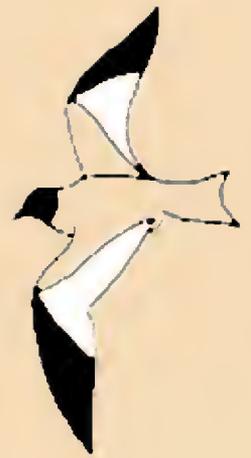


WESTERN BIRDS



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Western Specialty: **Black Swift**



Photo by © Tim Reeves of Farmington, New Mexico:

Black Swift (*Cypseloides niger*)

Ouray Box Cañon Falls Park, Ouray County, Colorado, 2 August 2008. In 2001 this park was designated an Important Bird Area by Colorado Audubon. It supports one of the state's largest populations of Black Swifts, a priority species for conservation. These birds nest in their preferred habitat — canyon walls sheltered by overhanging rocks near waterfalls.

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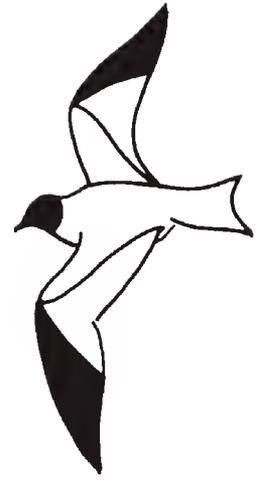
Front cover photo by © Bob Lewis of Berkeley, California: Dusky Warbler (*Phylloscopus fuscatus*), Richmond, Contra Costa County, California, 9 October 2008, discovered by Emilie Strauss. Known in North America including Alaska from over 30 records, the Dusky is the Old World Warbler most frequent in western North America south of Alaska, with 13 records from California and 2 from Baja California.

Back cover “Featured Photos” by © Kurt A. Radamaker of Fountain Hills, Arizona: Aztec Thrush (*Ridgwayia pinicola*), recently fledged juvenile, Mesa del Campanero, about 20 km west of Yecora, Sonora, Mexico, 1 September 2007.

Western Birds solicits papers that are both useful to and understandable by amateur field ornithologists and also contribute significantly to scientific literature. The journal welcomes contributions from both professionals and amateurs. Appropriate topics include distribution, migration, status, identification, geographic variation, conservation, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, and techniques for 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 reports of studies done in or bearing on the Rocky Mountain and Pacific states and provinces, including Alaska and Hawaii, western Texas, northwestern Mexico, and the northeastern Pacific Ocean.

Send manuscripts to Kathy Molina, Section of Ornithology, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007. For matters of style consult the Suggestions to Contributors to *Western Birds* (at www.westernfieldornithologists.org/docs/journal_guidelines.doc).

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THE 33RD REPORT OF THE CALIFORNIA BIRD RECORDS COMMITTEE: 2007 RECORDS

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ABSTRACT: The California Bird Records Committee reached decisions on 285 records involving 92 species evaluated during 2007, endorsing 238 of them. New to California were Townsend's (Newell's) Shearwater (*Puffinus auricularis newelli*), Tristram's Storm-Petrel (*Oceanodroma tristrami*), Lesser Frigatebird (*Fregata ariel*), Swallow-tailed Kite (*Elanoides forficatus*), Eurasian Kestrel (*Falco tinnunculus*), Wood Sandpiper (*Tringa glareola*), and Common Rosefinch (*Carpodacus erythrinus*). Adjusting for these changes brings California's bird list to 640 species, ten of which are non-native.

This 33rd report of the California Bird Records Committee (hereafter the CBRC or the committee) is the second annual report to be published after the publication of *Rare Birds of California* (CBRC 2007). That book summarizes the status of all vagrants and rare migrants in the state and details all of the committee's decisions from its inception in 1970 through 2003. In it, Appendix H covers selected but not all records from 2004 to 2006; therefore, the simple addition of records in this report to those already listed in the book could result in incorrect record tallies because some records were covered in Appendix H while others were not. This report discusses the evaluation of 285 records of 92 species. Although most records pertain to birds found in 2007, the years covered by this report extend from 1915 through 2007. Of the 285 records submitted, the committee accepted 238, involving 268 individuals of 83 species, for an acceptance rate of 84%. Forty-five records of 25 species were not accepted because of insufficient documentation or because descriptions were inconsistent with known identification criteria. Two additional records of two species were not accepted because of questions concerning the birds' natural occurrence. Counties best represented by accepted records were San Diego (46 records), Imperial (26), Monterey (23), Los Angeles (16), Humboldt (13), Santa Barbara (11), San Francisco (10, all from Southeast Farallon I.), Orange (9), Ventura (9),

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Riverside (8), Marin (7), Mono (7) San Luis Obispo (6), San Mateo (6), and Sonoma (6).

Highlights of this report include California's first Townsend's (Newell's) Shearwater (*Puffinus auricularis newelli*), Tristram's Storm-Petrel (*Oceanodroma tristrami*), Lesser Frigatebird (*Fregata ariel*), Swallow-tailed Kite (*Elanoides forficatus*), Eurasian Kestrel (*Falco tinnunculus*), Wood Sandpiper (*Tringa glareola*), and Common Rosefinch (*Carpodacus erythrinus*). Other noteworthy records in this report include the state's second of Cory's Shearwater (*Calonectris diomedea*), Bridled Tern (*Onychoprion anaethetus*), and Green Violetear (*Colibri thalassinus*). Remarkable also were three Arctic Warblers (*Phylloscopus borealis*) in one fall.

The committee currently is evaluating a potential first state record of the Great Black-backed Gull (*Larus marinus*). The seven species added in this report bring California's list to 640 species, ten of which are non-native and two of which have been extirpated within historical times. The recent acceptance of a further additional species, the Bluethroat (*Luscinia svecica*), will be described in the next report.

The acceptance rate in this report of 84% is above the weighted average of 79.6% over all CBRC reports combined, perhaps because of the increasing use of digital photography to support records that otherwise might have been documented only with written descriptions. The total of 285 records reviewed is above the average of 214.4 records per report over the first 30 reports.

The list of species reviewed by the CBRC is posted at the California Bird Records Committee web site (www.californiabirds.org), which also includes the entire California list, the committee's bylaws, a reporting form for e-mail submission of records to the CBRC, contact information for current and recent committee members, a photo gallery of recent submissions (including some of birds addressed in this report), recent annual reports, information on ordering the committee's publication *Rare Birds of California* (2007), corrigenda for same, a search function for all post-2003 records, and other information about the CBRC.

All documentation reviewed by the CBRC, including copies of descriptions, photographs, videotapes, audio recordings, and committee members' comments on records submitted, is archived at the Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, CA 93012, and is available for public review. The CBRC solicits and encourages observers to submit documentation of all species on the review list, as well as species unrecorded in California. Documentation should be sent to Guy McCaskie, CBRC Secretary, P. O. Box 275, Imperial Beach, CA 91933-0275 (e-mail: guymcc@pacbell.net).

News and Format

Committee News. The committee's voting membership after the January 2009 annual meeting consisted of Paul E. Lehman (chair), Daniel S. Singer (vice-chair), Jon L. Dunn, Joseph Morlan, Kristie N. Nelson, James E. Pike, Peter Pyle, Brian Sullivan, and Jim Tietz. Guy McCaskie continued in his role as nonvoting secretary. Previous committee members who also voted on many of the records in this report include David M. Compton,

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Kimball L. Garrett, Matthew T. Heindel, Marshall J. Iloff, Alvaro Jaramillo, and Scott B. Terrill.

As noted by Shuford (2006) and Iloff et al. (2007), *California Birds/Western Birds* is now available online via SORA, the Searchable Ornithological Research Archives (<http://elibrary.unm.edu/sora>), and all previously published CBRC reports through 2005 are available through that site.

Format and Abbreviations. As in other recent CBRC reports, records are generally listed chronologically by first date of occurrence and/or geographically from north to south. Included with each record is the location, county abbreviation (see below), and date span. The date span usually follows that published in *North American Birds* (hereafter N. Am. Birds; formerly *American Birds* and *Field Notes*), but, if the CBRC accepts a date span differing from that in a published source, the differing dates are italicized. Initials of the observer(s) responsible for finding and/or identifying the bird(s)—if known and if they supplied supportive documentation—are followed by a semicolon, then the initials, in alphabetized order by surname, of additional observers submitting supportive documentation, then the CBRC record number consisting of the year of submission and a chronological number assigned by the secretary. All records are sight records unless otherwise indicated: initials followed by a dagger (†) indicate the observer supplied a supportive photograph, (‡) indicates video, (§) indicates a voice recording, and (#) indicates a specimen record, followed by the acronym (see below) of the institution housing the specimen and that institution's specimen catalog number. An asterisk (*) prior to a species' name indicates that the species is no longer on the CBRC's review list.

In this report, the first number in parentheses after the species' name is the number of *individual birds* accepted by the CBRC through this report, not the number of accepted *records*; the number of individual birds may be higher than the number of records because historically the committee has treated groups of individuals appearing together with a single record number (e.g., a flock of Common Redpolls, *Carduelis flammea*). The second number is the number of new individuals accepted in this report (because this number excludes records thought to pertain to returning individuals treated in previous reports, it may be zero). Two asterisks (**) after the species' total indicate that the number of accepted records refers only to a restricted review period or includes records accepted for statistical purposes only; see Roberson (1986) for more information.

When individual birds return to a location after a lengthy or seasonal absence, each occurrence is reviewed under a separate record number, and committee members indicate whether or not they believe the bird is the same as one accepted previously. Such decisions follow the opinion of the majority of members, and, if a bird is considered a returning individual, the total number of individuals remains unchanged.

Although the CBRC does not formally review the age, sex, or subspecies of each bird, information on these subjects is often provided during the review process (and in some cases a strong majority or consensus is achieved). We report much of this information; the diagnosis of age, sex, or subspecies is the authors' opinion based on the evidence in the files and committee members' comments. Our terminology for age follows that used in text accounts by the CBRC (2007).

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At the 2008 meeting the committee decided to include all records of a species, including those accepted, those not accepted because of identification concerns, and those not accepted because of natural-occurrence concerns, within one species account. This is a major change in format from all previous reports and is intended to make finding specific records easier by eliminating the need for flipping back and forth between sections during a search for all records of a particular species.

The CBRC uses standard abbreviations for California counties; those used in this report are ALA, Alameda; BUT, Butte; DN, Del Norte; GLE, Glenn; HUM, Humboldt; IMP, Imperial; INY, Inyo; KER, Kern; KIN, Kings; LAK, Lake; LAS, Lassen; LA, Los Angeles; MRN, Marin; MEN, Mendocino; MNO, Mono; MTY, Monterey; NEV, Nevada; ORA, Orange; RIV, Riverside; SAC, Sacramento; SBE, San Bernardino; SD, San Diego; SF, San Francisco; SLO, San Luis Obispo; SM, San Mateo; SBA, Santa Barbara; SCL, Santa Clara; SCZ, Santa Cruz; SHA, Shasta; SIS, Siskiyou; SOL, Solano; SON, Sonoma; TRI, Trinity; VEN, Ventura; YOL, Yolo. A list of abbreviations for all 58 California counties is available at www.californiabirds.org/counties.html and in CBRC (2007). Other abbreviations used: Cr., creek; I., island; L., lake; Mt., mountain; n. miles, nautical miles; N.W.R., national wildlife refuge; Pt., point; R., river; W. A., wildlife area; W. M. A., wildlife management area.

Museum collections housing specimens cited in this report, allowing access to committee members for research, or otherwise cited, are the Natural History Museum of Los Angeles County, Los Angeles (LACM), Museum of Vertebrate Zoology, University of California, Berkeley (MVZ), San Diego Natural History Museum, San Diego (SDNHM), Santa Barbara Museum of Natural History, Santa Barbara (SBMNH), Royal Ontario Museum, Toronto (ROM), Museum of Wildlife and Fish Biology, University of California, Davis (MWFB), and the Western Foundation of Vertebrate Zoology, Camarillo (WFVZ).

RECORDS

EMPEROR GOOSE *Chen canagica* (89, 2). An adult was at the north jetty of Humboldt Bay, HUM, 2 Mar 2007 (SGe; 2007-085). While examining specimens at MVZ, David E. Quady noticed an Emperor Goose that had been collected by Harold C. Bryant and "Lamme" on 27 Oct 1915 at West Butte, SUT. The record was not included in Grinnell and Miller (1944), nor had it been reviewed by the committee. It is surprising that the very thorough Grinnell and Miller would have missed this specimen in their own collection, but that appears to be the case. Photos of the specimen were furnished to the committee (†DEQ; MVZ #25861; 2007-097).

IDENTIFICATION NOT ESTABLISHED: Three adults and one immature were reported from the Lower Klamath National Wildlife Refuge, SIS, 14 Dec 2005 (2006-225). The observer is experienced with waterfowl, but the majority of the committee believed that the description was too brief and incomplete to establish the identification.

TRUMPETER SWAN *Cygnus buccinator* (76, 1). An adult was with seven Tundra Swans (*C. columbianus*) at Modoc N. W. R., MOD, 2 Dec 2007 (SCR; 2007-281). This bird was vocalizing and showed most of the features distinguishing the Trumpeter from the Tundra Swan except the outline of the feathering on the forehead, which

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was curved as typical for Tundra Swan rather than pointed as on a classic Trumpeter Swan. Caution is warranted in identifying swans, especially silent birds (e.g., see Patten and Heindel 1994 for identification criteria), and there appears to be significant individual variation, further complicating identification.

IDENTIFICATION NOT ESTABLISHED: A bird along Road 39 northeast of Willows, BUT, 6 Feb 2007 (2007-064) was identified as a juvenile Trumpeter Swan by an observer who has worked with this species extensively. Young swans are extremely difficult to identify in the field, and the observer identified this bird primarily on the basis of size and by the entirely gray plumage, which is correct for the Trumpeter but does not rule out the Tundra. On the basis of the reported size difference (25–30% larger than nearby Tundra Swans), most committee members thought that the bird was likely a Trumpeter. These swans vary considerably in size, however, and seemingly large Tundra Swans create identification problems.

AMERICAN BLACK DUCK *Anas rubripes* (2, 1). A bird flying with a female Mallard (*A. platyrhynchos*) was shot during a waterfowl hunt at the Prime Time Duck Club 11 miles south of Willows, COL, 21 Dec 2006. The hunter recognized it as an American Black Duck, and photographs of the bird were submitted to the committee (†YFK; 2007-015). The specimen is being mounted, and Forest-Knowles plans to donate it to the Museum of Wildlife and Fish, University of California, Davis. With only two accepted records for California, the American Black Duck remains exceptionally rare in far western North America. Identification of this species is complicated by extensive hybridization with the Mallard, evidence of which can be subtle and difficult to detect in some birds. In addition, assessing the origin of individuals of this species in western North America is complicated by releases and attempted introductions. In the West, escapes and releases are known especially from Washington (P. E. Lehman pers. comm.). The committee saw no reason to question the origin of this bird, however, nor did it detect evidence of hybridization from photos of the specimen. The validity of a record for Korea involving a band recovered from a male initially captured in Virginia (cited by CBRC 2007), has been called into doubt (D. D. Gibson, J. L. Dunn pers. comm.)

SMEW *Mergellus albellus* (3, 1). An adult male in Soulsbyville, TUO, 20–29 Jan 2007 (SU; LBI†, WGB†, MB, DMC, EDG†, OJ†, JK†, LLI‡, MMe†, MSanM†, JM†, SJM†, DWN†, MTi; 2007-024) returned the following winter 29 Dec 2007–2 Feb 2008 (PB†; SUM; 2008-010; photo in *N. Am. Birds* 62:334).

ARCTIC LOON *Gavia arctica*. **IDENTIFICATION NOT ESTABLISHED:** A distant loon at Monterey Harbor, MTY, 3 Jan 2007 (2007-067) showed what appeared to be conspicuous white flares on the flanks. The bird was photographed, however, only through a scope when it was too far away for detail to be discerned. Most committee members believed this bird could well have been an Arctic Loon but concluded that the documentation did not establish that identification fully.

YELLOW-BILLED LOON *Gavia adamsii* (77, 1). One was inland at O'Neill Forebay, MER, 16–20 Nov 2007 (ADeM; 2007-282). Inland records represent fewer than 10% of the records of this species in California.

SHORT-TAILED ALBATROSS *Phoebastria albatrus* (22, 4). Three (all young birds) were photographed: one at 30° 43.300' N, 123° 23.310' W (approximately 140 n. miles southwest of San Nicolas Island, VEN) 16 Jan 2007 (LSh†, fide TJG; 2007-018), one on Monterey Bay, MTY, 22 Apr 2007 (MS†; 2007-109), and one off Bodega Bay, SON, 23 Sep 2007 (LLu‡; PhE†, GEw†, EPr†; 2007-204). On the last date, there were two separate sightings approximately 1.5 hours apart, prompting the question whether two individuals were off Bodega Bay that day (LLu‡; PhE†, GEw†, EPr†; 2007-205). After studying the photographs, however, the committee unanimously agreed the observations involved a single bird. Also, a fourth Short-tailed Albatross was observed from Pt. Pinos, MTY, 24 Jun 2007 (BLS; 2007-265).

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GALAPAGOS/HAWAIIAN PETREL *Pterodroma phaeopygia/sandwichensis* (22, 1). One was 9.17 n. miles west of Pt. Pinos, MTY, 17 Sep 2005 (ToE; MME; 2005-123A). There is an emerging consensus that the Hawaiian Petrel (*P. sandwichensis*) accounts for most or all California records. Force et al. (2007) discussed potential identification criteria. The CBRC is currently analyzing all previously accepted California records to determine which, if any, can be assigned to the Hawaiian rather than the Galapagos or Galapagos/Hawaiian petrels. Adult Hawaiian Petrels with satellite transmitters have been tracked making regular foraging forays from Hawaii to waters off the west coast of North America, including those off California, during the breeding season (D. Ainley pers. comm.).

STREAKED SHEARWATER *Calonectris leucomelas* (17, 2). One was 25 n. miles west of Pt. Pinos, MTY, 13 Oct 2007 (ToE; RW, 2007-264), and the following day a second bird was 2.5 n. miles north of Pt. Pinos (ToE†; DSg; 2007-227). Over half of California's Streaked Shearwaters have been found on Monterey Bay, and all records fall between 5 Aug and 15 Oct.

CORY'S SHEARWATER *Calonectris diomedea* (2, 1). One was 30 n. miles west of San Diego, SD, at 32° 43.07' N, 117° 41.83' W on 4 Sep 2007 (DPo; 2007-170). What was presumably the same individual had been observed repeatedly on and around the Islas Los Coronados, just south of the international border off Tijuana, Baja California, in 2005, 2006 (CBRC 2007), and 2007 (DPo comments in submission). but it was noted in U.S. waters only once. As discussed in *N. Am. Birds* (60:441, 468), this bird's underwing pattern is consistent with *C. d. borealis*. The only Cory's Shearwater previously accepted for California was off Sonoma County on 9 Aug 2003 (San Miguel and McGrath 2005).

*MANX SHEARWATER *Puffinus puffinus* (109, 12). Single Manx Shearwaters were seen from Asilomar, MTY, 17 Sep 2006 (BLS; 2007-268), approximately 9 n. miles west of Pt. Pinos, MTY, 30 Sep–8 Oct 2006 (DR; MB; 2006-159), southeast of Davenport Landing, SCZ, 7 Oct 2006 (MB; 2006-193), from Pt. Pinos, MTY, 5 Oct 2006 (BLS; 2007-269), off Rincon Pt., SBA/VEN, 2 Mar 2007 (WF; MaS; 2007-142), from Pt. Dume, LA, 3 Mar 2007 (KLG; 2007-068), from Pt. Pinos, MTY, 15 Apr 2007 (BLS; 2007-270), from Pt. Pinos, MTY, 3 Sep 2007 (BLS; 2007-271), in Monterey Bay, MTY, 10 Sep 2007 (BLS†; 2007-189), and from Pt. Pinos, MTY, 28 Dec 2007 (RFo; 2008-001). Two were in the Santa Barbara Channel, VEN/SBA, 23 Sep 2007 (OJ†; DVP†; 2007-206). The committee reviews records of this species through 2007.

TOWNSEND'S (NEWELL'S) SHEARWATER *Puffinus auricularis newelli* (1, 1). One at Del Mar, SD, 1 Aug 2007 (DAH†, GMcC, MFP†, MS†, PU; SDNHM #52126; 2007-156; Unitt et al. 2009; photos also in *N. Am. Birds* 62:150 and *Birding* 40:34) represents a first record for mainland North America. The bird had come ashore at night and was dive-bombing men wearing headlamps who were working on stabilizing coastal bluffs. One of the workers brought the bird to wildlife rehabilitators, who identified it initially as a Manx Shearwater. When the bird was brought to the SDNHM, however, Unitt noted that the undertail coverts were white basally but black distally and identified the bird as a Newell's Shearwater (Unitt et al. 2009). The identification of Townsend's (*P. a. auricularis*), Newell's, and Manx Shearwaters was addressed by Howell et al. (1994). The bird eventually died at Project Wildlife and is now a specimen at SDNHM. Newell's breeds in the Hawaiian Islands, Townsend's on the Revillagigedo Islands off west Mexico (AOU 1998).

TRISTRAM'S STORM-PETREL *Oceanodroma tristrami* (1, 1). One photographed on Southeast Farallon I., SF, 22 Apr 2006 (PW†; 2007-162; Figure 1; photos also in *Birding* 40:35) represents a species new to North America. It was captured during nocturnal banding of storm-petrels. The biologists handling it initially



Figure 1. This Tristram's Storm-Petrel (*Oceanodroma tristrami*) captured on Southeast Farallon Island on 22 Apr 2006 was initially identified as a Black Storm-Petrel (*O. melania*). Subsequent review of the photos by Steve N. G. Howell, Peter Pyle, and Richard Stallcup indicated that the bird was definitely not a Black Storm-Petrel and likely a Tristram's Storm Petrel. Extensive comments on the record, including measurements of specimens, were submitted by Howell and Pyle. In particular, the bird's large size, with a wing chord (191 mm) substantially longer than that of any similar species, confirmed the identification.

Photo by Russ Bradley

thought the bird was likely a Black Storm-Petrel (*O. melania*), but Warzybok et al. (2008) later identified it as a Tristram's Storm-Petrel. The comments and detailed analysis by Warzybok et al. (2008) and other experts consulted, especially Pyle, were added to the record. This species breeds on the northwestern Hawaiian Islands and the Japanese islands of Torishima (Izu Is.) and Kita-iôtô or Kita Iwo (Volcano Is.) and ranges at sea from the Hawaiian Islands to Japanese waters (AOU 1998). There are no other records of this species in the eastern Pacific (P. Pyle pers. comm.).

RED-TAILED TROPICBIRD *Phaethon rubricauda* (28, 1). One was 158 n. miles southwest of San Nicolas Island, VEN, 28 Sep 2005 (TSt; 2005-183). It was one of 42 Red-tailed Tropicbirds observed on a Southwest Fishery Science Center research cruise in the northeastern Pacific in 2005. Seven of the 42 were in California waters (P. Pyle pers. comm.), and the CBRC has accepted four of these (Ilf et al. 2007).

MASKED BOOBY *Sula dactylatra* (14, 1). A subadult came aboard the sport-fishing boat *MV Victory* between Santa Catalina I. and Long Beach, LA, 29 Sep

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2007 (AK†, SK, DWet; 2007-215). It was taken to the International Bird Rescue and Research Center in San Pedro, rehabilitated, then banded and released on the west side of Santa Catalina I. 9 Oct 2007 (*fide* KLG).

BLUE-FOOTED BOOBY *Sula nebouxii* (91, 2). Following the “mini invasion” of this species to the Salton Sea in 2006, only two Blue-footed Boobies were reported in 2007, both from coastal locations where the species is much rarer. One was at Pt. Vicente, LA, 9 Jun 2007 (KGL; 2007-135), the other near Coronado, SD, 7 Sep 2007 (MS†; 2007-176).

*BROWN BOOBY *Sula leucogaster* (122, 25). Four on Southeast Farallon I., SF, included an adult male 25 Jan–22 May 2006, adult females 28 Apr 2006–24 Jan 2007 and 26 Sep 2006–24 Jan 2007, and an immature 20 Oct 2006–24 Jan 2007 (MB, JE†, RFo, RG†, RST, JTz, PW†; 2007-033). An immature was west of San Clemente I., LA, 11 Oct–2 Nov 2006 (MS†; 2006-181). Establishing a first record for Humboldt Co., a juvenile at the entrance to Humboldt Bay 29 Nov–9 Dec 2006 (KMS; BAc, COg; 2006-203) later moved to Trinidad, HUM. An adult female was 5 miles west of Dana Point, ORA, 20 Jan 2007 (JEP; JA†; 2007-087; photo in *N. Am. Birds* 61:326). A juvenile was at Fort Bragg, MEN, 23 Feb 2007 (LHu; 2007-081). A subadult female was at Natural Bridges State Beach, SCZ, 15–18 Mar 2007 (PB; JeP†, MMR†, LSe†; 2007-075). An adult male, an adult female, and a subadult were at Sutil I. off Santa Barbara I., SBA, 14 Mar 2007 (LH†; 2007-201). A subadult was at the Santa Cruz wharf, SCZ, 25 Mar–17 Apr 2007 (PLaT†, JeP†, LSe†; 2007-241; photo in *N. Am. Birds* 61:505). A female was 2 miles north of Pacific Grove, MTY, 11 Apr 2007 (RW†; 2007-242). One was at La Jolla Cove, SD, 28 May 2007 (EA; 2007-125). An immature was at Pt. Vicente, LA, 2 Jun 2007 (KGL; 2007-128). A subadult female that landed on a boat 20 miles off Trinidad, HUM, 4–5 Jun 2007, stayed on the boat overnight and then departed when the boat was 1 mile off the entrance to Humboldt Bay (anonymous observer†; *fide* EE; 2007-254). An immature was at La Jolla, SD, 4–24 Jun 2007 (EA; CH, GMcC, SES; 2007-129). An adult female and a subadult female were at Pt. La Jolla, SD, 27 Jul 2007 (PEL; 2007-154), and another was at the same location 12 Aug 2007 (GMcC; 2007-159). Another was 1–2 miles south of Pt. Loma, SD, 26 Aug 2007 (CGE; 2007-178). A subadult was at Alviso, SCL, 13 Sep–20 Nov 2007 (BS; KH†, MJM; 2007-194), and another subadult was at Pt. Piedras Blancas, SLO, 1 Dec 2007 (MSanM; 2007-307). Finally, a juvenile was 15 miles off Imperial Beach, SD, 4 Dec 2007 (TAB†; 2007-279). The committee reviews records of this species through 2007.

IDENTIFICATION NOT ESTABLISHED: An adult was reported from the Tijuana R. mouth, SD, 15 Oct 2006 (2006-161). The majority of the committee thought that the description was simply too brief and incomplete to document the identification.

NEOTROPIC CORMORANT *Phalacrocorax brasilianus* (16, 3). One was at Obsidian Butte at the south end of the Salton Sea, IMP, 19 Oct 2007 (CAM; GMcC; 2007-229), and up to two were at Fig Lagoon and Sunbeam L. near Seeley, IMP, 23 Nov 2007–16 Feb 2008 (GG†, DWA†, PBr†, JFe, SAG†, HBK, KZK†, CLi, LLi, GMcC, MMe†, MSc†; 2007-273; photo in *N. Am. Birds* 62:151 and 62:302).

LESSER FRIGATEBIRD *Fregata ariel* (1, 1). A superbly documented subadult female, representing a first record for California and the fourth for North America (Sullivan et al. 2007), was west of Arcata, HUM, 15 Jul 2007 (MJI†, STK, CJR, BLS†; 2007-153; Figure 2; photos also in *N. Am. Birds* 61:540–545). The Magnificent Frigatebird (*F. magnificens*) was formerly regular in California, and frigatebirds seen, especially during the summer, have been assumed to be this species, typically without much scrutiny. The Great Frigatebird (*F. minor*) has occurred in California once in March and once in October. This summer record of a Lesser indicates that all frigatebirds, regardless of season, should be studied very carefully. This species breeds fairly widely in the south Pacific and ranges north to the South China Sea and

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Figure 2. The first Lesser Frigatebird (*Fregata ariel*) for California and the fourth for North America was well documented at Arcata, Humboldt County, on 15 July 2007. Sullivan et al. (2007) summarized the features distinguishing the Lesser from other frigatebirds, many of which are visible in this photo (see text).

Photo by Brian L. Sullivan

western Pacific to Korea and Japan, casually to Kamchatka and the northwestern Hawaiian Islands. It also breeds sparingly in the south Atlantic and the western Indian Oceans (AOU 1998, Brazil 2009).

Sullivan et al. (2007) analyzed the bird's identification in detail. In summary, its molt pattern suggested the bird was in at least its third cycle, and the pattern of incoming plumage (lacking dark mottling on the white underparts; developing a completely dark head) identified it as a female. (1) The black partial collar across the lower throat was too extensive for a Great Frigatebird; (2) the prominence and whiteness of the collar on the hindneck indicated the Lesser rather than the Great; (3) the cinnamon on the lower throat suggested a species other than the Magnificent; (4) the black of the lower belly extended up through the central portion of the belly and lower breast in an inverted V shape, as typical of the female Lesser and Magnificent but not the Great, which shows a more evenly U-shaped belly patch; (5) white extended from the breast onto the axillaries as a solid patch rather than as pale scalloping as in the Magnificent and Great; and (6) the well-developed pink orbital ring indicated the Lesser Frigatebird. Other characters, including the pink bill and feet, were also consistent with the Lesser. Many of these features can be seen in Figure 2. Sullivan et al. (2007) also briefly discussed the elimination of the other two species of frigatebirds, which are much less likely to occur in California, the Christmas Frigatebird (*F. andrewsi*) and the Ascension Frigatebird (*F. aquila*).

TRICOLORED HERON *Egretta tricolor* (55**, 5). Single birds were at Fig Lagoon, IMP, 10 Feb–4 Mar 2007 (GMcC; DVB, HD†, MTH; 2007-051), the southeast corner of the Salton Sea, IMP, 3 May–5 Sep 2007 (HBK, EM; RFr†, GMcC; 2007-114), the San Diego R. mouth, SD, 15 Nov 2007–29 Apr 2008 (MJB†; PEL, GMcC, JPe†, DSe†; 2007-261), and the Tijuana R. estuary, SD, 25 Nov 2007–18 Apr 2008 (SMa; PEL; CAM, GMcC, BiM; 2007-275). One was photographed near Woodlake, TUL, in Jun 2000, but the specific date is unknown (GL†; 2007-288).

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Figure 3. This stunning photo of a second-year Mississippi Kite (*Ictinia mississippiensis*) was taken 8 July 2007 in the Tijuana R. valley, San Diego County. The majority of California's records of this species are of one-year-old birds such as this one during late spring.

Photo by Matt Sadowski

YELLOW-CROWNED NIGHT-HERON *Nyctanassa violacea* (38, 6). An adult was paired with a Black-crowned Night-Heron (*Nycticorax nycticorax*) at North I. Naval Air Station, SD, 19 Apr–30 Jun 2007 (JR†, MPR†; 2007-118; see Platter-Rieger et al. 2008). The same pair that established the first nesting record for California in 2006 raised three young at Imperial Beach, SD, 30 Jun 2007–15 Mar 2008 (GMcC, VM†, PZ†; 2007-151). Single birds were at Pt. Mugu Naval Air Station, VEN, 17–23 May 2007 (DP, MR†; 2007-131) and Famosa Slough, SD, 7 Aug 2007 (SHu†; 2007-166).

GLOSSY IBIS *Plegadis falcinellus* (14, 2). Single adults were at the north end of the Prado Basin, SBE, 3–8 Apr 2007 (JEP†; 2007-095) and the Yolo Bypass W. A., YOL, 25–29 Aug 2007 (ToE†; 2007-163).

IDENTIFICATION NOT ESTABLISHED: One was reported from Barstow, SBE, 17 Aug 2003 (2007-150), but the majority of the committee thought the description and sketch were not detailed enough to determine the age of the bird and that it might have been a juvenile White-faced Ibis (*P. chihi*). Two photos were submitted from Calipatria, IMP, 7 Sep 2006 (2006-190). Two-thirds of the committee believed that the photos were too out of focus to allow a conclusive determination, although what could be discerned suggested the Glossy Ibis.

ROSEATE SPOONBILL *Platalea ajaja* (136**, 7). Three juveniles were at the Morton Bay/Hazard Unit at the south end of the Salton Sea, IMP, 26 Jul–1 Sep 2007 (GMcC; MG†; 2007-172), and two others were at the south end of the Salton Sea and Finney L., IMP, 10 Nov 2007–10 Apr 2008 (WF†; GG†, HBK, CLi, GMcC, CAM; 2007-257). Single juveniles were near Seeley, IMP, 13–25 Nov 2007 (TC†;

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Figure 4. Set of Yellow Rail (*Coturnicops noveboracensis*) eggs collected at Bridgeport, Mono County, on 30 May 1954.

Photo by David Compton

HBK, CLi, GMcC; 2007-256; photo in *N. Am. Birds* 62:151) and along the Santa Ana R. from Orange/Anaheim, ORA, to Norco, RIV, 5 Dec 2007–2 Jan 2008 (ABL; MBa, DFu†, HBK, CAM, CMcG†, SJM†, MMT†; 2007-280).

SWALLOW-TAILED KITE *Elanoides forficatus* (1, 1). The first Swallow-tailed Kite accepted from California was photographed 2 miles west of Graton, SON, 4 Oct 2007 (CJJ†; 2007-217). This species breeds in the southeastern United States, and although it strays north regularly in eastern North America north to southern Canada, there are many fewer records from western North America, where it is considered accidental in Colorado (Andrews and Righter 1992) and casual in New Mexico (A.O.U. 1993). Closer to California, there is only a single sight record from Arizona (2–3 August 1980; Rosenberg and Witzeman 1998).

MISSISSIPPI KITE *Ictinia mississippiensis* (41, 3). Single second-year birds were at the South Coast Botanic Garden, Palos Verdes Peninsula, LA, 26 May–4 Jun 2007 (SW†; KLG, KGL, MSanM, LS†; 2007-124; photo in *N. Am. Birds* 61:510), near San Marcos Pass, SBA, 27 May 2007 (WC†; 2007-143) and the Tijuana R. valley, SD, 8 Jul 2007 (PU; EK†, AM†, MS†; 2007-148; Figure 3; photo also in *N. Am. Birds* 61:641).

COMMON BLACK-HAWK *Buteogallus anthracinus* (5, 1). An adult near Santa Rosa, SON, 20–29 Mar 2007 (SM; 2007-080) was assumed to be the same adult that had been at the same location 14 May–22 Oct 2005 (Iliff et al. 2007) and 30 Apr–9 Oct 2006 (Heindel and Garrett 2008). An adult was at Morongo Valley, SBE, 14 Sep 2007 (JPS†; 2007-199).

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HARRIS'S HAWK *Parabuteo unicinctus*. IDENTIFICATION NOT ESTABLISHED: The description of one from Rancho San Diego, SD, 18 Jan 2008 (2008-019) was too brief to establish the identification. NATURAL OCCURRENCE QUESTIONABLE: A record of one near Blythe, RIV, 11 Nov–17 Dec 2005 (2005-161) went three rounds with seven committee members questioning the origin of the bird in the final circulation. No details were submitted with a poor-quality photo, so there was no way to determine whether the bird showed signs of captivity. Because this species is widely kept in captivity and there have been escapes and intentional releases in the lower Colorado R. valley (Walton et al. 1988), the majority of the committee thought that the lack of information about the condition of this bird (degree of feather wear, bands, etc.) left the question of natural occurrence open.

CRESTED CARACARA *Caracara cheriway* (24, 3). Single Crested Caracaras were in Shasta Valley near Grenada, SIS, 21 Oct 1988–26 Mar 1989 (BB†, ADB, NEC, RE, SSh; 1989-045A), the Tijuana R. valley, SD, 9 Sep 2006–6 Jun 2007 (DWA†, MB, MJB†, TAB†, CAM, GMcC, TAM†, GLR, BJS; 2006-127; photo in *N. Am. Birds* 61:144), and the Ferndale Bottoms, HUM, 8 Dec 2006–28 Mar 2007 (RG, JTz; 2007-076; photo in *N. Am. Birds* 61:506).

IDENTIFICATION NOT ESTABLISHED: The report of one from the south end of the Salton Sea, IMP, 21 Feb 2007 (2007-060) lacked detail sufficient to establish the identification.

EURASIAN KESTREL *Falco tinnunculus* (1, 1). A juvenile female trapped, banded, and released at the Marin Headlands, MRN, 23 Oct 2007 [MA†; 2007-233; photo on back cover of *Western Birds* 39(3)] represented a first for California and the third and most southerly record on the Pacific coast of North America south of Alaska (Hull et al. 2008). This widespread Eurasian species has been recorded casually along the east coast of North America and from Alaska. Elsewhere in the West



Figure 5. This Wilson's Plover (*Charadrius wilsonia*) at Coronado, San Diego County, 13–21 Jun 2007 was only the twelfth recorded in California but the seventh in well-covered San Diego County.

Photo by Matt Sadowski



Figure 6. The first Wood Sandpiper (*Tringa glareola*) for California was superbly photographed at the Naval Air Weapons Station, China Lake, Kern County, 22–23 May 2007. This photo shows the uniformly barred tail and white rump that distinguish this species from the similar Solitary Sandpiper (*T. solitaria*), which has solidly dark central tail feathers and a dark rump, and by the underwing coverts, which are notably paler than those of the Solitary Sandpiper and (especially) Green Sandpiper (*T. ochropus*).

Photo by Bob Steele

it has been recorded previously from British Columbia, at Alkali L., 41 km south of Williams L. in the Chilcotin–Cariboo region, where one was collected on 10 Dec 1946 (Campbell 1985), and from Washington, at Bow, 23 km south of Bellingham, where one was present from 31 October until after 25 Dec 1999 was caught and photographed on 3 Nov (Wahl et al. 2005).

GYRFALCON *Falco rusticolus* (11, 1). A dark intermediate-morph juvenile was in an agricultural area 11 miles southwest of Corcoran, KIN, 21–23 Nov 2007 (SSu†, ERP†; 2007-278; photo in *N. Am. Birds* 62:144). This record is the southernmost for the Gyrfalcon in California and one of the southernmost for this species in North America.

*YELLOW RAIL *Coturnicops noveboracensis* (84, 6). Committee member Compton photographed a series of nests with eggs in the WFVZ collection. All were collected at Bridgeport, MNO, in the mid 20th century by Ralph Dixon: WFVZ #139804, 8-egg set, 2 Jun 1939 (2007-248); WFVZ #144451, 9-egg set, 28 Jun 1949 (2007-249); WFVZ #86354, 4-egg set, 28 Jun 1949 (2007-250); WFVZ #86355, 8-egg set, 10 Jun 1950 (2007-251); WFVZ #167458-9, 9-egg set, 30 May 1954 (2007-252; Figure 4); WFVZ #167459, 9-egg set, 30 May 1954 (2007-253). The committee treats one set of eggs as one individual. This is the minimum number of birds known present (there could have been no male present and the eggs infertile, but there is



Figure 7. Hudsonian Godwit (*Limosa haemastica*) at the Salinas Wastewater Treatment Plant, Monterey County, on 13 September 2007. This photo captures the dark underwing coverts that distinguish this species from the similar Black-tailed Godwit (*L. limosa*) of Eurasia, which occurs very rarely to casually in western Alaska (most regularly in the western Aleutian Islands) and could reach California. The Black-tailed Godwit shows mostly white underwing linings.

Photo by Jeff Poklen

no question that a female was present, even if never seen). The committee reviews records of this species through 2003.

AMERICAN GOLDEN-PLOVER *Pluvialis dominica* (34**, 11). Spring records comprise one at Red Hill, south end of the Salton Sea, IMP, 18 Apr 2007 (JPU†; 2007-120), one at the north end of Poe Road, Salton Sea, IMP, 3 May 2007 (GMcC; RFo; 2007-111), two near Red Hill, south end of the Salton Sea, IMP, 10–18 May 2007 (GMcC; HD†; 2007-115), and one near the Whitewater R. mouth at the north

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Figure 8. Representing the only accepted occurrence of the White-rumped Sandpiper (*Calidris fuscicollis*) in California involving more than one bird, these two were photographed together at the Naval Air Weapons Station, China Lake, Kern County, on 23 May 2007.

Photo by Bob Steele

end of the Salton Sea, RIV, 17 May 2007 (JFe; 2007-121). Fall records comprise one at Owens L. mitigation ponds, INY, 26 Aug 2007 (RSt†, SSt†; JLD†, CHo†, RHo, MSanM; 2007-169; photo in *N. Am. Birds* 62:151), one at the end of Young Road at the south end of the Salton Sea, IMP, 28 Sep 2007 (BM†; 2007-216), one at Hayward Shoreline, ALA, 3–7 Oct 2007 (PDr†; 2008-032), one at Salinas Wastewater Treatment Plant, MTY, 11 Oct 2007 (BLS†; BHi†, JeP†; 2007-222), one at Owens L., INY, 14–16 Oct 2007 (MP; SSt†; 2007-292), and one at the Eel R. estuary, HUM, 15–16 Oct 2005 (SMc†; RFo†; 2007-196). The 26 Aug record was of an adult, the first adult recorded in fall in California since the committee began reviewing records of this species in 2004 and explaining the early date (J. L. Dunn pers. comm.).

IDENTIFICATION NOT ESTABLISHED: Six records involving seven birds were not accepted because the committee concluded that the Pacific Golden-Plover (*P. fulva*) was not eliminated: one at the wastewater-treatment facility at Naval Air Weapons Station, China L., KER, 20–21 May 2006 (2006-070), two there on 28 Apr 2007 (2007-123), one on the Oxnard Plain, VEN, 21–30 Oct 2006 (2006-172), one at the San Simeon Cr. mouth, SLO, 31 Oct–13 Nov 2006 (2006-198), one at the Salinas R. mouth, MTY, 21 Oct 2007 (2008-034), and one at the Santa Ynez R. estuary, SBA, 27 Oct 2007 (2007-306).

WILSON'S PLOVER *Charadrius wilsonia* (12, 1). One was at Delta Beach on the Silver Strand in Coronado, SD, 13–21 Jun 2007 (MS†; MJB†; JFe, GMcC, GLR; 2007-132; Figure 5).

*AMERICAN OYSTERCATCHER *Haematopus palliatus* (37, 2). Single birds were at Royal Palms Beach, San Pedro, LA, 28 Sep (TGM†; 2006-139) and Anacapa I., VEN, 10 Mar 2007 (RH†; 2007-073). One at La Jolla, SD, 2–17 Dec 2007 (BDo†; 2007-291) was considered a returning bird (2006-117; see Heindel and Garrett 2008).

IDENTIFICATION NOT ESTABLISHED: The description of an oystercatcher at Royal Palms Beach and Cabrillo Beach in San Pedro, LA, 4–16 May 2006 (2006-073) certainly indicated that the bird had American Oystercatcher genes. However, four or five committee members over three circulations of the record thought that the description was not detailed enough to rule out an intergrade with a Black Oystercatcher (*H. bachmani*). Although apparent American Oystercatchers recorded in southern

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California show some signs of introgression, the possible extent of introgression was difficult to determine from the description of this bird. The committee removed the American Oystercatcher from the review list at its 2009 annual meeting. Reasons for the removal involved the high degree of hybridization between the American and Black oystercatchers in the northern portion of the range of *H. p. frazari* and the somewhat arbitrary decision of when a bird qualifies as an American Oystercatcher. In addition, it is difficult to assess the degree to which repeated observations from particular locations represent the same individuals or different birds. The committee concluded that continued review would not contribute significantly to further knowledge of *H. p. frazari* in California.

SPOTTED REDSHANK *Tringa erythropus*. IDENTIFICATION NOT ESTABLISHED: Aspects of descriptions of a bird along the Mad R., Arcata, HUM, 6–7 Nov 2007 (2007-247) suggested this species (clearly reddish legs, obvious supercilium, primarily pale gray on the upperparts and whitish underparts), but seven committee members thought that the reports omitted too much detail to support the identification of such a rarely occurring species. In particular, the observers did not note the distinctive shape (very long, narrow, and slightly drooping at the tip) and color (conspicuously red at the base of the mandible) of the bill.

WOOD SANDPIPER *Tringa glareola* (1, 1). An overdue addition to the California list, a Wood Sandpiper was found at the Naval Air Weapons Station, China L., KER, 22–23 May 2007 (SSt†; DVB, JLD, AH, VH, AEK, KHL, GMcC, MSanM, LS, RSt†; 2007-119; Figure 6; photo also in *N. Am. Birds* 61:356). This palearctic shorebird occurs in western Alaska in numbers in spring, almost annually in fall. Away from Alaska, it has been recorded in Hawaii, Oregon, Yukon Territory, British Columbia, Newfoundland, New York, Delaware, Bermuda, and Barbados.

UPLAND SANDPIPER *Bartramia longicauda* (28, 1). A juvenile was in the Tijuana R. valley, SD, 23 Sep 2007 (JFe, MSanM†; MS†, TRS†; 2007-203).

HUDSONIAN GODWIT *Limosa haemastica* (26, 3). A female was at the Naval Air Weapons Station, China L., KER, 7–8 Jun 2007 (SSt†; AH, VH, AEK, KHL†, MSanM; 2007-130). Juveniles were at the Salinas Wastewater Treatment Plant, MTY, 8–20 Sep 2007 (BLS†; BHi†, JeP†; 2007-192; Figure 7) and at Doran Beach State Park, Bodega Bay, SON, 23 Sep 2007 (JW; 2007-285).

BAR-TAILED GODWIT *Limosa lapponica* (33, 3). Three fall records, all of juveniles, are of one at the Mad R. estuary, HUM, 30 Aug–10 Sep 2007 (KB, SMc†, KR†2007-173), one at Año Nuevo Pt., SM, 3 Sep 2006 (PJM; 2007-019), and one at Famosa Slough, SD, 22 Sep–7 Oct 2007 (BT; MJB†, TAB†, JFe, KZK†, GMcC, AM†, CAM, MS†, TRS†; 2007-202; photo in *N. Am. Birds* 62:152).

LITTLE STINT *Calidris minuta* (9, 1). An adult was on Southeast Farallon I., SF, 24–27 Aug 2007 (MB; AKI†, JTz‡; 2007-303).

IDENTIFICATION NOT ESTABLISHED: The record of a juvenile filmed by camcorder near Crescent City, DN, 27 Sep 2005 (2005-177) went four circulations before being rejected 1–8 on the fourth and final round. The majority of the committee thought that the bird may have been a somewhat aberrant Least Sandpiper (*C. minutilla*). Several outside experts were consulted on this record; initially, they thought the bird was a Little Stint, but after viewing the video repeatedly concluded the bird was a Least Sandpiper.

LONG-TOED STINT *Calidris subminuta*. IDENTIFICATION NOT ESTABLISHED: One reported from the Caspar Cr. estuary, MEN, 23 Aug 2006 (2006-122) was described in detail by experienced observers, and several committee members assessed the description as good for this species. However, the Long-toed Stint is extremely rare in North America away from the Aleutians and Bering Sea, with only



Figure 9. Yellow-bellied Flycatcher (*Empidonax flaviventris*) at Point Loma, San Diego County, on 6 Oct 2007.

Photo by John Puschock

three accepted records for the west coast of the lower 48 states: one for California, of a juvenile substantiated by photographs (Patten and Daniels 1991) and two for Oregon, one of them of a juvenile substantiated by photographs (south jetty of the Columbia R., 2–6 Sept 1981). The third was a sight record of an adult at the same location 17 Jul 1983 (Marshall et al. 2003). The Least Sandpiper can be quite variable, and bright juvenile Least Sandpipers have been misidentified as Long-toed Stints. This difficulty combined with the Long-toed Stint's extreme rarity prompted a number



Figure 10. Comparison of a very bright Blue-headed Vireo (*Vireo solitarius*; right) and fairly typical Cassin's Vireo (*Vireo cassinii*; left) captured on Southeast Farallon I., San Francisco County, on 9 September 2007, a date very early for the Blue-headed Vireo in California.

Photo by Kenneth Burton



Figure 11. This Red-faced Warbler (*Cardellina rubrifrons*), probably a second-year male, was photographed on 14 July 2007 in Green Canyon in the San Bernardino Mountains in San Bernardino County, where it remained for more than three weeks.

Photo by John C. Sterling

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of committee members to conclude that more solid documentation was necessary to establish the identification of this species in California.

WHITE-RUMPED SANDPIPER *Calidris fuscicollis* (23, 3). One spring record, of two at the Naval Air Weapons Station, China L., KER, 23 May 2007 (GMcC; JLD, KHL, MSanM, RSt; 2007-122; Figure 8; photo also in *N. Am. Birds* 61:510). One fall record, of an adult at the Salinas Wastewater Treatment Plant, MTY, 1–9 Sep 2007 (BLS†; BHi†, JeP†, DR†; 2007-174; photo in *N. Am. Birds* 62:145). All White-rumped Sandpipers identified in California in fall have been adults.

CURLEW SANDPIPER *Calidris ferruginea* (38, 2). An adult was at the Vic Fazio W. A. near Davis, YOL, 29–31 Jul 2007 (ToE†; KK; 2007-155), and a juvenile was near Fort Dick, DN, 13 Sep 2007 (LB†; 2007-200).

BLACK-HEADED GULL *Chroicocephalus ridibundus* (25, 2). A first-winter bird near the Whitewater R. mouth at the north end of the Salton Sea, RIV, 15 Jan–9 Feb 2007 was a county first and the first for California's interior away from the Central Valley (DGo, CMcG; PAG, CAM, GMcC, TMcG†, JM†, MSanM; 2007-016; photo in *N. Am. Birds* 61:328). Another first-winter bird was in Goleta, SBA 20 Apr 2007 (WF†; DMC, OJ†, NL; 2007-106; photo in *N. Am. Birds* 61:511).

LITTLE GULL *Hydrocoloeus minutus* (99, 4). Of the four recorded during 2007 three were first-winter birds, at the west end of Young Road at the south end of the Salton Sea, IMP, 9–19 Jan 2007 (GMcC; AHa†, KZK†, CAM; 2007-012; photo in *N. Am. Birds* 61:327), near the Whitewater R. mouth at the north end of the Salton Sea, RIV, 20 Jan–9 Feb 2007 (GMcC; NMo†; 2007-026), and at Salton City, IMP, 5 Feb 2007 (MJB, WTH†; 2007-050). Differences in the amount of black in the outer primaries and duskiness on the crown suggested that these were different individuals. An adult was along Ballona Cr. near Marina Del Rey, LA, 3 Mar 2007 (KGL; 2007-074).

ICELAND GULL *Larus glaucooides* (6, 2). A first-winter bird at South Humboldt Bay, HUM, 1 Jan 2007 (ToE†; SC†, JEH, JTz; 2007-063) was accepted unanimously after two rounds. It was at the pale end of the species' spectrum of variation and at a northerly location where bleaching is unlikely so early in the winter. An adult at Morgan Hill, SCL, 10 Feb 2007 (SCR†; 2007-165) was not conclusively identified until months after the sighting when photos were developed that showed on the upper surface of the outer primaries a pattern beyond the range of the palest Thayer's Gull (*L. thayeri*) and well within the range of a typical *L. g. kumlieni* (Zimmer 1991, Howell et al. 2003). This record is only the second of an adult Iceland Gull accepted for California and the first of any age class of a bird showing characters consistent solely with *kumlieni*. The difficulties involved in identifying out-of-range Iceland Gulls have been recently reviewed by Iliff et al. (2007) and Heindel et al. (2008). Despite the acceptance of four records since 2005, reports of the Iceland Gull continue to bedevil committee members, who, in general, take a conservative approach to this species, a situation likely to continue until identification criteria are better understood and taxonomic issues become clearer.

IDENTIFICATION NOT ESTABLISHED: Seven records, all but one involving first-winter birds, failed to gain acceptance because of identification issues. A recurring pattern among these records is that the birds' plumage matches known criteria for the Iceland Gull but their structure does not; for example, the bill is large, the head blocky, or the wings short. One at the Nimbus Fish Hatchery along the American R., SAC, on 22 Nov 2004 (2004-206) went three rounds until concerns over structure and a secondary bar noticeable in some photos but not in the field convinced all members to reject. A majority of members thought a well-documented bird from Half Moon Bay, SM, 23 Jan 2006 (2006-082) was too bulky and large billed and thus probably a hybrid. Additional records documented with photographs showing birds

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that appeared too large for the Iceland Gull included one near Orick, HUM, 5 Jan 2007 (2007-029) and one near Natural Bridges State Beach, SCZ, 16 Feb 2007 (2007-009). Many members commented on the excellent written documentation in two records, from Morgan Hill, SCL, 10 Feb 2007 (2007-164) and Napa, NAP, 21–26 Nov 2007 (2007-289). Most thought the identifications were likely correct but, given the difficulty inherent to the Iceland Gull, were unwilling to accept without photo documentation. A second-winter bird near Westmorland, IMP, 24 Feb 2007 (2007-090) received minimal support because the photographs lacked detail sufficient for members to assess the bird's plumage, structure, and age.

LESSER BLACK-BACKED GULL *Larus fuscus* (47, 16). An astonishing and unprecedented 17 accepted records included 13 from the Salton Sea, where the influx comprised five adults, three third-winter, one second-winter, and four first-winter birds. Up to three adults were at Red Hill, IMP, 8 Oct 2006–23 Feb 2007 (PEL, GMcC; MJB†, MB, OJ†, KHL†, CAM, DVP†, MMR†, RST; 2006-143), one of them inferred to be a returning individual present the previous winter 22 Feb–4 Mar 2006 (2006-023). Single adults at the Whitewater R. mouth at the north end of the Salton Sea, RIV, 6–17 Feb 2007 (JFe; OJ; 2007-082) and at the Alamo R. mouth, IMP, 18 Dec 2007 (OJ†; 2008-014) were judged by a majority of the committee to be birds different from those frequenting the Red Hill area. Additional records from the south end of the Salton Sea were of a second-winter bird at Obsidian Butte, IMP, 16 Jan 2007 (GMcC; 2007-017), third-winter birds at Obsidian Butte, IMP, 10–24 Feb 2007 (MTH, GMcC; OJ†, KHL†, DVP†; 2007-052), Red Hill, IMP, 10 Feb 2007 (GMcC; MTH, KHL†; 2007-053), and Obsidian Butte, IMP, 15 Nov 2007–10 Apr 2008 (GMcC; SG†, OJ† DSS†, BLS†; 2007-260), and first-winter birds near Johnson's Landing at Salton City, IMP, 22 Feb 2007 (ToE†; 2007-084), at the Alamo R. mouth, IMP, 23 Feb 2007 (GMcC; 2007-062), at the north end of Poe Road, IMP, 8–25 Apr 2007 (GMcC; EE†, RFo†; 2007-099), and at the Alamo R. mouth, IMP, 28 Dec 2007 (GMcC; 2007-305). Four additional records away from the Salton Sea were of third-winter birds at Kaweah and Bravo L., TUL, 3–24 Feb 2007 (JLo†; 2007-070) and Doheny State Beach, ORA, 11 Feb 2007 (M&NF†; 2007-091), a second-summer bird at Bolsa Chica, ORA, 10 Jun–18 Aug 2007 (BED†; MSanM; 2007-167) that represents the first summer record for California, and a second-winter bird at Owens L., INY, 18–20 Nov 2007 (SS†; JLD†, TH, J&DP†, RSt†; 2007-294).

IDENTIFICATION NOT ESTABLISHED: Photographs and written details of an adult at Salton City, IMP, 23 Oct 2007 (2007-235) were contradictory and failed to support the identification to most committee members' satisfaction.

SLATY-BACKED GULL *Larus schistisagus* (29, 13). Thirteen records during the winter of 2006–2007 brought the total number of accepted records to a staggering 29, all but two since 2005. A third-winter bird near Fort Dick, DN, 26 Feb–3 Mar 2007 (AB†, KB†, KR†; 2007-065) was joined by an adult 3 Mar 2007 (RF†; 2007-104). A third-winter bird was at the mouth of Humboldt Bay, HUM, 31 Dec 2006–2 Jan 2007 (ToE; JEH; 2007-055), and an adult was at Redwood Cr. mouth near Orick, HUM, 2 Jan 2007 (ToE†; JEH; 2007-056). A massive gull flock attracted to a herring run at the west end of the Richmond–San Rafael Bridge, MRN, on 19 Feb 2007 included an adult (ToE†; DSS†; 2007-057) and a second-winter Slaty-backed (ToE†; DSS†; 2007-058). Up to five at Venice Beach in Half Moon Bay, SM, included adults 5 Jan–21 Feb 2007 (AJ†; SBT; 2007-008) and 6–22 Mar 2007 (RSTh; JBa†, DHe†, AJ†, PEL; 2007-069) and second-winter birds 13–30 Jan 2007 (AJ†; RSTh; 2007-014), 6–17 Mar 2007 (RSTh; JBa†, DSS†; 2007-102), and 9–17 Mar 2007 (DSS†; 2007-103). A second-winter bird at Pt. Pinos, MTY, 5 Feb 2007 (BLS†; 2007-072; photo in *N. Am. Birds* 61:324) was followed by an adult at the Salinas R. mouth, MTY, 13 Feb 2007 (DVP†; 2007-071).

IDENTIFICATION NOT ESTABLISHED: Two earlier records were re-reviewed in



Figure 12. The anomalous plumage and bill led most members to question the natural occurrence of this Yellow Grosbeak (*Pheucticus chrysopheplus*) photographed 1 August 2006 at Keough Hot Springs, Inyo County. The black wings and large white patches at the base of the primaries are diagnostic for a male in its second year or older, yet the blackish or dusky on the crown appears to be retained juvenal feathers, a retention, to our knowledge, not matched by wild birds or specimens. The worn flank feathers, generally disheveled appearance, and lack of patterns of wear due to exposure to the elements on the tertials, inner greater coverts, outer primaries, and central rectrices suggest the bird could have been an escapee from captivity.

Photo by Bob Steele

light of the changing status of this species in California, but neither gained acceptance. Only four committee members favored acceptance of an adult at Folsom L., PLA, 5–6 Jan 1998 (2002-195A), though everyone agreed that this bird likely had substantial Slaty-backed Gull genes. Of primary concern was the mantle paler than expected. Mantle tone, color of head and neck streaking, bill shape, and body structure were also mentioned by various members as being inconsistent with typical *L. schistisagus*. Mantle-shade variation in the species has been widely discussed (Gustafson and Peterjohn 1994, King and Carey 1999, Olsen and Larsson 2003, Howell and Dunn 2007). Whether this variation may be intraspecific or results strictly from hybridization remains uncertain. Hybridization of gulls is well known in the North Pacific rim (Bell 1996, King and Carey 1999). The Slaty-backed is known to hybridize with the Vega (*L. argentatus vegae*), Glaucous-winged (*L. glaucescens*), and Glaucous (*L. hyperboreus*) Gulls. On the basis of current knowledge many individuals are better left unidentified. A gull in fourth basic plumage at Salton City, IMP, 21 Feb–7 Mar 1998 (1998-050A) received majority support during its first round of recirculation but none in its final round, when all members agreed the bird had too many anomalous features. Molt schedule, eye color, primary-tip pattern, leg color, and mantle shade were inconsistent



Figure 13. Although superficially similar to North America's resident *Carpodacus* finches, this Common Rosefinch (*C. erythrinus*) photographed in hand on Southeast Farallon I., San Francisco County, 23 September 2007, is readily identified the combination of short stubby bill with a strongly decurved maxilla, a blank-faced appearance created by a lack of any strong markings such as a supercilium, greenish or olive tones to much of the plumage, especially on the flight-feather edges, a lack of streaking on the undertail coverts (not visible here), and a notched tail.

Photo by Kristie Nelson

with our current understanding of what constitutes a Slaty-backed Gull. At least one member believed strongly this individual was one of the Lesser Black-backed Gulls breeding in northern Siberia (though not close to the Bering Sea), *L. fuscus heuglini* or *taimyrensis*. Four additional records were rejected because written documentation was insufficient or photographs were inconclusive or nonexistent: of second-winter gulls at San Rafael, MRN, 19 Feb 2007 (2007-059), Fort Dick, DN, 31 Mar–14 Apr 2007 (2007-089), and the Smith R. bottoms, DN, 7–13 Nov 2007 (2007-255) and an adult at Crystal Springs Reservoir, SM, 25 Nov 2007 (2007-283).

BRIDLED TERN *Onychoprion anaethetus* (2, 1). A well-documented adult at the Santa Margarita R. mouth, SD, 14–23 Aug 2007 (TAB†, PAG, ELK†, GMcC, MS†; 2007-161; photo in *N. Am. Birds* 62:191) was only California's second and the first to be photographed.

IDENTIFICATION NOT ESTABLISHED: The written description of a bird at south San Diego Bay, SD, 11 Aug 2007 (2008-037), while suggestive, lacked detail sufficient to persuade the committee that the identification was correct.

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SANDWICH TERN *Thalasseus sandvicensis* (4, 1). One at North I. Naval Air Station, SD, 4 Aug 2007 (DP; MS†; 2007-157) went two rounds before unanimous acceptance. Several members commented on the small amount of orangish coloration along the tomium, suggesting it might derive from hybridization or introgression, most likely with the Elegant Tern (*T. elegans*).

THICK-BILLED MURRE *Uria lomvia* (47, 1). One flying past Pt. Pinos, MTY, 11 Dec 2006 (BLS; 2007-272) was seen briefly but was well described and sketched.

IDENTIFICATION NOT ESTABLISHED: One ~3 miles north of Bodega Bay, SON, 9 Jun 2007 (2007-140) met with resistance, even though most members agreed the identification was probably correct, because the bird's bill shape and structure were not described and the outlier June date warranted more thorough documentation.

PARAKEET AUKLET *Aethia psittacula* (79, 8). Seven were found feeding along a break in a current ~38–40 n. miles WSW of San Nicolas I., VEN, 21 Apr 2007 (OJ; TAB†, DMC, MSanM, GT†; 2007-108; photo in *N. Am. Birds* 61:511). One found alive on Venice Beach, LA, 18 Jun 2007 perished in captivity the next day (KLG†; LACM #114551; 2007-127).

IDENTIFICATION NOT ESTABLISHED: One off the Big Sur R. mouth, MTY, 2 Jun 2007 (2007-149) was too distant for the bill shape or color to be seen in the field, though the described plumage pattern of gray above and white below suggested this species. Most members thought the bird was too distant to be identified conclusively.

*RUDDY GROUND-DOVE *Columbina talpacoti* (109, 1). An old record by a very experienced observer of one at Pt. Loma, SD, 14 Oct 1990 (REW; 2007-181) was accepted unanimously. The committee reviews Ruddy Ground-Dove records through 2003.

SNOWY OWL *Bubo scandiacus* (60, 1). A second-year male was at the south spit of Humboldt Bay, HUM, 26 Mar–1 Apr 2007 (SC†, GSL†, RLV†, SMc†, KR†; 2007-088; photo in *N. Am. Birds* 61:507). It established the latest date for this species in California.

GREEN VIOLETEAR *Colibri thalassinus* (2, 1). One in Berkeley, ALA, 18 Aug 1977 (DHo, FCH; 1977-159A) was re-reviewed and accepted after two rounds following acceptance of California's first record from Mt. Pinos, KER, from the same summer (Ilf et al. 2007). Though the record was originally submitted as of a Magnificent Hummingbird (*Eugenes fulgens*), an analysis by J. V. Remsen steered the committee in the right direction, and the record was circulated as one of the Green Violetear. This bird spent a day coming to a feeder in the Berkeley hills just one week after the last appearance of the bird at Mt. Pinos. Concerns over the identification were allayed by the detailed description written by an observer unfamiliar with the species. Archiving of records, arguably a bird records committee's most important function, is invaluable in allowing future committees to reconsider historic records as new information becomes available.

BROAD-BILLED HUMMINGBIRD *Cynanthus latirostris* (72, 1). An adult male attended feeders in Atascadero, SLO, 23 Nov–3 Dec 2007 (KJZ†; CAM†, BKS†; 2007-274; photo in *N. Am. Birds* 62:153).

IDENTIFICATION NOT ESTABLISHED: A female hummingbird photographed at a feeder in La Jolla, SD, 31 Aug–5 Sep 2007 (2007-175) was an aberrant Anna's Hummingbird with a largely pinkish bill.

RUBY-THROATED HUMMINGBIRD *Archilochus colubris* (10, 1). An immature male was videotaped attending a feeder in Bolinas, MRN, 27–28 Aug 2007 (KH‡; 2008-029).

GREATER PEWEE *Contopus pertinax* (39, 0). One at Griffith Park, LA, 6–15 Apr

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2007 (DSC; MB, RFo†, KLG†, PMcN, OJ†; 2007-096) was considered a returning wintering bird not found until April (see Heindel et al. 2008; 2006-053).

YELLOW-BELLIED FLYCATCHER *Empidonax flaviventris* (22, 2). One at Zyzzx, SBE, 10 Sep 2007 (MJSanM†; 2007-191; photo in *N. Am. Birds* 62:153) and one at Pt. Loma, SD, 6 Oct 2007 (MTH†, GMcC; PAG, CH, JPu†, MS†, TRS†; 2007-218; Figure 9) were well documented with photographs.

IDENTIFICATION NOT ESTABLISHED: The committee unanimously considered one reported from Apollo Park near Lancaster, LA, 19 Sep 2007 (2008-068) a Western Flycatcher (*E. difficilis/occidentalis*), and ultimately the observer concurred. One reported from the San Gabriel Mts., LA, 27 Sep 2007 (2008-069) received three votes to accept but was also considered a Western Flycatcher by most members. Photographs were suggestive of the Yellow-bellied but were open to interpretation, written details were incomplete, and no vocalizations were heard.

ALDER FLYCATCHER *Empidonax alnorum* (6, 1). One collected near Westmorland, IMP, 28 Sep 1991(RH#, SDNHM specimen 47934; PU; 2007-112) was originally identified as a Willow Flycatcher (*Empidonax traillii*), but analysis by Philip Unitt, presented at WFO's annual meeting in 1998, established its identity. This record was not submitted to the committee until 2007 and was accepted after two rounds once the committee had an opportunity to review measurements. It was published by Patten et al. (2003).

GREAT CRESTED FLYCATCHER *Myiarchus crinitus* (49, 1). One at the Carmel R. mouth, MTY, 7–13 Oct 2007 stayed exceptionally long (DR†; JLD, BH, OJ†, CL, LML‡, RJ, MMR, AS, GW†; 2007-220). All California records of this species are for fall, most from mid September to early October.

SULPHUR-BELLIED FLYCATCHER *Myiodynastes luteiventris* (17, 1). One at Arcata Marsh, HUM, 11 Oct 2007 (RFo†; DF, KR†; 2007-221; photo in *N. Am. Birds* 62:147) established the northernmost record for California. All records but one are from the fall.

THICK-BILLED KINGBIRD *Tyrannus crassirostris* (17, 0). One returned for its third consecutive winter at Banning Park, Wilmington, LA, 23 Nov 2007–10 Feb 2008 (KGL; DE†, LSz†; 2007-276).

FORK-TAILED FLYCATCHER *Tyrannus savana*. IDENTIFICATION NOT ESTABLISHED: Documentation for one reported from Berkeley, ALA, 14 Apr 2007 (2007-110) lacked detail sufficient to convince committee members the identification was correct.

WHITE-EYED VIREO *Vireo griseus* (53, 1). One videotaped at the Palomarin Field Station in Bolinas, MRN, 13–15 Sep 2007 provided an unusual fall record (RCo, JGu‡; 2007-193). About 75% of California's records are from spring (CBRC 2007).

*YELLOW-THROATED VIREO *Vireo flavifrons* (118, 8). Five spring records, most in June, were from Rancho Sierra Vista, VEN, 12 May 2007 (DL; 2007-117), Camp Pendleton, SD, 13 Jun–1 Jul 2007 (ELK†; PAG†, GMcC; 2007-136), Wilmington, LA, 16 Jun 2007 (KGL; 2007-141), Pt. Loma, SD, 17 Jun 2007 (JMgn†; 2007-137), and Mono L., MNO, 16 Jun 2007 (BP; 2007-138). Three fall records were of a singing bird near Beaumont, RIV, 19–21 Aug 2007 (HK, CAM, CMcG†; 2007-168), one in Oceano, SLO, 3–14 Sep 2007 (JMC; CAM, AFS†, BKS†, MaS; 2007-188), and one in Yorba Regional Park, ORA, 24 Sep 2007 (BL; 2007-301). During its 2008 meeting the committee voted to remove this species from the review list as California now averages more than four records per year. The committee continues to review records through 2007.

BLUE-HEADED VIREO *Vireo solitarius* (51, 6). One on Southeast Farallon I.,

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SF, 20–21 Sep 2005 (MB†; 2007-225) lacked strong contrast between the nape and back, and its head color matched that of some bright fall Cassin's Vireos, but the strong contrast between throat and cheek, extensively yellow sides, and conspicuous white edgings to the rectrices supported the identification. One on Southeast Farallon I., SF, 9–11 Sep 2007 (JTz; MB, KB†; 2007-304; Figure 10) was arguably at the bright extreme for this species and in date matched the earliest accepted fall records for California, all three of them for Southeast Farallon I. The committee accepted four records pre-dating the 1997 split of the Solitary Vireo complex (AOU 1997), one from DeHaven Cr., MEN, 6 Oct 1984 (JSt; 2005-020) and three from Pt. Loma, SD, 10 Oct 1984 (REW; 2007-184), 15 Sep 1991 (REW; 2007-182), and 29 Sep 1991 (REW; 2007-183).

YELLOW-GREEN VIREO *Vireo flavoviridis* (90, 2). One was at Pt. Loma, SD, 18 Sep 2007 (SES; 2007-209), another at Memorial Park, Chula Vista, SD, 2–3 Oct 2007 (MS†; EA, MJB†, GMcC, VM†; 2007-211).

DUSKY WARBLER *Phylloscopus fuscatus* (11, 1). One at Elings Park in Santa Barbara, SBA, 6 Oct 2007 (HR†; WF†, PAG, JG†, NL, DPe†; 2007-219; photo in *N. Am. Birds* 62:154) was the second recorded in the state this decade but the third overall for well-covered Santa Barbara County.

ARCTIC WARBLER *Phylloscopus borealis* (7, 3). A surprising three records nearly doubled California's previous total of the Arctic Warbler and raised the question of how many individuals may have moved down the west coast during the fall of 2007. Two were at Galileo Hill, KER, in early September: one 6–9 Sep 2007 (SS†; TAB†, JB, JFe, GH, KHL, CAM, GMcC, CMcG†, MSanM, MS†, GS, RSt†, MMT†, GW†, TEW; 2007-177; photo of one in *N. Am. Birds* 62:188), another 8–10 Sep 2007 (GH; DA†, JB, TEW; 2007-180). Yet another was at DeForest Park in Long Beach, LA, 13–14 Sep 2007 (KSG†; RB, BED; 2007-198). There are single records of the Arctic Warbler from Baja California and the Yukon but still none for British Columbia, Washington, or Oregon. See Iliff et al. (2007) and CBRC (2007) for recent discussions of the Arctic Warbler's identification and status.

WOOD THRUSH *Hylocichla mustelina* (23, 1). A belated submission accepted was of one at Fort Rosecrans National Cemetery on Point Loma, SD, 21 Oct 1990 (REW; 2007-185).

EASTERN YELLOW WAGTAIL *Motacilla tschutschensis* (17, 3). An impressive three accepted records were of one at Bodega Bay, SON, 6 Sep 2007 (MBr; 2007-230), one at Malibu Lagoon in Malibu, LA, 14–15 Sep 2007 (KP; AB†, JLD†, DFu†, OJ, CAM, CT†; 2007-195), and one at the Ventura County Game Preserve near Oxnard, VEN, 24–25 Sep 2007 (LS†; OJ, DVP†; 2007-213; photo in *N. Am. Birds* 62:154), a first for Ventura County. To date all California records have been of hatch-year birds, which cannot be reliably distinguished from the Western Yellow Wagtail (*M. flava*), although many have largely or entirely lacked yellow on the underparts, as is more typical of eastern birds. The committee provisionally treats all of California's accepted records of yellow wagtails as the Eastern; see Iliff et al. (2007) for a recent discussion of this species.

IDENTIFICATION NOT ESTABLISHED: One heard only at the Mott Cr. mouth, MEN, 15 Sep 2007 (2008-067) was reported by an experienced observer familiar with this species' call, but the committee was unanimously reluctant to accept a record of a bird not seen. Calls of the Citrine Wagtail (*M. citreola*) may be indistinguishable (Heindel 1999, Alström and Mild 2003). The Citrine has not been recorded in California, but it is a long-distance migrant and should be anticipated, as there is one North American record, from Mississippi in 1992 (DeBenedictis 1995).

*SPRAGUE'S PIPIT *Anthus spragueii* (101, 4). One was at Mystic L., RIV, 21

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Oct 2007 (CMcG†; CAM; 2007-232). Up to three in fields north of Calipatria, IMP, 10 Nov–18 Dec 2007 (BH, HBK; GMcC; 2007-258) were at a site where this species has been found regularly in winter. At its 2009 meeting, the committee voted to remove this species from the review list as California now averages more than four records per year and small numbers winter annually in the Imperial Valley. The committee will continue reviewing records through 2008.

BLUE-WINGED WARBLER *Vermivora pinus* (41, 1). A female, probably in its first fall, was well documented from Deep Springs College, INY, 8 Sep 2007 (C&RH†; 2007-190).

GOLDEN-WINGED WARBLER *Vermivora chrysoptera* (70, 1). A singing male near Washington Memorial Park in Pacific Grove, MTY, 22 Apr 2007 (WR; 2007-107) was over two weeks earlier than the previous early spring date of 8 May, though it fits the species' arrival on the north coast of the Gulf of Mexico, so it may have wintered somewhere on the California coast or in western Mexico.

YELLOW-THROATED WARBLER *Dendroica dominica* (120, 7). As expected, five of the seven Yellow-throated Warblers accepted in 2007 were found in spring or early summer, three of them in May, the month of roughly one in three California records. One was near Hayfield Pumping Station, RIV, 6 May 2007 (JPD†; 2007-113; photo in *N. Am. Birds* 61:512). One was at Hansen Dam, LA, 12–13 May 2007 (KLG; JFe, MSanM, SSo†; 2007-116). One 7 miles offshore, VEN, 19 May 2007 (WF; 2007-134) followed a fishing boat for 10 minutes. Late spring/early summer records were of one at Davis, YOL, 6–9 Jun 2007 (LD; RA†, SH; 2007-139) and one at L. Jennings, SD, 7–8 Jul 2007 (MBS†; DFu†, GMcC, TRS†; 2007-147; photo in *N. Am. Birds* 61:643). One at Prisoners Harbor on Santa Cruz I., SBA, 29 Sep 2007 was the only one recorded in fall (OJ†; 2007-214). The state's tenth midwinter Yellow-throated Warbler, in Orange, ORA, 5 Dec 2007–2 Apr 2008 was of the white-lored subspecies *D. d. albilora* (DW†; CAM; 2007-297; photo in *N. Am. Birds* 62:305). Approximately half of California's midwinter records are of the yellow-lored nominate subspecies *D. d. dominica*.

GRACE'S WARBLER *Dendroica graciae* (56, 4). One on Southeast Farallon I., SF, 14–15 Oct 2007 was the island's first, only the fourth for northern California, and California's northernmost Grace's Warbler to date (SMc†; MB†, MMy; 2007-226; photo in *N. Am. Birds* 62:148). Wintering birds included two at Pt. Loma, SD, with one in a residential area 23 Feb–3 Mar 2007 that was presumed to have spent the winter (MS; TAB†, GMcC; 2007-061) and an adult female that returned to Fort Rosecrans National Cemetery for its fifth consecutive winter 13 Oct 2007–26 Feb 2008 (MTH†, GMcC; DA†, MJB†; 2007-223; same bird as 2006-142, Heindel and Garrett 2008). Another wintered at Morro Bay State Park, SLO, 14 Dec 2007–15 Feb 2008 (CAM; TE, JLx, AFS†, BLS†; 2008-006). One in Rolling Hills on the Palos Verde Peninsula, LA, 26 Dec 2007 (KL; 2008-002) may have wintered locally.

PINE WARBLER *Dendroica pinus* (88, 8). With few exceptions, the Pine Warbler occurs in California in late fall and winter, so four singing males in April were exceptional, though these birds may have wintered on the west coast, perhaps locally, and simply went undetected. Supporting this notion was one returning in November and another in December to overwinter. The singing males were one in Estancia Park in Costa Mesa, ORA, 4–8 Apr 2007 (MB, OJ†; 2007-100), a second-year bird in Orange, ORA, 15–21 Apr 2007 (RH†; 2007-105), and two second-year birds in Chula Vista, SD, one in Memorial Park 5–16 Apr 2007 (MS†; MJB†, CGE, GMcC, GLR; 2007-092) and one in nearby Friendship Park 7–23 Apr 2007 (MS†; MJB†, GLR; 2007-098). The last returned to Friendship Park, Chula Vista, SD, 18 Nov 2007–1 Apr 2008 (MJB†; DWA†, GMcC, MS†; 2007-263; same bird as 2007-098), while the one at Estancia Park, Costa Mesa, ORA, returned 25 Dec 2007–7

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Apr 2008 (JEP†; CAM; 2008-007; same bird as 2007-100). A first-winter female was at Greenwood Cemetery, San Diego, SD, 7 Jan 2007 (PEL; DWA†, GMcC; 2007-010). The single fall record was also from San Diego Co., of a first-fall male at Fort Rosecrans National Cemetery, Pt. Loma, 3 Nov 2007 (SES; TAB†, PAG; 2007-240; photo in *N. Am. Birds* 62:155). Longer-staying birds were a first-winter male in Goleta, SBA, 9 Nov 2007–14 Jan 2008 (NL; DMC, RCM†, MSanM; 2007-246) and a first-winter female at Guajome Regional Park, SD, 22 Dec 2007–25 Feb 2008 (JD; RH†, GMcC, MS†; 2007-298).

IDENTIFICATION NOT ESTABLISHED: A report from Ocean Park, Lompoc, SBA, 12 Nov 2007 (2007-295) was supported by a brief description that some committee members considered did not eliminate the Blackpoll Warbler (*D. striata*) or Bay-breasted Warbler (*D. castanea*).

WORM-EATING WARBLER *Helminthos vermivorum* (104, 1). One was at Tamarisk Grove Campground in Anza–Borrego Desert State Park, SD, 18–19 Oct 2007 (RT; SB†, KZK†, TRS†; 2007-228; photo in *N. Am. Birds* 62:155).

CONNECTICUT WARBLER *Oporornis agilis* (109, 1). One in its first fall was near the lighthouse at Pt. Reyes National Seashore, MRN, 8–9 Sep 2007 (RWR; DWN†; 2007-187).

MOURNING WARBLER *Oporornis philadelphia* (137, 3). Two in their first fall were captured and banded at Southeast Farallon I., SF, 26 Sep 2005 (RDB †; 2008-011 and 2008-012). Another was captured and banded at the Big Sur R. mouth, MTY, 8 Sep 2007 (JS†; 2007-210).

RED-FACED WARBLER *Cardellina rubrifrons* (22, 2). One lingered in Green Canyon in the San Bernardino Mts., SBE, 27 Jun–20 Jul 2007 (JBr, BiD, WF, AEK, CAM, SM, DO†, DEQ, MSanM, PDS, JCS†, K&LSt; 2007-146; Figure 11). Observers' opinions on the sex and number of birds involved differed, though the documentation submitted supported one bird, probably a second-year male. One was at Burnt Rancheria Campground, Laguna Mts., SD, 16 Sep 2007 (JBr; 2007-197).

*SCARLET TANAGER *Piranga olivacea* (147, 10). The single spring record for 2007 was of a second-year male at Muir Woods, MRN, 3 Jun 2007 (RST†; MB; 2007-145; photo in *N. Am. Birds* 61:637). As expected, most records were for fall: a first-fall male in Seaside, MTY, 1 Oct 2007 (SR†; 2007-231), a first-fall male in Goleta, SBA, 28 Oct–4 Nov 2007 (JG†; DMC, NL; 2007-238), and a first-fall female in Santa Maria, SBA, 15–16 Dec 2007 (JMC†; 2007-290; photo in *N. Am. Birds* 62:306). Up to three first-fall males and two first-fall females at Fort Rosecrans National Cemetery on Pt. Loma, SD, 15–19 Nov 2007 were an unprecedented concentration (MTH†, TH, GMcC; DA†, MJB, TAB†, EK†, MS†, SES, TRS†; 2007-262). All previous California records have involved single birds; five at once was completely unexpected. Curtis A. Marantz discovered at the Royal Ontario Museum in Toronto a specimen collected near Shandon, SLO, 25 Nov 1950; it predates all but one of the California's previous records (CAM†; ROM #79820; 2007-287). At its 2008 meeting the committee voted to remove the Scarlet Tanager from the review list, as California now averages over four records per year. The committee will continue reviewing records through 2007.

EASTERN TOWHEE *Pipilo erythrophthalmus*. IDENTIFICATION NOT ESTABLISHED: One reported at the Eaton Canyon Nature Reserve in Pasadena, LA, 18 Nov 2007 (2007-266) was supported by a brief and intriguing description that was not detailed enough to persuade the committee to accept a first state record. This species has occurred well west of its normal winter range, with extralimital records extending from southern Alberta to northern and southern Arizona (CBRC 2007).

FIELD SPARROW *Spizella pusilla* (9, 1). The report of one coming to a feeder in

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a backyard in Berkeley, ALA, 14–15 Nov 2005 (HAG; 2005-189) went four rounds before finally gaining acceptance, despite a majority of committee members' approval throughout its circulation. The committee is cautious when considering single-observer records of rarer vagrants lacking thorough details or photographs.

LE CONTE'S SPARROW *Ammodramus leconteii*. IDENTIFICATION NOT ESTABLISHED: A bird in Santa Barbara, SBA, 15 Oct 2007 (2007-296) may have been this species, but the description did not support the identification adequately, no photographs were obtained, and the brevity of the sighting combined to convince members to withhold support.

*NELSON'S SHARP-TAILED SPARROW *Ammodramus nelsoni* (35**, 5). The committee reviewed and accepted an old record of five individuals at Morro Bay, SLO, 27 Dec 1952 after it obtained photographs of the specimens (CAM†; ROM #83928 and #83929; 2007-300). It reviews records of this species only through 1986.

SNOW BUNTING *Plectrophenax nivalis* (117, 6). Six records fit nicely within the established pattern of late-fall and early-winter occurrence (CBRC 2007). One at Big Bear Basin Lookout, DN, 13 Oct 2007 (SP†; 2007-236) established the earliest record for California by nine days. Another at Fort Bragg, MEN, 20 Oct 2007 (DFI†, SW; RHu, DT; 2007-237) eclipsed the previous early date by two days. Others included one at the Mad R. mouth, HUM, 15–21 Jan 2007 (DC†, JTz; 2007-077), one at Southeast Farallon I., SF, 30 Oct 2007 (JTz; 2008-013), one at King Salmon, HUM, 4–7 Nov 2007 (KB†, RF†, KR†; 2007-245), and one near Willows, GLE, 1–8 Dec 2007 (KB†, BD, SHu†, KP, JCS†; 2007-277).

YELLOW GROSBEAK *Pheucticus chrysopheplus*. IDENTIFICATION ACCEPTED BUT NATURAL OCCURRENCE QUESTIONABLE: One at Keough Hot Springs, INY, 31 Jul–2 Aug 2006 (2006-093; Figure 12; photos also in *N. Am. Birds* 60:598 and CBRC 2007:H28) was well documented by abundant photographs, a video recording featuring vocalizations, and excellent written details from multiple observers. Despite its occurring at a time of year plausible for a vagrant, a strong majority of the committee questioned the bird's provenance, two members voted to accept it as a naturally occurring vagrant, and one member voted to reject the identification because of difficulty distinguishing this species from its South American counterpart, the Golden-bellied Grosbeak (*P. chrysogaster*). Nevertheless, some members consider the Yellow Grosbeak overdue in California. This species is casual in southeast Arizona, where all but a few records are for June and July (Rosenberg et al. 2007).

COMMON GRACKLE *Quiscalus quiscula* (76, 3). Sacramento County's first, a male at Galt 17–18 Jan 2007 (ERP†; 2007-020), was followed three weeks later by its second, at Staten I. 11 Feb 2007 (BP; 2007-054). The 18-mile distance between sightings suggested one bird might have been involved, but this question wasn't resolved by the committee. A spring migrant was along the San Lorenzo R. in Santa Cruz, SCZ, 25 Apr 2007 (SG†; 2007-126).

IDENTIFICATION NOT ESTABLISHED: The report of one seen flying over Cabrillo National Monument on Pt. Loma, SD, 13 May 1997 (2007-186) by two very experienced observers received little support because the very brief documentation lacked sufficient information on the bird's appearance.

BLACK ROSY-FINCH *Leucosticte atrata*. IDENTIFICATION NOT ESTABLISHED: The description of a rosy-finch seen at close range without the aid of binoculars near Mirror L. on Mt. Whitney, INY, 21 Aug 2007 (2007-171), a date unprecedented for the Black Rosy-Finch in California, better fit a juvenile Gray-crowned Rosy-Finch (*L. tephrocotis*), which can look very dark and show little if any pink on the belly.

COMMON ROSEFINCH *Carpodacus erythrinus* (1, 1). Continuing the island's

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seemingly never-ending contribution of first state records was a hatch-year Common Rosefinch banded on Southeast Farallon I., SF, 23 Sep 2007 (MB, TRL†; RF†, KN†, JTz; 2007-207; Figure 13; photo also in *N. Am. Birds* 62:191). This constitutes the first North American record south of western Alaska, where the species is casual in spring and fall (Gibson and Byrd 2007), though spring records predominate (P. Lehman pers. comm.). Records from Alaska pertain to the northeastern subspecies *grebnitskii*, which breeds from central to northeastern Siberia (Cramp and Perrins 1994, Gibson and Byrd 2007). Like the Purple (*C. purpureus*) and Cassin's (*C. cassinii*) finches, first-year male Common Rosefinches remain in female-like plumage for a year and thus cannot be sexed by their plumage.

COMMON REDPOLL *Carduelis flammea* (78, 1). One coming to a feeder in Fort Bragg, MEN, 2–10 Mar 2007 was only the third recorded along California's coast (GEC, KAH, RJK, MMA†, DT; 2007-079; photo in *N. Am. Birds* 61:509).

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This report would not have been possible without the support of 280 observers who provided documentation of their observations. The CBRC thanks the following individuals for contributions on records contained in this report: Dan Gibson for his comments on the American Black Duck, Richard Chandler and Killian Mullarney for their comments on the Little Stint, and J. Van Remsen for his helpful analysis of the Green Violetear. Jon L. Dunn, Kimball L. Garrett, Matt T. Heindel, Marshall J. Iliff, Paul E. Lehman, Guy McCaskie, and Jim Tietz made many helpful comments on earlier drafts of the manuscript. Several museums and their staff also deserve our thanks, for housing important specimens and data, and helping us on several of these records: thanks to the LACM, MVZ, SDNHM, SBNHM, and WFVZ. We particularly thank WFVZ staff members Linnea Hall, René Corado, Peg Stevens, and Chrystal Klabunde for their support and housing of the CBRC archives. Finally, we thank David Krueper and Ted Floyd for their reviews of this report.

CORRIGENDA

The following corrections are for the CBRC's previous report (Heindel and Garrett 2008): *Rare Birds of California* (CBRC 2007) summarizes all of the committee's decisions from its inception through 2003, not 2004 (p. 121). The date span for the Trumpeter Swan in Long Valley and at Crowley L., MNO (p. 148) is 17 Jun–22 Oct 2006. The record number for the three juvenile Yellow-crowned Night-Herons (p. 128) in Imperial Beach, SD, is 2006-075. Within the list of Roseate Spoonbill records (p. 129) Colin Wilkinson should be credited with submitting written documentation for record 2006-123. The adult Crested Caracara in Mendocino Co. (p. 130) was near Caspar, not Casper. The date span for Iceland Gull record 2006-019 is 11–12 Feb 2006 (p. 146). Slaty-backed Gull record 2006-044 (p. 134) was published previously in the 31st report (pp. 177–178), so the 11 new records should be reduced to 10. Within the Slaty-backed Gull records (p. 134), David Vander Pluym should be credited with submitting documentation and photographs for records 2006-008 and 2006-026. The Long-billed Murrelet (p. 135) was in Humboldt Co., not Mendocino. The Snowy Owl at Grizzly Bay, SOL (p. 135), was a second-winter bird as is evident from p7 and p8 being of a generation newer than the other primaries—see Larry Sansone's photograph on the inside cover of *Western Birds* 38(1), 2007. The Common Black-Hawk (p. 145) was reported in Riverside Co., not San Bernardino. The date span for the Ruby-throated Hummingbird (pp. 136–137) is 16–25 Oct 2006. The record number for the Blue-headed Vireo at Mad R. County Park, HUM, is 2007-021 (p.38). The date for the Curve-billed Thrasher at Big R., SBE, is 1 Nov 2006 (p. 139). The date span for the Yellow-throated Warbler at Terwinkle Park, Costa Mesa, ORA, is

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12 Nov 2006–11 Mar 2007 (p. 141). The date span for Grace's Warbler 2006-142 is 3 Oct 2006–2 Apr 2007 (p. 141). The date span for the Connecticut Warbler in Arcata, HUM, is 15–16 Sep 2006 (p.142). Within the corrigenda (p. 148), James R. Tietz should be credited with finding the American Golden-Plover, and the last date should be changed to 4 Sep 2004. Under the Literature Cited (p. 150–151), the 31st report of the CBRC covers 2005 records, not 2006 records. We thank Thomas Benson, Steve N. G. Howell, Robert Keiffer, James R. Tietz, and David Vander Pluym for bringing these discrepancies to our attention.

The following corrections are noted for the 31st report (Iloff et al. 2007): The Parkinson's Petrel (p. 191) was reported 85 n. miles southwest of San Nicolas I., VEN. Long-billed Murrelet record 2004-102 (p. 178) was previously published in the 30th report (p. 75), so the total new records should be reduced to one. The date span for the Common Black-Hawk near Santa Rosa, SON (p. 172) is 14 May–22 Oct 2005. Cassin's Sparrow record 2005-061 is of the 48th (not 47th) individual accepted for the state (p. 188). The record number for the Common Grackle record from Vallejo, SOL, is 2004-163 (p. 189).

The following corrections are noted for the 30th report (Cole et al. 2006): The returning Common Black-Hawk lingered in Stockton, SJ, until 12 Mar 2005 (p. 71). The date span for the Bar-tailed Godwit is 5–14 Oct 2004 (p. 72). The record number for the Broad-billed Hummingbird in Sonoma, SON, is 2004-105 (p. 79). The date span for a returning female Grace's Warbler at Pt. Loma, SD, is 25 Sep 2004–2 Apr 2005 (p. 82). The date span for the Louisiana Waterthrush in Los Gatos, SCL, is 9–18 Aug 2004 (p. 83). Cassin's Sparrow record 2004-143 is of the 47th (not 46th) individual accepted for the state (p. 83). The date span for the Snow Bunting at Clifton Court Forebay, CC, is 27 Feb–18 Mar 2004 (p. 84).

MISCELLANEOUS

Sightings from 2007 published in *North American Birds* for which **no** documentation was submitted to the CBRC include three Emperor Geese at Cosumnes River Preserve, SAC, 15 Feb 2007 (*N. Am. Birds* 61:321), a Brown Booby at Jug Handle State Reserve, MEN, 13 Jan 2007 (*N. Am. Birds* 61:322), one or two Brown Boobies at Southeast Farallon I., SF, 3 Mar–9 Apr 2007 (*N. Am. Birds* 61:505-506) and 3 Jun–27 Jul 2007 (*N. Am. Birds* 61:636), one of the two Glossy Ibises at the Yolo Bypass W. A, YOL, 25–29 Aug 2007 and 10 Oct 2007 (*N. Am. Birds* 62:145) (the *Central Valley Bird Club Bulletin*, winter 2008, reported only one on 10 Oct), and a Crested Caracara at Ferndale, HUM, 30 Dec 2007 (*N. Am. Birds* 62:298). We welcome submission of documentation of these birds, but until the committee has reviewed and accepted them, we recommend the records not be considered valid.

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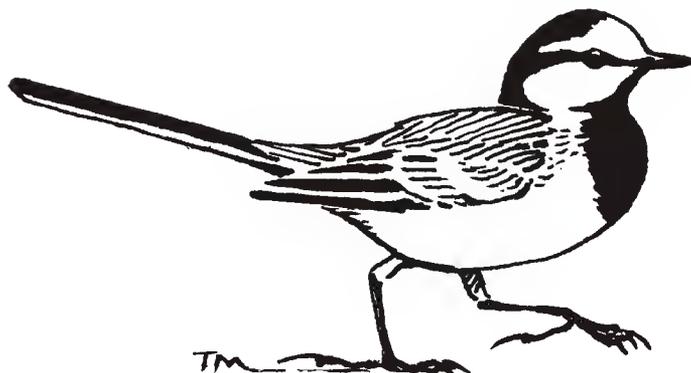
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DISTRIBUTION, ABUNDANCE, AND SURVIVAL OF NESTING AMERICAN DIPPERS NEAR JUNEAU, ALASKA

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ABSTRACT: We studied the distribution of the American Dipper (*Cinclus mexicanus*) near Juneau, Alaska, from 2004 through 2008. An upper limit on the local abundance and distribution of dippers in our area resulted from several factors, including stream size and food abundance, nest sites, and territorial aggression. Dippers nested only along streams with an estimated flow in summer of at least 0.5 cubic feet per second and nested commonly only where flow exceeded 0.9 cubic feet per second. Large streams provided a greater average density and estimated total abundance of benthic macroinvertebrates. Although most territories were centered on typical fast, rocky reaches of fairly high gradient, a few were centered on low-gradient reaches with a sandy substrate where anthropogenic nest sites were available. Some nests were located along glacial streams, but no nests were located along streams originating in bogs. Nest sites were typically in locations protected from predators, floods, and other hazards. After each of three cold winters apparent survival was low, markedly reducing the number of occupied territories; survival analysis with the program MARK showed that apparent survival decreased with decreasing winter temperature. We suggest that if dippers are used as indicators of stream quality in our area, the research should either include multi-year and region-wide surveys of distribution and abundance to account for annual variation in survival or focus on the effects of stream pollution on dipper physiology and reproduction.

The American Dipper (*Cinclus mexicanus*) is North America's only aquatic songbird. It nests along streams in the mountainous regions of western North America from northern Alaska to Central America and feeds on aquatic invertebrates and small fish (e.g., Kingery 1996, Willson and Hocker 2008b). The distribution and abundance of the dipper are often considered to be limited mainly by the availability of suitable nest sites or sometimes also by food supply (e.g., Kingery 1996). Here we consider the roles of these and other factors in limiting the distribution and abundance of dippers near Juneau, southeastern Alaska. We compare the presence of nesting dippers with estimates of stream size and prey abundance and characterize the core portions of nesting territories and specific nest sites. We then report variation in annual survival and its effect on territory and stream occupancy.

The five species of dippers can be used as indicators of stream quality because their abundance or reproductive success often decreases in response to acidification, sedimentation, or industrial pollutants (e.g., Tyler and Ormerod 1994, Price and Bock 1983). Near Juneau, streams are subject to several kinds of natural and anthropogenic disturbances (e.g., Redman 1988, Swanson et al. 1998), such as mining, logging, and road building, that can affect their quality. Therefore, a baseline understanding of dipper distribution and abundance is useful for understanding and assessing future patterns. We here provide a baseline for future comparisons of the distribu-

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tion and abundance of the dipper near Juneau and discuss the species' use as an indicator of stream quality.

STUDY AREA

Our study area is located near Juneau (58° 18' N 134° 25' W) in southeastern Alaska. During the nesting season, we searched for dippers along 40 streams from Pt. Bishop north to Bessie Creek on the mainland (a distance of approximately 93 km along the coast) and around nearby Douglas Island (approximately 77 km of coast; Figure 1). Ten of the streams that we studied are second-order, four are third-order, and the remainder are first-order, as judged from a topographic map (1:63,360). Most of these streams originate

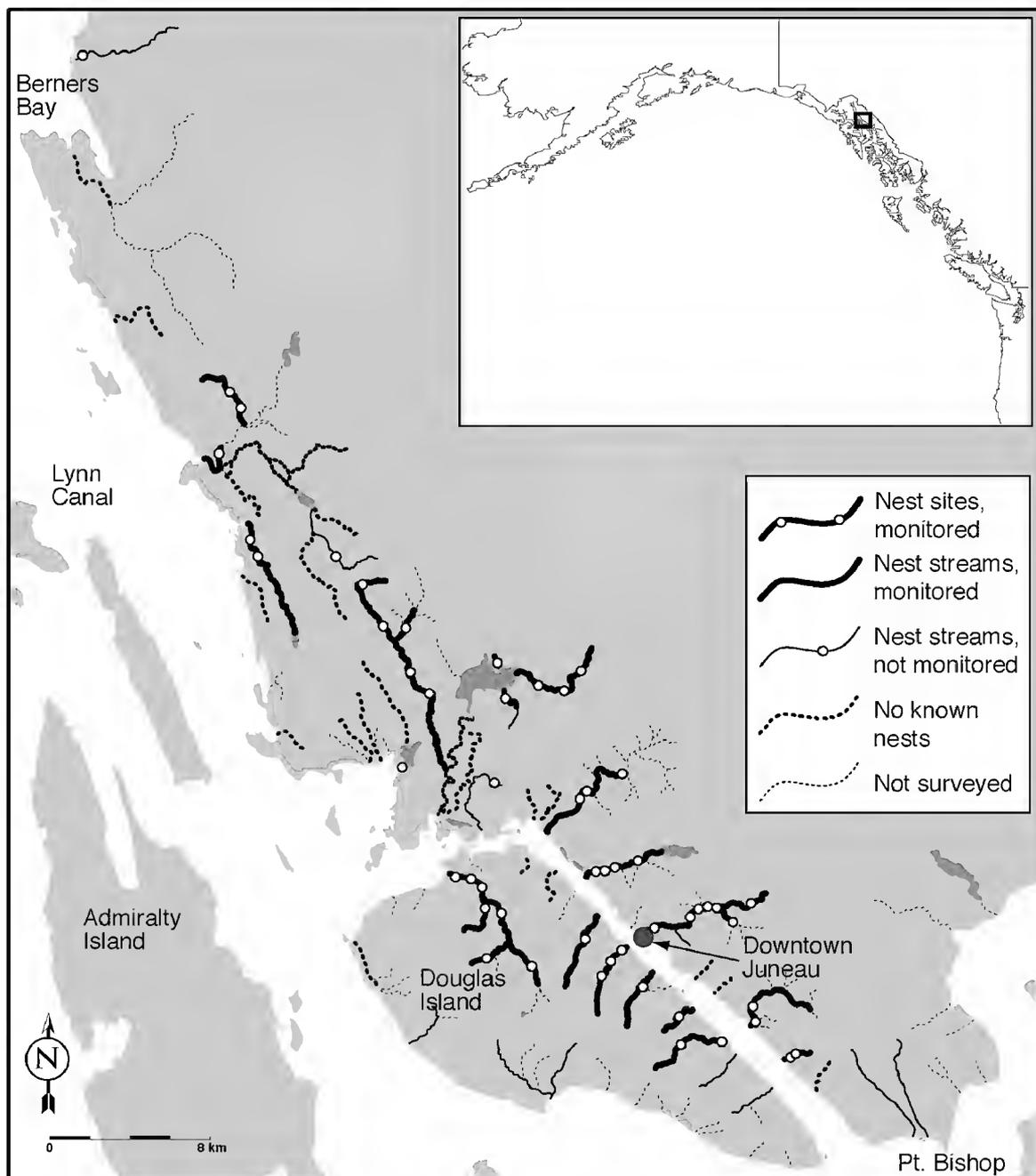


Figure 1. The study area around Juneau, Alaska, showing streams surveyed and approximate locations of nest sites occupied in at least one year of the study.

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in alpine zones and are fed largely by snow melt in spring and summer. Three streams originate at glaciers, nine originate in mid-elevation bogs, and two originate in natural nonglacial lakes. Seven of these streams were accessible only by boat, and we visited them only once; we include these streams only in the characterization of occupied and unoccupied watersheds. The remaining 33 streams were accessible within a 3- or 4-hour round-trip hike from local roads. This set of streams we surveyed regularly includes all streams in the Juneau area except the three largest glacial rivers, mostly at a low gradient, and tiny intermittent streams. Initial surveys quickly showed that such very small streams did not support nesting dippers (see also Results).

METHODS

We assessed factors that have been thought to limit the dipper's distribution and abundance (e.g., Kingery 1996). To this end, we estimated stream flow, as an index of potential foraging space, measured characteristics of territories around known nest sites, sampled densities of macroinvertebrate prey in known foraging areas, and characterized nest sites. In addition, we monitored annual variation in apparent annual survival of banded birds and territory occupancy, using this information to assess the relative role of nest sites and food in limiting the local population of dippers.

Estimating Stream Flow

Because our sites were not equipped with stream gauges, we characterized streams by size (flow) as estimated by an equation based on watershed area, elevation, and precipitation (Wiley and Curran 2003). We delineated watersheds by using a digital elevation model from the Shuttle Radar Topography Mission (SRTM; Werner 2001) in combination with digital hydrography interpreted by the U.S. Forest Service (2002) from aerial photography. The SRTM's digital elevation model was the source for preliminary watershed boundaries drawn on the basis of predicted surface flow in the direction of maximum slope (Tarboton et al. 1991). These were compared with observed streams in the Forest Service's database. Where we found discrepancies, we adjusted the digital elevation model to fit the flow pattern observed in the Forest Service's database and recalculated watershed boundaries (Werner 2001). The accuracy of the final delineation of watershed boundaries was verified with the Forest Service streams as well as with USGS topographic maps at a scale of 1:63,360. Later, we estimated the area of two additional watersheds visually by extrapolating boundaries with georeferenced aerial photos and topographic maps in an ArcGIS database; these estimates have a wider margin of error than those calculated by the first method. We estimated the average elevation of each watershed by placing a grid over the watershed on a topographic map (scale 1:25,000) and sampling grid squares at each elevation increment according to a random-number table (sample size was proportional to watershed area).

Precipitation data were obtained from maps in Jones and Fahl (1994). It is important to emphasize that each of these variables is only an estimate, so the estimate of stream flow is rough. Precipitation is the variable with the least detail and the greatest potential source of error because there are

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relatively few gauges measuring the great local variation of precipitation in the mountainous terrain around Juneau and the data available do not include the most recent years. In addition, use of the average elevation fails to reflect marked (but unrecorded) altitudinal differences in precipitation. Our index of stream flow was the 90% exceedance equation for the summer season, meaning that stream flow would exceed the calculated value 90% of the time. Use of the 90% exceedance equation seemed appropriate in view of our initial impression that some streams were “too small” to support nesting dippers. The estimates from other exceedance equations (e.g., 50%) were correlated with the one we chose, so our choice of 90% should not affect interpretation of results.

Dipper Territories and Nest Sites

We surveyed local streams for nesting activity of dippers between 05:00 and 20:00 from late April through early August, 2004–2008, with some preliminary data from 2003. Initially, we surveyed each stream at least three times each season, from tidewater up to a point determined by hiking time on the nearest trail (see below). Surveys in 2004 and 2005 clearly showed that dippers did not nest on certain streams, and these small streams were not surveyed regularly in the following years. We found most nests by following the birds as they carried nest material to a nest site and monitored these sites about twice a week until chicks fledged or the nest failed (Willson and Hocker 2008b). To facilitate frequent monitoring of as many nests as possible, we monitored only nests that were within a 3- or 4-hour round-trip hike of a road. A catalog of all nest locations, resident pairs, and nest success has been placed in the library of the University of Alaska-Southeast, Juneau. Because we surveyed each stream for 5 or 6 years, we knew not only the nest sites used each year but also the distribution of territories along the stream. Therefore, by comparing the distribution of territories among years, we could determine if a given territory was occupied in a given year.

Dippers typically place their domed nests in protected sites very close to the streams where they forage (e.g., Kingery 1996). We characterized nest sites used each year by nesting substrate and our estimates of levels of protection. Each nest site was ranked in one of four levels (from 0 to 3) in four categories: estimated protection from flood (giving the highest rank to nests at a height of at least 2 m above usual summer water levels), weather (presence and completeness of overhang above nest), terrestrial predators (inaccessibility to mink, weasels, squirrels, etc., climbing along extended ledges or over boulders), and aerial predators (inaccessibility and lack of perch sites for ravens, etc.). These estimates cannot account for the effects of extreme events such as rare massive floods and landslides. Ranks in the four categories were summed for an overall estimate of level of protection (maximum = 12).

We also measured several features of the core of each territory at 50-m intervals along a 400-m reach centered on the nest site in 2004, 2005, and 2006 for five intervals per territory. These features included stream substrate (visually estimated proportion of substrate occupied by bedrock, boulders (diameter >25 cm); cobbles (5–25 cm), gravel (2 mm–5 cm), sand, or mud, channel width (measured with tape or range finder), and gradient. Coarse

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substrates harbor more benthic macroinvertebrates than fine substrates (see Willson and Hocker 2008a). Categories of gradient followed those of the Environment and Natural Resources Institute (ENRI), University of Alaska-Anchorage (Major and Barbour 2001), which uses the English system, here converted to the metric system: high, >122 cm in 15 m (>4-foot rise in 50 feet); medium, 30–122 cm in 15 m (1–4-foot rise in 50 feet); low, <30 cm in 15 m (<1 foot rise in 50 feet). We assessed gradients by measuring 15 m (50 feet) along the stream and sighting horizontally from the upper end of the section to the lower; the distance between the water surface and the intersection of the horizontal line of sight with a vertical object at the lower end of the 15-m section gave the amount of rise.

We also recorded type of forest canopy (coniferous or deciduous) and degree of canopy closure over the stream (ranking the width of the canopy opening above each of the five points sampled in a territory core) because previous studies documented effects of these variables on stream invertebrates (e.g., Hawkins et al. 1982, Allen et al. 2003, Kelly et al. 2003). We do not discuss this information further, however, because it proved relatively uninformative: territory cores were distributed quite evenly over the full range of both canopy type and closure categories; the sole exception was a lack of territories on small streams where canopies were fully closed.

During the nesting season in 2004 and 2005 we sampled benthic macroinvertebrates in the riffles of a number of stream reaches, both occupied ($n = 21$, at various elevations in 14 watersheds) and unoccupied ($n = 10$, all at low elevation) by dippers. In occupied streams we took samples in reaches known to be used by foraging dippers and accessible to us; in small, unoccupied streams we took samples in downstream reaches, where stream flow was as high as possible, to minimize the effect of stream size. Sampling took place in May (early in the nesting cycle) in 2004 and in June and July (when many pairs were feeding chicks) in 2004 and 2005. Sampling methods were based on those of ENRI (Major and Barbour 2001). Each sample consisted of five subsamples in units about 46 cm square, spread over at least 25 m of stream, and pooled. We disturbed the substrate manually to a depth of about 5 cm and brushed rocks to dislodge invertebrates, which were swept by the current into the kick-net downstream. Macroinvertebrates (≥ 4 mm in length) were counted and identified at least to family. Densities are presented as numbers per sample. Dippers also pick drifting invertebrates from the water column and water surface (pers. obs.), but these potential prey items were not sampled. At the same time we sampled macroinvertebrates, we also measured the pH and temperature of the water.

Survival Analysis

We banded adult dippers with one USFWS aluminum band and three colored plastic bands for identification of individuals. Birds were caught in mist nets placed across the stream while the adults were feeding chicks. Captured birds were banded, weighed, and sexed by presence or absence of a brood patch (developed by females only). All birds were released on site after being banded. Estimated apparent annual survival was based on resighting of banded adults the following year. This is, necessarily, “apparent” survival because we do not know the frequency of emigration from the study area,

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but the observed fidelity of breeding dippers to a site and watershed implies that emigration was low.

We fit a series of Cormack–Jolley–Seber mark–resight models (Williams et al. 2001) to the observations of dippers. These models estimated annual survival (ϕ) and detection probabilities (p); ϕ is the probability that a bird alive and in the study area in one year is still alive and in the study area the following year, and p is the probability that a bird alive and in the study area during a year is detected during the surveys in that year. All marked birds were adults of unknown age ($n = 113$), so estimates apply to adults but are not age-specific. Because we suspected that survival might be a function of winter weather, we used the number of days with temperatures $\leq -12^\circ\text{C}$ as an index of weather conditions, a criterion chosen arbitrarily ($-12^\circ\text{C} \approx 10^\circ\text{F}$; local weather stations record temperature in Fahrenheit). Such cold days were numerous in months with average temperatures $< 1^\circ\text{C}$, a criterion applicable to the White-throated Dipper (*C. cinclus*) of Eurasia (Loison et al. 2002, Sæther et al. 2000; see Willson and Hocker 2008a). Temperatures were available from multiple local sources, all near sea level (see Willson and Hocker 2008a); when sources differed in the number of cold days, we used the minimum plus 0.5 (i.e., ≥ 10 days became 10.5). Because only one marked bird (female) had a gap in its sighting history (i.e., resighted after having been unobserved for ≥ 1 year), we assumed that the probability of birds being resighted did not vary by year or sex [i.e., $p(\cdot)$]. Initially, we fit a model that allowed survival probability to vary by year and sex, including sex-specific effects of the number of cold days (i.e., separate survival estimates for each year for each sex with weather affecting the sexes differently). After fitting the initial model, we fit simpler models that pooled survival estimates by sex or year or excluded the effect of number of cold days. We evaluated the fit of our most general model [$\phi(\text{year} \times \text{sex} + \text{cold days} \times \text{sex})$, $p(\cdot)$] (i.e., we estimated an overdispersion factor \hat{c} ; Burnham and Anderson 2002) by using the median \hat{c} goodness-of-fit procedure in the program MARK (version 5.1). We compared models by using the change (Δ) in the small-sample version of Akaike's information criterion adjusted for lack of fit (i.e., QAIC_c) (Burnham and Anderson 2002), which we used to estimate each model's weight, a measure of support for each model relative to the other models considered.

RESULTS

Streamflow and Occurrence of Nesting Dippers

Dippers occupied territories on many of the streams in our study area (Figure 1). However, nesting dippers were not observed on streams with an estimated summer low-flow exceedance of less than about 0.4 cubic feet per second ($n = 10$; Figure 2), even though several of these streams had cliffs and boulders seemingly suitable for dipper nests (as judged from known nest sites). One of these small streams had been used for nesting at least once in the past.

Seven of 10 streams with exceedances between 0.4 and 0.99 cubic feet per second were usually occupied during this study, two were not occupied,

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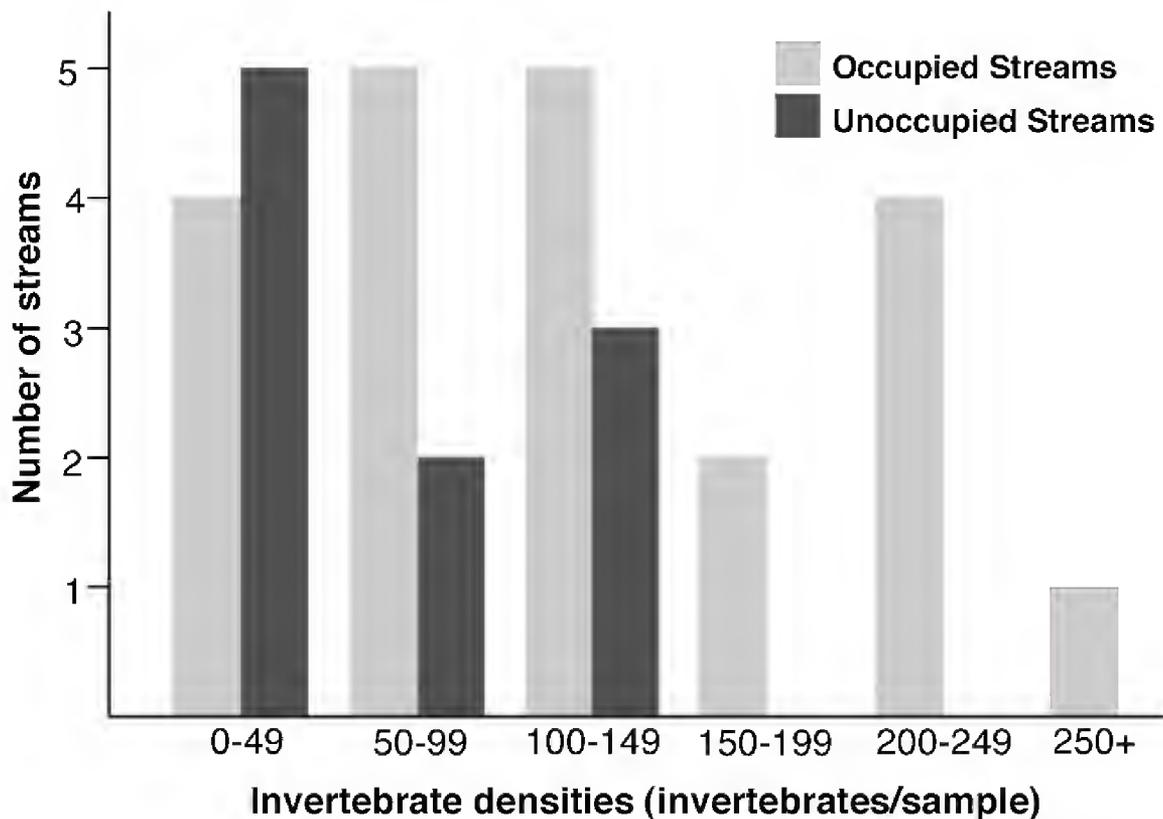


Figure 3. Density of macroinvertebrate prey per sample in reaches of streams occupied and unoccupied by the American Dipper near Juneau, Alaska.

Of 64 nest sites used in at least one year, 58% were on rocky cliffs, 19% were in cavities in boulder piles, 6% were in old wooden dams, 6% were on bridges, and the remainder were in other categories (i.e., a log on a retaining wall, boulder top, steep shale slope, tree-root cavity, concrete spillway). Eleven sites (17%) were anthropogenic in origin.

By our estimates, 75% of nest sites had a high overall degree of protection, with a combined score of at least 10 (of a possible 12). Four nest sites (6%) had little protection from weather, and six sites (9%) had little protection from aerial predators (Table 2). Ten sites (16%) were at some risk of flood, and nine (14%) had little protection from terrestrial predators. Despite the potential risk, most of these nests were probably successful (Table 3; see also Willson and Hocker 2008b). One site on the top of a boulder was exposed to all potential dangers but fledged two broods in 2005.

Annual Variation in Distribution and Abundance

American Dippers nested on up to 21 of the 33 streams we surveyed intensively, depending on the year. Sometimes we found vacant territories on stream reaches that had been occupied in previous years or were occupied in subsequent years. For 31 territories for which we have at least four seasons of data, the frequency of vacant territories was 13% in 2004, 19% in 2005 and 2006, but 48% in 2007 and 32% in 2008 (Table 3); in 2003, 11% of known territories ($n = 19$) were unoccupied.

The rate of vacancy was greatest after three years of low apparent annual survival (from one nesting season to the next) of banded adults (2005–2006,

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Table 1 Characteristics of Streams along 400 m Centered on Known Nest Sites^a of the American Dipper near Juneau, Alaska

Characteristic	<i>n</i>	%
Channel width ^b		
2–6 m	19	37
6–10 m	14	26
>10 m	19	37
Stream substrate ^c		
Bedrock and boulders	32	62
Cobble	16	31
Sand and silt	4	7
Gradient ^c		
High	29	56
Medium	16	31
Low	7	13

^a*n* = 52.

^bCategories are arbitrary.

^cCategories defined under Methods.

2006–2007, 2007–2008) and one season of lower nest success (Table 3). Although apparent adult survival was low in the winter of 2005–2006, nest success the previous season was high (Table 3), so territory vacancy was relatively low. The winter of 2006–2007 had low adult survival and was preceded by a season of low nest success, and territory vacancy in 2007 was high. The winter of 2007–2008 had low adult survival; it was preceded by a year of relatively good nest success but few breeding pairs, so recruitment was low and in 2008 many territories were vacant. Several small streams previously used for nesting had no nesting dippers at all in 2007 and 2008.

We found strong evidence for annual variation in survival rates; the only model that did not allow survival to vary by year but only by sex had a weight of <0.01 (Table 4). The best model, with ~2.7 times the support of the

Table 2 Numbers of American Dipper Nest Sites^a at Four Estimated Levels of Protection from Four Risk Factors

Risk factor ^b	Estimated level of protection			
	High	Medium	Low	None
Weather	52	8	2	2
Flood	35	19	10	0
Aerial predators	50	8	4	2
Terrestrial predators	35	20	8	1

^a*n* = 64.

^bRanked from zero to high and summed for a combined estimate.

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Table 3 Vacancy of American Dipper Territories near Juneau, Alaska, in Relation to Survival over the Previous Winter and Nest Success

Breeding season	Apparent annual survival from previous year (<i>n</i>) ^a	Probable nest success ^b	Vacant territories (<i>n</i>) ^c
2004	67% (12)	91%	13% (19)
2005	53% (40)	94%	19% (31)
2006	39% (56) ^d	74%	19% (31)
2007	37% (57) ^d	92%	48% (31)
2008	42% (19) ^d	—	32% (31)

^a*n* = number of banded birds alive the previous year.

^bPercent of nests fledging chicks, from Willson and Hocker (2008b).

^c*n* = number of territories whose occupancy was determined.

^dSurvival following very cold winters

next best model (Table 4), estimated that survival declined as a function of the number of cold (≤ -12 °C) days (Figure 4); this relationship was almost linear within the range of winters we observed and had a common pattern for both sexes. The second-best model estimated separate, parallel (on the logit scale) slopes for each sex; the third-best model had separate slopes for each sex. The estimated relationship between annual survival and the number of cold days is $\phi = e^{1.396 - 0.0948x} / (1 + e^{1.396 - 0.0948x})$, where *x* is the number of cold days. The estimates (values of ϕ) range from 0.654 (95% confidence interval 0.501–0.781) for years with 8 cold days to 0.324 (95%

Table 4 Statistics for Selection among the Cormack–Jolley–Seber Models Fit to the Mark–Resighting Data for the American Dipper near Juneau, Alaska

Model ^a	Parameters	Δ QAIC _c ^b	Model weight ^c
$\phi(\text{days}), p(.)$	3	0.00	0.610
$\phi(\text{days} + \text{sex}), p(.)$	4	1.98	0.227
$\phi(\text{days} \times \text{sex}), p(.)$	5	4.03	0.081
$\phi(\text{year}), p(.)$	6	4.89	0.053
$\phi(\text{year} + \text{sex}), p(.)$	7	6.94	0.019
$\phi(\text{sex}), p(.)$	3	8.93	0.007
$\phi(\text{year} + \text{sex} + \text{days} \times \text{sex}), p(.)$	9	11.27	0.002
$\phi(\text{year} \times \text{sex}), p(.)$	11	15.13	0.000
$\phi(\text{year} \times \text{sex} + \text{days} \times \text{sex}), p(.)$	13	19.71	0.000

^a ϕ = survival probability; *p* = probability of a dipper being resighted; (days) indicates that the number of days < -12 °C is a factor in the model, (year) indicates that variation in survival by year is a factor in the model; (sex) or (+ sex) or (\times sex) indicates that variation by sex is a factor in the model; (.) indicates the parameter is constant across years and sexes. Statistics are based on $\hat{c} = 1.25$.

^bChange in QAIC_c (a measure of model fit) among models.

^cRelative support for a model relative to other models considered (sum to 1).

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confidence interval 0.222–0.446) for years with 22.5 cold days (Figure 4). Model-averaged (Burnham and Anderson 2002) estimates were very similar to those produced by the best model (Figure 4). The estimated detection probability for both the best model and from model averaging was 0.939 (95% confidence interval 0.758–0.987).

During the years of this study, 61 (54%) of the 113 banded birds nested in only one year and 28 (25%) nested in two years. Only 24 (21%) nested in at least three years.

DISCUSSION

Dippers typically concentrate their activity on fast, clear mountain streams, often on reaches of relatively high gradient, constrained by steep walls (e.g., Kingery 1996, Loegering and Anthony 1999). However, we found some nesting territories centered on reaches of low gradient and fine substrates where anthropogenic structures provided nest sites. Dippers were able to nest along glacial streams, probably because they nested early, before the heaviest loads of sediment came down, and they commonly foraged in nearby tributaries and sloughs with clear water.

All reaches of the streams we studied run through forested terrain, precluding a comparison with the finding of Loegering and Anthony (1999) of the dipper's apparent preference in Oregon for streams through forest over those through other habitats. From observations in Alaska and the Yukon Territory outside our study area (Darcie Neff, Auke Bay Laboratory, Juneau, pers. comm.; Willson pers. obs.), we do not think that American Dippers avoid unforested landscapes in our region.

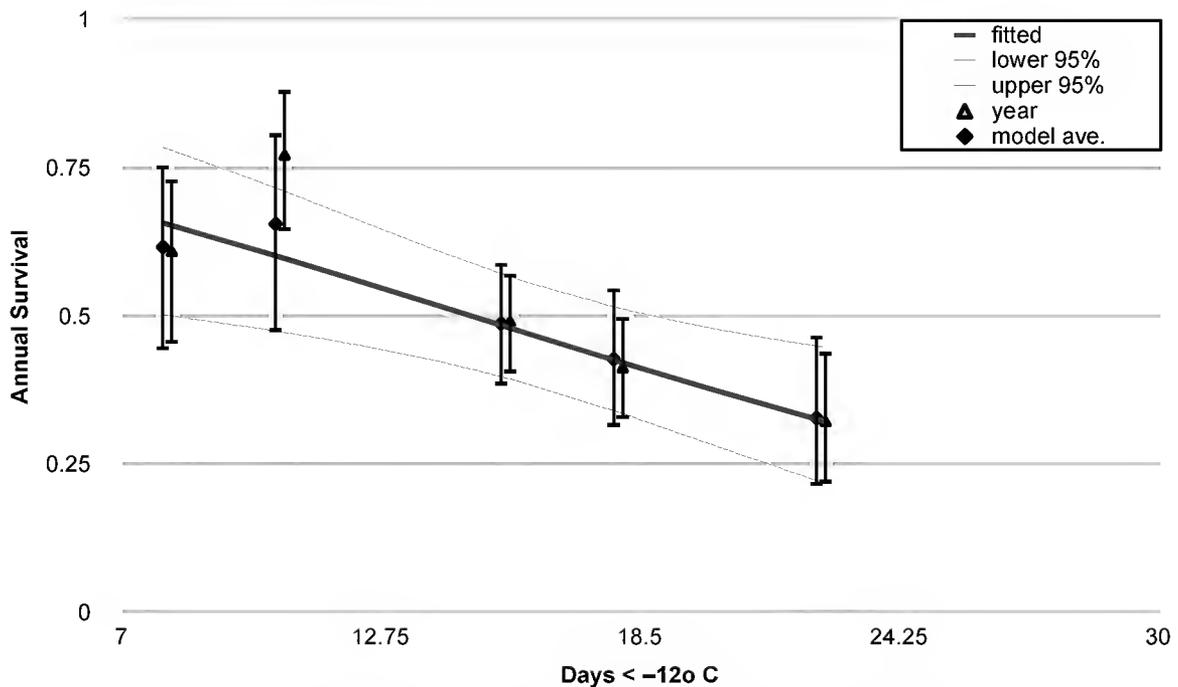


Figure 4. The estimated relationship between probability of annual survival of dippers and the number of cold days ($\leq -12^{\circ}\text{C}$) that year. Dashed lines indicate the 95% confidence interval. Triangles are separate yearly survival estimates from model [$\phi(\text{year}), p(\cdot)$], and diamonds are the model-averaged yearly estimates (Burnham and Anderson 2002).

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Many small streams in our study area originate in muskeg bogs at mid to low elevations but were unoccupied by dippers, despite the occurrence of apparently suitable nest sites on some of these streams. Possible explanations for the lack of nesting dippers on streams originating from bogs might include the lack of prolonged input of snow melt from high elevations and characteristics of the streams' chemistry (David D'Amore, Richard T. Edwards, Forestry Sciences Lab, Juneau, pers. comm.). Although acidification of streams in Britain has led to low density of dippers and their prey (e.g., Tyler and Ormerod 1994), all of the streams we sampled, with pH between 5 and 6, are at least as acidic as acidified streams in Britain. Perhaps the aquatic invertebrates in western North American streams are better adapted to low pH than the European species. We cannot determine if the density and reproductive success of American Dippers (and their prey) are lower than they would if our streams were less acidic; a comparison with streams in Alaskan karst landscapes might be informative.

The broad overlap between occupied and unoccupied reaches in density of macroinvertebrates suggests that (over the observed range) macroinvertebrate density alone did not determine dipper occupancy. Larger (wider) streams, however, typically have more substrate to support benthic invertebrates, so the total abundance of invertebrates should be greater in the larger streams that nesting dippers are more likely to occupy. Thus, the disparity between occupied and unoccupied streams in total abundance of macroinvertebrates is probably greater than the differences in invertebrate density we observed.

The levels of annual survival of adult dippers we estimated include values slightly higher and lower than for other nonmigratory species of similar body size summarized by Martin and Li (1992) and Martin (1995), for the American Dipper as reported in other studies (39–56%; Ealey 1977, Price and Bock 1983), and for the White-throated Dipper (Marzolin 2002). The apparent annual survival we recorded is probably close to the actual value because we seldom missed resighting banded birds that were actually present in the study area (only one banded bird known to be alive after two years was not resighted in the intervening year; detection probability = 0.939). Our regular surveys of numerous streams should have revealed banded birds if they changed watersheds within our broad study area. We found several birds that had shifted territories within watersheds but none that changed watersheds (but see Osborn 2000), although dippers commonly move among watersheds in winter (Willson and Hocker 2008a). It remains possible, however, that some birds moved to regions outside our study area.

Limits to Abundance and Distribution

Several factors may limit dipper abundance and distribution in an area. Nest sites are often thought to be the most important limiting factor, with some influence of prey availability (e.g., Kingery 1996). Evidence of nest-site limitation comes from rapid occupation of new sites such as bridges and nest boxes (Loegering and Anthony 2006, Osborn 1999) and lack of occupation after removal of nest sites (Backlund 1998). There is also evidence, however, for the importance of prey. Campbell et al. (1997) stated that critical habitat is a food-rich stream, although nest sites help determine density

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along a stream. Price and Bock (1983) found territory size to be related to food density. Miller and Ralph (2005) found a higher density of nesting dippers on larger streams (third- and fourth-order) and a lower density on first-order streams. Stream size and susceptibility to drought affect stream use by the White-throated Dipper (Marzolin 2002). In Britain, studies of the White-throated Dipper on acidified streams with reduced abundance of prey support the importance of food availability. Osborn (1999) noted that good but unoccupied nest sites can be found on streams whose quality has been impaired by human activity. The relatively recent decline of dipper populations in the Black Hills of South Dakota has been attributed to a combination of pollution, sedimentation, heavy grazing, dams, dewatering, and modern bridges without nest ledges (Backlund 1998, 2004). In addition, territorial aggression can limit the number of breeding pairs on a stream (Sullivan 1973, Ealey 1977, Price and Bock 1983).

In our study area, evidence that the availability of nest sites limits dipper populations includes the few territories centered on low-gradient streams where suitable nest sites have been provided by man-made structures, such as dams or bridges. These sites had sandy or silty substrates that dippers commonly avoid (e.g., Osborn 1999) because invertebrate prey is more abundant on coarse substrates (e.g., Willson and Hocker 2002a). Presumably, the dippers nesting in these sites needed to forage most intensively at some distance from the nest. During our study, dippers nested successfully in anthropogenic sites, and in general nest success has not been associated with particular habitat features (e.g., Loegering and Anthony 2006, Willson and Hocker 2008b).

The probable importance of prey abundance to the dipper's distribution in our area is indicated by the birds' nesting consistently along larger streams, occasionally along intermediate-sized streams, and not along small streams, despite the existence of seemingly good nest sites. In 1977, however, after several years of unusually high snowfall (Juneau Forecast Office, <http://pajk.arh.noaa.gov>), Robert H. Armstrong (pers. comm.) recorded very young dipper fledglings on a stream categorized here as low-flow. During our study, territorial aggression was observed to eliminate one breeding pair (Willson and Hocker 2008b). Moreover, territorial behavior clearly limited the size of the territory of another pair that foraged widely over two previously occupied but now vacant territories. These three factors taken together, an upper limit to dipper abundance and distribution in our area may be set by stream size (and inferred prey abundance) and nest sites, modified by territorial aggression.

Low overwinter survival, however, especially when combined with poor nest success, reduced density below that upper bound. Apparent annual survival of marked adults varied from year to year, and low annual survival resulted in vacant territories and unoccupied streams. The existence of territories vacant in some years but occupied previously or subsequently, often with good nest success, suggests that sometimes there were too few birds to occupy all the territories.

Even though dippers have dense insulating plumage and are able to function well at very low temperatures (references in Kingery 1996, Willson and Hocker 2008a), cold winter weather appears to reduce their winter survival,

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restricting the number of available breeders (Sullivan 1973, Price and Bock 1983). Nocturnal drainage of cold air down narrow ravines (see Pypker et al. 2007) and the high winds common around Juneau may exacerbate the effects of low temperature. Low nest success in the cold, wet summer of 2006 (Willson and Hocker 2008b) probably contributed to the decline in abundance in 2007.

Weather is also known to affect populations of the White-throated Dipper. For example, populations of this species in France fluctuated in response to flood and drought (Marzolin 2002). Furthermore, low winter temperatures contribute significantly to low overwinter survival of many birds (e.g., Nilsson 1987, Arcese et al. 1992, Robinson et al. 2007, Flockhart and Wiebe 2008), including the White-throated Dipper (Sæther et al. 2000, Loison et al. 2002; see also Tufto et al. 2000).

The American Dipper as an Indicator Species

Southeast Alaska is subject to natural and anthropogenic disturbances that affect the quality of stream water (e.g., Swanson et al. 1998), so the dipper could be useful here as an indicator species for stream quality. Many local streams that can support nesting dippers, however, are so small that only one pair has been found to nest along them, so the absence of a single pair from a small stream would not be valid evidence of impaired stream quality. Low overwinter survival, as we observed, could also be the cause. Using dipper distribution and abundance as an indicator of stream quality necessitates a multi-year, regional assessment of the population rather than simple before-and-after surveys of a single stream subject to suspected disturbance. Annual variation in overwinter survival (and nest success) has too great an effect on distribution and abundance.

Therefore we suggest that a more direct way of using dippers as indicators, in our area, is to assess the birds' physiological and reproductive condition. Studies of the White-throated Dipper have documented many effects of pollution, suggesting many possible responses that could be investigated in the American Dipper. The White-throated Dipper accumulates toxins, lives at lower densities, and eventually abandons streams polluted with sewage, industrial and agricultural waste products, and heavy metals draining from mines in several regions of Europe (Mönig 1985, Tyler and Ormerod 1994, Sorace et al. 2002). Stream acidification from industrial emissions and plantations of conifers in Britain and other parts of Europe has had numerous detrimental effects on dippers there, including poor body condition, later egg-laying dates, decreased eggshell thickness and egg mass, smaller clutches and broods, increased time spent foraging, lower rates of food delivery to chicks, lower rates of energy gain, slower nestling growth, lower chick weights and survival, decreased frequency of second clutches, and ultimately lower population density (Ormerod et al. 1985, 1988, 1991, Ormerod and Tyler 1987, 1990, 1996, O'Halloran et al. 1990, Vickery 1991, 1992, Logie 1995, Logie et al. 1996, Sorace et al. 2002). Many of these effects were induced by changes in the abundance and taxonomic composition of prey (e.g., Ormerod et al. 1985, 1988, Ormerod and Tyler 1991, Vickery 1991). Among other things, changes in the principal prey types resulted in lowered calcium intake (Ormerod and Tyler 1986, Ormerod et al. 1988,

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1991). There is growing evidence for several species of passerines, including dippers, that calcium can be a limiting factor (see Ormerod et al. 1991, Obermeyer et al. 2006).

The effects of pollution and sedimentation on the American Dippers have been studied less than for the Eurasian species. Price and Bock (1983) reported that a heavy input of sediment into a stream led to reduced density and reproductive success of the American Dipper. Feck and Hall (2004) found that dipper density decreased with decreasing abundance of favored prey insects but was only weakly related to several indices of stream quality.

Cyanide in mine-tailing ponds has been lethal to many kinds of aquatic birds (Henny et al. 1994) and could pose a threat to dippers, including during the nonbreeding season, when dippers forage in many kinds of aquatic habitats (Willson and Hocker 2008a). Furthermore, mercury from mine tailings has detrimental effects on fish-eating birds (Henny et al. 2002), and in our area dippers commonly eat fish (Obermeyer et al. 2006, Willson and Hocker 2008b). American Dippers are known to accumulate organochlorines, polychlorinated biphenyls, and heavy metals (including mercury) in eggs and chicks (Blus et al. 1995, Strom et al. 2002, Morrissey et al. 2004), though Henny et al. (2005) detected no effects of these contaminants on the dipper's reproductive success. Exposure to lead decreases the activity of an enzyme essential for formation of hemoglobin and cytochromes (Blus et al. 1995, Strom et al. 2002) and can lead to decreased hematocrit and hemoglobin. Strom et al. (2002) found that decreased activity of this enzyme is associated with higher lead concentrations in the blood of adult and nestling dippers, but they did not assess the birds' survival and reproductive success. For a small, active bird, any decrease in hemoglobin and cytochrome is likely to diminish its metabolic capacity and reduce its ability to deal with high demands for energy. The ability of the American Dipper to cope with heavy metals and other pollutants should be examined more thoroughly to assess at what level and under what conditions particular pollutants have negative effects

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American Dipper

Sketch by George C. West

CHANGES IN THE WINTER DISTRIBUTION OF THE ROUGH-LEGGED HAWK IN NORTH AMERICA

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ABSTRACT: We used Christmas Bird Count (CBC) data to demonstrate a shift in the winter distribution of the Rough-legged Hawk (*Buteo lagopus*) in North America from the late 1970s to the early 2000s. Data from nearly 300 CBC circles reveal decreases in the Rough-legged Hawk's abundance on the east and west coasts and throughout the southern portion of this species' winter range. Its abundance increased in the northern portions of the Great Plains. This distributional shift was associated with a decrease in the number of December days with substantial snow cover in the northern Great Plains and an increase in the winter abundance of the Red-tailed Hawk (*Buteo jamaicensis*) throughout most of the range of the Rough-legged Hawk. In addition, increasing human populations and associated loss of open country may have contributed to this shift.

The Rough-legged Hawk (*Buteo lagopus*) is a holarctic breeder that, in North America, winters from southern Canada through all but the most southerly parts of the continental United States (Johnsgard 1990, Bechard and Swem 2002). On the basis of Christmas Bird Count (CBC) data from 1962 to 1972, Root (1988) showed that its main areas of winter abundance were the northern Great Basin and the Great Plains from western Kansas to eastern Montana. The northern limit of the winter range seems determined by climate (Bock and Lepthien 1976, Root 1988, Olson and Arsenault 2000), while it is unclear what factors determine the southern limit.

Although there are no obvious continent-wide trends in breeding or winter populations of the Rough-legged Hawk in North America (McCay et al. 2001, Bechard and Swem 2002), from the late 1980s into the late 1990s local declines were reported from New Jersey (Walsh et al. 1999), Delaware (Hess et al. 2000), Colorado (Schmidt and Bock 2005), and California (Pandolfino 2006). To determine if these local changes represent a widespread phenomenon, we examined CBC data from throughout the Rough-legged Hawk's North American winter range over roughly the past three decades. We examined climate data, changes in Red-tailed Hawk abundance, and trends in the human population (possibly an indicator of habitat loss) to assess possible effects of these factors on the Rough-legged Hawk's winter distribution. Winter temperature and/or snow cover can affect the Rough-legged Hawk's distribution (Root 1988), movements (Theil 1985, Watson 1986a), and behavior (Schnell 1968, Klein and Mason 1981, Temeles and Wellicome 1992, Watson 1986b, Lingle 1989), and the Red-tailed Hawk is a documented interspecific competitor (Schnell 1968, Bildstein 1987).

METHODS

CBC Data

We obtained CBC data from the National Audubon Society's database (www.audubon.org/bird/cbc/hr/index.html). For all analyses we used the

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CBC count year to identify time. For example, count year 79 = winter of 1978–1979, count year 80 = winter of 1979–1980, etc. We chose a 28-year period from 1978 to 2006 because we found that the number of CBC circles (CBCs) within the range of the Rough-legged Hawk decreased rapidly prior to count year 79, resulting in large geographical gaps in the data set. We used data from CBC circles (CBCs) that met the following two criteria:

- Conducted during at least 8 of the 14 years between count year 79 and count year 92 and at least 8 of the 14 years between count year 93 and count year 106.
- Averaged more than three Rough-legged Hawks per year for at least one of the two 14-year periods so defined.

We chose the first criterion to ensure that the CBCs used were conducted on a fairly regular basis over the entire 28-year period used for this analysis. A more stringent criterion (e.g., >8 of 14 years), would reduce the number and the geographic coverage of the CBCs substantially. We used the average of at least three Rough-legged Hawks per year to ensure that each CBC was within the normal winter range of the Rough-legged Hawk and to exclude CBCs where this species occurs rarely. A higher threshold for inclusion would have required dropping many CBCs that record the Rough-legged Hawk nearly every year. Of approximately 2000 CBCs in North America, 293 met these criteria. We normalized CBC data for the Rough-legged and Red-tailed Hawks by party hour.

Regional Analyses

We divided the Rough-legged Hawk's winter range into ten geographic regions (Figure 1). The line separating the two Pacific regions from the two Intermountain West regions is the axis of the Cascade Range–Sierra Nevada, the line separating the two Intermountain West regions from the two Plains regions is the axis of the Rocky Mountains, and the line separating the Atlantic Coast region is the axis of the Appalachian Mountains. For the line dividing these regions into northern and southern segments, we used latitude 41° N from the Pacific Ocean to Illinois in the west and the border between Pennsylvania and New York in the east. For the area between Illinois and Pennsylvania we defined a border placing CBCs within 50 km of one of the Great Lakes into one of the Great Lakes regions. The border between the North Plains and West Great Lakes regions is the western border of Wisconsin, deviating from that border in the north to place any CBC within 50 km of a Great Lake into the West Great Lakes region. The border between the two Great Lakes regions was chosen to divide the number of CBCs between those two regions roughly in half.

We analyzed data by region by comparing results for two consecutive periods of 14 years each (count years 79–92 vs. count years 93–106). We also performed linear regression analyses to compare the Rough-legged Hawk's trends in each region versus various predictor variables. In addition, we analyzed data by comparing four consecutive intervals of 7 years each in order to display trends for each region graphically.

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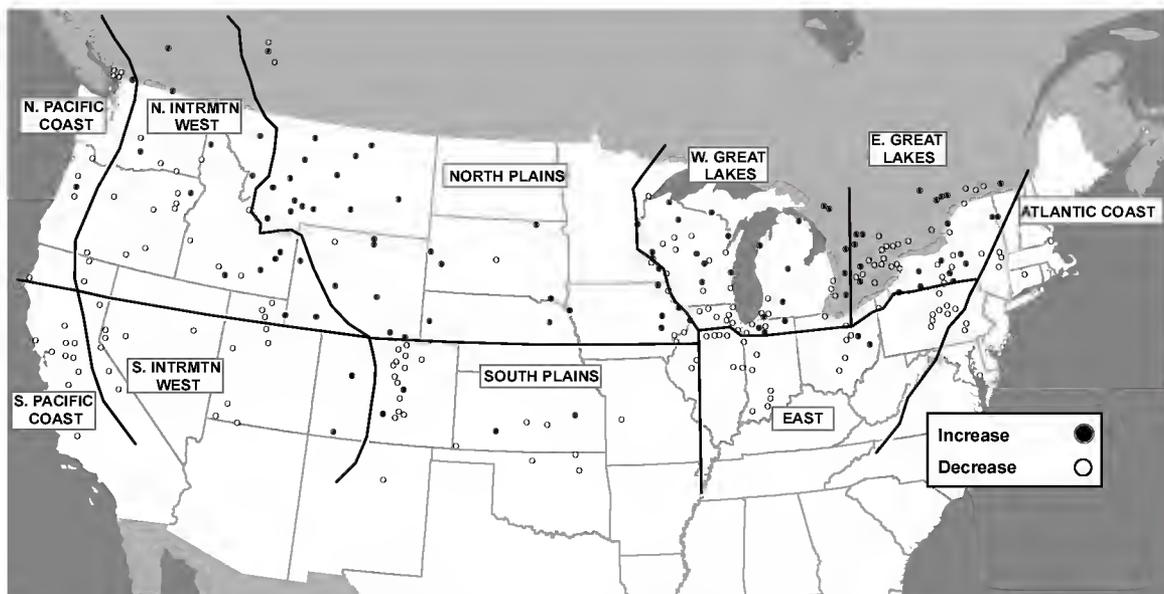


Figure 1. Ten regions and sites of Christmas Bird Counts used to evaluate changes in the numbers and distribution of the Rough-legged Hawk in North America. Black circles represent counts on which the number of Rough-legged Hawks per party hour increased from count years 79–92 to count years 93–106; white circles represent counts on which the number decreased. Circles are approximately to scale.

Potential Predictor Variables

To assess variables that might influence the Rough-legged Hawk's winter range, we attempted to link climate factors, human-population changes, and Red-tailed Hawk abundance to each CBC circle. Because of lack of data we did not analyze other variables such as prey density or composition or specific land-use changes that likely also have an effect.

We obtained climate data from the U.S. Historical Climatology Network web site (http://cdiac.ornl.gov/epubs/ndp/usncn/usa_monthly.html). We assigned climate data to a CBC circle on the basis of the weather station closest to that CBC circle, provided that station was within 100 km of the center of the CBC circle. In 11 cases the closest weather station was at an elevation more than 400 m different from the CBC circle. In those cases, because of concern that the elevation difference would create too large a discrepancy in climate conditions between the CBC circle and the weather station, we used the next nearest weather station within 100 km of the CBC circle and similar in elevation. For our analyses, we used two climate variables: average December temperature ($^{\circ}\text{F}$ as reported by weather stations) and the number of December days with snow cover >5 cm (2 inches as reported by weather stations). Although temperature data were complete, in some cases there were gaps in the snow-cover data. In cases where snow cover measured >5 cm on a given day and subsequent days had no data, we used daily high temperatures to determine whether snow cover remained. If the daily high temperatures remained at 0°C or less through the gap, we assumed that the snow cover remained >5 cm during those days.

Since historical land-use data for each CBC circle are either unavailable or impractical to obtain, we used population change between the 1980 and 2000 U.S. censuses for the county constituting the largest fraction of a given CBC circle as a crude proxy for land-use change.

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We chose Red-tailed Hawk abundance to test the potential effect of interspecific competition on the Rough-legged Hawk. The Red-tailed Hawk is a documented interspecific competitor (Schnell 1968, Bildstein 1987) and is, by far, the most abundant raptor across nearly all the winter range of the Rough-legged Hawk (Root 1988). We determined Red-tailed Hawk abundance by using data from the same CBC circles used for the Rough-legged Hawk's abundance.

Statistical Analysis

We screened the data to check assumptions related to normality and heterogeneity by using probability plots in Systat Version 9 (SPSS, Chicago). We also screened the continuous covariates (average December temperature, December days with snow cover >5 cm, and numbers of Red-tailed Hawks per party hour) for multicollinearity by using PROC REG in SAS 9.1 (SAS Institute 2005) and removed any variables with tolerance values <0.40 (Cody and Smith 2006).

We used a paired *t* test to determine the statistical significance of changes in Rough-legged Hawk abundance between the two periods (first 14 years versus second 14 years) for each of the ten regions. We applied the Bonferroni method to yield a threshold of significance of <0.005 for these analyses.

We used logistic regression to analyze the effects of single predictor variables on Rough-legged Hawk numbers. We used the change in Rough-legged Hawks per party hour from the first 14 years to the second 14 years as the binary response variable. That is, if the average number of Rough-legged Hawks per party hour over the second 14 years was greater than the average over the first 14 years, that CBC circle was assigned a value of one. If the average over the second 14 years was less than over the first 14 years, that CBC circle was assigned a value of zero. We performed logistic regression versus the following four predictor variables:

- The change in December average temperature between the two periods,
- The change in the average number of December days with snow cover >5 cm,
- County population increase (percent) from 1980 to 2000, and
- The number of Red-tailed Hawks per party hour over the entire 28-year period (count years 79–106).

Because climate or population data were not available for some CBC circles, not every circle was analyzed for each variable. Also, in evaluating the effects of snow cover, we used only CBCs that averaged at least five December days with snow cover >5 cm during one of the two periods. As a result, we used 259 CBC circles for analysis of the change in December temperature, 199 for analysis of December snow cover, 245 for analysis of change in human population, and 293 for analysis of Red-tailed Hawks per party hour.

RESULTS

Figure 1 shows all 293 CBCs used. Numbers of the Rough-legged Hawk on nearly all (101/112, 91%) of the CBCs on the coasts and in the three southern regions decreased. In all but seven of the 43 CBCs in the North

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Plains region they increased (36/43, 84%). Similarly, when counts are pooled by region, Rough-legged Hawk numbers decreased in the westernmost, easternmost, and southern regions but increased in the North Plains (Table 1). The North Intermountain West and the two Great Lakes regions showed decreases that were not statistically significant. The results of linear regression by region (Figure 2) were qualitatively identical, with negative trends for the southern and coastal regions and a strong positive trend for the North Plains.

Logistic regression of the change in the Rough-legged Hawk versus single predictor variables indicated there were statistically significant negative effects on the abundance of the Rough-legged of the abundance of the Red-tailed (coefficient = -1.90 ± 0.38 , $P < 0.001$; odds ratio = 0.15, 95% confidence interval 0.07–0.32; $n = 293$) and of an increase in the number of December days with snow cover >5 cm (coefficient = -0.19 ± 0.05 , $P < 0.001$; odds ratio = 0.83, 95% confidence interval 0.75–0.92; $n = 199$). Increase in human population had a significant negative effect on Rough-legged Hawk abundance (coefficient = -1.12 ± 0.54 , $P = 0.04$; odds ratio = 0.33, 95% confidence interval 0.11–0.94; $n = 245$). Changes in average December temperature had no significant effect (coefficient = 0.14 ± 0.11 , $P = 0.21$; odds ratio = 1.15, 95% confidence interval 0.92–1.44; $n = 262$).

Pacific Coast Regions

In the Pacific Coast regions Rough-legged Hawk abundance was relatively low while Red-tailed Hawk abundance was relatively high (Figure 3). The South Pacific Coast had the highest Red-tailed Hawk abundance of any region with numbers consistently over 130 birds/100 party hours. Red-tailed Hawk numbers in both Pacific Coast regions were relatively stable, in contrast to the increases seen in nearly every other region. As snowfall was generally light to none in these regions, snow cover was not a factor

Table 1 Changes in Numbers of the Rough-legged Hawk (per 100 Party Hours) on Christmas Bird Counts in Ten Regions of North America.

Region	Count years 79–92	Count years 93–106	Change	P^a	CBCs (n)
N. Pacific Coast	8	4	–50%	<0.001	15
S. Pacific Coast	6	2	–59%	0.003	10
N. Intermountain West	43	34	–22%	NS ^b	35
S. Intermountain West	24	11	–54%	0.002	16
N. Plains	13	21	60%	<0.001	43
S. Plains	13	9	–32%	0.002	27
W. Great Lakes	10	9	–12%	NS ^b	53
E. Great Lakes	8	7	–12%	NS ^b	50
East	12	6	–49%	<0.001	27
Atlantic Coast	8	3	–64%	<0.001	17
All	13	10	–20%	NS ^b	293

^aPaired t test.

^bNot significant, $P > 0.005$.

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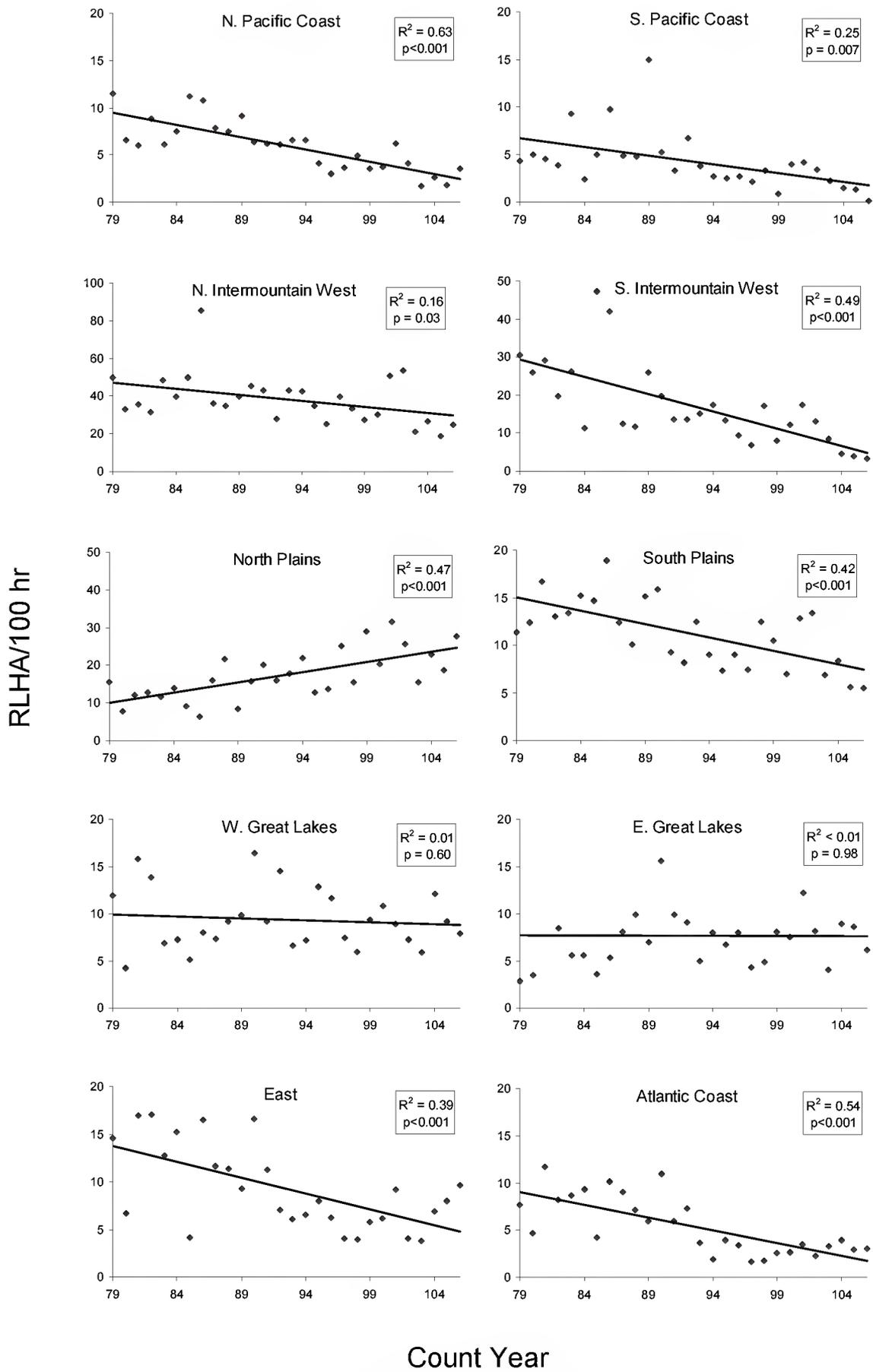


Figure 2. Linear-regression analyses of trends in Rough-legged Hawk numbers on Christmas Bird Counts by ten regions of North America, 1979–2006.

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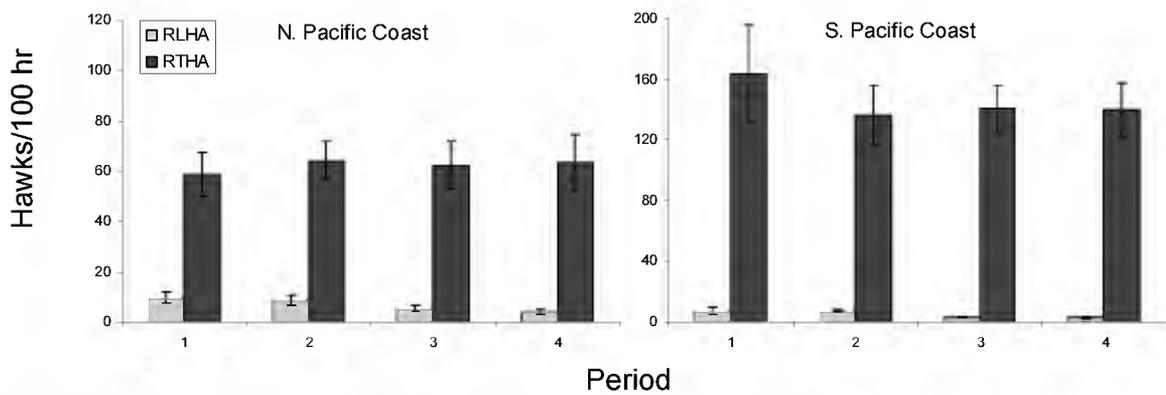


Figure 3. Average numbers of the Rough-legged Hawk (RLHA) and Red-tailed Hawk (RTHA) per 100 party hours in four successive 7-year periods (1, count years 79–85; 2, count years 86–92; 3, count years 93–99; 4, count years 100–106) for the North and South Pacific Coast regions.

there. Within both Pacific Coast regions the human population of counties associated with the CBC circles increased substantially (26% for the North Pacific Coast; 59% for the South Pacific Coast).

Intermountain West Regions

The North Intermountain West had the highest Rough-legged Hawk abundance of any region and the second-highest Red-tailed Hawk abundance

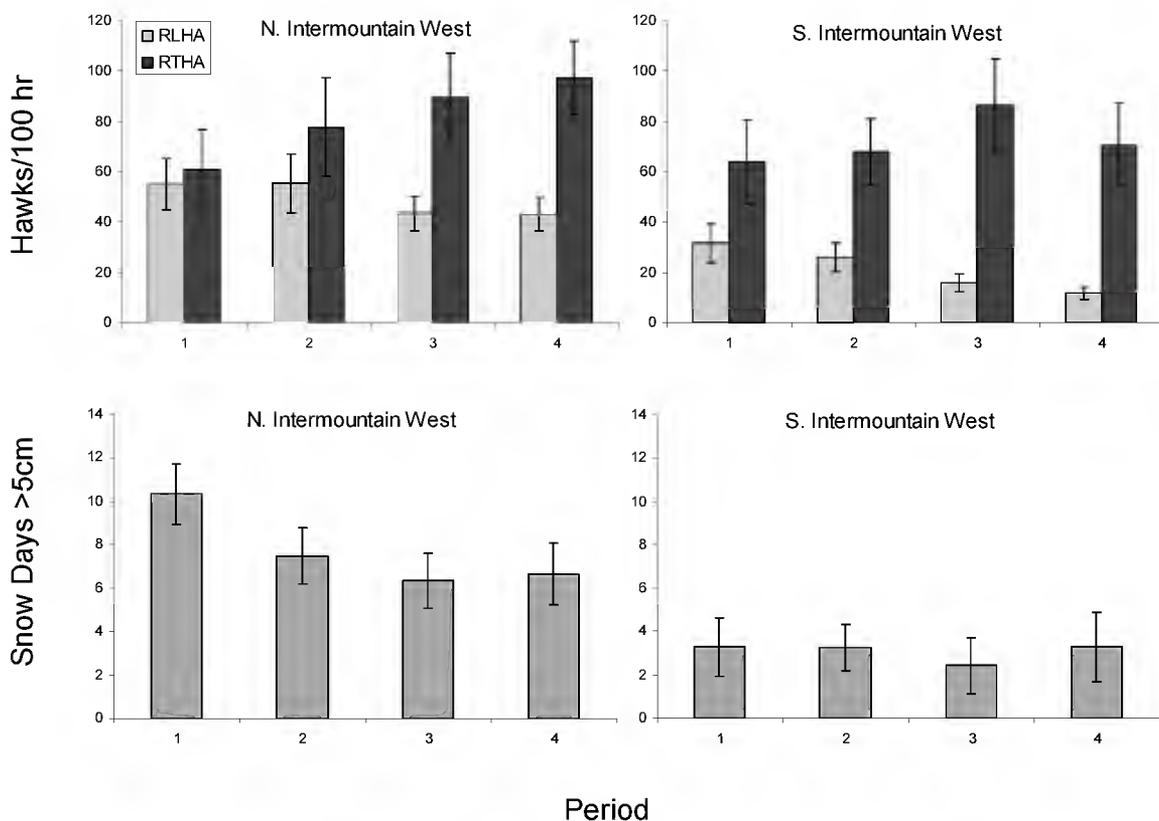


Figure 4. Average numbers of the Rough-legged Hawk (RLHA) and Red-tailed Hawk (RTHA) per 100 party hours and number of December days with snow cover in excess of 5 cm in four successive 7-year periods (1, count years 79–85; 2, count years 86–92; 3, count years 93–99; 4, count years 100–106) for the North and South Intermountain West regions.

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(Figure 4). Red-tailed Hawk numbers increased in each successive period. Red-tailed Hawk abundance in the South Intermountain West was also relatively high and increased slightly. The number of days with significant snow cover decreased substantially in the North Intermountain West but remained fairly stable in the South Intermountain West. Both Intermountain West regions had large increases in human population in the counties associated with the CBC circles (30% for the North Intermountain West; 62% for the South Intermountain West).

Plains Regions

The increase in Rough-legged Hawk abundance in the North Plains was paralleled by a similar increase in the Red-tailed Hawk (Figure 5). In both 14-year periods, however, the abundance of the Red-tailed in this region was consistently lower than in any other region. Rough-legged Hawk abundance in the North Plains increased in each successive 7-year period with abundance in the last period (45 birds/100 party hours) exceeding that of the North Intermountain West (43 birds/100 party hrs). The number of days with significant snow cover in the North Plains decreased in each 7-year period. In the South Plains the abundance of the Red-tailed Hawk increased dramatically, doubling from less than 50 birds/100 party hours in the first 7-year period to nearly 100 in the last 7-year period, while Rough-legged

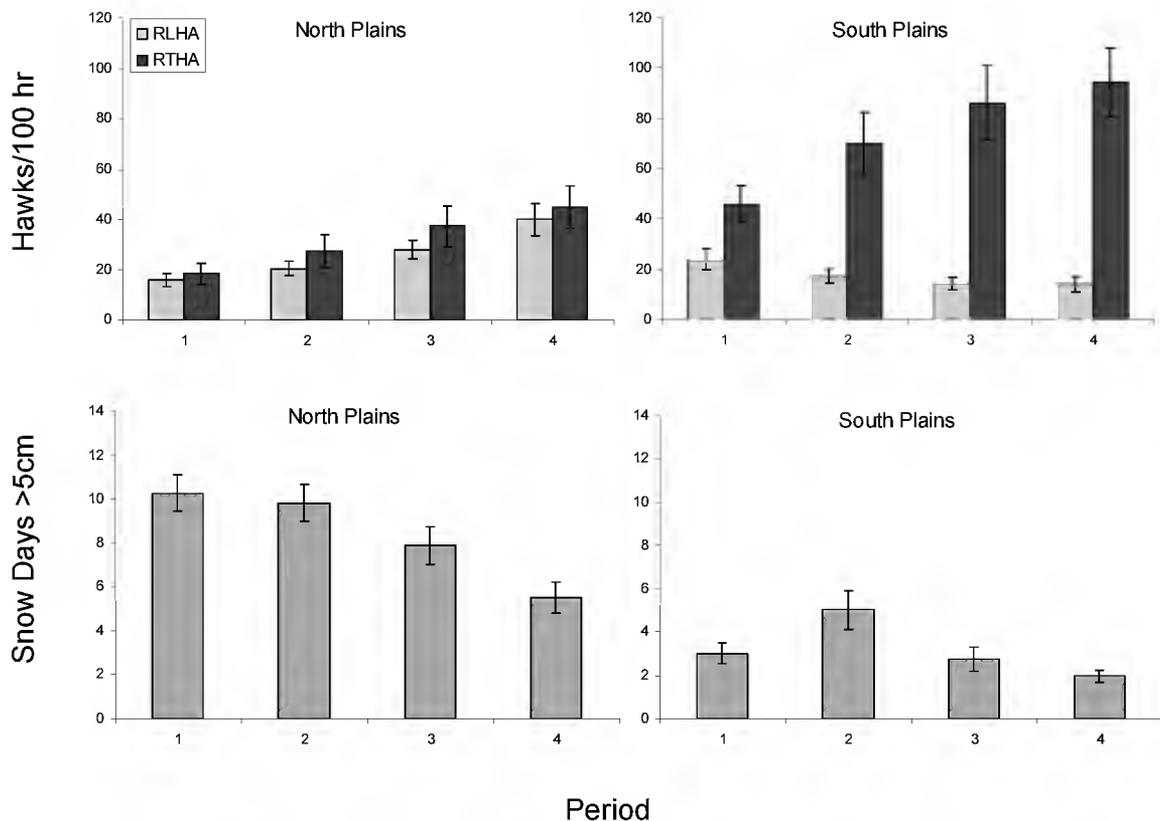


Figure 5. Average numbers of the Rough-legged Hawk (RLHA) and Red-tailed Hawk (RTHA) per 100 party hours and number of December days with snow cover in excess of 5 cm in four successive 7-year periods (1, count years 79–85; 2, count years 86–92; 3, count years 93–99; 4, count years 100–106) for the North and South Plains regions.

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Hawk abundance declined from 24 to 14 birds/100 party hours. In the South Plains snow cover decreased less sharply than in the North Plains. Human population growth in the counties associated with the CBC circles in the North Plains was low (9%), in the South Plains much higher (43%).

Great Lakes Regions

Although Red-tailed Hawk abundance increased in both Great Lakes regions (Figure 6), the abundance of this species in these regions was lower than in any other except the North Plains. Rough-legged Hawk abundance did not vary significantly from period to period in either region. The number of days with significant snow cover was relatively stable in the East Great Lakes but decreased slightly in the West Great Lakes in the second 14-year period. Human population in the counties associated with the CBC circles grew slowly (10%) in the East Great Lakes and declined (-1%) in the West Great Lakes.

East and Atlantic Coast Regions

The Red-tailed Hawk's abundance in the East region increased markedly; numbers in the last 14-year period were more than double those of the first period (Figure 7). In the Atlantic Coast region, it was relatively low (51 birds/100 party hours) and increased much less dramatically. In both

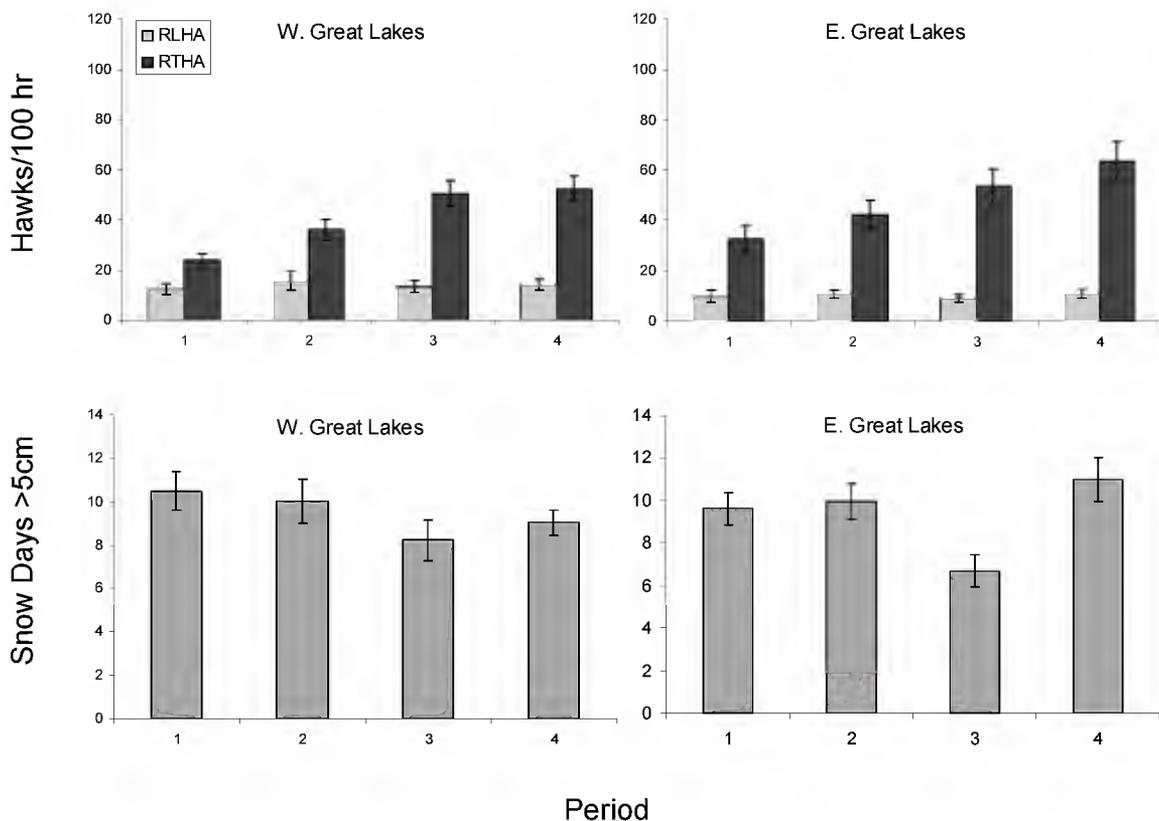


Figure 6. Average numbers of the Rough-legged Hawk (RLHA) and Red-tailed Hawk (RTHA) per 100 party hours and number of December days with snow cover in excess of 5 cm in four successive 7-year periods (1, count years 79–85; 2, count years 86–92; 3, count years 93–99; 4, count years 100–106) for the North and South Plains regions.

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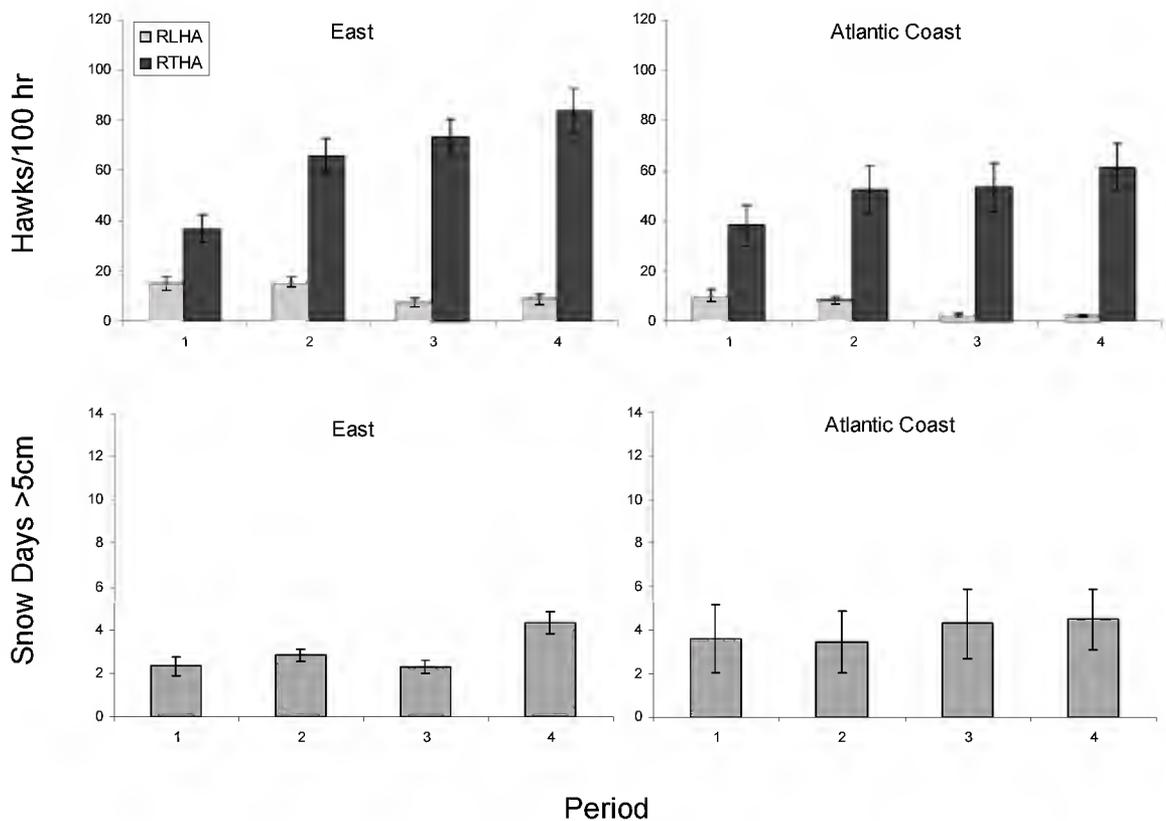


Figure 7. Average numbers of the Rough-legged Hawk (RLHA) and Red-tailed Hawk (RTHA) per 100 party hours and number of December days with snow cover in excess of 5 cm in four successive 7-year periods (1, count years 79–85; 2, count years 86–92; 3, count years 93–99; 4, count years 100–106) for the North and South Plains regions.

regions the Rough-legged Hawk declined, and in the Atlantic Coast region its abundance in the later 14-year period (2 birds/100 party hours) was the lowest of any region. In both regions days with significant snow cover remained relatively stable, with only a slight increase in snow cover for the last two 7-year periods for the Atlantic Coast. Human population growth in the counties associated with the CBC circles in both regions was low (8% for the East; 15% for the Atlantic Coast).

DISCUSSION

Christmas Bird Counts reveal changes in the winter distribution of the Rough-legged Hawk throughout its North American range. Ranges and migration dates of many species are changing in response to climate change (Møller et al. 2004, Schneider and Root 2002, Niven et al. 2009, Kim et al. 2009), and this northward shift in the Rough-legged Hawk's distribution is consistent with many other bird species in North America (Niven et al. 2009).

Logistic regression showed no significant effect of average December temperature on Rough-legged Hawk abundance. For snow cover (December days with cover >5 cm), however, the effect was negative and significant ($P < 0.001$). It is not surprising that Rough-legged Hawks might remain farther north or shift their wintering range to the north in response to less snow

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cover. Thiel (1985) showed a negative correlation between snow depth and Rough-legged Hawk numbers in Wisconsin. Watson (1986a) documented movements just after a major snowfall, and numerous authors observed changes in foraging behavior in apparent response to increased snow cover (Schnell 1968, Klein and Mason 1981, Temeles and Wellicome 1992, Watson 1986b, Lingle 1989). We found no evidence in our data for short-term (within a year) shifts in response to snow cover. For example, winters when the entire North Plains region experienced heavy snowfalls and many days with significant snow cover were not associated with any obvious decrease in Rough-legged Hawks. The shift was more gradual, apparently in response to the decrease in snow cover and improved opportunities for foraging over a longer term. Perhaps birds wintering in areas with reduced snow cover had higher survival rates or were more likely to return to a given area in subsequent years if the foraging conditions were good. This possibility is more consistent with the species' winter site fidelity as described by Watson (1986a), Gatz and Hegdal (1986), and Garrison and Bloom (1993).

Some regional trends suggest that factors other than climate may also be involved in this range shift. For example, snow cover decreased in the North Intermountain West (Figure 4) and, to a lesser degree, in the South Plains (Figure 5), but Rough-legged Hawk abundance in both these regions decreased. Other factors that might influence the winter distribution of the Rough-legged Hawk include loss of habitat, changes in the density or mix of prey, and competition with other open-country raptors.

We had no access to data on prey density or mix and no practical means of examining specific land-cover changes over the 28 years of the study for all CBC circles. Because increases in human population may reflect conversion of open country to cities, suburbs, or more intense forms of agriculture, we used human population increase from 1980 to 2000 in the county associated with each CBC circle as a very crude proxy for local habitat loss. Logistic regression showed a negative effect ($P = 0.04$) of human population growth on Rough-legged Hawk abundance.

To examine the potential influence of competition with other raptors, we analyzed trends in Red-tailed Hawk abundance in these same CBC circles. The Red-tailed Hawk is the most abundant raptor with which the Rough-legged Hawk shares most of its winter range. There is nearly complete overlap in the Red-tailed Hawk's habitat use (Weller 1964, Fischer et al. 1984, Bildstein 1987) and prey base (Craighead and Craighead 1956, Bildstein 1987) with those of the Rough-legged Hawk. Although Craighead and Craighead (1956) noted little direct competition between these species in Michigan, others have noted evidence of competition. Hogan (1983) reported a Rough-legged Hawk kleptoparasitizing a Red-tailed Hawk. Bildstein (1987) noted many agonistic encounters in Ohio, with Red-tailed Hawks pirating prey from Rough-legged Hawks more often than the contrary. Schnell (1968) reported that these two species avoid competing for prey and perches when possible. The Red-tailed Hawk uses a wider variety of prey and habitats than the Rough-legged Hawk (Weller 1964, Bildstein 1987), with the latter more restricted to open areas (Zarn 1975, Baker and Brooks 1981, Fischer et al. 1984, Lingle 1989).

We found that numbers of the Red-tailed Hawk increased in all regions

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except the North and South Pacific coasts. This widespread increase in wintering Red-tailed Hawks has been noted by others (Preston and Beane 1993, White 1994, McCay et al. 2001). Logistic regression of Red-tailed Hawk abundance versus changes in Rough-legged Hawk numbers showed a significant negative effect of the Red-tailed on the Rough-legged ($P < 0.001$), suggesting that competition between these species may be a factor in the range shift we observed. Given the finite amount of suitable habitat, it is reasonable to infer that large increases in the Red-tailed Hawk must, at some point, apply significant competitive pressures on the Rough-legged Hawk. In addition, the Rough-legged Hawk is more sensitive to urbanization than the Red-tailed Hawk (Bosakowski and Smith 1997, Berry et al. 1998, Schmidt and Bock 2005). Therefore, the increasing numbers of Red-tailed Hawks and increased conversion of habitat to urban uses may have a combined negative effect on Rough-legged Hawk abundance.

Regional Trends

Examination of trends for the ten regions suggests that changes in Rough-legged Hawk abundance might be influenced by some combination of the following: (1) Rough-legged Hawks staying in the North Plains region because of reduced snow cover in that area, (2) Rough-legged Hawks avoiding areas where Red-tailed Hawk density is high, and/or (3) loss of habitat associated with increases in human population. Our observation that numbers of the Rough-legged Hawk in the North Intermountain West and South Plains regions decreased in spite of reduced snow cover might be explained by these regions' high average abundance of the Red-tailed Hawk (81 and 74 birds/100 party hours, respectively). Also, both regions experienced high rates of human population growth (30% and 43%, respectively). Decreases in the Rough-legged in the South Intermountain West (Figure 4) were associated with high abundance of the Red-tailed (72 birds/100 party hours) and very high rates of human population growth (62%). The North and South Pacific Coast regions (Figure 3) had high abundance of Red-tailed Hawks (62 and 145 birds/100 party hours, respectively), high rates of human population growth (26% and 59%, respectively), and large decreases in Rough-legged Hawks. The North Plains region showed almost parallel increases in Rough-legged and Red-tailed Hawks (Figure 5). However, the abundance of the Red-tailed was low throughout the period (18–45 birds/100 party hours), and rates of human population growth were also low (9%). Both Great Lakes regions showed no significant change in Rough-legged Hawk abundance even though Red-tailed Hawk abundance increased (Figure 6). Average Red-tailed Hawk abundance was generally low for both Great Lakes regions (41 birds/100 party hours for the West Great Lakes; 48 birds/100 party hours for the East Great Lakes), however, and the human population grew slowly in the East Great Lakes (10%) and decreased in the West Great Lakes (–1%). The East region had low abundance of the Red-tailed (Figure 7) in the first 7 years (37 birds/100 party hours) but high abundance during the last three 7-year periods (66–84 birds/100 party hours) and a significant decline in the Rough-legged. Human population growth was low (8%). The Atlantic Coast was the one region where a decrease in Rough-legged Hawks was not associated with high Red-tailed Hawk abundance (Figure 7) and/or large

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increases in human population. In this region the Red-tailed Hawk's average abundance (51 birds/100 party hours) and human population growth (15%) were both fairly low. Snow cover on the Atlantic Coast did increase slightly in the last two 7-year periods, but this slight change seems unlikely to have been a major factor. Other factors may be responsible for trends in this region, or the decline in Rough-legged Hawks may simply be the result of more birds remaining in the North Plains region and not migrating to the coast.

One possible hypothesis to explain our results is the following. During the period we examined, increases in Red-tailed Hawks (possibly coupled with increased loss of open country) may have applied increasing competitive pressure on wintering Rough-legged Hawks. At the same time, decreasing snow cover in the North Plains made that area more productive for winter foraging, allowing Rough-legged Hawks to shift away from areas with high concentrations of Red-tailed Hawks. More broadly, this hypothesis suggests that while the northern limit of the winter range of the Rough-legged Hawk may be determined by climate factors (Bock and Lepthien 1976, Root 1988, Olson and Arsenault 2000), the southern, western, and eastern limits may be influenced by competition with the Red-tailed Hawk. More detailed data on actual historic land-use changes and interspecific interactions at the level of specific CBC circles could help test this hypothesis.

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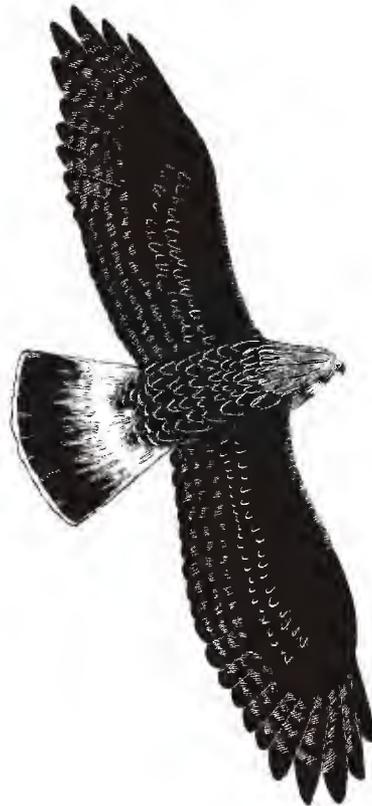
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Rough-legged Hawk

Sketch by George C. West

NESTING SUCCESS OF CALIFORNIA LEAST TERNS AT THE GUERRERO NEGRO SALTWORKS, BAJA CALIFORNIA SUR, MEXICO, 2005

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ABSTRACT: We studied a nesting colony of the Least Tern in the saltworks at Guerrero Negro, Baja California Sur, between 31 May and 23 July 2005. We marked the nests as they appeared and counted nests, eggs, and chicks daily. In a comparison of two periods of laying (31 May–13 June and 17 June–19 July) average clutch size of 15 nests (2.06 and 2.00 eggs/nest, respectively) did not differ, suggesting that in the year of our study food was not a limiting resource. We observed 36 chicks, 31 from the first period and five from the second. Incubation in the second period was interrupted by natural predation of nine nests (eight by coyotes and one by ravens). The hatching and fledging success of eggs laid during the first period were 100%, higher than for those laid in the second period (16% and 26%, respectively); the low values of the second period are attributable to a longer time during which the colony was exposed to predation. Though in an artificial habitat, the colony was not affected by human disturbance and enjoyed a high success rate overall. The problem of coyote depredation could be prevented with a fence, increasing the terns' success further.

The California Least Tern (*Sternula antillarum browni*) breeds from central California to the southern Baja California Peninsula (Thompson et al. 1997). Prior to the 1970s, Least Tern populations in California decreased because of loss of nesting habitat on beaches to human development and recreation (Massey 1974). Listing of *S. a. browni* under the United States and California endangered species acts in the early 1970s led to management such as nest-site protection and predator control, and these have yielded population increases in California (Thompson et al. 1997). In California, many aspects of Least Tern reproductive biology, such as site fidelity, habitat requirements, and reproductive success (e. g., Massey 1974, Atwood and Massey 1988) have been studied, as well as the species' response to management (Swickard 1974, Massey and Atwood 1981).

On the Baja California Peninsula, even though most of the coastline remains unaltered (Kramer and Migoya 1989), habitat loss and disturbance have caused partial or total reproductive failure of the California Least Tern in some areas (Palacios 1992, Mendoza 1994, Ibarra and Carmona 1998). Information on the birds' reproductive success, however, is available for only the northern and southern extremes of the peninsula (Palacios 1988, 1992, Mendoza 1994, Ibarra and Carmona 1998, Cuellar 2003). Although Least Tern breeding on the peninsula has been reported since 1927, the only data available for the entire peninsula are locations of nesting sites (Bancroft 1927, Lamb 1927, Massey 1977, Massey and Palacios 1994, Palacios and Mellink 1996).

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The Least Tern's nesting at Ojo de Liebre (Scammon's) Lagoon has been known since 1927 (Bancroft 1927). But its reproductive success in the central peninsula had not been studied until we addressed the question in the Guerrero Negro saltworks (central Pacific coast of the peninsula) in 2005 nesting.

STUDY AREA AND METHODS

The Guerrero Negro saltworks are a part of the El Vizcaíno Biosphere Reserve and are also operated by Exportadora de Sal (ESSA); they are closed to the public. Salt production involves pumping seawater from the Ojo de Liebre Lagoon along a system of connected ponds covering 27,773 ha. Water levels and salinity are kept fairly stable at all times, as a requirement of the industrial process. The first ponds of the system (S1-A and pond 1) receive water pumped from the lagoon, and their salinities are similar to those of the lagoon (ca. 33 practical salinity units); salinity values then ascend gradually from one pond to the next. The brine yielded by evaporation is pumped to a series of crystallization ponds where the salt precipitates and is collected. Although salt is produced year round, salt is collected from each pond for only one week every six months. At other times the ponds are undisturbed.

The colony we studied settled on a sand substrate with patches of salt flats. The colony is surrounded by low dunes and a margin of crystallization ponds (pond number 26: 27° 56' 42" N and 114° 02' 24" W). There is no vegetation on the nesting area, although patches of alkali heath (*Frankenia* spp.) and saltbush (*Atriplex* spp.) grow nearby and were used by the chicks to hide and to protect themselves from the sun and wind. The colony is approximately 4 km from the closest fishing areas.

Once we located the colony, we searched for nests daily (between 07:00 and 08:00), from 31 May until 23 July 2005. We counted the number of eggs in each nest and placed numbered wooden markers alongside each nest. We noted each egg's date of hatching and, in case of failure, the probable causes on the basis of nearby tracks. Using these data, we calculated two indicators of reproductive success: hatching success (proportion of chicks hatched out of the total number of eggs laid) and nesting success (proportion of nests that produced at least one chick; Erwin and Custer 1982). We also compared differences in clutch size and reproductive success between the two nesting periods by using a Kruskal–Wallis nonparametric test ($\alpha = 0.05$ in all cases; Zar 1999).

RESULTS

The reproductive season ran from 31 May until 23 July 2005. Most eggs (31, 51%) were laid during the first two weeks of the season (31 May–13 June), in 15 nests. Subsequently, laying was less concentrated, with 30 eggs laid over six weeks (17 June–23 July). In the first period, average clutch size was 2.06 eggs per nest, in the second, 2.00 eggs per nest; thus the periods did not differ significantly in clutch size (Table 1).

We observed 36 chicks, 31 hatched from eggs laid during the first period, five from eggs laid during the second (Table 1). The second hatching period was interrupted by predation of nine nests, eight of those, judged from nearby

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Table 1 Breeding of the California Least Tern at the Guerrero Negro Saltworks, Baja California Sur, México, 2005

Variables measured	First period	Second period	Both periods combined	Kruskal-Wallis value	Probability
Number of nests	15	15	30		
Eggs laid	31	30	61		
	(31 May–13 June)	(17 June–19 July)			
Chicks	31	5	36		
	(20 June–3 July)	(8 July–18 July)			
Clutch size	2.06	2.00	2.03	0.17	0.67
Hatching success	100%	16%	59%	43.05	<0.001
Nesting success	100%	26%	63%	16.79	<0.001

tracks, by coyotes (*Canis latrans*), and the remaining nest apparently was raided by Common Ravens (*Corvus corax*).

For both periods combined, the hatching success was 59% and the nesting success was 63% (Table 1). During the first period hatching success and nest success were 100%, but during the second period they were 16% and 26%, respectively (Table 1).

DISCUSSION

In 2005 Least Terns nested at the Guerrero Negro saltworks during the same interval as observed at Laguna Percebú at the extreme north of the Gulf of California (Palacios 1992) and in some years at Ensenada de la Paz in the far south (Cuellar 2003 for 1999), with the first laying at the end of May. Laying began, however, two weeks later than is typical for colonies in California (Massey and Atwood 1981) and as observed at Ensenada de La Paz in other years (Cuellar 2003 for 2000). Therefore the timing of reproduction at a given site apparently depends more on the specific conditions during a given season than on the geographic location.

At various sites on the peninsula, one of the main reasons Least Tern nests have failed has been human disturbance (Palacios 1988, 1992, Mendoza 1994). Within the Guerrero Negro saltworks, disturbance is at a minimum (Carmona and Danemann 1998), as probably reflected in the high success values we recorded, especially for the first period. Another factor that commonly diminishes success on the peninsula is tidal flooding (Palacios 1992, Ibarra and Carmona 1998), but the nests we studied were all outside the range of the tides.

At Guerrero Negro, nest failure was due largely to predation, with 60% of eggs laid after 17 June being lost to predation. Increased predation later in the season may be the result of the length of time of the colony is exposed; it has been noted that as more time passes, the probability that predators will locate the nests increases (Brunton 1999).

Predation observed in the saltworks was by native species (coyotes and

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ravens). At other colonies predators often include introduced fauna (Burger 1984, Martínez 2006). The Black-crowned Night-Heron (*Nycticorax nycticorax*) is a major predator of Least Tern eggs and chicks at some colonies (Brunton 1999). Though the herons breed at Guerrero Negro (Gutiérrez-Aguilar pers. obs.), the tern colony is away from areas they frequent.

That clutch size remained constant through the season suggests that at Guerrero Negro egg laying was not limited by food, at least in the single year of our study. Clutch size is known to be affected by food availability in various species of Laridae (Harris and Plumb 1965).

Hatching success at Guerrero Negro fell between the values of 57% and 90% reported for protected colonies of this species (Swickard 1974, Massey and Atwood 1981, respectively). Even the much lower hatching success later in the season (16%) was higher than values reported for some unprotected colonies (between 4% and 12%, Zuria and Mellink 2002, Ibarra and Carmona 1998, respectively). An exception to the lower values found in colonies without active protection is at Punta Banda, where hatching success values of almost 60% (Palacios 1992, Zuria and Mellink 2002) are linked to a minimal effect of the tides.

As at many colonies, the principal problem for the Least Tern at Guerrero Negro was predation, in this case by coyotes. Coyote predation could be avoided by fencing the colony to prevent access.

The Guerrero Negro saltworks, although carefully managed for salt production, is as undisturbed as any segment of the Baja California coast. The colony's high success rates is an example of human development not conflicting with conservation. The Least Tern colony at Guerrero Negro having success similarly to that of actively protected colonies elsewhere on the peninsula indicates that with minimal effort the saltworks can contribute to the conservation of these birds.

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NOTES

SANDWICH TERNS ON ISLA RASA, GULF OF CALIFORNIA, MEXICO

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In North America the Sandwich Tern (*Thalasseus sandvicensis*) breeds locally along marine coasts and offshore islands primarily of the southeastern United States and Caribbean (AOU 1998). In these areas it commonly nests in dense colonies of the Royal Tern (*T. maximus*) and Laughing Gull (*Leucophaeus atricilla*; Shealer 1999). It winters along the coasts of the Atlantic Ocean and Gulf of Mexico from Florida to the West Indies, more rarely as far south as southern Brazil and Uruguay. It also winters on the Pacific coast, mainly from Oaxaca, Mexico, south to Panama (Howell and Webb 1995), occasionally to Colombia, Ecuador, and Peru (AOU 1998). As there are no breeding colonies on the Pacific coast, all birds wintering there are believed to represent migrants from Atlantic and Caribbean colonies (Collins 1997, Hilty and Brown 1986, Ridgely 1981, Ridgely and Greenfield 2001). Sandwich Terns have occasionally wandered as far north as eastern Canada (New Brunswick, Nova Scotia, and Newfoundland) and inland to Minnesota, Michigan, and Illinois (AOU 1998, Clapp et al. 1983). In the Pacific vagrants are known from California and the Hawaiian Islands (Hamilton et al. 2007, AOU 1998).

Here we report vagrancy of Sandwich Terns to Isla Rasa, Gulf of California, Mexico, with our observations of single individuals in 1986 and again in 2008. Tordesillas noted the first on 17 May 1986, during her behavioral observations of nesting Elegant Terns. The Sandwich Tern was identified by being close in size to the Elegant Terns but having a black bill tipped with yellow. At that time, it appeared to be attending a nest. About an hour later we returned to the site but could not get sufficiently close to isolate its nest in a photograph without severely disturbing the dense Elegant Tern nesting colony surrounding it. On the following day we returned to the location of the Sandwich Tern and found only an Elegant Tern occupying the nest. The large size of this Elegant Tern colony, with 45,000 individuals (Tobon 1992), and the high densities of both the Royal and Elegant (9 nests/m² and 15 nests/m², respectively), precluded us from following the nest of this apparent Sandwich Tern/Elegant Tern mixed pair further, to determine its eventual outcome. If the colony is approached terns leave the nest and the eggs are exposed to severe predation by Yellow-footed Gulls (*Larus livens*).

In 2008, the second Sandwich Tern at Isla Rasa was not observed directly but inadvertently documented, this time among the densely nesting Royal Terns (which numbered near 14,000 individuals, the average annual population size for the island; Velarde and Anderson 1993, Velarde et al. 2005). While photographing newly hatched Royal Tern chicks within one of the many small subcolonies on the island on 4 May, Velarde captured a partial image of a Sandwich Tern (Figure 1). It was only later that evening, while reviewing her photos, that she discovered one of her images included the yellow-tipped black bill, breast, and folded wing of a Sandwich Tern among the many Royal Terns.

Along the Pacific coast north of Oaxaca, the Sandwich Tern has been reported previously only from California, where there are four records (Hamilton et al. 2007, ww.californiabirds.org/cbrc_book/update.pdf), all during the breeding season. It has

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Figure 1. Partial image (part of bill, breast, and wing) of the Sandwich Tern in the colony of Royal Terns on Isla Rasa in 2008.

not been previously verified in Baja California (Howell et al. 2001, Erickson et al. 2003). The first Sandwich Tern in California was observed in an Elegant Tern colony in south San Diego Bay in May 1980 (Schaffner 1981). What was believed to be this same individual recurred at the same location during the breeding seasons of 1982, 1985, and 1987 (Collins 1997), but there was no suggestion of successful nesting in any year. In May 1991 an adult was seen at Malibu Lagoon, Los Angeles County, and in summer 1991 and again from 1995 through 1997 what was presumed to be this same individual frequented the colony of Elegant Terns at Bolsa Chica, Orange County (Hamilton et al. 2007). In 1995, Collins (1997) documented the successful mating of this bird to an Elegant Tern, the pair producing a single chick. A single bird with “a small amount of orangish coloration along the tomium” of the bill was seen at North Island, San Diego, in early August 2007 (Singer and Terrill 2009). Most recently, one with the yellow tip of the bill apparently more extensive and diffuse than typical of the Sandwich Tern was at San Diego 11 May 2009 (identification under consideration by the California Bird Records Committee; photo at www.westernfieldornithologists.org/gallery).

The Sandwich and Elegant Terns have been considered components of a single superspecies (AOU 1998); on the basis of a genetic study, Efe et al. (2009) reported the Elegant to be nested among the subspecies of the Sandwich. They proposed that *T. s. sandvicensis* of the Old World be classified as species distinct from the New World taxa, consisting of two sister species, *T. elegans* and the present *T. s. acuflavidus* (including *T. s. eurygnathus*). So it may not be surprising that in California, and now in Baja California, vagrant Sandwich Terns have usually been associated with nesting Elegant and Royal Terns. It is likely that these observations of out-of-range Sandwich Terns are of birds caught up in the northwestward movement in early spring of Elegant and Royal Terns, which have also wintered in southern Mexico, to breeding colonies in the Gulf of California and southern California rather than following their usual northeasterly migration to breeding colonies in the Gulf of Mexico and southeastern United States.

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Given the very large size and densities of the breeding colonies of terns on Isla Rasa—currently some 200,000 Elegant Terns and 14,000 Royal Terns (Velarde pers. obs.), the probability of finding one or a few Sandwich Terns on the island is low. But in view of the recent trend in the vagrancy of this species in western North America, more attention should be dedicated to the possibility of future sightings. Occurrence of the Sandwich Tern in the primary colony of the Elegant could lead to sporadic hybridization and the appearance of variably intermediate birds throughout the range of the Elegant.

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CURVE-BILLED THRASHER REPRODUCTIVE SUCCESS AFTER A WET WINTER IN THE SONORAN DESERT OF ARIZONA

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Studies of avian reproductive success provide important clues about the relationship between a species' populations and its habitats. Although many species are hard to study because their nests are difficult to locate and assess, the Curve-billed Thrasher (*Toxostoma curvirostre*) is an ideal subject. Its open-cup stick nests are easy to find and often at a height convenient for observing nest contents. For the subspecies in southeastern Arizona (*T. c. palmeri*), the breeding season can begin in late January, but generally nesting does not increase sharply until late March, with a distinct peak from mid-April through mid-May (Corman 2005). The initiation of breeding, however, seems (in part) correlated with the amount of winter precipitation. Two or more wet months in succession lead to food resources sufficient to elicit early nesting (Smith 1971), but earlier clutches may be smaller than those laid later, as early in the season food supplies may be limited (Stahlecker 2003). As food supplies increase, clutch sizes increase (Smith 1971). On the other hand, the success rate of earlier nests may be greater, as important predators of eggs and nestlings, such as snakes, are less active early in the season (Tweit 1996). To assess the Curve-billed Thrasher's nesting chronology and reproductive success after a period of abundant autumn-winter rainfall, I began a study of its nesting near Tucson, Pima County, Arizona, in late January 1979.

The 130-ha study site, within the Sonoran Desert ecoregion (Ricketts et al. 1999), was on the east slope of the Tucson Mountains 3.2 km east-northeast of Gates Pass (111° 06' N, 32° 13' W) at an elevation of 793 m. The dominant overstory vegetation consisted of Saguaro cacti (*Carnegiea gigantea*), wolfberry (*Lycium* sp.), mesquite (*Prosopis* spp.), Chainfruit Cholla (*Cylindropuntia fulgida*), and palo verde (*Cercidium* sp.), with an understory predominantly of bursage (*Ambrosia* sp.) and annual forbs. All thrasher nests were easily located during nest building, egg laying, or early incubation, as all were in cholla and usually visible from a distance. I assessed nests' contents weekly by using a bicycle mirror attached to a rib from a decomposed Saguaro. At the Tucson weather station, ~11 km east-southeast of the study site, mean precipitation for October through January 1971–2000 was 9.0 cm, but for October 1978–January 1979 total precipitation was 23.13 cm; October had 4.72 cm, November 4.01 cm, December 6.93 cm, and January 7.47 cm, but February precipitation was below normal (1.07 versus 2.24 cm, respectively). Maximum temperatures from October 1978 through January 1979 averaged 16° C, lower than the 30-year mean of 19° C, perhaps because of increased cloud cover.

In 1979, laying of the first egg by 38 pairs of thrashers ranged from 14 February to 14 March; most laying was in mid-to late February. All 38 nests were in Chainfruit Cholla and averaged 154.9 cm (standard deviation ± 27.32 cm) above ground (range 108–212 cm). Mean clutch size was generally smaller (2.53 eggs, standard deviation ± 0.56) than reported in other studies of the Curve-billed Thrasher in southeastern Arizona, in which clutch sizes ranged from 2.5 to 3.2 eggs (Tweit 1996). For example, from 1963 to 1968 at nearby Saguaro National Monument, Anderson and Anderson (1973) found a mean clutch size in 86 Curve-billed Thrasher nests of 2.7 eggs. During my study, 19 of 38 clutches (50%) had two eggs, 18 (47%) had three eggs, and one (3%) had four eggs. Nesting success was high; among 38 clutches, at least one egg hatched in 36, for an apparent nest-success rate of 95%. Three other studies of the Curve-billed Thrasher in southeast Arizona during the late 1960s and early 1970s

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reported apparent success rates ranging from 58.1 to 63.1% (Tweit 1996). Of the nests I studied, the one with four eggs was destroyed when strong winds displaced it (at 212 cm above ground it was the highest nest), and another clutch was destroyed when the three eggs were punctured. Five eggs from five nests were infertile, for a fertility rate of 94% in 89 eggs. Of the 84 young that hatched, two died when their nest was blown from a cholla, five disappeared from four nests, and 77 fledged. Thus of 96 eggs laid, 80% fledged young, a rate higher than the 44% reported for 54 eggs during an earlier study near Tucson (Edwards and Stacy 1968, in Tweit 1996).

Predation has been identified as the most important factor in mortality of Curve-billed Thrasher eggs and nestlings (Tweit 1996). The vicious spines on the Chainfruit Cholla generally deter mammalian predators, but some local snakes, such as the Red Racer (*Masticophis flagellum*), Common Kingsnake (*Lampropeltis getulus*), and Gopher Snake (*Pituophis catenifer*), are capable of climbing into chollas and are known consumers of eggs and young birds. Predation by snakes, however, has not been reported early in the Curve-billed Thrasher's nesting cycle (Tweit 1996). In the clutch whose three eggs were punctured the punctures were small, suggesting destruction by either a neighboring Cactus Wren (*Campylorhynchus brunneicapillus*) or another Curve-billed Thrasher.

Precipitation above normal from October 1978 through January 1979 was likely responsible for early nesting of the Curve-billed Thrasher in late winter 1979. Temperature did not seem as important, but Edwards and Stacy (1968) reported the species laying as early as 26 January after a mild winter. As reptiles have been implicated as important predators of Curve-billed Thrasher eggs and nestlings, the high success rates in 1979 were perhaps related to the first nesting cycle of the year being completed before snakes emerged. Smith (1971) and Edwards and Stacy (1968) reported rates of nesting and fledging success higher when pairs nested early. Early nesting can be risky, however; 41 mm of a cold rain near Tucson in March 1968 resulted in death for several nestlings 3–6 days old (Anderson and Anderson 1973, Edwards and Stacy 1968).

At the time of this study in 1979, global warming had received little attention, but global climate change and its effect on ecosystem survival are currently at the forefront of numerous biological investigations. If the desert Southwest becomes drier and warmer as predicted, years of early nesting and high nest success, such as I observed in 1979, will become ever less frequent. Much will depend on vegetation changes. Cholla is the principal component of the Curve-billed Thrasher's nesting habitat at least in Arizona, with prickly pear, thorny shrubs, and other species used to a lesser extent. Corman (2005) reported that of 87 nests noted during research for the Arizona Breeding Bird Atlas, 90% were constructed in six species of cholla and that Curve-billed Thrashers avoided the Sonoran Desert where vegetation was sparse and cholla lacking. If a decrease in rainfall eliminates cholla, the thrasher's populations would be affected severely, except perhaps in irrigated urban settings.

My study's original objective was to assess the Curve-billed Thrasher's breeding success after a wet winter followed usually by a cooling trend in March; the winter was wet, but the March cooling did not occur. Stephen Russell suggested the study, and to him I am most grateful. I thank Robert Scholes for reviewing an early draft of the manuscript, and also thank reviewers Mathew Johnson and Robert Tweit, and editors Thomas Gardali and Philip Unitt who provided suggestions for improving a later draft.

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FIRST NORTH AMERICAN RECORDS OF THE RUFIOUS-TAILED ROBIN (*LUSCINIA SIBILANS*)

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The Rufous-tailed Robin (*Luscinia sibilans*) breeds in Asia from the Altai Mountains and upper Yenisei River east to the Amur River basin, Ussuriland, and Sakhalin and south to Transbaikalia and Manchuria (OSJ 2000). Nearest to Alaska is an isolated population in central eastern Kamchatka in the Trukhinka River valley (Dement'ev and Gladkov 1954, Vaurie 1959). The species winters mainly from the Yangtze valley, in southern China, south to Hainan; it is a scarce or uncommon winter visitant in northern Thailand, Laos, and Vietnam (Vaurie 1959, Robson 2000). It migrates primarily over continental Asia and is of only rare and irregular occurrence in Japan, primarily in May along the west coast and on islands of the Sea of Japan (Brazil 1991). In Europe, the Rufous-tailed Robin has been recorded once each in the fall at Fair Isle, Scotland (Shaw 2004), and in early winter at Białystok, Poland (Grygoruk and Tumiel 2006). This species has been reported three times from North America, all in Alaska.

The first Alaska sighting of the Rufous-tailed Robin was at Attu Island (52° 55' N 172° 55' E), in the western Aleutian Islands, on 4 June 2000. The bird was found along Gilbert Ridge trail by Heinl, who was leading a birding tour for Attour, Inc. The bird spent much of its time skulking in rock crevices and under snow banks at the base of the ridge but periodically emerged to forage on the open ground and matted vegetation adjacent to the trail. Photos and video of this bird by Jan Knott (Figure 1) and Diantha Knott (on file, University of Alaska Museum of the North [UAM]) were judged by Gibson et al. (2003), Robbins et al. (2003), and Banks et al. (2004) to be inadequate to substantiate the identification.

The first Rufous-tailed Robin well substantiated in Alaska was discovered and collected exactly eight years later, on 4 June 2008, at Attu by Sonneborn and Jack J. Withrow while conducting bird studies for UAM. The bird (Figure 2) was found in a deep canyon in West Massacre Valley, where it occupied willows approximately 50 cm tall growing among empty 55-gallon fuel drums left from World War II. The specimen was deposited at UAM, where the identification was corroborated by Daniel D. Gibson, who prepared the specimen (UAM 24600) as a study skin and partial skeleton plus frozen tissues, stomach contents, and lower digestive tract for disease screening. The specimen was a female, in its second year on the basis of retained buff tips of the greater wing coverts.

On the evening of 8 June 2008, another Rufous-tailed Robin was discovered and identified at St. Paul Island (57° 10' N, 170° 15' W), Pribilof Islands, by DeCicco, who was conducting bird studies for the Alaska Maritime National Wildlife Refuge. The bird remained through 9 June, frequenting rock outcroppings on Hutchinson Hill at Northeast Point, where it was seen by a number of people associated with several birding tours. This occurrence was well documented by photographs (Figures 3 and 4) obtained by Gregory L. Thomson (U.S. Fish and Wildlife Service) and Cameron D. Cox (St. Paul Island Tours); additional photographs were taken by George Armistead (Field Guides Birding Tours, Inc.) and Gary H. Rosenberg (WINGS Birding Tours, Inc.) on 9 June. The photographs revealed that, on the basis of the buff tips to the greater coverts, this individual was also in its second year (Figure 3).

The behavior of these three birds was similar. All tended to skulk behind and under any objects available such as large rocks or snow banks. The bird on Attu in

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Figure 1. Rufous-tailed Robin at Attu Island 4 June 2000. Note the long pink legs, brown upperparts with contrasting rufous tail and upper tail coverts, generally whitish underparts, and pale eye ring and supraloral area. Although the scaly pattern on the underparts is not obvious in these photos, the grayish markings that are visible (malar stripes, markings across the upper chest, and streaked appearance on the sides of the chest) are all formed by the grayish tips of those feathers.

Photos by Jan Knott

2000 remained under one rock for approximately 20 minutes and also hid under snow banks, moving briefly in and out of sight. On a number of occasions this same behavior resulted in the bird on St. Paul being difficult to flush from an area where it had ample shelter. The bird on Attu in 2008 was likewise very furtive, being difficult to flush and disappearing into willow tangles. On the ground these birds commonly cocked the tail to approximately 75° over the back, resulting in a very distinct posture. The birds bobbed and quivered the tail when they paused between flights or runs: the tail was cocked at a high angle, then rapidly flicked up and down three to five times, then quivered at a shallow angle on a horizontal plane. This tail movement was not sustained but occurred in short bursts as the birds moved around. No vocalizations were heard from any of them.



Figure 2. Rufous-tailed Robin specimen (UAM 24600) collected at Attu Island on 4 June 2008. Note the brown upperparts with contrasting rufous tail, generally whitish underparts, and obvious pattern of brownish gray scales on the throat, breast and flanks.

Photos by Daniel D. Gibson

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Figure 3. Rufous-tailed Robin at St. Paul Island on 9 June 2008. Note the brown upperparts with contrasting rufous tail, generally whitish underparts, and pattern of brownish gray scales on the flanks. The dusky malar stripes are also formed by the grayish tips to those feathers. The bird also exhibits a whitish eye ring with a duller supraloral stripe. The pale tips to the inner greater secondary feathers identify this bird as in its second year.

Photo by Cameron Cox



Figure 4. Rufous-tailed Robin at St. Paul Island on 9 June 2008. Here the tail appears brighter rufous and more contrasting with the brownish upperparts than in Figure 3, likely a result of the photographic exposure.

Photo by Gary Rosenberg

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The small size, round body shape, proportionally short-tailed and long-legged appearance, and behavior (skulking and tail bobbing) identified the three birds as small thrushes or chats in the palearctic genus *Luscinia*, of which there are 11 species (Monroe and Sibley 1993). The Rufous-tailed Robin is distinctive as the only small *Luscinia* featuring a combination of brown upperparts with a contrasting rufous tail (Figures 1 and 4), white breast, belly, and undertail coverts, and an obvious pattern of brownish gray scales on the underparts (Figures 2 and 3; see MacKinnon and Philipps 2000, Robson 2000). These characters were evident on all the Alaska birds, and each was marked with a pale buff eye ring and dull buff supraloral area between the eye and the bill (Figures 1 and 3).

Other species of *Luscinia* are either much larger (e.g., the nightingales *L. megarhynchos* and *L. luscinia*) or distinctively marked. Females of five species (the Siberian Blue Robin, *L. cyane*, Indian Blue Robin, *L. brunnea*, Blackthroat, *L. obscura*, Firethroat, *L. pectardens*, and Rufous-headed Robin, *L. ruficeps*) are most similar to the Rufous-tailed Robin in their shape and obscure markings. All, however, have some degree of buff or olive coloration on the underparts, which is generally lacking in the Rufous-tailed Robin. Female Siberian Blue and Rufous-headed robins have scaly patterns on the underparts but also have an olive-brown dorsum and buff throat and chest (Siberian Blue Robin) or an olive-tinged breast and flanks (Rufous-headed Robin). Females of the Blackthroat also exhibit a rufous tail (“rufescent-tinged uppertail-coverts, warm-tinged brown tail”; Robson 2000 but, in addition to buff underparts, have darkish (rather than pink) legs and lack a scaly pattern on the underparts.

Given the vigorous birding coverage of Attu and of the Bering Sea islands of St. Paul and St. Lawrence, these three sightings of the Rufous-tailed Robin represent the detection of yet another Asiatic species of only extralimital occurrence in western Alaska, like so many other birds recorded at those localities over the years. The fact that all three sightings in Alaska fell within a five-day window suggests a consistent timing of migration through areas exposing this species to weather systems able to blow it off course.

We thank Attour, Inc., the U.S. Fish and Wildlife Service, and UAM for their integral roles in our field work at Attu and St. Paul islands. For their efforts to help document these occurrences we acknowledge the diligence of George Armistead, Cameron D. Cox, Jan and Diantha Knott, Gary H. Rosenberg, and Gregory L. Thomson. The review and comments by Paul Leader regarding the identification of the first Rufous-tailed Robin on Attu were greatly appreciated. G. Vernon Byrd, Jon L. Dunn, Theodore G. Tobish, Jr., D. Shutler, and Jeffrey C. Williams provided reviews that greatly improved our manuscript. Finally, we thank Daniel D. Gibson for his thorough review of our manuscript and information and photographs of the specimen collected at Attu.

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BOOK REVIEWS

Bird Songs of the Pacific Northwest, by Geoffrey A. Keller and Gerrit Vyn. 2008. Cornell Laboratory of Ornithology. 5-CD set, including a 57-page booklet, \$39.95.

This set of five compact disks contains 931 separate recordings covering 316 species from the Pacific Northwest. This area is not defined, but to judge from a map on the back cover of the booklet it includes southwestern British Columbia, all of Washington and Oregon, the canyonlands of southwestern Idaho, and about a 100-mile swath of northern California. Each species receives its own track. Each track begins with the species' name, and individual cuts within each track are separated by a brief pause.

The booklet includes a short paragraph titled "Using This Audio Guide" that explains the information included in the descriptions of the tracks. After the acknowledgments and before the descriptions is a list of contributing recordists. A total of 69 recordists contributed recordings, including some of historical interest, such as that of the Black Oystercatcher by Arthur A. Allen. The primary author provided the lion's share of the recordings (38%), while the secondary author, serving primarily as producer and studio engineer, provided a little more than 5%.

Other major recordists are David H. Herr (8.1%), Thomas G. Sander (6.6%), and Randolph S. Little (6%). In the descriptions of the tracks, each track's number is followed by the species' name, followed by a list of recordings of that species with a brief description of each vocalization type, often with notes comparing it to sounds of similar species as well as an attempt at transcribing the sounds into print with the English alphabet. Also included are location by state or province (or country in a few examples), month, Macauley Library (ML) catalog number, and initials of the recordist. I found it very easy to follow the descriptions while listening to the recordings. The booklet concludes with an index to the species' English names.

Quality of Recordings. As we have come to expect from Keller's collaborations with the Macauley Library, the quality of the recordings is outstanding overall. The beginnings and endings of the cuts are cleanly and artfully edited without any irritating fading away in the middle of song phrases. Some cuts do have recognizable background noises, but they are always minimal and do not detract from the species portrayed. If any were edited to reduce background noise none have the typically tinny or tunnel effect that usually results from such treatment. All are a pleasure to listen to.

Species Selection. This "audio guide" is said to be focused on species "that breed within this region but also includes calls of many migrants and winter visitors one is likely to encounter." There are, in fact, so many nonbreeding species included I wonder why any were left out at all. Some rather uncommon ones, such as the Black Scoter, were included while more common ones, such as the Greater Scaup and White-winged and Surf Scoters, were not. The Rock Sandpiper was included; the Surfbird was not. The Common Redpoll was included; the Palm Warbler was not. At least six species known to breed (even if rarely) in the region were left out altogether: the Horned Grebe, Cattle Egret, Northern Hawk Owl, Broad-tailed Hummingbird, Blue Grosbeak, Great-tailed Grackle, and White-winged Crossbill. This makes the inclusion of two rarities in the region utterly incongruous: Virginia's Warbler and, especially, the Red-throated Pipit. Sure, it's nice to have an excellent recording of calls of the latter, no matter how brief the cut (at 8 seconds the briefest treatment of any species), but then why not include the Eastern Yellow Wagtail, Eurasian Kestrel, Brambling, etc.?

Vocalization Types. This set is clearly intended to be a wide-ranging, if not comprehensive, collection of species and vocalization types, not just an identification aid (the Turkey Vulture and American White Pelican are included, after all). Nor is it, as the title suggests, simply a collection of songs. Most tracks begin with the primary

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song followed by additional song types and then a variety of calls. All but 59 species have at least two cuts (the American Coot wins the prize with 10), most of those with just one cut being water birds, and some having more than one vocalization or sound type within the cut (such as the Common Nighthawk, with the *peent* and the boom). The owls are especially well represented by more vocalization types than in any of the other regional CD collections for North America (check out the barking alarm call of the male Long-eared Owl). Some interesting variants are included, such as an unusual song of the Olive-sided Flycatcher, as are several subspecies (of the White-breasted Nuthatch and Fox Sparrow, for example). Some species, such as some of the rails and owls, are represented even by distinct calls for each sex, when they differ. Unfortunately, only call notes and no songs are included for the Evening Grosbeak and House Sparrow (both of which mimic and are therefore of special interest).

Although the variety of vocalizations deserves to be praised, the opportunity to be utterly thorough was passed by. There are not only region-specific song dialects that differ from dialects of the same species elsewhere in North America, there are distinctive vocalizations (not just dialects) uttered by populations (and perhaps even unrecognized species) *within* the Pacific Northwest. This is a very large region, after all. I was disappointed by the lack of a song of the Streaked Horned Lark (*Eremophila alpestris strigata*), one of the most distinctive songs in the complex, for example, as well as of regionally distinctive subspecies of the Willow Flycatcher, Gray Jay, and Bushtit. The very incomplete selection of Red Crossbill types (and no indication of which ones are included) is a huge oversight. There are some attempts to include subspecific information with some cuts, but they are inconsistent. One example is the White-breasted Nuthatch, the first two cuts of which are given simply as two different song types, while the next two cuts of call notes are labeled as being from “interior” and “coastal” birds; all four cuts should have been so labeled.

Lack of Precision in Recording Localities. Related to the lack of recordings of subspecies, one of my biggest complaints is the lack of more precise localities for the recordings. In many cases, more specific locality data would have allowed the user to determine which form had been recorded. The Fox Sparrow represents the best attempt at labeling each cut with its subspecies group. But since each group is comprised of more than one subspecies, the actual location would have added very useful information.

A further example is Swainson’s Thrush, of which two distinctive forms (probably species) occur in the Pacific Northwest. The recording from Montana is obviously of an Olive-backed Thrush, but only the call is given (the description neglects to mention that the first calls are not the two-parted *whit-burrr* but rather the distinctive *prit* of this eastern form). On the other hand, the analogous liquid drop-like *whit* of the Russet-backed Thrush can be heard only in the background of the third cut, which otherwise features the harsher and less often heard alarm call. More precise locality data would also have made the Red Crossbill recordings more useful.

One can log on to <http://www.animalbehaviorarchive.org>, enter the Macauley Library catalog number in the search field, and thereby obtain a little more information on each recording. At the time of this writing, the only additional information available was the exact date of the recording, but it appears that more specific locality data may eventually become available. By listening to the entire recording on the website (from which cuts were taken for this publication), more information can be gleaned from the recordists’ tag notes for some of the recordings. Only in this way did I discover that the first cut of Fox Sparrow song, labeled as being from the “slate-colored group,” was recorded in the Cascades near Sisters, Oregon. This would place it in the subspecies *Passerella iliaca fulva*, which is a Thick-billed Sparrow, not a Slate-colored.

Several recordings were made entirely outside of the region. For example, calls of the Downy Woodpecker from Maryland were used when Keller’s perfectly good cut in *Bird Songs of California* (Cornell Laboratory of Ornithology, 2003) could have

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been borrowed (it's clear that the drums of this species are the same on both CDs, after all). The Spruce Grouse recorded in Maine is of a subspecies quite different from the one found in the Northwest (maybe even a different species), and a Northern Mockingbird call from Florida is from an unnecessarily distant location.

Booklet Notes. The notes describing the vocalizations are in general good but uneven in quality and usefulness. They are helpful in the examples comparing the Pacific-slope and Cordilleran Flycatchers but not for the Dusky and Sooty Grouse, where the former is said to be lower in pitch than the latter, though both my ear and the RavenLite sound-editing software indicate that they are in fact at the same pitch. The comparisons of woodpecker drumming are particularly useful. The first Yellow-rumped Warbler song is said to be similar to that of the Northern Junco (sic), but it sounds nothing like the simple trill of the Dark-eyed Junco cuts. Mimicry is mentioned in several species, but in others, such as Steller's Jay, Fox Sparrow, and Pine Siskin, it is ignored; only for the Gray Catbird, Sage Thrasher, and European Starling are some of the mimicked species mentioned. More notes on the behavior of the bird being recorded would have been useful, such as whether the call was given as an alarm near a nest, though sometimes it is noted if the bird is "agitated" (Red-breasted Nuthatch) or "perturbed" (Sora). The last two cuts for Brewer's Blackbird, for example, are not of typical call notes, and it would have been useful to know under what circumstances these particular calls were given.

Misidentifications. Finally, one last gripe is the misidentification of at least three cuts: the *chuck* notes attributed to a Hermit Thrush (second cut) are of a Varied Thrush, the first example of a Lesser Goldfinch song is actually of a Lawrence's Goldfinch, and the supposed call notes of a Nashville Warbler are those of a MacGillivray's Warbler. The third cut of the White-crowned Sparrow (labeled as a Mountain White-crowned Sparrow, "interior race," ML 42273) is definitely not that and is apparently the result of a mix-up in the studio; the recording with that catalog number at the ML website is indeed of a Mountain White-crowned Sparrow and is not the same as the recording on the CD. With a bit of searching, I found that the recording on the CD is actually ML 43976, recorded on the Oregon coast, and sounds like a White-crowned Sparrow that mistakenly learned a House Finch song—a fascinating and rare recording that I'm glad was included. Unfortunately, we are left without Keller's fabulous recording of the distinctive song of the Mountain White-crowned Sparrow from Hart Mountain, which to hear you must go to the website and listen to ML catalog number 42273.

Summary. The variety of vocalizations and heretofore unpublished vocalization types make this set one of the most valuable and interesting of publications by Keller and Cornell. The owls alone make it worth the purchase, and despite the few failings, it is an excellent product and one that all birders spending time in the Pacific Northwest should own.

I thank Will Russell for his insights and comments.

Rich Hoyer

Memoirs of a Wildlife Biologist, by David B. Marshall. 2008. Audubon Society of Portland, 5151 NW Cornell Rd, Portland, OR 97210; 503-292-9453. 220 pages, paper quarto, \$21.75. Issued without ISBN.

I decided to ignore the convention that discourages people from reviewing books by their friends because in this case there is some virtue in having a reviewer who knows the people and the subjects to a certain extent. I admit that I was a co-editor, with Dave Marshall and Matt Hunter, of *Birds of Oregon: A General Reference*. Marshall's memoir, issued privately through the Audubon Society of Portland, is far, far more than a personal recollection. It is in effect a compact history of the wildlife refuge system in the Far West, told through the experiences of someone who helped build the refuges from scratch.

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One reason why we are able to read this book at all is that the author came of age in the last years of the era in which wildlife jobs were available to people without college degrees. Marshall got his degree from Oregon State University at exactly the time when people with degrees were starting to enter the wildlife refuges' workforce in significant numbers after World War II. This meant that Marshall was hired at a very young age into jobs where he suddenly had more significant responsibilities than an entry-level person would have today. In short, he grew up with the refuge system and it grew up in part owing to his work.

Dave Marshall was a "kid birder" in Portland, Oregon, where he had unique access to figures such as Stanley Jewett (*Birds of Oregon*, 1940; *Birds of Washington State*, 1953), Ira Gabrielson (*Birds of Oregon*; *Birds of Alaska*, 1959), nature photographer/writer William L. Finley, and noted bird illustrator Bruce Horsfall. Along with a few boyhood friends, he developed the habit of birding northwest Oregon by bicycle after age 12, something that most parents would not allow, but he did. These birder kids of the late 1930s crossed the Cascade Range by bicycle when they were about 15, carrying camping gear, and ranged at large throughout the Portland area and the northern Willamette Valley, finding all manner of birds.

At age 17 in 1943, Marshall got a job as a fire lookout in the Fremont National Forest of southern Oregon, as did his friend Tom McAllister. They kept careful bird notes, and when Jewett suggested that they submit an article to the *Auk*, to their astonishment it was accepted. They were 18 years old, and shortly thereafter Marshall joined the Army Air Force, where he was trained as a B-17 ball-turret gunner and flew in several missions over Europe. One of the many unexpected anecdotes in this book is that Marshall first saw his *Auk* article in print at the out-of-the-way home of a British ornithologist, while waiting for a ship home to the U.S.

But this is just the curtain-raiser for the extraordinary chapters on the birth of the wildlife-refuge system, in which Marshall worked from shortly after the war until his selection as a senior official working on endangered species in the 1970s. Marshall was involved in early decisions about the direction of Stillwater National Wildlife Refuge in Nevada (there is considerable detail about this early work) and the Sacramento refuge complex (where he was assigned to show Peter Scott his first wild Ross's Goose and escorted Jean Delacour). His years at Malheur during the 36-year reign of legendary manager John Scharff provide a vivid sense of how that refuge came of age.

Also of great interest are chapters related to the management of new refuges in Hawaii and Alaska and the remarkably informal sequence of events that led to the establishment of the three refuges in the Willamette Valley of Oregon. It was an era of highly personalized decision making, before the Environmental Protection Agency and before all manner of procedures required today, yet the government bureaucracy has always provided challenges, and this book explains how the biologists of the time dealt with those issues.

There is a certain whiff of the Wild West in these recollections. Witness John Scharff allowing a local rancher to use a refuge truck on his acreage in exchange for use of the ranch tractor for refuge work instead of trucking a refuge tractor 50 miles over dubious roads. I can't help but admire the willingness of people of judgment to make good but politically risky decisions and deal with the consequences. Certainly the wildlife official who was prepared to risk his career by making ecologically sound decisions in the face of a negative report from the General Accounting Office and a prodding Congress would be harder to come by today, when a field guide to the jellyfish seems a necessary desk companion to anyone working with the political establishment.

Marshall's years in Washington, D.C., and in the West working on endangered-species legislation are set forth here as well, with an extraordinary series of personal vignettes of interactions with people that can only be placed in the "who would have guessed" category, for example, the discovery of Defense Secretary James Schlesinger

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poking around a marsh all by himself, a secret birder outside the Beltway.

Other examples (among many) are trips to remote Alaskan outposts by float plane and homemade boat to decide what to do about an inconveniently located herd of musk oxen and an assignment to take two Sandhill Cranes to Tokyo as a gift to the emperor of Japan—and what happened when he unexpectedly had to find them overnight lodging in Anchorage (no, I won't tell you). An enlightening encounter with Senator Mark Hatfield, traveling incognito, changed the future of a stuffed armadillo (I won't tell you that, either). The neighbors in D.C. turned out to be far more than just Gabrielson.

There may be other, more formal histories of wildlife management in the western U.S. available, but I guarantee that none is more interesting or more moving in making clear what an honest, determined individual can do. The book has been produced somewhat informally, with some editing issues and unfortunately no ISBN, but it is an instant classic.

Alan Contreras

FEATURED PHOTO

JUVENAL PLUMAGE OF THE AZTEC THRUSH

KURT A. RADAMAKER, 16313 E. Crystal Point Dr., Fountain Hills, Arizona 85268; kurtrad@att.net

The monotypic Aztec Thrush (*Ridgwayia pinicola*) is endemic to Mexico (Howell and Webb 1995). It ranges from the mountains of central Chihuahua and Coahuila south to the Isthmus of Tehuantepec, favoring Madrean pine–oak woodland (Conservation International 2008) and pine forest from 1800 to 3500 m elevation (Howell and Webb 1995). Outside Mexico, it is casual in southeastern Arizona and southern Texas (AOU 1998). The secretive nature, irregular distribution, and nomadic habits of the Aztec Thrush make it difficult to study, leading to some uncertainty about its true status over much of its range. Also, little is known about its demography and life history; for example, the nests, eggs, and fledglings have rarely been observed.

On 1 September 2007 David Powell and I observed a recently fledged Aztec Thrush (see the photos featured on this issue's back cover), along with an adult female. They were in a steep-walled ravine in Madrean pine–oak woodland with a small flowing creek, located off a cobblestone road above the restaurant and lodging at km 266 along Mexico Highway 16 at Mesa del Campanero, about 20 km west of the town of Yecora. This area is in a rugged region of the Sierra Oscura along the southern Chihuahua/Sonora border, surrounded by deep forested canyons (barrancas) typical of the higher reaches of the Sierra Madre Occidental. As we approached the ravine we flushed the birds from a large oak and noted the adult female carrying food. The juvenile, with only a partially grown tail (see top photo featured on this issue's back cover), alighted nearby and allowed close approach, while the adult female was wary and kept mostly hidden. The adult stayed nearby and responded to pishing and mimicking of owl whistles by giving a raspy high-pitched “skree” call several times. The call was reminiscent of a Spotted Towhee (*Pipilo maculatus*) “shree” but higher pitched. The juvenile remained silent.

The juvenal plumage of the Aztec Thrush has rarely been photographed, is seldom depicted in field guides, and is infrequently encountered in the field. Outside of Mexico there is only one documented occurrence of a juvenile, of a bird photographed on 21 August 1977 at Boot Canyon, Big Bend National Park, Texas. Remarkably, that bird provided the first record for the United States (Wolf 1978). The juvenal plumage is quite different from the striking black and white of the adult and may offer some identification challenges. The overall ochraceous-buff appearance—combined with the heavily spotted/scaly breast and underparts, a characteristic shared with other juvenal-plumaged thrushes—could cause confusion, possibly with the juvenile Rufous-backed Robin (*Turdus rufopalliatu*s) or American Robin (*T. migratorius*).

While there is potential for misidentification, with clear looks the identification is uncomplicated. Even with the noticeable differences from the adult in the contour feathers, on the bird we saw at Mesa del Campanero the black wings with contrasting white markings on the secondaries and primaries produced a subtle but clear resemblance to the adult. The resemblance was especially noticeable in flight. The color of the upperparts was sooty blackish brown with prominent ochraceous-buff streaking on the face, crown, nape, back, scapulars, and wing coverts. The coarse streaking on the crown formed a conspicuous supercilium, and the broad wedge-shaped spots of buff on the tips of the greater wing coverts formed a wide but broken lower wing bar. The breast and underparts were buff and heavily scalloped with black. The broad black margins to the feathers of the breast and underparts produced prominent spots. The eye was dark brown, the bill black, and the legs pink.

FEATURED PHOTO

These photographs document only the second known nesting of the Aztec Thrush in Sonora and one of relatively few records of the species from that state. Russell and Monson (1998) cited just two reports, including one of an adult and three young birds on 17 September 1984, establishing the first breeding record for Sonora. Those birds were also near Mesa del Campanero. In fact, all Aztec Thrush sightings for Sonora of which I am aware come from the vicinity of Yecora, I suspect because of the area's easy access via Mexico Highway 16. The 280 km of highway from Hermosillo to Yecora is a well known birding corridor, only a day's drive from Nogales, Arizona.

A review of *North American Birds* (NAB) reports for the Aztec Thrush in Sonora since reporting began for Mexico in March of 2001 yielded a single report of 15 birds on 16 July 2006 at Yecora (NAB 60:584). However, I am aware of a few other sightings by birders who have visited Yecora, e.g., 5 birds on 10 July 2006 (Richard E. Webster pers. comm.), a lone female on 26 May 2008 (David Powell), and two winter reports: 12–15 birds on 19 December 1998 (Richard Palmer pers. comm.) and 25 birds on 20 December 1998 on the Yecora Christmas Bird Count (CBC). Forrest Davis (pers. comm.), compiler of the Yecora CBC, reports seeing the Aztec Thrush sporadically at Mesa del Campanero and in the surrounding barrancas above Yecora since 1990.

The status of the Aztec Thrush in Sonora, especially the northern limits of its breeding range and its status in winter, is not entirely clear. But the species is proving to be more regular in Sonora than the number of published records suggests. In Arizona there are approximately 20 accepted records, including several of multiple birds, e.g., up to nine in Madera Canyon, Santa Cruz County, 24 July 2006–7 August 2006. (Rosenberg and Witzeman. 1998, Rosenberg 2001, unpubl. data). There are four accepted records for Texas (Lockwood and Freeman 2004). Most of these sightings were during the summer monsoon season from July through September; there are only two acceptable reports in winter. This pattern of occurrence in Arizona and Texas appears to coincide with the species' status in Sonora. Phillips (1991) suggested that summer residents withdraw from northwestern Mexico from October through February; Howell and Webb (1995) reported that the Aztec Thrush occurs in winter north at least to Sinaloa. Given the two winter reports of sizable flocks at Yecora, evidently it occasionally winters in Sonora as well.

In Sonora the Aztec Thrush should be considered a rare and local summer resident and casual winter visitant to the higher Madrean pine–oak woodlands and pine forests of the Sierra Madre Occidental.

I thank Richard E. Webster, David Powell, Cindy Rademaker, Forrest Davis, Richard Palmer, Mark M. Stevenson, Richard A. Erickson, and Osvel Hinojosa for helpful comments and suggestions.

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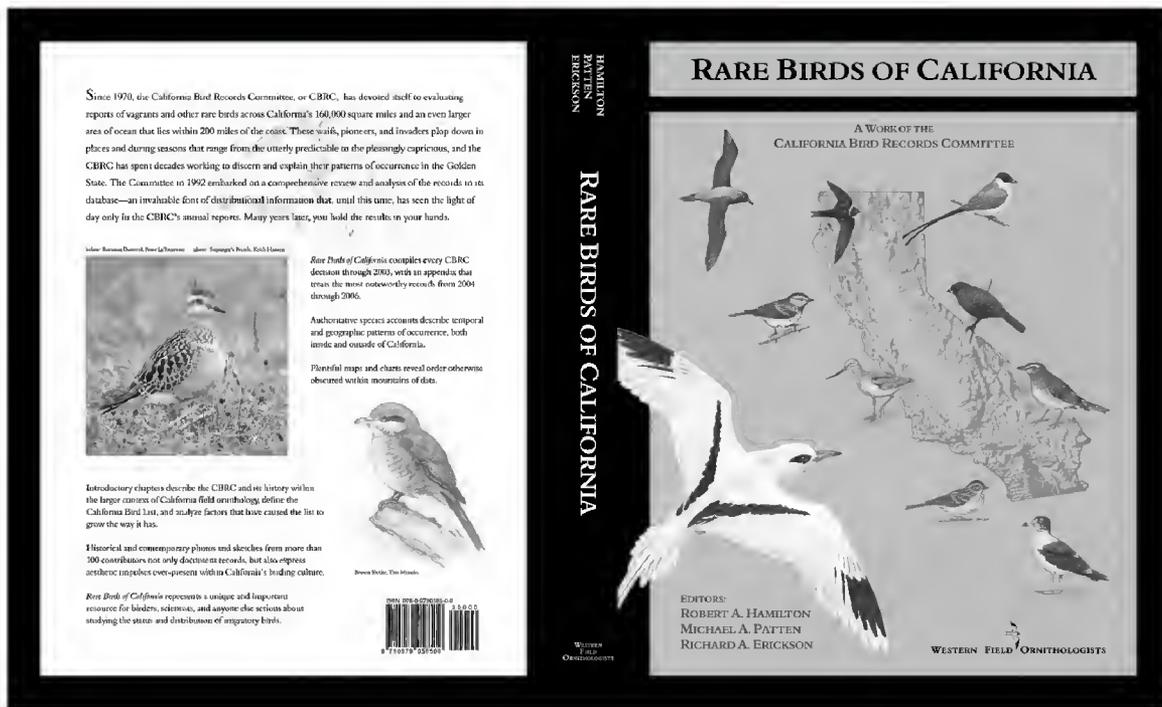


Aztec Thrush

Sketch by Narca Moore-Craig

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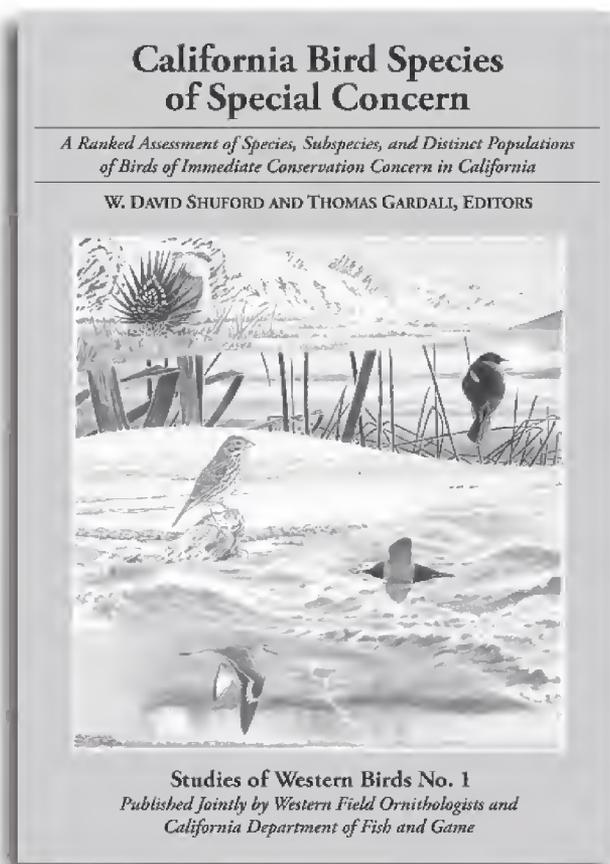
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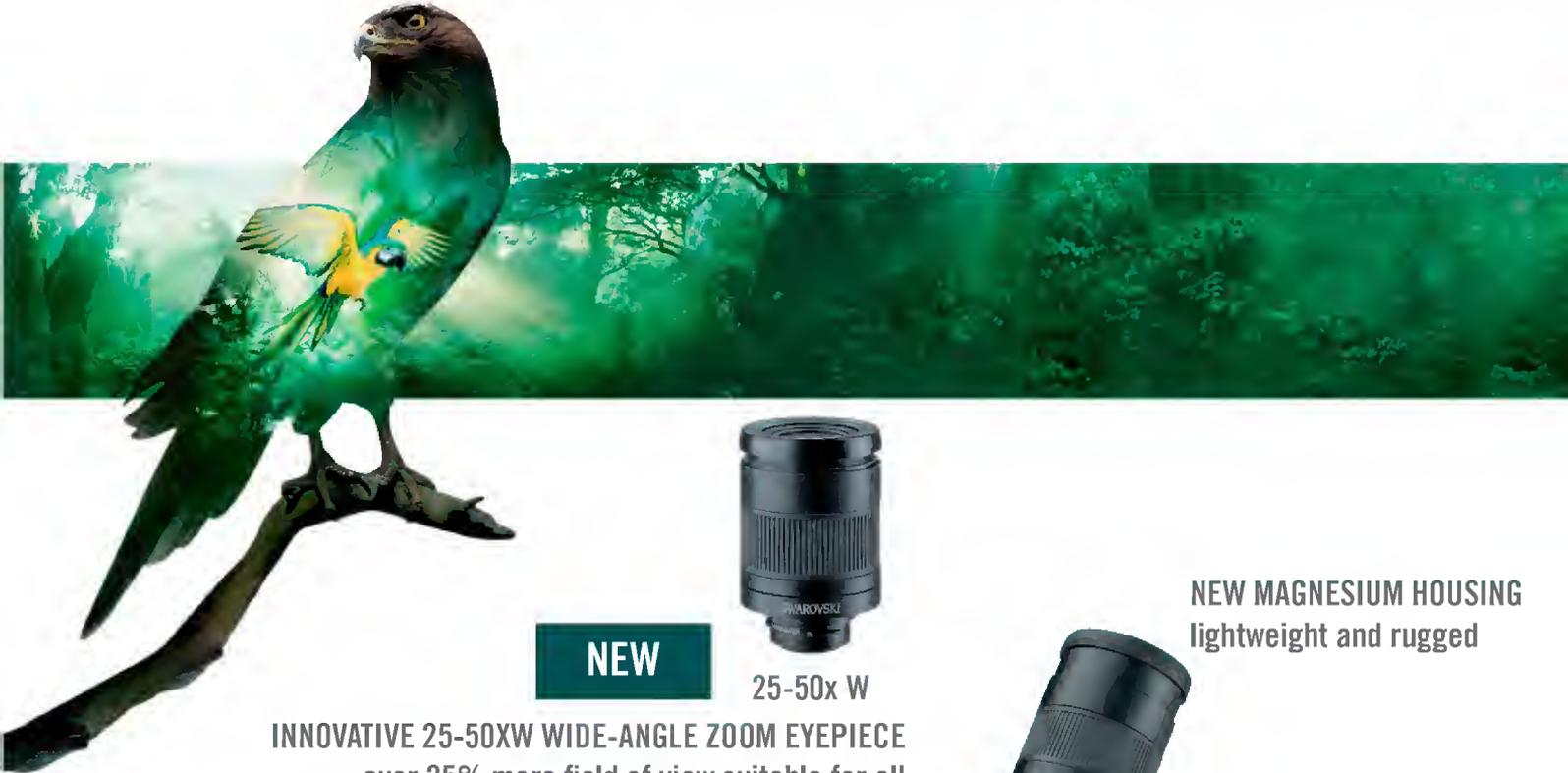
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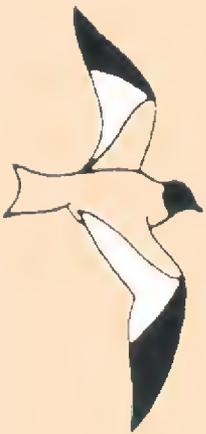


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