0 |
| Total | 133 | 100.0% |

Table 8. Diversity (H′) and evenness (J′) values for foraging characteristics of Red-faced Warblers.

| Foraging Category | Diversity | Evenness |
|---|---|---|
| Method | 0.39 | 0.36 |
| Stance | 0 | 0 |
| Perch type | 0.05 | 0.07 |
| Perch diameter | 0.76 | 0.55 |
| Distance from tip | 1.09 | 0.99 |
| Tree species | 1.66 | 0.76 |
| Tree height | 1.45 | 0.90 |
| Distance from ground | 0.80 | 0.50 |
| Mean evenness | | 0.52 |

Table 6. Tree height selection by foraging Red-faced Warblers and tree height frequency.

| Tree Height | Number and Percent of Observations | | Tree Height Frequency[1] |
|---|---|---|---|
| ≤ 9 m | 22 | 15.6% | 46.2% |
| > 9 ≤ 18 m | 50 | 35.4% | 29.8% |
| > 18 ≤ 27 m | 42 | 29.8% | 17.7% |
| > 27 ≤ 36 m | 19 | 13.5% | 5.0% |
| > 36 m | 8 | 5.7% | 1.3% |
| Total | 141 | 100.0% | 100.0% |

[1] Based on measurements obtained during vegetation analysis.

Most foraging occurred in the medium to tall trees—those greater than 9 m but less than or equal to 27 m (Table 6). The shortest trees (9 m or less) were used considerably less frequently than the proportion they comprised of the vegetation profile.

The Red-faced Warbler frequently foraged relatively close to the ground (Table 7). In fact over 55% of the observations occurred within 9 m of the forest floor. An estimated 97% of foraging activities were conducted in trees within 18 m from the ground, even though substantial foliage volume was available higher in the trees.

Distance from the tip was the most generalized foraging characteristic as indicated by the evenness value (0.99) (Table 8). Tree height selection was also relatively generalized. In contrast, stance was a highly specialized foraging category showing no diversity. Perch type was also highly stereotyped.

## DISCUSSION

Warbler foraging ecology has been the subject of a number of studies (MacArthur 1958; Morse 1967a,b, 1968, 1971, 1976; Wilz and Giampa 1978; Szaro and Balda 1980; Hutto 1981). However, none of these studies examined foraging ecology of the Red-faced Warbler, a primarily Mexican species whose breeding range northernmost extension is central Arizona and southwestern New Mexico.

Red-faced Warblers preferred to forage in Douglas-fir, the dominant tree species. Disproportionately more observations occurred in this tree species even considering its dominance and relatively high foliage volume (17.6% of all foliage) (Franzreb 1978) in the habitat. Szaro and Balda (1980) noted that Red-faced Warblers were not present below a certain foliage volume. In this study they tended to utilize the tree species with the densest foliage. Thus, they were less frequent in Ponderosa Pine than expected on the basis of plant density and relative frequency data. Their increased use of Southwestern White Pine may perhaps be attributed to the fact that this tree's foliage density is generally higher than that of Ponderosa Pine. Foliage density may be important because of its influence on food availability, quantity and distribution. The degree to which a particular tree species is capable of providing suitable cover (necessary for protection against predators and inclement weather) is partly dependent on the density of foliage.

Red-faced Warblers selected moderate (>9 m), moderately tall (≤ 27 m), and tall (> 27 m) trees for foraging considerably more often than anticipated based on the proportion of trees of these heights in the habitat. However, their use of these trees was not as pronounced as that of other species on the study plot such as Mountain Chickadee (*Parus gambeli*) and Ruby-crowned Kinglet (*Regulus calendula*).

Red-faced Warblers showed a decided preference to forage relatively close to the ground (i.e., within 9 m). Again, this is quite different from the behavior of the most common species on the study area: Mountain Chickadee, Ruby-crowned Kinglet and Yellow-rumped Warbler (*Dendroica coronata*).

Studies examining niche overlap between subordinate and dominant species have usually found a decrease in niche breadth in the subordinate species when in the presence of a dominant (Colwell and Futuyma 1971, Morse 1974). However, other workers have noted an increase in niche breadth along certain niche dimensions when dominants were present (Willis 1966, Morse 1970, Yeaton 1974). In this study, it may well be that interspecific competition resulted in the restriction of the Red-faced Warbler to the lowest areas of the vegetation profile.

The Red-faced Warbler was present in relatively low density when compared to other species such as the Yellow-rumped Warbler, possibly its closest potential competitor because of morphological similarities. Red-faced Warbler densities were 10.6 birds/40 ha in 1973 and 25.6/40 ha in 1974 compared to 131.6/40 ha and 89.8/40 ha for the Yellow-rumped Warbler (Franzreb and Ohmart 1978). Mountain Chickadees and Ruby-crowned Kinglets were also considerably more numerous than Red-faced Warblers (Franzreb and Ohmart 1978). In a Maine spruce fir forest, Morse (1967a) found that kinglets and other warblers were an important factor limiting the distribution of the Northern Parula (*Parula americana*). A similar situation may be occurring in this study area.

It also was noted, in an investigation of four species of *Dendroica* warblers, that males tended to forage closer to their song posts than to their nests, whereas females tended to forage closer to the nests than to the male song perches (Morse 1968). This behavior presumably results in partitioning the habitat to provide for the most efficient resource exploitation. Because the Red-faced Warbler is a ground nester, it would be reasonable to predict that it would forage closer to the ground than tree-nesting species, especially once eggs hatch and the substantial food requirements of nestlings place an additional burden on the adults.

The most specialized foraging categories (method, stance and perch type) as indicated by diversity and evenness values were the most constrained by morphological considerations. The other characteristics were less stereotyped and behaviorally more plastic.

## SUMMARY

We examined the foraging ecology of the Red-faced Warbler in a mixed-coniferous forest, White Mountains, Arizona, during the breeding season in 1973 and 1974. Foraging characteristics addressed included method, stance, type of perch, diameter of perch, position on the branch, tree species selection, tree height preferences, and height from the ground. Diversity (H ′) and evenness (J ′) values indicated that this warbler was most diverse in distance from the branch tip and in tree height selection. Red-faced Warblers over-

whelmingly preferred to glean on branches/twigs and usually selected the smallest (≤ 1.3 cm) branches with a slight preference for the third of the branch closest to the tip. Over 66% of the observations occurred within Douglas-fir and Southwestern White Pine. Although trees of all heights were utilized, warblers preferred to forage relatively close to the ground. This preference may have resulted from interspecific competitive pressures, or possibly, because this species is a ground nester, foraging closer to the ground may be energetically more efficient.

## ACKNOWLEDGMENTS

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Red-faced Warbler *Sketch by Narca Moore*

# FIRST NESTS OF HEERMANN'S GULL IN THE UNITED STATES

JUDD HOWELL, DAVID LACLERGUE, SHARON PARIS, and WILLIAM I. BOARMAN, National Park Service, Golden Gate National Recreation Area, Fort Mason, Building 201, San Francisco, California 94123

ANTHONY R. DEGANGE, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska 97503

LAURENCE C. BINFORD, 985 Emily Avenue, Rohnert Park, California 94928

The primary breeding colonies of Heermann's Gull (*Larus heermanni*) are on islands in the Gulf of California, Mexico. Only two colonies are known from the Pacific side of the Baja California peninsula. One was on Isla San Roque (27°09′N; Grinnell 1928), where Huey (1927) found 35 pairs beginning to lay on 20 April 1927. The second colony, previously the northwesternmost for the species, was discovered on Isla Benito del Centro of the San Benito Islands (28°20′N) on 25 May 1971, when Jehl (1976) found 25 adults and nine nests containing one to five eggs each. Later surveys disclosed 15 adults and two active nests with one small chick each on 21 June 1974 (Jehl 1976) and at least 30 adults, eight scrapes and eight nests containing eggs and/or small chicks on 9 June 1975 (Boswall 1978).

In this paper we describe the first nesting attempts by Heermann's Gull in the United States. The species nested at two locations in California: on Alcatraz Island in 1979, 1980 and 1981, and at Shell Beach in 1980. Brief accounts were published by Binford (1980) and by Laymon and Shuford (1980) for Alcatraz and by Sowls et al. (1980) for Shell Beach.

## ALCATRAZ ISLAND

Alcatraz Island (37°49′N) is part of the Golden Gate National Recreation Area (GGNRA) and is located in San Francisco Bay, San Francisco County, about 1.6 km north of the city of San Francisco and 1250 km north of the San Benito Islands. Formerly used as a penitentiary, it is now staffed throughout the year by personnel of the Golden Gate National Recreation Area, who conduct tours for the public.

The 4.8 ha island forms a 540 m long rough oval running northwest-southeast. The nests were located on the southwest side of the northwest half, just south of the industrial shop, about 3 m from a 1.8 m-tall incinerator, and about 13 m above and about 5 m away from the edge of San Francisco Bay (Figure 1). They were situated under the canopy on the north side of a Coyote Bush (*Baccharis pilularis* var. *consanguinea*) which measured 1.68 m tall and 2.74 m in diameter.

*Summer 1979*. In summer, 1979, Bob Connell (pers. comm.), a security guard on Alcatraz, saw two adult Heermann's Gulls and a nest containing three eggs under the Coyote Bush but did not report his discovery. He saw no chicks but noted that only one egg remained after the season. As confirmation of this nesting, on 17 June 1980 Binford and Howell found an old scrape 30 cm from the edge of the 1980 nest. The two immature Heermann's seen by Laclergue at the site in early summer 1980 might have been from the 1979 nesting (but see Discussion).

*Summer 1980.* In 1980 summering Heermann's Gulls were first detected on 15 June by Paris. She and Laclergue notified Howell, who visited the site the next day and discovered one adult on a nest containing three eggs. On 17 June, Binford and Howell found two adult Heermann's Gulls, one sitting on the nest and the other standing on the incinerator about 3 m away. As the observers approached cautiously, the incubating bird walked off the nest. Twice the observers stopped, and twice the bird returned to the nest; this behavior suggested close nest attentiveness. The three warm eggs (Figure 2) compared favorably with specimens borrowed from the California Academy of Sciences. A fourth egg, cold and abandoned, lay 75 cm from the center of the nest. Binford collected and prepared this egg (CAS egg collection 9501). It was uncracked and apparently fresh; a sticky substance and several feathers adhering to the surface washed off with difficulty. The egg measured 59.75 × 44.21 mm and in color and pattern was typical of Heermann's Gull eggs.

For the next 6 weeks Binford, Howell, Laclergue and Paris checked the nest intermittently. On 23 June Binford and Howell found one adult incubating and a second roosting with Western Gulls (*Larus occidentalis*) some distance away. The incubating bird hovered in the vicinity as the observers approached but then disappeared. Howell collected one of the three eggs on 8 July (specimen in GGNRA collection); it lay near the nest, broken longitudinally and empty. On 22, 23, and 24 July the adults were still incubating the remaining two eggs. The next day the adults perched on the incinerator but were not seen on the nest. Neither adult was present on 26 July. Both eggs were in the nest on 28 July but one was cold and the other (collected, GGNRA) was cracked longitudinally. The nest was last checked on 4 August, when Howell found the conical tip of the last egg, broken and empty, 75 cm from the nest.

The nest consisted of a ring-shaped mound of debris and soft dry earth (Figure 2). The former included numerous twigs 2-5 cm long, about five white breast feathers probably from Western Gulls, several small bones, four bits of cigarette package tinfoil, a piece of weathered rag, and many pieces of dried leaves of the Coyote Bush. The nest was unlined. The dimensions of the nest ring were as follows: outer diameter, 360 mm; inner diameter, 190 mm; width, 85 mm; depth at center of nest (to top of ring), 40 mm. In the mornings the nest was shaded from direct sunlight by the higher parts of the island, and in the afternoon it received about 50% sunlight through the bush canopy. The nearest nest of the Western Gull, which breeds commonly on the island, was 23 m northeast of the Heermann's nest and contained one egg.

*Spring-Summer 1981.* On 27 January 1981 Howell began observing activities in the vicinity of the 1980 Alcatraz nest. The following is a synopsis of his observations for the 24 days he visited the area. *27 January:* three adults and three immatures present. *17 February:* one adult and two immatures present; no evidence of nesting under *Baccharis* bush. *18 March:* one adult,

Figure 1. Incinerator compound on Alcatraz Island, looking southwest toward San Francisco, California, 23 June 1980. Heermann's Gull nest was under canopy of Coyote Bush indicated by arrow in lower center of photo.

*Photo by Judd A. Howell*

two immatures. *31 March:* two adults. *6-28 April:* two-three adults and one-two immatures; no scrape found. 4 May: two adults, one of which walked under Coyote Bush (no eggs seen). *6 May:* two adults under Coyote Bush, one sitting next to 1980 nest scrape, other at edge of bush; two eggs in scrape near 1980 nest; tours rerouted to avoid incinerator area, even though they seemed not to disturb nesting birds. *13 May:* parents twice exchanged places on nest; parent standing near bush called and lunged at a Western Gull that walked past, causing it to fly; non-incubating adult placed one twig next to incubating bird; latter bird later gathered nest material within reach and placed it onto nest ring. *19 May:* Connell noted four eggs in the nest; Howell saw one adult on nest. *27 May-15 June:* two adults present; incubating adults added feathers to nest; parents exchanged incubation duties; still four eggs in nest; accumulation of feathers indicated one bird molting primaries and body feathers (Figure 3). *15-18 June:* Third adult (migrant?) noted in area. *23 June:* adult left nest upon being approached; 30 nonbreeding (migrant) Heermann's Gulls flew by; Howell collected one cracked egg out of the nest, and took following notes: outer diameter of nest ring, 380 × 330 mm; depth of cup, about 40 mm; nest composed of leaves, sticks, feathers, and bits of glass; intact egg collected measured 42 × 57 mm; partly decomposed contents of intact egg indicated infertility or early arrested development. *1 July:* one adult standing outside nesting area; one other flying and calling some distance away; both eggs cracked, one 15 cm and the other 150 cm away from nest; numerous Heermann's Gulls at edge of bay.

Figure 2. Heermann's Gull nest with three eggs, 23 June 1980, Alcatraz Island, California. *Photo by Judd A. Howell*

## SHELL BEACH

The town of Shell Beach (35°09′N) is located on the coast of San Luis Obispo County just northwest of Pismo Beach and about 900 km (569 mi) northwest of the San Benito Islands. Just offshore from town are numerous rocks, some of which support breeding American Black Oystercatchers (*Haematopus bachmani*), Western Gulls and Pigeon Guillemots (*Cepphus columba*).

On 26 May 1980, while conducting hourly counts on seabirds, DeGange discovered two nests of Heermann's Gull on one of these rocks (Figure 4). The nest rock, 80 m from shore and 350 m SE of South Point (U.S. Geological Survey, Pismo Beach, California, Quadrangle), rises about 6.5 m above the high tide mark and is about 5.3 m in diameter at mid-height. The north nest was situated near the top, while the south nest was about 0.5 m lower. Both nests were near the east end of the rock. Because none of the observers could land on the rock, the details of nest site, construction, and exact contents could not be ascertained; all observations were made from the mainland 112 m away.

On the day of his first visit, DeGange noted five breeding-plumaged Heermann's Gulls, two of which were sitting on the nests. Some of the other Heermann's occasionally chased Western Gulls and Rock Doves (*Columba livia*). At nightfall, the two sitting Heermann's and one additional adult were still present.

Figure 3. Pair of adult Heermann's Gulls at nest site, 4 June 1981, Alcatraz Island, California. Parent on the left is incubating. *Photo by Judd A. Howell*

On 27 May DeGange returned with Margaret Stewart. With the aid of a spotting scope they were able to see some nest vegetation under the two sitting birds. The nests were about 2 m apart and about 5 m from a Western Gull nest on which a bird was incubating. The north Heermann's nest contained at least one egg; the south nest was hidden by the terrain, but was assumed to contain eggs judging from the behavior of the parents. At no time did DeGange note any aggression between the two nesting pairs of Heermann's.

The following is a summary of DeGange's field notes written from 0830 to 0940 on 27 May. *0830:* two adult Heermann's Gulls, in addition to the incubating birds, standing on rock when observers arrived. *0845:* two standing birds chased another adult Heermann's off rock and returned; bird sitting on north nest stood up, stared down into nest, and resettled; one standing Heermann's chased an American Black Oystercatcher off rock. *0900:* bird sitting on south nest exchanged places with one of two standing birds; the replaced bird picked up and dropped several pieces of vegetation. *0910:* two other adult Heermann's flew in; one walked over to Western Gull nest, stood over incubating bird, and made a series of head up vocalizations; breeding Heermann's chased away the other intruder Heermann's. *0915:* one of standing adults exchanged places with bird sitting on north nest; latter bird picked up three small pieces of vegetation near nest but each time dropped it and chased one of the intruder Heermann's; same parent later chased Rock Dove away from vicinity of nest and at 0935 took some nest material to north nest.

Arthur L. Sowls (pers. comm.), U.S. Fish and Wildlife Service, made the following observations. In the evening of 10 June, three Heermann's Gulls were on the rock, two on the nests. The next morning one bird was on the north nest, and occasionally a second bird would arrive on the rock. The Western Gull nest contained at least two small chicks.

Don Parham (pers. comm.) of the Morro Bay Audubon Society visited the site one day in June and saw no sign of nesting Heermann's Gulls. DeGange returned on 16 July and found no nesting Heermann's Gulls; he saw many migrant Heermann's in the course of an all-day count.

## DISCUSSION

The bulk of evidence indicates that all three nesting attempts on Alcatraz were unsuccessful. It is tempting to speculate that the full-sized immatures that frequented the site in 1980 and 1981 came from the nests, but more likely they were simply Baja birds that migrated north the previous summer and were induced to overwinter by the presence of adults.

We doubt that climate caused the nest failures. Alcatraz does have a much colder climate than do the islands of Baja, San Francisco having lower average air temperatures, more frequently overcast skies (high fog), and colder winds. Further, these conditions probably were accentuated by the position of the nests, which were exposed to the prevailing cold west winds, shaded by the island in the mornings, and partially shaded by the bush in the afternoons. Nevertheless, the parents incubated the eggs continuously during periods of observation, and it seems likely that their attentiveness was adequate to shield the eggs from the environment.

That disturbance from tour groups passing 36 m away could have contributed to the failure of the Alcatraz nests seems unlikely. On numerous occasions in 1981 Howell noted that passing tours, as well as low-flying aircraft, failed to dislocate the incubating parent or cause more than momentary reaction on the part of the nonincubating adult. When the parent was dislocated it returned to the nest in a matter of minutes. Also, the tours were rerouted to avoid the nesting area on 6 May 1981, before the last two eggs were laid. Neither did the presence of the researchers seem to greatly disturb the birds.

While the abandoned egg found on Alcatraz on 17 June 1980 might have owed its undeveloped embryo to lack of incubation, such could not have been the case for the intact egg removed from the nest on 23 June 1981, which had been incubated for over 5 weeks and was shown to be undeveloped. Thus the evidence suggests that infertility was the most likely cause of the Alcatraz nest failures.

The fate of the two Shell Beach nests is unknown, although Sowls et al. (1980) probably were correct in stating that the attempts were unsuccessful. It should be noted, however, that the 5 weeks between 10 June, when Sowls saw adults on both nests, and 16 July, when DeGange made the next extensive observations, might have been enough time for the eggs to hatch and the young to mature to flying stage.

Figure 4. Two Heermann's Gull nests on sea stack, 27 May 1980, Shell Beach, California. Arrows indicate nest location with parents.

*Photo by A. R. DeGange*

Heerman's Gull is rare in California during the spring when the species is breeding farther south (McCaskie et al. 1979). The first northward movements into the southern and central parts of the state normally take place in early to mid-July. In some years, however, appreciable numbers arrive in early June, as was the case at Pacific Grove, Monterey County, in 1971, when 46 birds were seen on 10 June (DeSante and LeValley 1971), and in 1973, when 100+ were present on 4 June (Remsen and Gaines 1973). The California birds begin egg laying by early May, well before the earliest influxes of birds from the south. Hence chronological as well as biological factors argue against the California breeding birds' being migrants from the south.

Jehl (1976) pointed out that Heermann's Gulls on the San Benitos nest a month or two later than the populations in the Gulf of California and suggested that the environmental conditions required for successful breeding may not be achieved along the outer coast until late spring and early summer. The same may be said for the Shell Beach and Alcatraz birds, which have breeding seasons similar to those on Isla San Roque and the San Benitos.

## ACKNOWLEDGMENTS

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# NOTES

## A CRESTED AUKLET FROM BAJA CALIFORNIA

ROBERT PITMAN, Southwest Fisheries Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, California 92038 (present address: Oregon Institute of Marine Biology, Charleston, Oregon 97420)

MICHAEL NEWCOMER, Southwest Fisheries Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, California 92038 (present address: Department of Biological Sciences, San Jose State University, San Jose, California 95192)

JOHN BUTLER, Southwest Fisheries Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, California 92038

JAMES COTTON, Southwest Fisheries Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, California 92038

GARY FRIEDRICHSEN, Southwest Fisheries Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, California 92038 (present address: P.O. Box 890, Arcata, California 95521)

On 7 July 1980, while conducting a marine mammal survey for National Marine Fisheries Service, we discovered a Crested Auklet (*Aethia cristatella*) 9 miles ESE of Cedros Island (27°59'N, 115°00'W), 300 miles south of the United States—Mexico border. In the flat calm water in the lee of Cedros we were able to study it for 10 minutes during midday from a distance of 75 m using mounted 25x 150 mm spotting binoculars.

The bird was a stunning adult in breeding plumage. Its size was intermediate between Cassin's Auklet (*Ptychoramphus aleuticus*) and Rhinoceros Auklet (*Cerorhinca monocerata*), both seen during the day. As it sat on the water it was entirely dark grey, its plumage appearing recently renewed with no evident signs of wear. The prominent bill was bright red (or reddish-orange), stout, laterally compressed and had a somewhat rounded appearance when viewed from the side. Also prominent was a line of white plumes extending backwards from the eye and a tuft of grey feathers arising from the base of the upper mandible and curling forward. The eye was pale yellow with a black pupil. As we approached the bird, it started nervously dipping its head into the water, which wetted the tuft of feathers and caused them to droop over onto the bill. These drooping feathers must have annoyed the bird because after each dip it quickly flicked its head to the side to throw the water off, allowing the tuft to bounce back up and out of the way. The bird appeared quite healthy and alert as it sat preening in 66°F (19°C) water. As we approached within 75 m, the auklet whirred off, landing about 1 km away. We turned to follow, but the bird was lost among Craveri's Murrelets (*Synthliboramphus craveri*) in the area.

This sighting represents the first record of a Crested Auklet for Mexico and only the third record for North America exclusive of Alaska. In a recent paper, Weyman (Condor 82:472, 1980) reported the only Crested Auklet record for California and summarized the other known extralimital records for the species. Interestingly, both the California record and our Baja California sighting occurred in July.

While searching for any additional records, we were provided with information on an early record for British Columbia: R. Wayne Campbell located a Crested Auklet specimen (no. 11915) in the collection of the British Columbia Provincial Museum. The specimen was collected by a sealer (J.M. Lindley) offshore in the latitude of Kyuquot North West, Vancouver Island, British Columbia, in the winter of 1892-1893. This specimen represents the only record for Canada and the earliest known record of a Crested Auklet for North America outside of Alaska.

As our sighting is an isolated record, it seems highly unlikely that environmental perturbations (e.g., storms, changes in ocean climate) could have forced this boreal species so far south of its normal range. Instead, this occurrence probably again demonstrates the ability of individual seabirds, even species not particularly renowned for their flight capabilities, to turn up as extralimital strays almost anywhere.

We wish to thank R. Wayne Campbell for providing information on the British Columbia record.

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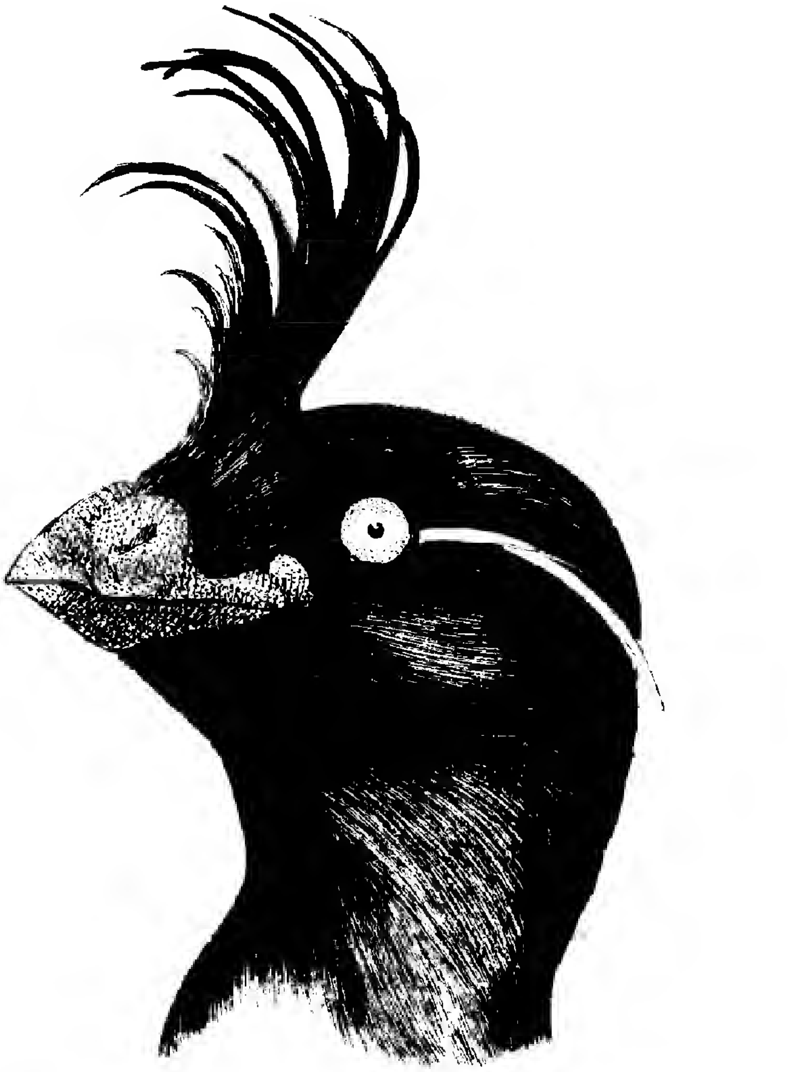

Narca

Crested Auklet *Sketch by Narca Moore*

# NOTES ON THE DISTRIBUTION AND BIOLOGY OF THE FLAMMULATED OWL IN CALIFORNIA

PETER H. BLOOM, Department of Biology, California State University, Long Beach, California 90840

Although the Flammulated Owl (*Otus flammeolus*) is thought to be considerably more common than once suspected (Marshall 1939; Winter 1974, 1979), new data are scarce. Winter (1974, 1979) has provided an excellent analysis of the species' distribution and seasonal occurrence in California, but much remains to be learned about other aspects of its biology. This paper provides data on four previously unpublished distributional records, three nesting attempts in nest boxes, and further information on body weight and molt.

Observations of Flammulated Owls during this study were largely incidental to data collection for other field surveys: the Point Reyes Bird Observatory's Beached Bird Survey; and the American Kestrel Nest Box Program of the Susanville District of the Bureau of Land Management. However, the two observations of birds in the Warner Mountains were obtained by deliberately setting mist nets for the species in suitable habitat.

## RESULTS

On 1 July 1974, approximately 1 km north of the mouth of the Santa Margarita River, Camp Pendleton Marine Corps Base, San Diego County, I found a badly decomposed, partially feathered, headless specimen (California State Univ. Long Beach 5546) on the beach. The bird was found in the surf and is thought to have died at sea within 2 weeks prior to my finding it. Positive identification was made by a comparison of the skeletal remains with those of all small southwestern owls, including the Flammulated Owl. The habitat directly adjacent to where the owl was found is coastal sage with no suitable nest trees.

On 12 September 1976, approximately 4.8 km north of Fandango Pass on the east side of the Warner Mountains, Modoc County, I captured two Flammulated Owls at night with mist nets. The dominant tree species at this location were White Fir (*Abies concolor*) and Ponderosa Pine (*Pinus ponderosa*). The area had been previously logged and the majority of the trees present were 5-10 inches in diameter breast height (DBH).

Both birds were weighed, banded and examined for molt. The larger of the two owls, 1143-02434, had a body weight of 70 g and was undergoing extensive molt of the body and flight feathers. On both wings primaries 8-10 were ensheathed and growing in. Primaries 1-7 had been recently replaced and were new and unworn. Secondary molt was also symmetrical except for number 9, which was new on the left wing and growing in on the right wing. Secondaries 1,2,3,5,6 and 10 were new, and 4,7 and 8 were growing in on both wings. All rectrices were new and the bird was undergoing a heavy body molt of contour feathers.

To my knowledge, no species of the genus *Otus* molts flight feathers during its first fall. Since this bird was undergoing an extensive body and flight feather molt, it was almost certainly an adult (after hatching year) and probably a female. Sex determination was based on its relatively large size with respect to the second individual.

I caught the second individual several hours later, 20 m away. It was not molting any flight feathers, but was undergoing a heavy body molt. The bill was smaller compared to the presumed female; the body weight was 63 g. This bird was felt to be recently fledged (hatching year) and most likely a male.

On 11 July 1978, 2.4 km north of the shore of Eagle Lake, Lassen County, I found an adult female Flammulated Owl incubating 3 eggs. The nest was 6 m above the ground in a south-facing nest box, attached to a Ponderosa Pine (Figure 1). The dominant tree in the area, which had been previously logged in 1959, and pre-commercially thinned in 1968, was Ponderosa Pine with occasional Western Junipers (*Juniperus occidentalis*). The topography in the immediate vicinity of the nest tree was flat, but with nearby low rolling hills. Most trees within 200 m of the nest tree had a DBH of approximately 10 inches but ranged up to 48 inches. On 22 July 1978 I reexamined the nest box and banded the adult female (1143-73994). The box contained 3 young approximately 10 days old, indicating that the eggs were near hatching when the box was first checked.

When checked again on 3 August 1978, the 3 young were near fledging and capable of 1.5 m flights. On approximately 10 August, the nest box was empty and the young were presumed to have fledged. The nest site was reexamined several times during the 1979 breeding season but no activity was noted.

When banded, the adult female weighed 69 g and was initiating molt of the primaries. Primaries 2 and 3 were growing in while primary 1 had been recently replaced. Primaries 4-10 were old and worn. All secondaries were new. No rectrix or body molt was observed.

On 25 June 1980 S. Hawks observed an adult Flammulated Owl incubating 3 eggs in this same box. The adult female banded on 22 July 1978 was recaptured on 21 July 1980 in the nest box with 3 young which were 14-17 days old. When examined in early August, the nest box was empty and the young presumably fledged.

When recaptured, the female weighed 62 g and was completing a molt similar to, but more asymmetrical than, that observed in 1978. Primaries 4-10 were old on both wings. Primary 1 was new on the left wing and primaries 1-3 were new on the right wing. The only primaries growing in were 2 and 3 on the left wing. All secondaries were new except 5 which was old.

I again found the box to be active on 9 July 1981. Although the attending adult was not captured, it responded much like the previous occupant and perched on the same limbs utilized in 1980. I suspect that this was the same owl that was banded here in 1978 and recaptured in 1980.

When checked, the box contained 3 young approximately 2 weeks old. One of these birds was about 1 week behind in development relative to its nest mates and appeared to be ill. It was taken from the nest box, but died in captivity after 8 hours. The probable cause of death was a long strand of horsehair that was lodged deep in the digestive tract with an end protruding 5 cm out of the mouth. Efforts to extract the hair were unsuccessful. Both of the bird's nest mates had fledged by the time the box was rechecked on 23 July. When last observed in July 1982, the nest box had been taken over by Douglas Squirrels (*Sciurus douglassi*; S. Hawks pers. comm.).

## DISCUSSION

The Camp Pendleton specimen is the second of only 2 known coastal occurrences, both in San Diego County, of the Flammulated Owl in California (Banks 1964, Winter 1974). This specimen is even more unusual since this particular bird was substantially outside of the normal breeding range in a non-migratory season. Perhaps the best explanation is that it represents an extremely late migrant which wandered out to sea and died before washing ashore.

The two individuals that were mist netted in the Warner Mountains add more documentation to that reported by Johnson (1970) for this mountain range. However, no breeding has been confirmed, despite the fact that these observations range from 11 June (Johnson 1970) to 12 September (this study).

The three nest records from July 1978, 1980 and 1981 at Eagle Lake represent the first breeding records of this species from Lassen County. A female Flammulated Owl found dead in aquatic vegetation along the west side of Eagle Lake in May 1971 by G. Gould (Humboldt State University 2868) indicates the possibility of other breeding activity in this area.

The three nesting occurrences by the Eagle Lake female in a kestrel nest box are of particular interest. The use of artificial nest boxes by the species has been reported only rarely (Hasenyager et al. 1979). Further, this Eagle Lake observation represents the first documentation of a female Flammulated Owl using the same nest site over several years. A description of the kestrel nest box utilized is presented elsewhere (Bloom and Hawks 1983).

Molt data collected from the adult female banded in the Warner Mountains and from the adult female banded at Eagle Lake indicate the primaries are replaced during the summer and early fall, between approximately 1 July and 25 September. Secondary molt apparently largely precedes the primary molt and is initiated by about 1 June and completed by 30 September. Since all rectrices were new in July, they were presumably replaced in May and June, perhaps simultaneously, as is true of several species of small owls (Mayr and Mayr 1954, Collins 1961). A complete molt of all remiges and rectrices of Flammulated Owls can be expected to last 4 months, between approximately 1 June and 30 September.

Winter (1974) observed a captive juvenile from the central Sierra Nevada that underwent a heavy body molt in mid-September. As this was the same condition that I observed in the male captured in the Warner Mountains, I feel that the age was correctly ascertained.

Figure 1. Adult female Flammulated Owl standing at entrance to the nest box cavity in Lassen County, California, 10 July 1978.

*Photo by P.H. Bloom*

## ACKNOWLEDGMENTS

For comments on earlier drafts of this manuscript, I would like to thank Charles Collins, Jon Winter, Gordon Gould and Melinda Leach. Robert Walker assisted with the installation of the Eagle Lake nest box and Stephen Hawks provided additional field observations of the adult and young Flammulated Owls. James Northern provided Flammulated Owl skeletons for comparison with the Camp Pendleton specimen; David Bontrager and Charles Collins helped verify its identification. Stanley Harris provided data on the Eagle Lake specimen. This study was funded partially by the U.S. Department of the Interior, Bureau of Land Management, Susanville District.

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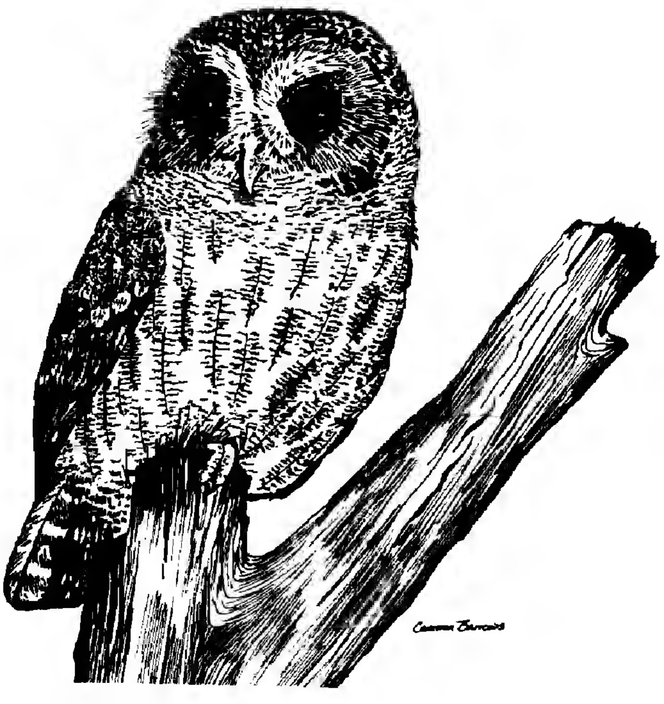
*Accepted 4 September 1982*



Flammulated Owl

*Sketch by Cameron Barrows*

# NOCTURNAL MOONLIGHT CALLING BY ELEGANT TROGON IN ARIZONA

BRUCE G. ELLIOTT, California Department of Fish and Game, 2201 Garden Road, Monterey, California 93940

On 29 June 1982 I heard extended post-dusk calling by an Elegant Trogon (*Trogon elegans*) in the South Fork portion of Cave Creek Canyon, Chiricahua Mountains, Cochise County, Arizona. There was a half-full, waxing moon and light intensity in the canyon due to both direct and cliff-side reflected light was sufficiently bright to see many details of the South Fork Creek riparian vegetation quite clearly. The bird commenced calling at 2112, approximately 45 minutes after all noticeable solar illumination had concluded. The bird called a series of the typical turkey-like "cory-cory-cory" notes at intervals of about 20 seconds for at least 17 minutes, and last call series noted occurring at 2129. During the calling period, the bird moved the length of a territory that I and accompanying observers had noted earlier that day. I heard no other trogon vocalize, and the only other conspicuous noises occurring locally during the same period were the calls of one or more Spotted Owls (*Strix occidentalis*) from a distance high above on the slopes of this same canyon; the owls did not commence calling until several minutes after the trogon initiated its sequence of calls.

I can find no record of this species or others of the New World representatives of the family vocalizing after dark. My own observation of trogons in this area span several breeding seasons since 1956 and I had never heard trogons call before first-light of dawn.

*Accepted 17 June 1983*

Elegant Trogon *Sketch by Narca Moore*

# FIRST RECORD OF A SNOW BUNTING IN ARIZONA

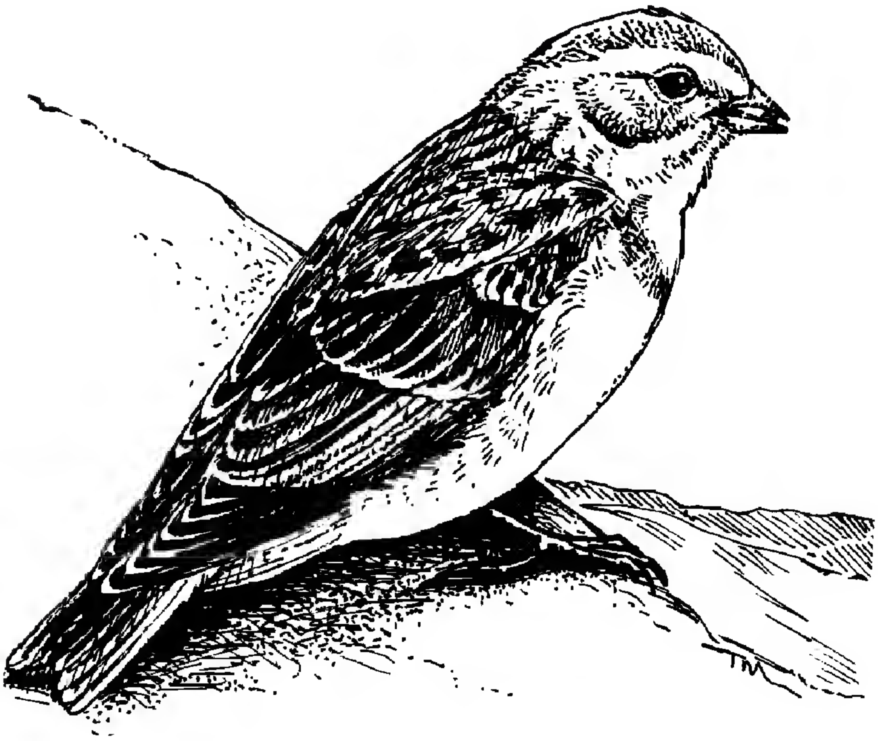
WALTER BOYCE, 3636 Oakdale Rd., Birmingham, Alabama 35223

LEE ELLIOT, Rt. 2, Box 196, Cedar Bluff, Alabama 35959

On 3 November 1981 we found a freshly dead female Snow Bunting, *Plectrophenax nivalis*, at the Tanner Ranch, 2 km southwest of Littlefield in Mohave County, Arizona. This unusually early southern occurrence constitutes the first specimen (University of Arizona 14222) reported in Arizona. The nearest previous sightings were 95 km to the northeast in Zion National Park, Utah, where two birds were seen in January 1979 (Kingery, Am. Birds 33:302, 1979) and 1980 (Kingery, Am. Birds 34:295, 1980).

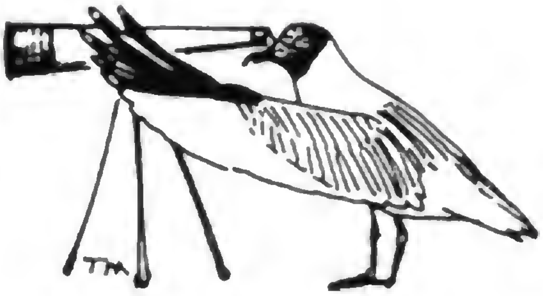
We found the bird in Bermuda Grass (*Cynodon dactylon*) pasture adjacent to a small pond in the Virgin River floodplain at an elevation of 600 m. The typical habitat surrounding the floodplain is Mohave Desert scrub dominated by Creosote Bush (*Larrea tridentata*), White Bursage (*Ambrosia dumosa*), and *Opuntia* spp.

*Accepted 5 May 1983*



Snow Bunting *Sketch by Tim Manolis*

# IDENTIFICATION QUIZ



The low-slung neck and protruding feet of this flying bird are characteristic of loons, grebes and whistling-ducks, but the thick, bulky neck and bill shape clearly identify this bird as a loon. Although experienced seabird watchers may have little difficulty identifying flying loons, a single photograph like this one may present problems even to experts.

Most field guides stress differences in the face patterns of winter loons, but when you are looking at a flying bird it is best to look at the feet first. The

Common Loon (*Gavia immer*) has proportionally larger feet than Arctic (*G. arctica*) or Red-throated (*G. stellata*) loons. All loons have big feet, but only Common and Yellow-billed (*G. adamsii*) loons have feet that appear unusually massive and heavy.

An angled profile to the forehead is said to be characteristic of Common and Yellow-billed loons, but Arctic Loons occasionally show a similar head shape. The apparently angled forehead in this photograph is the protrusion of bone forming the upper margin of the eye socket, which appears when the head is angled away from the observer. It would not show up in profile.

Our bird has relatively well-proportioned feet and a fairly thin bill and is therefore either Arctic or Red-throated. Winter Arctics have more contrast between the hindneck and the foreneck, often looking darkest at the margin along the side of the neck, especially in adults. This gives Arctics a crisp, neat appearance. Most Arctics of the race *G. a. pacifica* also show a row of small brown spots across the throat forming a "chin-strap" in winter. This mark may be difficult to see in the field unless the bird is very close and in good light.

Field guides portray the winter Red-throated with more extensive white on the face and neck, but this is true only of adults which have just a narrow strip of gray down the back of the neck. Immature Red-throateds have considerable gray extending forward to the front of the neck, as seen here. This immature Red-throated Loon was photographed at Berkeley, California, in January 1973 by Albert Ghiorso.

JOSEPH MORLAN, 417 Talbot Avenue, Albany, California 94706

# BULLETIN BOARD

## REQUEST FOR OBSERVATIONS OF GOSHAWKS AND WILLOW FLYCATCHERS

The California Department of Fish and Game is undertaking studies of the Goshawk (*Accipiter gentilis*) and the Willow Flycatcher (*Empidonax traillii*) in California to document distribution, abundance, habitat requirements, and reproductive success. Please send any reports of recent sightings (within the past decade) of breeding Goshawks and Willow Flycatchers to Ronald W. Schlorff, California Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814. Please include your name, address and phone number, along with the following: location of sighting (if possible, include township, range, section, ¼ section, and ideally, a copy of a topographic map), date of observation, behavioral notes, and any other relevant information such as threats to habitat or evidence of flycatcher nest parasitism by Brown-headed Cowbirds (*Molothrus ater*). Goshawk nest locations will be kept confidential and will be made available only to those persons involved in legitimate research and management of the species. This information will assist State and Federal agencies in developing habitat protection and species management plans for these species of special concern.

# Volume 14, Number 1, 1983

NOTES

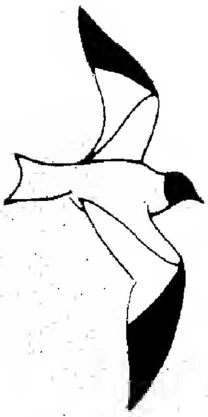
*Cover photo by Frans Lanting:* Yawning Tufted Puffin (*Fratercula cirrhata*), Farallon Islands, California, Summer 1981

Manuscripts should be sent to Alan M. Craig, P.O. Box 374, Lakeview, CA 92353. For matters of style consult *Suggestions to Contributors to Western Birds* (6 pp. mimeo available at no cost from the Editor) and *Council of Biology Editors Style Manual* 4th edition, 1978 (available from the American Institute of Biological Sciences, 1401 Wilson Boulevard, Arlington, VA 22209 for $12.00).

Papers are desired that are based upon field studies of birds, that are both understandable and useful to amateurs, and that make a significant contribution to scientific literature. Appropriate topics include distribution, migration, status, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, the techniques for identifying, censusing, sound recording and photographing birds in the field. Papers of general interest will be considered regardless of their geographic origin, but particularly desired are papers dealing with studies accomplished in or bearing on Rocky Mountain states and provinces westward, including Alaska and Hawaii, adjacent portions of the Pacific Ocean and Mexico, and western Texas.

Authors are provided 50 free reprints of each paper. Additional reprints can be ordered at author's expense from the Editor when proof is returned or earlier.

Good photographs of rare and unusual birds, unaccompanied by an article but with caption including species, date, locality and other pertinent information, are wanted for publication in *Western Birds*. Submit photos and captions to Photo Editor, Don Roberson, P.O. Box 985, Pacific Grove, CA 93950.



# WESTERN BIRDS

Vol. 14, No. 2, 1983

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WESTERN BIRDS

Volume 14, Number 2, 1983

# LEAST TERN FORAGING ECOLOGY AT THREE MAJOR CALIFORNIA BREEDING COLONIES

JONATHAN L. ATWOOD, Department of Biology, University of California, Los Angeles, California 90024
DENNIS E. MINSKY, Department of Biology, California State University, Long Beach, California 90840

The California Least Tern (*Sterna antillarum browni*) historically nested commonly on coastal beaches from Monterey County, California, to Cabo San Lucas, Baja California (Grinnell 1928, Grinnell and Miller 1944). However, substantial population declines were documented in the subspecies' United States range during the years following World War II, and the population was given Federal and State endangered species status in 1969 and 1971.

Because most of the Least Tern's decline in California seems to have resulted from disturbance or destruction of nesting areas, recent protective efforts have focused on the breeding colonies themselves, and research has generally emphasized breeding biology, nesting requirements and population trends (Massey 1974; Massey and Atwood 1978, 1981; Atwood et al. 1979). Yet in spite of early suggestions that loss of estuarine foraging habitat may also have contributed to the California Least Tern's decline, little attention has been given to the population's foraging ecology aside from an indirect analysis, based on fish dropped at nesting sites, of food habits (Atwood MS), a 1-year study of daily and seasonal fluctuations in feeding activity at a single colony (Collins et al. 1979), and some brief speculations that tidal estuaries represent the principal foraging habitat (Wilbur 1974, Massey 1977).

Recent and dramatic increases at several California Least Tern breeding areas, where formerly extensive estuarine habitat has been almost entirely destroyed, raised questions of where terns from these colonies were obtaining food, and how important the remaining estuarine areas near these sites were to the colonies' continued growth and success. During 1980-1981 we studied foraging activities at two of these large, growing colonies that are essentially lacking nearby, viable estuarine foraging habitat; in 1982, observations were made at a third site located adjacent to a relatively undisturbed river mouth.

## STUDY AREAS AND METHODS

Observations of Least Tern foraging activity were made during 1980 and 1981 at the Venice Beach and Huntington Beach breeding colonies located at Dockweiler State Beach, Los Angeles County, and Huntington State Beach, Orange County, respectively. In 1982, data were collected in the vicinity of the Santa Margarita River nesting area, located on the U.S. Marine Corps Base, Camp Pendleton, San Diego County. All sites are historic nesting areas which, with protection during the spring and summer months, have supported substantial numbers of nesting Least Terns in recent years (Table 1). Not only have these colonies consistently been among the largest in California since 1978, Venice Beach and Huntington Beach have also been the most significant in terms of number of young produced; from 1978-1981, approximately 41% of Least Terns successfully fledged in California have come from these two sites (California Department of Fish and Game, unpubl. data). All three study colonies are situated relatively distant (greater than 5 miles) from other major Least Tern nesting areas and, during 1980-1982, the small colonies at Playa del Rey (0.8 miles ESE of Venice Beach), Upper Newport Bay (5.0 miles NE of Huntington Beach), and White Beach (3.5 miles N of Santa Margarita River) either failed early in the nesting season or were not used at all. Therefore, we have made the assumption that most or all foraging Least Terns observed in the study areas were individuals associated with the breeding colonies under investigation.

All potential Least Tern feeding areas were identified within a 5 mile radius of each nesting site, and observation stations were selected that allowed quick surveys of foraging terns (Figures 1, 2, 3). Habitat was broadly characterized for each station, and included (a) open ocean, (b) flood control channels and channelized rivers, (c) degraded saltmarsh channels with little or no tidal flow, (d) freshwater and sewage treatment ponds, (e) sheltered marinas, (f) shallow, brackish lagoons, (g) relatively undisturbed river channels, and (h) natural, unchannelized river mouths. Not all habitats were represented within 5 miles of each study colony. In comparison with potential foraging habitats that historically occurred at Venice Beach and Huntington Beach, estuarine and freshwater areas have been almost entirely eliminated by landfills, channelization and marina dredging; at the Santa Margarita River, extant estuarine and freshwater habitats are reduced and somewhat degraded compared with historic conditions (Salata 1981).

Table 1. Numbers of Least Terns nesting at three southern California colonies, 1978-1982.

| | Approximate number of breeding pairs[a] | | | | |
|---|---|---|---|---|---|
| | 1978 | 1979 | 1980 | 1981 | 1982 |
| Venice Beach | 60-75 | 80-95 | 150-165 | 140-160 | 150-185 |
| Huntington Beach | 75-90 | 80-95 | 70-90 | 109-122 | 85-111 |
| Santa Margarita River | 30-40 | 32-40 | 47-65 | 50-105 | 110-140 |

[a] California Department Fish and Game, unpubl. data.

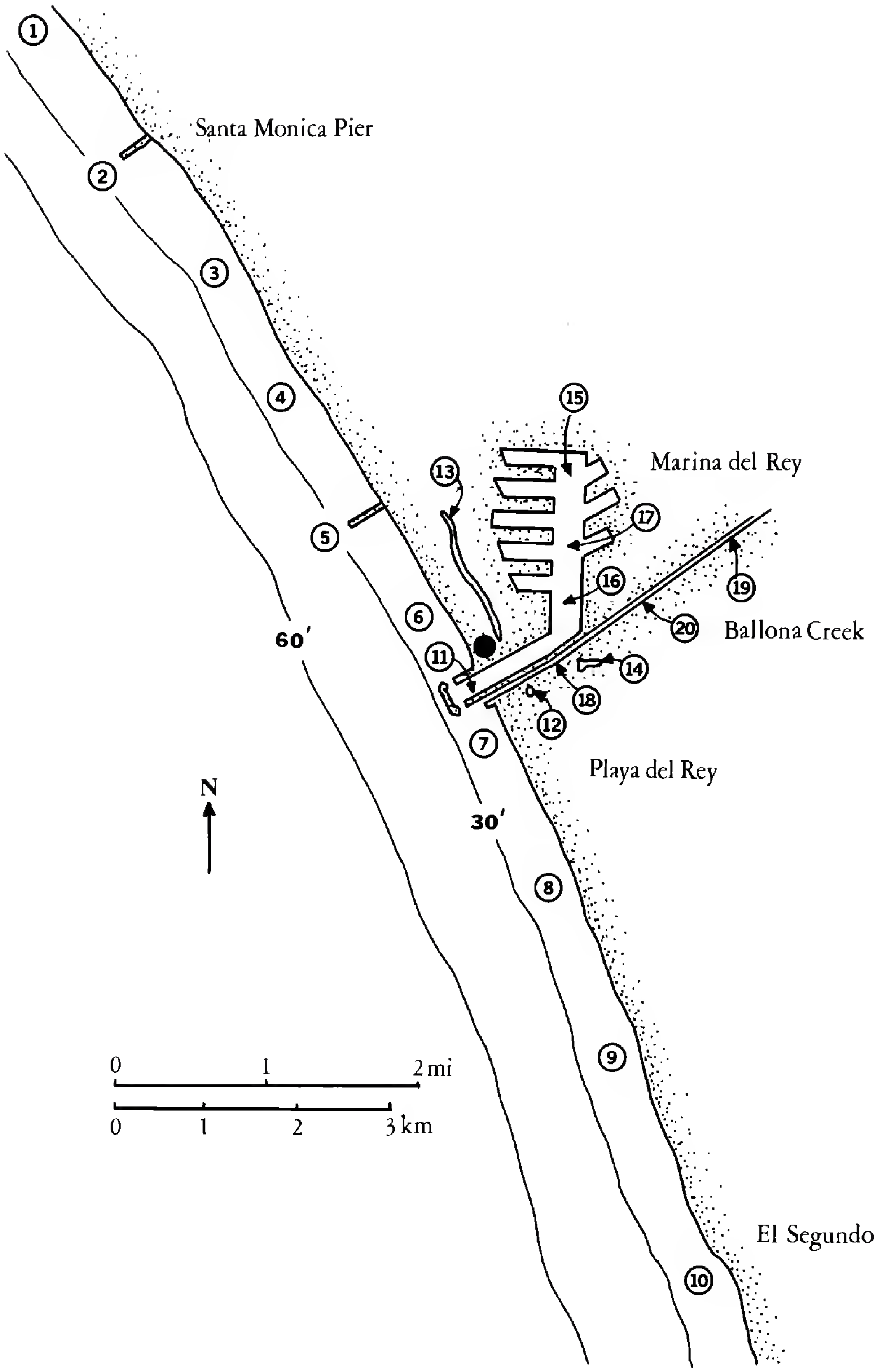

Figure 1. Least Tern foraging survey stations at Venice Beach, Los Angeles County. Solid circle indicates location of breeding colony.

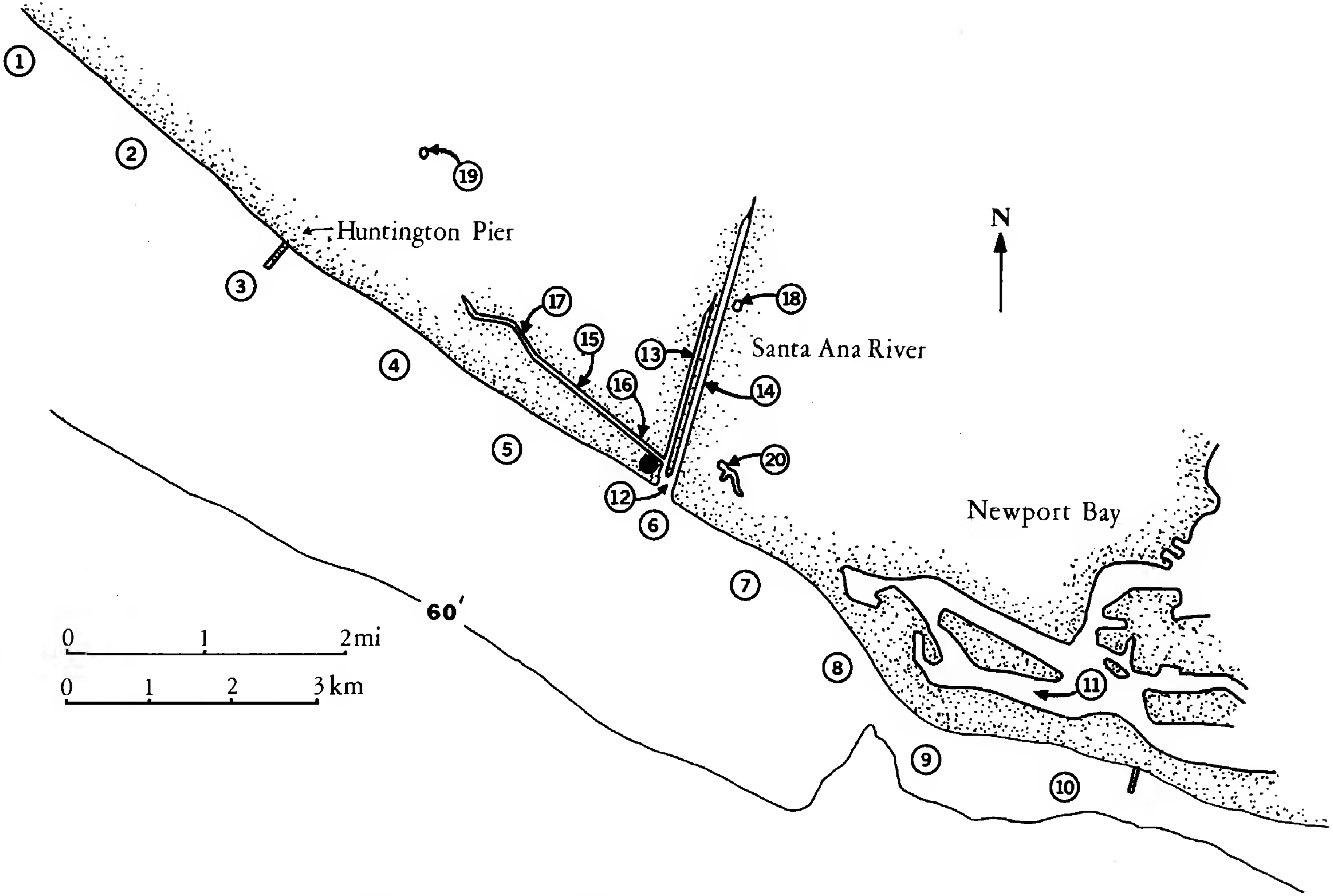

Figure 2. Least Tern foraging survey stations at Huntington Beach, Orange County. Solid circle indicates location of breeding colony.

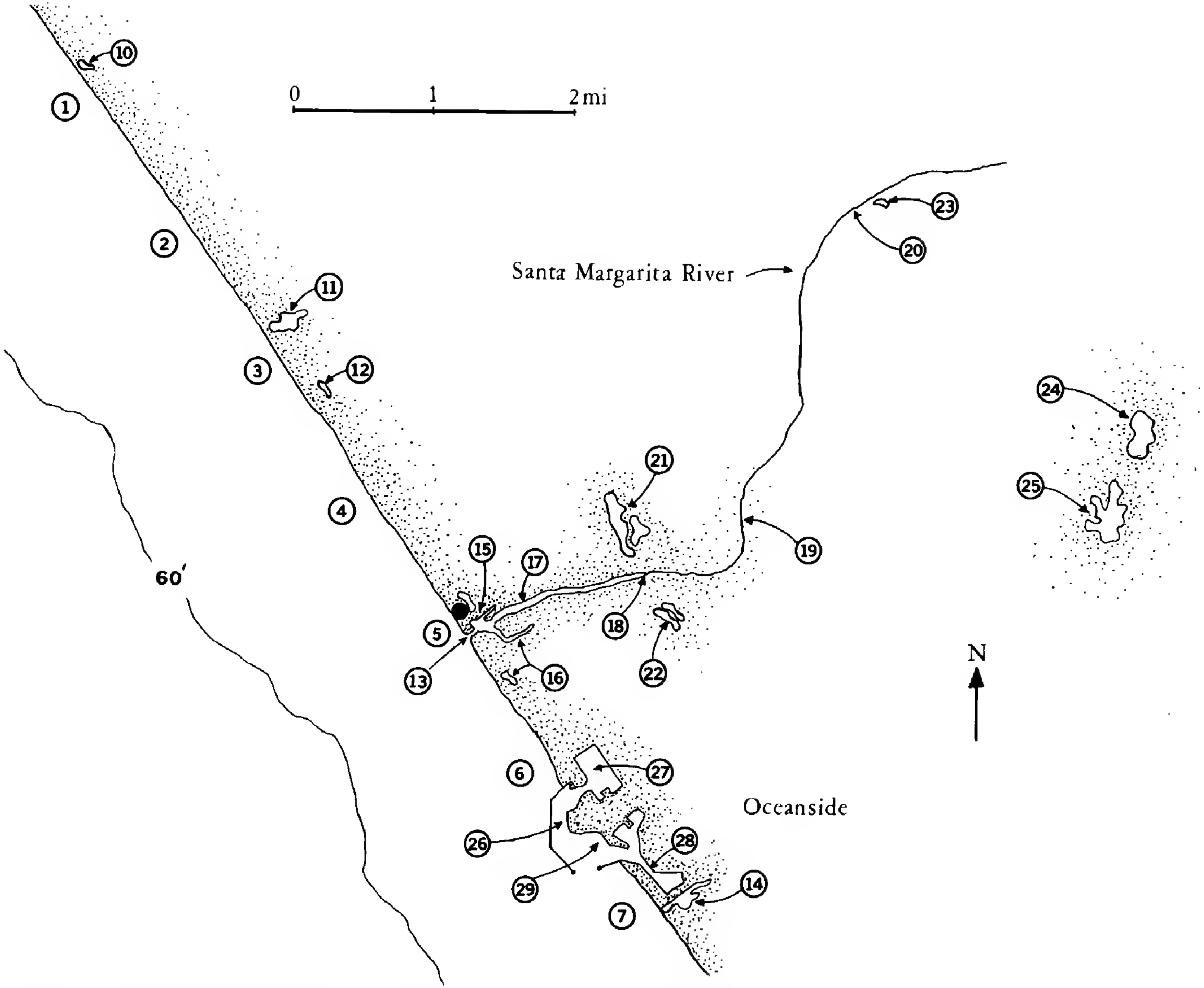

Figure 3. Least Tern foraging survey stations at the Santa Margarita River, San Diego County. Solid circle indicates location of breeding colony.

Each station was visited within a 90-minute period beginning approximately 30 minutes after sunrise. Although simultaneous observations from each station were beyond the scope of the present study, we feel that variations in intensity of foraging activity during the 90-minute time span of each survey were probably so minor as to not affect overall results (Collins et al. 1979). Furthermore, we doubt that occasional duplicated observations (i.e., the same bird recorded at more than one station) would alter general patterns in recorded foraging activity.

During 1980, surveys were conducted at Venice Beach and Huntington Beach on four dates, spaced so as to represent each major phase of the tern nesting cycle (courtship, incubation, feeding of chicks and post-fledging dispersal). In 1981, six surveys were performed at these two sites at approximately 2-week intervals. Eleven surveys, including three pairs of consecutive-day observations, were made at approximately 2-week intervals at the Santa Margarita River in 1982; additional information regarding the Santa Margarita River study is provided in Minsky (1982).

Observations were made with 10 × binoculars from each station, and the number of Least Terns visible during each of five 1-minute scans of the survey area, spaced at 1-minute intervals, was recorded. The behavior of each individual was classified as follows: (a) foraging, including birds actively plunging into the water or clearly searching for prey, (b) transit, including birds engaged in high, direct flight with no evident searching behavior, (c) courting, including birds in fish flights or aerial glides (Wolk 1974), and (d) bathing or loafing. Only birds considered to be foraging at the time of observation are included in the present analysis. Simultaneous with each set of surveys made from land in 1980, boat transects were also conducted at approximately 0.5-mile intervals moving parallel to the coastline offshore to approximately 5 miles.

Data supplementing the present study have been collected by Atwood since 1977 at most southern and central California Least Tern nesting areas; Minsky has studied the species on Cape Cod, Massachusetts, and in southern California since 1974. Relevant information based on this experience, especially concerning foraging behavior during post-fledging dispersal, is included in this report.

## RESULTS

Data collected during foraging surveys at Venice Beach, Huntington Beach and the Santa Margarita River are summarized in Tables 2, 3 and 4. At least 75% of all foraging activity occurred in the ocean on 9 of 10 surveys at Venice Beach, on 8 of 10 at Huntington Beach, and on 8 of 11 at the Santa Margarita River. Approximately 90-95% of such ocean feeding was within 1 mile of shore in water less than 60 feet in depth. Least Terns were rarely seen foraging in the ocean at distances from shore of 1-2 miles, and never were encountered farther than 2 miles offshore. Non-ocean habitats in the vicinity of the study colonies received limited use by foraging terns; in particular, marina areas, which were well represented near all colonies, were little used. At Venice Beach and Huntington Beach, with only one exception, at least 60% of all foraging took place within approximately 2 miles of the nesting sites; at the Santa Margarita River, this pattern was observed on only 6 of 11 surveys

(Table 5). Relatively large numbers of feeding terns were occasionally seen at stations located more than 2 miles from nesting sites at each of the three study areas.

Least Terns appear opportunistic in their foraging behavior, and have been observed on numerous occasions to shift to different feeding areas in response to localized concentrations of suitable prey. During experiments conducted at small artificial feeding ponds near Huntington Beach in 1979, numbers of foraging Least Terns increased from 2 to 24 individuals within 10 minutes of the release of several thousand Mosquitofish (*Gambusia affinis*). Similar vagility in feeding activity is reflected in the present study by fluctuations at particular stations on different dates (e.g., Table 2, stations 7 and 9 on 4 May 1981 and 19 May 1981). During the study, Least Terns at Venice Beach and Huntington Beach fed primarily on Northern Anchovy (*Engraulis mordax*), Topsmelt (*Atherinops affinis*) and Jacksmelt (*Atherinopsis californiensis*) (Atwood MS); a small food sample obtained at the Santa Margarita River colony in 1982 was comparable. While we have no actual data on day-to-day changes in prey population levels at foraging survey stations, all of the principal prey species form large, mobile schools and hence might be expected to vary in abundance at a single location on different dates.

Although the movements of prey species makes specific Least Tern foraging localities difficult to delimit, certain areas did receive consistently high levels of use by feeding terns at Venice Beach (stations 5, 6, 7), Huntington Beach (stations 5, 6, 7) and the Santa Margarita River (stations 4, 5, 6) (Table 6). In general, foraging activity was especially high in nearshore ocean waters near major river mouths.

No clear shifts in habitat utilization or preference were noted near Venice Beach and Huntington Beach during the nesting cycle (Tables 2, 3). However, abundant observations of family groups, frequently including color-banded juveniles identifiable as to natal colony, have indicated that many terns from Venice Beach and Huntington Beach nesting areas disperse following the breeding season to freshwater and estuarine habitats located beyond the areas included in the present study. Use of freshwater Windmill Lake, located approximately 5 miles inland from the Santa Margarita River colony, increased during the period of post-fledging dispersal (Table 4, station 24). Similarly, terns nesting at Purisima Point, Santa Barbara County, fed almost entirely in nearshore ocean areas during periods of courtship, incubation, and feeding of chicks during 1979; after juveniles were capable of sustained flight, family groups dispersed from the vicinity of the nesting area to the Santa Ynez River mouth, located 5.8 miles S of the colony. Comparable post-breeding aggregations of Least Terns at localities that had received little or no foraging use earlier in the season have been observed annually at numerous freshwater, estuarine and protected shallow marine areas in coastal central and southern California, apparently representing a general pattern in the population's behavior.

There is no evidence that failure of previously used offshore food resources "forced" dispersal to these newly utilized foraging localities, as late-nesting pairs at all colonies continued to feed successfully in nearshore ocean areas. Rather, the behavior of Least Terns at freshwater or estuarine foraging sites during the post-fledging period strongly suggests that this shift in habitat utilization may be associated with young birds developing their fishing skills. This behavior has been best documented at freshwater Harbor Lake, Los Angeles County, which is known to have been used by foraging Least Terns since at least 1973 (Bender 1974, Massey and Atwood 1980). Importantly, Least Terns seldom appear at Harbor Lake until after the dispersal of fledglings from local breeding colonies in early July. Although no effort has been made to quantify feeding rates, older juveniles at Harbor Lake clearly foraged more frequently and with greater success than did younger birds, which spent most of their time on the ground waiting to be fed by their parent(s).

## DISCUSSION

The Least Tern is opportunistic in its foraging habits, and efforts to precisely define "essential" feeding habitats or localities may be met with frustration. Prior to post-fledging dispersal from breeding colonies, most foraging activity occurs within 2 miles of the nesting sites; within this range, terns will probably feed in almost any body of water that supports suitable prey items.

Within a habitat type, certain areas may receive consistently higher levels of use, suggesting that some localities may be of greater importance than others. At Venice Beach, Huntington Beach and the Santa Margarita River, most foraging occurs in relatively shallow, nearshore ocean waters in the vicinity of major river mouths, possibly as a result of water depth, salinity or nutrient supplies which might favor concentrations of suitable prey species. However, these stations are also among the closest feeding areas to the breeding sites themselves, and the heavy foraging activity may be related more to proximity to the colony than to high prey concentrations. Regardless of the cause, we note that even in a superficially uniform and widespread habitat such as nearshore ocean waters, certain sites may be of primary importance in the feeding activities of a Least Tern breeding colony.

Prior to the subspecies' decline, at least 82% of known California Least Tern nesting sites (n = 33) were located within 1 mile of river mouth and/or estuarine habitats (R. Erickson, unpubl. data). This fact, along with the increased probability of seeing feeding terns flying over restricted marsh areas as opposed to open ocean, probably led to the assumption that estuaries are the species' required foraging habitat (Massey 1971, Wilbur 1974). Some presently existing colonies, such as those located at Batiquitos Lagoon, San Diego County, and Anaheim Bay and Bolsa Chica, Orange County, do feed primarily in estuarine habitats (Atwood MS). However, other colonies, including several located adjacent to relatively undisturbed river mouths, appear to forage mostly in nearshore ocean waters. The current absence of significant freshwater and estuarine ecosystems near both Venice Beach and Huntington Beach colonies makes it impossible to establish historic habitat preferences.

Similarly, determination of habitat preferences is difficult at the Santa Margarita River, where estuarine and freshwater habitats are present but substantially altered and reduced. We intend to study foraging behavior at a nesting colony situated in undisturbed habitat in Baja California, where both estuarine and ocean fishing are options, to determine Least Tern foraging preferences under natural conditions.

Table 2. Least Tern foraging activities at Venice Beach, Los Angeles County, during 1980-1981.

| | | PERCENT OF TOTAL FORAGING OBSERVED[b] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Station[a] | Habitat | 05 May[d] 1980 | 04 Jun[e] 1980 | 23 Jun[f] 1980 | 22 Jul[g] 1980 | 04 May[d] 1981 | 19 May[e] 1981 | 01 Jun[e] 1981 | 23 Jun[f] 1981 | 30 Jun[f] 1981 | 14 Jul[g] 1981 |
| 1 | ocean | — | — | — | — | 9 | 1 | 16 | 0 | 5 | 6 |
| 2 | ocean | 13 | 0 | 4 | 16 | 0 | 0 | 2 | 0 | 0 | 2 |
| 3 | ocean | 13 | 12 | 9 | 0 | 0 | 8 | 7 | 0 | 3 | 5 |
| 4 | ocean | 7 | 3 | 6 | 3 | 0 | 3 | 2 | 0 | 17 | 3 |
| 5 | ocean | 7 | 15 | 3 | 22 | 1 | 1 | 19 | 17 | 1 | 1 |
| 6 | ocean | 10 | 18 | 16 | 17 | 4 | 1 | 20 | 8 | 6 | 30 |
| 7 | ocean | 16 | 24 | 9 | 9 | 0 | 47 | 12 | 13 | 37 | 7 |
| 8 | ocean | 14 | 3 | 7 | 3 | 0 | 3 | 3 | 12 | 23 | 18 |
| 9 | ocean | 8 | 0 | 22 | 9 | 72 | 16 | 13 | 0 | 1 | 4 |
| 10 | ocean | — | — | — | — | 0 | 0 | + | 0 | 0 | 0 |
| 11 | ocean | 3 | 2 | 8 | 1 | 1 | 8 | 3 | 17 | 5 | 5 |
| 12 | freshwater pond | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | degraded saltmarsh channels | 4 | 9 | 3 | 0 | 5 | 1 | 0 | 0 | 0 | 0 |
| 14 | degraded saltmarsh channels | 1 | 4 | 4 | 6 | 7 | 0 | + | 0 | 0 | 1 |
| 15 | marina | 0 | 0 | 0 | 0 | — | — | — | — | — | — |
| 16 | marina | 0 | 0 | 0 | 6 | 0 | 0 | 2 | 1 | 1 | 12 |
| 17 | marina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | flood control channel | 1 | 2 | 5 | 4 | 0 | 11 | 0 | 25 | + | 1 |
| 19 | flood control channel | 0 | 0 | 0 | 0 | — | — | — | — | — | — |
| 20 | flood control channel | 3 | 7 | 4 | 0 | 0 | 0 | 0 | 8 | 0 | 5 |
| | sample size (n)[c] | 23.0 | 20.6 | 48.8 | 9.7 | 18.8 | 22.0 | 24.6 | 25.7 | 69.2 | 32.1 |

[a] Location of observation stations as indicated in Figure 1.

[b] Based on mean values of five 1-minute counts at each station. Thus, if the mean number of foraging terns observed at station A was 3.2, and the total of all station means for that day (n) was 23.7, foraging activity at station A would represent 14% of the total recorded foraging. (+) indicates that observed foraging represented less than 1% of total; (−) indicates that data were not obtained.

[c] Number of foraging terns visible from each station calculated as mean of counts obtained during five 1-minute scans of area; sample size (n) is the total number of means from all stations on a given date.

[d] Main activity of breeding colony — courtship.

[e] Main activity of breeding colony — egg laying and incubation.

[f] Main activity of breeding colony — feeding of chicks.

[g] Main activity of breeding colony — dispersal of fledglings.

Table 3. Least Tern foraging activities at Huntington Beach, Orange County, during 1980-1981.

| | | PERCENT OF TOTAL FORAGING OBSERVED[b] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Station[a] | Habitat | 05 May[d] 1980 | 06 Jun[e] 1980 | 20 Jun[f] 1980 | 21 Jul[g] 1980 | 05 May[d] 1981 | 18 May[e] 1981 | 02 Jun[e] 1981 | 17 Jun[f] 1981 | 01 Jul[f] 1981 | 13 Jul[g] 1981 |
| 1 | ocean | — | — | — | — | 3 | 0 | 0 | 2 | 0 | 2 |
| 2 | ocean | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 0 |
| 3 | ocean | 0 | 0 | 30 | 0 | 6 | 0 | 27 | 0 | 9 | 0 |
| 4 | ocean | 2 | 0 | 24 | 3 | 2 | 0 | 3 | 35 | 5 | 0 |
| 5 | ocean | 5 | 0 | 18 | 0 | 30 | 0 | 41 | 24 | 11 | 27 |
| 6 | ocean | 17 | 57 | 12 | 10 | 3 | 7 | 14 | 4 | 16 | 18 |
| 7 | ocean | 25 | 39 | 3 | 3 | 15 | 16 | 3 | 10 | 35 | 3 |
| 8 | ocean | 33 | 0 | 0 | 0 | 8 | 0 | 3 | 0 | 5 | 25 |
| 9 | ocean | 13 | 0 | 0 | 7 | 13 | 29 | + | 7 | 6 | 4 |
| 10 | ocean | 0 | 0 | 0 | 7 | 0 | 3 | + | 0 | 2 | 0 |
| 11 | marina | 0 | 0 | 0 | 7 | 0 | 3 | + | 0 | 2 | 0 |
| 12 | flood control channel | 0 | 3 | 0 | 0 | 0 | 7 | + | 5 | + | 3 |
| 13 | flood control channel | 0 | 0 | 9 | 7 | 6 | 9 | + | 5 | 5 | 7 |
| 14 | flood control channel | — | — | — | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | flood control channel | 0 | 0 | 0 | 13 | 0 | 13 | 2 | 0 | 0 | 0 |
| 16 | flood control channel | — | — | — | — | 0 | 3 | 2 | 0 | 0 | 0 |
| 17 | flood control channel | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 0 | 0 |
| 18 | freshwater pond | 0 | 0 | 1 | 17 | 0 | 0 | 0 | 0 | 3 | 0 |
| 19 | freshwater pond | — | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | degraded saltmarsh channels | 3 | 0 | 3 | 23 | 9 | 13 | 0 | 7 | 2 | 9 |
| | sample size (n)[c] | 18.1 | 15.5 | 20.3 | 11.8 | 17.3 | 6.3 | 33.7 | 15.3 | 35.1 | 11.3 |

[a] Location of observation stations as indicated in Figure 2.

[b-g] See explanations, Table 2.

Table 4. Least Tern foraging activities at Santa Margarita River, San Diego County, during 1982.

| | | PERCENT OF TOTAL FORAGING OBSERVED[b] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station[a] | Habitat | 03 May[d] 1982 | 04 May[d] 1982 | 18 May[e] 1982 | 01 Jun[e] 1982 | 02 Jun[e] 1982 | 18 Jun[e] 1982 | 29 Jun[f] 1982 | 13 Jul[f] 1982 | 27 Jul[g] 1982 | 28 Jul[g] 1982 | 11 Aug[g] 1982 |
| 1 | ocean | 3 | 6 | 13 | + | 0 | + | 0 | 0 | 3 | 0 | 0 |
| 2 | ocean | 11 | 16 | 5 | 0 | 0 | 0 | + | 3 | 7 | 4 | 0 |
| 3 | ocean | 35 | 18 | 0 | 4 | 1 | 12 | 2 | 13 | 15 | 5 | 0 |
| 4 | ocean | 10 | 29 | 1 | 14 | 22 | 28 | 35 | 20 | 19 | + | 0 |
| 5[h] | ocean | 15 | 5 | 22 | 33 | 24 | 39 | 55 | 52 | 21 | 42 | 70 |
| 6 | ocean | 4 | 1 | 0 | 27 | 39 | 17 | 4 | 1 | 0 | + | 0 |
| 7 | ocean | 16 | 0 | 39 | 11 | 6 | 3 | 2 | 1 | 4 | 2 | 0 |
| 10[i] | brackish lagoon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 11[i] | brackish lagoon | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | 0 | 0 |
| 12[i] | brackish lagoon | 0 | + | 0 | 0 | 0 | 0 | 0 | 2 | + | 11 | 0 |
| 13 | river mouth | + | 6 | + | 0 | 2 | 0 | 0 | 0 | 0 | + | 0 |
| 14[j] | river mouth | 0 | 5 | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | degraded saltmarsh channels/estuary | 0 | 1 | 3 | 3 | 1 | + | 0 | 3 | 5 | 0 | 0 |
| 16 | degraded saltmarsh channels | 2 | 0 | 2 | 0 | + | 0 | 0 | 1 | 0 | 0 | 0 |
| 17 | river channel | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | river channel | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 |
| 19 | river channel | — | — | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 |
| 20 | river channel | 0 | — | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 |
| 21 | freshwater pond/lake | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | freshwater pond/lake | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | freshwater pond/lake | 0 | — | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 |
| 24 | freshwater pond/lake | 0 | — | 0 | 0 | 0 | — | 0 | 1 | 22 | 31 | 19 |
| 25 | freshwater pond/lake | 0 | — | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 |
| 26 | marina | 4 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 27 | marina | 1 | 3 | 0 | 3 | 2 | 0 | + | 1 | 0 | 0 | 0 |
| 28 | marina | 1 | 3 | 8 | 3 | + | + | + | + | 0 | 0 | 8 |
| 29 | marina | — | — | 4 | + | 1 | + | 0 | + | 3 | + | 0 |
| | sample size (n)[c] | 54.4 | 51.8 | 62.4 | 55.8 | 56.4 | 127.2 | 133.8 | 56.6 | 20.8 | 22.2 | 5.2 |

[a] Location of observation stations as indicated in Figure 3.

[b-g] See explanations, Table 2.

[h] A more detailed description of foraging activity at Station 5 is provided in Minsky (1982).

[i] Station 11 was dry after 13 July; stations 10 and 12 were occasionally dry throughout the study period.

[j] San Luis Rey River mouth was blocked after 18 May.

Table 5. Effect of distance from nesting area on Least Tern foraging activity.

| Date | Distance from Nesting Site (miles)[a] | | | | |
|---|---|---|---|---|---|
| | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5[b] |
| **Huntington Beach** | | | | | |
| 05 May 1980 | 25 | 60 | 15 | 0 | — |
| 06 Jun 1980 | 60 | 39 | 1 | 0 | — |
| 20 Jun 1980 | 42 | 28 | 30 | 0 | — |
| 21 Jul 1980 | 53 | 33 | 14 | 0 | — |
| 05 May 1981 | 48 | 25 | 21 | 2 | 3 |
| 18 May 1981 | 52 | 16 | 29 | 3 | 0 |
| 02 Jun 1981 | 60 | 9 | 27 | 4 | 0 |
| 17 Jun 1981 | 45 | 46 | 7 | 0 | 2 |
| 01 Jul 1981 | 34 | 48 | 15 | 2 | 0 |
| 13 Jul 1981 | 64 | 28 | 7 | 0 | 3 |
| Mean ($\overline{X}$) | 48.3 | 33.2 | 16.6 | 1.1 | 1.3 |
| **Venice Beach** | | | | | |
| 06 May 1980 | 41 | 25 | 21 | 13 | — |
| 04 Jun 1980 | 71 | 17 | 12 | 0 | — |
| 23 Jun 1980 | 44 | 21 | 31 | 4 | — |
| 22 Jul 1980 | 59 | 18 | 9 | 16 | — |
| 04 May 1981 | 11 | 7 | 72 | 0 | 9 |
| 19 May 1981 | 69 | 6 | 24 | 0 | 1 |
| 01 Jun 1981 | 54 | 7 | 20 | 2 | 16 |
| 23 Jun 1981 | 80 | 20 | 0 | 0 | 0 |
| 30 Jun 1981 | 49 | 41 | 5 | 0 | 5 |
| 14 Jul 1981 | 44 | 39 | 9 | 2 | 6 |
| Mean ($\overline{X}$) | 52.2 | 20.1 | 20.3 | 3.7 | 6.2 |
| **Santa Margarita River** | | | | | |
| 03 May 1982 | 17 | 20 | 51 | 11 | 3 |
| 04 May 1982 | 12 | 42 | 23 | 16 | 6 |
| 18 May 1982 | 27 | 19 | 39 | 5 | 13 |
| 01 Jun 1982 | 36 | 48 | 15 | 0 | 0 |
| 02 Jun 1982 | 27 | 64 | 7 | 0 | 0 |
| 18 Jun 1982 | 39 | 46 | 15 | 0 | 0 |
| 29 Jun 1982 | 55 | 39 | 4 | 0 | 0 |
| 13 Jul 1982 | 56 | 22 | 14 | 5 | 1 |
| 27 Jul 1982 | 26 | 22 | 19 | 7 | 25 |
| 28 Jul 1982 | 42 | 0 | 7 | 15 | 34 |
| 11 Aug 1982 | 70 | 12 | 0 | 0 | 19 |
| Mean ($\overline{X}$) | 37.0 | 30.4 | 17.6 | 5.4 | 9.2 |

[a] Values indicate percent of foraging activity occurring at stations located given distances from nesting sites.

[b] Stations at distances of 4-5 miles from nesting sites were not established at Venice Beach and Huntington Beach until 1981.

Table 6. Principal foraging localities used by Least Terns at three major breeding colonies.

| | Station Number[a] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Venice Beach | | 2 | 2 | 1 | **4** | **5** | **6** | 3 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | — | — | — | — | — | — | — | — | — |
| Huntington Beach | 0 | 0 | 2 | 2 | **6** | **5** | **6** | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 2 | — | — | — | — | — | — | — | — | — |
| Santa Margarita River | 1 | 1 | 3 | **7** | **10** | **4** | 2 | — | — | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 |

[a] Location of observation stations as indicated in Figures 1, 2 and 3.

[b] Values indicate number of dates on which station was among the three most heavily utilized feeding localities. Boldfaced numbers identify the three principal feeding localities for each colony during the study period.

Increased use of freshwater and estuarine marsh areas during post-fledging dispersal, when juveniles are developing their foraging skills, suggests to us that such calm, protected waters may be of major significance during this period. Even estuarine and freshwater localities that are distant from active nesting sites and that receive little or no foraging use during earlier stages of the breeding cycle may be used heavily by Least Terns during post-fledging dispersal; loss or disturbance of such areas may reduce the survivorship of dependent young.

## SUMMARY

Least Terns at three large southern California breeding colonies foraged primarily in nearshore ocean waters in the vicinity of major river mouths. Most foraging took place within 2 miles of the nesting sites. Substantial alteration and reduction of non-ocean Least Tern foraging habitats in the vicinities of the study colonies made determination of historic habitat preferences impossible. However, increased use of coastal freshwater and estuarine habitats during post-fledging dispersal indicates the importance of such areas during this period.

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Least Terns courtship feeding, May 1981, Venice, California *Photo by Dana Echols*

Least Tern with chicks, July 1980, Anaheim Bay, Seal Beach, California

*Photo by Dana Echols*

# THE NEST, EGG, YOUNG, AND ASPECTS OF THE LIFE HISTORY OF THE ENDANGERED HAWAII CREEPER

HOWARD F. SAKAI, USDA Forest Service, Institute of Pacific Island Forestry, 1151 Punchbowl Street, Honolulu, Hawaii 96813 (present address: USDA Redwood Sciences Laboratory, 1700 Bayview Drive, Arcata, California 95521)

THEA C. JOHANOS, USDA Forest Service, Institute of Pacific Islands Forestry, 1151 Punchbowl Street, Honolulu, Hawaii 96813

The Hawaii Creeper (*Oreomystis mana*), an endangered species (USF&WS 1975), occurs only on the Island of Hawaii and is limited to higher forests in a patchy distribution (J.M. Scott pers. comm.). The bird is about 11-13 cm long, drab-green with a whitish throat and a slightly decurved bill (Scott et al. 1979). The species is not known to be sexually dichromatic (Scott et al. 1979) but we and others have noticed plumage variation among adults.

Very little is known of the breeding biology of this species (Berger 1981). Only recently have even partial nests and their placement been described (Scott et al. 1980, Sakai and Ralph 1980). We report here, for the first time, on a successful Hawaii Creeper nest and its eggs and young.

## STUDY AREA AND METHODS

The nest was found in the Kilauea Forest Reserve 16 km NNW of Hawaii Volcanoes National Park headquarters, on 11 August 1980. The nest was 14 m high in an 18 m Ohia (*Metrosideros collina*) tree with a diameter at breast height of 28 cm. The nest tree was in an undisturbed, closed-canopy forest of Ohia and Koa (*Acacia koa*) trees at 1690 m elevation, about 40 m from the edge of Keauhou Ranch, a forest disturbed by logging and grazing. The understory vegetation consisted of mainly tree fern (*Cibotium* spp.), pilo (*Coprosma* spp.), ohelo (*Vaccinium* spp.), Olapa (*Cheirodendron trigynum*) and other native plants.

We observed the nest for 48.3 hours from a blind 30 m from the nest tree using spotting scope and binoculars. In addition, we made five climbs for nest checks. These checks were conducted towards the end of incubation and into the brooding period during optimal weather conditions in an effort to cause as little disturbance as possible.

## RESULTS

### *Distinguishing Features of This Nesting Pair*

Although these birds were not color banded, we were able to recognize them individually and later determine their sex. The female was paler with an overall green-yellow tinge to her back and breast, and a distinct white throat. The male had no yellow tinge to its back and breast, and a dull gray-white throat. The male sang near the nest during the nest building and incubation period, and once chased a banded Hawaii Creeper that intruded into his territory. As in the Common Amakihi (*Hemignathus virens*) (van Riper 1978), only the female incubated and brooded, and only she solicited food from the male during the nest building, incubation and brooding stages of the breeding cycle.

### *The Nest*

The nest was cup-shaped, in the crotch of three small (3 to 4 cm diameter) vertical branches, and was sheltered from above by foliage (Figure 1). The measurements were nest rim thickness, 1.0 to 1.7 cm; outside diameter, 9.1 to 13.2 cm; height, 9.3 cm; inside diameter, 5.2 to 6.1 cm; and cup depth, 3.2 cm.

The outside nest wall was well camouflaged with mosses and liverworts, which also grew on the branches supporting the nest. The body of the nest consisted primarily of liverworts and various parts of ferns, and the cup was lined with *Cheirodendron* branch fibers (Table 1). The nest has been deposited with the U. S. National Museum (No. 47765).

### *Nest Building*

Nest construction probably lasted about 14 days (Table 2). When discovered, the nest was 2 to 4 cm high with distinct holes in the wall. We estimated it to have been 3 days old.

The female did most of the next construction. The male brought nesting material only once at the beginning of construction. The female worked nesting materials into the nest by moving her head sideways or up and down and then rotating her body. In the 122 trips to the nest that we observed, she carried the following nesting material: *Cheirodendron* fiber (n = 16); moss and liverwort (n = 83); rootlet (n = 3); *Metrosideros* bark (n = 3); lichen (n = 4); no visible nesting material (n = 10); and parts of spider egg casing (n = 3).

The female obtained all nesting materials 8 to 50 m from the nest tree in the following situations: (1) the female gathered moss and liverwort from the trunk of *Metrosideros* trees at heights of 1 to 3 m; (2) she obtained lichen from fallen *Acacia* limbs and from branches of 23 m *Acacia* trees; (3) she plucked rootlets from the ground along feral hog trails; (4) she gathered *Cheirodendron* branch fibers by prying the loose, dead bark of small branches then plucking the dangling fibrous strands (in one observation, she plucked five strands of fiber before flying to the nest); and (5) she obtained spider webbing from egg casings found under *Metrosideros* and *Acacia* foliage (webbing was not seen in the bird's beak, but her immediate flight to the nest with no visible nesting material, and much head movement at the nest, suggested to us that webbing was being incorporated into the nest as Sakai and Ralph [1980] reported).

Flights to the nest to deposit nesting material were not direct; the adults always landed 0.5-1.5 m below or above the nest, then hopped and flew to the nest. They were always silent in flight near the nest.

We observed courtship feeding on 15 and 21 August. In both instances, before being fed, the female arranged nesting material in the nest as the male foraged nearby. She flew from the nest to a perch about 2 m from the male, and began to beg. She emitted several "sweet-sweet" calls and quivered her wings, with her head protruding slightly forward. The male perched next to the female and, after a slight pause, fed her. He continued foraging after the feeding bout, and the female returned to continue nest construction.

Table 1. The taxa of plants and, in parentheses, the materials used in construction of the Hawaii Creeper nest.

| NEST LINING | Abundance[1] |
|---|---|
| Vascular plants | |
| *Cheirodendron trigynum* (branch fibers) | + + + |
| *Grammitis* sp. (rhizomes) | + |
| NEST BODY | |
| Vascular plants | |
| *Acacia koa* (phyllodes) | + |
| *Metrosideros collina* (leaves) | + |
| *Metrosideros collina* (bark) | + + |
| *Uncinia uncinata* (sedge leaves) | + |
| *Cheirodendron trigynum* (bark) | + |
| Ferns and fern allies | |
| *Cibotium glaucum* (hair) | + + + |
| *Cibotium* spp. (trunk fibers) | + + + |
| *Grammitis* sp. (rhizomes) | + + + |
| *Adenophorus* sp. (rhizomes) | + + + |
| Family Hymenophyllaceae (rhizomes) | + + + |
| Bryophytes | |
| *Jamesoniella* sp. (liverwort) | + + + |
| *Leucobryun gracile* (moss) | + |
| *Homaliodendrom flabelatum* (moss) | + + |
| *Lepidozia* sp. (liverwort) | + + + |
| *Bazzania* sp. (liverwort) | + + + |
| *Campylopus* sp. (?) (moss) | + |
| *Acroporium* sp. (?) (moss) | + |
| *Frullania* sp. (liverwort) | + |
| *Usnea* sp. (lichen) | + |
| Bryophytes (pieces of approx. 6 other species) | + |

[1] + + + Dominant components used in construction (n 26).
+ + Species in low numbers (n = 10-25).
+ Species present only as traces (n = 1-9).

Table 2. Summary of the nest observations of Hawaii Creeper.

| Days of cycle | Observation date (1980) | Hours: minutes of observation | Nest status |
|---|---|---|---|
| 1, 2 | 9-10 Aug | — | estimated first day of nest building |
| 3 | 11 Aug | 1:00 | nest building—nest discovered |
| 4,5 | 12-13 Aug | 5:02 | nest building |
| 6 | 14 Aug | — | no nest observation |
| 7 | 15 Aug | 1:00 | nest building |
| 8, 9 | 16-17 Aug | — | no nest observation |
| 10, 11 | 18-19 Aug | 2:00 | nest building |
| 12 | 20 Aug | — | no nest observation |
| 13, 14 | 21-22 Aug | 3:00 | nest building |
| 15, 16 | 23-24 Aug | — | no nest observation—suspect eggs were laid |
| 17 to 20 | 25-28 Aug | 6:00 | incubation |
| 21 to 24 | 29 Aug-1 Sep | — | no nest observation |
| 25, 26 | 2-3 Sep | 2:30 | incubation |
| 27 | 4 Sep | 1:30 | incubation—first nest check |
| 28 | 5 Sep | 1:00 | incubation |
| 29, 30 | 6-7 Sep | — | no nest observation |
| 31 | 8 Sep | 3:00 | brooding—second nest check |
| 32 | 9 Sep | 2:10 | brooding |
| 33 | 10 Sep | 1:30 | brooding—third nest check |
| 34, 35 | 11-12 Sep | 5:07 | brooding |
| 36, 37 | 13-14 Sep | — | no nest observation |
| 38 | 15 Sep | 2:00 | brooding—fourth nest check |
| 39, 40 | 16-17 Sep | 2:30 | no brooding |
| 41 | 18 Sep | 2:30 | no brooding—last nest check |
| 42 to 44 | 19-21 Sep | — | no nest observation |
| 45 to 48 | 22-25 Sep | 6:30 | no brooding |
| 49 | 26 Sep | 0:45 | fledged—at 1530 both juveniles were about 8 m from the nest tree |

### *Eggs*

The two eggs were virtually identical in color. The background was dull white with a faint blue tinge. Brown splotches formed a dense cap around the larger end of each egg with scattered, irregularly shaped brown speckles covering the remaining surface (Figure 1). The eggs measured 20.1 × 14.6 mm and 19.2 × 14.1 mm.

### *Incubation*

If Hawaii Creepers lay one egg per day like the Common Amakihi (van Riper 1978), then the eggs of this pair were probably laid on 23 and 24 August (Table 2). The incubation period was either 13 or 14 days, and only the female incubated. During 660 min of nest observation, excluding our nest checks, the female made 19 trips off the nest for an average of 1.73 trips per hour and an average time off the nest of 299 sec (range 10-682 sec.; S.D. = 210 sec). The average female attentive period was 1469 sec (range 303-4163 sec; S.D. = 1213 sec). She left the nest 11 times to be fed by the male. Only once, during a moderate drizzle, did the male fly to the nest to feed the incubating female. Near the nest tree the male always emitted a soft, single note "sweet" and the female responded with wing quivers and begging calls before flying off silently to join her mate. The female was not totally dependent on the male for food; she left the nest eight times to forage within the nest tree or in a tree 8-12 m away.

### *Parental Care of the Young*

The period of brooding, or the covering of the young (Pettingill 1970), lasted approximately 9-10 days (Table 2). Only the female brooded. During 827 min of observation, excluding our nest checks, she left the nest 31 times for an average of 1.38 trips per hour; time off the nest averaged 418 sec

Figure 1. Hawaii Creeper (*Oreomystis mana*) nest and egg photographed 16 km NNW of Hawaii Volcanoes National Park headquarters, Hawaii, on 4 September 1980.

(range 5-1320 sec; S.D. = 313 sec). The average female attentive period was 837 sec (range 6-2520 sec; S.D. = 599 sec). During this stage, the female left the nest to forage and was no longer dependent on the male for food. The male did provide some food for the female and nestlings, by regurgitating into their throats. He always fed the female before the nestlings. During the entire period, the male fed the female and young a total of 24 times, an average feeding rate of 1.14 visits per hour and an average visit of 42 sec (range 9-180 sec; S.D. = 37 sec) at the nest.

Once, when the nestlings were about 9 days old and the female was away, a heavy drizzle occurred and the male flew to the nest and fed the nestlings, but did not brood them.

Table 3. Developmental patterns of two Hawaii Creeper nestlings.

| Date of nest check | 8 Sep 80 | 10 Sep 80 | 15 Sep 80 | | 18 Sep 80 | |
|---|---|---|---|---|---|---|
| Figure | | | 2 | | | |
| Estimated age (days) | 1 to 2 | 4 to 5 | 8 to 9 | | 11 to 12 | |
| Size of nestling | 1 larger about 30% | 1 larger about 20% | 1 larger about 10% | | 1 larger about 10% | |
| Head movement | larger-yes<br>smaller-no | yes-both | yes | | yes | |
| Begging response | larger-yes<br>smaller-no | yes-both | no | | no | |
| Oral cavity color | bright orange-pink | orange-pink | not determined | | not determined | |
| Status of eye | closed | closed | open | | open | |
| Egg tooth present | yes | no | no | | no | |
| Beak color | bright yellow | yellow | light yellow | | brown-yellow | |
| General body characteristics | naked | naked | partly covered | | covered | |
| Cowering response | no | no | yes | | yes | |
| Fecal sac in nest | 0 | 0 | 1 | | 2 | |
| Feather tract | | | s, h | | s, h | |
| location[1] | all | all | s,h | c, f | s,h | c, f |
| Feather type | down | down | pin feather | down | feathered[2] | pin feather |
| Color of feather | gray | gray | gray | gray | gray-green | gray-green |
| Body feather cover (%) | 1-2 | 5-10 | 20 | 60 | 30 | 70 |

[1] c = capital, s = spinal, h = humeral and f = femoral

[2] with basal shaft in sheath

The post-brooding period lasted 11 days before the nestlings fledged (Table 2). During 8 days of observation in this stage, both adults searched for food and fed the nestlings. In 690 min of observation, excluding our nest checks, both adults made 21 feeding visits to the nest, or 1.82 trips/hr. The female made 10 of the visits, ($\bar{X}$= 0.87 trips/hr with an average attentiveness of 28 sec at the nest (range 15-59 sec; S.D. = 14 sec). The male made 11 trips ($\bar{X}$= 0.95 trips/hr), and had an average attentiveness of 19 sec (range 13-31 sec, S.D. = 6 sec).

During observations of the brooding period and the first 3 days of post-brooding, the male and female together removed nine fecal sacs, an average removal rate of 0.70 trips per hour. The nest remained clean throughout the nesting cycle. Five days before fledging, both nestlings were observed defecating over the nest rim.

About 5 to 6 days before fledging, both young actively flapped their wings. Three days before fledging, the young repeatedly left the nest to perch on nearby branches.

On the day of fledging, approximately 35 days after the eggs were laid, both juvenile creepers were 8 m from the nest tree being fed by the parents.

### *Nestling Development*

We determined the nestlings' developmental patterns during the four nest checks (Table 3). On the initial check, no egg shell fragments were found in the nest, nor on the ground below the nest. The larger of the 1-2 day old nestlings lifted its head straight up and gaped. The bare skin of the nestling through day 9 (Figure 2) was orange-pink. On days 11-12, both nestlings were covered with feathers preventing a view of the body.

*Fecal sac analysis.* Using the methods of S. Nagata and C.P. Ralph (ms), we collected three fecal sacs from the nest and analyzed them microscopically to help identify the ingested foods. Invertebrates were the only items found in the sacs (Table 4).

### *Breeding Season*

All known observations, many previously unpublished, of nesting attempts by the Hawaii Creeper indicate that the creeper has a protracted breeding season of about 7 to 8 months, from January into summer (Table 5).

### *Adult Behavior During Nest Checks*

The behavior of the adults during nest checks changed as the nesting cycle progressed. Both adults were very aggressive towards the climber during the later part of the incubation period. The level of aggression declined as the nestlings grew older.

On the first check the female flew off the nest when the tree was first touched by the climber. She emitted several harsh "whit-whit" calls in flight and continued calling while perched in the nest tree, quite close to the climber.

Table 4. Contents of fecal sacs of Hawaii Creeper.

| Order | Number of individuals | Parts found |
|---|---|---|
| Arachnida | 10 | larva mandibles, spiracles, head parts |
| Lepidoptera | 7 | fangs, legs, pedipalps, or chelicerae |
| Homoptera | 1 | adult-abdominal structure |
| Coleoptera | 1 | larva mandibles, leg pieces |
| Chelonitheda | 1 | pinchers |
| Neuroptera | 1 | larva mandibles |
| Diptera | 2 | whole larva, head, antennae, wings |
| Hymenoptera | 1 | wings, head, thorax |
| Homoptera or Hemiptera | 3 | ovipositors |
| Unknown insect | 2 | sclerotized skin with spine |

Table 5. Known nesting attempts of the Hawaii race of the Hawaii Creeper.

| Date found | Reported or found by | Nest location | Tree species | Height (m) nest/tree | Nest type[1] | Initial/final status of nest[2] |
|---|---|---|---|---|---|---|
| Feb 1975 | Scott et al. (1980) | Kilauea Forest | *Acacia* | 11/23 | cavity | b/u |
| Jan 1978 | Sakai & Ralph (1980) | Keauhou Ranch | *Acacia* | 13/19 | cupped | b/u |
| Feb 1979 | A. Taylor | Kilauea Forest | *Metrosideros* | 14/23 | cavity | b/u |
| Feb 1979 | A. Taylor | Kilauea Forest | *Acacia* | 17/20 | cupped | b/u |
| Feb 1979 | C.J. Ralph | Kilauea Forest | *Acacia* | 13/19 | cupped | b/u |
| Mar 1979 | C.J. Ralph | Kilauea Forest | *Acacia* | 19/22 | cupped | b/u |
| Apr 1979 | H. Sakai | Kilauea Forest | *Acacia* | 13/22 | cupped | b/u |
| May 1979 | D. Breese | Kilauea Forest | *Metrosideros* | 14/15 | cupped | b/u |
| Aug 1980 | This nest | Kilauea Forest | *Metrosideros* | 14/18 | cupped | b/s |

[1] Cavity nests are nests in crevices or holes in trees and cupped nests are "nests elevated, without structure, consisting of loosely assembled materials arranged and compacted to form a cup" (Pettingill 1970).

[2] b/u = building/unsuccessful; b/s = building/successful

The male immediately flew into the nest tree to join in the vocal display. Both birds flew from branch to branch as the observer peered into the nest. The female approached the observer to within 0.5 m, with an average distance of 2 m.

During the second check, the female flew off the nest to perch in an adjacent tree, about 4 m away. She called "whit-whit" several times, both while flying and perched, but stopped after about a minute. She remained in the adjacent tree, hopping and calling occasionally, and did not appear excited. The male was not present during the check.

On the third check, the female flew off the nest calling several times then disappeared in the forest canopy. The adults were not present during the rest of the check. No adults were at or near the nest on the fourth and fifth checks.

### *Other Behavior*

*Head scratching.* On several occasions, we observed both adults using the indirect method to scratch the nape area. They accomplished this by extending the wing away from the body and passing the leg over the wing to scratch.

*Intraspecific behavior.* On 18 August, while the female worked in the nest and the male foraged 8 m from the nest tree, another male creeper sang twice 20 m away. The foraging male immediately showed some agitation by hopping and flying from tree to tree while singing and calling. The intruder, a

Figure 2. Hawaii Creeper nestlings about 8 to 9 days old; photo taken 15 September 1980.

color-banded bird, sang twice more and the nesting male flew towards the intruder, but no physical contact was made. The intruder immediately left its perch and was driven off with the defender in pursuit; an exchange of raspy, rapid "whit-whit" calls from both birds followed. During this entire episode, the female continued work in the nest.

*Interspecific behavior*. On 18 August, an Iiwi (*Vestiaria coccinea*) and, on 26 August, an Apapane (*Himatione sanguinea*) foraged on flowers in the nest tree, approximately 2 m from the nest, but the incubating female showed no reaction.

### *Food Items Taken*

A few observations of food taken by adults during the nesting cycle showed their preference for animal food.

*Worms*. Once the female obtained an earthworm (about 5 cm long) while foraging on a moss-covered, dead *Metrosideros* branch. She ate it by grasping it in her foot then tearing off portions. The male once plucked a light gray larvae (about 1 cm long) from a Kawau (*Ilex sandwicensis*) leaf, and the female plucked a green worm (about 1 cm long) from a *Metrosideros* leaf. In all instances, the creepers pecked the worms against a branch before eating them.

*Land snail*. Once the female obtained a snail (about 0.5 cm long) from the underside of a *Metrosideros* leaf and consumed pieces of it after pecking and probing through the shell.

## DISCUSSION

In the past 5 years, U. S. Forest Service researchers spent approximately 5000 person-days in the Keauhou Ranch and 1800 person-days in the Kilauea Forest Reserve. Keauhou Ranch is open-canopy forest grazed by cattle and logged for *Acacia* for many years. Kilauea Forest Reserve is an unlogged, ungrazed, closed-canopy forest with predominantly mature *Metrosideros* and *Acacia* trees. Despite these greater efforts in Keauhou Ranch, only one Hawaii Creeper nest has been found, as compared to eight in the Kilauea Forest Reserve (Table 5). Although the sample is not large, this difference suggests either that the nesting rate is much higher in the unlogged Kilauea Forest or that creeper nests in the logged and more open Keauhou Ranch are more difficult to locate. During and following the breeding season throughout the years, we have observed young creepers in the Keauhou Ranch.

The breeding biology of the creeper is very similar to the closely related Common Amakihi that was studied by van Riper (1978). A question might be raised as to why the Hawaii Creeper is found in low numbers and the Amakihi is very common (Berger 1981). We believe that this difference lies in their feeding strategy. The Amakihi is basically a generalist (van Riper 1978, C.J. Ralph pers. comm.) feeding on flowers, fruit and insects on bark and leaf surfaces. The Hawaii Creeper, however, is more specialized (C.J. Ralph pers.

comm.), foraging mostly on bark. There is an ever increasing alteration of native forest habitat caused by dieback of the native *Metrosideros* forest (Petteys et al. 1975), logging and grazing (Berger 1981). These habitat disturbances are most likely to affect a specialist (Fisher 1958).

## SUMMARY

Very little is known of the breeding biology of the Hawaii Creeper (*Oreomystis mana*). This is the first report of a successful nest of this species. We found the cup-shaped nest in the Kilauea Forest Reserve, Hawaii, at 1790 m elevation, built in an Ohia (*Metrosideros*) tree. The nest consisted primarily of liverworts and tree fern fibers and hair, with Olapa (*Cheirodendron*) branch fibers lining the cup. Nest-building, done mostly by the female, took approximately 14 days. Only the female incubated the two eggs, which hatched in approximately 13 days. She brooded for 9 or 10 days while the male provided some of her food. After an additional 11 days, both nestlings fledged. The species showed a protracted breeding season of about 7 to 8 months, probably from January to July or August.

## ACKNOWLEDGMENTS

We are especially grateful to the trustees of Bishop Estate for permission to conduct research on their lands. We are in debt to C.J. Ralph, our Unit's project leader, for his interest, support and many valuable suggestions in the course of this study. We thank the following individuals for their critique of the draft manuscript: Sheila Conant, Andrew J. Berger, Douglas Pratt, C.J. Ralph, J.M. Scott, Cameron B. Kepler and Charles van Riper. We also thank Stephanie Nagata and Mary Ellen Lindenfelser for analyzing the fecal sacs and acknowledge Ernie Kosaka, the U. S. Fish and Wildlife Service's Endangered Species Coordinator, and the Hawaii State Fish and Game Division's biologist, Tim Burr, for obtaining permission to climb the nest tree. We also want to express our aloha to Paul Higashino for analyzing the nest and to Dawn Breese and Joshua Kohn for their help in nest observation.

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Immature (above) and adult (below) Hawaii Creepers

*Sketch by Narca Moore*

# ANOTHER LOOK AT THE WESTERN AND YELLOW-FOOTED GULLS

GUY McCASKIE, San Diego Natural History Museum, P. O. Box 1390, San Diego, California 92112

With recognition of the Yellow-footed Gull (*Larus livens*) as a distinct species, separate from the Western Gull (*Larus occidentalis*) (American Ornithologists Union 1982), there is renewed interest in the dark-mantled gulls of western North America. In order to correctly identify these birds it is important to understand how they progress from juvenal to adult plumage, and when molts occur.

Jonathan Dwight's definitive work, *The Gulls of the World* (1925), includes much valuable information on plumages and molts, but was designed for museum workers with specimens in hand, and is now difficult to obtain, being long out of print. Recently, Peter Grant (1982) provided a masterpiece on all the gulls known to occur in the western Palearctic, *Gulls: A Guide to Identification,* with emphasis on field identification. It is from this book that the chart showing the sequence of plumages and molts, as well as the topographical terminology, is taken.

Most gulls molt twice a year, with a complete molt in late summer and early fall, and a partial molt involving only head and body feathers in late winter and early spring. The time taken to advance from juvenal to adult plumage varies among species but, in general, the larger the bird the longer it takes to attain adult plumage. Small gulls reach adult plumage in their second winter, medium-sized gulls in their third winter, and large gulls in their fourth winter. Needless to say, there are exceptions (e.g., some large gulls reach adult plumage in third winter). In addition, some individuals, particularly among the larger species, show signs of immaturity during the first year as adults (e.g., adult-plumaged birds with dark markings retained in the tail), while others advance towards adult plumage in a more rapid or retarded rate than expected (e.g., a large species of gull in third-winter plumage could possibly be in its second winter if progressing at a more rapid rate than expected, or in its fourth winter if retarded), and sick or injured birds may fail to molt at the appropriate times. Figure 1 indicates the typical sequence of plumage and the approximate seasons of molts for the three sizes of gulls as they advance from juvenile to adult. It also includes the age terminology (e.g., first-winter) in common use, which is used throughout this paper.

A basic knowledge of the various plumages of Western Gulls is necessary to identify Yellow-footed Gulls with certainty, and is essential to those interested in the differences that helped establish the Yellow-footed Gull as a distinct species in the minds of those studying the bird. Consequently, a complete review of Western Gull plumages is in order.

## WESTERN GULL *Larus occidentalis*

This species is the common dark-mantled gull of the Pacific coast of North America, nesting from the vicinity of Destruction Island in northern Washington south to Guadalupe Island off the west coast of central Baja

Western Birds 14: 85-107, 1983

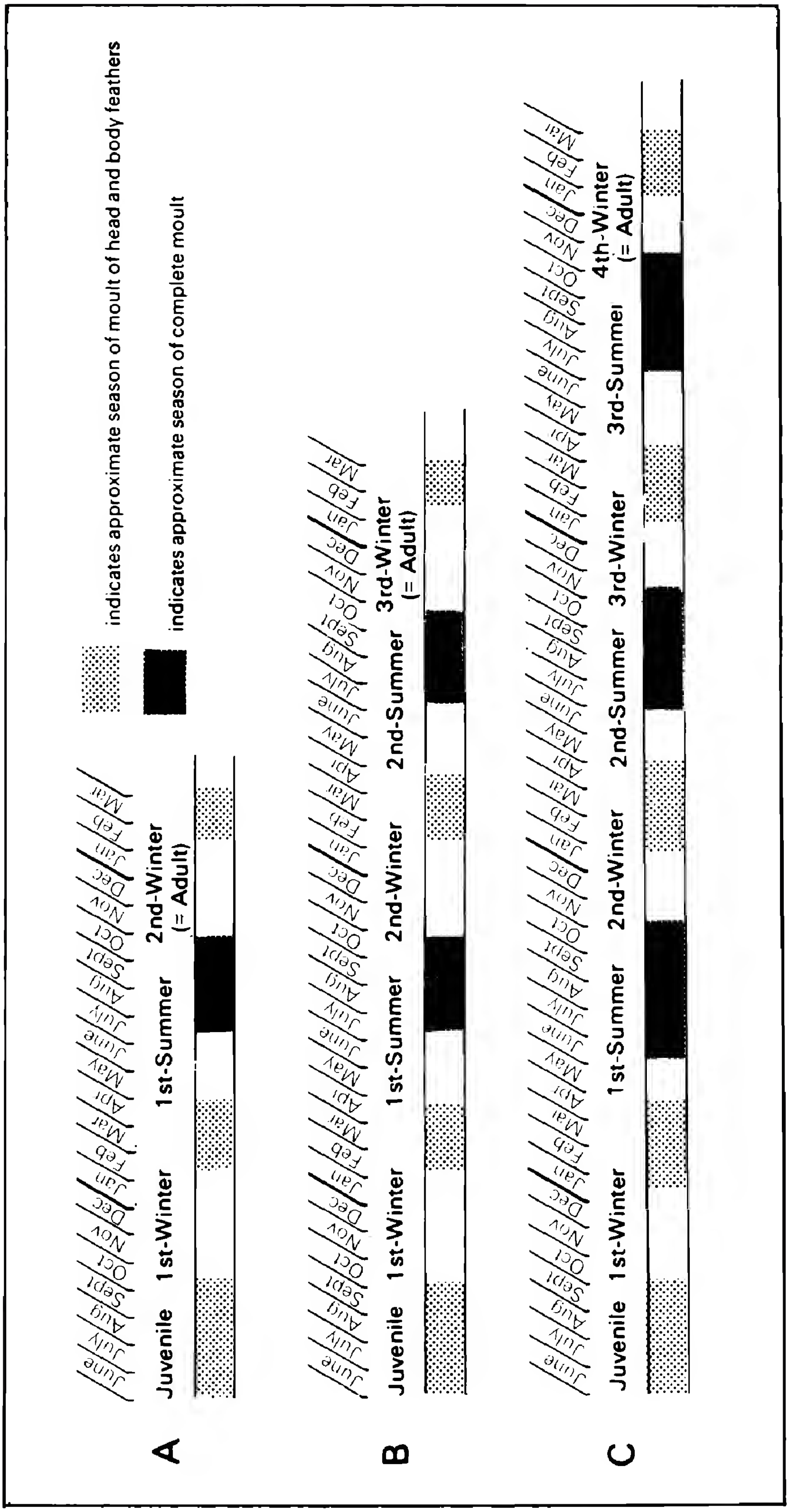


Figure 1. Sequence of plumages and moults from juvenile to adult of typical small (A), medium (B) and large (C) gulls.

Reproduced from *Gulls: A Guide to Identification* (Grant 1982) by permission of the author.

California. There are two races, the nominate form *occidentalis*, nesting from the Farallon Islands off central California northward, and the darker-mantled form *wymani*, nesting from the vicinity of Monterey Bay southward (Figure 2). At the northern limit of the range Western Gulls interbreed with the closely related Glaucous-winged Gull (*Larus glaucescens*), resulting in many intergrades (Scott 1971, Hoffman et al. 1978). In winter some birds move northward into coastal southwestern British Columbia, with a straggler recorded as far north as near Chignik on the Alaska Peninsula (Kessel and Gibson 1976:46), while others move as far south as the southern tip of the Baja California peninsula, with stragglers having reached Guaymas, Sonora, on the coast of mainland Mexico (Devillers et al. 1971). However, the species as a whole is mostly sedentary, remaining in the immediate vicinity of the coast. Feeding areas (e.g., garbage dumps) and bathing spots attract flocks a few miles inland along the coastal plain, and spawning salmon have been reported to attract individuals up major rivers (LaFave 1965, Weber 1981), but the species is otherwise accidental inland.

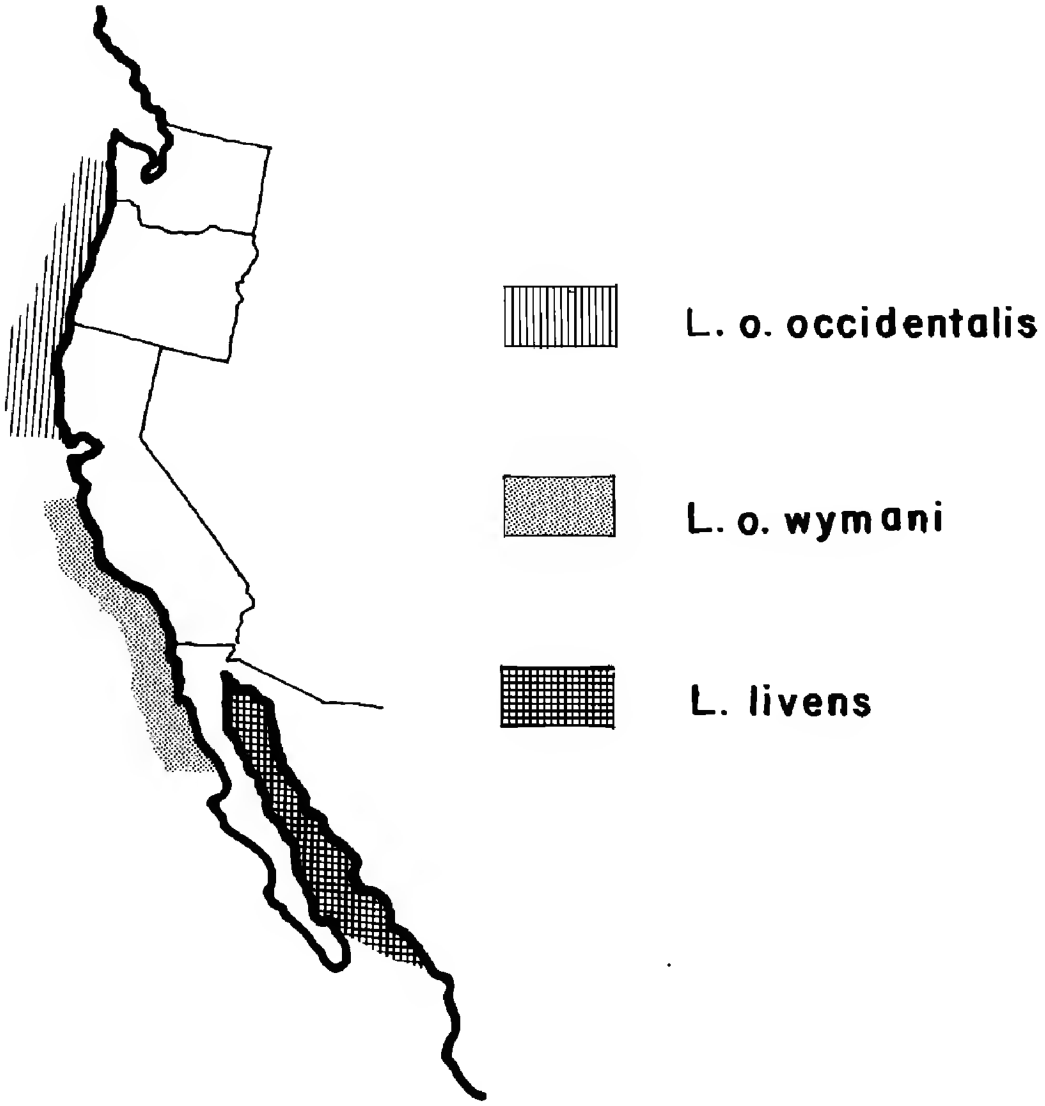


Figure 2. Breeding range of Western Gull (*Larus o. occidentalis* and *L. o. wymani*) and Yellow-footed Gull (*L. livens*).

The only occurrences from the true interior in the western United States are one (*L.o.occidentalis*) collected along the Colorado River above Parker Dam (Monson and Phillips 1981) and four seen on the Salton Sea in southeastern California (a third-winter bird along the south shore between 17 January and 13 February 1965, another there on 29 March 1969, an adult judged to be *wymani* at Salton City on 26 September 1982, and a third-winter bird, also judged to be *wymani*, there on 11 and 28 November 1982—McCaskie pers. obs.). Reports of one seen near Denver, Colorado (Am. Birds 32:1038, 1978) and another seen on Lake Mead, Nevada (Am. Birds 35:210, 1981) lack substantiating details, and all other published records from the Salton Sea are now believed to have been *L. livens*.

The Western Gull is a large gull, taking about 3½ years to acquire adult plumage. It is about the size of a Herring Gull (*Larus argentatus*), possibly a bit larger, but stockier, with a stouter bill and shorter wings, having much the body size and shape of a Glaucous-winged Gull. The southern form *wymani* is darker mantled than the northern birds at all ages, and acquires a pale eye as an adult. The nominate form *occidentalis* more closely resembles the Glaucous-winged Gull, normally having a dark eye as an adult, and having some darkness on the head and neck in winter plumage. However, the distinction between the southern birds and the northern birds is not obvious, there being more of a clinal trend, with the darkest-mantled birds in the south and the lightest-mantled birds in the north, the latter being quite similar in appearance to the more southern Glaucous-winged Gulls. The following discussion and detailed descriptions apply to the southern birds.

In juvenal plumage the Western Gull appears much like a juvenile Herring Gull, but is darker, the overall coloration being sooty-gray rather than gray-brown, and the pale edges to the feathers of the upper parts being narrower, giving the bird a less mottled appearance than juvenile Herring Gulls. The rump of the Western Gull appears whiter than that of the Herring Gull, there being a greater contrast between the back and rump than on a Herring Gull. The tail is also darker, helping to emphasize the pale rump. The flight feathers on both species are blackish, but Western Gulls lack pale areas on the inner webs of the inner primaries that form pale windows in the wings of young Herring Gulls.

First-winter Western Gulls are similar to the juveniles, but have more conspicuous white in the rump, and lack the patterning on the upper parts formed by the pale edges to the mantle and scapular feathers on the juvenile, the overall appearance being streaked and smudged. First-winter Western Gulls do not exhibit the pale-headed appearance evident on most first-winter Herring Gulls. First-summer Western Gulls are similar to first-winter, but tend to be paler about the head and underparts, with the now 1-year-old wing and tail feathers showing evidence of wear and fading, varying from little to extensive (some individuals of all gull species have primaries and rectrices that appear to be mere feather-shafts in summer). The minor differences that separate juvenile Western and Herring gulls hold true through the first summer.

In second-winter the head and body are mostly white, and the mantle and scapulars show much of the dark gray worn by the adult. The bird acquires the eye color of the adult late in the winter (pale yellow or gray to whitish for most *wymani*, but dark brown to blackish for most *occidentalis*). The wings appear much as they did in first-winter, with only a minimal amount of dark gray feathering on the wing coverts, but the primaries remain entirely blackish. The tail shows a little more white at the base than in first-winter, but is nonetheless mostly dark, contrasting sharply with the whitish rump. From this stage onward the coloration of the mantle and scapulars makes differentiating Western and Herring gulls much easier than in first-winter and first-summer. Second-summer birds are whiter about the head and underparts with relatively conspicuous white rumps. The dark gray on the upper parts becomes a little more extensive, but the wings and tail are the same as in second-winter, though showing the effects of wear.

Third-winter birds look more similar to adults, having the dark gray of the upper parts extending across the wing coverts. However, the primaries are uniform blackish without the white mirrors. There is normally some brown coloration evident on the wing coverts, and some black is always present in the tail. The bill may start to acquire some of the yellow color of the adult, but is more normally pinkish with black towards the tip (bill color is variable on most immature gulls, and is not recommended for use in aging individuals, especially after the first winter). Third-summer birds look much the same, but never show any dusky coloration about the head and neck, and many individuals have bare parts matching those of the adult.

Adult Western Gulls in the winter are entirely white about the head and throughout the underparts. The mantle and upper sides of the wings are dark gray merging into the black primaries. White tips to the primaries and secondaries form a prominent white trailing edge to the wing, and the outermost primary contains a small white mirror. The dark flight feathers contrast noticeably with the white underwing coverts, and the white trailing edge to the wing is quite evident from below. The rump and tail are entirely white. The bill is yellow with a reddish-orange spot at the gonys. Southern birds have only a minimal amount of dusky spotting about the head and neck (difficult to see on many individuals), but this mottling is more evident on winter adults from the more northern populations, and is most evident on those hybrids with Glaucous-winged Gulls. Summer adults are similar, but normally lose the white tips to the primaries due to wear, and the bare parts are more brightly colored at the onset of the breeding season. All dusky markings about the head and neck are gone. A more detailed description of each plumage follows.

**Juvenile** (Figures 3A, 4, 5, and 7A).

HEAD Rather uniform sooty-gray, darkest immediately ahead of the eye and on the ear-coverts, with diffused pale gray streaking on the crown, nape and neck.

BODY Underparts sooty-gray flecked with white, the individual feathers dark sooty-gray finely edged with pale gray to white, the lower belly and vent being somewhat paler than the rest of the underparts. Mantle and scapulars dark sooty-gray liberally flecked with white, the individual feathers blackish finely edged with white, the larger scapulars presenting a "scaled" appearance. Rump and uppertail coverts whitish liberally flecked with black, appearing paler than the back, but not strikingly so.

WINGS Wing coverts sooty-gray flecked with white much as the mantle and scapulars, the individual feathers being sooty-gray edged with white, but also having extensive pale brown blotches, this brown coloration being most evident on the greater coverts and tertials. Primaries blackish and secondaries dark brown to blackish with a narrow line of pale gray at the very tip of the inner primaries, and more noticeable pale buffy-gray tips to the secondaries, forming a narrow pale trailing edge to the wing. Underwing coverts and axillaries blackish, appearing darker than the underside of the flight feathers.

TAIL Blackish with pale buffy-gray terminal stripe formed by light tips to feathers.

BARE PARTS Iris blackish. Orbital ring dark gray to black. Bill entirely black. Legs and feet blackish with traces of dirty pink throughout, the extent of pink varying from individual to individual.

**First-winter** (Figure 3B). Acquired by post-juvenal head and body molt between August and November. There is much variation in the length of time individuals retain juvenal plumage, some having acquired first-winter plumage by early October while others are still in juvenal plumage in November.

HEAD AND BODY Head sooty gray-brown, slightly paler than in juvenile, with the area immediately ahead of the eye and ear-coverts being the darkest, and the nape and hindneck tending to be the palest. Underparts smudged sooty gray-brown, the white flecking of the juvenile now appearing more diffused. Mantle and scapulars sooty gray-brown smudged with light gray, the "scaled" appearance of the juvenile gone, the individual feathers being sooty gray-brown with diffused pale gray edges. Rump and uppertail coverts whitish liberally flecked with sooty gray-brown, still appearing paler than the back.

WINGS AND TAIL Wing coverts sooty gray-brown matching the coloration and pattern of the mantle and scapulars. Primaries and secondaries dark brown to blackish, underwing coverts and axillaries blackish, and tail blackish as in juvenile.

BARE PARTS Iris blackish. Orbital ring dark gray to blackish. Bill black with varying amounts of dirty pink at the extreme base, particularly at the base of the lower mandible. Legs and feet dirty pink.

**First-summer** (Figure 3C). Acquired by head and body molt between February and April, with wing and tail feathers of the juvenile retained.

HEAD AND BODY Head much as in first-winter but somewhat lighter, with the dark area around the eye retained. Body much as in first-winter with underparts tending to be somewhat paler, and the markings on the upperparts appearing smudged.

WINGS AND TAIL Wing coverts dark gray-brown like the mantle and scapulars. However, wear and bleaching affects the appearance and color of the feathers, particularly the greater coverts which can be anything from pale brown to almost whitish. The primaries and secondaries, now a year old, tend to show the effects of wear, and are decidedly brownish. The tail, also a year old, matches the primaries.

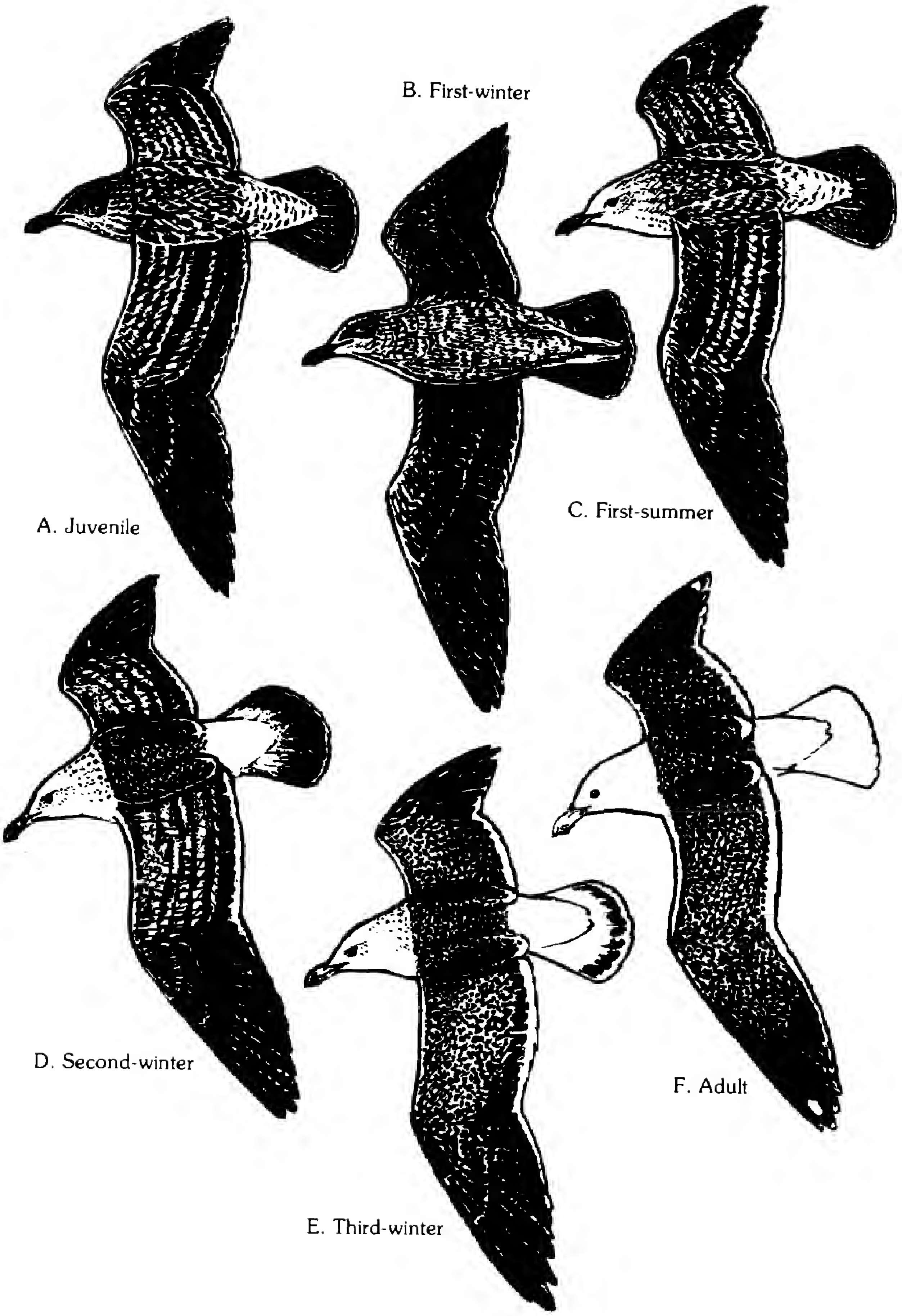
BARE PARTS Iris now detectably paler than the pupil, but still quite dark. Orbital ring dark gray. Bill much as in first winter, but with more dirty pink at the base. Legs and feet pinkish with a gray tone.

**Second-winter** (Figure 3D). Acquired by a complete molt between July and October.

HEAD Mostly white with varying amounts of dusky-gray smudging and spotting, particularly around the eye, and most noticeably ahead of the eye.

BODY Underparts mostly white with varying amounts of dusky-gray scalloping on the breast and belly, the lower belly and vent tending to look cleaner than the breast. Mantle and scapulars mostly uniform dark gray, but containing some gray-brown feathering. Tips of the longest scapulars pale brown to whitish forming pale scapular crescents, and the tips of the longest tertials whitish forming pale tertial crescents. Rump and uppertail coverts white with a minimal amount of dark flecking and smudging.

WINGS Wing coverts much as in first-winter, but having a little more of the dark gray feathering on the lesser coverts, contrasting sharply with the much more uniformly colored back. Primaries blackish with no trace of white mirrors, though inner primaries tipped pale gray to white. Secondaries dark brownish-gray tipped with pale gray forming a pale line along the trailing edge of the wing. Underwing coverts and axillaries dirty brown mottled with white, appearing quite dark, and matching the color of the underside of the flight feathers.



A. Juvenile

B. First-winter

C. First-summer

D. Second-winter

E. Third-winter

F. Adult

Figure 3. Western Gull (*Larus occidentalis*).

TAIL Mostly blackish, but some white mottling towards the base, particularly at the base of the outer tail feathers, and narrow pale terminal band formed by pale gray tips to the individual feathers.

BARE PARTS Iris pale gray-brown. Orbital ring gray. Bill pink with varying amounts of black on the tip, though the very tip is normally whitish, the black merging into the pink rather than appearing sharply separated as in first-winter California Gulls (*Larus californicus*). Legs and feet dusky-pink.

**Second-summer.** Acquired by head and body molt between February and April, the wing and tail feathers of second-winter being retained.

HEAD AND BODY Much as in second-winter, but head and underparts whiter, and mantle and scapulars acquiring more of the uniform dark gray associated with the adult.

WINGS AND TAIL Much as in second-winter, but wing coverts acquiring a little more of the dark gray, and the underwing coverts and axillaries appearing a little whiter. The flight feathers are normally paler due to wear and bleaching.

BARE PARTS The orbital ring may show a trace of yellow and the bill can show some yellow tones in the areas of pink, with the black at the tip becoming more restricted.

**Third-winter** (Figures 3E and 6). Acquired by complete molt between July and October.

HEAD White with dusky mottling, particularly around the eye, and on the nape and hindneck, the extent of this mottling being more than that present in adult, but much less than that of a Herring Gull.

Figure 4. A juvenile Western Gull showing pattern of upperparts. Carmel, Monterey County, California, August 1982. *Photo by Don Roberson*

BODY Underparts mostly white with varying amounts of dusky mottling about the sides of the breast, clearest on the center of the breast and upper belly. Mantle and scapulars uniform dark gray with a hint of brown, the ends of the longest scapulars and tertials being white forming scapular and tertial crescents. Rump and uppertail coverts white.

WINGS Similar to adult in winter, the entire upper surface being uniform dark gray merging into the black of the primaries, and the white tips on the secondaries and inner primaries forming a bold white line along the trailing edge of the wing. However, the outer primaries lack the white tips and there is no mirror on the outer primary, and varying amounts of blackish coloration are present along the leading edge of the outer wing. including the primary coverts and alula. Most individuals retain some brown feathering on the wing coverts that disrupts what would otherwise be the uniform appearance of the adult. Underwing coverts and axillaries white flecked with dark brown, appearing mostly white.

TAIL White with black subterminal marks of highly variable extent and pattern forming an irregular black band toward the tip of the tail.

BARE PARTS Like adult except for bill which is typically pinkish with varying amounts of black towards the tip and which often lacks red at the gonys.

**Third-summer.** Acquired by head and body molt between February and April, the wing and tail feathers being retained.

Similar to third-winter, except head and underparts entirely white, all dusky mottling having been lost. Flight feathers, particularly the primaries, show evidence of wear

Figure 5. A juvenile Western Gull in flight. Carmel, Monterey County, California, August 1982. Compare this with the juvenile Yellow-footed Gull in Figure 10.

*Photo by Don Roberson*

(white tips to primaries lost). Bill frequently contains red at the gonys along with the black near the tip and is now decidedly yellow (some individuals have adult bill coloration in third-summer).

**Adult winter (fourth winter)** (Figure 3F). Acquired by complete molt between July and October.

HEAD AND BODY Head entirely white with faint dusky mottling evident on most individuals (this mottling can be somewhat restricted and difficult to see unless carefully looked for). Underparts entirely white. Mantle and scapulars uniform dark gray. White tips to longest scapulars and tertials form bold white scapular and tertial crescents. Rump and uppertail coverts entirely white.

WINGS AND TAIL Upper surface of wing uniform dark gray merging into black primaries. White feathering at the marginal coverts form a thin white line along the

Figure 6. A third-winter Western Gull in flight showing typical tail pattern. A second-winter Yellow-footed Gull looks similar, but would have much more black in the tail, and would lack dusky markings about the head. *Photo by Don Roberson*

leading edge of the inner wing. White tips to the secondaries and inner primaries form a bold white trailing edge to the wing. Outer primaries black with small white tips and somewhat restricted white mirror on outer primary (white mirror present on second primary in some individuals). Underwing coverts and axillaries pure white, contrasting sharply with black underside of primaries and dark gray underside of secondaries (white trailing edge to the wing is a prominent feature on Western Gulls viewed from below). Tail entirely white.

BARE PARTS Iris pale gray to white. Orbital ring pale yellow. Bill yellow with orange-red spot at gonys and whitish tip. Legs and feet dark pinkish.

**Adult summer.** Acquired by head and body molt between February and April, the wing and tail feathers being retained.

As adult winter, except all traces of dusky marking about the head lost, the bird appearing clean white throughout with dark gray mantle and upper wings merging into the black primaries. White tips to outer primaries invariably lost due to wear. Coloration of bare parts more intense at the onset of nesting, the yellow of the orbital ring being brighter, and the color of the bill deeper.

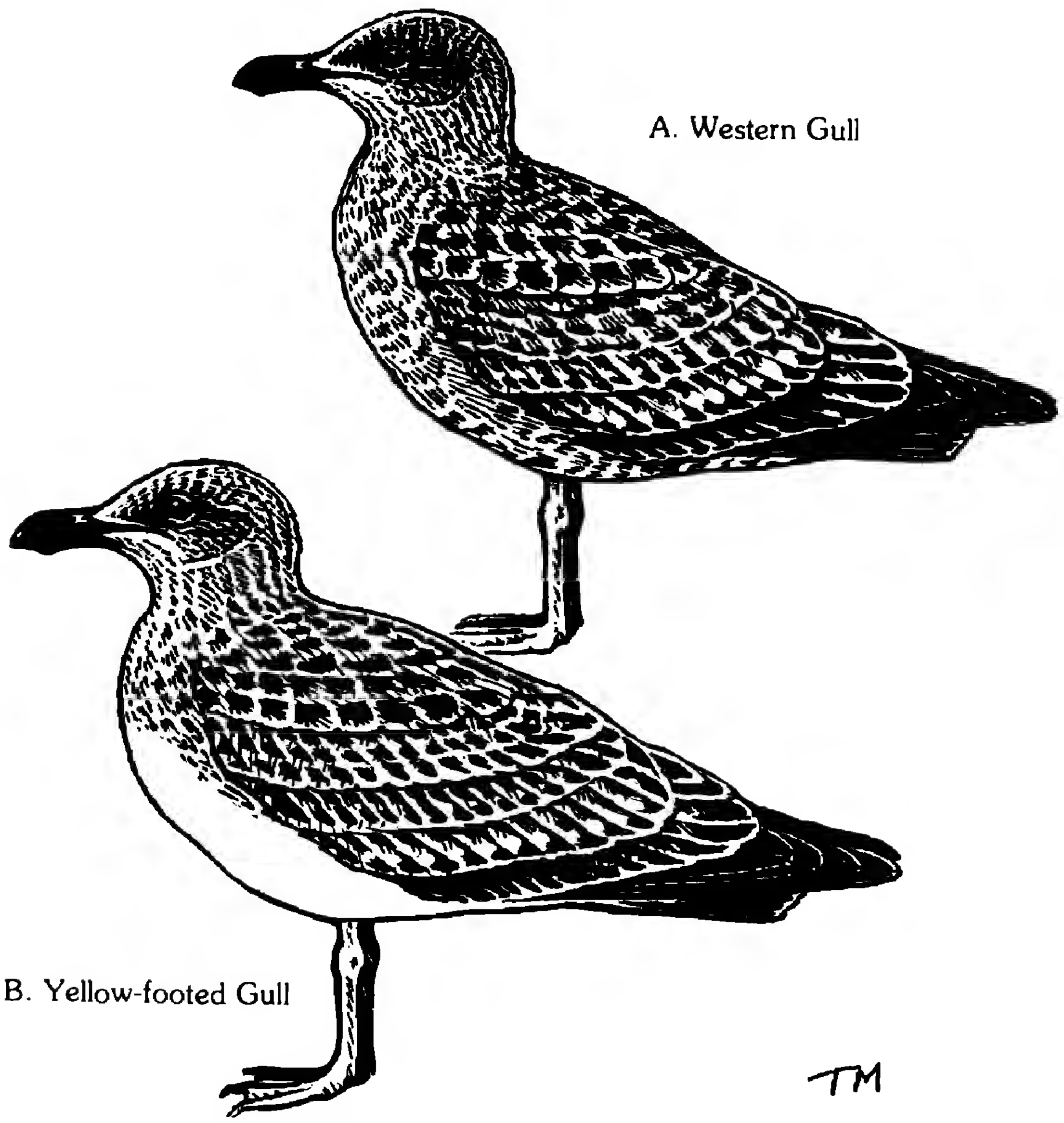


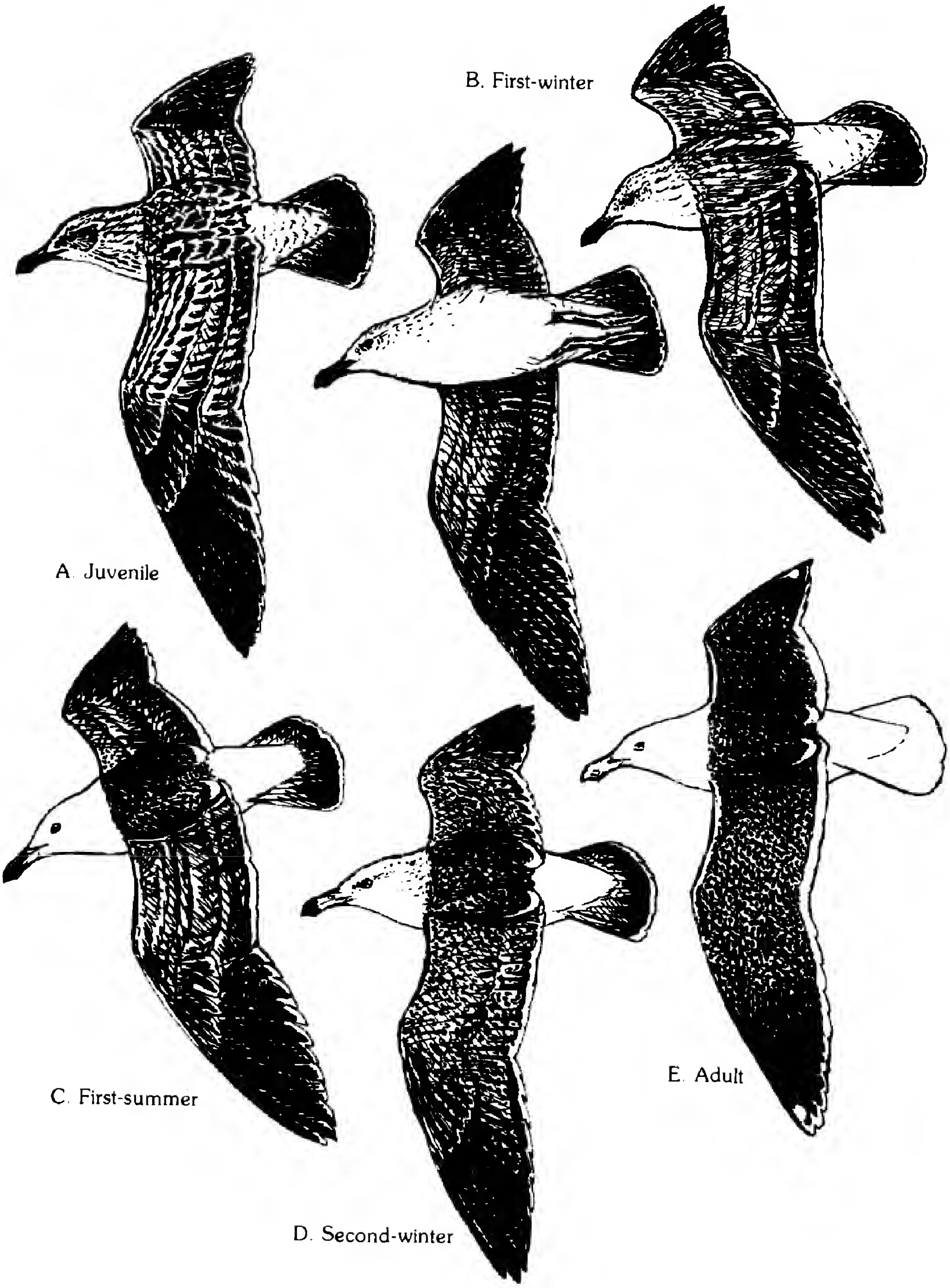
Figure 7. Juvenal plumage of Western Gull (*Larus occidentalis*) and Yellow-footed Gull (*L. livens*).

## YELLOW-FOOTED GULL *Larus livens*

This species is the large dark-backed gull that is resident in the Gulf of California. A historic review of this species, and the Western Gull with which it had until recently been considered conspecific, illustrates the state of confusion surrounding this bird. John James Audubon (1839) first described the Western Gull from two specimens collected near the mouth of the Columbia River in southern Washington in early October 1836, and named the bird *Larus occidentalis*. Subsequent ornithologists believed the range to be the entire west coast of North America from Washington to the tip of Baja California and throughout the Gulf of California. Dwight (1919) pointed out that the more southern Western Gulls had noticeably darker mantles, and on the basis of a specimen collected on San Jose Island in the Gulf of California, described the darker mantled birds as a new race *Larus occidentalis livens*, retaining *Larus occidentalis occidentalis* for the more northern paler-mantled birds, and stated that both forms have yellow feet. *Larus occidentalis livens* was believed to range from central California south to the tip of Baja California and throughout the Gulf of California.

Following Dwight's description of *livens* there was a period of disagreement among authorities as to the color of the legs and feet of Western Gulls, with Allan Brooks (1922) stating that all Western Gulls along the Pacific coast have pink legs. However, in 1925 A. J. Van Rossem correctly assessed the situation, pointing out the fact that all Western Gulls on the Pacific coast have pink legs, while those in the Gulf of California have yellow legs. This observation led to the separation of the Western Gull into three races, the nominate form *occidentalis* occurring along the Pacific coast from Washington to central California, a newly described dark-mantled, pink-legged form *wymani* occurring from central California to the Pacific coast of Baja California, and the yellow-legged birds of the Gulf of California retaining the name *livens* (Dickey and Van Rossem 1925). Donald Dickey and A. J. Van Rossem suggested the yellow-legged birds of the Gulf of California might be specifically distinct, but lacked current knowledge about the breeding distribution in Baja California, and the possible intergradation between *wymani* and *livens*.

We now know that the vocalizations of Yellow-footed Gulls differ from those of Western Gulls, in particular in the "long call" of *livens*, which is noticeably lower pitched, justifying suggestions that the Yellow-footed Gull be treated as a separate species from the Pacific coast birds (Hand 1981). In addition, breeding colonies of Yellow-footed Gulls differ from those of Western Gulls. Yellow-footed Gulls place their nests on beaches in a row roughly paralleling the tide line, allowing them unimpeded access to the water without having to cross other territories (Hand et al. 1981); in sharp contrast, Western Gulls form clustered colonies high above the water. These differences support the suggestion that *livens* is a distinct species. It is also believed that the Yellow-footed Gull is confined to the Gulf of California as a breeding bird, and that the Western Gull breeds no farther south than halfway down the Pacific coast of Baja California (Figure 2); thus nesting areas do not overlap. In actuality, there is very little contact between these two species at any time of the year, since few Western Gulls enter the Gulf of California, and the Yellow-footed Gull is accidental along the Pacific coast.



A. Juvenile

B. First-winter

C. First-summer

D. Second-winter

E. Adult

Figure 8. Yellow-footed Gull (*Larus livens*).

*Sketches by Tim Manolis*

The Salton Sea in southeastern California is the only locality in the United States where Yellow-footed Gulls regularly occur, and their occurrence there is a relatively recent phenomenon. The first record was of an adult found near Salton City on 22 August 1965 (Devillers et al. 1971). Numbers gradually increased through the 1960s, with as many as 45 individuals a day recorded during July 1969. This increase continued through the 1970s, and today the Yellow-footed Gull is a relatively common late summer visitor (e.g., 250+ on 7 August 1982), present between late June and the end of September, with smaller numbers (15 maximum) remaining through the winter, and an occasional straggler found in spring and early summer. Most are found along the bare sandy shores and around rocky jetties, as at Salton City, being much scarcer on mudflats, as at the mouth of the Whitewater River, but occasionally found in irrigated fields, as south of the Salton Sea. Most individuals found in winter and spring are in first-year plumage, there being no records of adults at this time of the year. Juveniles appear in early July (10 July 1976, 1977 and 1982 are the earliest arrival dates for juveniles in the past 10 years) at the time the species is most numerous on the Salton Sea.

There are only four records from along the coast of California, all in San Diego County: a second-summer female collected in San Diego on 23 June 1966 (San Diego Natural History Museum 36001); an adult seen in the Imperial Beach/Otay area on 7 December 1978 and 19 January 1979 (Am. Birds 33:314, 1979); and two adults (one a third-winter bird showing some black in the tail) seen around Otay between 13 and 28 February 1981 (Am. Birds 35:336, 1981).

The Yellow-footed Gull is one of the larger gulls occurring along the west coast of North America, being on average slightly larger than the similar appearing Western Gull, but with a heavier bill. However, unlike all other large gulls occurring in North America, the Yellow-footed Gull acquires adult plumage in only 2½ years. Yellow-footed Gulls nest early in the year, with eggs laid by early April, and young fledged by late June. The complete molt of late summer occurs earlier than that of the more northern large gulls, and starts as early as May, being virtually complete by September. The partial molt of late winter also occurs earlier, with birds showing evidence of molt in December; this molt is completed by March.

The juvenile Yellow-footed Gull is strikingly different from the juvenile Western Gull, having more boldly patterned upperparts, conspicuous white underparts, and a whiter rump. The overall color is quite dark about the head and neck, though paler than a juvenile Western Gull, and not as brown as a Herring Gull. The back is more boldly patterned than that of a juvenile Western Gull, the feathers being broadly edged with light gray-buff, adding a slight brownish tone, though still extremely dark. The belly and undertail coverts are mostly white, strikingly different from the sooty-gray underparts of the juvenile Western Gull, and the rump is conspicuously whiter (less spotted with dark flecking) than that of a juvenile Western Gull, contrasting sharply with the dark tail and back.

In the first winter the Yellow-footed Gull acquires much white about the head and neck, but loses much of the bold patterning on the upperparts, the back being a more uniform gray-brown. At this stage it more closely resembles a second-winter Western Gull, but lacks any of the dark gray feathering on the mantle. The dark gray feathering like that worn by adults is present on the mantle in first-summer plumage, and the bird now resembles a second-summer Western Gull, but having more black in the tail and with the legs showing traces of yellow.

Second-winter birds look much more similar to adults, having the dark gray of the mantle extending across the wing coverts and merging into the black of the primaries. However, the primaries lack white mirrors, and the wing coverts show a definite brownish cast. At this stage the bird most closely resembles a third-winter Western Gull, but has much more black in the tail, the bill is yellow with a black tip, and legs and feet are yellow. Second-summer birds look much the same, but are whiter about the head and show signs of wear on the wings and tail. Many second-summer birds have the full colored bill of an adult.

Adult Yellow-footed Gulls in winter are entirely white about the head and underparts, with dark gray mantle and uppersides to the wings merging into the black of the primaries, looking similar to the Western Gulls found along the coast of southern California. However, these adults appear to lack dusky markings on the head in winter, and have bright yellow legs and feet instead of the pink legs and feet of the Pacific coast birds. In summer the white tips to the primaries are lost due to wear, and the color of the bare parts is brighter, but the plumage is otherwise identical to winter. A more detailed description of each plumage follows.

**Juvenile** (Figures 7B, 8A, 9 and 10).

HEAD Top of head and hindneck gray-brown finely streaked with white, the individual feathers being gray-brown finely edged with white. Eye-crescent and ear coverts darker gray-brown, lacking white streaking, giving the bird a dark facial appearance. Chin, throat and foreneck white liberally marked with diffused elongated spots of gray-brown, the individual feathers being mostly white mottled with gray-brown, these diffused spots terminating in a somewhat well-defined line across the lower breast, forming an obvious line of demarcation between the dark breast and the white belly.

BODY Underparts mostly white with some diffused gray-brown mottling on the flanks, and widely spaced spots on the undertail coverts. Mantle and scapulars relatively boldly patterned, the individual feathers being dark gray-brown boldly edged with pale whitish-buff, the entire upperparts appearing fresh and unworn. Rump and uppertail coverts white with limited dark gray-brown flecking throughout, this flecking being noticeably reduced from that found on juvenile and first-winter Western Gulls, resulting in a whitish rump that contrasts sharply with the blackish tail and dark back.

WINGS Wing coverts dark gray-brown boldly patterned with whitish-buff matching the mantle and scapulars. However, greater coverts (including primary coverts) are darker with pale edgings more restricted. Primaries and secondaries uniform blackish with no obvious pale edges on the primaries, but narrow pale tips on the secondaries form a narrow line along the trailing edge of the wing. Underwing coverts and axillaries dark gray-brown, with a minimal amount of white flecking visible, appearing almost blackish in the field, and looking darker than the undersides of the flight feathers.

TAIL Entirely blackish with pale gray tips to the individual feathers forming a narrow terminal band.

BARE PARTS Iris dark. Orbital ring dark gray. Bill entirely black with small amount of white at the very tip (some individuals show small amount of pink at the very base of the lower mandible). Legs and feet a dirty-looking pinkish with no indication of yellow at this early stage of development.

**First-winter** (Figures 8B, 11 and 12). Acquired by post-juvenal molt of head and body feathers between July and September, the wing and tail feathers being retained.

HEAD AND BODY Head and neck much whiter than in juvenile, there being no contrast in color between the breast and belly because most of the diffuse gray-brown elongated spotting has been lost. In addition, much of the darkness around the eye and on the ear coverts is lost, the facial area being mostly whitish with dark feathering restricted to the area immediately around the eye (mostly ahead of the eye). Mantle and scapulars more uniform dark gray-brown, having a definite gray cast; most of the bold whitish edgings to the feathers are now gone. Light gray-brown tips on the longest tertials form pale diffused tertial crescents. Rump and uppertail coverts white with only a limited amound of gray-brown flecking, appearing whiter than in the juvenile.

WINGS AND TAIL Wing coverts gray-brown similar to the mantle and scapulars, most of the pale edges to the individual feathers having been lost. Underwing coverts and axillaries much as in juvenile. Primaries, secondaries and tail feathers are those of the juvenile.

BARE PARTS Iris remains dark and the orbital ring remains dark gray. Bill mostly black with varying amounts of pinkish-yellow at the base, particularly on the lower mandible, and small amount of white present on the very tip. Legs and feet pinkish, much as in juvenile.

**First-summer** (Figures 8C, 13 and 14). Acquired by partial molt involving only head and body feathers between December and March, the juvenal wing and tail feathers being retained.

Figure 9. A mixed group of Yellow-footed Gulls including four juveniles, one bird in transition from first-summer to second-winter plumage (the adult-like bird in the center) and two full adults. Salton City on the Salton Sea, July 1982.

*Photo by Richard E. Webster*

HEAD AND BODY  Appearance much as in first-winter, except head and underparts now generally whiter with diffuse brown streaking confined to hindneck, and a limited amount of brown spotting in the immediate area of the eye. Mantle and scapulars now mostly uniform dark gray with a brownish cast, the feathers themselves being dark gray with a trace of brown. Rump and uppertail coverts white, virtually devoid of dark flecking.

WINGS AND TAIL  Wing coverts remain much as in first-winter plumage, contrasting with the uniform gray appearance of the mantle and scapulars, but due to wear are now paler, the greater coverts often showing much abrasion. Primaries and secondaries, along with the tail feathers, are those worn in juvenal plumage, but now appear browner due to wear and bleaching. Underwing coverts and axillaries show more white flecking than in first-winter, but remain quite dark.

Figure 10. A juvenile Yellow-footed Gull in flight showing the white underparts. Mouth of the Whitewater River at the north end of the Salton Sea, July 1982.

*Photo by Richard E. Webster*

BARE PARTS Iris is now noticeably paler than in juvenile, some individuals acquiring noticeably whitish iris by the end of the first summer. Orbital ring remains gray, slightly paler than in juvenile. Bill pinkish-yellow at the base and black at the tip, the pinkish-yellow merging with the black at about the mid-point of the bill, and the very tip of the bill retaining the small area of white. Legs and feet now show strong traces of yellow.

**Second-winter** (Figures 8D and 15). Acquired by a complete molt between June and September.

HEAD Mostly white with fine diffuse gray-brown streaking on the crown and ear coverts extending down the nape, and becoming more conspicuous (long diffuse gray-brown streaks) on the hindneck, and occasionally extending to the sides of the breast.

BODY Underparts mostly white, but not appearing clean white as in the adult. Mantle and scapulars uniform dark gray (a shade paler than the dark gray of the adult) with a trace of brown. White tips to the longest scapulars and tertials form prominent scapular and tertial crescents. Rump and uppertail coverts white.

WINGS Wing coverts uniform dark gray matching the mantle and scapulars, but containing a trace more brown coloration. The fresh primaries and secondaries are blackish, with pale tips to the secondaries and inner primaries forming a white line along the trailing edge of the wing. Underwing coverts and axillaries dark brown liberally flecked with white, with the greater underwing coverts being mostly white.

TAIL Mostly blackish with whitish terminal band formed by pale gray tips to the feathers, the individual feathers being dark gray with broad black borders, there being only a minimal amount of white mottling at the very base of the feathers, and that confined to the inner webs of the feathers. The overall effect is of a uniform blackish tail contrasting sharply with the white rump. Although the bird now appears most like the third-winter Western Gull, the tail itself appears mostly dark, never showing the white at the base which is so evident on third-winter Western Gulls.

Figure 11. A Yellow-footed Gull in transition from juvenile to first-winter plumage showing the paleness about the head and neck. North end of the Salton Sea, August 1982. *Photo by Richard E. Webster*

Figure 12. A first-winter Yellow-footed Gull in flight showing the contrasting pale rump. Red Hill at the south end of the Salton Sea, November 1982. *Photo by Jerry Oldenettel*

Figure 13. A first-summer Yellow-footed Gull standing among Ring-billed Gulls (*Larus delawarensis*) indicating relative size, and showing uniform dark gray on the mantle. Salton City on the Salton Sea. *Photo by Richard E. Webster*

BARE PARTS Iris now appears whitish, but not the pale white of an adult. Orbital ring pale yellowish. Bill yellow with terminal third black, and the very tip whitish, there being a relatively well-defined line of demarcation between the yellow of the base and the black of the tip, and a trace of red at the gonydial angle of some individuals. Legs and feet yellow with traces of pink disappearing as the winter progresses.

**Second-summer.** Acquired by partial molt of head and body feathers between December and March, the wing and tail feathers being retained.

HEAD AND BODY Head and neck pure white as are the entire underparts. Mantle and scapulars uniform dark gray with a slight brownish tone. White tips of the longest scapulars and tertials form prominent scapular and tertial crescents. Rump and uppertail coverts entirely white.

WINGS AND TAIL Wing coverts uniform dark gray matching the mantle and scapulars, but showing a little more brown coloration, especially on the greater coverts (feather wear will exaggerate the brown coloration). Blackish primaries and secondaries now showing the effects of wear. Underwing coverts and axillaries virtually uniform white with only a minimal amount of dark flecking confined to the lesser underwing coverts. Tail mostly blackish as in second-winter, but like wing feathers, showing effects of wear. The presence of varying numbers of all-white rectrices in some individuals results in a checkered pattern, and suggests that some tail feathers may be molted when the gull goes from second-winter to second-summer.

Figure 14. A Yellow-footed Gull in transition from first-summer to second-winter plumage, showing extent of diffused streaking on the head and neck. Salton City on the Salton Sea, July 1982. *Photo by Richard E. Webster*

BARE PARTS Iris pale yellow to whitish. Orbital ring pale, showing traces of yellow. Bill mostly yellow at the base with black near the tip becoming much more restricted, and varying amounts of reddish color present at the gonys, with the very tip whitish. Legs and feet yellow.

**Adult winter** (third-winter) (Figure 8E). Acquired by complete molt between June and September.

HEAD AND BODY Entire head and underparts pure white, there being no apparent dusky markings about the head as in most other large species of gulls in winter. Mantle and scapulars uniform dark gray with prominent white scapular and tertial crescents. Rump and uppertail coverts pure white.

WINGS AND TAIL Wing coverts uniform dark gray matching the color of the mantle and scapulars, merging into the black of the primaries. White feathers at the marginal coverts form a thin white line along the leading edge of the inner wing. The fresh primaries are black with restricted white spots at the very tips, and a small white mirror near the tip of the outermost primary. Secondaries dark gray to blackish with white tips forming a line along the trailing edge of the wing. Underwing coverts and axillaries entirely white contrasting with the blackish coloration on the underside of the primaries and secondaries. Tail entirely white (a number of individuals in third-winter show small amounts of black on the inner webs of some of the feathers).

BARE PARTS Iris pale yellow to whitish. Orbital ring pale yellow. Bill yellow with orange-red spot at the gonys. Legs and feet yellow matching the bill color.

**Adult summer.** Acquired by head and body molt between December and March.

Identical to adult winter. However, white tips to primaries lost due to wear, and the coloration of the bare parts more intense at the onset of the nesting season. The orbital ring is bright yellow (some individuals show a trace of orange), the bill is bright yellow with red spot at the gonys, and the legs and feet match the yellow color of the bill.

Figure 15. A second-winter Yellow-footed Gull showing similarity to adult birds. Red Hill at the south end of the Salton Sea, November 1982. *Photo by Jerry Oldenettel*

Although the Yellow-footed Gull most closely resembles the Western Gull as indicated above, confusion between the two is rare since their ranges seldom overlap. On the Salton Sea Herring Gulls are common in winter (mid-October to mid-April), but never show white underparts in first-winter plumage as do all Yellow-footed Gulls, and normally show some pale gray on the mantle when more than a year old. California Gulls are not as large as Yellow-footed Gulls, and have decidedly smaller bills. However, they can appear dark-mantled, and do have yellow legs in spring, but all California Gulls have dark eyes (Yellow-footed Gulls have light eyes after the first year), and never have the very dark mantle of a Yellow-footed Gull. Other large gulls found on the Salton Sea include Glaucous-winged Gulls (rare) and Thayer's Gulls (*Larus thayeri*) (rare), both having noticeably pale primaries in immature plumages, particularly from the underside, that separate them from Yellow-footed Gulls. These same species can be found associating with Yellow-footed Gulls in the Gulf of California, and are all relatively common winter visitors along the Pacific coast of southern California where the occasional Yellow-footed Gull has occurred.

Armed with the above information, today's observer can confidently go into the field, and not only correctly identify adult Western and Yellow-footed gulls, but can also identify and age those birds in immature plumages, and possibly attempt to assign some of the Western Gulls to race. Extralimital occurrences should be documented with carefully taken notes and/or good photographs. The accumulation of these records will aid in our understanding of the distribution and movements of these birds.

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Pierre Devillers must be acknowledged as the person singly responsible for bringing to all our attention the most significant fact indicating that the Yellow-footed Gull is a species distinct from Western Gull, i.e., that Yellow-footed Gulls, unlike Western Gulls and most other large gulls, acquire adult plumage in only 2½ years. I also wish to thank Pierre for the many enjoyable hours I spent in the field with him from 1967 through 1970.

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## RECORDS OF THE SCOTT'S ORIOLE FROM WYOMING

SCOTT L. FINDHOLT, Wyoming Natural Heritage Program, The Nature Conservancy, 1603 Capitol Avenue, Room 325, Cheyenne, Wyoming 82001 (present address: Wyoming State Training School, Lander, Wyoming 82520)

SAM D. FITTON, Game and Fish Department, 260 Buena Vista Drive, Lander, Wyoming 82520 (present address: 1976 Timberman Road, Hamilton, Ohio 45013)

The first sighting of a Scott's Oriole (*Icterus parisorum*) in Wyoming occurred on 24 June 1967 when O. K. Scott observed an adult male on "Trash Hill," 4 km southeast of Rock Springs, Sweetwater Co. Scott found another adult male in the same location on 1 July 1972. The Scott's Oriole was not seen again in Wyoming until R. Jackman located an adult male and an adult female or immature in Little Firehole Canyon, 13 km southeast of Green River, Sweetwater Co., on 20 May 1980. An adult male was observed in the same location by R. Jackman and D. Johnson the following day.

Several Scott's Orioles were reported from Wyoming during 1982. On 10 June Findholt saw an adult male in Firehole Canyon, 18 km southeast of Green River, Sweetwater Co. Another adult male was discovered by Fitton in Little Firehold Canyon on 26 June, near where the sightings were made in 1980. Two different adult males were observed by Fitton on Powder Rim, approximately 106 km southeast of Rock Springs, Sweetwater Co., on 16 May and 29 June, respectively. Also, on 29 June Fitton located a pair of adults near Anthill Reservoir, approximately 105 km southwest of Rawlins, Sweetwater Co., and 1 km north of Colorado.

At this same location on 26 July 1982 Fitton found and photographed a Scott's Oriole nest containing one addled egg. The adult male was observed near the nest feeding one flightless young. Also, Scott's Oriole call notes were audible nearby, indicating that the female and other young orioles may have been present. The nest has been deposited at the Museum of Vertebrate Zoology, University of Wyoming, Laramie, Wyoming. This is the first nesting record of the Scott's Oriole in Wyoming. The habitat where the nest was located and where all of the Scott's Orioles were observed consisted of Utah Junipers (*Juniperus osteosperma*) interspersed with open areas composed primarily of Big Sagebrush (*Artemisia tridentata*), other shrubs, and grasses.

According to the AOU Check-list (Fifth ed., Am. Ornithol. Union, Baltimore, MD, 1957), the breeding range of the Scott's Oriole includes southern and central western Nevada, southwestern and northeastern Utah, north-central Arizona, north-central New Mexico, and western Texas south through southeastern California to Baja California, Sonora and Coahuila. The closest nesting record to Wyoming is from northeastern Utah, where the Scott's Oriole is considered a rare summer resident (Behle, The birds of northeastern Utah, Utah Mus. Nat. Hist. Occas. Publ. No. 2, Salt Lake City, 1981). Evidence of nesting includes the collection of a female Scott's Oriole, with a well-worn brood patch and three young barely able to fly, from 40 km southeast of Vernal, Dagget Co., Utah on 25 June 1937 (Twomey, Carnegie Mus. Ann. 28:341-490, 1942). More recent Scott's Oriole nesting records that are close to southwestern Wyoming include the discovery of an isolated nesting population near Rangely, Moffat Co., in northwestern Colorado (Kingery, Am. Birds 34:917, 1980).

The large number of Scott's Oriole sightings in southwestern Wyoming during 1982 are probably the result of more observers being in the area and not a recent range expansion of Scott's Orioles into southwestern Wyoming. This species should be considered a rare summer resident in the state.

We thank Oliver K. Scott, Ron Jackman and Dave Johnson for allowing us to use their Scott's Oriole observations in this paper and Hugh E. Kingery for reviewing *American Birds* for Scott's Oriole records. Oliver K. Scott provided helpful comments on the manuscript.

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Scott's Oriole *Sketch by Keith Hansen*

# FIRST NESTING RECORDS OF WILSON'S PHALAROPE IN ARIZONA

LINDEN A. PIEST, Arizona Cooperative Wildlife Research Unit, 214 Biological Sciences East, University of Arizona, Tucson, Arizona 85721

Wilson's Phalaropes (*Phalaropus tricolor*) nest commonly throughout much of the Great Plains and Great Basin regions of the U.S. and Canada as far south as the central parts of Utah and Nevada and south-central California (American Ornithologists' Union, Check-list of North American birds, 1957). Prior to 1981, however, this species had never been reported to nest in Arizona. This note documents the nesting of Wilson's Phalaropes at Pintail Lake in southern Navajo County, Arizona, during 1981 and 1982.

Pintail Lake (elevation 1937 m) was created in 1977 by the U.S. Forest Service with sewage effluent from the city of Show Low, 4.7 km to the southwest. While studying duck nesting at Pintail Lake from 1979 through 1982, I observed other wildlife using the lake. In 1980, the first year that Pintail Lake received sewage effluent, I saw Wilson's Phalaropes there in the spring and fall but found no nests. On 15 June 1981, however, I flushed male Wilson's Phalaropes from two nests on islands that had been constructed for nesting ducks. In 1982, I flushed a male phalarope from a nest on an island on 2 June and another from a nest along the mainland shoreline on 10 June. Each of the four nests contained four eggs. The nest on the mainland was later deserted before the eggs hatched. No eggs or shells remained near the three other nests after they had terminated and so I was unable to determine if they had hatched or had been destroyed by predators. I suspect that the remaining 1982 nest hatched, however, because during a period of approximately 3 weeks after termination a male Wilson's Phalarope often hovered over my head and called when I was near the island where the nest had been located. Höhn (Auk 84:220-244, 1967) and Johns (Auk 86:660-670, 1969) noted similar behavior in make Wilson's Phalaropes that were brooding young.

Aquatic insects were unusually abundant at Pintail Lake and this food source was probably a primary attractant for the Wilson's Phalaropes and other water birds that visited there. Wetmore (U.S. Dept. Agriculture Bull. No. 1359, 1925) found that water boatmen (Corixidae) and midges (Chironomidae) were the two most commonly occurring food items in his sample of 106 Wilson's Phalaropes. These two taxa were particularly abundant at Pintail Lake.

At 34°18′N latitude, Pintail Lake is the southern-most location of Wilson's Phalarope nesting that has been reported. The nearest known nesting locality is Bluewater Lake, New Mexico, 206.4 km to the northeast (Kaufman, Hubbard and Witzeman, Am. Birds 34:918-920, 1980).

*Accepted 5 May 1983*

# A TRANSPARENT NEST BOX FOR SWALLOWS

DOUGLAS B. INKLEY, Zoology and Physiology Department, University of Wyoming, Box 3166, University Station, Laramie, Wyoming 82071

The affinity that Violet-green Swallows (*Tachycineta thalassina*) and especially Tree Swallows (*Tachycineta bicolor*) have for nest boxes is well known. Nest boxes, properly placed and maintained, may be used for many years. In this note I report the use of plexiglass in the construction of swallow nest boxes. Plexiglass facilitates observation of nesting activities such as incubation, brooding and feeding of young. Prey items may be identified and interactions among young and adults observed. Photographs inside the nest box may also be obtained. Finally, transparent nest boxes can contribute immensely to natural history education of children and adults by providing close observation opportunities without disturbing the birds.

I constructed two nest boxes of wood and plexiglass. Both nest boxes were approximately 13 cm (5 in) × 13 cm (5 in) × 20 cm (8 in) with a 3.8 cm (1.5 in) diameter entrance. The bottom, top, front and back of both boxes were made of wood.

Box 1 had two sides made of plexiglass. Black paper was initially taped in successive 2.5 cm (1.0 in) horizontal strips over the outside of the plexiglass so that the box interior would resemble a natural dark cavity. After placement on a utility pole, the box was occupied by a breeding pair of Tree Swallows. Following hatching I removed, on successive nights, one strip of the black paper from each side. Removal of strips at night prevents a sudden increase in light intensity. The swallows accommodated to the daily increase in light with no detectable annoyance. The young were successfully reared and fledged. On one occasion an adult Tree Swallow became disoriented in the nest box and was observed fluttering against the plexiglass instead of using the entrance to leave. This bird may have been unfamiliar with the box since three different adult swallows were captured and banded in this nest box.

Box 2 was similar to box 1 except that only one side was constructed with plexiglass. The box was placed by a window so that the plexiglass side came in full contact with the window. Thus, the box interior could be viewed from inside the building. Again, the black paper strips were removed in succession but during incubation. The clutch was successfully hatched, reared and fledged. The adults were aware of my movements inside the house but continued normal activities unless I was moving only a couple of meters from the box. The birds did not appear disoriented with respect to the nest entrance.

Transparent boxes should not be used in open situations because they may trap birds unable to find the entrance. Placement of a box (having only one transparent side) with its transparent side against a window was successful. This technique may be extremely useful at nature centers for educational purposes. Potentially, similar nest boxes could be constructed for wrens, nuthatches and chickadees.

*Accepted 13 July 1983*

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NOTES

*Cover photo by Dana Echols:* A pair of Least Terns (*Sterna antillarum*) following courtship feeding, May 1981, Venice, California

Manuscripts should be sent to Alan M. Craig, P.O. Box 254, Lakeview, CA 92353. For matters of style consult *Suggestions to Contributors to Western Birds* (6 pp. mimeo available at no cost from the Editor) and *Council of Biology Editors Style Manual* 4th edition, 1978 (available from the American Institute of Biological Sciences, 1401 Wilson Boulevard, Arlington, VA 22209 for $12.00).

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# A EURASIAN SKYLARK AT POINT REYES, CALIFORNIA, WITH NOTES ON SKYLARK IDENTIFICATION AND SYSTEMATICS

JOSEPH MORLAN, 417 Talbot Avenue, Albany, California 94706
RICHARD A. ERICKSON, Post Office Box 657, Klamath, California 95548

> " . . . perhaps the most controversial bird in California's birding history . . . the bird in question was identified for several days by a legion of birders as a Smith's Longspur. Eventually, it proved to be a species of lark!"
>
> —Shuford and DeSante 1979

We report here on a Eurasian Skylark (*Alauda arvensis*) wintering at Point Reyes, Marin County, California, from 1978 to 1983, which showed characteristics of northeast Asiatic/Alaskan populations. It represents the first record of a naturally occurring Eurasian Skylark in North America outside of Alaska and the first North American mainland record. Morlan (1979) and McCaskie (1979) discussed the bird's initial visit, and the record has been reviewed briefly by Roberson (1980).

From the beginning this bird posed an identification problem which seemed insurmountable. Intense controversy developed over whether the bird should be collected, some of which appeared in print (Duncan 1979, Bourne 1980, Garrett 1980, Gibson 1981b). Ultimately this record was reviewed and accepted by the California Bird Records Committee (Luther 1980). We present here details of how the identification problem was finally resolved in the hope that it may serve as a guide for such difficult cases in the future.

## THE RECORD

Hall Ranch, above Drake's Beach Visitors' Center at Point Reyes National Seashore, is recognized as the most productive site for vagrant "grassland passerines" in central mainland California. At about 1300 on 16 December 1978, while covering this area for the Point Reyes Christmas Bird Count, Erickson first observed the Eurasian Skylark. Other birds present at this time included about 250 Horned Larks (*Eremophila alpestris*), 40 Water Pipits (*Anthus spinoletta*), 35 Savannah Sparrows (*Passerculus sandwichensis*), 12 to 20 Lapland Longspurs (*Calcarius lapponicus*) and 2 or 3 Chestnut-collared Longspurs (*Calcarius ornatus*).

The skylark was somehow passed off as an aberrant Lapland Longspur until later that evening when the possibility of Smith's Longspur (*Calcarius pictus*) presented itself. Assuming the bird was a longspur, it clearly fit Smith's best and Erickson soon became rather convinced he had seen that species. Over the next 3½ days most of California's active birders saw the skylark and virtually all of them were content with it as the first California record of Smith's Longspur!

On 20 December, following an examination of specimens at the California Academy of Sciences and the University of California Museum of Vertebrate Zoology, Laurence C. Binford suggested the bird was a skylark, either Eurasian Skylark or Oriental Skylark (*A. gulgula*), or possibly a Lesser Short-toed Lark (*Calandrella rufescens*). With this information, Jon Dunn and others studied specimens at the Museum of Vertebrate Zoology and tentatively identified the bird as a Eurasian Skylark from one of the northeast Asiatic populations.

The lark was seen on a regular basis through 19 February 1979 but not thereafter. Hall Ranch is checked consistently through the fall, and the skylark was rediscovered there 27 October-1 November 1979 (Laymon and Shuford 1980), but we suspect it may have wintered in other fields on Pt. Reyes. The bird returned to Hall Ranch for the following winters: 25 October 1980-21 February 1981 (Evens and LeValley 1981, LeValley and Evens 1981), 3 November 1981-3 January 1982 (Evens et al. 1982, LeValley and Evens 1982), and 31 October 1982-29 January 1983 (LeValley and Roberson 1983, Evens and LeValley 1983). Each winter photographs were obtained by Albert Ghiorso and compared with those of other years; and each year the bird appeared unchanged, indicating the same individual was involved as skylarks exhibit a great deal of individual variation (Vaurie 1951).

## DESCRIPTION

The following description is based primarily upon photographs taken by Albert Ghiorso and on the authors' field notes (all on file with the California Bird Records Committee).

Size and shape: Basically very similar to Horned Lark but with broader wings (greater wing area) and perhaps slightly smaller, shorter-tailed and chunkier.

Head: Crown tawny and heavily marked with parallel long dark-brown (nearly blackish) streaks; crown set off by cream-colored eye-rings and superciliaries (more narrow in front of eye but extending to bill) joining narrowly across nape to form a distinct "coronal band" (long crest feathers helped set off crown from nape); crest clearly evident when crown feathers raised slightly; auricular patch ochraceous-buff faintly streaked with medium brown and bordered by a band of rusty-brown, this band being narrow along the fore edge, irregular along the rear edge and curving around below the eye, avoiding the pale eye-ring; a separate rusty-brown spot present in the lores; nape (paler than back and crown, giving a definite collared effect) cream-colored, moderately streaked with medium brown merging gradually into upper back; chin and throat pale ochraceous-buff with two adjacent narrow malar stripes (dark brown) on either side; a row of very fine, short streaks extending across lower throat; sides of neck cream-colored, gradually merging with color of throat.

Upperparts: Central upper back-feathers deep brown with extensive blackish centers, a ring of paler back-feathers (cream-colored with dark-brown centers) along the sides and behind accentuating the more richly colored feathers; scapulars extensively dark brown with buff fringes, forming a double row of darker feathers between wing and back; lesser wing coverts, uppertail coverts, rump and lower back-feathers buff-edged with faily extensive dark-brown centers; uppersides of secondaries medium brown, uppersides of primaries dark brown, all with rather narrow cream borders (more rusty borders on some primaries, especially inner ones); tips of secondaries and innermost primaries whitish, clearly evident in flight; greater wing coverts marked as adjacent flight-feathers but lacking white tips; middle wing coverts extensively dark brown centrally forming an obvious band of darker feathers across wings; tertiaries blackish with some suggestion of hazel, outermost tertiary edged rufous; central rectrices medium brown fringed with buff; outermost rectrices largely white; intermediate rectrices primarily blackish, outer ones with largely white outer webs and inner ones with buff and rusty fringes.

Underparts: Breast ochraceous-buff (brightest on upper sides) heavily streaked with very dark brown (blackish), these streaks becoming heavier and rustier toward sides of upper breast, often forming distinct dark collar marks on either side when head turned; breast streaking stopping abruptly at throat, giving a necklaced effect; sides and flanks buff and inconspicuously streaked with brown, but normally obscured by wings; belly and undertail coverts whitish, contrasting sharply with buff on breast, and with a faint wash of buff across vent; leg feathers pale buff and extending to ankle; underside of wings pale gray with brownish underwing coverts.

Soft parts: Eye very dark; bill rather broad-based and shallow (not unlike Horned Lark), pale horn-colored with blackish culmen and tip; legs and feet pinkish (duskier along upper surface of tarsi) with extremely long claws evident on hind toes.

Voice: Most common call a short note, low pitched end rough, reminiscent of the call of Northern Rough-winged Swallow (*Stelgidopteryx serripennis*); also a series of rich, low, musical "chirrup" calls. Some observers reported brief segments of flight song.

Behavior: Associated with a large flock of Horned Larks, invariably one of the last birds to flush; crouched low while feeding, often taking a concealment posture with wings slightly spread; walked deliberately without bobbing or hopping; occasionally walked about standing quite tall and revealing its legs, unlike the longspurs present; flight very bouyant, especially upon landing.

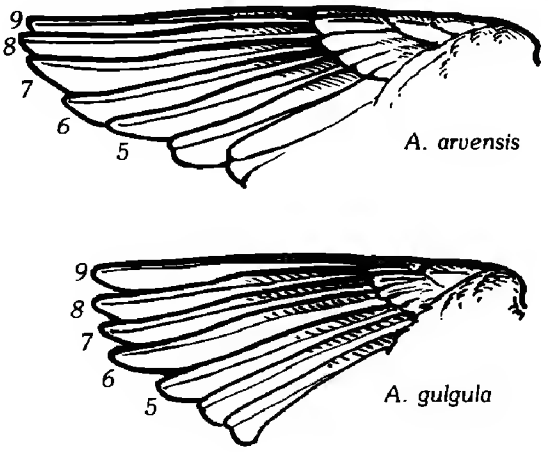

Figure 1. Outer wing shape of Eurasian (*Alauda arvensis*) and Oriental (*A. gulgula*) skylarks showing differences in relative length of five outermost visible primaries, numbered 5-9 (after Portenko 1954).

## IDENTIFICATION (ELIMINATION OF SIMILAR SPECIES)

### Smith's Longspur

It is obvious from the photographs that the bird is not a Smith's Longspur. The bill shape evident in Figures 2 through 4 is too slender for a longspur. Note particularly the color of the central rectrices in Figure 2; these brown central rectrices are not present in longspurs. Additionally, winter plumaged Smith's Longspurs usually have bright buff coloration extending over the entire underparts.

### Other Larks

Most other lark genera bear no real resemblance to *Alauda*. Harrison (1966) proposed merging *Lullula* and *Galerida* into *Alauda* but his suggestion was not followed by Hall and Moreau (1970), Voous (1977) or Devillers (1980). *Galerida* includes three species of African sun larks (*G. modesta*, *G. fremantilii*, and *G. magnirostris*) which are somewhat similar to skylarks but lack white outer rectrices. *Galerida* also includes three sibling species of crested larks (*G. cristata*, *G. malabarica*, and *G. deva*) which also lack white outer rectrices and can further be told by their abrupt crests, which are much more prominent and pointed than on skylarks. Woodlark (*Lullula arborea*)

Figure 2. Eurasian Skylark at Point Reyes, California, 11 February 1979 with wing and tail spread. Note white tips to inner primaries, and pure white, not rufescent white, outer rectrices. *Photo by Albert Ghiorso*

can be distinguished by its much shorter tail, with white corners, and its very prominent "coronal band" (the merging of the pale superciliary stripe with the short pale feathers of the nape).

Lesser Short-toed Lark is much smaller than any skylark or Horned Lark. The bill of Lesser Short-toed Lark is very small and much more conical in shape than in *Alauda*. *Alauda* has a very long hind claw and a short crest, whereas Lesser Short-toed Lark does not.

## Razo Island Lark

Although the genus *Alauda* is usually confined to two species, *arvensis* and *gulgula*, another species has recently been added to this genus. "*Spizocorys*" *razae* was placed in *Alauda* by Hall (1963), and most recent authors (Bannerman and Bannerman 1968, Burton 1971, Voous 1977, Devillers 1980) agree. This lark breeds on a section of Razo Island in the Cape Verde group off West Africa, where it is endemic. It has a very small population and is entirely nonmigratory. Compared to the skylarks, *razae* has a longer, more curved bill, a much less distinct face pattern, and a much shorter hind claw (Harrison 1966).

Figure 3. Eurasian Skylark at Point Reyes, California, 21 December 1978. Note rich russet color on upper back and crown. Dark auricular patch is exaggerated by shadow and feather angle. Contrast between pale nape and heavy back markings is characteristic of birds from northeast Asia. Also note crest feathers overlying feathers of upper nape forming a "coronal band." *Photo by Albert Ghiorso*

### Oriental Skylark

Most similar to Eurasian Skylark is the Oriental Skylark, which is resident in Kazakhstan, India, China and Southeast Asia. The two are sibling species and, in many instances, field separation of the two may be impossible. The most reliable differences are structural.

Wing Formula.—The wing tip of Eurasian Skylark is more pointed than that of Oriental Skylark (see Figure 1). Skylarks have ten primaries, but the outermost (tenth) is minute and not visible in Figure 5. In Eurasian Skylark the sixth primary is clearly shorter than the wing tip, while in Oriental Skylark the sixth, seventh, eighth, and ninth primaries are almost equal in length (Portenko 1954, Vaurie 1955). The sixth primary in Figure 5 is clearly shorter than the wing tip. This difference can also be seen in Figure 4 where the sixth and seventh primaries are visible beyond the tertiaries. In Oriental Skylark the seventh primary does not extend nearly as far beyond the sixth (pers. obs. of specimens).

Bill Shape.—The bill of Oriental Skylark is relatively longer, less deep and more curved than that of Eurasian Skylark (Vaurie 1951, 1955; Kuroda 1953; Harrison 1966 *contra* Voous 1960; Heinzel et al. 1972). We compared the bill shape of our bird by projecting a slide on a screen and placing an actual speciment of Eurasian Skylark in front so that its shadow fell on the screen. The bill shape of the specimen exactly matched that of the bird in Figure 4.

Figure 4. Eurasian Skylark at Point Reyes, California, 28 December 1978. Note short stubby bill and shortened sixth primary. *Photo by Albert Ghiorso*

Although the structural differences discussed above are sufficient for identification, there are other differences mentioned in the literature. We are uncertain that these differences apply to all populations, but based on our initial examination of specimens they appear to be valid.

Face Pattern.—Oriental Skylark has a pale superciliary stripe but only posterior to the eye (Harrison 1966). Figure 6 clearly shows the pale stripe both anterior and posterior to the eye. Harrison (1966) also pointed out that the "coronal band" is more distinct in Eurasian Skylark. It is clearly visible in Figure 3. Four enlarged prints were sent to David Snow at the British Museum (Natural History) at Tring. Snow (*in litt.*) stated, "There is no doubt, I think, that it is a Skylark *A. arvensis*, not *gulgula* which (on the basis of our skins) has a rather less distinct head pattern."

Color of Inner Primaries.—While both species have a white trailing edge to the inner wing, Dolgushin (1970) pointed out that the inner primaries are not white-tipped in Oriental Skylark, whereas they are on Eurasian Skylark. Figure 2 clearly shows white tips on the inner primaries.

Color of Underwing Coverts.—According to Sharpe (1890), Oriental Skylark has paler underwing coverts.

Color of Outer Rectrices.—The outer rectrices of Oriental Skylark are rufescent-white (Ali and Ripley 1972) or buff (Heinzel et al. 1972) and pure white in Eurasian Skylark. This distinction probably applies best to Indian populations, but note these feathers are pure white in Figure 2.

Figure 5. Eurasian Skylark at Point Reyes, California, 12 February 1981. Spread wing shows pointed wing tip and prominent flank streaking of this species.

*Photo by Albert Ghiorso*

Extent of Ventral Streaking.—According to Ali and Ripley (1972) breast streaking is usually much finer and less extensive on Oriental Skylark. Sharpe (1890) noted an almost entire absence of flank-stripes on Oriental Skylark (cf. Figure 5).

Behavior.—Dolgushin (1970) and Eck (1973) state that Oriental Skylark is never found in flocks, even during migration. The Pt. Reyes bird always associated closely with flocks of Horned Larks.

Voice.—La Touche (1930), Misonne (1953), Erard and Etchecopar (1970) and Desfayes and Praz (1978) report that Oriental Skylark has a different call-note. Thorpe (1961) states that flight-notes form a component of the Eurasian Skylark's song. The call-notes we heard at Pt. Reyes can be detected interspersed in the Eurasian Skylark song on the recording by Kellogg et al. (1962). The Pt. Reyes bird was attracted to a play-back of this recording on one occasion (Arnold Small pers. comm.). Vaurie (1951) suggested that the songs of the two species may be different.

Another possible difference claimed by Dement'ev and Gladkov (1954) and Heinzel et al. (1972) is the proportionally shorter tail of Oriental Skylark. This distinction appears to be invalid (Eck 1973). Characters separating the two given by Fleming et al. (1976) are best disregarded. The alleged Eurasian Skylark specimen (Fleming 1968) upon which the distinctions were based was actually a misidentified Oriental Skylark (Melvin Traylor *in litt.*).

Figure 6. Eurasian Skylark at Point Reyes, California, 28 December 1978. The dark neckband showed only when the bird turned its head or crouched. Note the pale lores. *Photo by Albert Ghiorso*

## DISTRIBUTIONAL EVIDENCE

The Eurasian Skylark is one of the most familiar and widespread birds of the Palearctic Region. Except for an introduced population on Vancouver Island and attempted introductions elsewhere, the first New World record came from the Pribilof Islands, Alaska, in 1967 (Thompson and DeLong 1969). It is now recognized as a regular migrant and casual summer visitor on the islands of western Alaska with possible breeding on the Pribilofs (Byrd et al. 1978, Kessel and Gibson 1978, Gibson 1981a).

It is significant that a bird identified as *A. a. pekinensis* was collected on Green Island, Kure Atoll (Hawaiian Islands), 7 October 1963 (Clapp and Woodward 1968). Two small birds with white outer rectrices were seen there for over a week before a specimen was secured. Commenting on the specimen, George Watson (in Clapp and Woodward 1968) wrote that it ". . . has the black central portions of the back-feathers far more extensive than in any European specimens [cf. Figure 3] and in this character resembles specimens from western [sic] China. . . . [It agrees] with the population *pekinensis* which breeds in northeast Siberia, Kamchatka, and the Kuriles." We believe the "skylark" sightings of Fisher (1965) at Midway Atoll are unconvincing.

We are aware of only one other published reference to a possible naturally occurring Eurasian Skylark in North America south of Alaska (Ramsey 1978): one seen 26 May 1968 briefly in flight over a ship about 15 miles west of Depoe Bay, Oregon (Fred Ramsey *in litt.*). The circumstances of the sighting leave the identification uncertain.

We feel that the pattern of appearances during five consecutive winters at Point Reyes indicates regular migrations were being undertaken. We will not speculate on where the bird spent its summers, but we do note that Point Reyes is at the same latitude that *A. a. pekinensis* normally winters in Asia. In fact, only two races of skylark are considered to be highly migratory, *A. a. dulcivox* and *A. a. pekinensis* (Vaurie 1951). All Alaskan specimens have been identified as *A. a. pekinensis* (Kessel and Gibson 1978, Gibson 1981a). The occurrence of *A. a. pekinensis* at Point Reyes would not be overly surprising considering its prior occurrence at Kure Atoll and the multiple records in California of similarly ranging species such as Northern Wheatear (*Oenanthe oenanthe*), Black-backed Wagtail (*Motacilla lugens*—see Morlan 1981) and Red-throated Pipit (*Anthus cervinus*).

The introduced population of nominate *arvensis* on southern Vancouver Island is essentially sedentary (Stirling and Edwards 1962). The recent spread to the San Juan Islands, Washington, involved an overwater flight of only 18 km (Weisbrod and Stevens 1974). The Victoria population is now believed to be declining (Harrington-Tweit et al. 1980) and none were found on the Christmas Bird Count in the area in December 1980 for the first time since 1958 (Shepard 1981, and *in litt.*).

Phillips (1928) reported that 75 pairs of Eurasian Skylarks (race unknown but probably *arvensis*) were released in San Jose, California, around 1896 and about 200 were liberated in Santa Cruz, California, in 1908. All eventually perished (Grinnell and Miller 1944). In California it is a violation of the California Administrative Code to import skylarks. No exceptions have been granted and it is the opinion of the Wildlife Protection Branch, California Department of Fish and Game (James Zobel pers. comm.), that the bird at Point Reyes was wild.

The Oriental Skylark is essentially sedentary with only a few races undertaking any true migratory movement. *Alauda gulgula inopinata* is the only race considered by Vaurie (1951) to be migratory. It moves at most from Kansu Province, China, to northern Burma. The chance of such a bird occurring in California is extremely remote.

## SKYLARK SYSTEMATICS

### Species Level

Since some recent authors have questioned the validity of the specific status of the two skylarks (e.g. Desfayes and Praz 1978), and since various past authors have treated them as subspecies groups instead of full species (Hartert 1922, Meinertzhagen 1951), we include a brief summary of some of the literature which pertains to the systematics of the two taxa. Some recent Russian publications are reviewed here in English for the first time.

The two groups were originally classified as separate species by Sharpe (1890) and this view was upheld by Vaurie (1951) based on apparent breeding range overlap in Kazakhstan. This sympatry has since been well described and mapped by Dolgushin (1970). Where the breeding ranges of the two forms overlap, the Oriental Skylark nests in moist river valleys and the Eurasian Skylark breeds in alpine meadows. However, the two forms do nest side by side in two localities in the foothills of Boroldav and Karzhantau in Kazakhstan. No hybridization has been reported.

The population of skylark breeding in Japan is usually considered a subspecies of Eurasian Skylark (Vaurie 1959, Peters 1960). We have treated it here as a subspecies of Oriental Skylark, since it has recently been found that it does not interbreed with Eurasian Skylark where the two nest on Kunashir Island (Nechaev 1969, Stepanian 1980). It is also probable that the breeding range of Eurasian Skylark overlaps that of *japonica* in southern Sakhalin (Kuroda 1953, Gizenko 1955, Yamashina 1961), and possibly on Yagishiri Island (Udagawa 1953, but cf. Kuroda and Morioka 1974).

*Alauda gulgula japonica* has plumage characters closer to Eurasian Skylark than to Oriental Skylark, but it has wing-formula and bill shape much closer to the latter (Vaurie 1951, Kuroda 1953, Eck 1973). It is possible that it is an entirely independent species as suggested by Stepanian (1978, 1980). We prefer to follow a suggestion of Vaurie (1954) and unite it with the Oriental Skylark. Jurgen Haffer (*in litt.*) has accepted this view and will include it in a forthcoming volume of the *Handbuch der Vogel Mitteleuropas* (U. Glutz, ed.).

### Subspecies Level

It is beyond the scope of this paper to discuss all the geographic variation in skylarks, or the subspecies which have been recognized by various authors. The number of recognized subspecies of Eurasian Skylark ranges from seven

(Meinertzhagen 1951) to sixteen (Dement'ev and Gladkov 1954). Vaurie (1959) recognized ten. The number of subspecies of Oriental Skylark is also controversial (Ali and Ripley 1972). Most variation is actually clinal (Meinertzhagen 1951), and the number of subspecies recognizable in a cline is highly subjective (Mayr 1969).

Johansen (1944) proposed that *A. arvensis* be divided into three subspecies groups. We have modified his idea somewhat to reflect the three isolated regions in which Eurasian Skylarks winter, as their breeding range is essentially a continuum.

*Arvensis* group — Those races breeding in Europe and wintering from southern Europe and North Africa to the Middle East.

*Dulcivox* group — Consisting of *A. a. dulcivox* breeding in central Asia and wintering in the northern part of the Indian subcontinent. Larger and paler than the *arvensis* groups but closely allied to it.

*Pekinensis* group — Populations breeding in northeast Asia and wintering in China, consisting of *A. a. pekinensis, A. a. lonnbergi, A. a. intermedia,* and *A. a. kiborti.* Highly pigmented birds, clearly related to each other.

David Snow (in litt.), comparing our photographs with specimens at the British Museum, wrote: "It fits the race *pekinensis* very well indeed, especially the distribution and colour of the markings on the side of the head. When I first looked at *pekinensis* the match seemed so good that I thought that your bird must be *pekinensis*; but when I looked at [other northeastern races] I came to the conclusion that one cannot exclude them. Peter Colston of this department, who is very interested in problems of identification, has looked at the photos and specimens and he comes to essentially the same conclusion. . . . There is no doubt that the bird is from one of the eastern races of *arvensis.*"

We compared our photographs with specimens and found that the large dark areas clearly visible on the upper back in Figure 3 and the finely-streaked nape, distinct face pattern and rich color of the breast matched rather closely specimens of birds in the *pekinensis* group. In these characters it differs from examples of the other two groups. The rich russet color on the upper back and crown (Figure 3) and orange-buff ground color of the breast (Figure 6) is most frequent on birds from coastal populations in northeast Asia, sometimes given subspecific status, *A. a. blackistoni* (Meinertzhagen 1951, Kuroda 1953).

## SUMMARY

Documentation (including photographs) is presented of the first natural North American record of Eurasian Skylark (*Alauda arvensis*) outside of Alaska. The bird shows characteristics of the *pekinensis* group of subspecies, and diagnostic features which separate it from the very similar Oriental Skylark (*Alauda gulgula*) are set forth. The specific status of the two taxa and the taxonomic position of the Japanese skylark population are reviewed.

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# SIXTH REPORT OF THE CALIFORNIA BIRD RECORDS COMMITTEE

LAURENCE C. BINFORD, 985 Emily Avenue, Rohnert Park, California 94928

This is the sixth report of the Western Field Ornithologists' California Bird Records Committee. It contains 165 records divided as follows: 138 records (of 47 species) accepted; 25 (19) unaccepted, identification questionable; 1 unaccepted, origin questionable (i.e., possible escapee; identification accepted); and 1 unresolved. These figures represent a rejection rate of only 15.9%.

Included among the accepted records in the present report are two species new to California: Gray-tailed Tattler (*Heteroscelus brevipes*) and Least Auklet (*Aethia pusilla*). The Yellow Wagtail (*Motacilla flava*) was added to the state list by Jones et al. (1981) on the basis of a record previously accepted by the Committee but now being reviewed because of new information; hence this species should be removed at least temporarily from the list. Because the "White Wagtail, *Motacilla alba*" of Jones et al. (1981) has recently been split into two species, the White Wagtail (*M. alba*) and the Black-backed Wagtail (*M. lugens*) (AOU 1982), the Committee has decided to review all past records of white wagtails; hence, "White Wagtail, *M. alba*" should be removed from the state list; probably it will be replaced by the Black-backed Wagtail (see Morlan 1981). With two species added and two subtracted, the state list remains at 541 species.

The review list—those species for which the Committee solicits documentation —stands at 117 species after the addition of Gray-tailed Tattler, Least Auklet and (by Committee decision) Painted Redstart (*Myioborus pictus*) and the deletion of Yellow and white wagtails since the last published list (Jones et al. 1981). Of course, records of species previously unrecorded in the state should also be submitted. At its 1982 meeting, the Committee reaffirmed its desire to review all past records of species currently on the review list, including specimen records (which should be submitted with both written and photographic documentation).

The documents and photographs forming the basis for records published in Committee reports, as well as all Committee comments and votes, are now housed at the Western Foundation of Vertebrate Zoology, courtesy of Ed N. Harrison. Parties interested in these records may make an appointment to visit the Foundation or may contact Curator Lloyd F. Kiff (1100 Glendon Avenue, Los Angeles, CA 90024; phone 213-477-2001). The Committee is greatly indebted to the Foundation and to Messrs. Harrison and Kiff for their generosity. Unpublished records are on file with Secretary B.D. (Mike) Parmeter (2500 Emerson Street, Napa, CA 94558; home phone 707-255-6757), to whom all new reports should be submitted.

At its annual meeting of 7 March 1981, the Committee amended the bylaws that it adopted on 14 January 1978 (see Binford 1977). The most important change was the addition to the state list of an "unresolved category," defined as follows: If, at a meeting of the Committee, a record of a species not on the main state list is neither accepted (all or all but one "accept" votes) nor rejected ("reject" votes from a majority of those members present), the case shall be considered "unresolved" and the species shall be added to the unresolved category; members may vote "unresolved." Persons desiring a list of bylaw emendations may write Vice-Secretary Binford.

The following Committee members voted on some or all of the records in this report: Laurence C. Binford (Vice-Secretary), David DeSante, Jon L. Dunn, Richard A. Erickson, Kimball L. Garrett, Lee Jones, Paul Lehman, John S. Luther, Guy McCaskie, Joseph Morlan, B. D. Parmeter (Secretary), Arnold Small, Richard Stallcup and Philip Unitt.

Although Committee members devote a great deal of their time in the name of science, the real heroes of this report are the contributors. Their records will be used for years to come in determining the status and distribution of many bird species and will aid in understanding the role of vagrants in nature.

The taxonomy and nomenclature employed in this paper are those of the American Ornithologists' Union (1982). Within each species account, records are listed chronologically according to the first known date of occurrence. Usually, information for each record includes, in order, the following: number of birds recorded (sometimes with age and/or sex), official Committee file number (in parentheses), dates, locality, initials of those persons submitting written descriptions or photographs (see list of Contributors), and pertinent comments. Those species marked with an asterisk (*) are no longer on the review list. For the age of shorebirds in their first fall, I have, for the most part, used the term "immature" rather than "juvenal." Although in the field such young birds appear to be in full juvenal plumage, by September or October they might well have commenced their first prebasic molt into first basic (first-winter) plumage (Bent 1927: 248). All records are sight records unless the bird is noted as collected or photographed. As requested by the Committee, I have attempted to determine the entire period when the bird(s) was present, gleaning these data from the documentation submitted to the Committee, the published accounts and unpublished files of the regional editors of *American Birds*, and the notes of Committee members. All hyphenated dates are inclusive; they may or may not embrace other dates of observation or be the dates submitted by reporters.

For the first time in Committee reports, the unaccepted records are annotated. The purpose of these comments is not to alibi Committee decisions; the complete discussions and votes are available to anyone upon request. Neither is the purpose in any way to criticize the reporters, who are to be commended for their efforts; in fact, nearly half (12 of 25) of the records judged unacceptable because of questionable identification were submitted by past or present members of this Committee, including two secretaries! Rather, these comments are intended to be both instructive and entertaining in that they reveal information on field identification, Committee policies, and members' validation techniques. Annotations of both unaccepted and accepted records are mine, although they are largely a distillation of information in the Committee files and have been reviewed by each member of the Committee. These remarks may include reference to records that are "generally" accepted but have not yet been reviewed by the Committee. Some of the unaccepted records may represent correct identifications that were supported by insufficient descriptions. Observers reporting rare birds may write the Secretary for a free copy (or as many as desired) of the Committee's official report form. Although this form need not be used, it will aid description-writers in deciding what information is desired in a thorough report.

## ACCEPTED RECORDS

YELLOW-BILLED LOON (*Gavia adamsii*). One immature female (128-1980) 23 Jan-6 Mar 1971, Moss Landing, Monterey Co. (LCB, JLD, GMcC); found dead on 6 Mar and now study skin 162350 in the Museum of Vertebrate Zoology, Berkeley (Remsen and Binford 1975). One (129-1980) 13 Nov-1 Dec 1974, Tomales Bay near Inverness, Marin Co. (LCB, JLD, RAE, JM, GMcC). One (18-1980) 17 Feb-1 Mar 1980 (last date from *American Birds* files, fide R. LeValley), Pt. Richmond, Contra Costa Co. (RAE, JL, SW); photos on file.

COOK'S PETREL (*Pterodroma cookii*). Two (71-1979) 24 Nov 1979, vicinity of Davidson Seamount (35°44'N, 122°43'W), offshore from Cambria, San Luis Obispo Co. (AS). One (71-1979) 1 Dec 1979, same locality (RAE, GMcC). See Unaccepted Records, identification questionable.

*SHORT-TAILED SHEARWATER (*Puffinus tenuirostris*). One (38-1977) 10 Jan 1976, in Monterey Bay off Moss Landing, Monterey Co. (DDeS, RH).

*REDDISH EGRET (*Egretta rufescens*). One immature (29-1980) 11 Feb-3 Mar 1979, Imperial Dam, Colorado River, Imperial Co. (JLD, GMcC). One immature (153-1980) 19 Aug-26 Sep 1979, San Diego River mouth, San Diego Co. (GMcC).

YELLOW-CROWNED NIGHT-HERON (*Nycticorax violaceus*). One adult (154-1980) 15 Apr - 2 May 1979, Tijuana River Valley south of Imperial Beach, San Diego Co. (GMcC). One adult (91-1980) 20-26 Apr 1980, Ventura, Ventura Co. (JLD, JMG, PL, RW); photos on file. One adult (123-1980) 18-26 Jul 1980, Imperial Beach, San Diego Co. (JLD, GMcC, JO); photo on file.

TRUMPETER SWAN (*Cygnus buccinator*). One adult (131-1980) 1 Jan-17 Feb 1975, Legg Lake, near El Monte, Los Angeles Co. (JLD, PU). According to McCaskie (1975d) and Garrett and Dunn (1981), one in nearby Covina, Los Angeles Co., 13-15 March 1975, was probably the same bird; this is the second definite record for southern California (Garrett and Dunn 1981).

KING EIDER (*Somateria spectabilis*). One female (92-1978) 6-7 May 1978 (rumored present since February), Año Nuevo State Reserve, San Mateo Co. (LH).

ZONE-TAILED HAWK (*Buteo albonotatus*). One (84-1980) 10 May 1970 (not 9 May as published by McCaskie 1970), Morongo Valley, San Bernardino Co. (KLG). One adult (50-1980) 21-22 Apr 1978, Morongo Valley, San Bernardino Co. (flew south into Riverside Co.) (JLD, RAE, GMcC). One adult (146-1980) 17 Jun 1978, upper end of the Fort Piute Gorge, San Bernardino Co. (GMcC). Two adults at a nest, 7 Jul-early Aug 1979 (nesting believed to have failed), two adults plus nest with at least two young (which died before fledging), 21 Jun into Jul 1980, two adults last seen near failed nest, 21 Jun 1981, and one adult with no evidence of nesting, 19 Jun-17 Jul 1982 (33-1980), Santa Rosa Mountain, Riverside Co. (JLD, GMcC).

AMERICAN OYSTERCATCHER (*Haematopus palliatus*). One (92-1980) 15 Apr 1973, Fraser Point, Santa Cruz Island (PL, DS); photo on file. One or two "pure" *H. palliatus* have been recorded here every year since 1968, having first been recorded 11 Nov 1966; one and sometimes two other birds, exhibiting apparent hybrid characters with the American Black Oystercatcher (*H. bachmani*), have been recorded since Feb 1973 (fide L. Jones).

GRAY-TAILED TATTLER (*Heteroscelus brevipes*). One adult (43-1981) 23 Jul 1981, Lancaster Sewage Ponds, near Lancaster, Los Angeles Co. (HC, JLD); photos on file. This is the only North American record outside Alaska. This species apparently breeds only in eastern Siberia and winters in the western Pacific. It is a rare spring and fall migrant on the islands in the Bering Sea and on the Aleutians and a casual spring migrant and summer visitant on the coast of northern Alaska (Kessel and Gibson 1978). Identification was based primarily on call, described by JLD as a two-noted upslurred whistle, "chu-wheeet." The bird also exhibited the clear white belly, sparsely barred crissum (sides only) and narrowly barred breast and sides typical of alternate plumage, and a bold white superciliary, wider before the eye, which may prove to be a useful field mark. The shorter nasal grooves and white tips to the upper tail coverts, of little value in the field, were not noted.

UPLAND SANDPIPER (*Bartramia longicauda*). One (1-1980) 23 May 1975, Santa Barbara Island (LJ). One (79-1980) 23-24 May 1980, Furnace Creek Ranch, Death Valley National Monument, Inyo Co. (JLD, DEG, PL).

HUDSONIAN GODWIT (*Limosa haemastica*). One (82-1980) 9-19 May 1980 (not 9-11 May as in Roberson 1980), Lancaster Sewage Ponds near Lancaster and adjacent marsh on Edwards Air Force Base, Los Angeles Co. (HC, JLD, RAE, JL, GMcC, LS, NS); photos on file. This is the second record for southern California and the third for the state.

*SEMIPALMATED SANDPIPER (*Calidris pusilla*). One (49-1977) 28 Aug 1966, Carmel River mouth, Carmel, Monterey Co. (AB, RLB, WR); photo on file. One (132-1980) 20 May 1976, Wister Unit, south end of Salton Sea, Imperial Co. (JLD). One immature (93-1980) 10-11 Aug 1977, Goleta, Santa Barbara Co. (PL). One adult (52-1980) 13 May 1978, Whitewater River mouth, north end of Salton Sea, Riverside Co. (JLD, GMcC). Up to three immatures (51-1980) 9-15 Sep 1978, Santa Clara River mouth, Ventura Co. (JLD, PL, GMcC). One (155-1980) 21-24 Apr 1979, near New River mouth, south end of Salton Sea, Imperial Co. (GMcC). One (45-1980) 18 May 1979, South Wilber Flood Area, Kings Co. (RW). One immature (34-1980) 31 July-2 Aug 1979 (not 31 Jul-3 Aug as in Garrett and Dunn 1981), Lancaster Sewage Ponds, north of Lancaster, Los Angeles Co. (JLD, KLG). Two immatures (35-1980) 6-11 Aug 1979, Edwards Air Force Base, Los Angeles Co. (JLD). Two immatures (36-1980) 2-3 Sep, with "one or two" present 30 Aug-6 Sep 1979, Santa Clara River mouth, Ventura Co. (JLD, PL); photo on file. One (83-1980) 6-8 May 1980, Santa Clara River mouth, Ventura Co. (JLD, PL, LS); photo on file. One immature (126-1980) 3-9 Aug 1980, Edwards Air Force Base, Los Angeles Co. (JLD). Six immatures (125-1980) 10 Aug 1980, Tijuana River bed south of Imperial Beach, San Diego Co. (JLD, GMcC).

*SHARP-TAILED SANDPIPER (*Calidris acuminata*). One (47-1977) banded (USFWS 731-30499) 4 Oct 1972, Bolinas Lagoon, Marin Co. (GP); photos on file. One (2-1980) 5 Oct 1976, Thompson Reservoir, Santa Catalina Island (LJ). One (94-1980) 5 Oct 1977, Goleta, Santa Barbara Co. (PL). One (95-1980) 24-30 Oct 1977, Goleta, Santa Barbara Co. (PL). One (96-1980) 13 Dec 1977, Goleta, Santa

Barbara Co. (PL). One (97-1980) 1 Oct 1978, Santa Maria River mouth, Santa Barbara Co. (LRBe). Two (98-1980) on 15 Oct, with one remaining until 17 Oct 1978, Santa Maria River mouth, both Santa Barbara and San Luis Obispo Cos. (PL). One (53-1980) 21-29 Oct 1978, Santa Clara River mouth, Ventura Co. (LRBe, JLD, PL, LS); photo on file. One (99-1980) 22-27 Oct 1978, near Santa Maria, Santa Barbara Co. (PL). One (100-1980) 19 Sep 1979 (not 9 Sep as in Roberson 1980), Goleta, Santa Barbara Co. (LRBe, JMG, PL); photo on file. One (37-1980) 19 Jan-2 Mar 1980, Point Mugu, Ventura Co. (JLD, GMcC); this is the only wintering record for North America, the date span demonstrating that the bird was not simply a late fall migrant.

CURLEW SANDPIPER (*Calidris ferruginea*). One immature (56-1980) 27-28 Sep 1979, Santa Clara River mouth, Ventura Co. (KLG, PL, RW). This is the second record for southern California and fifth for the state.

BUFF-BREASTED SANDPIPER (*Tryngites subruficollis*). One (55-1980) 27 Aug-1 Sep 1978, San Jacinto Lake, near Lakeview, Riverside Co. (JLD, KLG, GMcC, PU). Two (147-1980) 2-3 Sep 1978, Lake Hodges, San Diego Co. (GMcC, PU). One (54-1980) 10-18 Sep 1978, Tijuana River Valley south of Imperial Beach, San Diego Co. (JLD, GMcC). Flock of four (38-1980) 6 Sep 1979, Santa Clara River mouth, Ventura Co. (JLD, PL).

*RUFF (*Philomachus pugnax*). One immature (57-1980) 17-24 Sep 1978, Santa Clara River mouth, Ventura Co. (LRBe, JLD, PL). One (6-1979) 24 Sep 1978, 5 miles northwest of Orcutt, Santa Barbara Co. (JAJ). One (101-1980) 7-8 Oct 1978, Santa Clara River mouth, Ventura Co. (LRBe, PL, LS); photo on file. One (11-1979) 18 Dec 1978, Bodega Bay, Sonoma Co. (LSt). One (102-1980) 24 Dec 1978, Santa Maria River mouth, Santa Barbara Co. (PL). One immature (39-1980) 2-7 Sep 1979, Santa Clara River mouth, Ventura Co. (JLD, PL); photo on file. One (103-1980) 14-18 Sep 1979, Santa Maria River mouth, Santa Barbara Co. (LRBe, PL); photo on file. One (104-1980) 30 Sep-2 Oct 1979, near Santa Maria, Santa Barbara Co.(LRB, PL). One (127-1980) 4-8 Oct 1979, Harbor Lake, Long Beach, Los Angeles Co. (CM); photo on file. One adult in alternate (breeding) plumage (124-1980) 10 Aug 1980, Tijuana River bed south of Imperial Beach, San Diego Co. (JLD, GMcC).

LITTLE GULL (*Larus minutus*). One first-winter bird (16-1980) 1-5 Mar 1980, Santa Clara River mouth, Ventura Co. (JMo).

COMMON BLACK-HEADED GULL (*Larus ridibundus*). One adult (105-1980) 30 Dec 1978, ocean ¾ mile off Montecito, Santa Barbara Co. (RW). This is the first record for southern California.

LEAST AUKLET (*Aethia pusilla*). One adult (73-1981) 15 Jun 1981, Thornton State Beach, Daly City, San Mateo Co. (SFB); photos of specimen (Museum of Vertebrate Zoology, Berkeley, 168469) on file. This bird was found alive on the ocean beach by a park ranger and died the same night. Its breeding plumage and summer occurrence are in accord with the pattern established by other north Pacific alcids, notably the Horned Puffin (*Fratercula corniculata*), and thus suggest natural occurrence. The Least Auklet nests on islands in the Bering Sea and on the Aleutians and has been recorded in winter as far south as northern Japan and Kodiak, Alaska. The Daly City bird is the first to be recorded in the eastern Pacific south of Kodiak.

BROAD-BILLED HUMMINGBIRD (*Cynanthus latirostris*). One male (58-1980) 1 Nov-30 Dec 1978, West Los Angeles, Los Angeles Co. (JLD, KLG). One male (40-1980) 12-29 Jan 1979, Riverside, Riverside Co. (JLD, GMcC). One male (41-1980) 9-14 Oct 1979, Santa Barbara, Santa Barbara Co. (LRBe, JLD, JMG, PL); photo on file. One female (42-1980) 10 Oct 1979-3 Feb 1980, Gaviota State Beach, Santa Barbara Co. (LRBe, JLD, JMG, PL); photos on file. One male (43-1980) 28 Nov 1979-29 Feb 1980, Balboa Park, San Diego, San Diego Co. (JLD, GMcC). One male (44-1980) 21 Dec 1979-17 Feb 1980, Harmon Barranca, Ventura, Ventura Co. (JLD).

GREATER PEWEE (*Contopus pertinax*). One (136-1980) 9-23 Feb 1976, Balboa Park, San Diego, San Diego Co. (JLD). One (19-1980) 7 Nov 1979-30 Jan 1980, 3 Nov 1980-23 Feb 1981, and 13 Jan-20 Feb 1982, Griffith Park, Los Angeles, Los Angeles Co. (JLD, GMcC, DR). One (20-1980) 9 Jan-19 Mar 1980 (not 16 Jan-11 Feb as published by McCaskie 1980b), Leo Carillo State Beach, Los Angeles Co. (JLD, GMcC).

*LEAST FLYCATCHER (*Empidonax minimus*). One (109-1980) 18 Sep 1977, Santa Barbara, Santa Barbara Co. (JLD, PL). One (60-1980) 19-25 Sep 1978, Big Sycamore Canyon (Pt. Mugu State Park), Ventura Co. (JLD, RAE, KLG). One (61-1980) 5 Nov 1978-3 Mar 1979, Fillmore State Fish Hatchery, Ventura Co. (LRBe, JLD, PL); this and the next record represent California's first truly wintering birds. One (62-1980) 26 Nov 1978-17 Feb 1979, Brock Ranch, Imperial Co. (JLD, GMcC). One 151-1980) 16 Sep 1979, Point Loma, San Diego Co, (GMcC). One (27-1980) 7 Oct 1979, Santa Maria River mouth, San Luis Obispo Co. (LRBe, JLD, PL). One (152-1980) 21 Oct 1979, Point Loma, San Diego Co. (GMcC).

DUSKY-CAPPED FLYCATCHER (*Myiarchus tuberculifer*). One (28-1980) 30 Dec 1979-10 Feb 1980, Irvine, Orange Co. (JLD, PL, GMcC); photo on file.

GREAT CRESTED FLYCATCHER (*Myiarchus crinitus*). One (75-1980) 6 Oct 1978, Point Loma, San Diego Co. (GMcC, PU). One (107-1980) 13-14 Oct 1979, Santa Barbara, Santa Barbara Co. (LRBe, JMG, PL); photo on file.

SULPHUR-BELLIED FLYCATCHER (*Myiodynastes luteiventris*). One (159-1980) 7 Oct 1979, Point Loma, San Diego Co. (GMcC). This is the third record for the state.

THICK-BILLED KINGBIRD (*Tyrannus crassirostris*). One (59-1980) 5-16 Aug 1978, along Colorado River about 13 miles north of Blythe, Riverside Co. (JLD, GMcC).

GRAY CATBIRD (*Dumetella carolinensis*). One (137-1980) 26 Oct-2 Nov 1974, Scotty's Castle, Inyo Co. (JLD, GMcC). One (4-1980) 2-3 Nov 1974, San Nicolas Island (LJ). One (5-1980) 2 Jun 1978, Panamint Springs, Inyo Co. (LJ). One (63-1980) 27 Mar-17 Apr 1980 (found dead on 18 Apr), Northridge, Los Angeles Co. (JLD, CS).

CURVE-BILLED THRASHER (*Toxostoma curvirostre*). One (138-1980) 28 Dec 1973-9 Mar 1974, along Colorado River near Bard, Imperial Co. (JLD, GMcC). One (21-1980) 12 Dec 1978-19 Jan 1979, along Colorado River above Laguna Dam, Imperial Co. (JLD).

RED-THROATED PIPIT (*Anthus cervinus*). One (86-1980) 17 Oct 1970, Tijuana River Valley south of Imperial Beach, San Diego Co. (KLG). Two together (6-1980) 20-21 Oct 1974, San Nicolas Island (KLG, LJ). One (7-1980) 10 Nov 1974, Santa Cruz Island (LJ). One (64-1980) 4-9 Oct 1978, Oxnard Plain, near Oxnard, Ventura Co. (JLD, PL, GMcC). One (65-1980) on 13 Oct and 3+ on 15 Oct 1978, Oxnard Plain, near Oxnard, Ventura Co. (JLD, RW). One on 26 Oct and two on 27 Oct 1978 (113-1980), Goleta, Santa Barbara Co. (LRBe, PL).

SPRAGUE'S PIPIT (*Anthus spragueii*). Three (47-1980) on 19 Oct 1974, with one or two remaining through 27 Oct, and one adult female collected (San Diego Natural History Museum 38980) by GMcC on 24 Oct, Tijuana River Valley just south of Imperial Beach, San Diego Co. (JSL); photos on file; this was the first acceptable record for California (see McCaskie 1975a). One (139-1980) 23 Oct 1975, near Carson, Los Angeles Co. (JLD). One (30-1980) 23 Oct 1979, Furnace Creek Ranch, Death Valley National Monument, Inyo Co. (JLD).

YELLOW-THROATED VIREO (*Vireo flavifrons*). One (89-1980) 5 Dec 1969-19 Mar 1970, Fairmount Park, Riverside, Riverside Co. (KLG, GMcC); this is the only winter record for California. One (8-1980) 27 Oct 1974, Santa Catalina Island (LJ).

PHILADELPHIA VIREO (*Vireo philadelphicus*). One (142-1980), 17-21 Oct 1974 (not 17-20 as published by McCaskie 1975b), Tijuana River Valley south of Imperial Beach, San Diego Co. (JLD, LJ, GMcC). One (150-1980) 12-14 Oct 1979, Tijuana River Valley south of Imperial Beach, San Diego Co. (GMcC). One (31-1980) 23-24 Oct 1979, Shoshone, Inyo Co. (JLD).

*RED-EYED (YELLOW-GREEN) VIREO (*Vireo olivaceus flavoviridis*). One (141-1980) 19-20 Sep 1974, Tijuana River Valley south of Imperial Beach, San Diego Co. (JLD, GMcC). One (74-1980) 13 Sep 1978, Point Loma, San Diego Co. (PU). This form is now considered by the AOU (1982) to be a race of the Red-eyed Vireo and therefore is no longer on the Committee's review list.

GOLDEN-WINGED WARBLER (*Vermivora chrysoptera*). One male (9-1980) 29 May 1974, Deep Springs College, Inyo Co. (JLD, LJ). One male (10-1980) 4 Jun 1977, San Nicolas Island (LJ).

YELLOW-THROATED WARBLER (*Dendroica dominica*). One (148-1980) 28 Oct-4 Nov 1978, Deep Springs College, Inyo Co. (GMcC). One (24-1980) 18 Apr 1979, Point Loma, San Diego Co. (JLD, GMcC). One (66-1980) 12 May 1979, Santa Monica, Los Angeles Co. (KLG). One (25-1980) 4-7 Jun 1979 (not 4-6 Jun as published by McCaskie 1979b), Point Loma, San Diego Co. (JLD, GMcC). One (118-1980) 24-25 Oct 1979, Gaviota State Beach, Santa Barbara Co. (JMG, PL); photos on file. One male (78-1980) 29 May-1 June 1980, Oasis, Mono Co. (JLD, JL); photos on file.

GRACE'S WARBLER (*Dendroica graciae*). One (23-1980) 6 Jan-2 Apr 1980, 4 Nov 1980-28 Mar 1981 (not 4 Nov-8 Mar as in Garrett and Dunn 1981: 389), 10 Oct 1981-10 Mar 1982, and 11 Oct 1982 into winter, Montecito, Santa Barbara Co. (JLD, WF, PL, GMcC); photo on file. One (119-1980) 24 Feb-11 Apr 1980, 22 Feb-21 Mar 1982, and 24 Oct 1982 into winter, Carpinteria, Santa Barbara Co. (JMG, PL); not seen during winter 1980-1981, probably because of incomplete coverage (fide PL); photos on file.

PROTHONOTARY WARBLER (*Protonotaria citrea*). One (143-1980) 9 Jun 1974, San Nicolas Island (JLD, LJ, GMcC). One (72-1980) 19 May 1978, Tijuana River Valley south of Imperial Beach, San Diego Co. (GMcC, PU). One (76-1980) 6 Oct 1978, Point Loma, San Diego Co. (GMcC, PU). One (158-1980) 1 Jun 1979, Point Loma, San Diego Co. (GMcC). One (117-1980) 20-28 Sep 1979, Gaviota State Beach, Santa Barbara Co. (PL); photo on file. One (22-1980) 23 Oct 1979, Furnace Creek Ranch, Death Valley National Monument, Inyo Co. (JLD).

CONNECTICUT WARBLER (*Oporornis agilis*). One (144-1980) 29-30 Sep 1974, San Nicolas Island (JLD, LJ, GMcC).

*HOODED WARBLER (*Wilsonia citrina*). One immature male (70-1978) collected (San Bernardino County Museum) by S. Cardiff, 22 Oct 1977, about ¼ mile east of Fort Piute, East Mojave Desert, San Bernardino Co. (DDeS, JVR).

RED-FACED WARBLER (*Cardellina rubrifrons*). One (116-1977) 4 June 1977, Morongo Valley, San Bernardino Co. (CB, DM).

SCARLET TANAGER (*Piranga olivacea*). One female (13-1980) 1 Jun 1973, San Nicolas Island (LJ). One immature male (14-1980) 1-3 Nov 1974, San Nicolas Island (LJ). One male (145-1980) 20-24 Jun 1976, San Pedro, Los Angeles Co. (JLD, KLG, PL). One male (15-1980) 21 Jun 1977, Santa Catalina Island (LJ). One male (156-1980) 26-28 May 1979, Point Loma, San Diego Co. (GMcC, PU).

PAINTED BUNTING (*Passerina ciris*). One (87-1980) 21-24 Sep 1974, Tijuana River Valley south of Imperial Beach, San Diego Co. (JLD, KLG, GMcC).

CASSIN'S SPARROW (*Aimophila cassinii*). One male (68-1980) 8-16 May 1978, 19 miles north of Lucerne Valley on CA 247, San Bernardino Co. (JLD, RAE, GMcC). One male (73-1980) 10-12 Jun 1978, 1 mile east of El Cajon, San Diego Co. (GMcC, PU); see Garrett and Dunn (1981) for occurrences in other years at this locality.

LE CONTE'S SPARROW (*Ammodramus leconteii*). One (90-1980) 27 Oct-1 Nov 1974, with two 28 Oct, Furnace Creek Ranch, Death Valley National Monument, Inyo Co. (JLD, KLG). See McCaskie (1975b, 1975c) for a summary of records.

*SNOW BUNTING (*Plectrophenax nivalis*). Flock of three (7-1978) 6 Nov 1977, with singles, perhaps the same birds, on 9, 10 and 11 Nov, Lake Talawa, Del Norte Co. (RSW).

COMMON GRACKLE (*Quiscalus quiscula*). One (121-1980) 22 May 1979, Scotty's Castle, Inyo Co. (PL); photo on file. One (77-1980) 24-26 May 1980 (not 24-25 May as published by Roberson 1980), Furnace Creek Ranch, Death Valley National Monument, Inyo Co. (JLD, PL).

## UNACCEPTED RECORDS, identification questionable

BLACK-BROWED ALBATROSS (*Diomedea melanophris*). One (158-1977) 24 Mar 1977, from Pigeon Point, San Mateo Co.

This record was submitted as only a "probable sighting of a Black-browed Albatross." The Committee normally will not review such records, but in this special case—a possible state record—decided to make an exception. The final vote at the Committee meeting of 13 February 1982 was accept 0, reject 8, unresolved 2. The Committee agreed with the observer's own assessment that immature Gray-headed Albatross (*D. chrysostoma*), while much less likely on geographical grounds, could not be ruled out, because distance (¼ mile) precluded detection of the critical field marks. While the described characters—narrow white stripe running the length of the underwing, grayish crown and throat, white belly, dark mantle, and dark bill—eliminate all normal "white" albatrosses previously recorded in California, they might not eliminate an aberrant Black-footed Albatross (*D. nigripes*) or hybrid Black-footed × Laysan (*D. immutabilis*). Two members felt that distance and lighting may not have been sufficient to rule out even a typical Laysan by underwing pattern alone. Field observers should prepare themselves to separate Black-browed from Gray-headed, while being aware of hybrids and aberrant plumages in regularly occurring species (see Roberson 1980).

COOK'S PETREL (*Pterodroma cookii*). Three individuals (71-1979, individuals #2, #3 and #5) 17 Nov 1979, vicinity of Davidson Seamount (35°44′N, 122°43′W), offshore from Cambria, San Luis Obispo Co. (JLD, RAE, GMcC, DR, RS).

Seven *Pterodroma* petrels were seen on 17 November. One (#4 = fourth bird seen) was validated as a Stejneger's Petrel (*P. longirostris*) and published in the Committee's fifth report (Luther et al. 1983). Birds #1 and #6 were accepted as Cook's Petrels in the same report. Bird #7 is still under review. The remaining three, treated herein, probably were Cook's but the views and hence descriptions did not provide sufficient evidence for acceptance, and each was rejected, 1-9.

Because these six Cook's Petrels were among the first for California and a valid Stejneger's was seen on the same pelagic trip, the Committee decided to treat each individual separately. Had the species been known previously to be regular, all six might have been handled as a single record, as was the case with record 71-1979 (24 November) accepted above. Reporters, especially on pelagic trips, should be aware that individual birds of any species might be treated separately and take notes accordingly.

WEDGE-RUMPED STORM-PETREL (*Oceanodroma tethys*). One (46-1980) 1 Dec 1979, vicinity of Davidson Seamount (35°44′N, 122°43′W), offshore from Cambria, San Luis Obispo Co.

Many of the participants on this pelagic trip were unaware that a possible Wedge-rumped Storm-Petrel had been seen until the record was published in *American Birds* (McCaskie 1980a) and by Roberson (1980). Only some of those people on the top deck of the boat saw the bird. Of the three who submitted descriptions, one was not convinced of the identification. Although one observer described the diagnostic rump pattern well—"clear white rump, white going almost to end of center of tail, leaving dark corners"—he and another reporter felt that the bird did not have as much white as some birds they had seen in the Galapagos Islands. Committee members voting against the record noted that the period of observation was very brief. Two members thought it best "to consider the bird a possible Wedge-rumped Storm-Petrel that got away." The record was judged unacceptable on the first round, 4-6.

Inexperienced observers should be aware that imagination can play tricks on even the most careful observer, and the shorter the glimpse the more likely that the mind will fill in the missing details. Even experienced observers cannot identify every bird seen;

## UNACCEPTED RECORDS, identification questionable (Cont.)

distance, lighting, brevity of sighting, etc., preclude many identifications. When a rare bird is concerned, it is doubly hard to "let it go," but go it must if the diagnostic field marks cannot be ascertained.

RED-FOOTED BOOBY (*Sula sula*). One (17-1980) 6 Sep 1979, Cibola National Wildlife Refuge on the Colorado River about 5 miles south of Palo Verde, Imperial Co.

The Committee felt confident that the observer did not see a booby (record rejected 0-10 on the first round) but could not agree on what might have been seen. The description included reference to a black cap, which should never adorn a Red-footed Booby.

TRUMPETER SWAN (*Cygnus buccinator*). One (125-1978) 11 Nov 1978, Lake Merced, San Francisco, San Francisco Co.

This record was rejected on the second round, 4-6, after a first round vote of 6-4. It was accepted by Winter and Laymon (1979). The bird was with nine Tundra Swans (*C. columbianus*), seen only in flight, and identified by size alone. Dissenters pointed out that the bill characteristics of a Trumpeter (large size, straighter profile, and all black color) could not be seen from below and that Mute Swan (*C. olor*) and Whooper Swan (*C. cygnus*), which are both larger than the Tundra Swan and are distinct possibilities for occurrence in California, could not be eliminated.

Perhaps the most interesting point here is that the Committee, in reviewing records, considers as possibilities even species unrecorded in the state, believing that many unrecorded migratory species could arrive naturally and any species could occur as an escapee.

BLACK VULTURE (*Coragyps atratus*). One (35-1978) 5 Sep 1977, 2 miles south of Parker Dam, San Bernardino Co. (not "north" of Parker Dam as stated by Garrett and Dunn 1981).

This controversial record was previously published as rejected, origin uncertain, in the Committee's third report (Luther et al. 1979). After submission of additional descriptive material, it was recirculated and accepted, 9-1. It was also accepted by McCaskie (1978a) and Roberson (1980). However, the dissenting Committee member requested that the record be discussed at the meeting of 13 February 1982, a safeguard measure provided by the bylaws. At that time, after much discussion, the record was rejected, identification questionable, by a vote of 3 accept, 6 reject, and 1 unresolved. Acceptance would have added this species to the state list. Dissenters believed that the descriptive details necessary for conclusive identification were not given, noting that an immature Turkey Vulture (*Cathartes aura*), which has a blackish or brownish head well into fall, could not be ruled out; that the flight mannerisms of the bird were described as "a few slow flaps and then glide" and "a few deep flaps . . . and then gliding," rather than the Black Vulture's characteristic, rapid shallow flaps alternating with short glides; and that the white patches seen in the primaries were not only depicted in the wrong place but also might have been the distal parts of the pale gray remiges of a Turkey Vulture as viewed from directly behind.

Most Committee members require a more thorough and accurate description for a new state bird than for a previously recorded rarity. If the Committee is to err in its judgment, it would rather do so on the conservative side, rejecting a valid record rather than accepting an invalid one.

## UNACCEPTED RECORDS, identification questionable (Cont.)

ZONE-TAILED HAWK (*Buteo albonotatus*). One (73-1978) 10 Oct 1977, Paso Picacho, Cuyamaca Rancho State Park, San Diego Co.

This record circulated through the Committee for the maximum three times and was finally rejected, 8-2, at the meeting of 13 February 1982. It was accepted by McCaskie (1978a) and Garrett and Dunn (1981). This record of an immature was supported by a detailed drawing of the underparts in flight but very little written description. Dissenters felt that dark phase Swainson's (*B. swainsoni*) and immature Red-tailed (*B. jamaicensis*) hawks were not eliminated, pointing out that an immature Red-tailed is slimmer-bodied, narrower-winged, and proportionately longer-tailed than an adult, thus approaching the shape of a Zone-tailed. Also, a Swainson's could fit the description "soaring and balancing on slightly tilted wings." Proponents argued that a melanistic Swainson's would show light-barred undertail coverts, while the drawing of the bird in question has an all-dark crissum; dissenters countered that a written description corroborating the drawing was needed before emphasis could be placed on such an obscure field mark.

Reporters should note that a drawing may not be enough; it should accompany a thorough written description, which should include a discussion of how all similar species are eliminated.

YELLOW RAIL (*Coturnicops noveboracensis*). One (15-1979) 7 Oct 1973, Crespi Pond, Pt. Pinos, Pacific Grove, Monterey Co.

This record was judged unacceptable on the second round, 1-9. At the time of observation, the reporters were unaware of the rarity of this species and did not write a description until 5½ years later, when time may have unconsciously distorted their memories. The sketchy description stressed the "light buff" overall color and white wing patches of the observed bird. The Committee pointed out that Yellow Rails are quite dark above (the feathers having broad black centers) and dark buff below, while an immature Sora (*Porzana carolina*) is more likely to be described as "light buff." One Committee member has seen a young Sora with apparent white wing patches on the leading edge of the wing, possibly a result of the displacement of the white underwing coverts; the position of the white in the wings of the Crespi Pond bird was not described. Finally, the bird in question fed in the open in short grass, a behavior better befitting a Sora than the shy Yellow Rail.

*SEMIPALMATED SANDPIPER (*Calidris pusilla*). Two (53-1977) 3-14 Sep 1975, location not given. One (65-1979) 3 Jun 1979, Point Mugu, Ventura Co.

A letter from the Secretary of the Committee failed to elicit additional description or the purported photographs for record 53-1977. Probably these birds were correctly identified (as published by Stallcup and Winter 1976), but in the absence of locality, additional description, and especially the photos (if any exist), the Committee had no choice but to reject the record, which it did on the second round, 3-7.

Record 65-1979 is a classic case that demonstrates the variation in approach by different members of the Committee. This bird was seen by a member of the Committee who is fully qualified to identify this species. Further, this species is no longer thought to be very rare in California and has been removed from the review list. The record was accepted by McCaskie (1979b) and Garrett and Dunn (1981). The entire description of the bird itself was as follows: "short bill, dark brown coloration giving general appearance of Least Sandpiper [*C. minutilla*] in comparison to Western [*C. mauri*]; size and leg color of Western; no call; breast less heavily and more finely marked" than that of a Western.

## UNACCEPTED RECORDS, identification questionable (Cont.)

Sample comments from the Committee are as follows: (1) "A record like this reflects the dichotomy of opinion on this Committee between those who are willing to trust inadequately documented records from observers who are very trustworthy and those who are not." (2) "Everyone on the Committee agrees the observer identified this bird correctly. Therefore, it was a Semipalmated Sandpiper. Since it was a Semipalmated Sandpiper, I am voting for it." (3) "I support this record because I'm certain that a correct identification was made. If this were a first state record, then I certainly would have a much more difficult decision. . . ." (4) "My standards for acceptance of this species are especially lax now that it is off our review list, and I feel more harm would be done in 'rejecting' this record than in letting it slide through." (5) "I don't believe in voting 'yes' only due to the observer's name." (6) ". . . these details should never have been submitted . . . and the sighting would stand if it had not been sent to the Committee for authentication. Now it will have to be published as a rejected record. Acceptance of records merely on the observer's reputation undermines the function and status of the Committee." (7) "Such a sketchy record can never stand the test of time. I believe one of our primary concerns is to accept only those records which are not likely, because of their nature, to be discredited by future ornithologists. If this record is accepted, it must be done so solely on the basis of the observer's reputation. This is not enough, as even good birders make mistakes. One hundred years from now no one will have heard of the observer—or most (all?) of the Committee members—and must then either take the word of an 'unknown' Committee or validate the record themselves. They will not be able to do the latter with this description. Science must be built on a firm foundation. It is far better to have 10 unquestionable records than to have 50 records, some of which are wrong."

Even though everyone believed a Semipalmated Sandpiper was seen, the documentation was judged inconclusive and the record was rejected, 4-6. This demonstrated variation in approach to the validation process is considered by all members to be a highly desirable attribute of the Committee. It should be pointed out that unbeknownst to the Committee, the description of this bird was originally directed to *American Birds* and was later submitted to the Committee by another person in the observer's name. Without doubt, a report meant for this Committee would have been far more complete. See Rufous-necked Stint below.

RUFOUS-NECKED STINT (*Calidris ruficollis*). One immature (118-1978) 1-6 Sep 1978, Santa Clara River mouth, Ventura Co.; photo on file.

This record was at first widely accepted as a Rufous-necked Stint. It was so published by McCaskie (1979a) and Roberson (1980) but later retracted by McCaskie (1981) and Roberson (1980, Errata and Addenda) and published as a Semipalmated by Garrett and Dunn (1981). Committee members, upon reflection, felt that the bird probably was a Semipalmated and rejected the record on the first round, 0-10. The considerable controversy surrounding this record led to an increase in our knowledge of Rufous-necked vs Semipalmated identification, although this problem is far from solved. Separation of young Rufous-necked from Little Stint (*C. minuta*) apparently is even more difficult. Proposed field marks of juvenal Rufous-necked compared to juvenal Semipalmated include the following: (1) chestnut or bright rufous edgings on the back feathers and inner scapulars; a Semipalmated, as in the case of the Santa Clara River bird, can show fairly bright rusty (but not chestnut or bright rufous) on the inner scapulars and tertials but not the back; (2) reportedly, grayish median and lesser wing coverts with slender dark centers and thin whitish fringes, producing a gray "panel" contrasting with the inner scapulars and back feathers, both of which have broad dark centers and bright chestnut or rufous edges (the outer scapulars are more

## UNACCEPTED RECORDS, identification questionable (Cont.)

like the coverts); these wing coverts in a Semipalmated are like the back feathers —broad black centers with narrow buff to whitish margins, giving a uniform appearance to the entire mantle (but sometimes interrupted by rustier-edged inner scapulars and tertials); caution: the scapulars often hide the wing coverts; (3) a slightly drooped, finer, more tapered bill, much like that of a Least Sandpiper; the bill of the Semipalmated is straight with less tapering to a blunter, thicker, even bulbous, tip; (4) webbing lacking between the forward toes; however, the webbing of a Semipalmated can be so restricted as to be virtually invisible in the field, especially if the feet are muddy; (5) more white in the tail; (6) head perhaps whiter than that of a Semipalmated, the crown, auriculars and possibly the nape being paler; and (7) calls may well be different, but if so, the differences are slight, may defy description, and in any event should be used only by observers thoroughly familiar with *both* species; one call of *ruficollis* has been rendered as a soft "kip." The above notes are largely fide Jon Dunn, who corresponded with P. J. Grant, D. I. M. Wallace, A. J. Prater and others. The marks are largely untested and must therefore be used with extreme caution. The record clearly demonstrates the elementary state of stint identification. Even the British are confused!

RED-LEGGED KITTIWAKE (*Rissa brevirostris*). One adult (13-1981) 3 Nov 1980, Moss Landing, Monterey Co.

Although this record was rejected, 1-9, on the first circulation, some Committee members felt that the bird might well have been a Red-legged Kittiwake. However, this would have been the first record for the state (although long overdue, judging from the three Oregon and one Nevada records mentioned by Roberson 1980) and as such required a more thorough description, preferably by more than one observer, to rule out an aberrant Black-legged Kittiwake (*R. tridactyla*) and other species. The Moss Landing bird was said to have "*bright* red" legs and feet. However, Black-legged Kittiwakes with pinkish legs and feet have been seen in Monterey (Binford pers. obs.; G. McCaskie in litt.) and one with orange-red legs and feet was noted in Britain (Coulson 1959). All other characters described would fit a Black-legged equally well. Unfortunately, underwing color (dark), so critical to identification of this species, was not noted, nor were the darker mantle, shorter bill, more rounded head, steeper forehead and pure white trailing edge of the primaries, compared to Black-legged. Perhaps most damaging was the described all-white head. By 3 November an adult Red-legged should be in full basic (winter) plumage, not the alternate (breeding) plumage described, and have an obvious dark auricular spot and a dusky wash on the crown.

THICK-BILLED MURRE (*Uria lomvia*). One (71-1978) 3 Jan 1977, Eel River mouth, Humboldt Co. One (26-1978) 21 Jan 1978, Otter Point, Pacific Grove, Monterey Co.

Record 26-1978 was published by Winter and Manolis (1978) but rejected by the Committee, 3-7, on the third round. The Committee's comments demonstrate confusion on certain field marks, especially the color of the upperparts. According to some observers (J. Dunn and T. Wahl, pers. comm.), the entire mantle and the dark portions of the head and neck of breeding Thick-bills are jet black, without the grayish or brownish cast of the Common Murre (*U. aalge*). Whether or not this difference holds for all breeding birds and for immatures and winter adults is uncertain. Roberson (1980) states that the head of a winter Thick-bill becomes brownish but the back remains black, providing a contrast useful in separating this species from the uniformly grayish (brownish?) Common Murre. Upperpart coloration needs additional study and documentation before it can be used in the field. The inverted "V" shape of the white on the chest and the white tomial stripe were not seen on the Pacific Grove bird,

## UNACCEPTED RECORDS, identification questionable (Cont.)

although the Committee agreed that these marks are not always present on Thick-bills. While the description of the bill as "blunt, short, thick, and with a decurved culmen" sounds right for a Thick-bill, the Committee pointed out that there is some overlap in length and shape with the Common Murre and that more detailed descriptions of culmen shape (the distal half is more strongly decurved in relation to both the horizontal plane and to the remainder of the culmen; see photo in Roberson 1980:210) and bill size (usually higher in relation to length and sometimes shorter overall) were necessary before the bird could be accepted on bill characteristics alone.

Record 71-1978 was accepted by Winter and Erickson (1977), McCaskie et al. (1979), and Roberson (1980) but rejected by the Committee, 4-6, on the second round. All dissenters felt that the description was too incomplete for conclusive identification of the species. The proper face pattern (black extending from the crown to the malar area, without white above the black eye stripe) was the only accepted field mark noted, although the upperparts were said to be jet black. The bill was described only as "stout." No mention was made of a white inverted "V" on the chest, pale tomial stripe, or the usual thick-necked appearance (see photo in Roberson 1980: 210). Distance (300 yards) may have precluded detection of the critical marks.

BROAD-BILLED HUMMINGBIRD (*Cynanthus latirostris*). One female (56-1977) 8 Oct 1967, Pt. Pinos, Pacific Grove, Monterey Co.

One of the two observers later became a member of this Committee. His original notes were in the form of an English theme written at age 14. The age and inexperience of both observers and the incompleteness of the descriptions forced the Committee to question the record (vote 4-6 at the meeting of 13 February 1982).

Virtually every beginning birder "identifies" rarities during his birding youth. If not verified by experienced observers at the time, most of us, in later years, come to question such records, especially if supported only by memory or by the usual embryonic note-taking system. Even if we still count such birds on our personal lists, we rarely feel secure enough in our early judgment to report the sightings to a group like the CBRC. When a beginner sees a rarity, he should *immediately* notify the closest and most experienced birder available, as well as any others he knows. If confirmed, such a record will enhance the beginner's reputation, result in meeting new friends (who come to see the bird), and alleviate the possibility of having to question the record in later years.

*LEAST FLYCATCHER (*Empidonax minimus*). One (161-1977) 9 Oct 1974, "Abandoned Ranch," Point Reyes, Marin Co. One (3-1980) 24 May 1975, Santa Barbara Island. One (110-1980) 24 Sep 1979, Santa Barbara, Santa Barbara Co.

Record 161-1977 circulated three times and then received a final vote of 8-2 at the meeting of 13 February 1982. It was accepted by Stallcup et al. (1975). Committee discussions on this and other Least Flycatcher records demonstrate our collective "state of the art" or more precisely our uncertainties about *Empidonax* identification. Some Committee members liken the call note of the Least to "a far away Audubon's Warbler" (*Dendroica coronata*, western races), having a distinct "ch" sound, as described for the Point Reyes bird. Other members cannot detect the "ch" sound and describe the call as a soft mellow "wit," much like that of a Willow Flycatcher (*E. traillii*). Most members say Hammond's Flycatcher (*E. hammondii*) has only a distinctive loud "peek" reminiscent of a Pygmy Nuthatch (*Sitta pygmaea*), but some say it has both this call and a soft mellow "wit" (like Least?). The description of the Point Reyes bird says it "flitted its wings sometimes," thus approaching the behavior of Hammond's; however, it is clear that the exact nature of wing flicking in these two species (and other *Empidonax*) is unknown; if differences exist, are they in frequency, inten-

## UNACCEPTED RECORDS, identification questionable (Cont.)

sity or timing? And is there overlap? Some members think that tail length, not described for the Point Reyes bird, is an important field mark, feeling that Least should look short-tailed, even compared to Hammond's, while others say that Hammond's and Least overlap or are hard to distinguish in this regard. Many feel that the pale underparts (faint or interrupted dark breast band) and yellow restricted to the undertail coverts, as described for the Point Reyes bird, is indicative, if not diagnostic, of Least, but others point out that in fall some *Empidonax* (even Western, *E. difficilis*) can be so worn and faded as to lack most yellow. The bill color on the Pt. Reyes bird was described as "yellowish-brown" below. Some members believe that in fall the lower mandible should clearly be yellow (except for the extreme tip, dark), while others think there is enough variation to encompass "yellowish-brown." Some members objected to the "greenish-brown" back of the Pt. Reyes bird, while others thought this adequate or just right. The bill shape was not well-described; one observer called the bill "long," while a Least should have a bill as short as or shorter than any other *Empidonax* and relatively wide; also, the convex sides of the bill as viewed from above or below were not mentioned.

All in all, Committee discussions demonstrated that *Empidonax* identification is not a closed book (some would say we are still on page one) and that even "experts" differ significantly in what they believe, emphasize and use. Obviously such identifications are not for the inexperienced observer. We need a thorough field study of eastern vs western *Empidonax*, with scientific attention to calls and behavior.

Record 3-1980 was rejected, 3-7, on the first round. It was accepted in *American Birds* (McCaskie 1975e). Dissenters pointed out the lack of bill shape description and the following dubious statements: (1) the bird "often flicked wings kinglet-like," a characteristic perhaps more common to Hammond's, but see above. (2) "Outer webs of outer tail feathers lighter than inner webs . . ." also suggests Hammond's; Least may show a narrow, slightly paler outer web, but apparently only when strongly backlit. (3) "Breast gray (duskier but no darker than head) becoming lighter on belly" again suggests Hammond's; Least should have gray only on the sides of the chest or have a chest band much paler than the head. (4) "Bill . . . horn-colored [ = pale] at base of lower mandible becoming dark toward tip" better fits Hammond's; Least should have a lower mandible that is nearly all yellowish (but see above).

Record 110-1980 was rejected, 3-7, on the first circulation. Dissenters pointed out that a 10-second view is not sufficient to clinch such a difficult identification and that critical marks such as bill shape and color, call, and upperpart color were not noted. This record was accepted by McCaskie (1980a).

VEERY (*Catharus fuscescens*). One (60-1977) 29 May 1977, Oasis, Mono Co.

Dissenters pointed out that the Swainson's Thrush (*C. ustulatus*) varies both individually and geographically in the degree of reddishness of the upperparts and that the apparently diagnostic flank color (gray in Veery, brownish in Swainson's) was not specifically described. Supporters argued that the grayish unmarked face (lack of wide buffy eyering), scant throat and breast spotting, and extra bright back (like a Brown Thrasher, *Toxostoma rufum*) eliminate Swainson's and indicate Veery. Moreover, while the west coast race of Swainson's (*C. u. ustulatus*) is brighter above than the more easterly races, and the western Veery (*C. f. salicicola*) is duller above than the two eastern races, thus making difficult the separation of western Veeries from west coast Swainson's, there should be no trouble separating the bright eastern Veeries (which the Oasis bird was thought to be) from any Swainson's. This record was accepted by McCaskie (1977) but later rejected by him (1979a). In Committee it went the full three rounds and was finally judged unacceptable, 6-4, at the meeting of 13

## UNACCEPTED RECORDS, identification questionable (Cont.)

February 1982. Obviously, many Committee members feel that the Veery is very hard to separate from Swainson's and that records must be supported by extensive details, including flank color.

GRAY WAGTAIL (*Motacilla cinerea*). One (188-1980) 18 Oct 1980, Novato, Marin Co.

This record created great difficulties for the Committee, requiring three circulations and a meeting (13 February 1982) before a decision could be reached (accept 1, reject 7, unresolved 2). Had the description been more complete, the record might well have been accepted. There is little doubt that a wagtail was seen; both observers had seen Gray and Yellow wagtails previously. The wings were correctly noted as "plain gray" (without the wing bars of a Yellow) and the back as "pearl gray" (without a yellow-green or brownish cast). Unfortunately, the observers failed to note the extra long tail, yellowish rump, and call, all of which should, ideally, be recorded for a first state record. This would have been only the second fall record for North America and the first record south of Alaska.

PINE WARBLER (*Dendroica pinus*). One adult male (67-1980) 6-7 Sep 1979, Deep Springs College, Inyo Co.

This record was rejected on the first circulation, 3-7. Most Committee members felt that it was a Blackpoll Warbler (*D. striata*), pointing out that the black back stripes and the usually pale toes of a Blackpoll can be very inconspicuous. A diagnostic mark of the Pine was not noted in the description—the yellowish (adults and immature male) or whitish (immature female) extension of the throat paleness up and behind the darker cheek patch, forming a half collar in the manner of a Cape May Warbler (*D. tigrina*). One member said "I think this confusion is due in large part to poor illustrations of both Pine and fall Blackpoll warblers" in field guides. Most accepted California records of Pine pertain to immatures, and most reported fall "adults" are probably Blackpolls.

KENTUCKY WARBLER (*Oporornis formosus*). One (11-1980) 30 Apr 1979, Coso Rest Stop on US 395 between Little Lake and Olancha, Inyo Co.

Although accepted by McCaskie (1979b) and Roberson (1980), this record was felt to be too incomplete to eliminate similar species and was rejected, 3-7, on the first round. The easily observed black on the forehead and crown and the larger body, bill, and legs compared to nearby Wilson's Warblers (*Wilsonia pusilla*) were not noted. Further, the bird was described as "flitting into the lower branches of the cottonwoods," a behavior not normal for the skulking Kentucky. The date is 2 weeks before the earliest accepted California occurrence.

CONNECTICUT WARBLER (*Oporornis agilis*). One (44-1979) 29 Oct 1977, Point Loma, San Diego Co.

Most members agreed that this bird was too incompletely described to establish the latest fall record for the state; the record was rejected on the second round, 3-7. Members pointed out that the description said nothing about this species' habit of walking (it only rarely hops), plump body shape, long undertail coverts (nearly to end of tail), or pale legs. Nor did the account deal with elimination of similar species—a "must" in reports of obscurely marked rarities. Fall Mourning Warblers (*O. philadelphia*) often have nearly complete (though usually narrow) eyerings.

## UNACCEPTED RECORD, origin questionable (identification accepted)

WHITE IBIS (*Eudocimus albus*). One immature (105-1978) 22 Apr 1978 (present Mar-May), Thomas Aquinas College, Malibu Canyon, Los Angeles Co. (photo on file), and what is believed to be the same bird 6-10 Jun 1978 (and probably into 1979, see below), Mugu Lagoon, Point Mugu Naval Air Station, Ventura Co.

This record was submitted as an escapee and to show that these two occurrences involve the same bird. The Committee agreed with the reporter on both counts, voting 0-10 on the first round. The bird in the Malibu photo seems to be in identical piebald plumage to the bird in the Pt. Mugu photo (in McCaskie 1978b). Most members felt that the bulk of evidence supported the theory that the bird escaped, probably from nearby Busch Gardens, which was known to have a similar, unclipped, unbanded, piebald immature that was lost at about the same time. What was presumably the same bird was collected in adult plumage (Los Angeles County Museum 90516) on 22 Dec 1979 at Pt. Mugu, Ventura Co., by W. F. Nichols.

This record and decision may cast doubt on all other California records of White Ibis. However, the Committee did not at this time wish to open the question of previously accepted records, preferring to await future developments that might demonstrate a clear pattern of occurrence. In its deliberations, the Committee agreed that the burden of proof that a bird is wild lies with the reporter, not the Committee. Obvious escapees should not be submitted.

## UNRESOLVED RECORD

ANHINGA (*Anhinga anhinga*). One seen on 9 Feb 1913 by Allan Brooks and two seen on 12 Feb 1913 by William L. Dawson, Potholes, above Laguna Dam, Imperial Co. (1-1979); submitted by DDeS.

After three rounds, this record received the following vote at the meeting of 13 February 1982: accept 3, reject 4, unresolved 3. The species therefore remains in the unresolved category of the California state list. See Brooks (1913), Dawson (1916, 1923), and Grinnell and Miller (1944) for details of these sight records. Those Committee members opposed to adding the Anhinga to the state list on the basis of this record pointed out that the only description of the birds consisted of the statements: when flying, the bird "looked for all the world like a small Goshawk [*Accipiter gentilis*] with a slender stick projecting in front; the regular succession of wing beats and sailings was just that of a Goshawk, and when the Darter alighted on a tree it did so with the ease of a raptor" (Brooks 1913); and ". . . their behavior contrasted strongly with that of the Farallon Cormorants [*Phalacrocorax auritus*] which accompanied them" (Dawson 1916); and "In striking contrast with the ungainly Shags, they described small circles in the air with a quick flap, flap, flap, and sail; and when they lighted on some dead limb overhanging the water, they did so with easy assurance and grace" (Dawson 1923). Supporters of the record pointed out that in early days it was not the custom to give a description of a rare bird and that Grinnell and Miller (1944) did not question the record, apparently including it on their hypothetical list because of their policy of accepting only specimen documentation. Brooks was confident enough of his identification to publish the record even in the face of scorn for sight records. Supporters also felt that the descriptive material, while not extensive, was adequate to indicate Anhinga, given the experience of Brooks. Dissenters thought the description was not adequate, especially for a state record.

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Dale Ault, Alan Baldridge, Larry R. Ballard (LRB), Louis R. Bevier (LRBe), Laurence C. Binford, Clark Blake, Ronald L. Branson, Larry Clark, Herbert Clarke, Dan R. Cohan, Bart Cord, David DeSante, Jon L. Dunn, Beverly Ehreth, Richard A. Erickson, Will Fulmer, Kimball L. Garrett, D. Edwin Gomke, James M. Greaves, Dan Guthrie, Linda Hale, Rob Hansen, Stanley W. Harris, Jerome A. Johnson, Lee Jones, Ethel Lagle, Jeri Langham, Stephen A. Laymon, Paul Lehman, Bill Lenarz, John S. Luther, Susanne Luther, Curtis Marantz, Guy McCaskie, Joseph Morlan (JM). Jim Morris (JMo), Doug Morton, Jerry Oldenettel, Gary Page, B. D. Parmeter, Larry Peavler, William Reese, J. Van Remsen, Don Roberson, Larry Sansone (LS), Luis Santaella (LSa), Barry Sauppe, Barbara Scharfenstein, Don Schroeder, Tom Schulenberg, Arnold Small, Caryol Smith, Susan Smith, Nancy Spear, Richard Stallcup, Lynn Stenzel (LSt), Scott B. Terrill, Philip Unitt, Peter Vickery, Richard Webster, David Weiss, Ralph S. Widrig, Steve Wilson.

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Breeding-plumaged Thick-billed Murre *Sketch by Narca Moore-Craig*

Yellow-billed Loon (*Gavia adamsii*). Richmond, Contra Costa Co., California, 17 February 1980. For information on the identification of this species see Binford and Remsen, Western Birds 5:111-126, 1974, and Burn and Mather, British Birds 67:257-296, 1974

*Photo by Ed Harper*

# NESTING ECOLOGY OF SCRUB JAYS IN CHICO, CALIFORNIA

LYMAN V. RITTER, PSW Forest and Range Experiment Station, Forestry Sciences Laboratory, 2081 E. Sierra Ave., Fresno, California 93710

Twelve races of the Scrub Jay (*Aphelocoma coerulescens*) occupy a geographic range extending from southern Mexico northward over most of western North America to southern Washington and Idaho. Another race is isolated in central Florida (American Ornithologists' Union 1957). Good quantitative information on nesting ecology is available only for the Florida race (*A. c. coerulescens;* Woolfenden 1973, 1975, Stallcup and Woolfenden 1978). Atwood (1978, 1980b) described the breeding biology of the Santa Cruz Island Scrub Jay (*A. c. insularis*), an insular population, but presented few quantitative data on nesting success. Anecdotal information on nesting by other races can be found in Bent (1946), Hardy (1961), Brown (1963), Stewart et al. (1972) and Verbeek (1973). This paper documents basic reproductive parameters of Scrub Jays (*A. c. superciliosa*) in the Sacramento Valley of northern California.

## STUDY AREA AND METHODS

I conducted the study along upper Lindo Channel and Big Chico Creek, partly within Bidwell Park in the northeastern section of Chico, Butte County, California. Valley Oak woodland typified the habitat, with an overstory of Valley Oak (*Quercus lobata*), California Sycamore (*Platanus racemosa*), Black Walnut (*Juglans hindsii*), Box Elder (*Acer negundo*), Interior Live Oak (*Quercus wislizenii*) and California Laurel (*Umbellularia californica*). The understory consisted of California Wild Grape (*Vitis californica*), Blue Elderberry (*Sambucus mexicana*), Poison Oak (*Toxicodendron diversiloba*) and California Blackberry (*Rubus vitifolius*). Valley Oak woodlands are characteristically heterogeneous, with oaks dispersed in groves with intervening openings. Data were also collected from other nesting sites in the suburbs of Chico. All study locations were at an elevation of about 70 m (230 ft).

Jays were captured during the autumn and early winter months in ground traps baited with acorns from Valley Oaks. Each captured jay was weighed, aged (Pitelka 1945), banded, and marked with patagial flags to facilitate individual recognition (see Hester 1963).

The sizes of the territory and home range were determined by plotting locations on a field map and connecting the outermost points, to form the largest polygon possible, as described by Odum and Kuenzler (1955). Areas within the polygons were measured with a planimeter. The locations plotted while determining the size of territories were sites of boundary disputes during the breeding season. In the case of home range measurements, the pair's locations throughout the year were plotted.

Observations were made on 119 nests from January 1971 through June 1974. Nests were located by searching likely spots and by observing nest-building or food-carrying behavior. Nest height and nesting substrate were recorded at each active nest. I also recorded the date of initiation of each clutch, clutch size, incubation period, numbers of eggs hatched and young fledged, and fledging period or cause of failure of a clutch. To obtain these data, I visited each nest at 3- to 5-day intervals and watched selected nests from blinds. Incubation periods were determined only for nests whose histories were carefully observed from beginning to end. Nest visits were kept brief to minimize altering the normal nesting activity or nest predation.

Nesting success was calculated using "egg-day" and "nestling-day" as units of exposure (Mayfield 1975). Calculations of nesting success assumed a 5-day egg-laying period, an 18-day incubation period and a 16-day nestling period. When calculating "egg-day" and "nestling-day," losses were assumed to have occurred midway through the interval between visits to the nest. Johnson's (1979) method was used to develop standard errors of daily mortality rates of eggs and nestlings. Furthermore, his ratio test was used to statistically compare mortality rates between stages of the nesting cycle, between initial and renest attempts, and between years. Hatching success was determined for nests that were found before hatching and that remained undisturbed through this phase of the incubation period. Nest failure was generally classified as caused by either predation or weather, depending on the appearance of the nest and its contents.

## RESULTS AND DISCUSSION

### SOCIAL INTERACTIONS AND TERRITORIALITY

Thirty-six adult jays and 66 birds of the year were banded and marked, mostly in 1970-1972. Trapping and field observations of social interactions were concentrated along upper Lindo Channel, where one or both members of six adjacent pairs of territory holders were marked. Breeding Scrub Jays in Chico appear to be resident, monogamous for life, and to recognize discrete territorial boundaries only during the breeding season. All activity during the breeding period was confined to the defended area, meeting criteria of the type "A" territory of Hinde (1956). Three pairs of Scrub Jays, which were marked in the fall of 1970 and observed regularly until June 1974, occupied the general vicinity of their capture locations throughout that period. Two of those pairs held territories with almost identical boundaries through four breeding seasons.

Other studies have suggested that Scrub Jays in the West maintain permanent pair bonds and year-round territories, although "territory" is not defined in these studies (Pitelka 1951; Hardy 1961; Brown 1963; Verbeek 1973; Atwood 1978, 1980a, 1980b). Florida Scrub Jays exhibit cooperative breeding and have year-round territories, with size depending on the number in the family unit (Stallcup and Woolfenden 1978, Woolfenden and Fitzpatrick 1978). The intensity of territorial disputes during the nonbreeding period seems to differ among localities. Verbeek (1973) found intense territorial defense throughout the year in Scrub Jays (*A. c. californica*) in Monterey County, California. Atwood (1980a, 1980b) noted a relaxation in territory defense during the nonbreeding season among Santa Cruz Island Scrub Jays. And among Scrub Jays (*A. c. oocleptica*) in Berkeley, California, Brown (1963) described a dominance hierarchy in which, during the nonbreeding season, territory holders were dominant over all other jays that occurred in the area of their breeding territory.

During autumn and winter, Scrub Jays in Chico sometimes form loose aggregations of up to 10 birds, which may be partly familial. For example, three nestlings from the same nest that were banded during the spring of 1971 were recaptured within 100 m of the nest the following October to December. First-year birds seemed to make up a large proportion of flock members. Aggregations of jays often were observed in old territories of known breeders and were loosely associated with the resident pair. The nonbreeding ranges of adjacent territory holders, where one or both birds of the resident pairs were marked, often overlapped, but rarely were they observed to aggregate longer than about 15 minutes. Flocks of jays, as noted by Atwood (1980a), were not observed during the breeding season.

Aggressive encounters were frequent during the nonbreeding season, usually over food. It was common to see a jay chase and supplant another that was carrying food. Such supplanting flights typically followed circular paths, rather than linear flights typical of most territorial disputes.

Approximate territory size in western mainland and Santa Cruz Island Scrub Jay populations was 2 to 3 ha (Atwood 1980b). Florida Scrub Jays unassisted by helpers had territories of approximately 8 ha. Five territories of Scrub Jays in Chico averaged 2.2 ha (s.d. = 0.84, range = 1.0 to 3.1). During the nonbreeding period, marked pairs were seen most often in the area defended during the breeding season. However, considerable extension of their movements occurred during the nonbreeding season. The home ranges of two pairs throughout a 24-month period covered 4.9 ha and 5.4 ha.

## NEST-SITE PREFERENCE

Four plant species, California Wild Grape, Blue Elderberry, Interior Live Oak and Coffeeberry, provided nest cover for 84% of all nests. Use of these cover species suggests that concealment of the nest was a primary factor in selection of plant species for nest placement. Nest-building typically occurred before most species of deciduous shrubs and trees had renewed their foliage. More nests were built in California Wild Grape vines than in any other cover species, and although this is a deciduous species, branch tangles provided protection from possible predation before new foliage provided concealment (but see section on nesting success). Blue Elderberry is among the first of the deciduous plants to renew its foliage in the spring, and it was typically in full leaf by the time jays built nests in it. Interior Live Oak and Coffeeberry are evergreen. All 19 nests found in suburban habitat were placed in evergreen shrubs and trees.

Variation among nesting sites was great. Nests were placed in terminal branches, the forks of branches, the forks of tree trunks, on lateral branches, and in vines.

Figure 1 shows the percentages of nests in various height intervals above the ground. Taking the 4 years together, just over 50% of the nests were placed from 2 to 4 m above the ground. The relatively large percentage of nests found above 6 m in 1972 may be due to the sampling variation present with small sample sizes. The height of 119 nests ranged from 0.6 to 15.2 m, with a mean of 3.4 m (s.d. = 1.94 m). The mean nest heights were not significantly different between years (ANOVA). I found no significant difference in nest height of first ($\bar{x}$ = 2.8 m, s.d. = 1.14) and second ($\bar{x}$ = 3.6 m, s.d. = 1.82) nesting attempts. The sampled nest heights were similar to those of the Santa Cruz Island Scrub Jay ($\bar{x}$ = 4.0 m, n = 89; Atwood 1980a, 1980b) but higher than those of the Florida Scrub Jay ($\bar{x}$ = 1.2 m, n = 123; Woolfenden 1973) and Scrub Jays in Monterey County ($\bar{x}$ = 1.6 m, n = 25; Verbeek 1973).

## NEST CONSTRUCTION

Jays were first observed building false nests in late February and early March. All pairs of jays observed prior to their building a complete, functional nest exhibited false nest-building. The false nest involved the arranging of one to several dozen sticks at a site (Ritter 1972). Among four pairs for which the onset of false nest-building was determined, an average of 12.8 days (s.d. = 5.2) was spent carrying materials to various false nests before starting a functional nest. An average of 12.7 days (n = 7, s.d. = 4.84) was required to complete a functional nest. No quantitative data are available on duration of nest-building by other subspecies of Scrub Jays. During favorable weather, nest building by Pinyon Jays (*Gymnorhinus cyanocephalus*) averaged 7.3 days (n = 21) and ranged from 5 to 9 days (Balda and Bateman 1972).

Nest-building by Scrub Jays in Chico was completed an average of 7.9 days (s.d. = 2.85, range = 5 to 12 days, n = 7) before initial oviposition. Woolfenden (1973) found the interval between building and egg-laying to be approximately 15, 16 and 17 days in three nests of Florida Scrub Jays. Pinyon Jays seem to have a much shorter transition period than Scrub Jays, averaging 2.3 days (range 1 to 5 days, n = 21; Balda and Bateman 1972).

## EGG-LAYING AND INCUBATION

The earliest record I have of egg-laying in known first clutches was on 10 March 1972, and the latest was on 20 April 1973. Approximately 92% of all egg-laying occurred during the last week in March and the first week in April (Figure 2). Davis (1953) observed egg-laying from late March to late April in Butte County. Breeding chronology was similar for the Santa Cruz Island Scrub Jay (Atwood 1978, 1980b) and Scrub Jays in Monterey County (Verbeek 1973).

Mean, biweekly air temperatures are also presented in Figure 2. These data suggest that higher temperatures during nest-building in 1972 and 1974 than in 1971 or 1973 may have stimulated earlier oviposition. Earlier laying dates were correlated with higher air temperatures in the period prior to egg-laying in the Rook (*Corvus frugilegus*; Owen 1959) and the Black-billed Magpie (*Pica pica*; Erpino 1968). The chronology of nesting in the Santa Cruz Island Scrub Jay seemed little affected by annual climatic variations (Atwood 1978, 1980b).

Sixty-four completed clutches were examined. One egg was deposited daily until a clutch was completed, conforming to a general pattern found among corvids (Holyoak 1967). Clutch size ranged from four to six ($\bar{x}$ = 4.8,

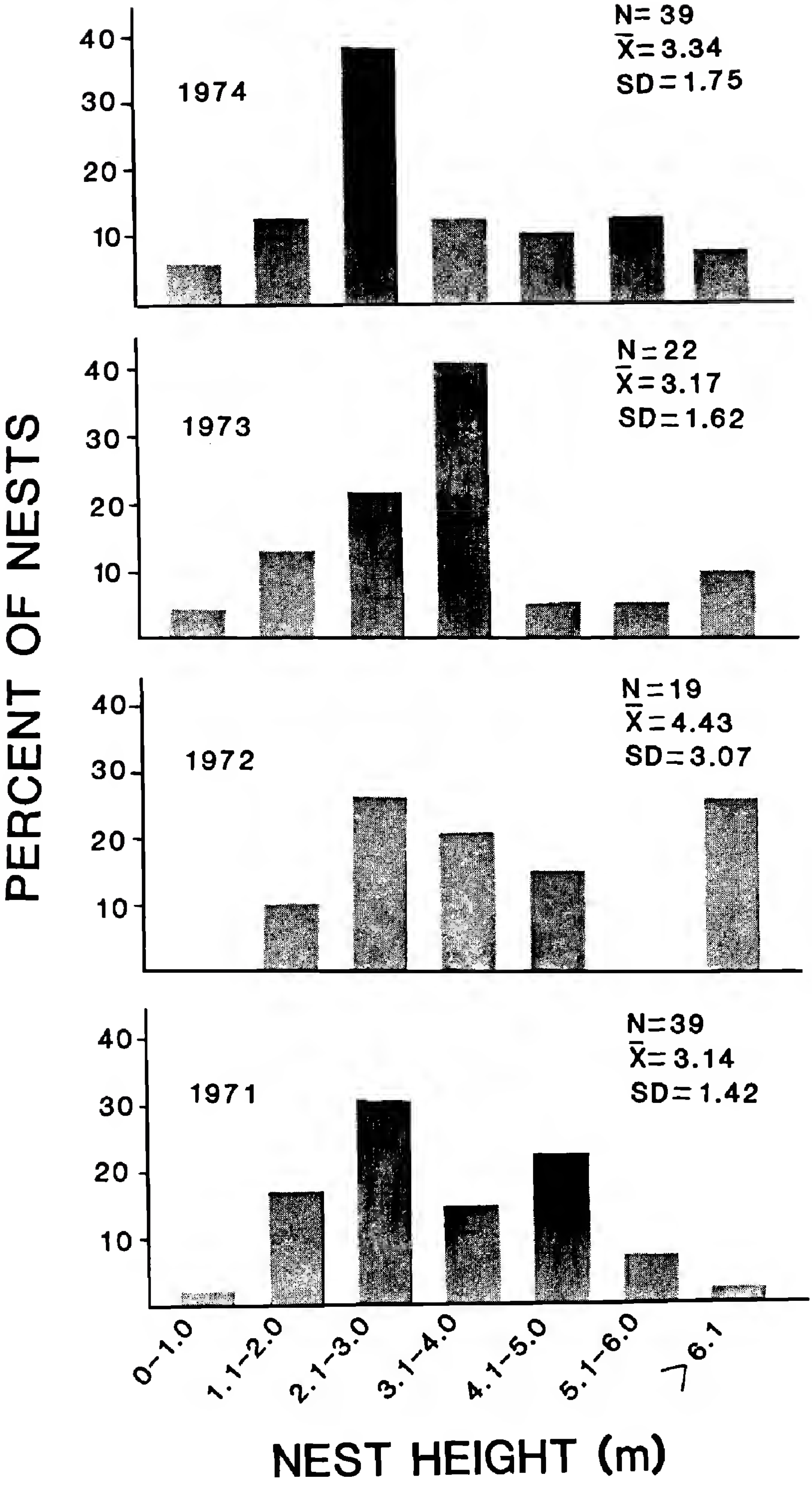

Figure 1. Height intervals of Scrub Jay nests in Chico, Butte County, California.

s.d. = 0.62). The modal clutch contained five eggs and comprised 57.8% of my sample. The differences in mean clutch size between years were not significant (ANOVA). For many bird species, including the Florida Scrub Jay (Woolfenden 1973), clutch size decreases as the nesting season progresses, with renesting attempts producing fewer eggs (Davis 1955, Klomp 1970).

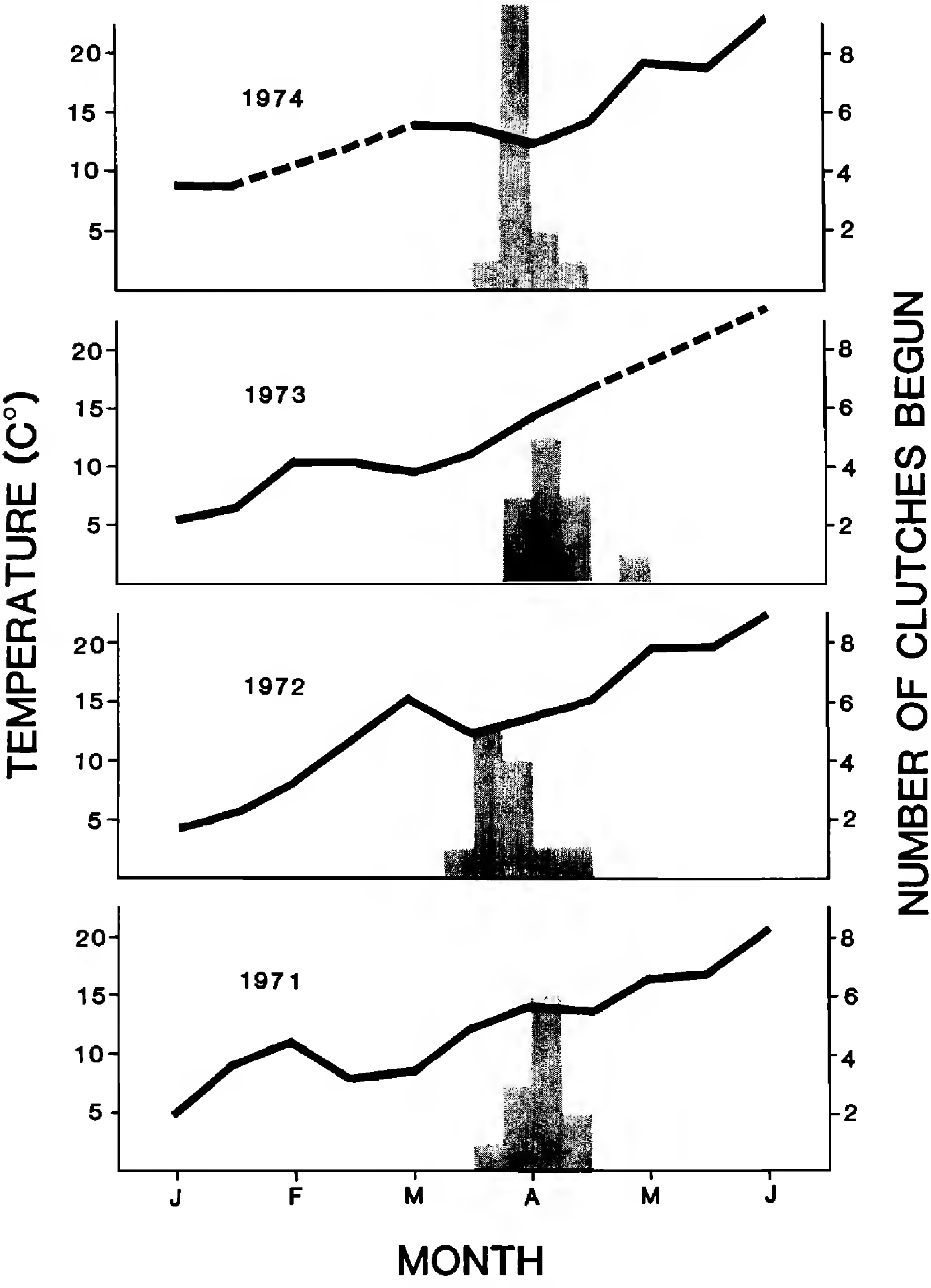

Figure 2. Scrub Jay egg-laying dates plotted at weekly intervals (shaded), and mean, biweekly air temperatures.

However, mean size of initial clutches in this study ($\bar{x}$ = 4.8, s.d. = 0.62, n = 48) was not significantly different from that of renesting efforts ($\bar{x}$ = 4.8, s.d. = 0.65, n = 16). Some marked jays of both sexes were found to nest successfully in their first year, but insufficient data were obtained to analyze properly the relationship among age of the bird, clutch size, date of clutch initiation or nesting success. Of 32 nesting jays of known-age, eight (25%) were first-year birds.

Clutch sizes found in this study were apparently larger than those reported in other races of Scrub Jays: Monterey County—$\bar{x}$ = 3.9, n = 29, range = 2 to 5 (Verbeek 1973); Santa Cruz Island—$\bar{x}$ = 3.7, s.d. = 0.70, n = 121, range = 2 to 5 (Atwood 1980b); and Florida—$\bar{x}$ = 3.4, s.d. = 0.60, n = 101, range = 2 to 5 (Woolfenden 1973). Atwood (1980a) suggests that reduced clutch size in the Santa Cruz Island and Florida Scrub Jays may have resulted from intense K-selection.

"Incubation period" in this study refers to the time between the laying and hatching of the last egg (Kendeigh 1963). Hatching of all eggs in a clutch required from 1 to 2 days. No attempt was made to study the relationship between the orders of laying and hatching. The average incubation period was 18.2 days (s.d. = 0.45, range = 18 to 19, n = 15). Incubation persisted for 28 days and 29 days at two nests in which the eggs failed to hatch. In a Scrub Jay nest in Marin County, California, incubation lasted 18 days and the young hatched one at a time during a 2-day period (Stewart et al. 1972). Verbeek (1973) found an incubation period of 17 to 18 days for Scrub Jays in Monterey County, and Stallcup and Woolfenden (1978) reported an incubation period of 16 to 19 days in the Florida Scrub Jay.

## NESTING SUCCESS

Mayfield (1961, 1975) suggested that data on nesting mortality are most meaningful when reported as a mortality rate rather than as percentages of the nests observed and the total eggs laid that hatched or fledged, and that mortality and survival are best reported as probabilities. He further suggested that data be reduced to units of exposure that reflect not only the number of nests but the length of time each nest was observed. This method places all nests on a comparable basis by using only information from the period during which a nest was under observation, regardless of the developmental stage and knowledge of outcome. This method reduces the bias inherent in nesting success rates calculated by the traditional method (Johnson 1979).

Nest success based on Mayfield's (1961, 1975) exposure method is summarized in Table 1. Egg-laying apparently did not occur in 28% of the nests found completed and lined. Virtually all nests begun by Florida Scrub Jays receive eggs (Woolfenden pers. comm.). Considering only those nests in this study in which egg-laying occurred, success ranged from 21% in 1974 to 47% in 1972. Egg-laying in some nests may have been undetected, because of possible predation between visits and the subsequent abandonment of the nest. Nests in which egg-laying did not occur may reflect breeding inexperience of the territorial pair. However, a pair of marked adult jays established territories, constructed nests, and performed courtship feeding in 1971 and 1972, but failed to lay eggs or build a second nest either year.

Table 1. Success of Scrub Jay nests according to stage of the nesting cycle.

| Year | Number nests[1] | Percent active nests[2] | Percent successful: Laying[3] | Incub.[3] | Hatching[4] | Nestling[3] | Overall success[5] |
|---|---|---|---|---|---|---|---|
| 1971 | 32 | 72 (23)[6] | 91 | 70 | 78 | 75 | 27 |
| 1972 | 19 | 69 (13) | 80 | 100 | 75 | 79 | 33 |
| 1973 | 21 | 67 (14) | 81 | 81 | 87 | 63 | 24 |
| 1974 | 33 | 79 (26) | 72 | 51 | 83 | 68 | 16 |
| Combined | 105 | 72 (76) | 82 | 72 | 81 | 71 | 24 |

[1] Number of accessible nests found.
[2] Nests in which egg-laying occurred.
[3] Percent successful based on "egg-days" or "nestling-days" (Mayfield 1975).
[4] Number of eggs hatched divided by the number of eggs in the nest at the time of hatching.
[5] Percentage of nests found prior to egg-laying from which at least one young fledged (percent active nests × laying success × incubation success × hatching success × nestling success = overall success).
[6] Number of active nests.

Except during the incubation period, factors affecting nesting outcome seemed to be consistent from year to year (Table 1). Results of ratio tests (Johnson 1979:657) indicated no significant difference between years during laying and nestling periods. Similarly, no significant difference was found between stages during any year (laying vs. incubation, laying vs. nestling, and incubation vs. nestling), suggesting a constant daily mortality rate throughout the nesting period. Only between the 1972 and 1974 incubation periods was a significant difference found (Johnson's ratio test, $P < 0.05$). The difference in mortality rates during the two incubation periods was attributed to higher predation in 1974, particularly during first nesting attempts. The lack of observed egg mortality during the 1972 incubation stage was probably due to a small sample size.

Woolfenden (1973) reported a hatching success of 92% and an overall nesting success of 43% in the Florida Scrub Jay. However, he calculated nesting success as the percentage of nests with eggs fledging at least one young. On a comparable basis, Scrub Jays near Chico had an overall nesting success of 54%. In general Scrub Jays have higher breeding success than other above-ground, open-nesting, altricial birds reported by Ricklefs (1969) and Nolan (1963), and most such species recorded by Best and Stauffer (1980).

Ricklefs (1969) indicates that predation is the main cause of nesting mortality among birds in general, and Woolfenden (1978) concluded that predation accounted for 80% of all nestling losses in Florida Scrub Jays. Similarly, predation was the greatest single cause of egg and nestling loss among Scrub Jays in this study. Predation accounted for 56 and 73% of egg and nestling mortality, respectively. I believe that Gray Squirrels (*Sciurus griseus*) and

Common Crows (*Corvus brachyrhynchos*) were the main predators involved. Intense scolding by jays towards those species was common during the breeding season. Holyoak (1967) found European Gray Squirrels (*S. carolinensis*) to be the main mammalian predator on British corvids. Likewise, Abert's Tassel-eared Squirrels (*S. aberti*) were the chief predators on Pinyon Jay eggs and nestlings (Balda and Bateman 1972). Destruction of eggs and young by corvids is well-documented (Jones and Hungerford 1972, Mulder et al. 1978).

One case of nest predation was likely the work of a Great Horned Owl (*Bubo virginianus*), as its feathers were found in and near the nest after it was found depredated. Three nestlings were missing from that nest, and remains of a fourth young and the adult female were in the nest.

Of 54 nests examined shortly after hatching, four clutches apparently failed to hatch because of infertility or early embryo death. One pair of jays was involved in two such nesting attempts. No attempt was made to examine all unhatched eggs, but some that were examined showed embryo death. Thirty-four percent of egg losses were attributed to hatching failure. Weather-caused nest destruction accounted for 5% of egg losses. Death by starvation of nestlings was limited to runts, but accounted for 18% of the nestling losses, and several nestlings were found strangled in nest fibers.

Seventeen eggs from five nests were taken during laying. Although eggs were removed throughout the incubation period, heaviest losses occurred during the first 12 days. Likewise, Best (1978) found predation to be lower late in the incubation period for Field Sparrows (*Spizella pusilla*). No trend was seen in the rate of nestling loss with age of the nestlings. Although greater nest mortality occurred during the incubation period than the nestling period, the difference was not significant.

Woolfenden (1973) reported renesting to be less successful than first nesting attempts among Florida Scrub Jays, but I found renesting attempts to be more successful (Johnson's ratio test, $P < 0.05$). Possible factors contributing to this difference were increased availability of nesting sites resulting from foliage development, the freeing of time for closer nest attentiveness, because less time was spent in territorial duties following the establishment of territory boundaries (Ritter 1972), and milder weather.

Differences in choice of nesting vegetation forms were not associated with differences in nesting success. Ten of 21 nests (48%) found in trees were successful; 14 of 28 (50%) found in shrubs were successful; and 13 of 25 (52%) found in vines were successful. These differences are not significant ($\chi^2 = 0.08$, 2 df, $P > 0.99$). Similarly, differences in success as related to nest heights were not statistically significant. Three of 6 nests (50%) placed from 0 to 1.5 m above the ground were successful; 21 of 38 (55%) in the 1.6- to 3.0-m interval were successful; 13 of 23 (56%) in the 3.1- to 4.5-m interval were successful; and 6 of 11 (54%) above 4.6 m were successful ($\chi^2 \doteq 0.11$, df = 3, $P > 0.99$).

## NESTLING AND FLEDGLING PERIOD

The period from hatching to fledging averaged 20.0 days (s.d. = 2.61, range = 16 to 26 days, n = 27). The mean nestling period likely would have been longer, but the young at three nests left the nest during my visits late in this period (16+ days). The nesting period for Florida Scrub Jays ranged from 12 to 21 days but seemed to vary with the amount of human handling (Woolfenden 1978). Nestling periods among Scrub Jays in Monterey County ranged from 20 to 24 days (Verbeek 1973).

The average number of young fledged per breeding effort (mean clutch size × probability of success) was 1.1 for all nests found and 1.5 considering only active nests. Florida Scrub Jays raised an average of 1.1 fledglings per completed nest (Woolfenden 1973). On a comparable basis, Scrub Jays in this study raised 1.4 fledglings per completed nest.

Parents of four broods continued to feed their young an average of 34.3 days (s.d. = 2.87, range = 32 to 38) after they had fledged. This corresponds approximately to the time when young are reported to begin their postjuvenal molt (about 5 weeks post-fledging—Pitelka 1945). Young in this study were first noticed actively foraging 20 days after fledging, but I did not determine at what age the young became self-sufficient. Atwood (1978) found evidence of Santa Cruz Island Scrub Jays feeding young 60 days after fledging. Adult Pinyon Jays continued to feed their young even after they were proficient at foraging (Balda and Bateman 1971).

## RENESTING AND SECOND NESTING

Renesting always involved the construction of a new nest from new materials, with building continuing up to the time of egg-laying. Renesting occurred even among pairs whose initial attempts failed as late as the late nestling stage. The period from loss of eggs or young to egg-laying in a renesting attempt averaged 8.8 days (s.d. = 1.98, n = 8, range = 7 to 12 days). The renesting interval in Florida Scrub Jays was between 8 days and 2 weeks (Woolfenden 1973).

Among 31 pairs successful with their first nesting attempt, only one (3%) attempted a second nesting. In late May 1971, that pair was observed building a new nest while still involved in territorial defense and the feeding of fledglings from their first nest. The fledglings were estimated to be about 31 days old, from hatching, when building of the second nest began. Construction of the second nest took 5 or 6 days. Five eggs were laid in the second clutch, beginning 5 days after the second nest was complete. Feeding of the fledglings from the first nest continued into the incubation period at the second nest. Late in the incubation period however, feeding of the fledglings ceased, and they were driven from the nest tree by the adults but were tolerated elsewhere in the territory. Shortly after the hatching of the second clutch, the fledglings from the first nest were no longer observed in their parents' territory.

Woolfenden (pers. comm.) found a 13% frequency of true second nesting attempts among Florida Scrub Jays. Clutch overlap as a reproductive tactic (Burley 1980) may be more common in the Chico Scrub Jay population than indicated by my results, because of the increasing difficulty of following pairs through time and space when foliage development is complete.

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# BREEDING BIOLOGY OF THE BLACK-HEADED GROSBEAK IN NORTHERN UTAH

GARY RITCHISON, Department of Biology, Utah State University, UMC 53, Logan Utah 84322 (present address: Department of Biological Sciences, Eastern Kentucky University, Richmond, Kentucky 40475)

Although the Black-headed Grosbeak (*Pheucticus melanocephalus*) is a common breeding bird in many parts of western North America, little is known about its breeding biology. Apart from a few anecdotal reports (Bent 1968), information on the breeding biology of this species comes from a single study performed in California (Weston 1947). The objective of the present study was to examine the breeding biology of a population of Black-headed Grosbeaks in northern Utah.

## STUDY AREA

The study was conducted at Malibu-Guinavah Forest Camp (Cache National Forest), 10 km east of Logan, Cache County, Utah. The area, at 1500 m elevation, is located on the flat bottom of Logan Canyon, with the Logan River cutting diagonally across the eastern section. The vegetation is discontinuous woodland, which is characterized by a heavy growth of grasses in the open areas and a dense understory of wild rose (*Rosa woodsii*), Blue Elderberry (*Sambucus coerulea*), hawthorn (*Crataegus rivularis*), Chokecherry (*Prunus virginiana*), and Sierra Willow (*Salix wolfii*). The dominant trees in the area are Box Elder (*Acer negundo*), Dusky Willow (*Salix melanopsis*), and River Birch (*Betula fontinalis*). Numerous Mountain Alder (*Alnus tenuifolia*) can be found along the stream banks with occasional Narrowleaf Cottonwood (*Populus angustifolia*) and Green Ash (*Fraxinus lanceolata*) dispersed over the area. Because of recreational improvements by U.S. Forest Service personnel, the canopy is discontinuous.

## METHODS

I made field observations almost daily from 1 April through 31 August in 1977 and 1978 at the Malibu-Guinavah Forest Camp. Approximately 850 hours were spent observing birds or nests and observations were equally distributed throughout the day. Territorial boundaries were delimited by plotting on a map those locations where intraspecific aggressive behavior occurred. If a part of a territory could not be determined by observation of boundary disputes, the outermost points of utilization were connected by straight lines to form a polygon of maximum size. Hatching dates were obtained by inspecting the nests. When this was impossible, these dates were estimated within 1 or 2 days on the basis of the behavior of the adults. In all cases, either fledging was observed, or young known to have been in the nest the previous day were seen in nearby trees or shrubs a day later. Thirty-one adults (24 males and 7 females) were captured and marked with combinations of colored leg bands, numbered aluminum bands, and felt pens. In addition, 21 nests were located, and colored and aluminum bands were placed on 20 nestlings. Observations at such nests were made with 7 × 35 binoculars at distances of 4-8 m, using natural vegetation as a "blind." A stopwatch was used to time the activities of breeding adults.

## RESULTS AND DISCUSSION

The first birds arrived in the study area during the first 2 weeks in May. Although Weston (1947) reported that males arrive about 6 days before the females, my observations indicated that many of the first birds to arrive were already paired. Grosbeaks continued to move into and through the area for the next 2 weeks or longer. Banding returns suggested that the first birds in the study area were often those that nested in the area the previous year. These birds, however, did not always remain in the study area. Six birds banded in 1977 were observed in the study area early in the 1978 breeding season; two of these previously banded birds (one male and one female) remained to nest in the study area.

Because many birds arrived already paired, observations of courtship behavior were limited. Weston (1947:55) stated that "the only type of display seen was a nuptial flight," i.e., the male uttered loud songs from some exposed perch near a female and then suddenly flew out, performing a song-flight in the air above the female. My observations indicated that such song-flights were not utilized solely for courtship. On several occasions males were observed performing song-flights during "singing duels" with neighboring males.

### The Pair Bond

During the early part of the breeding season (before nesting began), paired birds foraged together within their territories. Females usually followed as the males moved through the territory feeding and singing. Paired birds sometimes fed as close together as several centimeters, or more commonly in different parts of the same tree or bush or in adjacent trees or bushes. Vocalizations given by the birds as they moved through their territories included chip and wheet calls. Chip calls were given by both sexes and appeared to function as location calls. Wheet calls were given only when a bird was moving, e.g., when flying a short distance from bush to bush or when flying from the nest after incubating the eggs.

As stated above, males often sang as they foraged. Such song apparently served a territorial function and was probably used by the female in maintaining contact with the male. Females infrequently sang while foraging near the male (Weston 1947; pers. obs.). Female song has also been reported in the Rose-breasted Grosbeak (*Pheucticus ludovicianus*; Ivor 1944a, Dunham 1965). Such song may play some role in pair-bond maintenance.

### Territorial Behavior

In the Black-headed Grosbeak, singing by the male appears to be the most important factor in acquiring and retaining a territory. However, singing by itself is apparently not sufficient to maintain a territory. Early in the breeding season agonistic encounters involving chasing and even physical contact occurred. Nearly all chases involved males, although several female-female chases were observed. On three occasions females were observed chasing males. No instances of actual physical contact were noted in these female-female or female-male encounters. Weston (1947:56), however, described a conflict between mated pairs in apparent defense of their respective territories in which the females were more aggressive than the males. The females "repeatedly postured and flew at each other, and at each attack, loud songs, calls, and sounds of bodily contact could be heard." Weston reported no other instances of female song in territorial encounters. I observed two instances of singing by females in such situations. On one occasion, a female chased a male and, upon landing, sang one loud song. On another occasion a female appeared to engage in a brief singing duel with a neighboring male.

Following territory establishment, Black-headed Grosbeaks became progressively less aggressive. This change in behavior was quantified in two ways. First, male singing rates tended to decline as the season progressed (Figure 1). A second indicator of this decline was the distribution of intraspecific agonistic encounters (chases or actual physical encounters). Figure 2 summarizes this distribution for the 1977 and 1978 breeding seasons. It is

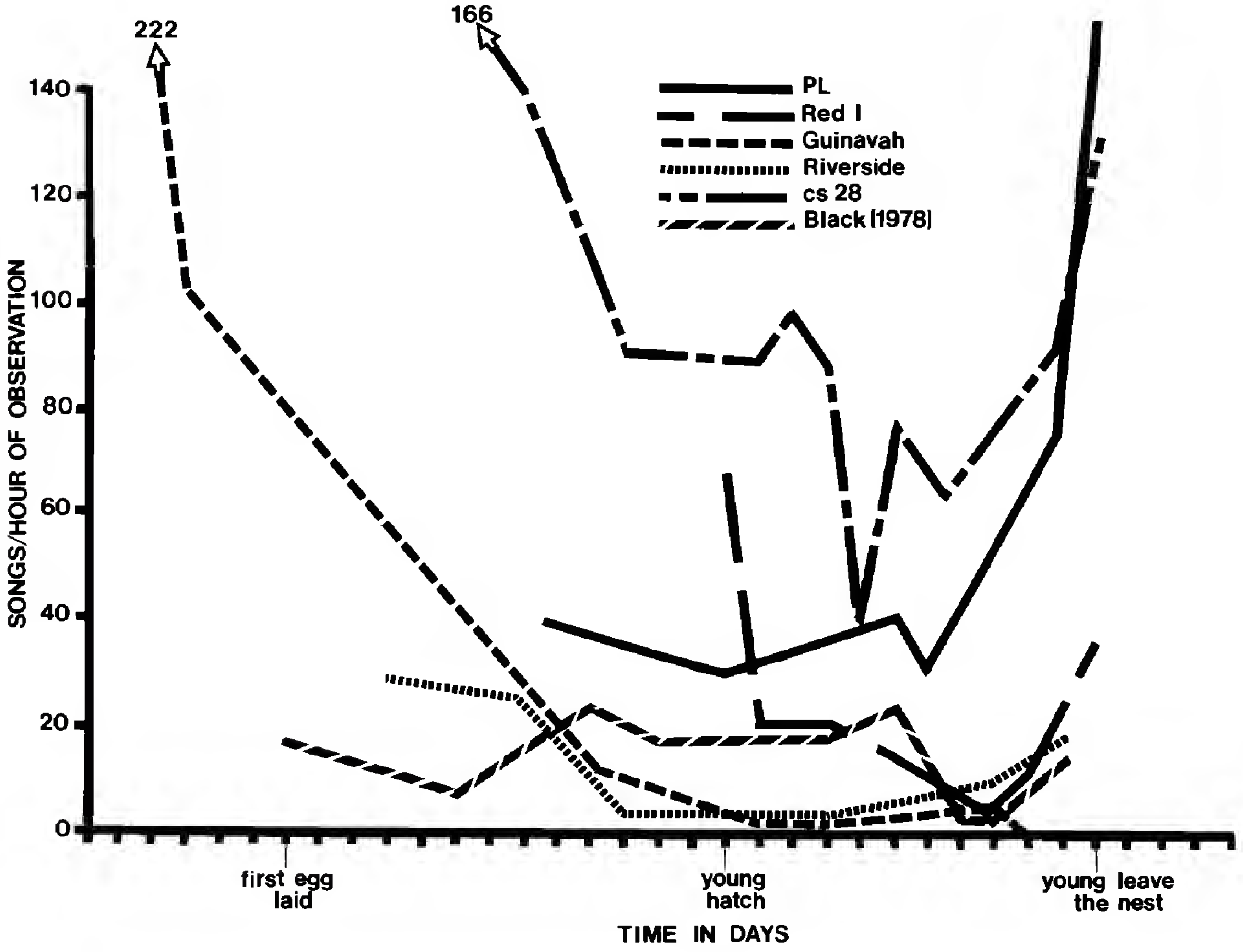

Figure 1. Singing rates of selected male Black-headed Grosbeaks during the 1977 and 1978 breeding seasons.

apparent that after egg-laying began there was a substantial drop in the number of encounters and, later, such agonistic behavior disappeared altogether. In the days prior to and immediately after the young left the nest, males and females responded weakly, if at all, to the presence of other grosbeaks. Similar behavior has been reported in the Rose-breasted Grosbeak (Dunham 1964).

Territories in the study area averaged about 2.7 ha (n = 12, range: 1.9 - 3.9). Previous investigators of the Black-headed Grosbeak have not indicated territory sizes. However, Dunham (1964, 1965) found that the average size of 20 Rose-breasted Grosbeak territories was 0.8 ha (range: 0.3 - 1.8).

## Nest site selection and nest construction

Nesting usually occurred in deciduous bushes and trees, usually at a height of 2-7 m above the ground (n = 21, $\bar{x}$ = 4.1). Weston (1947) listed height records for 163 nests and found the average to be about 3 m above ground. The nest is bulky and loosely constructed, and composed of slender twigs, plant stems, and rootlets.

Nests were generally built by the female. Weston (1947:60) reported that he had "never seen a male carrying nesting material nor in any way aid in the actual construction of the nest." However, Finley (1907) mentioned seeing a male grosbeak carrying a twig in his beak. On several occasions I observed

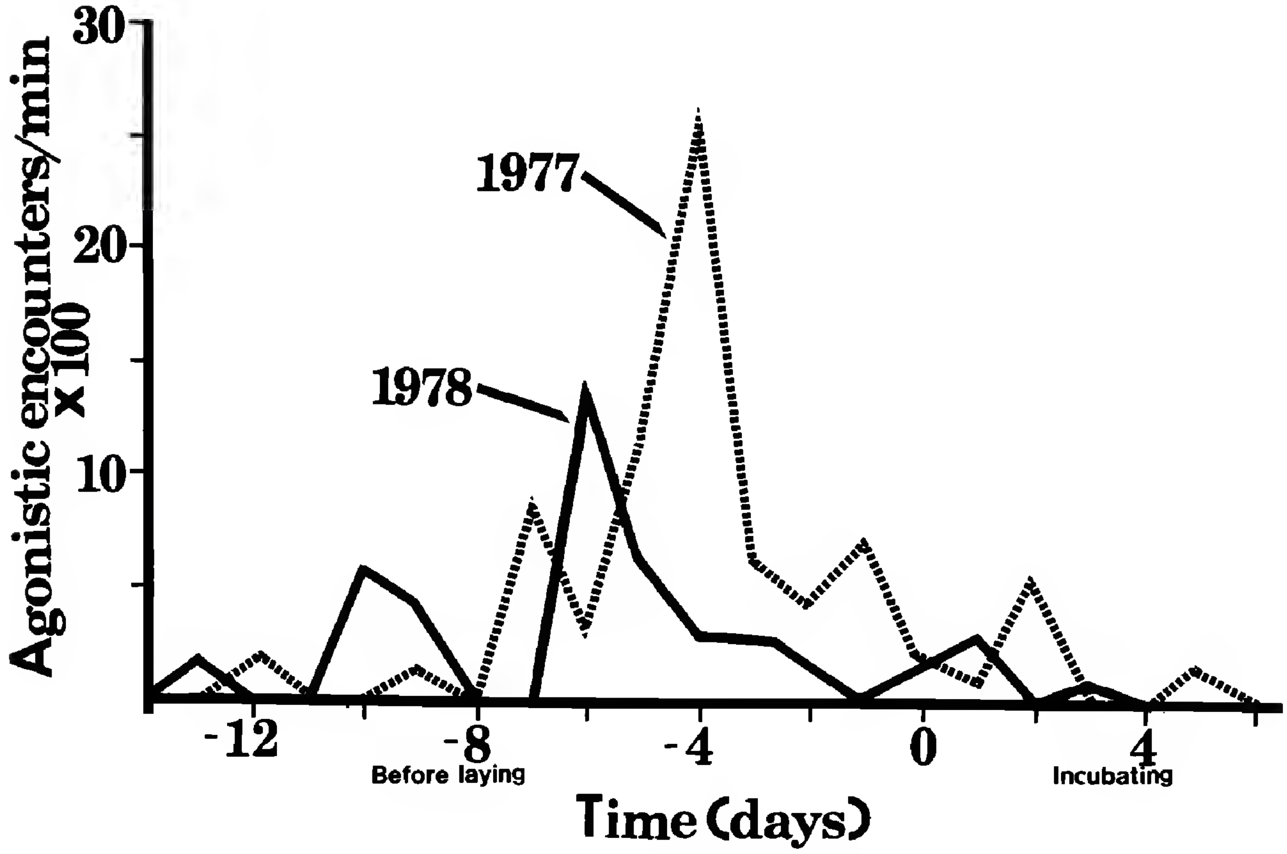

Figure 2. Distribution of intraspecific agonistic encounters (chases and/or actual physical encounters) among male and female Black-headed Grosbeaks (day 0 = first egg laid).

males assisting in nest construction. In all pairs observed, however, most of the construction was performed by the female.

Construction of nests took from 3-4 days with most of the building occurring in the morning. Visits to the nest became less frequent and more irregular as the day progressed, and in the afternoon nests were sometimes visited without any nesting material. During the final stages of construction, females spent less time placing new material in the nest and, instead, spent more time readjusting material already there (Weston 1947; pers. obs.).

Following the completion of the nest there was a period of 2-5 days before the first egg was laid. The eggs were laid at intervals of approximately 24 hours, and the usual set consisted of two to four eggs ($\bar{x}$ = 2.8, n = 14). Weston (1947) indicated that the average clutch consisted of 3.3 eggs (n = 192).

## Incubation

Both sexes incubated during the day (Head 1902, 1904; Weston 1947; pers. obs.), while the female incubated at night (Weston 1947; pers. obs.). During the day, eggs were incubated about 97% of the time, about 41% of the time by males and 56% by females. The average length of each incubation period for 10 males was about 35 minutes (range: 2.5 to 100) and for 10 females, about 51 minutes (range: 11 to 130).

Both sexes were surprisingly vocal on and around the nest. Males frequently sang while incubating. At times this song appeared to be in response to the singing of neighboring males; i.e., a male that was quietly incubating would begin to sing upon hearing a neighboring male sing. At other times the male's singing appeared to be a signal to the female. When a male's period of incubation was due to end he often began to sing. Generally, the female appeared at the nest within a few seconds.

Whereas incubating males often sang to inform the female of their apparent intention to leave the nest, incubating females appeared to convey the same information with chip calls. Males generally returned to the nest within a few seconds upon hearing their incubating mate's call note.

On many occasions a male or female approached the nest and found its mate quietly incubating. At these times, the approaching bird frequently uttered chip calls or sang. The incubating bird, upon hearing its mate, would then leave the nest (usually after uttering several chip calls). Rose-breasted Grosbeaks also behave in this manner when changing places on the nest (Ivor 1944a,b; Allen 1916). As mentioned previously, when grosbeaks flew from the nest they nearly always uttered one or more wheet calls. Such calls apparently informed the mate that the bird on the nest was leaving and resulted in faster change-overs. Rarely were nests left uncovered for more than a few seconds ($\bar{x}$ = 9.7 sec, n = 74).

The incubation period ranged from 12-14 days, with most eggs hatching at 13 days. Eggs in a clutch usually hatched on the same day, and in no case were more than 2 days required for the hatching of all eggs in a clutch.

## Parental Care

During the first few days post-hatching adults maintained the same "schedules" as when incubating. Both adults fed and brooded the young, and their behavior when changing places on the nest was similar to that during incubation, with one significant difference. During incubation an approaching female usually uttered chip calls to inform the male of her presence but during the brooding period females were more likely to sing (Figure 3). After fledging, such songs were used by females to maintain contact with the young (Ritchison 1983).

Males and females contributed equally to the feeding of the young throughout the nestling period. And, surprisingly, the number of feeding trips to the nest was found to remain rather constant throughout that period (Figure 4). However, later in the nestling period adults appeared to bring larger food items, and they frequently brought more than one item per trip to the nest.

As the young developed both parents spent progressively longer periods off the nest. By the 7th day post-hatching the parents brooded much less constantly, although the young were still covered a good part of the time (Figure 5).

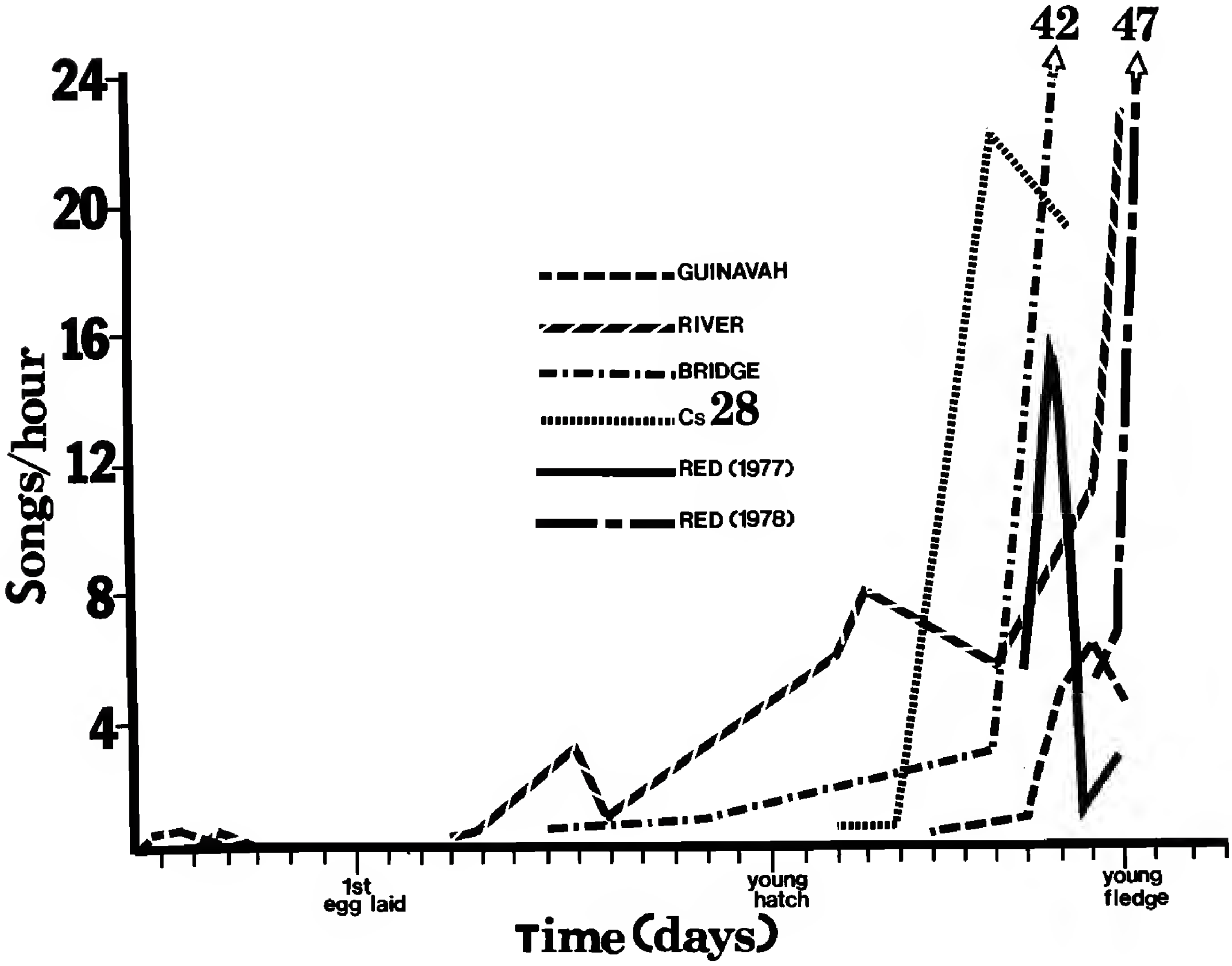

Figure 3. Singing rates of selected female Black-headed Grosbeaks during the 1977 and 1978 breeding seasons.

On the 8th day the eyes of the young began to open, and by the 9th day they were usually wide open. At this stage the young were brooded infrequently, the time spent brooding being dependent on the weather (Weston 1947; pers. obs.). Adults approaching the nest to feed the young usually vocalized, uttering either chip calls or songs. Upon the arrival of an adult at the nest, young grosbeaks immediately began to utter begging calls. At times young grosbeaks responded to the chip calls of their parents and began calling before the adults arrived at the nest.

Young grosbeaks left the nest as early as the 9th day post-hatching, although departure at 10-14 days post-hatching was more common ($\bar{x}$ = 11.5, n = 21). After leaving the nest the young scattered among the shrubs near the nest, perching on low branches. During the first few days after leaving the nest, the young were rather quiet. As the fledglings are unable to fly at this time, they remained within a restricted area and the adults appeared to have little trouble locating and feeding them (Weston 1947; pers. obs.). If, however, an adult was unable to locate a young bird, it would begin to utter chip calls and songs. Upon hearing their parents' vocalizations, young grosbeaks responded by uttering phee-oo and hunger-distress calls. In this manner the parents and young were able to maintain contact.

After the young attained flight (approximately 15 days post-hatching) maintaining contact between parents and young became more difficult. When parents had food for the young but were unsure of the location of the young, the parents uttered chip calls or, more frequently, songs. Upon hearing a

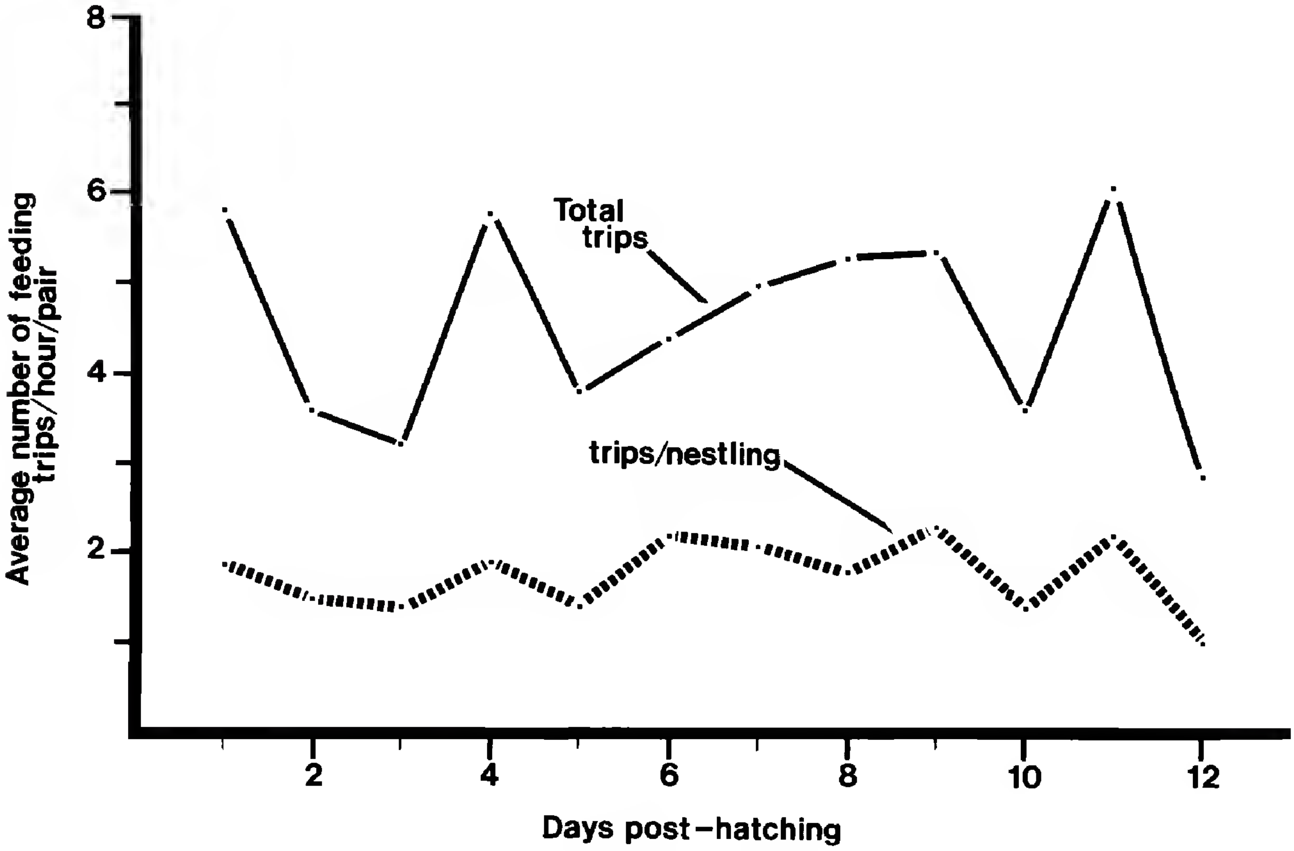

Figure 4. Average number of feeding trips made by pairs of Black-headed Grosbeaks (n =8) throughout the nestling period.

parent sing, a young grosbeak would fly to within a few meters or less of the adult and, if not fed immediately, would begin calling.

At this stage (2-3 weeks post-hatching), family groups no longer remained within their territories. Because of this wandering, it was difficult to observe specific family groups over long periods and, therefore, the duration of such groups remains unknown. Weston (1947) reported seeing young grosbeaks being fed by adults in early August, but he was unable to determine the actual length of the dependent period. In the Rose-breasted Grosbeak, Watts (1935) and Dunham (1965) reported that adults continued to feed the young after they had molted into their first winter plumage in at least some cases, and the family groups remained together until migration. Ivor (1944a,b), however, reported adult Rose-breasted Grosbeaks striking young on the bill after feeding them, beginning 27 days after hatching. He suggested that this may have been a weaning procedure, the "adults still reacting to begging with food, but to the adult appearance of the young with aggression."

Since males appeared to leave the nesting area before the females or young, later in the season family groups consisted solely of females and their

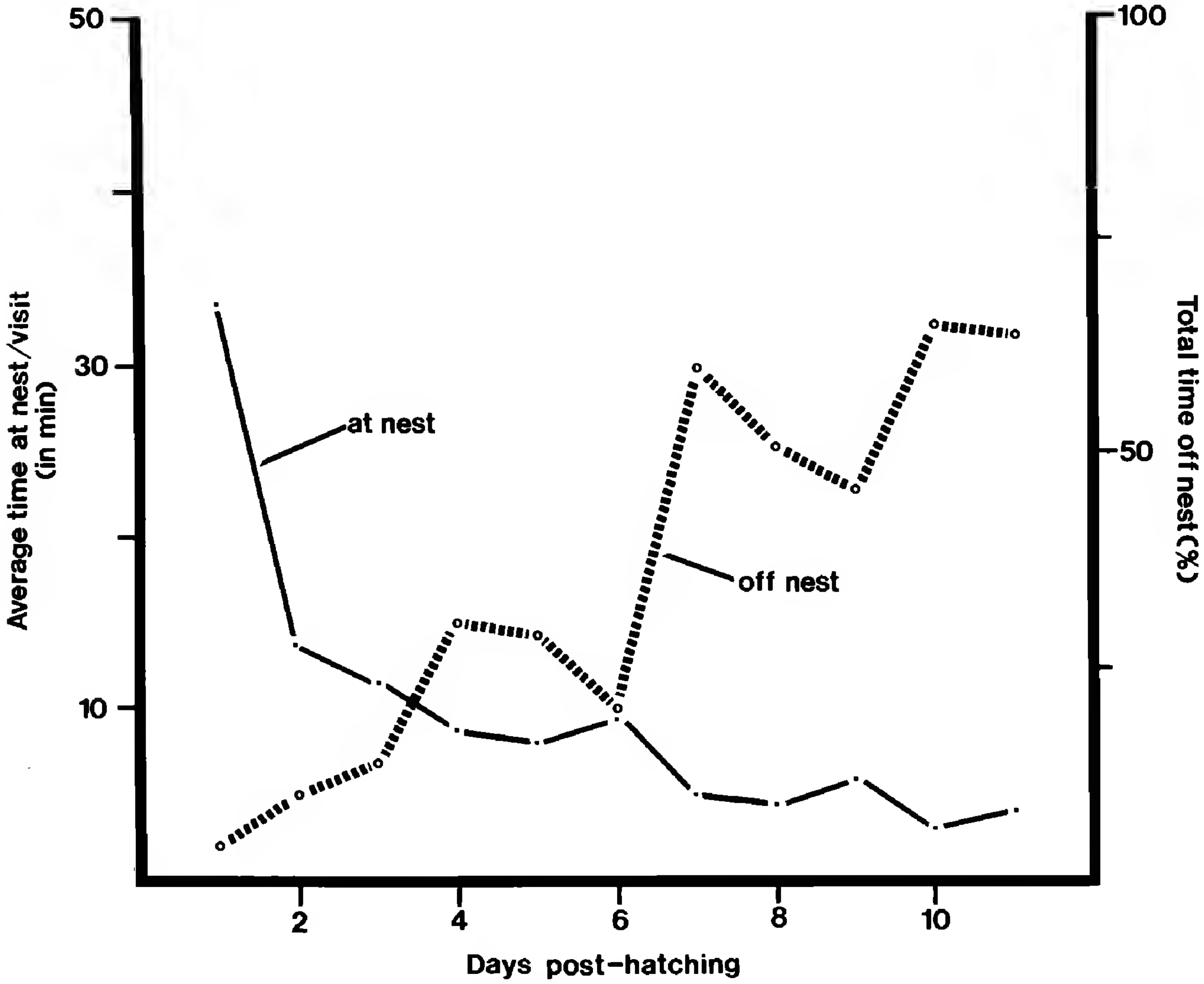

Figure 5. Average amount of time spent on and off the nest by pairs of Black-headed Grosbeaks (n = 8) throughout the nestling period.

young (Weston 1947; pers. obs.). Resident females and young began leaving the study area in early August, with the last groups leaving the study area in mid- to late August. Transients were seen in the area into early September.

## ACKNOWLEDGMENTS

I wish to thank Keith Dixon for his guidance throughout this study. Also, thanks are extended to Jack Watson and Lee Jones for assistance in the field. This investigation was partially funded by grants from the Frank M. Chapman Fund of the American Museum of Natural History and from Sigma Xi.

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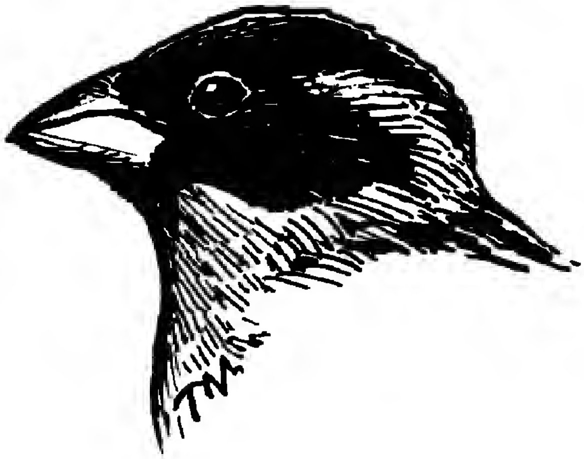

Black-headed Grosbeak *Sketch by Tim Manolis*

# NOTE

# ALBINISTIC RED-BREASTED SAPSUCKER

ROGER D. HARRIS, Department of Forestry and Resource Management, University of California, Berkeley, California 94720

On 5 July 1982 I photographed and observed an albinistic Red-breasted Sapsucker (*Sphyrapicus ruber*) for 20 min, 200 m east of the dam on Lake Almanor, Plumas County, California, elevation 1380 m. Gross (Bird-banding 36:67-71, 1965) reported 48 records of albinism among 10 species (and subspecies) in the family Picidae, although he did not indicate whether any were *Sphyrapicus*. I am not aware of any previous records of albinism for this species.

The bird was a juvenile with all-white plumage except for a faint red-orange cap. Carotenoid pigments, which produce reds, oranges and yellows, are resistant to albinism (Sage, Brit. Birds 55:201-225, 1962). Typical of albino birds, legs and bill were ivory-colored, and eyes were bright pink.

A normally pigmented sibling accompanied the albino and repeatedly pecked at it. The albino did not peck back. Nero (Auk 71:137-155, 1954) noted albino birds being harassed by conspecifics. Both recently fledged sapsuckers called constantly to at least one normally pigmented adult, which attended them approximately equally.

I approached to within a meter of the albinistic bird before it flushed. It had a weak flight and repeatedly landed on small branches, where it would lose its balance and then hang upside-down for 5 to 10 s before flying again. The normally pigmented sibling had a stronger flight and flew past small branches to land directly and exclusively on tree trunks. Presumably the albino had defective eyesight as it landed on small branches more often than on tree trunks. Defective eyesight has been noted for albino birds (McIlhenny, J. Heredity 41:433-438, 1940; Lincoln, Auk 75:220-221, 1958).

I thank Daniel A. Airola, Ned K. Johnson and Michael L. Morrison for reviewing this note and Meryl Q. Sundove for assisting in the field.

*Accepted 20 August 1983*

# Volume 14, Number 3, 1983

NOTE

*Cover photo by Kenneth W. Fink:* Horned Puffin (*Fratercula corniculata*), 13 June 1982, St. Paul Island, Alaska

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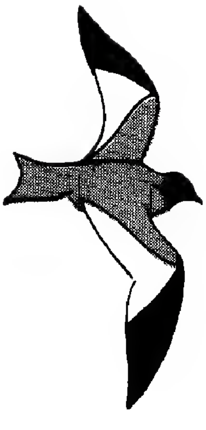

# WESTERN BIRDS

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WESTERN BIRDS

Volume 14, Number 4, 1983

# MARIN COUNTY CALIFORNIA HERON COLONIES: 1967-1981

HELEN M. PRATT, Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, California 94970

Like all birds dependent on freshwater and marine wetlands, members of the heron family are suffering progressive loss of essential habitat. In addition, agricultural and industrial pollution threatens their capacity to reproduce. Great Blue Herons (*Ardea herodias*) and Black-crowned Night-Herons (*Nycticorax nycticorax*) have declined in parts of their range and have been placed on the National Audubon Society's *Blue List* of species "which have recently given or are currently giving indications of non-cyclical population declines or range contractions either locally or widespread" (Tate 1981).

Most herons nest in conspicuous, often widely separated colonies. Some colony sites are used repeatedly for many consecutive nesting seasons; others are deserted after a few years and new colonies are established elsewhere. Sites are sometimes reoccupied after several years of inactivity and the number of birds may increase or decrease dramatically. Evaluation of population trends requires knowledge of both the history of active and inactive colonies within a region and the population changes in individual colonies.

This paper presents data on the location, population level, and history of 11 heron colonies known to have been occupied between 1967 and 1981 in Marin County, California (Figure 1). Its purpose is to provide a baseline for future comparisons by indicating current and past status.

Marin County lies between approximately latitudes 37° 50′ and 38° 20′ N, and longitudes 122° 28′ and 123° 00′ W. It borders the Pacific Ocean on the west and San Francisco Bay on the south and east. It is rich in tide flats and estuaries suitable for foraging herons and egrets. That Grinnell and Miller (1944) listed no Great Blue Heron colonies in Marin County as of 1943 is probably because ornithologists were not as familiar with the area as they are today. One Marin County heronry is known to have been occupied since at least 1941; the other sites are of more recent or intermittent occupancy.

Western Birds 14: 169-184, 1983

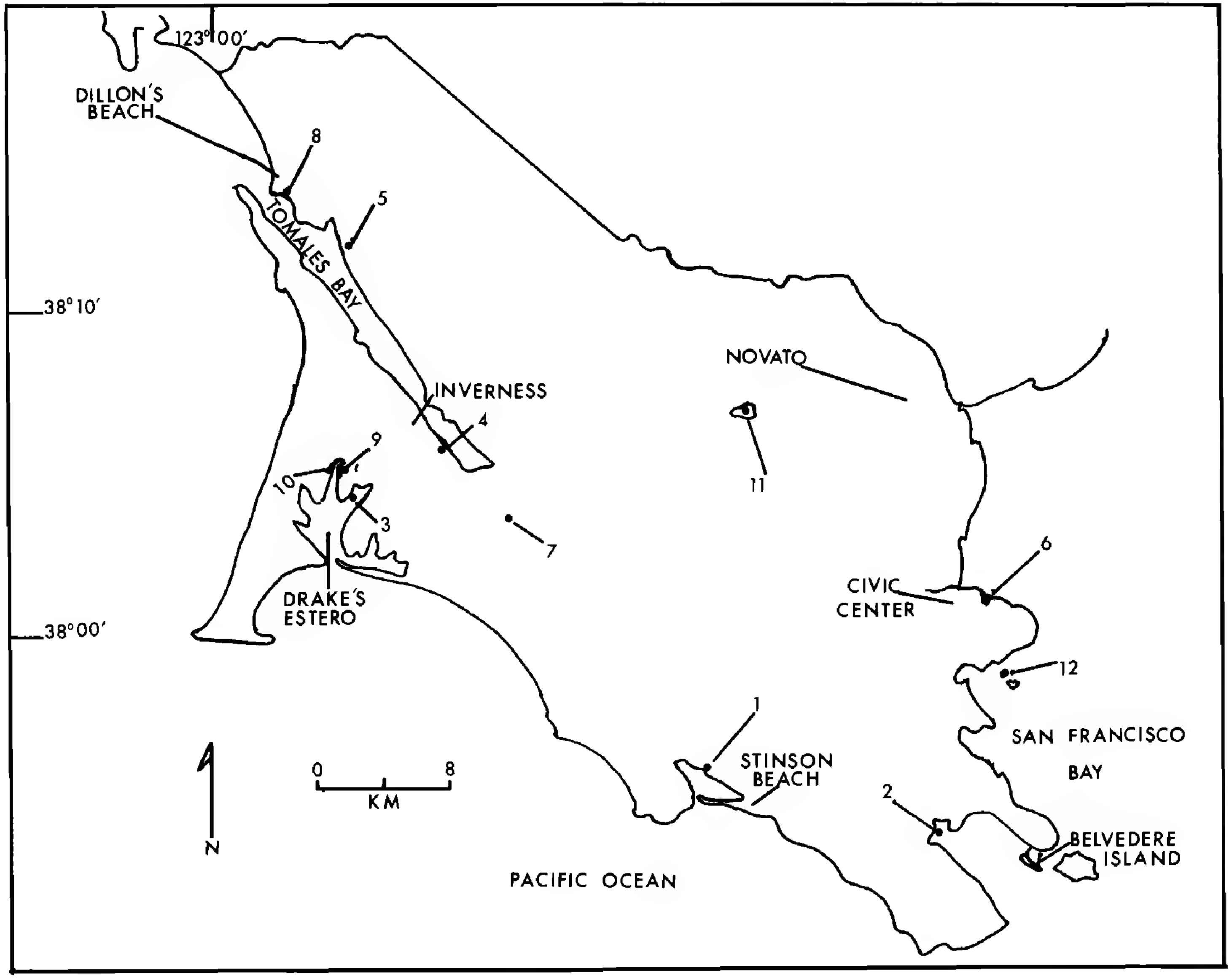

Figure 1. Locations of Marin County, California, heron colonies. 1. Audubon Canyon Ranch, 2. Da Silva Island, 3. Home Bay, 4. Inverness Park, 5. Nick's Cove, 6. North San Pedro Road, 7. Olema, 8. Sand Point, 9. Schooner Bay A, 10. Schooner Bay B, 11. Stafford Lake, 12. West Marin Island.

The species nesting in Marin County include the Great Blue Heron, Great Egret (*Casmerodius albus*), Snowy Egret (*Egretta thula*), and Black-crowned Night-Heron. Great Blue Herons nest at 10 colonies, Great Egrets 5 colonies, and Snowy Egrets and Black-crowned Night-Herons only 1 colony.

### METHODS

Estimates for the number of breeding pairs at nine colonies were based on total active nests. Counts were made with binoculars and spotting scopes from hillsides near colonies where it was possible to determine whether or not nests were active. Nest counts were made by the author except as otherwise noted. I estimated the size of the Inverness Park colony from nest counts augmented by reports from other observers of the number of flying herons seen early in the season. At the West Marin Island Colony the estimates for 1965, 1979 and 1981 were of occupied nests. I also include counts from 1973 through 1981 of the maximum number of birds seen on or feeding near the island. These counts were made from shore with a spotting scope at a distance of approximately 1.2 km with only one side of the island visible. They may be compared with each other to indicate population trends but do not provide an estimate of the number of occupied nests.

## COLONY DESCRIPTIONS AND HISTORIES

### AUDUBON CANYON RANCH

Audubon Canyon Ranch (Figure 2) is a wildlife sanctuary and nature education center located on Shoreline Highway about 5.8 km north of Stinson Beach on the east side of Bolinas Lagoon (Figure 1). Great Blue Herons and Great Egrets nest here in Coast Redwoods (*Sequoia sempervirens*). In 1969 about five pairs of Snowy Egrets also nested in the colony.

It is impossible to date the establishment of this colony, but since the trees at Audubon Canyon Ranch were cut during heavy logging that started in western Marin County in 1849 (Mason and Barfield 1973) and the nests are in second growth, it probably does not predate the late 1800s. M. Galloway (pers. comm.), a former resident of the ranch, reports that the colony was well-established and active in 1941 and included both Great Blue Herons and Great Egrets. Although Great Egrets were known to breed in the San Joaquin Valley in the 1920s (Moffitt 1939), the first recorded observation of a Great Egret in the San Francisco Bay region between the time when they were almost extirpated by plume hunters in the 1880s and their reappearance after being protected, was in October 1924 (Stoner 1934). Stoner (1934) also reported an observation of seven Great Egrets at Bolinas on 7 May 1929. Bolinas is 5 km from Audubon Canyon Ranch on the opposite side of Bolinas Lagoon and egrets currently sighted there at that time of year are known to be from the Audubon Canyon Ranch breeding population. Because the Great Egret population is usually at its maximum during May, the egrets reported in 1929 probably were breeding at Audubon Canyon Ranch. Great Egrets have joined established Great Blue Heron colonies at other sites in Marin County (see below), and they might well have done the same here.

From 1967 through 1981 the Great Blue Heron population ranged from 27 to 62 breeding pairs with a declining trend since 1973 (Table 1). The Great

Egret population increased during the same period from 70 pairs to 148 (Table 2). Details of nesting success for 1967 through 1973 have been published previously (Pratt 1970, 1972a, 1972b, 1974).

## DA SILVA ISLAND

The Da Silva Island colony is on the south side of a hill known as Da Silva Island, which borders Richardson Bay at the north end of the Richardson Bay bridge in Mill Valley (Figure 1). The hill is approximately 95 m from U.S. Highway 101, and though not an island now, may have been one before development of the area. It is privately owned and there are several dwellings close to the colony.

Great Blue Herons nest here in *Eucalyptus* sp. The colony was first occupied in 1979 by five pairs and was occupied again in 1980 and 1981 (Table 1).

## HOME BAY

Great Blue Herons nested in live oaks (*Quercus* sp.) on the northwest side of the south finger of Home Bay, a branch of Drake's Estero in the Point Reyes National Seashore (Figure 1), in 1968 and 1969 (Table 1). There are no reports for 1970-1978. In 1979 there was an unverified report of two or three nests. I was unable to find nests there in 1980 but found one in 1981.

## INVERNESS PARK

This colony is on private land in a clump of Douglas-fir (*Pseudotsuga menziesii*) (Figure 3) growing at the edge of Sir Francis Drake Boulevard 2 km south of Inverness (Figure 1). It was first reported occupied by Great Blue Herons in 1972 by the resident of a house opposite the colony. It may have been inactive in 1973 but was occupied again at least by 1975, the year that Great Egrets first nested there. Estimates of breeding pairs are highly tentative

Table 1. Numbers of breeding pairs of Great Blue Herons at Marin County colonies from 1967 through 1981. Dashes indicate known absence of birds. U = Nest counts unavailable; herons may or may not have been nesting.

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Audubon Canyon | 50 | 62 | 55 | 50 | 44 | 46 | 58 | 48 | 45 | 40 | 41 | 43 | 35 | 33 | 27 |
| Da Silva Island | — | — | — | — | — | — | — | — | — | — | — | — | 5 | 5 | 3 |
| Home Bay | U | 2[a] | 3[a] | U | U | U | U | U | U | U | U | U | U | — | 1 |
| Inverness Park | U | U | U | U | U | 16 | — | U | 4 | 3 | 4 | 3 | U | 12 | 8 |
| Nick's Cove | U | U | U | 23[a] | U | U | U | 23 | 28 | 23 | 24 | 16[a] | U | 18 | 15 |
| No. San Pedro Rd. | — | — | — | — | 1 | 1 | 1 | — | — | 1 | 2 | 1 | 4 | 4 | 3 |
| Olema | U | U | U | 26[a] | U | 19[b] | — | — | — | — | — | — | — | — | — |
| Sand Point | U | U | U | U | U | U | U | 25 | 7 | U | U | U | U | U | 16 |
| Schooner Bay A & B | U | U | U | U | U | U | 15 | 15 | 12 | 9 | — | 7 | 7 | 7 | 3 |
| Stafford Lake | 8[a] | U | U | 5[a] | U | U | 5[c] | 14 | 21 | U | 21 | 19 | 16 | 27 | 23 |

[a] California Dep. of Fish & Game, unpubl. data

[b] Richard Brown (pers. comm.)

[c] Alice Williams (pers. comm.)

Figure 2. Audubon Canyon Ranch. Egrets are visible occupying nests in trees behind the ranch house.

*Photo by Clerin Zumwalt*

because the nests are unusually difficult to find. The Great Blue Heron population has probably been as high as 16 pairs and as low as 4 (Table 1). There have been as many as 12 Great Egret pairs but usually fewer (Table 2).

### NICK'S COVE

This colony is on private land in a eucalyptus grove about 0.5 km east of Nick's Cove on Tomales Bay (Figure 1). I have no records prior to 1970, when the colony contained 23 Great Blue Heron nests, but it had likely been occupied before that date. Great Egrets nested there in 1974, with five nests, probably for the first time. Their late arrival that year (early June compared with late April in 1975 and 1976) suggests that they moved to Nick's Cove after experiencing nesting failure at another colony. The Great Blue Heron population has remained fairly stable (Table 1). The Great Egret nest count has fluctuated between 5 and 15 (Table 2).

### NORTH SAN PEDRO ROAD

The North San Pedro Road colony (Figure 4) is on private property at the edge of San Pablo Bay about 3 km southeast of the Marin County Civic Center (Figure 1). Great Blue Herons nest here in live oaks and Madrone (*Arbutus menziesii*). One heron pair nested here for the first time in 1971 (L. Boyd pers. comm.). Except for 1974 and 1975, when no herons returned, there were between one and four nests through 1981 (Table 1).

### OLEMA

This colony was located in the Point Reyes National Seashore in Douglas-firs about 1.5 km northwest of the Seashore Headquarters at Olema (Figure 1). The colony had 26 Great Blue Heron nests in 1970 and 19 in 1972 but has been inactive since then.

### SAND POINT

The Sand Point colony is on private land on the east side of Tomales Bay between Sand Point and Tom's Point about 2 km southeast of Dillon's Beach (Figure 1). Great Blue Herons and Great Egrets nest here in eucalyptus trees. Herons have occupied the colony since at least 1974 (Table 1) and the egrets joined them sometime between 1976 and 1981 (Table 2).

Table 2. Numbers of breeding pairs of Great Egrets at four Marin County colonies from 1967 through 1981. Dashes indicate known absence of birds. U= Nest counts unavailable; egrets may or may not have been nesting.

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Audubon Canyon | 70 | 74 | 86 | 85 | 85 | 96 | 99 | 96 | 85 | 65 | 84 | 88 | 98 | 103 | 148 |
| Inverness Park | — | — | — | — | — | — | — | — | 3 | 4 | 12 | 2 | U | 1 | — |
| Nick's Cove | U | U | U | — | U | U | U | 5 | 15 | 13 | 6 | 12[a] | U | 6 | 5 |
| Sand Point | U | U | U | U | U | U | U | — | — | U | U | U | U | U | 6 |

[a] California Dep. of Fish & Game, unpubl. data

Figure 3. Inverness Park heronry.

*Photo by Helen M. Pratt*

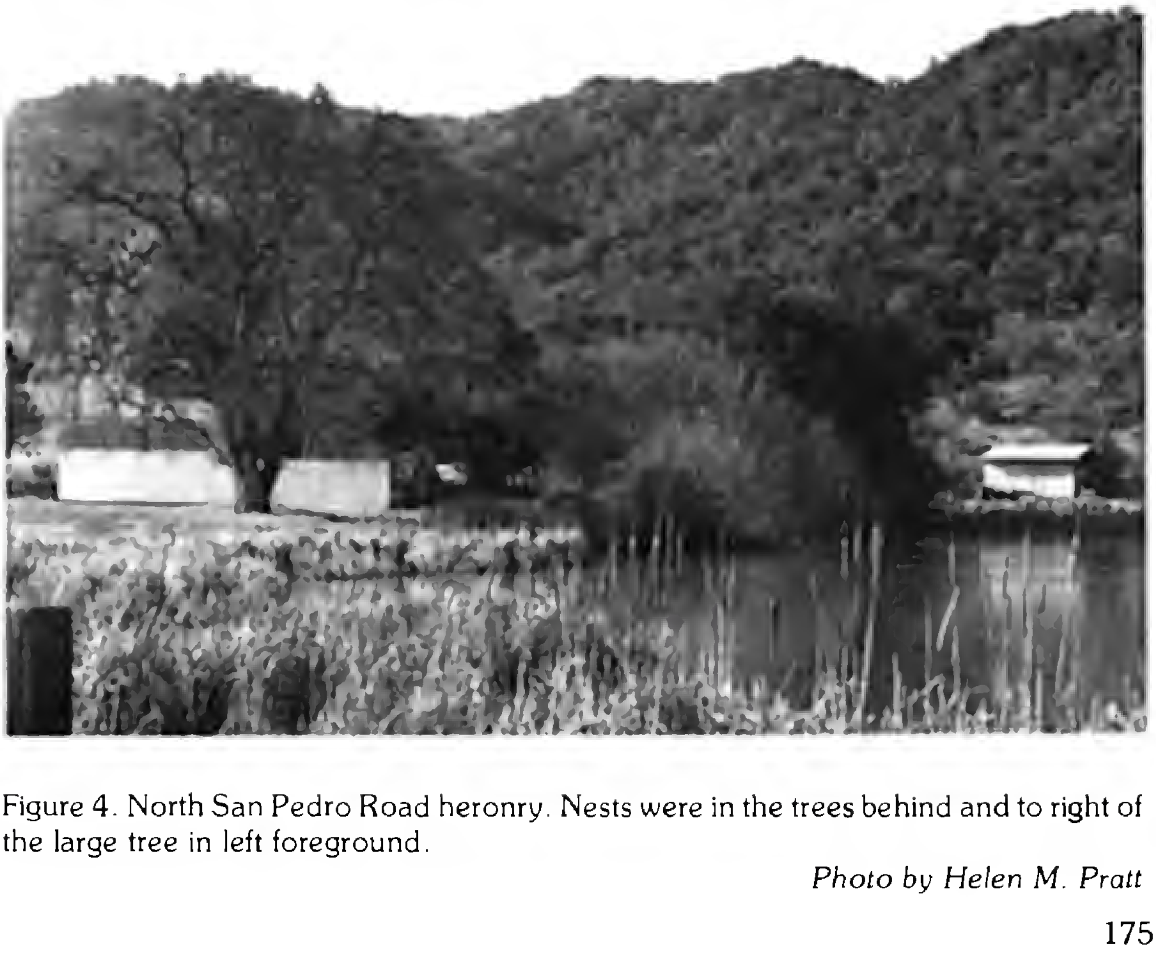

Figure 4. North San Pedro Road heronry. Nests were in the trees behind and to right of the large tree in left foreground.

*Photo by Helen M. Pratt*

## SCHOONER BAY A AND B

The Schooner Bay A colony is about 0.5 km south of Sir Francis Drake Boulevard behind the dwellings at the Johnson Oyster Company on the northeast shore of Schooner Bay, a branch of Drake's Estero in the Point Reyes National Seashore (Figure 1). Great Blue Herons nest here in eucalyptus trees. This colony was first occupied in 1963 (C. Johnson pers. comm.) and except for 1977 has been active every year through 1981 (Table 1). The Schooner Bay B colony (Figure 5) was first reported to me in 1981 (D. Shuford pers. comm.). It is directly across the bay within 0.5 km of Schooner Bay A. Of the five nests in 1981, two were successful Great Blue Heron nests. The other three were unoccupied at the time of my 24 June visit and showed no signs of heron occupancy such as splash or eggshells on the ground. They may have failed early or were built the year before but not used in 1981. The Schooner Bay sites are so close together that I currently consider them to be one split colony.

## STAFFORD LAKE

This colony (Figure 6) is on the island in Stafford Lake about 4.5 km west of Novato on South Novato Boulevard (Figure 1). The lake and island are owned by the North Marin Water District. Great Blue Herons nest here in live oak and California Bay (*Umbellularia californica*). They first nested here in 1962 (W.H. Melson pers. comm.) and the colony has become one of the three largest Great Blue Heron colonies in the county (Table 1).

Figure 5. Schooner Bay B. The heron nests were in the small grove of trees on the far side of the bay.

*Photo by Helen M. Pratt*

Figure 6. Stafford Lake heronry. The nests were concentrated in trees on the left third of the island.

*Photo by Ian Tait*

Figure 7. West Marin Island heronry.

*Photo by Ian Tait*

## WEST MARIN ISLAND

West Marin Island (Figure 7) is one of a pair of small privately-owned islands in San Francisco Bay about 1.5 km offshore from Loch Lomond Yacht Harbor in San Rafael (Figure 1). Great Egrets, Snowy Egrets and Black-crowned Night-Herons nest here in California Buckeye (*Aesculus californica*), live oak and coastal scrub. This site was not mentioned by Grinnel and Miller (1944) but it was active in 1957 and had been "growing for many years" (Ralph and Ralph 1958).

Stoner (1934) reported occurrences in the early 1930s of Great Egrets on the southern and eastern shores of San Francisco Bay but none north of the Golden Gate. Judging by this report Great Egrets did not colonize West Marin Island until at least the late 1930s or early 1940s.

Snowy Egrets, like Great Egrets, were almost wiped out by plume hunters and were thought to be extinct in California by 1900, but by 1908 they were being recorded again and in 1943 were considered fairly common in suitable habitat (Grinnell and Miller 1944). They had been nesting on West Marin Island for at least 5 years in 1957 (Ralph and Ralph 1958). At that time it was the northernmost breeding site for Snowy Egrets in California.

Black-crowned Night-Herons could have been nesting unobserved on West Marin Island before either of the egrets arrived. Grinnell and Miller (1944) described them as "varyingly common almost throughout (the) state." There was a colony of Black-crowned Night-Herons on Belvedere Island in 1938 (Moffitt 1939) but development forced them to move. They may have gone to West Marin Island, perhaps joining an established colony.

In 1957 Ralph and Ralph (1958) estimated that there were 1000 Great Egrets, 400 Snowy Egrets and 600 Black-crowned Night-Herons on the island. Although not stated, this estimate probably included both adults and young. According to an unpublished California Department of Fish and

Table 3. Maximum numbers of individuals of Great Egrets, Snowy Egrets and Black-crowned Night-Herons seen on or feeding near West Marin Island from 1973 through 1981. Data provided by Rosamund Day.

| | Great Egret | Snowy Egret | Black-crowned Night-Heron |
|---|---|---|---|
| 1973 | 125 | 418 | 105 |
| 1974 | 148 | 674 | 30 |
| 1975 | 139 | 332 | 140 |
| 1976 | 116 | 369 | 125 |
| 1977 | 115 | 315 | 70 |
| 1978 | 136 | 874 | 67 |
| 1979 | 120 | 494 | 98 |
| 1980 | 135 | 570 | 90 |
| 1981 | 168 | 640 | 62 |

Game report (Anon. 1965), the colony contained 100 Great Egret, 25 Snowy Egret and 100 Black-crowned Night-Heron nests in 1965 but it had been inactive for several years prior to that date. My estimates made from a boat circling the island in May 1979 were 58 Great Egret, 262 Snowy Egret and 98 Black-crowned Night-Heron nests. On a similar survey on 20 June 1981, I estimated 75 Great Egret, 325 Snowy Egret and 109 Black-crowned Night-Heron nests.

Table 3 shows counts made from 1973 through 1981 of maximum numbers of individuals, including both adults and fledged young, seen on or feeding near the island. Counts for all three species varied during this period without showing clear trends.

An adult Little Blue Heron (*Egretta caerulea*) was seen on West Marin Island in August 1965 (Chase and Paxton 1966). Nesting was suspected but not confirmed. Dead young first identified as Little Blue Herons were later found to be Snowy Egrets (Unitt 1977). I know of no subsequent reports of Little Blue Herons nesting there.

On 4 July 1981 fire burned the nesting substrate over about 1.5 acres of the northwest slope of the island. An estimated 100 young Snowy Egrets and Black-crowned Night-Herons died. The Great Egret nests were apparently spared. At this writing the consequences for the 1982 nesting season are unknown.

## DISCUSSION

Heron colonies are characterized by wide variations in population levels from year to year. (e.g. Thompson and Littlefield 1980). The fluctuations are far in excess of what could be explained by mortality or variations in breeding success and are probably the result of shifts of breeding birds from one colony to another. In addition, Marin County heron populations are not necessarily self-contained but probably intermingle with those of other nearby counties in the San Francisco Bay region. The counts in Marin County, therefore, may not be indicative of more generalized trends and should be interpreted with caution.

The largest Marin County Great Blue Heron colony, Audubon Canyon Ranch has shown a declining population trend since 1974. The Schooner Bay colony has also decreased in size but the Stafford Lake and Inverness Park colonies have increased (Table 1). Two small new colonies were established at North San Pedro Road and Da Silva Island. It is difficult to draw conclusions about Marin County Great Blue Heron population trends because accurate nest counts at Inverness Park and Sand Point were not available for most years, but there has been no general decline. The California Department of Fish and Game statewide surveys of heron colonies taken in 1969, 1970, 1971, 1972 and 1978 show a steady increase in active Great Blue Heron nests that is believed to be both the result of discovery of more colonies and an indication of population increase (Belluomini 1978).

The Great Egret breeding population increased at Audubon Canyon Ranch from 1967 through 1981 and the egrets appeared in three colonies where they had not nested previously (Table 2). Great Egrets have clearly declined on West Marin Island since the count of 1000 individuals in 1957 (Ralph and

Ralph 1958), and the nest estimates of 58 in 1979 and 75 in 1981 show a decline from the 1965 level of 100. Counts of egrets seen around the island since 1974 (Table 3) suggest that in spite of yearly fluctuations the population has recently been fairly stable. The California Fish and Game surveys show an increase statewide in the number of Great Egret nests from 401 in 1969 to 853 in 1978 (Belluomini 1978).

The Snowy Egret population on West Marin Island increased from 25 nests in 1965 to 325 in 1981. Comparing nest counts with the 1957 (Ralph and Ralph 1958) count of 400 individuals (adult and young) is risky, but assuming an average of two young/nest, the 1979 and 1981 counts would represent 524 and 650 young respectively augmented by an undetermined number of adults attending nests. Thus it would appear that Snowy Egrets have increased on West Marin Island over the 1957 levels as well. The statewide count of Snowy Egret nests increased from 227 in 1969 to 3704 in 1978 primarily because a new colony that contained 2500 nests was discovered at the north end of the Salton Sea in 1978 (Belluomini 1978).

Black-crowned Night-Herons have probably decreased in numbers on West Marin Island since 1957 when Ralph and Ralph (1958) estimated 600 birds (adults and young). The California Fish and Game estimate of 100 nests in 1965 and my estimates of 98 nests in 1979 and 109 in 1981 suggest a recently stable population. The statewide survey of nests shows a small decrease from a maximum of 1225 in 1971 to 939 in 1978 (Belluomini 1978).

Nests in four of the Marin County colonies are built in *Eucalyptus*, non-native trees introduced to California from Australia in the late 1800s. They grow to heights exceeding 100 m and occur in small groves where there are often no tall native trees. They thus afford suitable nest sites for herons in areas where native trees do not. One can only speculate about how the introduction of *Eucalyptus* may have affected the heron population and distribution of colonies. Perhaps colonies are more scattered, smaller and closer to certain estuarine feeding grounds. Perhaps *Eucalyptus* trees provide alternate sites for colonies that were displaced by logging in the past. The addition of *Eucalyptus* to the California flora seems unlikely to have been instrumental in increasing heron and egret populations.

Note that only three of the colonies active in 1981 — Audubon Canyon Ranch, Schooner Bay and Stafford Lake — are on land protected from development. The remainder including West Marin Island, the largest colony and currently the only known nesting site in Marin County for Snowy Egrets and Black-crowned Night-Herons, are privately owned. That the colonies on private land will remain undisturbed indefinitely cannot be assumed. Development is already planned for Da Silva Island, although the nest trees will not be cut. Herons and egrets are limited to nest sites that are near aquatic feeding grounds, such as estuaries or lakes, and that are in inaccessible locations, such as islands, marshes or high in tall trees, where they are protected from ground predators. When current sites become unsuitable through destruction or excessive disturbance, the presence of alternative sites becomes important. Periodic regional surveys of heron colonies should be continued to determine the status of populations and to assess the nesting and feeding resources for these birds as pressures from development increase.

## ACKNOWLEDGMENTS

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## ADDENDUM

The fire on 4 July 1981 on West Marin Island apparently did not affect Great Egret or Snowy Egret breeding there in 1982. The Great Egret nests increased to 187 and the Snowy Egret nests increased to 500 in 1982. The Black-crowned Night-Heron nests, however, decreased to 80 in 1982 from 109 in 1981. It is possible, though not proven, that the fire discouraged some night-heron pairs from returning to the island in 1982.

In 1982 two previously unknown Great Blue Heron colonies were discovered in Marin County (D. Shuford pers. comm.). One containing six nests was in a fir tree on the south shore of Lake Nicasio. The other containing 11 nests was in *Eucalyptus* trees on the east side of Drake's Head, a promontory reaching into Limantour Estero, the estuary extending eastward from the mouth of Drake's Estero. People rarely pass near these colonies and they have probably been active but undetected for several years.

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Great Egret *Sketch by Narca Moore-Craig*

Great Egrets during pair formation. *Photo by Philip Greene*

Great Blue Heron presenting a twig to its mate. *Photo by Philip Greene*

# STATUS OF THE HERMIT WARBLER IN WASHINGTON

CHRISTOPHER B. CHAPPELL, 10101 Laurelcrest Lane S.W., Tacoma, Washington 98498

BRENDA J. RINGER, Department of Biological Sciences, University of Idaho, Moscow, Idaho 83843

The Hermit Warbler (*Dendroica occidentalis*) reaches the northern limit of its breeding range in Washington, where its status has been unclear. The Hermit Warbler frequents treetops where it is difficult to observe, and its song resembles those of the Black-throated Gray Warbler (*D. nigrescens*) and Townsend's Warbler (*D. townsendi*). Other than a few references to a preference for tall conifers (Bowles 1906, Dawson and Bowles 1909, Rathbun 1916), mature coniferous forests (Pough 1957), and moderately dense coniferous forests (Cogswell 1957), little was known of its habitat requirements. The few scattered records of Hermit Warblers in Washington prior to 1970 provided little indication of its status, and most authors classified it as uncommon in coniferous forests of western Washington.

In the 1970s the number of records increased substantially as the number of field observers increased. Consequently, Wahl and Paulson (1977) concluded that the Hermit Warbler's principal range in Washington was the southern Cascade Range and that it was common in that area. However, its status in other parts of the state and its specific habitat requirements were still uncertain. The purpose of this study was to delineate Hermit Warbler habitat requirements and to synthesize existing information on its distribution and abundance in Washington.

## METHODS

Information on distribution and abundance of the Hermit Warbler was derived from the literature, the regional editor's files of *American Birds* (AB files), the Washington Department of Game Data Storage and Retrieval System (WDG), personal interviews with knowledgeable people, and field work conducted as part of this study. During May and June 1979 we searched for Hermit Warblers in several areas of western Washington where its status was unknown, but its presence seemed likely. Appropriate habitats were surveyed by driving roads and frequently stopping to listen for Hermit Warblers; searches were also made along several hiking trails.

Due to the variability and overlap in songs of Townsend's and Hermit warblers, many of the warblers we heard, but did not see, were not identified. Those that we did identify by sound only were separated by their song endings. Hermit Warbler songs often end with two abrupt, low-pitched notes. All of the many warblers in the southern Cascades that we were able to visually identify while they sang the low-pitched ending were Hermit Warblers. So, in the southern Cascades we used the low-pitched ending as our sole means of distinguishing them by sound. In areas outside of their principal range in the southern Cascades (see Figure 1), identification by sound alone is questionable and all of our listed records are of birds identified by sight.

An intensive habitat survey was conducted in the southern Cascades of Washington. The object was to find how many different forest types supported territorial Hermit Warblers and to analyze habitat characteristics of representative stands. During June 1979 we drove 30 km of roads in the St. Helens and Randle ranger districts in Skamania, Lewis and Cowlitz counties, in a search for Hermit Warbler habitat. We stopped at arbitrary points along roads in all forest types and listened for singing Hermit Warblers. We collected data on habitat characteristics in each of 13 representative stands where we found two or more singing Hermit Warblers.

Tree species composition in each stand was quantified using the point-centered quarter method (Cottam and Curtis 1956) with points spaced at 5 m intervals along five 50 m transects. Transects generally ran parallel except where terrain prohibited. Cover in the shrub layer was measured along each transect using the line-intercept method (Cottam et al. 1953). Canopy closure was determined by the percentage of points at which the canopy occupied more than 50% of the area directly above each transect point. Elevation, aspect of slope, mean canopy height and stand age were also determined for each stand.

Tree species composition of the stands was analyzed by a two axis ordination (Mueller-Dombois and Ellenburg 1974) calculated from species importance values representing the sum of the relative density, dominance and frequency values of each tree species. This ordination graphically emphasized differences among stands in tree species composition (correlation coefficient = 0.834).

## DISTRIBUTION AND ABUNDANCE

Figure 1 illustrates the known distribution of the Hermit Warbler in Washington. All localities mentioned in the following regional review of its past and present distribution and abundance are represented in Figure 1.

OLYMPIC PENINSULA. Very few records exist prior to the 1970s, possibly because of a lack of ornithological investigation in the region. Rathbun (1916) regularly found singing Hermit Warblers during the breeding season in the Lake Crescent area, Clallam County, but considered the species uncommon. Hermit Warblers were found during the breeding season at the Quillayute Prairie, Clallam County, (Jewett et al. 1953), but dates and abundance were not reported. A single bird seen on Hurricane Ridge,

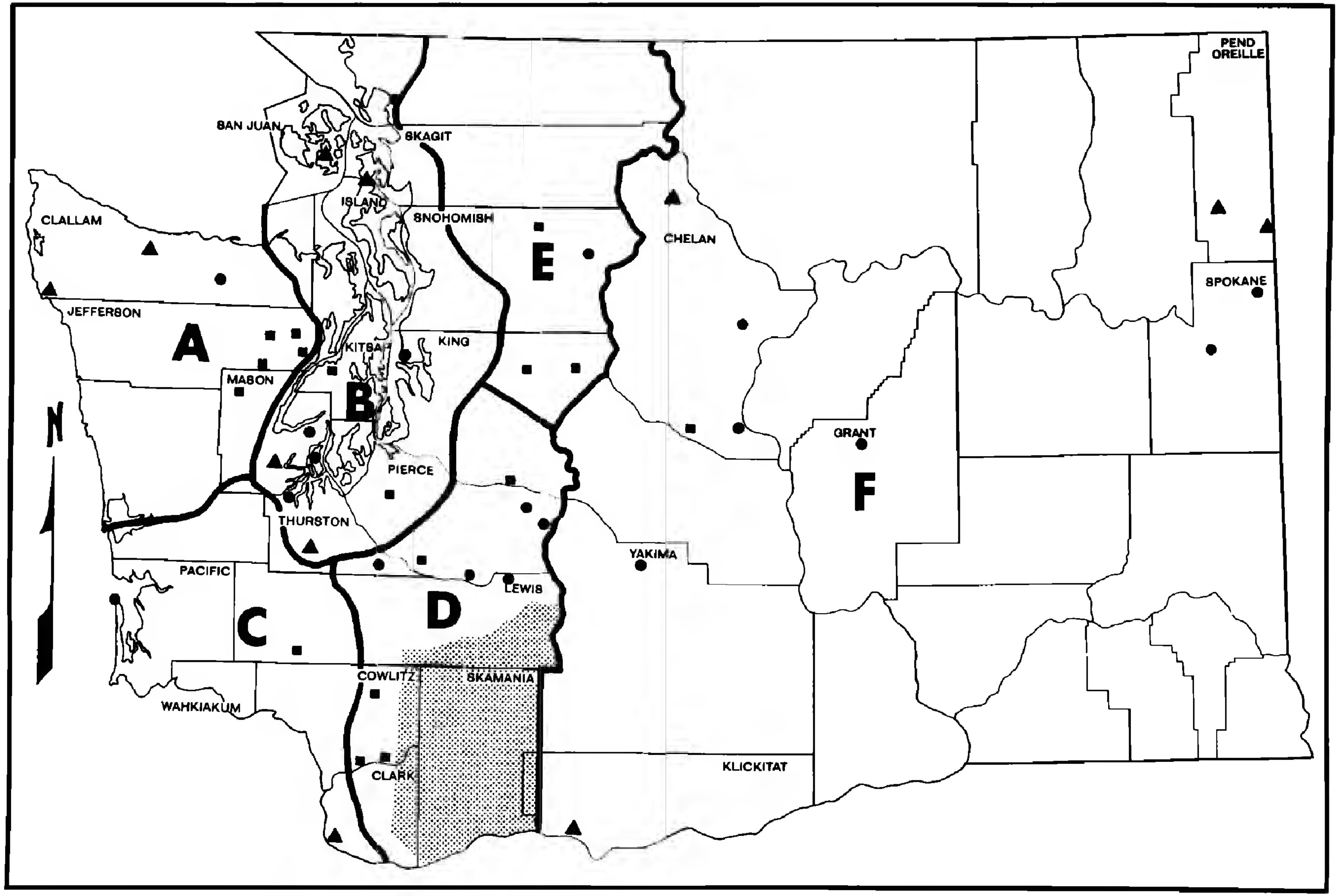

Figure 1. Known distribution of the Hermit Warbler in Washington. Dark lines separate regions: A = Olympic Peninsula; B = Puget Sound Trough; C = Southwest Washington; D = West slope of southern Cascades; E = West slope of northern Cascades; F = Eastern Washington. Shaded area represents principal range where the Hermit Warbler is widespread; ▲ = historical record (before 1960); ■ = recent (after 1960) probable breeding site (male on territory during breeding season, i.e., June-early July); ● = recent record (probably nonbreeding).

Clallam County, on 13 July 1974 (AB files) fits the pattern of late summer up-mountain movements noted by Cogswell (1957). Three singing males were seen at Staircase on Lake Cushman, Mason County, on 9 June 1977 (AB 31:1182, 1977). Jewett et al. (1953) also indicated that Lake Cushman was a breeding season locality. Two singing males were seen at Lena Lake in the Hamma Hamma River drainage, Jefferson County, on 16 June 1978 (pers. obs.). During this study singing males were seen in the Dosewallips River Valley and near Mt. Jupiter, Jefferson County, on 28 May and 10 June 1979. Based on the recent increase in observers and sightings in the region, the Hermit Warbler appears to be a fairly common breeder on the east slope of the Olympic Mountains and to be less common (probably rare) in other areas of the Olympic Peninsula. Future investigations may reveal a few warblers at other localities on the peninsula.

PUGET SOUND TROUGH. The warbler's historical status in Washington was well documented at only one location: the South Tacoma-Spanaway area of Pierce County. According to Bowles (1906, 1929), it was common in the stretches of fir woods in this prairie country from 1899 to 1921. Bowles (1929) noted a steady population decline from 1921 to 1929. Since then, the Hermit Warbler has been less common, but still present until recently. The most recent breeding record from Spanaway was 1966, and the last sighting was on 1 June 1974 (AB files). During May and June 1979, 2 days were spent searching for Hermit Warblers at Spanaway and adjacent Fort Lewis, but none were found. Jewett et al. (1953) listed Tenino, Thurston County, and Shelton, Mason County, as breeding season localities. Both areas exhibit a forest/prairie mosaic similar to that at Spanaway. For some unknown reason the Hermit Warbler has disappeared from the southern Puget Sound prairie country.

Wahl and Paulson (1977) mentioned historical records from Deception Pass, Skagit and Island counties. A bird was seen during migration on Lopez Island, San Juan County, in 1936 (WDG). Single birds were seen during migration in the Seattle area, King County, on three occasions: 12 April 1954 (AFN 8:326, 1954), 16 August 1955 (AFN 10:49, 1956), and 15 May 1975 (D. Paulson, pers. comm.). Hermit Warblers recently seen in the southeast Puget Sound area at Eld Inlet, Thurston County, on 23 August 1978 (AB files) and at Mason Lake, Mason County, on 25 July 1979 (WDG) were possibly migrants from the population that breeds on the eastern Olympic Peninsula. The sighting of two birds on Harstene Island, Mason County, on 12 June 1977 (AB 31:1182, 1977) indicated the possibility of a small breeding population, although the birds were more likely vagrants. A pair resided at Scenic Beach State Park, Kitsap County, from 10 May 1979 through the breeding season (WDG). This location is just across Hood Canal from a breeding population on the Olympic Peninsula, and birds on the Kitsap Peninsula possibly represented an expansion of the Olympic Peninsula population. A male at Bellingham, Whatcom County, on 16 May 1981 (J. Duemel pers. comm.), was the northernmost record of which we are aware. Currently, the Hermit Warbler is a rare summer resident and occasional migrant in the Puget Sound Trough.

SOUTHWEST WASHINGTON. Townsend (1837) first described the Hermit Warbler from a specimen taken at Vancouver, Clark County, but there were no subsequent records from the area until 5 September 1965, when one was seen during migration at Leadbetter Point, Pacific County (AFN 20:86, 1966). Another was seen 17 June 1975 on the Long Beach Peninsula, Pacific County (AB files), and possibly represented a vagrant. The single singing male seen during this study at Toledo, Lewis County, on 1 June 1979 may have been on its breeding grounds, but was probably a migrant. This inexplicable sighting prompted a search of the Willapa Hills, Pacific and Lewis counties, on 8-9 June 1979, but no Hermit Warblers were found. Hermit Warblers occur in the Coast Range of Oregon (Gabrielson and Jewett 1940, AB files), but apparently are absent or rare in the Willapa Hills, the range that links the Coast Range and the Olympics.

WEST SLOPE OF SOUTHERN CASCADES. From Randle and Packwood, Lewis County, south to the Columbia River, the Hermit Warbler is a common breeding bird (D. Fix pers. comm., B. Harrington-Tweit pers. comm., pers. obs.). As Wahl and Paulson (1977) noted, this is the warbler's principal range in Washington (Figure 1). In June 1979 we heard several singing birds at three localities in the foothills of Cowlitz County; the Hermit Warbler may be a widespread breeder in the foothills west of its principal range.

North of Randle and Packwood the Hermit Warbler is uncommon, and we discovered no records previous to 1970. At the Bald Hills, Thurston County, a single bird was seen on 9 May 1970 (WDG), and two singing males were seen on 6 June 1981 (pers. obs.). Two sightings of individual birds were made during late summer 1976 in Mt. Rainier National Park, Pierce County (WDG): near Crystal Lake on 25 July and at Longmire on 14 August. Another was seen along the West Fork White River, Pierce County, on 14 May 1977 (pers. obs.). The male seen 19 July 1978 at Reflection Lakes, Lewis County, in Mt. Rainier National Park (pers. obs.) was probably a post-breeding season up-mountain wanderer. Recent investigations in the Pack Forest near LaGrande, Pierce County (B. Harrington-Tweit pers. comm., WDG), and Federation Forest State Park, King County (Wahl and Paulson 1977, B. Harrington-Tweit pers. comm.), have shown the Hermit Warbler to be a fairly common and regular breeder at both localities. Possibly it is more widespread as a breeder in the Cascades of northern Lewis County, Pierce County and southern King County than these two known breeding sites indicate.

WEST SLOPE OF NORTHERN CASCADES. During summer 1979, a number of Hermit Warblers were seen in the northern Cascade region, where none had previously been recorded. Two territorial males were seen during the latter half of June 1979 south of Darrington, Snohomish County (pers. obs.). Two males were also seen along the North Fork Snoqualmie River, King County, on 28 June 1979 (AB 33:892, 1979). "Numbers" were found at Otter Lake near Skykomish, King County, on 9 July 1979 (AB 33:892, 1979). One was seen west of Glacier Peak, Snohomish County, on 16 August 1979 (pers. obs.). The preponderance of sightings during 1979 was not due to a previous lack of observers, as the area has received considerable exploration, but could be attributed to an expansion of birds out of their principal breeding grounds further south.

EASTERN WASHINGTON. Most of the possible Hermit Warbler breeding records east of the Cascade Crest came from around the turn of the century. Stehekin, Chelan County, and the Calispell Range and Newport, Pend Oreille County, were listed as breeding areas by Dawson and Bowles (1909), and Dawson (1897) collected a specimen near Stehekin. Jewett et al. (1953) also reported sightings at Stehekin in 1900 and at Calispell Lake in 1906. A bird was seen during migration at Lyle, Klickitat County, on 19 August 1918 (Jewett et al. 1953). LaFave (1955) saw six on Mt. Spokane, Spokane County, on 30 August 1954. Single birds were seen near Spokane, Spokane County, on 26 May 1964 (AB files); at Wenas Park, Yakima County, on 29 May 1971 (AB 25:774, 1971); on Swakane Wildlife Recreation Area, Chelan County, on 18 May 1972 (WDG); at Wenatchee, Chelan County, on 12 September 1972 (WDG); and at Ephrata, Grant County, on 14-15 May 1977 (AB 31:1027, 1977). These recent records of migrants suggest the possibility that a few still breed in the mountains of northeastern Washington. The only recent possible breeding record was of a pair seen at Swauk Pass in the Wenatchee Mountains, Chelan County, on 15 June 1978 (WDG).

The Hermit Warbler was apparently more abundant in the Pacific Northwest during 1979 than in recent years. This conclusion was evidenced by (1) the comments from many observers in Oregon on the species' unusually large numbers there (AB 33:892, 1979); (2) a noticeable expansion of birds into the northern Cascades of Washington; and (3) a few sightings in other areas of Washington where Hermit Warblers were not found before. Future field work will show whether this "good year" represents a single-season peak in abundance or the beginnings of a non-cyclic population increase and range expansion.

## HABITAT REQUIREMENTS

During the 1979 breeding season Hermit Warblers occurred in two major forest zones: the *Tsuga heterophylla* (Western Hemlock) zone and the *Abies amabilis* (Pacific Silver Fir) zone. The Hermit Warbler apparently did not breed regularly in the only other forest zone on the study area, the *Tsuga mertensiana* (Mountain Hemlock) zone, as we were unable to find any in this zone and we failed to locate any breeding season reports from this zone in Washington.

The *T. heterophylla* zone typically occurs in moist areas from sea level to 900 m in southern Washington (Franklin and Dyrness 1973). Major tree species in this zone are Douglas-fir (*Pseudotsuga menziesii*), Western Hemlock and Western Redcedar (*Thuja plicata*) (Franklin and Dyrness 1973). The *A. amabilis* zone lies between the temperate mesophytic *T. heterophylla* zone and the subalpine *T. mertensiana* zone, generally at elevations of 900-1300 m in southern Washington (Franklin and Dyrness 1973). It is wetter and cooler than the *T. heterophylla* zone and warmer with less snow pack than the higher *T. mertensiana* zone. Major tree species are Pacific Silver Fir, Western Hemlock, Noble Fir (*Abies procera*), Grand Fir, Douglas-fir, Western Redcedar, Lodgepole Pine (*Pinus contorta*) and Western White Pine (*Pinus monticola*) (Franklin and Dyrness 1973).

The ordination of Hermit Warbler habitats (Figure 2) illustrated the relative similarities and differences in tree species composition among the stands we analyzed. The ordination clearly segregated stands of the *T. heterophylla* and *A. amabilis* zones (Figure 2). At low elevations we found an association of Western Hemlock and Douglas-fir that corresponded to the *T. heterophylla* zone. Stands 10, 11 and 13 (Figure 2) were characteristic young seral communities dominated by Douglas-fir; stands 10 and 11 were 50-60 years old; and stand 13 was about 25 years old. Stands 2 and 12 were dominated by Western Hemlock and Douglas-fir, with hemlock the primary reproducing species under a canopy of mature (100-200 years) and old-growth (200 + years) Douglas-fir. Stand 7 was an old-growth community dominated by Western Hemlock. Stand 9 was an old-growth riparian community dominated by Western Redcedar and Grand Fir. Western Hemlock was the major reproducing species under the canopy of all stands within the *T. heterophylla* zone.

The second major group of stands on the ordination corresponded to the *A. amabilis* zone (Figure 2). Stand 4 was a young community (35 years) dominated by Western Hemlock, Western Redcedar and Pacific Silver Fir, and was located in an area of transition between the *T. heterophylla* and *A. amabilis* zones. Stands 1 and 3 were dominated by old-growth Pacific Silver Fir and Western Hemlock. Stand 6 was a unique association of Pacific Silver Fir and Lodgepole Pine that resulted from the dry, infertile soils developed from prior volcanic activity of Mt. St. Helens (Franklin 1966). Stand 8 was dominated by old-growth Grand Fir and a younger component of Pacific

Silver Fir. Stand 5 was an old-growth community dominated by Noble Fir and Pacific Silver Fir typical of cooler sites near the upper elevational limits of the *A. amabilis* zone. Pacific Silver Fir was dominant or codominant and was the major reproducing species in all stands within the *A. amabilis* zone.

The ordination of 13 representative stands (Figure 2) indicated that Hermit Warblers were not specific in their habitat requirements, using a variety of coniferous forest associations within the *T. heterophylla* and *A. amabilis* zones. Forests used were dense (mean canopy closure 70%), except for the Lodgepole Pine community (Stand 6, canopy closure 6.5%). Mean canopy height ranged from 13.6 m to 42.6 m. Deciduous trees were frequently codominant in the understory or a minor component of the canopy, especially in young stands. Cover in the shrub layer ranged from 3% to 48% (mean 16%), and shrub species conformed to expected associations with canopy species. The shrub layer appeared to be an incidental factor in habitat requirements as Hermit Warblers foraged and sang mainly in the canopy or

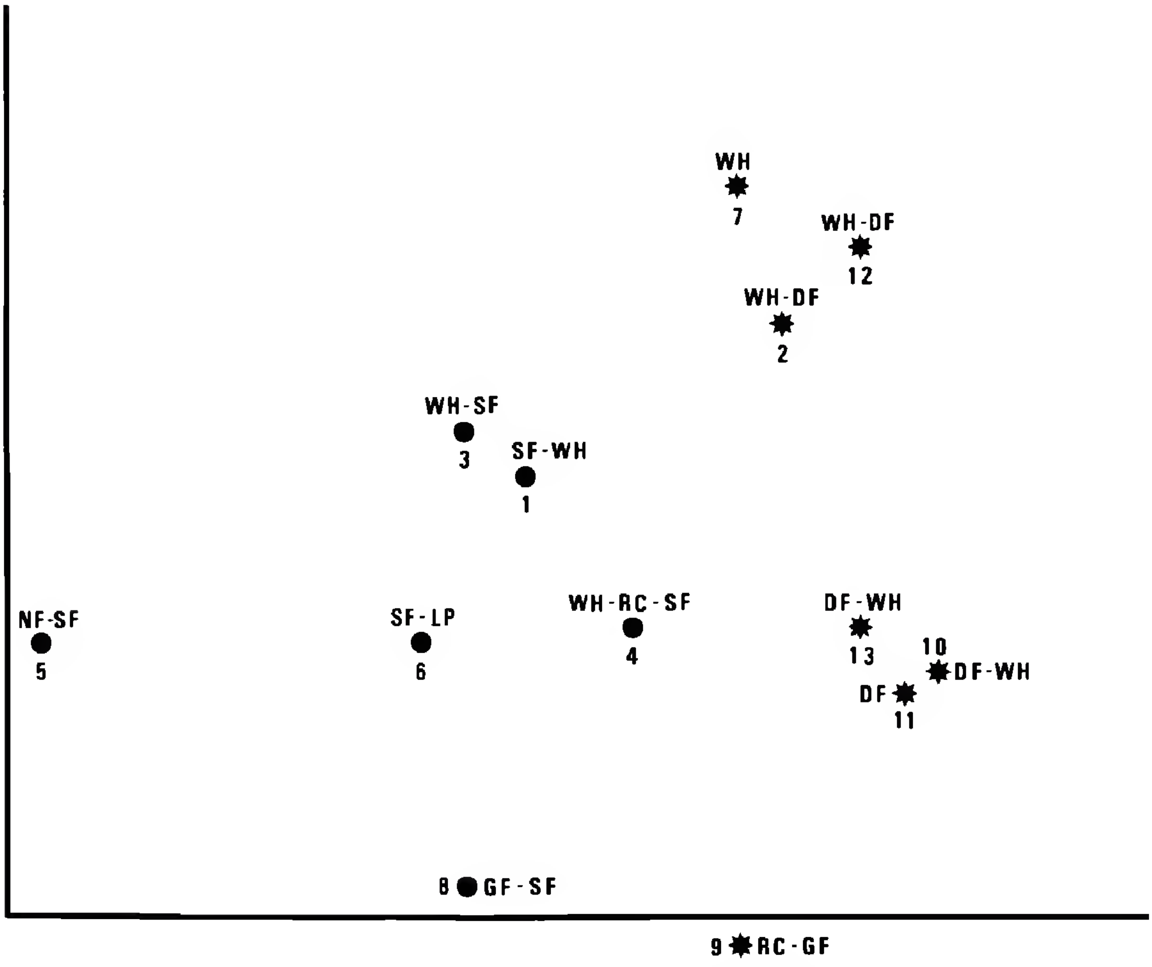

Figure 2. Community ordination of forest stands representing Hermit Warbler habitat in the southern Cascades of Washington. Numbers correspond to those used in the text. Forest zones: ★ = *Tsuga heterophylla* zone; ● = *Abies amabilis* zone. Tree species: WH = Western Hemlock; SF = Pacific Silver Fir; GF = Grand Fir; NF = Noble Fir; DF = Douglas-fir; RC = Western Redcedar; LP = Lodgepole Pine.

just below it. Aspect of slope also appeared to be an incidental factor in Hermit Warbler habitat requirements. Stand age ranged from second-growth as young as 25 years to old-growth (200+ years). Hermit Warblers appeared to be as numerous in young stands as in mature and old-growth stands, but this abundance in young stands may have been related to the apparent population increase of 1979. A study comparing population densities in various forest types (especially second-growth vs. old-growth) would be an appropriate follow-up to our study and would better define any management needs.

The habitat requirements delineated for Hermit Warblers in the southern Cascades appeared to be a fairly accurate representation of the Hermit Warbler's habitat use in other regions of Washington. West of the Cascade crest the Hermit Warbler breeds in various coniferous associations of the *T. heterophylla* and *A. amabilis* zones. The Hermit Warbler apparently does not breed in the coastal *Picea sitchensis* (Sitka Spruce) zone nor the subalpine *T. mertensiana* zone. However, there are two recent records (probably migrants) and one historical breeding season record from the coast (Figure 1), and there are several late summer records from the subalpine zone that fit the pattern of up-mountain movement after the breeding season noted by Cogswell (1957). The only recent possible breeding site east of the Cascade crest was an old-growth stand of Grand Fir and Douglas-fir in the Wenatchee Mountains (Figure 1).

The Townsend's Warbler is a very close relative of the Hermit Warbler. They have similar songs and habitat requirements, and their ranges overlap in the Cascade and Olympic mountains of Washington. Very little is currently known of the interactions between these two species that were frequently found breeding in close proximity to one another (B. Harrington-Tweit pers. comm., pers. obs.) and that have hybridized at least occasionally (Jewett 1944). Recently, hybrids have been found in Washington at the Pack Forest near LaGrande, Pierce County (B. Harrington-Tweit pers. comm.), and in Federation Forest State Park, King County (Wahl and Paulson 1977).

The most distinct difference that we observed in the habitat preferences of the two species was that the Hermit Warbler occurred only in the low to middle elevation forests of the *T. heterophylla* and *A. amabilis* zones, whereas the Townsend's Warbler also occurred in the higher elevation subalpine forests of the *T. mertensiana* zone. There is no apparent habitat or niche separation between the Hermit and Townsend's warblers in areas where they both occur (B. Harrington-Tweit pers. comm., pers. obs.). This interspecific relationship raises many questions, some of which will hopefully be answered by future research.

## SUMMARY

The Hermit Warbler is uncommon to rare over most of Washington State and its status has been unclear. The principal range of the Hermit Warbler in Washington is the west slopes of the southern Cascades where it is a common summer resident and breeder. The Hermit Warbler breeds uncommonly further north on the west slopes of the Cascades in Pierce and southern King counties. Prior to 1979, the Hermit Warbler had not been recorded on the west slopes of the northern Cascades. During the summer of 1979 several sightings were made in the northern Cascades, indicating an expansion out of the usual breeding grounds further south. The Hermit Warbler has declined in numbers in the Puget Sound region since the early 1900s. It was formerly of regular occurrence in the forest/prairie mosaic of the southern Puget Sound region, but it is now rarely seen in that area. The Hermit Warbler is now a rare summer resident and occasional migrant in the Puget Sound region. Recently, it was discovered that the eastern slopes of the Olympic Mountains harbor a sizable population of Hermit Warblers; the species is a fairly common summer resident and probable breeder in the area. Hermit Warblers are rare east of the Cascade crest where there have been several recent records during migration and only one recent breeding season sighting. Available evidence indicated that Hermit Warblers were more abundant than usual in Oregon and Washington during 1979.

Hermit Warblers in the southern Cascades of Washington used a variety of coniferous forest associations within the *Tsuga heterophylla* and *Abies amabilis* zones. None were found during the breeding season in the subalpine *Tsuga mertensiana* zone. Most forests used were moderately dense. Hermit Warblers occurred in second-growth forests (as young as 25 years) as well as in mature and old-growth forests. The closely related Townsend's Warbler occasionally hybridizes with the Hermit Warbler and the two species often breed in close proximity to one another. The Townsend's and Hermit warblers exhibited no observable habitat segregation.

## ACKNOWLEDGMENTS

We would like to thank D. Hansen of Pacific Lutheran University for his assistance in preparing the ordination. Jim Duemel, David Fix, Bill Harrington-Tweit, Phillip W. Mattocks, Jr., Dennis R. Paulson and Terence R. Wahl generously provided invaluable information. Bill Harrington-Tweit, Robert L. Jarvis, Dennis R. Paulson and Terence R. Wahl critically reviewed various drafts of the manuscript and provided helpful suggestions. We are also grateful to Allison Duryee for her field assistance, Richard L. Knight for the idea that sparked the beginning of this study, Elizabeth A. Rodrick for allowing us time off when we needed it, and Linda Crooks and Susan Peterson for their assistance in preparing the manuscript. Portions of this research were supported by the Nongame Program, Washington Department of Game.

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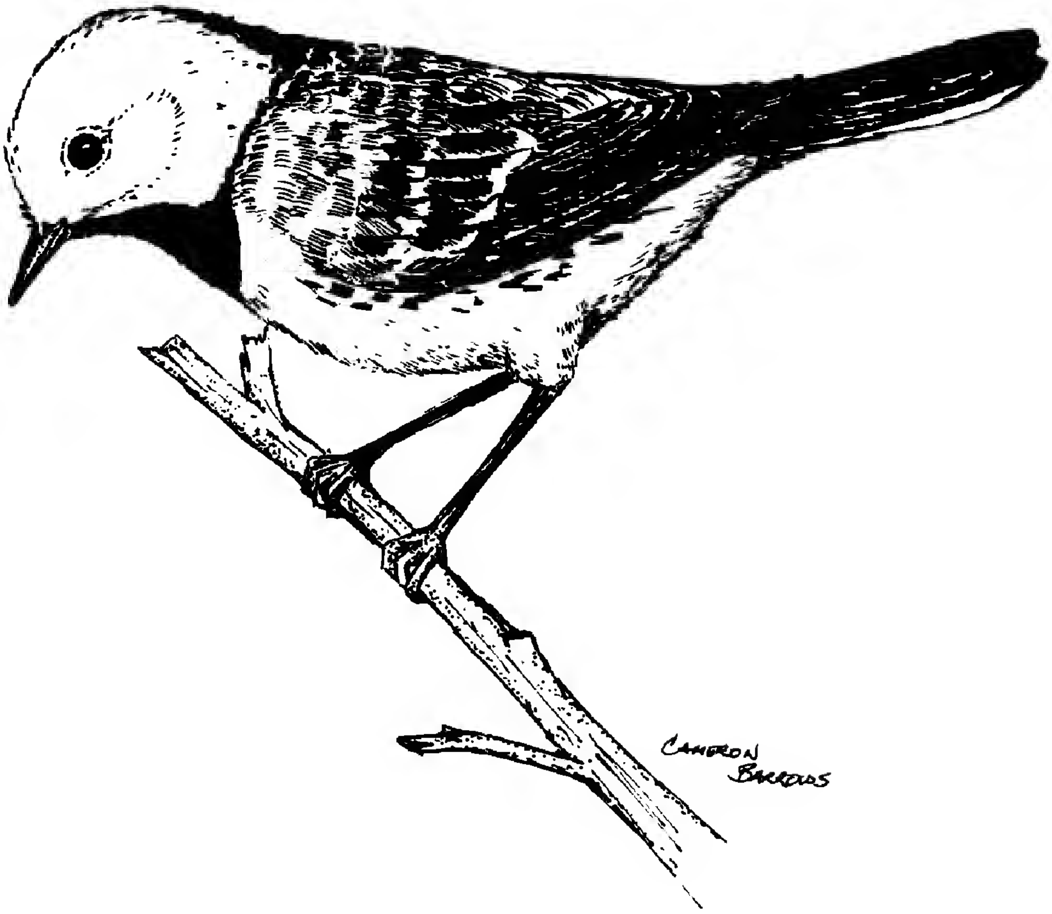

Hermit Warbler *Sketch by Cameron Barrows*

# REPORT TO MEMBERS

TERENCE WAHL, President, Western Field Ornithologists

WFO's annual meeting was held in Santa Cruz, California, 29 September-2 October 1983. The meeting was co-hosted by the Santa Cruz Bird Club, whose members assisted the local committee. Debi Love Shearwater was convention organizer and did an outstanding job. Jerry Langham ably introduced speakers at the papers presentation which included Birding Santa Cruz County, Aging Jaegers, The Manx Shearwater Group, UCSC Predatory Bird Project, Farallon Islands Birds, and the Survey of Central and Northern California Seabirds: 1980-1983. The banquet speaker, Bruce Eilliott, brought home the need for people like WFO members to assist with management of nongame species by providing good and otherwise unavailable information. To the many people who made the meeting and field trips so successful and enjoyable, I'm sure over 100 persons who attended will add thanks to mine. Field outings included pelagic trips which featured the impressive flocks of storm-petrels and other birds and many marine mammals on Monterey Bay, land and water birds of the Santa Cruz area, and a cooperative Sharp-tailed Sandpiper hung-out long enough to allow meeting attendees to see it during off-hours excursions. The weather saved northern resident WFO members from suffering heat-stroke and there was even enough rain to bring a touch of nostalgia.

## BUSINESS MEETINGS SUMMARY

Items discussed at the Board of Directors' meetings included the status of *Western Birds* in respect to publication and circulation. Also covered were aspects of business operations of WFO, communications and relationships with members and authors, and ways of improving these. Board members were assigned to new committees dealing with the journal, membership promotion, and with finances and budget. The membership elected Laurie Binford, John Luther and Virginia Johnson to three-year terms on WFO's Board of Directors. The Board elected Terry Wahl as President, Laurie Binford as Vice-president, Garth Alton as Membership Secretary/Treasurer, and Jean-Marie Spoelman as Recording Secretary for one year terms. Peter Gent was appointed chairman of the nominating committee for next year's meeting. Members should contact him with any ideas on board or officer nominations. Bruce Webb was appointed Photo Editor and WFO annual meeting coordinator to work with local committees. The location and dates of the annual meeting for 1984 were not set but members will be advised as soon as possible on this.

## WESTERN BIRDS

Editor Alan Craig, Associate Editors Narca Moore-Craig and Cameron Barrows, Layout Artist Virginia Johnson and the circulation crew in San Diego have succeeded in bringing WFO's journal up to date, fulfilling the outline in the President's Message [WB 13(1-4):42]. Issue 4 of Volume 14 is scheduled to be mailed in January 1984, after the Christmas mail rush. As explained in the last President's Message, the Board of Directors decided in

1982 that the only way to bring WB's publishing schedule to its calendar year was to publish Volume 13 as one issue, and to cover the cost of this from within the dues received for Volume 14. A word of explanation about Volume 13 (1-4): this issue was unfortunately delayed by two months due to a major paper being withdrawn by the author after the final proof for the issue had been returned to the printer. It is kind of thing which, in spite of valiant efforts of both editorial staff and printer in changing layout, articles and artwork, can cause much frustration and delay. We regret this and we hope members, awaiting their issues at the mailbox, will understand retroactively. We can also report that a back-log of accumulated manuscripts has been processed and WB is as "current" as possible in receipt, review, and publication of articles and notes submitted.

## FINANCES

As anticipated when the decision to publish five issues within a year was made, it has taken virtually all of our cash reserves to accomplish this. Paying necessary printing and mailing bills will require careful cash management of dues receipts in the near future. The Board is confident that problems will be minimal and, assuming support from members through renewal of existing memberships and gains in new memberships, WFO will be in solid shape financially.

## MEMBERSHIP RENEWAL NOTICES FOR VOLUME 15 — 1984

Members received notices for renewal of 1983 memberships in September-October 1983. This was late, but we are trying to keep dues notices in sequence with WB mailings. Correspondingly, notices for renewal of memberships for 1984 will be sent out in early January 1984. This is certainly close timing, but members will receive four issues between the two membership renewal notices. We hope this is not confusing and that you will support WFO by renewing promptly. Your support by doing this, and by encouraging new memberships and submission of articles to the journal will determine WFO's future ability to put out a quality journal. Thanks.

# NOTES

## FIRST VERIFIED CAPE MAY WARBLER FOR OREGON

JEFF GILLIGAN, 26 N.E. 32nd Avenue, Portland, Oregon 97232
OWEN SCHMIDT, 1220 N.E. 17th Avenue #2-D, Portland, Oregon 97232

This note reports the first verified record of the Cape May Warbler (*Dendroica tigrina*) from Oregon. We watched a warbler of this species for a little over 2 hours as it fed in alder (*Alnus*) trees on the Bayocean Sandspit, Tillamook County, Oregon, on 19 October 1980. More than 20 photographs which clearly show identifying marks were obtained.

The warbler was a male in basic plumage. Its identification was based on the following characteristics, all of which are apparent in at least some of the color transparencies on file with the Oregon Field Ornithologists' Bird Records Committee (P.O. Box 10373, Eugene, OR 97440). A large, thick whitish wing bar was on the otherwise gray-green wing. A large, dull yellow patch was behind the ear. The breast and sides were yellow, heavily streaked with black, with the streaking extending onto the lower throat. The yellow of the breast faded into the whitish belly and undertail coverts. The undertail was whitish. The top of the head and back were gray-green, flecked with inconspicuous dark markings. The upper tail was similar in color to the back. The face was yellowish, washed with gray on the cheek. The lores were thin and dark and there was a small amount of dark behind the eyes. The rump was yellow, although not as bright as that of the Yellow-rumped Warbler (*D. coronata*).

Cape May Warbler, Bayocean Sandspit, Tillamook Co., Oregon, 19 October 1980.
*Photos by Owen Schmidt*

We heard the warbler give an occasional weak chip call. The bird seemed to be a bit smaller than *D. coronata*.

There are two previous sight records of the Cape May Warbler from Oregon, both from Malheur National Wildlife Refuge in Harney County. The first sighting was of an alternate plumaged male watched for approximately 20 minutes at the Buena Vista Patrol Station on 9 June 1967 (Littlefield 1973). The second was also an alternate plumaged male seen at the refuge headquarters by John Gatchet, Charles Hanson, Keith Perrin, Alan Stoops, Jr., and Alan Stoops, Sr., on 3 June 1978 (Anonymous 1980). The latter record and the record for Bayocean Sandspit have been accepted by the Oregon Bird Records Committee.

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*Accepted 24 September 1983*

Cape May Warbler *Sketch by Donna Dittmann*

# OREGON'S FIRST RECORDS OF THE GREAT-TAILED GRACKLE

CARROLL D. LITTLEFIELD, U.S. Fish and Wildlife Service, Box 113, Burns, Oregon 97720

The Great-tailed Grackle *(Quiscalus mexicanus)* was first recorded in Oregon on 16 May 1980, when an adult male was seen by numerous observers at Malheur Field Station (MFS), ± 50 km SSE of Burns, Harney Co., Oregon. The individual was consistently observed within 10 m as it fed with Yellow-headed *(Xanthocephalus xanthocephalus)* and Brewer's *(Euphagus cyanocephalus)* blackbirds and Brown-headed Cowbirds *(Molothrus ater)*. The grackle was considerably larger than the associating icterids, and the long tail formed the characteristic vee or keel. The eye color was yellow. A photograph of the bird was published in American Birds (Rogers 1980a). Following the initial sighting, several other Great-tailed Grackles were found in Oregon during 1980 and 1981.

Since the turn of the century several avian species have been expanding their range northward in North America. East of the 100° meridian the Red-bellied Woodpecker *(Melanerpes carolinus)*, Tufted Titmouse *(Parus bicolor)*, Carolina Wren *(Thryothorus ludovicianus)*, Northern Mockingbird *(Mimus polyglottos)* and Northern Cardinal *(Cardinalis cardinalis)* have invaded regions where they were absent in 1900. West of the 100° meridian Magnificent Hummingbird *(Eugenes fulgens)*, Western Kingbird *(Tyrannus verticalis)*, Curve-billed Thrasher *(Toxostoma curvirostre)* and others have also expanded their range northward. Most of these range expansions have resulted from man's drastic and widespread changes of the environment (Terres 1980). In the east, forest clearings and urban developments and, in the west, shelterbelts, vegetation plantings around human settlements, and water and agricultural developments have created habitat that was not available 80 years ago.

The Great-tailed Grackle is among the species that has moved north from its original range. At the turn of the century the species occupied brush habitat from southern Texas, New Mexico and Arizona, south through Mexico and Central America, to northern South America (Oberholser and Kincaid 1974). About 1912, grackles began moving north from south Texas. The range expansion was slow at first, but a rapid invasion into west Texas occurred in the 1940s and 1950s. By 1958 it had arrived in the Texas Panhandle (Oberholser and Kincaid 1974). I found two Great-tailed Grackle nests in the panhandle's southwest corner (± 20 km S of Friona, Parmer Co.) in June 1961. Faanes and Norling (1981) described the species' range expansion through Texas, Oklahoma, Kansas and Colorado, and reported on the first nesting record for Nebraska.

In the 1970s, somewhat later than the Great Plains invasion, the Great-tailed Grackle began spreading from southern New Mexico and Arizona. Extensive deserts probably delayed their progress north of much of their original range, particularly in Arizona, until sufficient habitat changes had occurred. On 1 May 1973, the species was seen at Havasu National Wildlife Refuge (NWR), Mohave Co., in northwest Arizona. The first record in Nevada occurred 16 April 1973 near Las Vegas, Clark Co. (Oberholser and Kincaid 1974). A bird observed at Ruby Lake NWR, Elko Co., on 15 May 1978 was the first report from northern Nevada (Kingery 1978). In the summer of 1979, Utah had its first record when a single bird was seen near St. George, Washington Co.; and on 13 and 18 May 1980, two to eight individuals were recorded in the same county (Kingery 1980). A westward expansion was also occurring. Small (1974) reported it was first noted in the lower Colorado River Valley, California, in 1964, and was nesting by 1969.

Since the Great-tailed Grackle was first seen in Oregon in mid-May 1980, several additional records have accumulated. Apparently, several males were present in 1980. I know of the following records: one at Page Springs Campground, 4 km SE of Frenchglen, Harney Co., on 17 May; two at John Day Fossil Beds National Monument, Grant Co., on 18 May; and one had reached northeast Oregon near La Grande, Union Co., on 5 June (Rogers 1980b). I also know of four records in 1981: one male at MFS on 8 and 9 April; one photographed at Fields, Harney Co., during mid-May (H. Nehls pers. comm.); one male at Page Springs Campground on 19 June (D. Taylor pers. comm.); and another male in Hines, Harney Co., on 19 July (S. Thompson pers. comm.).

Great-tailed Grackles inhabit flatlands and avoid hills, mountains, heavily wooded areas and waterless deserts (Oberholser and Kincaid 1974). Few of these obstacles separate southeast Oregon from the species' original range in southern Arizona. Great Basin mountain ranges trend mostly north to south. Hills are low and scattered, and heavily wooded areas are non-existent except on isolated mountain ranges. Their major extrinsic barrier was probably great expanses of waterless desert. The recent introduction of mechanized sprinkler irrigation systems has resulted in increased agricultural developments in Nevada and southeast Oregon. These developments have reduced water deficiencies in former expanses of dry desert and may account for the grackle's rapid invasion into eastern Oregon, compared to the decades it took the species to reach northwest Arizona and southern Nevada from its historical range.

## ACKNOWLEDGMENTS

Larry Ditto, Brad Ehlers, David Paullin and Steven Thompson reviewed an early draft of this manuscript. I would like to thank them for their time and helpful comments. Harry Nehls refereed the manuscript and made many valuable suggestions. Dee Dee Ehlers typed the report.

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# A BRISTLE-THIGHED CURLEW AT LEADBETTER POINT, WASHINGTON

RALPH S. WIDRIG, Box 43, Ocean Park, Washington 98640

On 1 May 1982 I found a Whimbrel-like shorebird feeding alone at the high tide mark on an exposed sandy beach at Leadbetter Point, Pacific Co., Washington (Figure 1). The bird closely resembled a Whimbrel (*Numenius phaeopus*), but seemed to be more warm brown in color and to have a more erect posture. When flushed at about 30 m the bird gave a slurred call somewhat like that of a Black-bellied Plover (*Pluvialis squatarola*), but lower in pitch. The call was given only once as the bird flushed. As it circled low over the water in bright sunlight its rump and tail appeared to be a light tawny or buff color. After it resettled on the beach I approached the Whimbrel-sized bird from the sand dunes and observed it from a distance of about 25 m. Its bill was like that of a Whimbrel but somewhat more decurved; its legs were blue-gray, and its posture rather erect. When I rose, it flushed giving the same short, three-note call heard before, which seemed to say "chi-u-it" as described by Peterson (1961). Again, the rump and tail were a striking buff or light tawny color in flight, the rump being the lighter. This pattern was clearly visible for some distance as the bird flew down the beach. The observations were made with 7x 35 Nikon binoculars. The bird was unquestionably a Bristle-thighed Curlew (*Numenius tahitiensis*). It was almost identical to

Figure 1. Leadbetter Point, Washington. The x marks location of Bristle-thighed Curlew observation on 1 May 1982. Leadbetter Point is the northern terminus of Long Beach Peninsula, which separates Willapa Bay from Pacific Ocean near mouth of Columbia River. The habitat is protected, being part of Willapa National Wildlife Refuge.

Western Birds 14: 203,204, 1983

Peterson's field guide illustration (1961: Plate 26), except that the tail pattern could only be seen in flight.

This rare species breeds locally in western Alaska (Allen 1948, Gibson 1979). Its normal migration route is directly south over the Pacific Ocean by way of the Hawaiian and other central Pacific islands, although at least six records have been reported for the Gulf of Alaska from Kodiak to Yakutat (Bent 1929, Gibson 1978, Isleib and Kessel 1973). A single bird was collected at Grant Bay, near the north end of Vancouver Island, on 31 May 1969 (Richardson 1970). The first reported occurrence of *tahitiensis* in the contiguous 48 United States was of two observed at close range in low, northward flight at Leadbetter Point on 18 May 1980 (Ulrich Wilson pers. comm.). A light rump and brick-red tail pattern was clearly noted on both birds as they flew by together. No call was given. Most of the above sightings were on sandy ocean beaches during May, and the birds were not associating with Whimbrels or other shorebird species.

## ACKNOWLEDGEMENTS

The manuscript was reviewed by Dennis Paulson and Terry Wahl, who made helpful comments.

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*Accepted 15 October 1983*

# CAVITY-NESTING BREWER'S BLACKBIRDS

LYMAN V. RITTER and KATHRYN PURCELL, PSW Forest and Range Experiment Station, Forestry Sciences Laboratory, 2081 E. Sierra Avenue, Fresno, California 93710

Nest sites of the Brewer's Blackbird (*Euphagus cyanocephalus*) are unusually diverse—on the ground in weedy cover, in stump crevices, shrubs or trees (Verner and Boss, California wildlife and their habitats: Western Sierra Nevada, USDA Forest Service Gen. Tech. Report PSW-37, Berkeley, CA, 1980). In Washington, Dawson and Bowles (The Birds of Washington, Occidental Publishing Co., Washington, 1909:47) described nesting "in cavities near the tops of some giant fir stubs, none of them less than 150 feet from the ground." We have found no other reference to cavity nesting by Brewer's Blackbirds.

This note reports on a nest cavity used by Brewer's Blackbirds for three consecutive years in Poison Meadow, Sierra National Forest, Fresno County, California (T10S, R25E, Sec. 5), at an elevation of 1755 m. The meadow covers about 5 ha, has a permanent stream, is bisected by a paved road, and is surrounded by mixed-conifer forest. Scattered clumps of willow (*Salix sp.*) grow along the stream.

The nest cavity was in a 13-m Ponderosa Pine (*Pinus ponderosa*) snag measuring 65 cm dbh, with several large branches remaining, and about 15% bark covering. It was located 15 m from the nearest edge, 10 m from the road, and 10 m from standing water.

The cavity was in an enlarged, abandoned woodpecker hole 2.4 m above the ground. It faced 282° WNW. The opening was approximately rectangular, measuring about 6 x 10 cm. The rim of the nest was nearly up to the bottom of the cavity opening, so the adults could feed the nestlings without entering the cavity, and incubating and brooding adults could sometimes be seen in the opening.

The nest was first discovered with five nestlings on 12 June 1980. All nestlings were present on 17 June, but three fledged during an attempt to photograph them. By 22 June the nest was empty. On 10 June 1981 it contained three nestlings, and a fourth was found dead below the cavity. They were judged to be about 8 days old. Again on 7 June 1982 adult Brewer's Blackbirds were seen entering the cavity, and an undetermined number of nestlings were being fed there on 14 June. Presumably the young fledged between 15 and 20 June, as the cavity was empty on 21 June.

During the three seasons we knew that Brewer's Blackbirds nested in the cavity, a pair of White-headed Woodpeckers (*Picoides albolarvatus*) also nested in the snag. Their cavity was 2.0 m above ground—only 36 cm from the cavity used by the blackbirds—and faced 356° N. We observed no interactions between these species.

*Accepted 11 October 1983*

# HOUSE WREN BREEDS IN CLIFF SWALLOW NEST

BRUCE ELLIOTT, California Department of Fish and Game, 2201 Garden Road, Monterey, California 93940

On 25 June 1983 I observed a Northern House Wren (*Troglodytes aedon*) feeding an undetermined number of nestlings in a nest of a Cliff Swallow (*Hirundo pyrrhonota*). The nest was located under the Bradley Road Bridge spanning the Salinas River in southern Monterey County, California, and was approximately 20-25 m above the river bank. Two additional swallow nests, one active, were immediately adjacent to the one used by the wren. Approximately 300 other active swallow nests were on the outer border of the bridge, separated from direct view of the wren nest by a lateral support beam.

I observed the wren for about 45 minutes foraging repeatedly in exotic weedy vegetation in the shade under the bridge. It would periodically return to the nest with food.

Northern House Wrens are cavity nesters. The vast majority of their nest sites are natural crevices in trees or posts, cavities developed by other bird species for their own nesting requirements, or man-made birdhouses. However, House Wrens are known to utilize every kind of suitable aperture from hollow gourds to pockets of clothing hanging in buildings (Bent, A.C., U.S. Natl. Mus. Bull. 195, 1948). Although Bent does refer to one occurrence of a House Wren nesting in a Bank Swallow (*Riparia riparia*) burrow, I have been unable to locate any reference to use of Cliff Swallow mud-gourd nests by any wren species. In addition, the height of the nest above ground level is well above the usual upper height limit of 3 m for House Wren nests. Bent (ibid.) lists one nest in a dead yellow pine stub 50 m above ground, but also states that " . . . heights of 20 to 30 feet are unusual." Thus, the Bradley Bridge nest is unusual for its structure and its elevation and emphasizes the plasticity of the House Wren's behavior in selecting a nest site.

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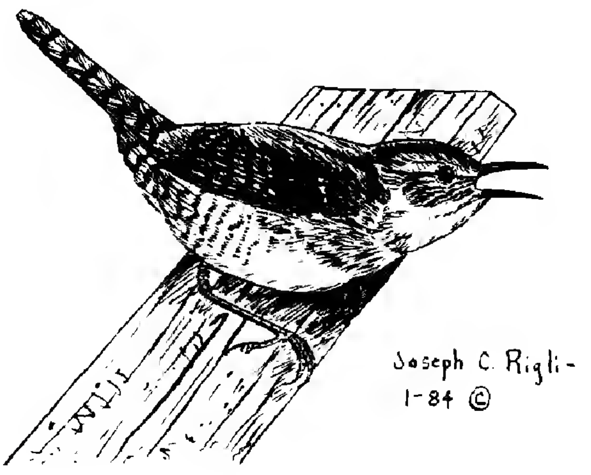

House Wren *Sketch by Joseph C. Rigli*

# A WHITE IBIS NEAR SHERIDAN, WYOMING

HELEN DOWNING, 371 Crescent Drive, Sheridan, Wyoming 82801

A 7-year-old ranch boy, Charles Collins, found "a funny white bird" in a small marshy pond near his home on Lower Piney Creek about 40 km SSE of Sheridan, Wyoming, on 12 September 1976. His father, Bruce Collins, identified it as a White Ibis *(Eudocimus albus)*. Marian Collins (not a relative) and I arrived at the pond at about 0730 on 13 September. The pond, situated in a pasture, was not more than 8 m across and had cattail *(Typha)* growth and two tree stumps standing in water near its center. The rest of the pasture was rather level and dry with short grass clipped off by the cattle present. The entire valley is made up of such pastures, some plowed and planted fields, some native grasses and sagebrush *(Artemisia)*, cottonwoods *(Populus)* and willows *(Salix)* along the stream plus large brushy areas. Low hills rise on either side. Several marshy ponds are in the area — two quite extensive. Piney Creek flows generally from southwest to northeast through the valley.

As we drove up I saw the bird in the shallow water among some vegetation and near a tree stump. I saw the back of the head (neck drawn back) and the bird's back — it was white with some dirt on the plumage. The bird turned its head and revealed the long, pinkish-red, down-curved heavy bill clearly — truly an adult White Ibis.

We parked the car within 40 m of the bird and observed it, using 7x35 binoculars. The bird was preening in full sun. Its bill was about as long as its neck, about 30 cm. It had much bare, bright red skin visible on the face, up as much as 5 cm over the eye and covering the face area. This red skin was as wide as 5 cm in a sort of square area below the eye. The ibis hopped up onto the stump spreading its wings and exposing its black wing tips and long, pinkish-red legs. I used a 40x scope to better view its face and noted that the bird had a black pupil and a yellow iris.

We watched the ibis for about an hour, and again later that morning we watched it with Platt H. Hall as it fed in the pasture among the cattle. I guessed it was picking up grasshoppers, which were abundant. The ibis walked rather deliberately but not as slowly as a Great Blue Heron. It moved its head, chicken-like, back and forth as it walked. The ranchers said that the stump in the center of the pond appeared to be a favorite perch, as the ibis returned to it again and again.

The White Ibis was still present at the original site until about noon on 13 September 1976, according to the ranchers. On 14 September 1976 Oliver K. Scott and I thoroughly searched all the sloughs, marshy areas and ponds in the area but were unable to find the bird.

The sighting represents a first state record as far as I can determine. N.W. Whitney cited a record in Bent (1926): two White Ibis were seen and one was collected in southeastern South Dakota in May 1879. Bent also noted a few near Ogden, Utah, 1 September to 8 October 1871; a specimen taken at Barr Lake, Colorado, in 1890; and others as far north as Illinois, Vermont, Connecticut and New York in 1878, 1878, 1875 and 1836-43, respectively. Recent bird checklists for Wyoming, Montana and Colorado do not include the White Ibis.

Scott suggested that the bird might be an escapee. Two small aviaries near Sheridan have never had a White Ibis. Ann Schimpf checked the Salt Lake City area with negative results; Esther Serr had the same results in the Rapid City, South Dakota, area; P.D. Skaar knew of no such captive bird in the Bozeman or Billings, Montana, areas; and Hugh Kingery wrote that the bird was not an escapee from the Denver, Colorado, area. No information was received through the National Zoo Keepers' publication.

One might wonder if the bird was an albino White-faced Ibis *(Plegadis chihi)*, a rare spring migrant in the Sheridan area. This possibility is ruled out by the bird's black pupil and yellow iris, very red facial skin, bright pinkish-red bill and legs, and black wing tips.

Some investigation has been made about how the White Ibis might have appeared here. The National Weather Service office personnel in Sheridan reported that, off the coast of Baja California during late August and early September, two or three tropical depressions had strong winds aloft at about 10,000 to 12,000 feet — fully strong enough to bring such a bird to this area. They also said that Hurricane Kathleen, which had moved up through Baja California into the Southwest at the time, was not responsible for the air mass over Sheridan from 10-13 September 1976, although the hurricane " . . . produced record rains as far north as Idaho" (Kaufman 1977:145). The probability of the White Ibis wandering to Wyoming from the Gulf of Mexico or Florida seems unlikely as a high pressure area with mild wind velocities was situated just east of the Rocky Mountains.

Of the ornithologists and qualified birders who expressed an opinion concerning the origin of the White Ibis in northeastern Wyoming, three suggested it was a post-breeding wanderer but declined to guess from where, and four thought that it was brought here via the southwestern United States by the strong weather pattern aloft. I favor the latter explanation.

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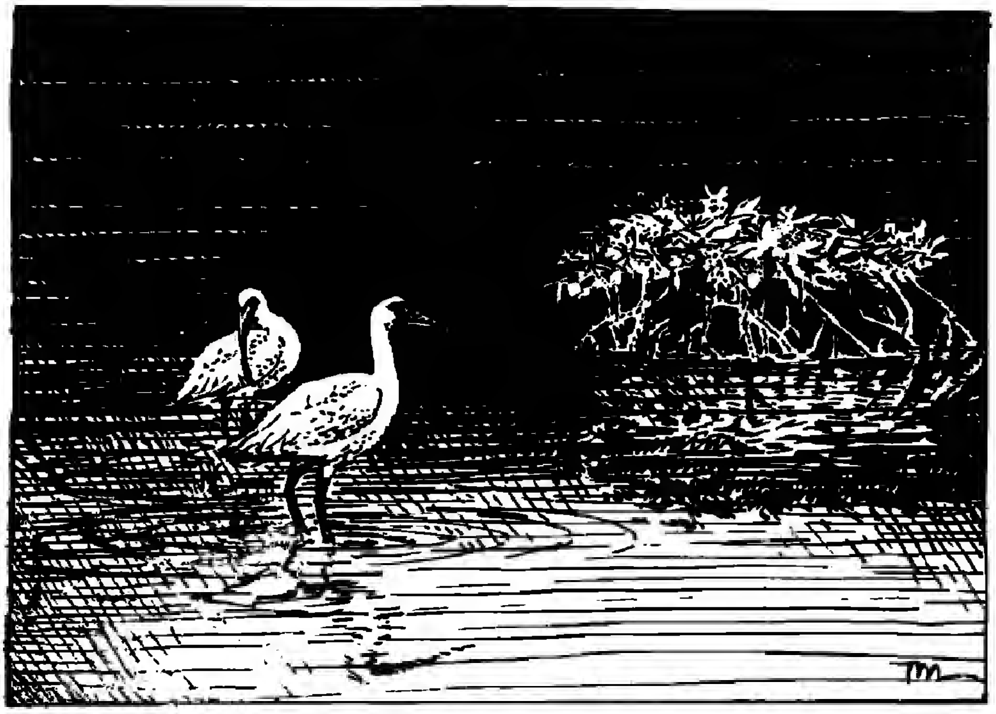

White Ibis *Sketch by Tim Manolis*

# UNUSUAL BEHAVIOR OF THE HORNED LARK

TIMOTHY D. REYNOLDS, Biology Department, Idaho State University, Pocatello, Idaho 83209 (present address: Department of Energy, Idaho Operations Office, RESL/CF-690, 550 Second Street, Idaho Falls, Idaho 83401)

DOUGLAS P. SHOREY, Biology Department, Idaho State University, Pocatello, Idaho 83209 (present address: Spray High School, Spray, Oregon 97874)

At 0720 (MST) on 12 May 1976, while conducting bird census work on the Idaho National Engineering Laboratory (INEL) 2 km west of Atomic City, Bingham Co., Idaho, we noticed a Horned Lark (*Eremophila alpestris*) dead on the road and a conspecific acting strangely nearby. Observing the birds from our vehicle, we recorded the following information from a distance of 5 m.

The live bird was paler and less distinctly marked than the dead one. We therefore classified the former as a female, the latter a male. A necropsy later confirmed the male's sex. The birds were on an infrequently traveled road in a habitat dominated by Big Sagebrush (*Artemisia tridentata*). They were within 150 m of two Horned Lark nests with eggs we had located on 10 and 11 May. Although direct evidence was lacking, the subsequent behavioral displays by the live bird indicated that the birds we were observing had most likely been a mated pair. We first saw the female within 1 m of the carcass. She was obviously greatly agitated, hopping and flying very short distances in a sporadic manner. She flapped violently in an exaggerated fashion, hovering for a second or less and landing within 0.5 m of the point of takeoff. She spent an instant motionless on the ground, and then fluttered and hopped toward the carcass, twice actually landing on it. Using her beak she grabbed the dead bird three times by the wing and several times by the head, pulling it towards the side of the road roughly in the direction of the nests. She then flew to a sagebrush about 2.5 m distant, called in a high fast chipping manner for about 5 seconds, and returned to the road with sporadic and exaggerated wing-fluttering. She then resumed hopping about, fluttering, probing, tugging at the body, and chipping intermittantly.

We observed this behavior sequence six times in 10 minutes and then approached the birds. By this time, the carcass had been moved about 0.5 m from the original position. As we advanced the female did not flush from her position by the carcass until we were within 1.5 m. She then flew only about 3 m away, landed in a sagebrush and resumed the high-pitched chipping mentioned previously. When we left the carcass, she immediately returned to her former position and continued her agitated behavior. We observed for several minutes more, and left the area. When we returned 6 hours later, only the carcass remained. It had been moved completely off the road, approximately 1 m from where we had last seen it. Later investigations revealed that both of the Horned Lark nests in the vicinity of the displays were unsuccessful. One was found empty (predation?) 2 days after our observations, and hatchlings in the second nest were trampled by domestic sheep nearly a week later.

The behavior of the live bird strongly suggests that these Horned Larks were a mated pair. A similar increase in activity and call rate upon separation from a mate has been recorded for Zebra Finches (*Poephila guttata*), Eurasian Bullfinches (*Pyrrhula pyrrhula*), Eurasian Tree Sparrows (*Passer montanus*) and Bearded Tits (*Panurus biarmicus*) (Butterfield 1970, Wickler 1972:95-99). All these passerine species reportedly pair for life. To our knowledge, ours is the first description of behavior which suggests postmortem mate fidelity in a passerine species that, at the most, forms a pair bond for only one breeding season.

This contribution is from the INEL Radioecology and Ecological Studies Programs, supported by the Division of Biomedical and Environmental Research, U.S. Department of Energy. Charles H. Trost, Jeanne Conry and Bruce Webb reviewed drafts of the manuscript. Their cogent suggestions were appreciated.

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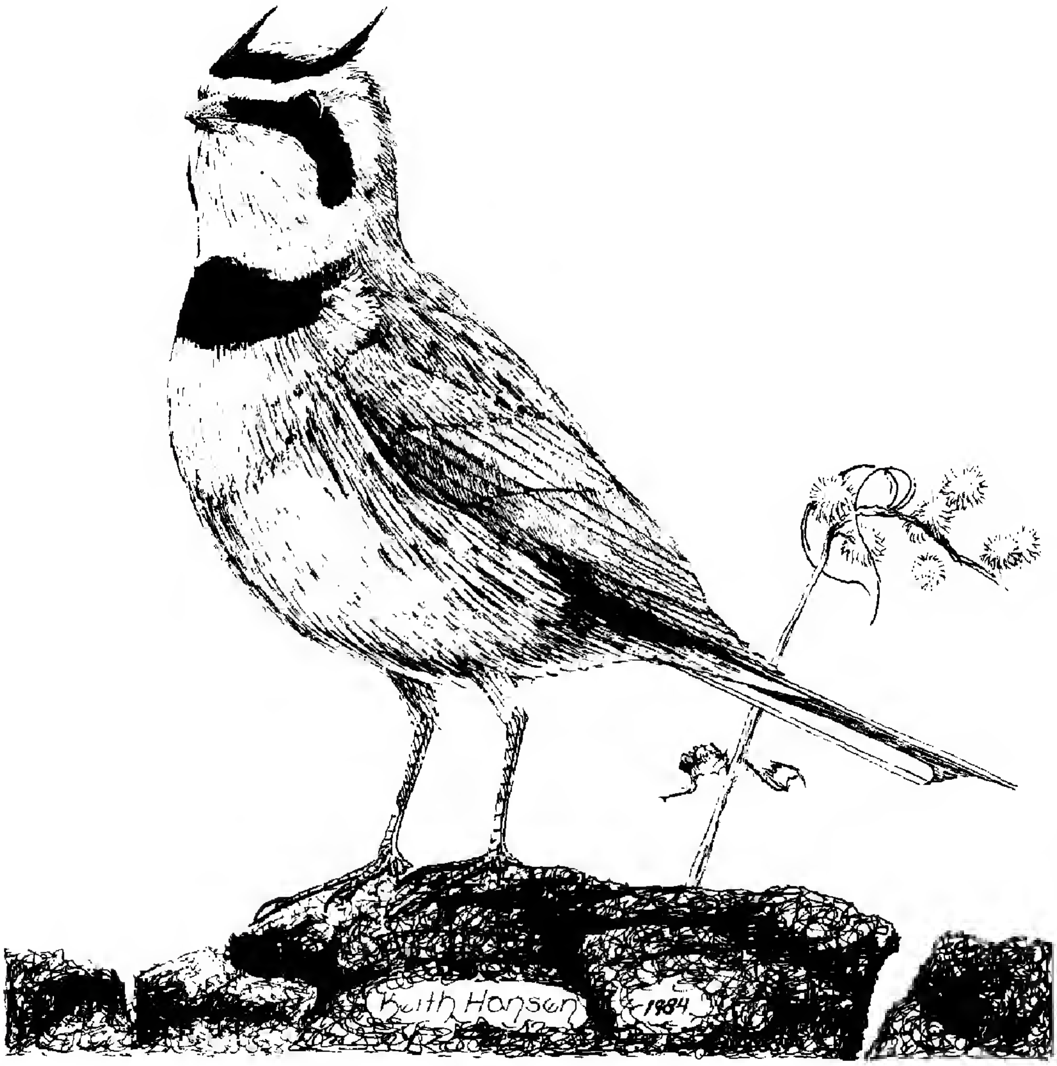

Horned Lark *Sketch by Keith Hansen*

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Compiled by *Mildred Comar*

## WFO *Vagrant Tree* Poster

A striking black and white poster by Narca Moore-Craig depicts 27 species of known or potential vagrants to Western North America. To order send $10.00 plus $1.00 for postage and handling to Ginger Johnson, 4637 Del Mar Ave., San Diego, CA 92107. Calif. residents please add 6% sales tax. Make checks payable to Western Field Ornithologists. All proceeds go to WFO.

## Volume 14, Number 4, 1983

NOTES

*Cover drawing by Narca Moore-Craig*: Burrowing Owls *(Athene cunicularia)*

Manuscripts should be sent to Alan M. Craig, P.O. Box 254, Lakeview, CA 92353. For matters of style consult *Suggestions to Contributors to Western Birds* (6 pp. mimeo available at no cost from the Editor) and *Council of Biology Editors Style Manual* 4th edition, 1978 (available from the American Institute of Biological Sciences, 1401 Wilson Boulevard, Arlington, VA 22209 for $12.00).

Papers are desired that are based upon field studies of birds, that are both understandable and useful to amateurs, and that make a significant contribution to scientific literature. Appropriate topics include distribution, migration, status, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, the techniques for identifying, censusing, sound recording and photographing birds in the field. Papers of general interest will be considered regardless of their geographic origin, but particularly desired are papers dealing with studies accomplished in or bearing on Rocky Mountain states and provinces westward, including Alaska and Hawaii, adjacent portions of the Pacific Ocean and Mexico, and western Texas.

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