WESTERN BIRDS

Vol. 39, No. 1, 2008

Western Specialties:

Lutescent Orange-crowned Warbler (*Vermivora celata lutescens*)

Photo by © Peter LaTourrette of Los Altos, California:
Coyote Point Recreation Area, San Mateo County, California, 17 October 2007
Note the uniformly strong yellow tinge to both the upperparts and underparts, characteristic of both sexes of *Vermivora celata lutescens* (yellow tinge stronger in males).

Rocky Mountain Orange-crowned Warbler (*Vermivora celata orestera*)

Photo by © Peter LaTourrette of Los Altos, California:
Coyote Point Recreation Area, San Mateo County, California, 26 October 2007
Note the contrasting gray head, characteristic of many females of *Vermivora celata orestera*, and underparts paler yellow than in *V. c. lutescens*, characteristic of both sexes of *V. c. orestera*, when the comparison is made by sex. Many males of *V. c. orestera* resemble females of *V. c. lutescens* closely.

Volume 39, Number 1, 2008

First Record of the Lanceolated Warbler Breeding in North America
Erik M. Andersen, Cornelius Schlawe, and Stephen Lorenz 2

Extirpation of the Willow Flycatcher from Yosemite National Park
Rodney B. Siegel, Robert L. Wilkerson, and David F. DeSante 8

Breeding Records of the Surfbird, Wandering Tattler, American Golden-Plover, and Upland Sandpiper in the Southwest Yukon Territory
Sabine Nouvet, Scott Wilson, and Kathy Martin 22

NOTES

Black Skimmer Occurrences in New Mexico, Including a High Elevation Record *Sartor O. Williams III and William H. Howe* 31

Terrestrial Foot-Paddling by a Glaucous-winged Gull
Ryan P. O'Donnell 33

First Record of the Cassin's Vireo Nesting in Alaska
Lucas H. DeCicco and Nicholas Hajdukovich 36

Current Status of the Cactus Wren in Northwestern Baja California
Kevin B. Clark and Mark Dodero 39

Book Reviews *David Fix, Enriqueta Velarde, Steve N. G. Howell, and J. Michael Reed* 44

Featured Photo: Attemped Kleptoparasitism by a South Polar Skua on a Laysan Albatross *Steve N. G. Howell and Debra L. Shearwater* 54

Front cover photo by © Cornelius Schlawe of Berlin, Germany: Lanceolated Warbler (*Locustella lanceolata*), Buldir Island, western Aleutian Islands, Alaska, 11 August 2007.

Back cover "Featured Photo" by © Steve N. G. Howell of Stinson Beach, California: South Polar Skua (*Catharacta maccormicki*) attacking a juvenile Laysan Albatross (*Phoebastria immutabilis*) near Cordell Bank, Marin County, California, 30 September 2007.

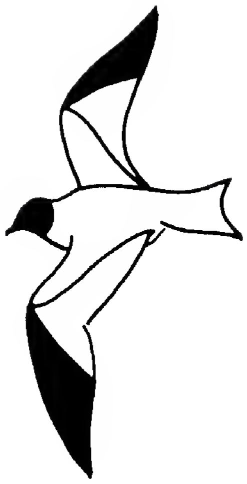
Western Birds solicits papers that are both useful to and understandable by amateur field ornithologists and also contribute significantly to scientific literature. The journal welcomes contributions from both professionals and amateurs. Appropriate topics include distribution, migration, status, identification, 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.wfo-cbrc.org/journal.html).

Good photographs of rare and unusual birds, unaccompanied by an article but with caption including species, date, locality and other pertinent information, are wanted for publication in *Western Birds*. Submit photos and captions to Photo Editor. Also needed are black and white pen and ink drawings of western birds. Please send these, with captions, to Graphics Manager.

WESTERN BIRDS

Volume 39, Number 1, 2008



FIRST RECORD OF THE LANCEOLATED WARBLER BREEDING IN NORTH AMERICA

ERIK M. ANDERSEN, 518 McDuff Dr., Alford, Florida 32420

CORNELIUS SCHLAWE, Paul-Schmidt Str. 5, 12105 Berlin, Germany

STEPHEN LORENZ, Department of Biology, Memorial University, St. John's, Newfoundland A1B 3X9, Canada; slorenz@mail.com

ABSTRACT: The Lanceolated Warbler (*Locustella lanceolata*) is a Eurasian species whose breeding range reaches east to include northern Japan, the Kuril Islands, and the Kamchatka Peninsula. It has been recorded three times previously in North America—twice in the western Aleutian Islands, Alaska, once in California. During our work at Buldir Island, western Aleutian Islands, in 2007, we documented the fourth occurrence of the species and the first nesting record within the political limits of North America.

STUDY AREA AND METHODS

Buldir Island is a 2000-ha (6.4 km × 3.2 km) volcanic outcrop located approximately 100 km from Kiska Island to the east and 130 km from Shemya Island to the west in the western Aleutian Islands, Alaska (Figure 1). Located at 52° 21′ N, 175° 56′ E, Buldir Island experiences weather typical of a northern maritime climate. The average temperature at sea level is approximately 7.7° C in the summer and 3.7° C annually, and precipitation averages about 81 cm annually, on the basis of weather data from similarly sized Shemya Island. Strong winds, fog, and light rain are common.

Part of the Alaska Maritime National Wildlife Refuge, Buldir Island is the site of a long-term seabird-monitoring station operated by the U.S. Fish and Wildlife Service (see Andersen 2007). The island's importance for migrant birds from Asia has been previously documented (Byrd et al. 1978, Byrd and Day 1986). We were present on the island from 29 May through 27 August 2007 as biologists for the refuge. Our duties during this period included the documentation of all bird species occurring on the island.

RESULTS

We observed several migrant passerines of Asiatic origin on Buldir during the first and second weeks of June 2007, following strong southwest winds. We first noted the Lanceolated Warbler (Figure 2; see also photo on this

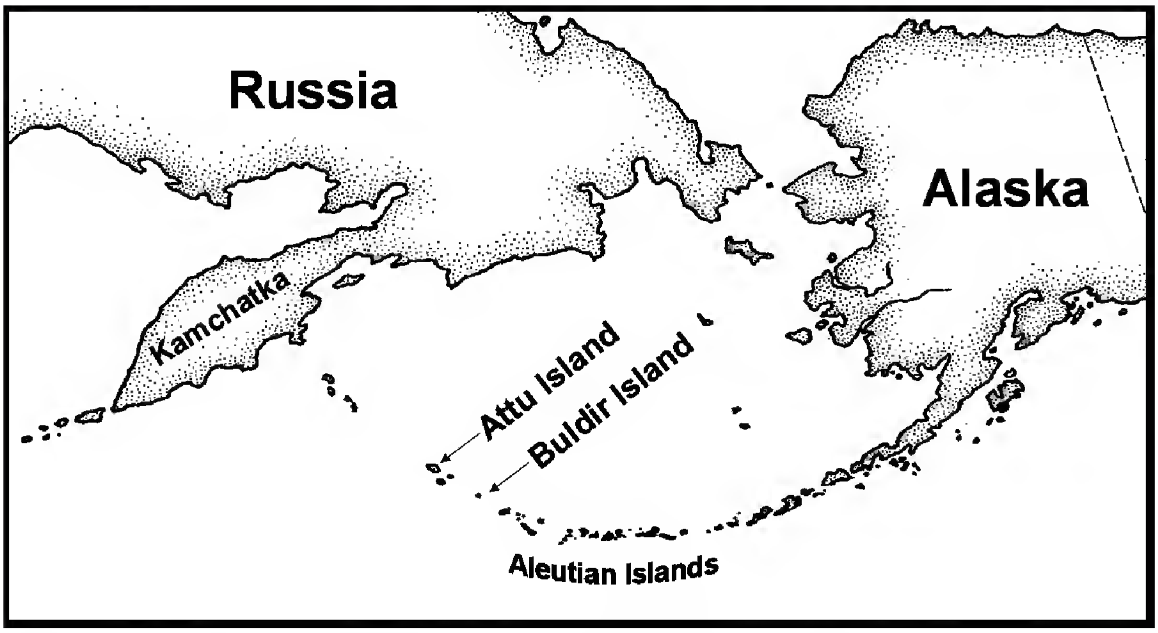


Figure 1. Location of Buldir Island in the western Aleutian Islands.

issue's front cover) on 8 June, when a single male was heard singing in the alluvial valley near the main camp. Identification was made by eliminating the two other streaked species of *Locustella* that occur in eastern Asia, Pallas's Grasshopper-Warbler (*L. certhiola*) and Common Grasshopper-Warbler (*L. naevia*), by the criteria summarized by Hickey et al. (1996).

Over the next two days (9–10 June), we found a total of four Lanceolated Warblers singing in the two valleys that constitute the majority of the island's flat lowlands (Figure 3; audio and video recordings are archived at the University of Alaska Museum, Fairbanks). Songs were typically introduced by short, interrupted stretches of singing that gradually extended into a continuous metallic trill reminiscent of a decelerated Common Grasshopper-Warblers.

Figure 2. Lanceolated Warbler on Buldir Island, Alaska, August 2007. From vocalizations and analysis of photographs of the two adult birds present in August, this individual was the female.

Photo by Cornelius Schlawe

Figure 3. Territory of occupied by Lanceolated Warblers on Buldir Island, Alaska, August 2007.

Photo by Cornelius Schlawe

All four birds appeared to be establishing territories and, except during a period of decreased activity in the afternoon, they could be heard singing nearly continuously throughout the day and dusk.

While observing and photographing one of the singing males on 12 June, we flushed a second individual, likely a female, from the territory; thus at least five Lanceolated Warblers were on Buldir in the spring of 2007. At least three of the male warblers continued to sing for the next week. By 18 June only one individual was still singing, and we continued to see it until 21 June, when the species was last observed before a 53-day hiatus.

On 11 August Schlawe located a Lanceolated Warbler in the same area where the pair had been noted in June. The bird was agitated by his approach and issued strong warning calls for 15 minutes before disappearing into the vegetation. The warning call can be characterized as a "chack" similar to the warning call of the Winter Wren (*Troglodytes troglodytes*) but slightly higher in pitch and less wooden.

The bird shortly reappeared carrying an insect, but the agitation and warning notes continued, and the food was subsequently swallowed. Schlawe then concealed himself in nearby vegetation, and over the course of 36 minutes observed the warbler making food deliveries on three occasions (Figure 4).

The food items were delivered to a small meadow characterized by short sedges and grasses interspersed with tussocks of tall grass. The bird foraged in the tall vegetation surrounding the meadow. Upon arriving near the presumed nest, the bird alighted on one of the grass tussocks before dropping into the shorter grass and sedges at the base of the tussock. Although the transfer of food to chicks was obscured by vegetation, the fact that the food

Figure 4. Lanceolated Warbler carrying insects on Buldir Island, Alaska, August 2007.

Photo by Cornelius Schlawe

was consistently delivered to the same location suggested that the chicks were relatively immobile at the time.

Approximately 25 minutes after the last food delivery, a second Lanceolated Warbler approached the area. This bird appeared slightly darker than the first individual, and later analysis of photographs revealed that the two individuals could be distinguished readily. The feathers of the second bird were more worn, particularly in the coverts, scapulars and crown, accounting for the overall darker appearance. Additionally, the second individual showed a conspicuous amount of orange on the maxilla that contrasted markedly with the primarily dark maxilla of the first bird. After it was seen singing on a later visit, we identified this second bird as a male and thus presumed the first individual was the female. The male uttered a few warning calls and quickly disappeared.

On 12 and 13 August Andersen visited the area where Schlawe had seen the food deliveries. Although he saw the adult birds and heard their warning calls on both days, he noted no further evidence of nesting on these visits.

On 16 August Andersen flushed two individuals from an area of relatively short sedge and grass. One of the birds was clearly an adult, but the other appeared darker and flew in a weaker, less direct manner. The two birds flushed approximately 15 m in different directions; the adult perched and began giving the alarm call. By this time, three other observers had reached the site and the dark bird was flushed a second time at closer range. The bird had the same shape and general appearance of the adult but fresh flight feathers and large amounts of downy juvenal plumage on the back and rump. The dark bird flew in a manner similar to that of the adult, but more exaggerated—very fast wing beats with the body tilted into a more vertical position. The bird's flight was straight and ended with an abrupt drop into the vegetation. The bird was flushed a third time, and although the views were brief, the examination was ample to identify it as a juvenile Lanceolated Warbler.

Over the next four hours, our team spread across the site, seeing and hearing the warblers several times. The adult gave occasional alarm calls, and a second call was noted in the region where the fledgling alighted. The juvenile's note was a very high "cheep" typically issued singly with long periods between calls. The juvenile moved through the area, primarily in the direction of the calling adult, but never left the cover of the vegetation.

During this time, the adults were active nearby. The female was heard issuing the "chack" call on several occasions and was often seen perched on top of vegetation. At ~14:00 both adult birds were present at the site. The male was observed carrying food and singing a short (1–2 seconds) rendition of the extended song heard in June, enabling us to sex the two adult birds and confirm that both parents participated in chick-rearing. While carrying food, the male perched on vegetation three times for 10–30 seconds and gave the abbreviated song. The juvenile answered from nearby and moved in the direction of the adult. The adult bird appeared nervous and swallowed the food after the third appearance above the vegetation—the two birds were never closer than 10 m during this time. Activity decreased during mid-afternoon, and we returned to camp.

On 18 August, Andersen noted two adult Lanceolated Warblers calling at the site, indicating that both the male and female make the "chack" note. This final observation was followed by several days of inclement weather, and the Lanceolated Warblers were not resighted again before our 27 August departure.

DISCUSSION

Although this is the first confirmed breeding record of the Lanceolated Warbler for North America, there is some suggestion that the species may have nested in the Aleutians in the past. The first report of it there (Tobish 1985) involved at least 25 individuals observed between 4 June and 15 July 1984 on Attu Island, approximately 180 km west of Buldir. One of those was observed carrying possible nesting material on 9 June. There was no evidence of nesting associated with the second American occurrence, of a juvenile banded on Southeast Farallon Island, California, on 11 September 1995 (Hickey et al. 1996) or the third, of single birds reported at Attu on 2 June and 6 June 2000 (Gibson and Byrd 2007). Other species of Asiatic birds also have been recorded breeding occasionally in the western Aleutians, particularly in years when spring storms caused substantial "fallouts" (Gibson and Byrd 2007).

The activity of the warblers at Buldir Island after the chick had fledged was restricted to a valley floor and covered a fairly large area. Based on mapping by means of the global-positioning system, the territory used by the nesting warblers covered approximately 2.8 ha and had an average elevation of 13 m. The site was located in a triangular alluvial valley where surrounding hills likely sheltered the warblers from the high winds characteristic of the island.

Vegetation in the territory consisted of a patchwork mosaic of several herbaceous habitat types described by Byrd (1984). About 60% of the territory contained tall plant cover (canopy height >1 m); the majority of the Lanceolated Warblers' foraging seemed to occur in this habitat. Dominant species included Sand Ryegrass (*Leymus arenarius*), Pacific Reedgrass (*Calamagrostis nutkaënsis*, fide Hultén 1968), Ladyfern (*Athyrium filix-femina*), Cow Parsnip (*Heracleum lanatum*), and Seacoast Angelica (*Angelica lucida*).

The remaining 40% of the territory included mesic areas characterized by shorter (0.5–1.0 m) grasses and sedges. This habitat was not as dense and was less botanically diverse than the taller habitat type. Much of this area was dominated by reedgrass, but several patches of shorter sedge (*Carex* sp.) marsh were also present. The nesting habitat used by Lanceolated Warblers at Buldir was apparently similar to that used in Asia (Dementiev and Gladkov 1954).

ACKNOWLEDGMENTS

We thank our team on Buldir Island for their help and companionship throughout the season: Scott Freeman, Sampath Seneviratne, Nick Seferovic, Pam Woodman, and Chris Smalls. We are grateful for the support of the staff of Alaska Maritime National Wildlife Refuge, especially Vernon Byrd and Jeff Williams, who were instrumental in the development of the monitoring program on Buldir Island and also assisted in the editing of the manuscript. In addition we thank Dan Gibson and Steve Heinl for useful comments on an earlier draft of the manuscript.

LITERATURE CITED

Andersen, E. M. 2007. Biological monitoring at Buldir Island, Alaska in 2007: Summary appendices. U.S. Fish & Wildlife Service Admin. Rep. AMNWR 07/08. Available from Alaska Islands Maritime Wildlife Refuge, 95 Sterling Highway, Homer, AK 99603.

Byrd, G. V. 1984. Vascular vegetation of Buldir Island, Aleutian Islands, Alaska, compared to another Aleutian island. Arctic 37:37–48.

Byrd, G. V., and Day, R. H. 1986. The avifauna of Buldir Island, Aleutian Islands, Alaska. Arctic 39:109–118.

Byrd, G. V., Trapp J. L., and Gibson, D. D. 1978. New information on Asiatic birds in the Aleutian Islands, Alaska. Condor 80:309–315.

Dementiev, G. P., and Gladkov N. A. 1954. Birds of the Soviet Union, vol. 6. Sovetskaya Nauka, Moscow. [English translation by the Israel Program for Scientific Translations, Jerusalem, 1968.]

Gibson, D. D., and Byrd, G. V. 2007. Birds of the Aleutian Islands, Alaska. Series in Ornithology no. 1, Nuttall Ornithol. Club, Cambridge, MA.

Hickey, C. M., Capitolo, P., and Walker, B. 1996. First record of a Lanceolated Warbler in California. W. Birds 27:197–201.

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford Univ. Press, Stanford, CA.

Tobish, T. G. 1985. The first record of *Locustella lanceolata* for North America. Auk 102:645.

Accepted 1 February 2007

EXTIRPATION OF THE WILLOW FLYCATCHER FROM YOSEMITE NATIONAL PARK

RODNEY B. SIEGEL, ROBERT L. WILKERSON, and DAVID F. DeSANTE, The Institute for Bird Populations, P. O. Box 1346, Point Reyes Station, California 94956; rsiegel@birdpop.org

ABSTRACT: The Willow Flycatcher has been declining throughout the Sierra Nevada and within Yosemite National Park since at least the middle of the 20th century. More recently, the number of Willow Flycatchers captured at a bird-banding station in Yosemite declined during the 1990s, with none captured since 2002. We used historical records and digital maps based on remote sensing to identify and survey Yosemite's most likely breeding habitat for the species. Over the 2006 and 2007 breeding seasons we visited 71 sites, which accommodated 1709 call stations. We detected no territorial Willow Flycatchers, and we conclude that the species no longer breeds in Yosemite National Park. The extirpation of this species from Yosemite, where so much protected, apparently high-quality habitat remains, suggests that causes in addition to direct effects of recent land-management practices have contributed substantially to the decline of the species across the Sierra Nevada.

The Willow Flycatcher (*Empidonax traillii*) has declined precipitously in the Sierra Nevada since the middle of the 20th century (Harris et al. 1987, Stefani et al. 2001, Green et al. 2003). Three subspecies of the Willow Flycatcher—*E. t. brewsteri*, *E. t. adastus*, and *E. t. extimus*—occur in the Sierra Nevada, and all three are listed as endangered by the California Department of Fish and Game; *E. t. extimus* is also listed as endangered by the U. S. Fish and Wildlife Service. Early in the 20th century the species was described as "common" in Yosemite Valley (Gaines 1992) and through much of the Sierra Nevada (Grinnell and Miller 1944), but by 2003, Green et al. (2003) were able to tally just 315 Sierran territories known to have been occupied at some time since 1982. Bombay et al. (2001) estimated population growth rates in the range of 0.768 to 0.869 in their Sierran study area, indicating a continuing population decline.

In a comprehensive review of possible causes of Willow Flycatcher decline in the Sierra Nevada, Green et al. (2003) determined that reduced fecundity due to high rates of nest predation, rather than poor survival of adults or recruitment of juveniles, was likely the primary demographic cause. They reviewed return rates of adults and juveniles from multiple Sierra Nevada locations and concluded that adult survival and juvenile recruitment within the Sierra Nevada fell within the range observed for Willow Flycatcher populations in other bioregions. Cain et al. (2003) found that standing water around nests is a deterrent to predation by mammalian predators, and Green et al. (2003) suggested that high rates of nest predation are a result of gradual desiccation of meadows, resulting from livestock trampling, road construction, human recreation, harvesting of adjacent timber, forest thinning for fire control, fire suppression, water diversions, mining, and perhaps climate change.

If meadow desiccation resulting primarily from land-management pressures is indeed the driving cause of Willow Flycatcher decline in the Sierra Nevada, we might expect a less pronounced decline in Yosemite National

Park, where the deleterious effects of these activities, since at least the middle of the 20th century, have presumably been less severe than elsewhere in the Sierra Nevada. Yet the species has clearly declined in Yosemite as well. Although detailed historical information about the species' distribution and abundance in the park is lacking, Willow Flycatchers nested commonly in Yosemite Valley at least into the early 20th century (Grinnell and Storer 1924) and were "vocal, conspicuous birds" in suitable habitat throughout the lower elevations of the park until at least the 1930s (Gaines 1992). But the species has not nested in Yosemite Valley since 1966 (Gaines 1992), and in the late 1980s Gaines (1992) estimated there were fewer than 30 pairs remaining in the greater Yosemite area.

Further evidence suggests declines in Yosemite's population have continued. Yosemite has hosted five bird-banding stations associated with the Monitoring Avian Productivity and Survivorship (MAPS) program (DeSante and Kaschube 2006, DeSante et al. 2007) since the early 1990s. The MAPS station at Hodgdon Meadow captured Willow Flycatchers every year between 1991 and 1997, but the number of captures declined through the 1990s, and no Willow Flycatchers have been captured at the station since 2002 (Figure 1). Evidence suggests that many of the birds caught at Hodgdon Meadow were not just migrating or dispersing birds but summer residents at the station, at least during the first half of the 1990s. During that time nine individuals were caught in two or more years, and seven of those birds were caught after 15 June in at least one year. Before 1996 seven birds with

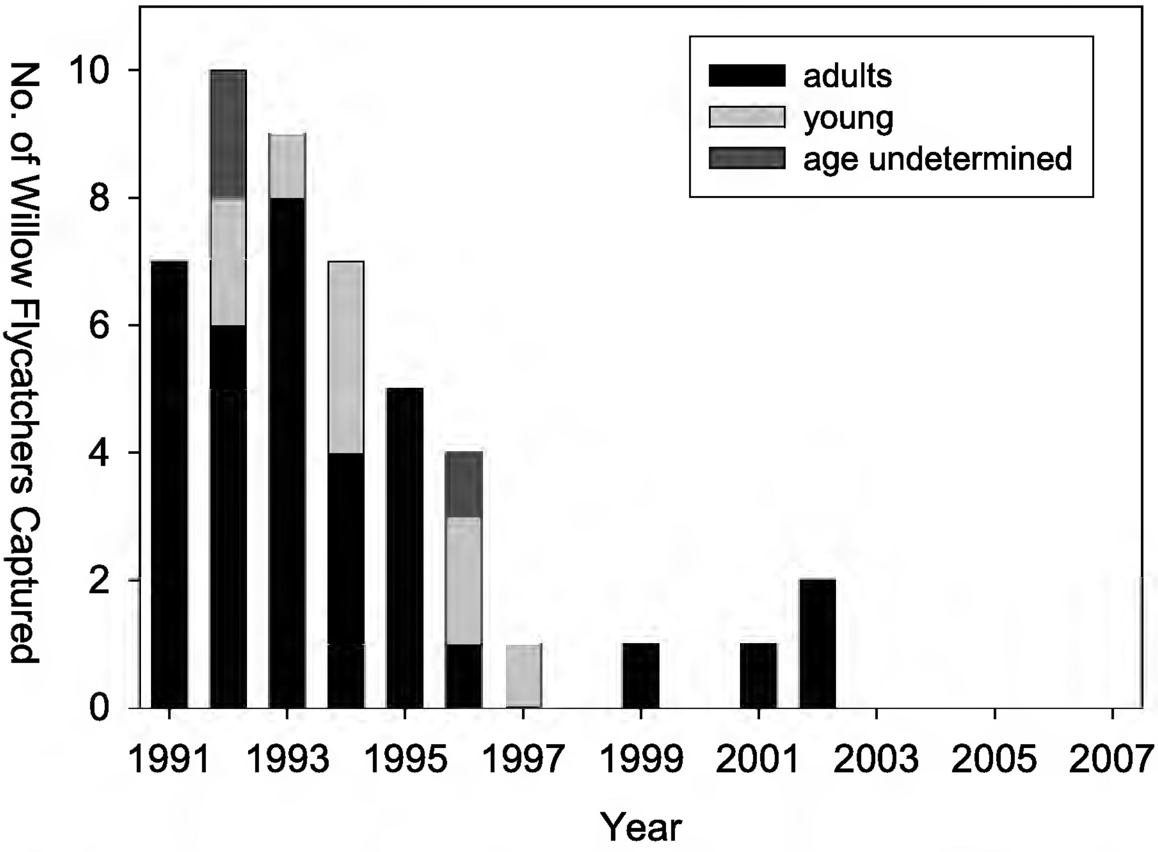


Figure 1. Annual number of Willow Flycatchers mist-netted at the Monitoring Avian Productivity and Survivorship (MAPS) station at Hodgdon Meadow, Yosemite National Park.

well-developed brood patches were captured, but none with brood patches have been captured since then.

Bombay et al. (2000) reviewed the Willow Flycatcher's nesting habitats in the Sierra Nevada. The species nests most typically in willow thickets in or adjacent to low- and mid-elevation meadows or riparian stringers covering at least 0.4 ha, usually considerably more (Figure 2). Nests have also been found in willow thickets adjacent to lakes, marshes, and creeks. Less frequently, Willow Flycatchers have nested in patches of riparian deciduous shrubs other than willows. Nesting areas, at least in the early part of the breeding season, generally are characterized by extensive surface water (Harris et al. 1988, Sanders and Flett 1989, but see also McCreedy and Heath 2004) and substantial openings, either large and continuous or small and numerous, in the forest canopy. The micro-site used for nesting is typically a patch of shrubs 2–4 m tall, with a high density of leaves (Sanders and Flett 1989, Bombay 1999). Historical records from the Yosemite area suggest Willow Flycatchers bred commonly in the park below 1525 m and less frequently at higher elevations (Gaines 1992). The highest recorded breeding pairs in the park were observed at around 2150 m (Gaines 1992), consistent with Bombay's (1999) suggestion that the upper elevation limit of breeding habitat is determined by the presence of snow and leafless willows at the time of spring arrival.

Figure 2. Potential Willow Flycatcher nesting habitat at Ackerson Meadow, just outside Yosemite National Park.

Photo by Bob Wilkerson

METHODS

As a prelude to investigating factors affecting the Willow Flycatcher's reproductive success in Yosemite, we conducted a nearly comprehensive two-year inventory of appropriate habitat throughout the park. Our goal was to locate all remaining Willow Flycatcher territories in Yosemite rather than merely estimate the size of the park's breeding population. We therefore sought to identify and survey all of the park's most promising habitat patches rather than to select a random subsample of the park's patches of potential habitat.

We developed a classification of sites we believed most likely to host breeding flycatchers and prioritized them for surveys according to the following process:

Priority 1 sites: We classified any sites where Willow Flycatchers were detected during the past 30 years as priority 1, regardless of the habitat's characteristics (although all such sites were meadows or riparian areas) or whether birds had been confirmed to be breeding at the site. We collated information on these sites from our own work in the park over the past 18 years, from published and unpublished reports, and by consulting with researchers and knowledgeable birders who have worked extensively in Yosemite over the past decades and/or are experts on Willow Flycatchers in the Sierra Nevada. Priority 1 sites were slated to be surveyed in both years (2006 and 2007) of our two-year study.

Priority 2 sites: We studied Yosemite National Park's digital maps based on remote sensing to identify additional patches of potential habitat not known to have had Willow Flycatchers during the past 30 years. Starting with all patches of willows and other riparian shrubs indicated on the park's most recent vegetation map (completed in 2003), we discarded from consideration all patches at elevations greater than 2440 m (see Gaines 1992). We grouped the remaining 454 patches into clusters of nearby patches that were generally within 500 m of one another, though typically even closer, and were part of the same riparian system. Clusters of habitat patches that contained at least 1.0 ha (combined) of willows or other riparian deciduous shrubs, were interspersed with substantial openings in the forest canopy, and appeared to have a nearby source of surface water, we classified as priority 2, for survey in either 2006 or 2007.

Priority 3 sites: We classified sites that met all the above requirements except for interspersion with openings in the forest canopy as priority 3, for survey in only one year of our study, if time permitted.

At the beginning of each field season, we provided our crew with a week-long training session. Before they could conduct surveys, we required all crew members to pass an exam testing their ability to identify by sight and sound Willow Flycatchers and species with which they could be confused.

Our survey methods adhered closely to those developed by Bombay et al. (2000). In brief, the survey protocol requires broadcasting recordings of Willow Flycatcher songs to elicit responses from territorial birds. We visited each site at least twice during the breeding season, once between 15 and 25 June, and once either between 1 and 14 June or between 26 June and 15 July. Surveys began 1 hr before official sunrise or as soon as there was adequate light to see birds and were always completed or suspended by 10:00. Survey points were spaced 30–50 m apart in suitable habitat.

If there was no suitable habitat, no survey points were established. During the second visit to each site, we did not ensure that individual survey points were placed exactly in the same location as in the previous visit, as the park's wilderness regulations prevented us from marking survey points, and relocating exact points without markers proved time-consuming; instead, we simply made sure that the same general areas were resurveyed. As a result we often surveyed a slightly different number of points during the two visits to a site. At each survey point observers first listened quietly for 1 min, then completed two cycles of broadcasting *fitz-bew* vocalizations for 30 seconds followed by listening quietly for 2 min.

RESULTS

Our site-selection process yielded 12 priority 1 sites, 40 priority 2 sites, and 21 priority 3 sites distributed across the lower and middle elevations of the park (Figure 3). During the two-year study, we visited 71 of our 73 selected sites (Appendix 1); two particularly remote priority 2 sites in the northwestern corner of the park proved to be inaccessible because of cliffs and streams that could not be crossed safely. Visits to six of the selected sites revealed no suitable Willow Flycatcher habitat. The spatial extent of the 65 survey sites where we found suitable habitat varied greatly, with individual sites accommodating as few as 3 and as many as 128 call stations (average 27 call stations per site). Sites classified as priority 1 were surveyed in both 2006 and 2007; the remaining sites were surveyed in either 2006 or 2007.

We detected Willow Flycatchers only twice during our surveys, and both detections were of nonterritorial birds at Wawona Meadow. On 1 June 2006, the first day of the field season, two Willow Flycatchers responded to our broadcast survey at the same call station at Wawona Meadow. Both birds repeatedly made the *fitz-bew* vocalization, and one of the birds was also observed at close range for approximately 20 minutes. We could not relocate the birds when we returned to the site the following day and then again later in the season. Because we repeatedly searched the meadow while broadcasting recordings of vocalizations and spent extra time searching the area around the detection, we are certain neither of the birds remained and held a territory at Wawona. In their protocol, Bombay et al. (2000) set the date of survey initiation at 1 June but cautioned that "migrants may still be present and singing during this period." Indeed, in a small population east of Yosemite Willow Flycatchers sometimes do not appear at their breeding sites until the first or second week of June (McCreedy 2006, 2007).

On 4 July 2007, we detected a Willow Flycatcher at Wawona Meadow, though this time the identification could not be 100% certain because the bird did not vocalize. Nevertheless, the observer was an experienced birder who recorded detailed and persuasive notes about the appearance of the bird. The bird had not been detected during two previous surveys of the site in June. After the detection, a return visit to the site the following day failed to relocate the bird, even with the use of playback and intensive searching by multiple observers. Our surveys of Wawona Meadow throughout the breeding season leave us certain the bird did not maintain a breeding territory at the site in either 2006 or 2007.

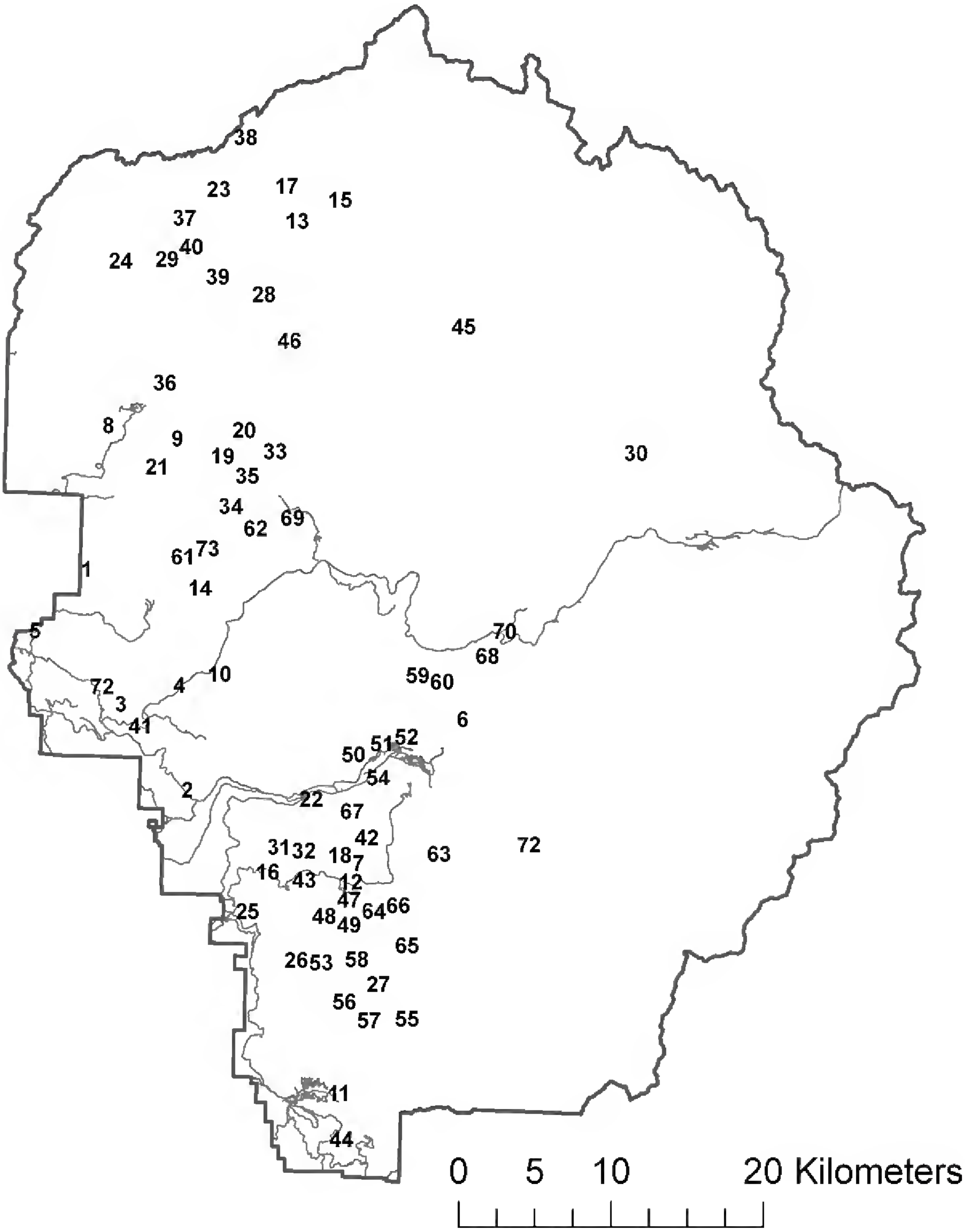


Figure 3. Sites targeted for Willow Flycatcher surveys in Yosemite National Park. Thin gray lines indicate paved roads. Sites 1–12 were priority 1; sites 13–52 were priority 2; sites 53–73 were priority 3. See Appendix 1 for site names and location coordinates.

DISCUSSION

Our failure to detect any territorial Willow Flycatchers strongly suggests that they no longer breed in Yosemite National Park. Although it was not possible to survey every patch of riparian deciduous vegetation in the park, we were able to survey virtually all the patches that seemed, on the basis of the best available data and published descriptions of habitat characteristics, most likely to host breeding Willow Flycatchers. Sites with detections during the previous 30 years were fully surveyed in both 2006 and 2007.

The detections of apparently nonterritorial birds at Wawona Meadow suggest that even though Willow Flycatchers clearly did not breed at the site during the last two years, the site has been visited by migrants or nonbreeders. Indeed, the meadow may have been occupied by at least one pair of Willow Flycatchers in the last decade, as an adult female with a well-developed brood patch was mist-netted there in 1999 (Wilkerson and Siegel unpubl. data). This evidence is not conclusive, however, as females with brood patches have been captured in the Mono Basin on nest plots where they apparently did not breed (Chris McCreedy pers. comm.). Nevertheless, continued visitation by Willow Flycatchers, even if they apparently spend most of the breeding season elsewhere, suggests that Wawona Meadow merits continued monitoring during the breeding season.

The apparent extirpation of Willow Flycatchers from Yosemite gives perspective on the causes of the species' decline in the rest of the Sierra Nevada. Green et al. (2003) identified anthropogenic meadow desiccation as the primary cause of Willow Flycatcher decline in the Sierra Nevada. Because Willow Flycatcher declines at Yosemite have mirrored declines throughout the Sierra Nevada, it is parsimonious to assume that the causes of decline at Yosemite and elsewhere in the Sierra Nevada are similar. Throughout the 20th century cattle grazing and other types of land management had substantial effects on meadows across the greater Sierra Nevada (Menke et al. 1996), but it seems puzzling that similar, recent declines of the Willow Flycatcher have occurred in the park, where most riparian habitat has been largely free of livestock grazing for many decades (Blaney and Moore 2001). Although we did not quantify vegetation and hydrological conditions at each site rigorously, willows throughout the park during our study generally had dense foliage and appeared healthy. Most sites had some standing water or saturated soils during our survey visits, even in 2007 after a winter with an unusually small snowpack.

The Willow Flycatcher's decline in Yosemite during the first half of the 20th century could have resulted from the dramatic changes in the meadows' plant communities triggered by heavy sheep grazing (Beesley 1996, Dull 1999) between the 1850s and the early 1900s (Farquhar 1976, O'Neill 1983) or the heavy grazing by pack animals that continued in the park well into the 20th century (Blaney and Moore 2001). It seems less plausible that such long-past activities continue to drive more recent declines, although Cooper et al. (2006) suggested that soils and plant communities in at least some Yosemite meadows still have not recovered from sheep grazing that ceased over a century ago.

Another possibility is that Yosemite's meadows are still drying out but in response to climate cycles or climate change rather than to grazing or other land-management practices. Warmer temperatures earlier in the year could reduce standing water later in the summer. Research on meadow hydrology in relation to climate change and climate cycles is warranted, as predictions for the Sierra Nevada include reduced snowpack and earlier, more rapid spring snowmelt (Gleick et al. 2000). Such changes could have substantial effects on meadow-nesting birds, if they have not already.

Gaines (1992) suggested an alternative hypothesis for the Willow Flycatcher's decline in Yosemite, that suitable habitat within the park is insufficient to sustain a viable population without immigration from neighboring areas. Under this scenario of disrupted metapopulation dynamics, Yosemite's declines could be explained by habitat degradation outside the park, regardless of habitat condition within the park. Yosemite appears to have no shortage of suitable Willow Flycatcher habitat, however. The sites we surveyed accommodated 1709 survey points within apparently suitable habitat. Assuming that each survey point was placed to survey a 20-m radius circle of suitable habitat surrounding it, we visited and surveyed approximately 215 ha of suitable habitat within the park. Published values suggest that Willow Flycatcher territories in the Sierra Nevada generally average less than 0.4 ha (Sanders and Flett 1989, Craig and Williams 1998), implying that the habitat patches we surveyed in the park could theoretically host hundreds of Willow Flycatcher territories, although the birds probably never saturated the available habitat so completely. Some of the habitat patches we judged "suitable" probably were not optimal. For example, some proved to be composed primarily of brown dogwood (*Cornus glabrata*) or other deciduous riparian shrubs rather than willows. But even if a substantial portion of the sites we surveyed is excluded from consideration, Yosemite may still offer adequate habitat area for a self-sustaining Willow Flycatcher population, depending on metapopulation dynamics. Modeling metapopulation dynamics to assess whether a population sink outside the park could explain population declines within the park, perhaps even in the absence of habitat degradation within the park, could help resolve this question.

Conditions on the wintering grounds or along migration routes, rather than on the Sierra Nevada breeding grounds, could be driving declines, but available information on the survival rates of adult Willow Flycatchers in the Sierra Nevada (Bombay et al. 2001) suggests that survival and/or return rates in the region appear comparable to or higher than those in other regions (Green et al. 2003), including southeastern Oregon (Sedgwick and Klus 1997, Sedgwick and Iko 1999) and the southwestern United States (Stoleson et al. 2000). Other hypotheses that might explain the decline at Yosemite—continuing effects of severe habitat degradation during the 19th century, more recent meadow desiccation due to climate change, and the disruption of metapopulation dynamics due to habitat degradation at sites outside the park—all warrant further study.

Most of the potential causes of the Willow Flycatcher's decline discussed above suggest that improved management of the species' riparian and meadow breeding grounds throughout the Sierra Nevada could aid its recovery. Regardless of whether other factors are also contributing to the decline, good management of breeding habitat is surely a critical component of the species' persistence in the Sierra Nevada. Furthermore, any measures taken to improve or restore montane meadows across the Sierra Nevada will likely benefit the many other bird species that also breed or forage in montane meadows.

ACKNOWLEDGMENTS

We are grateful to our 2006 and 2007 field crews (led by Bob Wilkerson): Abbie Alterman, Sage Clegg, Dayna Mauer, Michelle Murdock, Hannah Panci, Lauren Pulliam, Courtenay Ray, Melanie Schroer, Matthew Schwartz, Christopher Stanton, Stefan Thompson, Ariane Waldstein, and Ben Weinstein. We thank Steve Thompson and Sarah Stock at Yosemite National Park for facilitating and assisting this project in numerous ways. We thank the following individuals for information on historical detections of Willow Flycatcher in Yosemite and/or advice on survey methods and design: David Airola, Ted Beedy, Helen Loffland (née Bombay), Heather Mathewson, Jeff Maurer, Kurt Mize, Michael Morrison, Dave Quady, Adam Rich, Susan Sanders, Chris Stermer, and Jon Winter. Chris McCreedy, Michael Patten, Sarah Stock, and an anonymous reviewer provided helpful manuscript reviews. This project was supported by the Yosemite Fund and the National Park Service and was conducted by The Institute for Bird Populations' Sierra Nevada Bird Observatory. This is contribution 323 of The Institute for Bird Populations.

LITERATURE CITED

Beesley, D. 1996. Reconstructing the landscape: An environmental history, 1820–1960, in Status of the Sierra Nevada: Sierra Nevada Ecosystem Project: Final report to Congress, vol. 2, pp. 3–24. Centers for Water and Wildland Resources, Univ. Calif., Davis.

Blaney, C., and Moore, P. 2001. Grazing and Yosemite's meadows: Keeping the balance. Sierra Nature Notes 1. Yosemite Assoc., El Portal, CA; www.yosemite.org/naturenotes/grazingyose.htm.

Bombay, H. L. 1999. Scale perspectives in habitat selection and reproductive success for Willow Flycatchers *(Empidonax traillii)* in the central Sierra Nevada, California. M.S. thesis, Calif. State Univ., Sacramento.

Bombay, H. L., Ritter, T. M., and Valentine, B. E. 2000. A Willow Flycatcher survey protocol for California. www.dfg.ca.gov/wildlife/species/docs/wilflyproto.pdf.

Bombay, H. L., Morrison, M. L., Taylor, D. E., and Cain, J. W. 2001. Annual report and preliminary demographic analysis for Willow Flycatcher monitoring in the central Sierra Nevada. White Mts. Res. Sta., 3000 E. Line St., Bishop, CA 93514.

Cain, J. W., Morrison, M. L., and Bombay, H. L. 2003. Predator activity and nest success of Willow Flycatchers and Yellow Warblers. J. Wildlife Mgmt. 67:600–610.

Cooper, D. J., Lundquist, J. D., King, J., Flint, A., Flint, L., Wolf, E., Lott, F. C., and Roche, J. 2006. Effects of the Tioga Road on hydrologic processes and Lodgepole Pine invasion into Tuolumne Meadows, Yosemite National Park. Report prepared for Yosemite National Park, Yosemite, CA 95839.

Craig, D., and Williams, P. L. 1998. Willow Flycatcher (*Empidonax traillii*), in The riparian bird conservation plan: A strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight; www.prbo.org/calpif/htmldocs/species/riparian/willow_flycatcher.htm.

DeSante, D. F., Burton, K. M., Velez, P., Froehlich, D., and Kaschube, D. 2007. MAPS manual: Instructions for the establishment and operation of constant-effort bird-banding stations as part of the Monitoring Avian Productivity and Survivorship (MAPS) Program. Inst. Bird Pop., P. O. Box 1346, Point Reyes Station, CA 94956.

DeSante, D. F., and Kaschube, D. 2006. The Monitoring Avian Productivity and Survivorship (MAPS) Program 1999, 2000, and 2001 report. Bird Pop. 7:23–89.

Dull, R. A. 1999. Palynological evidence for 19th century grazing-induced vegetation change in the southern Sierra Nevada, California, USA. J. Biogeogr. 26:899–912.

Farquhar, F. P. 1976. History of the Sierra Nevada. Univ. Calif. Press, Berkeley.

Gaines, D. 1992. Birds of Yosemite and the East Slope. Artemisia Press, Lee Vining, CA.

Gleick, P. H. 2000. Water: The potential consequences of climate variability and change for the water resources of the United States. Pac. Inst. for Studies in Development, Economics, and Security, 654 13th St., Oakland, CA 94612.

Green, G. A., Bombay, H. L., and Morrison, M. L. 2003. Conservation assessment of the Willow Flycatcher in the Sierra Nevada. White Mts. Res. Sta., 3000 E. Line St., Bishop, CA 93514.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Grinnell, J., and Storer, T. I. 1924. Animal Life in the Yosemite. Univ. Calif. Press, Berkeley.

Harris, J. H., Sanders, S. D., and Flett, M. A. 1987. Willow Flycatcher surveys in the Sierra Nevada. W. Birds 18:27–36.

Harris, J. H., Sanders, S. D., and Flett, M. A. 1988. The status and distribution of the Willow Flycatcher in the Sierra Nevada: Results of the survey. Calif. Dept. Fish Game Wildlife Mgmt. Div. Admin. Rep. 88-1.

McCreedy, C. 2006. Mono Basin Willow Flycatcher Project: 2006 progress report. PRBO Cons. Sci., 3820 Cypress Dr. #11, Petaluma, CA 94954.

McCreedy, C. 2007. Mono Basin Willow Flycatcher Project: 2007 progress report. PRBO Cons. Sci., 3820 Cypress Dr. #11, Petaluma, CA 94954.

McCreedy, C., and Heath, S. K. 2004. Atypical Willow Flycatcher nesting sites in a recovering riparian corridor at Mono Lake, California. W. Birds 35:197–209.

Menke, J., Davis, C., and Beesley, P. 1996. Rangeland assessment, in Status of the Sierra Nevada: Sierra Nevada Ecosystem Project: Final report to Congress, vol. 3, pp. 901–972. Centers for Water and Wildland Resources, Univ. Calif., Davis.

O'Neil, E. S. 1983. Meadow in the Sky: A History of Yosemite's Tuolumne Meadows Region. Panorama West Books, Fresno, CA.

Sanders, S. D., and Flett, M. A. 1989. Ecology of the Sierra Nevada population of Willow Flycatcher (*Empidonax traillii*), 1986–1987. Calif. Dept. Fish Game Wildl. Mgmt. Div., Sacramento.

Sedgwick, J. A., and Iko, W. M. 1999. Costs of Brown-headed Cowbird parasitism to Willow Flycatchers. Studies Avian Biol. 18:167–181.

Sedgwick, J. A., and Klus, R. J. 1997. Injuries due to leg bands in Willow Flycatchers. J. Field Ornithol. 68:622–629.

Stefani, R. A., Bombay, H. L., and Benson, T. M. 2001. Willow Flycatcher, in Sierra Nevada forest plan amendment final environmental impact statement, vol. 3, pp. 143–195. U. S. Forest Service, Pacific Southwest and Intermountain Regions, 1323 Club Dr., Vallejo, CA 94592.

Stoleson, S. H., Whitfield, M. J., and Sogge, M. K. 2000. Demographic characteristics and population modeling, in Status, Ecology, and Conservation of the Southwestern Willow Flycatcher (D. M. Finch and S. H. Stoleson, eds.), pp. 83–94. U. S. Forest Serv. Gen. Tech. Rep. RMRS-GTR-60.

APPENDIX 1 Sites selected for Willow Flycatcher surveys in Yosemite National Park.

Site number	Priority[a]	Site name	Latitude (° N)	Longitude (° W)	No. of survey points[b]	Year of last detection
1	1	Ackerson Meadow	37.8331	119.8325	7.3	1999[c]
2	1	Big Meadow	37.7044	119.7532	26.0	2004[d]
3	1	Crane Flat	37.7540	119.8043	10.3	2001[e]
4	1	Gin Flat	37.7663	119.7611	0	2000[f]
5	1	Hodgdon Meadow	37.7959	119.8700	51.0	2002[g]
6	1	Mirror Lake	37.7510	119.5498	35.0	2005[h]
7	1	Peregoy Meadow	37.6644	119.6242	44.5	1974[i]
8	1	Poopenaut Meadow	37.9183	119.8198	11.5	1999[j]
9	1	Smith Meadow	37.9119	119.7680	7.5	1999[k]
10	1	Upper Tamarack Creek	37.7734	119.7359	0	1996[l]
11	1	Wawona Meadow	37.5277	119.6380	128.0	2007[m]
12	1	Westfall Meadows	37.6528	119.6342	15.3	1986[n]
13	2	Andrews Lake	38.0421	119.6878	24.0	
14	2	Aspen Valley East	37.8236	119.7524	23.0	
15	2	Avonelle Lake Northwest	38.0554	119.6564	28.5	
16	2	Badger Pass	37.6625	119.6593	25.5	
17	2	Bearup Lake	38.0626	119.6965	10.0	
18	2	Bridalveil Creek II	37.6691	119.6163	13.5	
19	2	Cottonwod Creek East	37.9028	119.7123	37.5	
20	2	Cottonwood Creek Headwaters	37.9177	119.7231	2.5	
21	2	Cottonwood Meadow	37.8947	119.7870	69.0	
22	2	Crocker Point Southwest	37.7011	119.6652	38.5	
23	2	Edith Lake	38.0596	119.7471	7.0	
24	2	Eleanor Creek	38.0156	119.8189	23.5	
25	2	Elevenmile Meadow	37.6338	119.7101	23.5	
26	2	Empire Meadows	37.6066	119.6436	90.5	
27	2	Empire Meadows West	37.6102	119.6119	31.0	
28	2	Falls Creek West Tributary	37.9983	119.7112	34.5	
29	2	Frog Creek Headwaters	38.0180	119.7584	9.0	

(continued)

APPENDIX 1 (*continued*)

Site number	Priority[a]	Site name	Latitude (° N)	Longitude (° W)	No. of survey points[b]	Year of last detection
30	2	Glen Aulin	37.9107	119.4305	7.5	
31	2	Grouse Creek I	37.6724	119.6838	19.0	
32	2	Grouse Creek II	37.6704	119.6696	14.0	
33	2	Harden Lake Northwest	37.9059	119.6994	17.0	
34	2	Harden Lake Southwest	37.8732	119.7114	19.0	
35	2	Harden Lake West	37.8909	119.7198	13.5	
36	2	Hetch Hetchy	37.9445	119.7831	14.0	
37	2	Kendrick Creek	38.0419	119.7721	—[c]	
38	2	Kendrick Creek Headwaters	38.0907	119.7283	—[c]	
39	2	Lake Vernon Southwest	38.0078	119.7459	31.0	
40	2	Laurel Lake Headwaters	38.0251	119.7663	25.5	
41	2	Little Crane Creek	37.7414	119.7936	0	
42	2	McGurk Meadow	37.6792	119.6229	28.3	
43	2	Monroe Meadows South	37.6533	119.6686	16.0	
44	2	South Entrance	37.5008	119.6355	62.0	
45	2	Table Lake	37.9827	119.5615	13.5	
46	2	Tiltill Valley	37.9714	119.6910	33.5	
47	2	Westfall Southeast I	37.6428	119.6144	6.0	
48	2	Westfall Southeast II	37.6331	119.6231	10.5	
49	2	Westfall Southeast III	37.6279	119.6139	9.5	
50	2	Yosemite Valley I	37.7285	119.6083	9.5	
51	2	Yosemite Valley II	37.7351	119.6057	16.0	
52	2	Yosemite Valley III	37.7393	119.5955	23.0	
53	3	Alder Creek	37.6048	119.6544	41.5	
54	3	Cathedral Beach Southeast	37.7148	119.6158	0	
55	3	Chilnwalna Creek	37.5730	119.5893	31.5	
56	3	Chilnwalna Falls I North	37.5823	119.6191	3.0	
57	3	Chilnwalna Falls North II	37.5715	119.6176	20.0	
58	3	Empire Meadows Southeast	37.6073	119.6279	26.0	
59	3	Indian Canyon Creek	37.7760	119.5805	0	
60	3	Lehamite Creek	37.7726	119.5702	0	
61	3	Lower Long Gulch Creek	37.8422	119.7578	22.0	
62	3	Middle Fork Tuolumne	37.8601	119.7122	83.0	
63	3	Mono Meadow East	37.6708	119.5689	23.5	

(*continued*)

APPENDIX 1 (*continued*)

Site number	Priority[a]	Site name	Latitude (° N)	Longitude (° W)	No. of survey points[b]	Year of last detection
64	3	Ostrander Lake Northwest	37.6367	119.5895	13.0	
65	3	Ostrander Lake West	37.6163	119.5908	25.5	
66	3	Peregoy Southeast	37.6398	119.5982	41.5	
67	3	Pohono Trail	37.6946	119.6344	14.0	
68	3	Porcupine Creek	37.7919	119.5371	21.5	
69	3	Siesta Lake Northwest	37.8668	119.6848	41.0	
70	3	Snow Creek	37.8033	119.5247	23.5	
71	3	Tuolumne Grove	37.7645	119.8082	18.5	
72	3	Upper Illilouette Creek	37.6776	119.5023	35.0	
73	3	Upper Long Gulch Creek	37.8473	119.7476	9.0	

[a] See Methods for an explanation of priority rankings.

[b] The number of survey points observers placed in suitable habitat, averaged over all visits to the site. Numbers varied slightly from visit to visit, as observers had discretion to place points 30–50 m apart. Entries of "0" indicate that the site had no suitable habitat.

[c] One bird heard singing (outside park boundaries) in June by Adam Rich, Stanislaus National Forest.

[d] Two adults captured at MAPS station in early June.

[e] One adult captured at MAPS station in mid-June.

[f] One adult captured at MAPS station in August.

[g] Two adults captured at MAPS station, one in June, one in July.

[h] Two individuals observed by Kurt Mize in late May.

[i] One singing bird heard by David DeSante in June.

[j] Two adults mist-netted in August.

[k] One adult mist-netted in August.

[l] One adult captured at MAPS station in August.

[m] Not territorial; see text. Last report prior to this study: one female with a well-developed brood patch mist-netted in July 1999.

[n] One singing bird heard by Jon Winter in June.

[o] Not surveyed because cliffs and stream crossings made access too dangerous.

Accepted 13 November 2007

Willow Flycatcher *Sketch by Zev Labinger*

BREEDING RECORDS OF THE SURFBIRD, WANDERING TATTLER, AMERICAN GOLDEN-PLOVER, AND UPLAND SANDPIPER IN THE SOUTHWEST YUKON TERRITORY

SABINE NOUVET, 888 Rand Ave, Ottawa, Ontario K1V 6X4, Canada

SCOTT WILSON, Centre for Applied Conservation Research, Forest Sciences Centre, 2424 Main Mall, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada; wilsonwa@interchange.ubc.ca

KATHY MARTIN, Centre for Applied Conservation Research, Forest Sciences Centre, 2424 Main Mall, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada, and Canadian Wildlife Service, 421 Robertson Road, Delta, British Columbia, V4K 3N2, Canada

ABSTRACT: Knowledge of the breeding behavior and habitat selection of arctic–alpine shorebirds is limited because of these species' remote habitats, low population densities, and cryptic behavior. We report nests and other observations of definitive breeding of the Surfbird (*Aphriza virgata*), Wandering Tattler (*Tringa incana*), American Golden-Plover (*Pluvialis dominica*), and Upland Sandpiper (*Bartramia longicauda*) in the Ruby Range of the southwest Yukon between 2002 and 2007. In most years, there were at least two breeding pairs of the Surfbird, one of the Wandering Tattler, three of the American Golden-Plover, and one of the Upland Sandpiper at our alpine study site covering 9 km^2. These are the first confirmed breeding records of the Surfbird in the southern Yukon, and they mark the second and third Surfbird and third and fourth Wandering Tattler nests documented in Canada. Despite the lack of previous records for all species, particularly the Surfbird, their consistent recurrence at the site suggests they breed regularly in the region.

Some shorebirds breeding in the Yukon use remote alpine habitats, which, combined with their low population densities, has resulted in very few previous breeding records. Thus we have a limited understanding of the distribution, abundance, and habitat requirements of those species (e.g., Morrison et al. 2000). Observations of breeding by the Surfbird (*Aphriza virgata*) and Wandering Tattler (*Tringa incana*) are of particular interest because only one Surfbird nest and two Wandering Tattler nests have been reported for Canada previously (Campbell et al. 1990, Sinclair et al. 2003, Eckert and Mactavish 2004). Because of uncertainty in population size and the risks arctic and alpine animals face from climate change (Hassol 2004), there is a need to increase our knowledge of the distribution and breeding requirements of these species. Here we report on breeding observations and nesting habitat of four shorebirds, the Surfbird, Wandering Tattler, American Golden-Plover (*Pluvialis dominica*), and Upland Sandpiper (*Bartramia longicauda*) from alpine habitats of the southwestern Yukon Territory.

STUDY AREA

We worked from 2002 to 2007 in a 9-km^2 alpine valley in the Ruby Range east of Kluane Lake, Yukon (61° 21′ N, 138° 28′ W, Figure 1). The valley follows a small rocky stream, Pika Creek, which retains flow

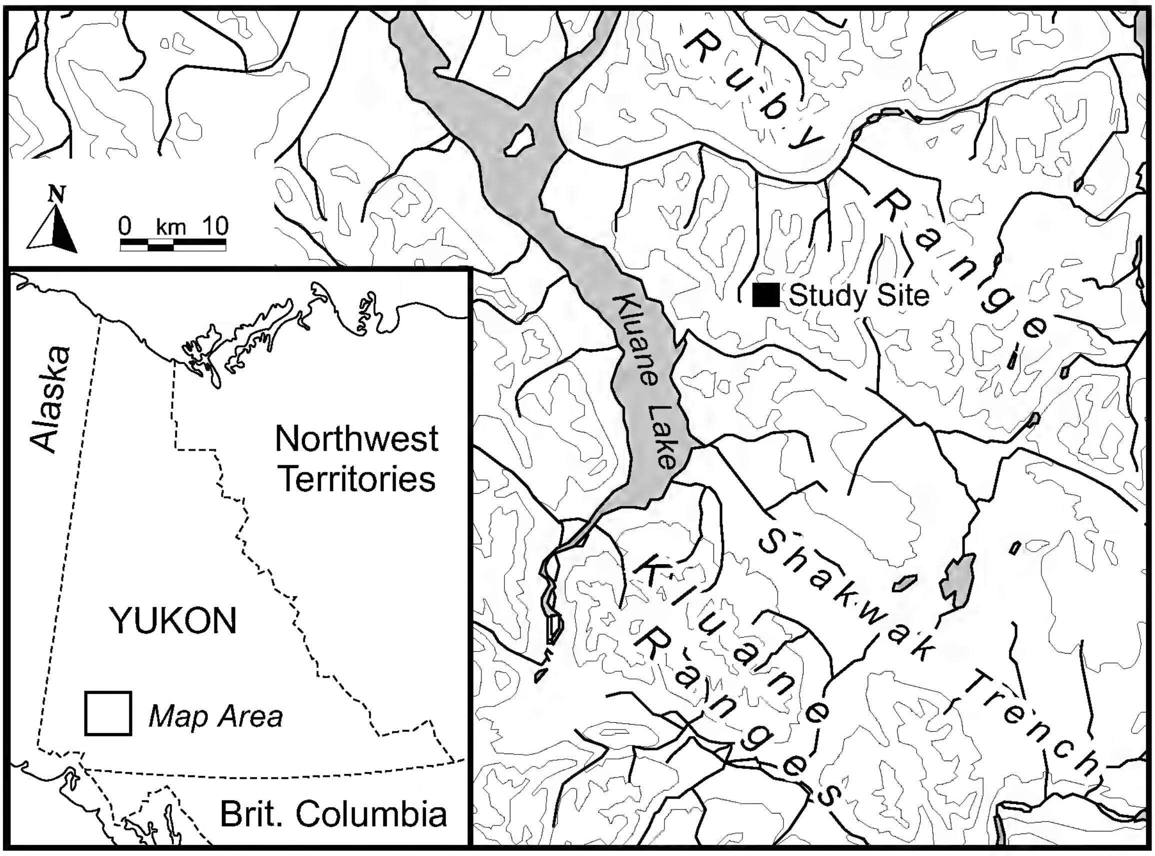


Figure 1. Location of the study site in the Ruby Range of southwestern Yukon Territory.

Map by Ryan Danby

throughout the summer. Lower alpine habitats (elevations 1500–1750 m) consist of lush meadows of graminoids (primarily *Carex* spp. and *Festuca* spp.), interspersed with woody shrubs (*Salix pulchra*, *S. glauca*, and *Betula glandulosa*), dwarf shrubs (e.g., *Dryas octopetala*, *Salix reticulata*), forbs, and rock outcrops. Higher alpine habitats (1750–2000 m) are drier with rock, lichens (e.g., *Flavocetraria* spp., *Cladina* spp.), and dwarf shrubs (e.g., *Dryas octopetala*, *Salix polaris*, *S. arctica*) predominating. Patches of moss and heather (*Cassiope tetragona*) are distributed throughout the study area.

RESULTS AND DISCUSSION

Surfbird

As a breeding species the Surfbird is distributed sparsely in northwestern North America, with confirmed breeding records limited to Alaska and the western half of the Yukon Territory (Dixon 1927, Kessel and Gibson 1978, Senner and McCaffery 1997). In Canada, these include one nest and four observations of adults with young (Frisch 1978, Sinclair et al. 2003, Eckert pers. comm.), making the Surfbird one of the most elusive breeding birds on the continent. In central and northern Yukon, Frisch (1978) suggested that the Surfbird occurs regularly in the Ogilvie and Richardson mountains. There are no confirmed breeding records for the southern Yukon, although displaying birds have been observed in the Dawson and Ruby ranges (Frisch

1983). Overall, the Surfbird is considered a rare breeder throughout much of the territory (Sinclair et al. 2003).

Record 1: On 22 June 2005 we found a Surfbird nest with four eggs in the upper end of the valley of Pika Creek. The nest was located at elevation 1797 m on a 10° west-facing slope amid scattered rocks and tundra vegetation (Table 1, Figure 2). It was approximately 100 m below a rocky ridgeline where the pair was observed foraging and in flight-song displays throughout June and July. The nest was a shallow scrape 20 × 12.5 cm (interior dimensions) and lined with lichens (*Flavocetraria* spp. and *Dactyllina arctica*). Both the incubating bird and the exposed eggs were well camouflaged (Figure 3). When we checked the nest, the bird defended its nest as described by Dixon (1927): it left the nest only when approached within 2 m

Table 1 Habitat[a] Surrounding Surfbird Nest and Brood Site near Pika Creek, Yukon Territory

	Nest (2005)		Brood (2006)	
Habitat	%	Species	%	Species
Rock/bare	24		13	
Mosses[b]	3		1	
Dwarf shrubs	27	*Dryas octopetala* 23%, *Salix reticulata* 3%, *S. polaris* 1%	47	*Dryas octopetala* 39%, *Salix arctica* 6%, *S. reticulata* 2%
Grasses/ sedges	15	*Festuca altaica* 2%, *Carex* spp. 13%	18	*Festuca altaica* 12%, *Carex* spp. 6%
Lichens	18	*Flavocetraria* spp. 12%, *Stereocaulon* spp. 3%, *Dactyllina arctica*, *Cladina rangiferina*, *Thamnolia vermicularis*, all 1%	17	*Flavocetraria* spp. 13%, *Thamnolia vermicularis* 4%
Forbs	8	*Silene acaulis* 3.5%, *Antennaria monocephala*, *Artemisia arctica*, *Castilleja hyperborea*, *Claytonia lasiocarpa*, *Lloydia serotina*, *Oxyria digyna*, *Parrya nudicaulis*, *Pedicularis lanata*, *Saxifraga davurica*, *S. hieracifolia* all <1%	4	*Oxytropis nigrescens* 2.5%, *Papaver macounii* 1%, *Cardamine purpurea*, *Oxyria digyna*, *Pedicularis lanata*, *Potentilla hyparctica*, *Saxifraga bronchialis*, *Silene acaulis* all <1%
Heather	5	*Cassiope tetragona*	0	

[a] Described by percentage cover of vegetation within a radius of 5 m.

[b] Not identified to genus or species.

Figure 2. Habitat of the Surfbird nest found in 2005 in the Ruby Range of the southwest Yukon Territory.

Photo by Scott Wilson

and then remained near the nest while trying to lead the observer away with calls, broken-wing displays, and mock charges. On 27 June, when the nest was checked again, the adult quickly jumped off when approached within 5 m and remained near the nest but was less aggressive than on the first visit. The nest contained four freshly broken and empty eggs, whose shells were unusually thin and soft in comparison to other shorebird eggs. It was unclear whether the eggs had broken or if predation had occurred.

Record 2: On 3 July 2006 we observed an adult with a downy chick 1 or 2 days old at 1901 m elevation on the ridgeline, 430 m east and 280 m north of the 2005 nest site. The adult protected the chick aggressively with frequent calls and mock charges at the observer. On 7 July, we encountered an aggressive adult 50 m to the northeast of the 3 July site. Because we did not observe any other breeding pairs at this location, we suspect this was one of the individuals of the same pair, suggesting it remained in the area for the first week of the chick-rearing period. These records, as well as repeated observations of display flights and breeding calls of Surfbirds from at least two other sites in this valley from 2004 to 2006, suggest that two or three pairs breed there consistently. To estimate percent cover and identify principal plant species associated with Surfbird nest and brood habitat in the valley, we quantified the vegetation within a 5-m radius around the 2005 nest site and the 2006 brood site (Table 1).

Records 3 and 4: In 2007, we noted two additional families of Surfbirds at locations just outside the main study area along Pika Creek. On 8 July,

Figure 3. Surfbird incubating on 29 June 2005 in the Ruby Range of the southwest Yukon Territory.

Photo by Scott Wilson

a nervous and aggressive adult was observed with a single chick on the top of a ridgeline at 1846 m elevation located 3 km southwest of the 2005 and 2006 locations. The chick was approximately two weeks old, and the adult behaved defensively, trying to lure the observer away from the chick. On 16 July, we found an adult Surfbird on a nest with its wings spread to cover the entire nest cup. A single eggshell of a hatched chick was lying just in front of the nest, and we suspect the adult was brooding at least one, but likely more, recently hatched chicks. Although we approached closely (within 2 m), the adult did not leave the nest, and to avoiding exposing the chicks, we did not flush it. The site was approximately 6 km to the northeast of Pika Creek valley, and the nest itself was situated just below the top of a gently sloping rocky ridge (1790 m) that was sparsely covered with vegetation dominated by lichens and dwarf willows (*Salix* spp.). We did not survey the vegetation at either site in detail in 2007.

Wandering Tattler

There are nine breeding records of the Wandering Tattler in the Yukon, including those of nests found in the Firth River and Craig Creek drainages in Ivvavik National Park, northern Yukon (Sinclair et al. 2003, Eckert and Mactavish 2004). In southwestern Yukon, there are three records of young chicks in the St. Elias Mountains west of the Ruby Range (Sinclair et al. 2003). The Wandering Tattler also breeds regularly in alpine habitats throughout Alaska and the northwest corner of British Columbia (Campbell et al. 1990, Gill et al. 2002). A pair of Wandering Tattlers occupied the same 600-m stretch of Pika Creek in 2002 and from 2004 to 2007. The pair was rarely observed more than 20 m from the creek and was most frequently

Table 2 Location, Dates, and Fates of Shorebird Nests in or near Pika Creek Valley, Yukon Territory

Location	Elevation (m)	Observer	Date found	Fate/estimated hatching date
Surfbird				
61.2086° N, 138.2677° W	1797	S. Nouvet	22 Jun 2005	Failed
61.2127° N, 138.1438° W	1790	D. & C. Thiel	16 Jul 2007	16 Jul 2007
Wandering Tattler				
61.2141° N, 138.2824° W	1600	P. Caputa	10 Jun 2002	Early July
61.2241° N, 138.2909° W	1495	D. & C. Thiel, K. Martin	10 Jul 2007	10 Jul 2007
American Golden-Plover				
61.2153° N, 138.2744° W	1680	P. Caputa	09 Jun 2002	23 Jun 2002
61.2166° N, 138.2870° W	1700	P. Caputa	20 Jun 2002	Failed
61.2101° N, 138.2749° W	1696	J. N. M. Smith	21 Jun 2002	26 Jun 2002
61.2136° N, 138.2891° W	1700	P. Caputa	22 Jun 2002	Failed
61.2120° N, 138.2730° W	1680	S. Nouvet	21 Jun 2005	17 Jul 2005
61.2109° N, 138.2830° W	1692	S. Nouvet	02 Jun 2006	Abandoned
61.2156° N, 138.2887° W	1668	B. Wilson	09 Jul 2006	02 Jul 2006
Upland Sandpiper				
61.2211° N, 138.2919° W	1736	M. Wong	15 Jun 2006	Mid July
61.2138° N, 138.2687° W	1736	M. Wong	15 Jun 2006	Mid July

encountered along a stretch at 1580–1620 m elevation. On 10 June 2002, we found a nest with four eggs along Pika Creek at approximately 1600 m elevation. Common plant and lichen species around the nest included *Dryas octopetala*, *Salix reticulata*, *Cassiope tetragona*, and *Carex* spp. We revisited the site on 23 July, finding one chick with the adults in the same area as the nest. From the size of the chick, we estimated it hatched during the first week of July (P. Caputa pers. comm.).

On 8 July 2004, we observed an adult and fledgling about 7–10 days old on a sparsely vegetated gravel bar in the same area as the 2002 territory. A pair held a territory in the same area in 2005 and 2006, but we did not locate nests or chicks in those years. On 10 July 2007, we found a defensive breeding pair with a freshly hatched chick within 10 m of Pika Creek at an elevation of 1495 m and approximately 1 km downstream from the other territory. The chick was 2 m from a nest containing two cold eggs. Wandering Tattlers typically lay a clutch of four eggs (Gill et al. 2002), so it is possible that another recently hatched chick was in the vicinity. The nest was situated amid lichens (*Dactylina arctica* and *Flavocetraria* spp.) and *Cassiope tetragona*.

American Golden-Plover

The American Golden-Plover breeds regularly in the Yukon Territory. There are 57 breeding records, of which 52 are from arctic tundra of northern Yukon, three from the central Yukon, and two from alpine areas of the southern Yukon (Sinclair et al. 2003). Elsewhere, the species is a common breeder across much of the Canadian arctic as well as alpine habitats of Alaska and northern British Columbia (Johnson and Connors 1996). We estimate that two to three pairs of American Golden-Plovers bred in the valley of Pika Creek each year and found a total of seven nests: four in 2002, one in 2005, and two in 2006. All nests contained four eggs, and four of the six clutches monitored to completion hatched. Estimated dates of hatching were 23 June and 26 June in 2002, 17 July in 2005, and 2 July in 2006. Because of the late hatching date, we believe the successful nest in 2005 was a second attempt after the first attempt failed. Of the two failed nests, one was probably depredated, while the other was abandoned. Plover nests were in lower alpine meadows between 1600 and 1700 m elevation. These areas were dominated by short, tussocky vegetation that often included *Carex* spp., *Dryas octopetala*, *Salix pulchra*, *S. reticulata*, *S. arctica*, *Cassiope tetragona*, and *Flavocetraria* spp. Common forbs included *Dodecatheon frigidum, Artemisia arctica*, *Petasites frigidus*, *Pedicularis lanata*, *Silene acaulis*, *Valeriana sitchensis*, and *Claytonia sarmentosa*.

Upland Sandpiper

The Upland Sandpiper breeds primarily in grassland habitats of southern Canada and the northern United States, but smaller populations also breed in areas of northwestern North America (Houston and Bowen 2001). In the Yukon Territory, Upland Sandpipers are found in grassland at low elevations, typically along floodplains, and in meadows in the subalpine and lower alpine zones (Sinclair et al. 2003). There are 14 breeding records from the Yukon Territory including nine from the southern region. We found one Upland Sandpiper nest with four eggs in the Pika Creek valley on 1 June 2004; on the next check, we found two chicks with an estimated hatching date of 22 June. The chicks were difficult to locate, and possibly more were present. A second nest with four eggs was found on 15 July 2006. The nest was empty on 21 July, but an aggressive adult was nearby, and it seems likely the young had hatched and left the nest. Both nests were in low alpine meadows similar in structure and species composition to sites used by American Golden-Plovers. Upland Sandpipers appear to be most common in upper subalpine habitats (elevation 1400–1500 m), and we observed several breeding pairs in these areas.

CONCLUSIONS

Studies of the effects of climate change suggest that warmer temperatures may lead to an altitudinal advance of woody shrubs into alpine areas (Walther et al. 2005) and a turnover within tundra communities, in which graminoids increase in abundance at the expense of more specialized vegetation like *Dryas* spp. and lichens (e.g. Klanderud and Totland 2005, Walker et al. 2006). These changes pose a threat to arctic and alpine shorebirds, such as the Surfbird and Wandering Tattler, which live at low population densities and rely exclusively on open alpine habitats. Although our report of breeding by four alpine shorebirds is limited, suitable alpine habitat in the area is vast, suggesting that breeding populations may be larger. An inventory of the region to estimate the total population sizes and densities of breeding shorebirds would be useful. Demographic studies of the Surfbird and Wandering Tattler, although logistically difficult, would also be extremely valuable for estimating population trends and dynamics by identifying influential factors. Population studies combined with further knowledge on habitat selection for each species would aid predictions on the potential impacts of climate change on an important bird community within alpine ecosystems.

ACKNOWLEDGMENTS

We thank P. Caputa, G. Pelchat, J. N. M. Smith, D. and C. Thiel, B. Wilson, and M. Wong for contributing nest records and recording habitat data. We are also grateful to D. S. Hik, A. and S. Williams, and L. Goodwin for logistical support at Pika Camp and the Arctic Institute of North America at Kluane Lake. C. Eckert, G. Morrison, E. Nol, D. Thiel, and A.Wilson provided helpful comments on earlier drafts of the manuscript. Funding for this project was provided by the Natural Science and Engineering Research Council of Canada through a undergraduate student research award to Nouvet, a postgraduate scholarship award to Wilson, and a discovery grant and northern research supplement to Martin, Indian and Northern Affairs Canada Northern Scientific Training Program grants to Nouvet and Wilson, and a Killam predoctoral award to Wilson.

LITERATURE CITED

Hassol, S. J. 2004. Impact of a Warming Arctic. Arctic Climate Impact Assessment. Cambridge Univ. Press, Cambridge, England. http://www.acia.uaf.edu/, accessed October 2006.

Campbell, R. W., Dawe, N. K., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W., and McNall, M. C. E. 1990. The Birds of British Columbia, vol. 2. Royal Br. Columbia Mus., Vancouver.

Dixon, J. 1927. The Surfbird's secret. Condor 29:3–17.

Eckert, C. D., and Mactavish, B. 2004. Canada's first Bluethroat nest and other noteworthy sightings from Ivvavik National Park, Yukon. Birders' Journal 12:250–257.

Frisch, R., 1978. Surfbirds in Ogilvie and Richardson Mountains, Yukon Territory. Can. Field-Nat. 92:401–403.

Gill, R. E., McCaffery, B. J., and Tomkovich, P. S. 2002. Wandering Tattler (*Heteroscelus incanus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 642. Birds N. Am., Philadelphia.

Houston, C. S., and Bowen, D. E., Jr. 2001. Upland Sandpiper (*Bartramia longicauda*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 580. Birds N. Am., Philadelphia.

Johnson, O. W., and Connors, P. G. 1996. American Golden-Plover (*Pluvialis dominica*), Pacific Golden-Plover (*Pluvialis fulva*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 201–202. Acad. Nat. Sci., Philadelphia.

Kessel, B., and Gibson, D. D. 1978. Status and distribution of Alaska birds. Studies Avian Biol. 1.

Klanderud, K., and Totland, Ø. 2005. Simulated climate change altered dominance hierarchies and diversity of an alpine biodiversity hotspot. Ecology 86: 2047–2054.

Morrison, R. I. G., Gill, R. E., Jr., Harrington, B. A., Skagen, S., Page, G. W., Gratto-Trevor, C., and Haig, S. M. 2000. Population estimates of nearctic shorebirds. Waterbirds 23:337–352.

Seneer, S. E., and McCaffery, B. J. 1997. Surfbird (*Aphriza virgata*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 266. Acad. Nat. Sci., Philadelphia.

Sinclair, P. H., Nixon, W. A., Eckert, C. D., and Hughes, N. L. 2003. Birds of the Yukon Territory. Univ. of Br. Columbia Press, Vancouver.

Walker, M. D., Wahren, C. H., Hollister, R. D., Henry, G. R. H., Ahlquist, L. E., Alatalo, J. M., Bret-Harte, M. S., Calef, M. P., Callaghan, T. V., Carroll, A. B., Epstein, H. E., Jónsdóttir, I. S., Klein, J. A., Magnusson, B., Molau, U., Oberbauer, S. F., Rewa, S. P., Robinson, C. H., Shaver, G. R., Suding, K. N., Thompson, C. C., Tolvanen, A., Totland, Ø., Turner, P. L., Tweedie, C. E., Webber, P. J., and Wookey, P. A.. 2006. Plant community responses to experimental warming across the tundra biome. Proc. Natl. Acad. Sci. 103:1342–1346.

Walther, G. R., Beibner, S., and Burga, C.A.. 2005. Trends in the upward shifts of alpine plants. J. Vegetation Sci. 16: 541–548.

Accepted 22 January 2008

NOTES

BLACK SKIMMER OCCURRENCES IN NEW MEXICO, INCLUDING A HIGH ELEVATION RECORD

SARTOR O. WILLIAMS III, Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico 87131; sunbittern@earthlink.net

WILLIAM H. HOWE, Migratory Bird Program, U.S. Fish and Wildlife Service, P.O. Box 1306, Albuquerque, New Mexico 87103; bill_howe@fws.gov

On the morning of 12 May 2007, W. H. Howe and M. D. Howe discovered an adult Black Skimmer (*Rynchops niger*) resting in the company of other waterbirds on the shore of Heron Lake, Rio Arriba County, New Mexico, and obtained photographs and videotape to document the record (Figure 1). During 35 minutes of observation (15:10–15:45), the skimmer remained on the shore with the other birds; two hours later, upon their return to the site, the Howes noted a vehicle parked close to where the birds had been and all birds were gone. The skimmer was not seen again despite searches the next morning by D. J. Krueper and J. M. Ruth. Heron Lake, at 2192 m, is situated in the San Juan Mountains of north-central New Mexico and is only some 50 km east of the continental divide; it is in the Chama River valley, a part of the Rio Grande drainage. The Heron Lake skimmer appears to represent an altitude record for the species in the United States and Canada, eclipsing another adult at 2092 m in Colorado's San Juan Mountains at Pastorius Lake near Durango, La Plata County, 29 April 2004 (*N. Am. Birds* 58:406). For North America generally, these are approached or matched only by records from the interior highlands of Mexico, including ones to 2000 m in the state of Durango and about 2200 m in the Valley of Mexico (Williams 1982). For the species as a whole, however, no North American record tops those from South America, at 3900 m on the Bolivian altiplano (Fjeldså and Krabbe 1990).

There are five previous records of the Black Skimmer for New Mexico, four of them documented by photograph or specimen and the fifth by adequate written

Figure 1. Adult Black Skimmer at Heron Lake, Rio Arriba County, New Mexico, on 12 May 2007.

Photo by Marilyn D. Howe

details. These are: (1) an immature at Lake McMillan (elev. 1000 m), Eddy County, 5–7 August 1964 (R. C. Brummett; *Audubon Field Notes* 18:527); (2) an adult at Elephant Butte Lake (elev. 1355 m), Sierra County, 1 May 1993 (photograph by L. P. Gorbet in *Am. Birds* 47:441); (3) an adult at Morgan Lake (elev. 1623 m), San Juan County, 15 May 1996 (photograph by T. Reeves in *Field Notes* 50:316); (4) an adult at Bitter Lake National Wildlife Refuge (elev. 1067 m), Chaves County, 10–11 June 2001 (photographs by W. H. Howe and J. R. Oldenettel; *N. Am. Birds* 55:468); and (5) an immature at Stein's Pass (elev. 1286 m), Hidalgo County, 18 October 2005 (salvaged specimen at Museum of Southwestern Biology, University of New Mexico, MSB 25152). Three of these are from east of the continental divide, with two in the Pecos River valley and one in the Rio Grande valley, and two are west of the divide, with one each in the San Juan River and the Gila River basins.

New Mexico lies roughly equidistant from large Black Skimmer populations on the Texas coast and smaller but still significant populations from the Gulf of California to southern California, and skimmers that reach New Mexico could originate from either coast. One, however, was of known origin: the immature salvaged at Stein's Pass, very near the Arizona line, had been banded as a chick at Salton Sea, California, 19 August 2005 by K. C. Molina (*N. Am. Birds* 60:113). Remarkably, another chick banded there that day likewise wandered inland and was found along the Gila River at Gillespie Dam, Maricopa County, Arizona, 16–19 September 2005, where it was identified from photographs of the alphanumeric code on its band (*N. Am. Birds* 60:117).

Inland occurrences of the Black Skimmer are always newsworthy, but the causes of such events are not always clear. Many individuals are believed to be storm-blown, and some inland records in the U.S. and Canada are clearly attributable to tropical storms during the late summer/early fall period of such weather disturbances; the single immatures that reached New Mexico in August and October may fit that pattern. The other four New Mexico records, however, are for May and early June, and all of those were of alternate-plumaged adults. Given that northerly breeding Black Skimmers on both coasts are migratory, strongly so in the eastern U.S. (Gochfeld and Burger 1994), somewhat less so in the western U.S. (Collins and Garrett 1996, Molina 1996), we suspect the spring adults that reach New Mexico more likely represent misdirected migrants rather than storm-driven refugees.

We thank Devische Farbotnik for reporting the banded skimmer found dead at Stein's Pass, Alan M. Craig for salvaging the carcass, and Kathy C. Molina for providing the banding history. Reviews by Charles T. Collins and Kimball L. Garrett improved the manuscript.

LITERATURE CITED

Collins, C. T., and Garrett, K. L. 1996. The Black Skimmer in California: An overview. W. Birds 27:127–135.

Fjeldså, J., and Krabbe, N. 1990. Birds of the High Andes. Zool. Mus., Univ. of Copenhagen, Copenhagen, Denmark.

Gochfeld, M., and Burger, J. 1994. Black Skimmer (*Rynchops niger*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 108. Acad. Nat. Sci., Philadelphia.

Molina, K. C. 1996. Population status and breeding biology of Black Skimmers at the Salton Sea, California. W. Birds 27:143–158.

Williams, S. O. III. 1982. Black Skimmers on the Mexican Plateau. Am. Birds 36:255–257.

Accepted 29 October 2007

TERRESTRIAL FOOT-PADDLING BY A GLAUCOUS-WINGED GULL

RYAN P. O'DONNELL, Department of Biology and the Ecology Center, 5305 Old Main Hill, Utah State University, Logan, Utah 84322-5305; Ryan@biology.usu.edu

Gulls are known to use a variety of foraging techniques in a variety of habitats (Burger 1988). One behavior, referred to as "foot-paddling," consists of rapidly alternating raising and lowering of the feet (Simmons 1961a). This behavior can be divided into two functions (Tinbergen 1962). First, on tidal mudflats, in pools of water, and on saturated sand, this behavior suspends sediment in water and creates quicksand, bringing buried invertebrates to the surface or inducing them to move so that they become visible. Second, foot-paddling on solid but moist grassy soil, hereafter referred to as terrestrial foot-paddling, is thought to induce earthworms to come to the surface in response to the vibrations in the soil (Tinbergen 1962, Edwards and Bohlen 1993; but see Sparks 1961).

On 23 February 2007 at 16:45, I observed an adult Glaucous-winged Gull (*Larus glaucescens*) performing terrestrial foot-paddling on the lawn of the parliament buildings on Belleville Street in Victoria, British Columbia, Canada. Observations were made from a distance of approximately 5 meters for a duration of approximately 5 minutes. I recorded 1 minute 58 seconds in three parts on a Nikon Coolpix 5200 digital camera at 640 × 480 pixels and 30 frames per second. These three videos are available from the author upon request.

The gull created vibrations in the damp soil by rapidly stomping both feet, alternating left and right, for continuous periods of 4 to 24 seconds. In the video-recorded portion of the behavior, the gull spent 78 of 118 seconds foot-paddling at a mean frequency of 3.2 stomps per foot per second and a maximum frequency of 4.5 stomps per foot per second. After each bout of foot-paddling the gull paused and struck at worms that had risen to the surface of the soil in front of it. The gull struck at the ground in front of it 9 times in the 118 recorded seconds and successfully captured and ingested one oligochaete earthworm (species not determined). The gull continued the behavior as I discontinued observation and left the area. Several other Glaucous-winged Gulls were within a few dozen meters of the described gull, but none of the others employed this behavior during the period of observation.

Foot-paddling to form quicksand in muddy or sandy substrates has been recorded for many species previously, especially plovers, but also geese, ducks, swans, flamingoes, and herons (reviewed in Simmons 1961a, b). This function of foot-paddling has also been reported in many species of gulls, including the Mew (*Larus canus*), Ring-billed (*L. delawarensis*), California (*L. californicus*), Great Black-backed (*L. marinus*), Kelp or Southern Black-backed (*L. dominicanus*), Glaucous-winged, Western (*L. occidentalis*), Herring (*L. argentatus*), Black-headed (*L. ridibundus*), Gray-hooded (*L. cirrocephalus*), Silver (*L. novaehollandiae*), Red-billed (*L. scopulinus*), Black-billed (*L. bulleri*), Bonaparte's (*L. philadelphia*), and Laughing (*L. atricilla*) (Williams 1933, Simmons 1961b, Fordham 1963, Buckley 1966, Dawson 1966, Moyle 1966, Tangren 1982, Burger 1988, Hendricks and Hendricks 2006). Although Moyle (1966) reported Glaucous-winged Gulls using foot-paddling in gravel-bottomed pools to acquire salmon eggs, foot-paddling behavior by this species was not mentioned in two other studies that included Glaucous-winged Gulls and reported foot-paddling behavior by other species (Tangren 1982, Burger 1988).

The second function of foot-paddling, drawing worms to the surface of grassy soil, has also been used by several bird species (e.g. Simmons 1961b, Tinbergen 1962, Heather 1977) and even a turtle (Kaufmann 1986) but has not been reported for any gull in North America. Terrestrial foot-paddling has not been mentioned in previous studies of Glaucous-winged Gull foraging (e.g., Moyle 1966, Tangren 1982, Irons et al. 1986, Burger 1988, Verbeek 1993). Thus my report apparently represents the first documentation of terrestrial foot-paddling by a Glaucous-winged Gull.

It would be interesting to know the geographic distribution of terrestrial foot-paddling behavior in the Glaucous-winged Gull. Only in the southernmost part of its current breeding range and through about half of its nonbreeding range does the Glaucous-winged Gull occur with native earthworms. North of Vancouver Island the only earthworms are species introduced since Europeans colonized the area (e.g., Callahan et al. 2006). Terrestrial foot-paddling may have been transmitted through learning from other species or adapted from foot-paddling in saturated substrates. In the Black-headed Gull, foot-paddling is apparently instinctual as it developed as early as 12 days after hatching in captive-born gulls and was even exhibited by a blind individual (Rothschild 1962). Whether terrestrial foot-paddling for worms in the Glaucous-winged Gull is learned or instinctual, this behavior may be expected to spread into areas where the species did not evolve with earthworms but where this food resource has recently become available.

Paul Hendricks provided references and encouragement and reviewed a draft of the manuscript. A Willard L. Eccles graduate fellowship from the Utah State University College of Science and a travel award from the USU Graduate Student Senate provided financial support.

LITERATURE CITED

Buckley, P. A. 1966. Foot-paddling in four American gulls, with comments on its possible function and stimulation. Zeitschrift für Tierpsychologie 23:395–402.

Burger, J. 1988. Foraging behavior in gulls: Differences in method, prey, and habitat. Colonial Waterbirds 11:9–23.

Callahan, M. A., Jr, González, G., Hale, C. M., Heneghan, L., Lachnicht, S. L. and Zou, X. 2006. Policy and management responses to earthworm invasions in North America. Biological Invasions 8:1317–1329.

Dawson, D. G. 1966. "Paddling" in Red-billed and Black-billed Gulls. Notornis 13:97.

Edwards, C. A., and Bohlen, P. J. 1993. Biology and Ecology of Earthworms. Chapman and Hall, London.

Fordham, R. A. 1963. Individual and social behaviour of the Southern Black-backed Gull. Notornis 10:206–222.

Heather, B. D. 1977. Foot-trembling by the Black-fronted Dotterel. Notornis 24:1–8.

Hendricks, P., and Hendricks, L. M. 2006. Foot paddling by Western Gulls. Northwestern Nat. 87:246–247.

Irons, D. B., Anthony, R. G., and Estes, J. A. 1986. Foraging strategies of Glaucous-winged Gulls in a rocky intertidal community. Ecology 67:1460–1474.

Kaufmann, J. H. 1986. Stomping for earthworms by Wood Turtles, *Clemmys insculpta*: A newly discovered foraging technique. Copeia 1986:1001–1004.

Moyle, P. 1966. Feeding behavior of the Glaucous-winged Gull on an Alaskan salmon stream. Wilson Bulletin 78:175–190.

Rothschild, M. 1962. Development of paddling and other movements in young Black-headed Gulls. Br. Birds 55:114–117.

Simmons, K. E. L. 1961a. Foot-movements in plovers and other birds. Br. Birds 54:34–39.

Simmons, K. E. L. 1961b. Further observations on foot-movements in plovers and other birds. Br. Birds 54:418–422.

Sparks, J. H. 1961. The relationship between foot-movements and feeding in shore birds. Br. Birds 54:337–340.

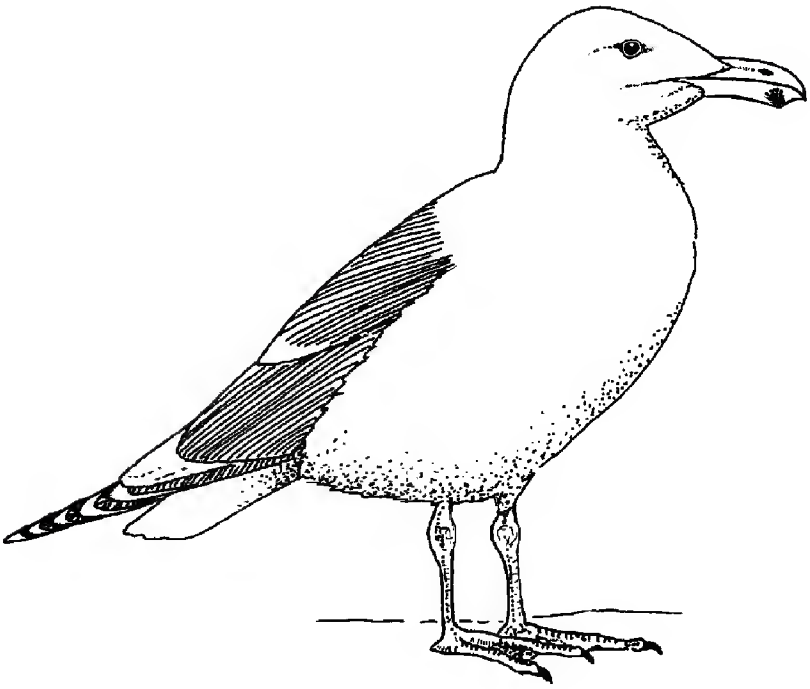
Tangren, G. V. 1982. Feeding behavior of crows and gulls on a Puget Sound beach. W. Birds 13:1–12.

Tinbergen, N. 1962. Foot-paddling in gulls. Br. Birds 55:117–120.

Verbeek, N. A. M. 1993. Glaucous-winged Gull (*Larus glaucescens*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 59. Acad. Nat. Sci., Philadelphia.

Williams, L. 1933. A peculiar feeding habit of the Short-billed Gull. Condor 35:161.

Accepted 5 November 2007



Glaucous-winged Gull

Sketch by George C. West

FIRST RECORD OF THE CASSIN'S VIREO NESTING IN ALASKA

LUCAS H. DECICCO, 1171 Albro Gregory Lane, Fairbanks, Alaska 99712; nebulosa200@gmail.com

NICHOLAS HAJDUKOVICH, 229 Iditarod Avenue, Fairbanks, Alaska 99701

On 4 June 2005, while birding along the Chilkat River near Haines, Alaska, we observed a pair of Cassin's Vireos (*Vireo cassinii*) attending an active nest. The birds were also observed later the same day by Thede Tobish, Jr., Alan DeMartini, and Gary H. Rosenberg. We first heard an adult singing at 06:00 hrs, and at approximately 06:30 hrs followed it to the nest, where it fed four young. We photographed the pair, nest, young (Figure 1), and surrounding habitat during the period of observation. The pair was actively feeding the young and disposing of fecal sacs during our visit. Both adults delivered food to the young, but they were seldom seen for more than a few seconds at the nest. When we approached the nest, both birds became agitated and gave alarm calls. After a short period of discontinuous singing in the early morning, the pair continued to vocalize solely with alarm calls until we departed after 0.5 hour of observation.

Figure 1. Female (upper) and male (lower) Cassin's Vireos attending nest near Haines Alaska, 4 June 2005.

Photo by Lucas DeCicco

Formerly considered conspecific with the Cassin's Vireo, the Plumbeous Vireo (*V. plumbeus*) and Blue-headed Vireo (*V. solitarius*) differ only slightly in plumage and voice. The Plumbeous Vireo's breeding range extends north only to northeastern Wyoming (Oakleaf et al. 1992), but the Blue-headed Vireo breeds much closer to Alaska, in northeastern British Columbia (Campbell et al. 1997). Given acceptable views, field identification of these species by plumage is reliable under most circumstances (Heindel 1996). The two birds near Haines differed slightly in plumage, with one appearing brighter than the other. On this basis, we identified the duller individual as the female (Pyle 1997). The male had more green and yellow tones than the female (Figure 1); we distinguished it from the Plumbeous Vireo by its olive-colored back contrasting slightly with a grayer head. This characteristic also distinguished it from the Blue-headed Vireo, which shows a strong and sharp contrast between a grayish-blue head and olive-green back, less than in the male we observed. The female appeared very similar to the Plumbeous Vireo, differing primarily by its yellow flanks and undertail coverts. This field mark is not completely reliable but does suggest our bird was not a Plumbeous Vireo. The Blue-headed Vireo was easily ruled out because of the minimal contrast between the crown and back of the observed birds and their overall drab gray coloration (Heindel 1996).

The territory was located within the alluvial floodplain of the Chilkat River 0.4 km southwest of mile 24.4 on the Haines Highway near the Chilkat River bridge. In this area, the Chilkat River is lined with riparian groves of black cottonwood (*Populus balsamifera*). In its lower reaches, the river widens into a shallow braided alluvial floodplain, situated between steep mountain slopes. The gravel bars of the floodplain are overgrown with black cottonwood ranging in height from 0.5 to 10 m. The trees are growing in stands of defined cohorts, with very few areas containing mixed size classes. Other vegetation in the floodplain includes dwarf fireweed (*Epilobium latifolium*), along the river's shoreline, willows (*Salix* spp.), and unidentified grasses.

The nest was a hanging cup, slung between two branches of a 5-m-tall black cottonwood tree, approximately 2 m above the ground. The nest measured roughly 90 mm wide by 55 mm tall. The inside of the cup measured 65 mm wide by 30 mm deep (nest measurements were taken in the fall, after the breeding season, when the birds had vacated the area). The nest was woven from grasses and spider webs and lined with stiff bristles. On 4 June, the four young had well-developed pinfeathers, with some emerging from their sheaths, including the rectrices; the nestlings' gapes were prominent, and their eyes were not yet open.

Alaska's first recorded Cassin's Vireo was an adult male collected at Hyder on 11 June 1986 (Univ. Alaska Museum [UAM] 5321; Gibson and Kessel 1992). Since then the species has been recorded 13 out of the past 20 years between late May and August in the riparian zones of the major rivers on the southeast Alaska mainland. As of spring 2006 there have been 39 additional Alaska records of Cassin's Vireo, 36 of which have come from mainland southeast Alaska, primarily from the following major rivers: Fish Creek (near Hyder) (Gibson and Kessel 1992, *Am. Birds* 45:1151, *Natl. Audubon Soc. Field Notes* 52:492, *N. Am. Birds* 58:417–420), the Chickamin (Johnson et al. in press), Unuk (Johnson et al. in press), Stikine (Gibson et al. 2003, UAM 6713), Whiting (Johnson et al. in press), Taku (*N. Am. Birds* 54:413, Johnson et al. in press), and Chilkat (Johnson et al. in press, *N. Am. Birds* 59:641). The impressive number of Alaska records of the Cassin's Vireo over the past 20 years would seem to parallel the trend of an increasing breeding population of this species in its normal range since 1980 (Sauer et al. 2007). The earliest arrival dates of this species in Alaska are 3 May 2004 (NAB 58:417–420, 2004) and 9 May 1998 (AFN 52:375, 1998), near Juneau. The birds we found near Haines had young that appeared to be at least 8 days old, as determined by the emerging rectrices, a technique verified for the closely related Blue-headed Vireo (James 1998). The birds' latest arrival to the nesting territory would have been 5 May, given an incubation period of approximately 13 days (Drynan and Purcell *in* Goguen and Curson 2002) and a nest-building and laying period of at least 10 days (Dawson and Bowles 1909). The suitable habitat along major southeast Alaska rivers is usually not visited by birders until late May, so earlier arriving birds could easily be missed. Three pairs of this species had been observed on territory prior to 2005, when the nest on the Chilkat River was found (Johnson et al. in press). One of these pairs was along the Taku River 27 May to 3 June 2000, one was along the Whiting River 7 June 2002, and one was observed vigorously defending a territory near Choca Creek, Chickamin River, 19 June 1996.

Beyond the southeast Alaska mainland rivers, there have been records of Cassin's Vireos from Mitkof Island, in the Alexander Archipelago adjacent to the Stikine River mouth (11 June 1993, G. B. van Vliet, pers. comm.), and from as far west and north as Anchorage (14–18 June 1999, *N. Am. Birds* 53:422, 1999, and 30 May–30 June 2001, *N. Am. Birds* 55:471, 2001). Previously, the Cassin's Vireo was known to breed sparsely as far north as Quesnel, in central British Columbia (Campbell et al. 1997), approximately 1075 km southeast of Haines.

We thank Gus B. van Vliet, Steven C. Heinl, and Daniel D. Gibson for assisting in the compilation of the Alaska records of Cassin's Vireos and Tobish and Rosenberg for transportation to Haines. The helpful editorial comments of Jon L. Dunn and Heinl were greatly appreciated.

LITERATURE CITED

Campbell, R. W., Dawe, N. K., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W., McNall, M. C. E., and Smith, G. E. J. 1997. The Birds of British Columbia, vol. 3. Univ. of British Columbia Press, Vancouver.

Dawson, W. L., and Bowles, J. H. 1909. The Birds of Washington. Occidental Publ. Co., Seattle.

Gibson, D. D., and Kessel. B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467

Gibson, D. D., Heinl, S. C., Tobish, T. G. 2003. Report of the Alaska Checklist Committee, 1997–2002. W. Birds 34:122–132

Goguen, C. B., and Curson, D. R. 2002. Cassin's Vireo (*Vireo cassinii*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 615. Birds N. Am., Philadelphia.

Heindel, M. T. 1996. Field identification of the Solitary Vireo complex. Birding 28:459–471.

James, R. D. 1998. Blue-headed Vireo (*Vireo solitarius*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 379. Birds N. Am., Philadelphia.

Johnson, J. A., Andres, B. A., and Bissonette, J. A. In press. Birds of major mainland rivers of southeast Alaska. Gen. Tech. Rep. PNW-GTR XXX. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

Oakleaf, B., Luce, B., Ritter, S., and Cerovski, A. 1992. Wyoming Bird and Mammal atlas. Wyo. Game and Fish Dept., Lander, WY.

Pyle, P. 1997. Identification Guide to North American Birds, part 1: Columbidae to Ploceidae. Slate Creek Press, Bolinas, CA.

Sauer, J. R., Hines, J. E., and Fallon, J. 2007. The North American Breeding Bird Survey, Results and Analysis 1966–2006. Version 10.13.2007. USGS Patuxent Wildlife Research Center, Laurel, MD; www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Accepted 13 November 2007

CURRENT STATUS OF THE CACTUS WREN IN NORTHWESTERN BAJA CALIFORNIA

KEVIN B. CLARK, Clark Biological Services, 7558 Northrup Drive, San Diego, California 92126; kevin.b.clark@sbcglobal.net

MARK DODERO, RECON Environmental Inc., 1927 Fifth Ave., San Diego, California 92101-2358; mdodero@recon-us.com

The distribution of the Cactus Wren (*Campylorhynchus brunneicapillus*) in northwestern Baja California is something of an enigma. Although widely distributed over most of the peninsula, the species is absent from many areas of seemingly suitable habitat in cactus-filled maritime succulent scrub. Immediately north of the border along the coast, Cactus Wrens were historically widespread, though they are now declining rapidly as increasingly frequent fire and continuing urbanization constrict available habitat. Here, we summarize published and unpublished information on Cactus Wrens in northwestern Baja California, including the recent rediscovery of what may be the region's only large population of the declining San Diego Cactus Wren (*C. b. sandiegensis*).

At least as far back as A. W. Anthony's (1891) behavioral observations, many ornithologists have recognized Cactus Wrens in coastal San Diego County as distinct from inland, desert-inhabiting populations. Rea and Weaver (1990) defined the Cactus Wrens found in southern Orange County, coastal San Diego County, and northwestern Baja California south to Valle de las Palmas as *C. b. sandiegensis*: "based on a mosaic of seven characters, *C. b. sandiegensis* differs from *C. b. anthonyi* of the transmontane desert by larger ventral spotting, reduced abdominal buff, and greater white tail barring, and from *C. b. bryanti* of Baja California by its less brown dorsum, less barred tail, generally single-spotted chest feathers, and tendency toward a chest patch." In an analysis of song-structure differences among Cactus Wren populations, Atwood and Lerman (2007) could not distinguish between the vocalization of individuals from within the range of *C. b. sandiegensis* and those farther to the north in Los Angeles and Ventura counties. But they concluded that "Cactus Wrens in coastal southern California are geographically isolated, morphologically different, and differ in song behavior from those in Baja California. Compared with Sonoran and Chihuahuan desert populations, Cactus Wrens in coastal southern California are geographically isolated, differ in song behavior, and occur in a unique and unusual ecological setting."

The existence of this distinct coastal population of the Cactus Wren has led to several attempts to define its distributional boundaries, especially to the south. Bancroft (1923) surveyed northern Baja California and reported a gap in the Cactus Wren's distribution extending from the border zone south approximately 260 km (161 mi) to 31° N at San Telmo, a gap also recognized by Grinnell (1921, 1928) and Rea and Weaver (1990). More recently, however, Cactus Wrens have been recorded within this area repeatedly. Beginning near San Telmo, Short and Crossin (1967: 294) reported five Cactus Wrens 17 km (11 mi.) southeast of San Vicente in La Calentura Valley on 7 April 1967 (Figure 1). Kenneth L. Weaver (in litt.) recorded a Cactus Wren approximately 12 km (7 mi.) northeast of Colonet on 7 August 2007 and a fresh nest in a cholla there two days later. Unitt et al. (1995) reported a Cactus Wren rectrix found in a nest at Rancho Vargas, east of San Vicente, on 10 August 1986 that had "too much black for typical *bryanti* and resembles *sandiegensis* more closely."

Farther to the north, since 2 October 1999, Cactus Wrens have been recorded along south-facing slopes of the lower Río Santo Tomás, from the estuary upstream to the winery near Highway 1, a distance of roughly 24 km (15 mi.) (R. A. Erickson in litt.), with a high count of six near the mouth on 13 November 2005 (T. J. Myers in litt.).

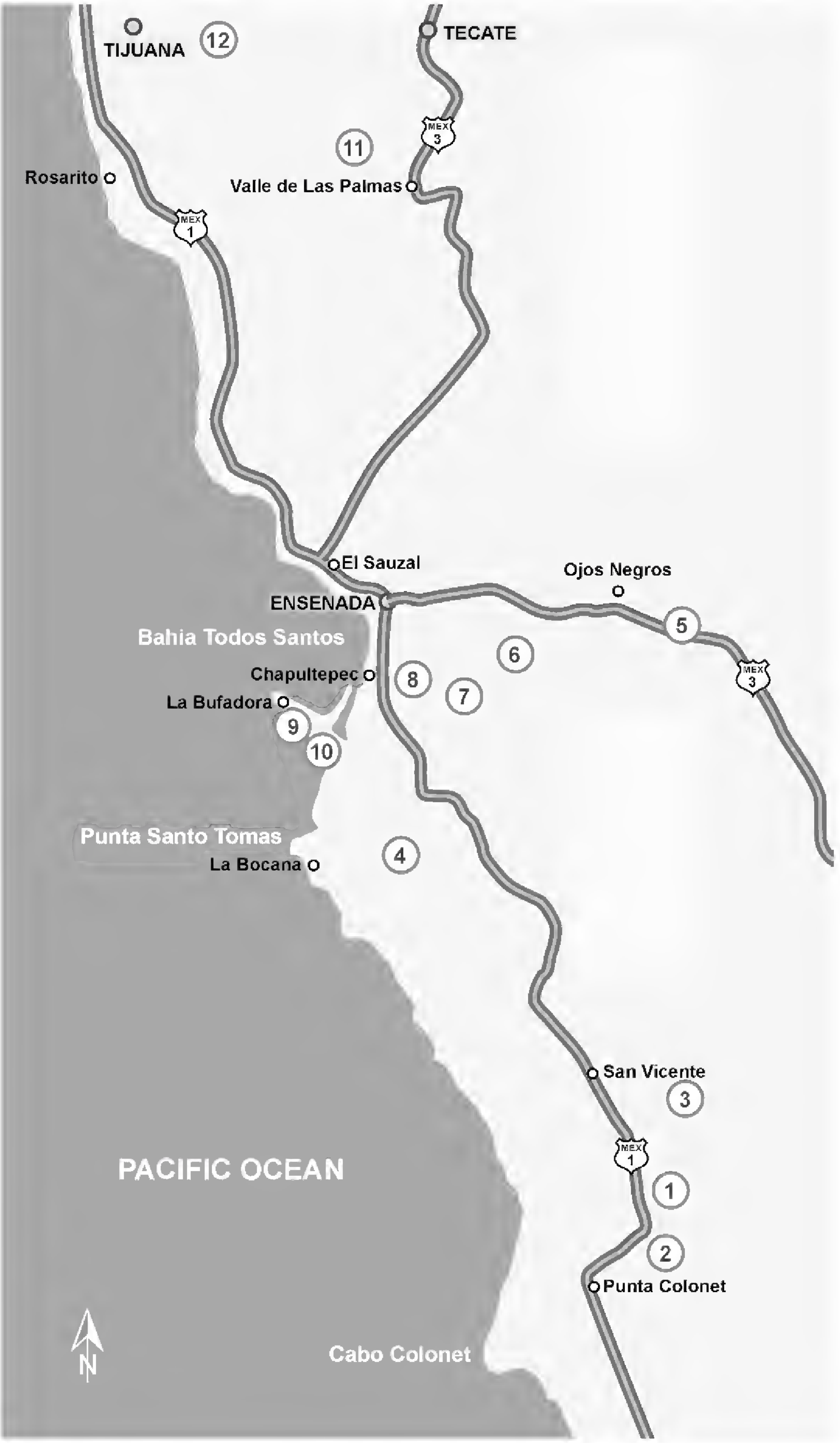


Figure 1. Northwestern Baja California, Mexico, showing the localities mentioned in the text. 1, La Calentura Valley; 2, 12 km northeast of Colonet; 3, Rancho Vargas; 4, Rio Santo Tomas; 5, 13 km east of Ojos Negros; 6, Agua Caliente; 7, Arroyo San Carlos; 8, Chapultepec; 9, Punta Banda (La Bufadora); 10, Arbolitos; 11, Valle de las Palmas; 12, Mesa Jesús Maria/Cerro San Isidro.

In the area around Ensenada, Short and Crossin (1967) reported a single Cactus Wren from hills 13 km (8 mi.) east of Ojos Negros on 2 April 1967. Six more were found near Highway 3 just east of the Ojos Negros Valley on 18 December 2003 (R. A. Erickson in litt.). Between Ojos Negros and the Maneadero Plain on 6 January 2002, Marshall J. Iliff found a Cactus Wren at Agua Caliente and another downstream along Arroyo San Carlos, and Daniel S. Cooper recorded a high count of ten birds along Arroyo San Carlos on 1 January 2006 (R. A. Erickson in litt.). Just to the north, William E. Haas found two Cactus Wrens in the hills east of Chapultepec on 19 December 2003 (R. A. Erickson in litt.).

Short and Crossin (1967) published the first record of a Cactus Wren from Punta Banda, of one seen on 8 April 1967. Ken Weaver and Bruce Farnsworth (in litt.) found there seven Cactus Wrens they recognized as *C. b. bryanti* in July 1992. Unitt et al. (1995) reported seven individuals observed along the coast of Punta Banda in August 1993 and also ascribed the population there to *C. b. bryanti*. The Ensenada Christmas bird counts since 2001 have recorded as many as eight Cactus Wrens in the Punta Banda area at La Bufadora and in the hills east of the Maneadero Plain.

On 1 October 1995, Clark observed six Cactus Wrens, including an apparent family group of four, on a steep slope overlooking the ocean 1 km (0.6 mi) southeast of Arbolitos and north of the island of Piedra Blanca, approximately 5 km (3 mi) southeast of the other Punta Banda records. The habitat in this area is maritime succulent scrub dominated by *Agave shawii*, *Bergerocactus emoryi*, *Artemisia californica*, *Ambrosia chenopodiifolia*, and *Salvia munzii*, with some coastal cholla (*Cylindropuntia prolifera*), prickly pear (*Opuntia* spp.), and *Stenocereus gummosus* cacti.

All of these observations are within a 100-km (62-mi.) distance between Ensenada and San Telmo. The number of observations and the repeated sightings of groups of birds indicate that several localized populations of Cactus Wrens occur in this region. Further field work should help to elucidate whether all these populations should be ascribed to *C. b. bryanti* or whether *C. b. sandiegensis* intergrades into this area, as the feather found by Unitt et al. (1995) east of San Vicente implies.

No Cactus Wrens have been observed between Ojos Negros and Valle de las Palmas, a distance of over 60 km (37 mi.). Rea and Weaver (1990) reported a total of seven museum specimens collected from three sites between Valle de las Palmas and the international border and assigned these specimens to *C. b. sandiegensis*. Their appendix 2 also lists observations of five Cactus Wrens on south-facing slopes "0.5–1.0 mi. N of town of Valle de las Palmas" on 27 July 1986, noting that the habitat was threatened by agricultural clearing. During recent surveys of the south-facing slopes of Valle de las Palmas, we found an open landscape of grasses and forbs with interspersed occasional shrubs and a few small patches of coastal sage scrub vegetation. We saw extensive evidence of frequent fires, likely set intentionally to clear shrubs and stimulate growth for livestock forage. Coastal cholla occurs only as isolated plants, and we saw no evidence that a Cactus Wren population persists.

Baja California's largest population of Cactus Wrens located within the described range of *C. b. sandiegensis* occurs south of Otay Mountain and directly east of the vernal pool ecosystem of Mesa Jesus María, from the south-facing slopes of Cerro San Isidro east approximately 5–6 km (3–4 mi.) (Figure 2). Numerous large patches of coastal cholla, some over an acre in size, grow there on steep slopes surrounded by nonnative grassland and patches of scrub (Figure 3). Despite extensive evidence of fires in the area, these cholla patches persist, and abundant clonal reproduction around their edges suggests that they may even be expanding. During limited field surveys we have found at least one Cactus Wren pair in each large cholla patch, and we suspect that the population exceeds 20 pairs.

Presumably referring to the same area, Bancroft (1923) described a much larger Cactus Wren population centered "twenty miles east of Tiajuana [*sic*]" and extending "about five miles in every direction," from which Laurence M. Huey collected three

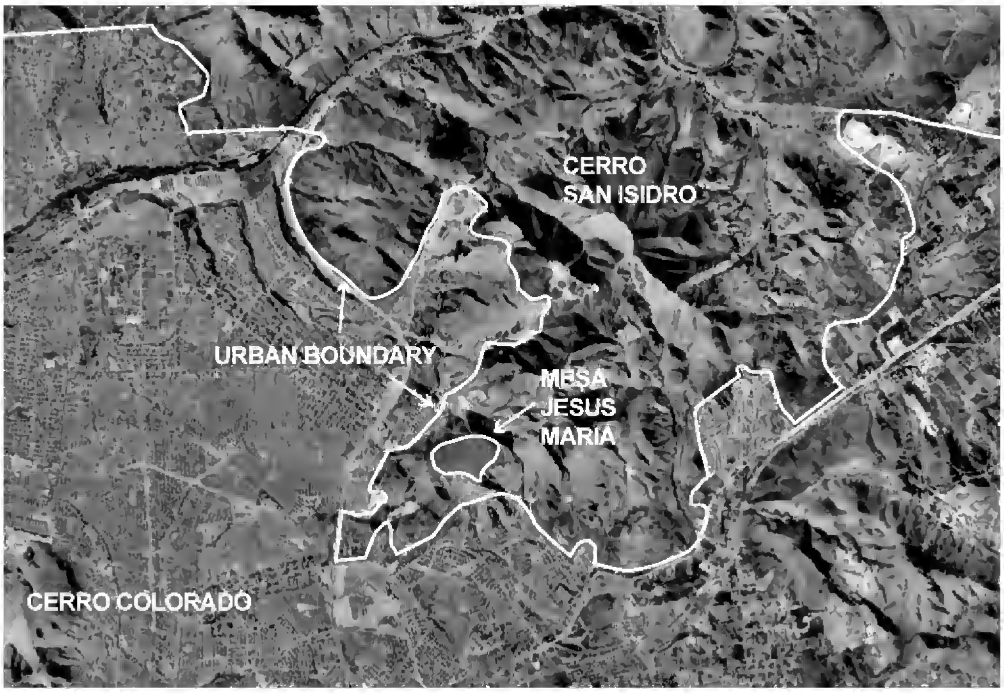


Figure 2. Aerial photograph of the Mesa Jesús Maria/Cerro San Isidro area east of Tijuana, showing the extent of the urban development in the region.

Image Source: Copyright Globe Xplorer, All Rights Reserved (flown April 2007)

Figure 3. Cholla patch on south-facing slopes below Mesa Jesus Maria, 9 March 2005. A pair of Cactus Wrens was observed nesting in this patch.

Photo by Kevin Clark

specimens on 6 April 1923, locality 15 miles east of Tijuana (San Diego Natural History Museum 8682–8684). Other sensitive species that we have observed in this area include the California Gnatcatcher (*Polioptila californica*), Burrowing Owl (*Athene cunicularia*), Rufous-crowned Sparrow (*Aimophila ruficeps*), and Sage Sparrow (*Amphispiza belli*). The mesa supports at least two invertebrates endangered in the U.S., the San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) and Quino Checkerspot Butterfly (*Euphydryas editha quino*).

Continuing urban expansion threatens to destroy these cholla patches as well as the vernal pools and other sensitive habitats farther up the slopes. Conservation efforts by the staff of RECON Environmental Inc., the Centro de Investigación Científica y Educación Superior de Ensenada (CICESE), and the U.S. Fish and Wildlife Service have focused on species inventory and mapping of the area, while developing a dialogue with the planning agency of the municipality of Tijuana. The rapid and weakly regulated economic growth of the border region, however, places the prospect of conserving this area's assemblage of rare species and ecosystems in doubt.

We thank Alison Anderson, Horacio de la Cueva, Rod Dossey, Erin Fernandez, and Bruce Hanson for accompanying us on field trips. Mark Billings, Richard Erickson, and Ken Weaver provided valuable comments and suggestions. Thanks to Vince Martinez and Frank McDermott (of RECON Environmental, Inc.) for preparing the maps. Robb Hamilton carefully edited and revised the draft manuscript, and his efforts are greatly appreciated.

LITERATURE CITED

Anthony, A. W. 1891. Notes on the Cactus Wren. Zoe 2:133–134.

Atwood, J. L., and Lerman, S. B. 2007. Geographic variation in Cactus Wren songs. W. Birds 38:29–46.

Bancroft, G. 1923. Some geographical notes on the Cactus Wren. Condor 25:165–168.

Grinnell, J. 1921. The Bryant Cactus Wren not a bird of California. Condor 23:169.

Grinnell, J. 1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Publ. Zool. 32:1–300.

Rea, A. M., and Weaver, K. L. 1990. The taxonomy, distribution, and status of coastal California Cactus Wrens. W. Birds 21:81–126.

Short, L. L., and Crossin, R. S. 1967. Notes on the avifauna of northwestern Baja California. Trans. San Diego Soc. Nat. Hist. 14:281–300.

Unitt, P., Rea, A. M., Palacios, E., Mellink, E. Alfaro, L., and Gonzalez, S. 1995. Noteworthy records of birds in northwestern Baja California, Mexico. W. Birds 26:144–154.

Accepted 28 January 2008

BOOK REVIEWS

Rare Birds of California, by Robert A. Hamilton, Michael A. Patten, and Richard A. Erickson (editors). 2007. Western Field Ornithologists, Camarillo, CA (order from Allen Press by e-mail at orders@allenpress.com or by phone at 800-627-0326. 504 pp., numerous photos, sketches, and 71 color plates. Hardback, $54.00 for WFO members, $59.95 for nonmembers. ISBN 978-0-9790585-0-9.

With the appearance of *Rare Birds of California*, edited by Robert A. Hamilton, Michael A. Patten, and Richard A. Erickson, the historic record of the pursuit of rare birds for fun and for science in the Golden State is presented. And it has been served up large. The book is a distillation of the work of the California Bird Records Committee over its first 37 years. All records submitted to the committee, as well as other reports and evidence, are here compiled in a single annotated listing. As well as a distillation, the book is a celebration, filled with photographs and documentary artwork attesting to the talents and zeal of California birders.

Rare Birds of California is dedicated to Guy McCaskie, who has fostered the growth of the state's birding fraternity during the past half-century. Given his long-time involvement with the California Bird Records Committee, it is appropriate that McCaskie also offers the foreword, in which a brief explanation and history of the committee is laid forth at the outset.

The introductory section describes the book's organizing principles, purpose, and operation. Table A is a history of when and where committee meetings took place, along with attendees at each; Table B details the membership of the committee through time. This material is followed by the California bird list of 634 species accepted as of 25 June 2007, which takes up 15 pages as Table C. Accounts for all species reviewed at any time by the committee are referenced by page number within the list. This is followed by the supplemental list of six species of uncertain natural occurrence. Table D lists 15 naturalized bird species not reviewed by the committee. Perhaps unsurprisingly, 9 of these are psittacids, but it may come as a surprise to some to find that only one such bird, the Red-crowned Parrot, is currently accepted on the main state list.

Of singular interest is Table E, "Annual Additions of Native Species to the Main List, 1900–2006." Harris's Sparrow, first reported in 1900, is at the beginning of this roster of 228 species. I found this historic record intriguing, my eye lingering on species or groups of species whose sudden detection in California hints at shifts in the when, where, and how of the field effort. One might intuit that the majority of the earlier additions by year are, like Harris's Sparrow, species now known to occur regularly in California and, for the most part, this is so.

Yet, the early potential for glamorous vagrants decades before the advent of modern birding in California is revealed by the state's first Louisiana Waterthrush (in 1908, with the next not until 1985 and only 13 since then), Varied Bunting (1914; only 3 total records), Streak-backed Oriole (1931; only 7 total records), and Jack Snipe (one shot by a snipe hunter in 1938 was followed by the only other record—with evidence obtained the same way—in 1990). A conspicuous run of five years, 1940–1944, with no additions to the California bird list suggests that no one lifted binoculars during the Second World War. Poetically, 1957—the year Guy McCaskie moved from Great Britain to California—was the most recent year in which no species was added.

The list of yearly additions during the decades of the 1960s and 1970s is busy with California firsts, including ten in 1969. As the state list has grown, so too has the pool of likely new possibilities diminished; the number of such species added per year can be seen to have decreased over the past 20 or so years. The discussion here closes with a wishful look at potential additions yet to come, ranging from species resident nearly to the California border in Arizona (the grudging Canyon Towhee) to "birds without maps": Siberian mindbenders yet to be detected in the state, such as the Bean Goose and Temminck's Stint.

Of special appeal in *Rare Birds of California* are three insightful and well-constructed essays. The first, "Trends in the California Bird List: Jehl (1980) Revisited," examines changes in the relative contributions of geographic source regions from which have come the set of California rarities. Most telling is the degree to which Asiatic and Arctic species have come to supplant eastern North American and Mexican/southwestern birds as new additions over the decades.

Next is "Birding in California 1960–2007," an overview that paints a picture of a birding fraternity growing in size, skill, and collective consciousness. It will succeed in imparting to the uninitiated reader what birding California has meant, both for those who have done it and for those pursuing birds elsewhere, who may stand to gain from applying California learning. An increased understanding of the identification, seasonality, dynamics, and intrastate distribution of California's birds in this era is referenced to seminal publications made during this time, many of which contribute perceptions and original understanding arising directly from the California birding experience.

Finally, an upbeat essay encourages readers to document and report records in an appropriate and useful manner, and to overcome "rejection dejection." This material is recommended reading for anyone, anywhere, who wants to write better reports of rare birds. The lesson is administered in a properly un-vireo-like fashion, without scolding or any arching of the supercilium.

A section explaining the necessarily space-constrained format of the species accounts allows users of this work to understand fully the account headings and table of records. The reader who has read this section will better understand why it is, say, that only three records of the Broad-winged Hawk and six of the Northern Parula appear in the book, and why the Rusty Blackbird was placed back on the review list after three decades during which no reports were requested.

To be sure, it is the species accounts treating the collective exaltation of California rarities that make up the bulk of *Rare Birds of California*. This section takes up 401 pages, two-thirds of the book (including appendices, etc.). The reader may begin at the front, with the Black-bellied Whistling-Duck (31 accepted records) and read straight through to Common Redpoll (73)—or skip and browse, taking in the summary of the Gyrfalcon (10), Common Greenshank (1), Groove-billed Ani (11), Sedge Wren (7), Gray Catbird (108), and Worm-eating Warbler (97).

Because each rarity has its own unique history in the annals of California birding, the accounts in *Rare Birds of California* are far from uniform. Yet the varying approach or tack called for by a given species' idiosyncrasies further stamps each rarity as its own nation of beings. Pushing beyond the overarching generalities of a theory of vagrancy, the editors have capably explicated each species' particulars: the possibility of escaped captive waterfowl is examined; incursive movements of boobies and southern waders are dutifully treated; emerging knowledge of identification attends the overview of exotic tubenoses. Differences or shifts in the historical distribution of records within and across the state are constantly noted. Intransigent dilemmas faced by the committee in its handling of some species, or species groups—the deep-water petrels, Harris's Hawk, White/Black-backed Wagtail, and Painted Bunting come readily to mind—are tersely recounted.

Accompanying many accounts are easily perceived maps indicating where in California and its offshore waters each species has occurred, with bubbles of varying sizes for various numbers of records per site. Occurrence by season or across the span of years is often plotted in histograms.

Accepted records do not stand by themselves in this listing. Submitted reports which were not accepted because the identification was not established or because the natural origin of the occurrence was questioned are also listed and, where appropriate, discussed. That many sightings have been accepted after having been initially voted down or, conversely, were ultimately rejected after a previous acceptance, indicates the value of including these ancillary reports to better represent the entire historic data base.

Those who have read the periodic reports of the California Bird Records Committee in *Western Birds* will recall that those reports have included significant material dealing with identification. It is worth noting that the present work, while in a sense a compendium of those efforts, by and large does not reiterate such information as primary formulae, rectrix shape, and interior covert patterns. Most often, identification is discussed when it simply bears mentioning that identification issues have played a critical role in the committee's decisions. That said, there is still a quite a collection of information offered about the importance of molt schedules, plumage state, the commonness of various songbirds in northwestern Mexican pet shops, etc. Nearly all of this is referenced, and much of it may prove useful to birders.

A section on hypothetical species addresses reports for which the identification is not established (50 species), natural occurrence is questionable (14), or establishment of an introduced population is questionable (2).

More than 21 pages of fine print are required to list the 1293 literature sources cited. Following the bibliography, eight appendices totaling 83 pages round out the book. These include the committee's bylaws, a list of its 31 numbered reports, its abbreviations for counties in California, abbreviations for the 40 institutions holding cited specimens, and an alphabetical master list of the 1883 contributors whose efforts laid the foundation for this volume. There is a 20-page gazetteer for records reviewed through 31 December 2003, giving the number of accepted records for each of hundreds of locations, along with their latitude and longitude; there are maps of political boundaries, roads, physical relief, bathymetry, nearest-point-of-land contours, and geographic distribution of accepted records. Several maps at increasing scales culminate—why not?—with a global perspective.

Appendix H discusses noteworthy records during the three years 2004–2006 and touches on other notable records involving reports of 89 species already treated. The book closes with a subject index.

As elsewhere in the pursuit of science, the methods employed in descriptive and quantitative ornithology are unconcerned with beauty, the most subjective and untestable of concepts. Rightly so, it is a theme seldom discussed in the text of this book. Rather, evidence of that beauty is manifested in the pages of *Rare Birds of California* in an array of photographs, color plates, and documentary artwork. These representations have been given abundant space in the book, allowing one to appreciate their accuracy and sensitivity more fully. The selected art portrays more than birds; it illustrates the broad spectrum of approaches spanned by birders who have committed their observations to pencil, pen-and-ink, watercolor, pastel, and related media. The bird portraiture seems scarcely subordinated to the main goal of representing a strictly historical picture. The result is a fusion of science, art, and well-edited writing. Stated at the outset, the editors' shared vision "to bring together something more compelling and vital than a dry collection of records and analyses" has been attained.

A diverse collection of personalities has held court in California birding. Proponents of various schools of thought attending rare-bird theory have, at various times, held sway. That this book is, after all, a record of the committee's decisions spurs the question of how much politics may have affected the outcome of any of various submitted reports that proved contentious. This I will leave unexamined. Nor do I find it appropriate here to call into question any of the decisions the committee has made, deferred, retracted, or revised.

Upon beginning reading *Rare Birds of California*, I set out a notepad for tracking mistakes. I never found anything with which to begin the list. Assuming that some error or another may well have slipped through undetected among the thousands of listed records, I looked for obvious factual errors or contradictions in the main text, and didn't find any. Surely, somewhere, there must be a simple error of fact, something overlooked, some misrepresentation—but I can't report that I discovered any. The text was proofread to the degree that I discovered no caption goofs and, indeed, *no* typos—do the authors know where a few are yet hidden? Sentences with no apparent reason to exist failed to come to my notice. I will relate that I encountered the words "beloved," "fugacious," and "metaphysically" once each.

The endpapers together comprise two maps of California, split north and south, each conforming to the two long-established regions by which are packaged the quarterly summaries in *North American Birds*. Counties are named with their 2- or 3-letter codes. White numerals, easily discerned against neat black boxes, draw one's eye to 273 numbered locations from which reports reviewed by the committee have come. By benefit of two inset maps magnifying heavily birded coastal southern California, that portion has been marked with 140 such sites, while northern California hosts 133. Sizable swaths of California unmarked by symbols betray regions that are sparsely populated, lightly birded, not strategic places to look for rarities—or, just as likely, all three. The endpapers in my copy were firmly glued and are evenly framed against the inside tuck of the covers. The book seems well bound and sturdy.

The looks, plan, and layout of *Rare Birds of California* work well. While the sheer glut of historic information cannot avoid appearing ponderous, that density by itself will not discourage reading. Throughout the book, it is apparent that a balance between tedium and liveliness has been met. The editors have welcomed the reader, enlivening a great deal of rare bird data with erudite analyses, questions, footnotes, and supporting references.

Dull bird books are promptly relegated to vertically aligned storage. It is safe to say that *Rare Birds of California* likely will lay on an exposed horizontal surface within easy reach for some days after the reader acquires it.

I thank Steve Mlodinow and Alan Contreras for their helpful suggestions.

David Fix

Gulls of the Americas, by Steve N. G. Howell and Jon Dunn. 2007. Houghton Mifflin, Boston. 516 pp., 1160 color photographs. Hardcover $35.00 (ISBN-10: 0618726411).

This book constitutes a superb reference guide for the identification and plumages of the 36 gulls that occur in the western hemisphere (22 breeding in North America, 10 in South America, 4 visitors), and it surely constitutes the best comparative and comprehensive reference book on gull plumages published to this date. The authors' profuse use and adequate selection of photos provide the reader with rich comparative visual material.

The book is divided into five main sections: How to use this book, Introduction, Plates, Species Accounts, and Glossary. The section "How to use this book" explains how the information is organized and the way maps should be interpreted. In this section, however, the authors already warn the reader that "citations are provided only for some specific distributional information and for specific statements and information that we consider not to be general knowledge." It is hard to assess what they consider "general knowledge" in relation to gulls, and the reader is left to wonder where much of the information included in the book is coming from. Furthermore, they later go on to state that "most gulls are relatively little studied. Recent observations have brought into question some time-honored beliefs about gull molts and plumage."

It is easy to imagine that the "little studied" statement applies to all aspects of gull biology. Also, most of our "general knowledge" about gulls is based on the species that tend to associate with people and behave commensally when around people, as around fishing operations or in marine animal parks. When not associated with people many of these gulls behave very differently, and this needs to be acknowledged.

The introduction definitely should not be skipped, as is commonly done, for it is rich in information concerning taxonomy, field-identification methods, variation in the plumages of gulls in relation to age, sex, geography, and environmental factors, and hybridization. It also gives excellent information on gull topography and appearance, including size and structure as well as body, wing, and tail topography and patterns, with a thorough explanation of the color variations and scales for the various feather groups and individual feathers. The authors explain head and bill size, color, shape and patterns, eye and orbital-ring colors, leg length and color, molts and plumages, age terminology, and plumage cycles comprehensively.

The last and molt process are explained at length for each group of gulls, and this detailed information is one of the greatest contributions of this guide. It categorizes American gulls into four groups by molt strategy and addresses the distinctive characteristics of each group. At the end of the Introduction, however, the subsection on habitat and behavior is too vague, contrasting with the rest of the otherwise very precise and detailed introduction. There is some inconsistency, such as when the authors mention that "from one to four cycles are required for plumage to attain adult (or definitive) appearance" (page 9), while a few pages later (page 13) they state that "most large species attain adult plumage in the fourth or fifth plumage cycle."

The plates are the highlight of the book, with detailed descriptions and over 1100 photographs of the multitudinous plumages of all the hemisphere's gulls. The rich and excellent photographic material provides the reader with the right example of the precise plumage and molt stage it is intended to illustrate. A critical aspect of the photos is the captions that give exact date and location, as well as short informative descriptions, and references to other photos for comparison, when appropriate. The species accounts include expertly written identification summaries for each species, addressing taxonomy, status, and distribution, followed by field identification with subsections on similar species, description, and molt. The subsection on habitat and behavior, however, shows flaws in the information given for some species, and a lack of the exhaustive and comprehensive work so characteristic of the rest of the book.

For example, in relation to ranges of colony sizes and food and feeding methods the information throughout is either incomplete or inconsistent; for some species feeding methods are mentioned but actual diet is not reported. For some others, some food items are mentioned but the diet is not discussed comprehensively. For some species, some statements are quite misleading. Probably the worst problem in this respect is that too many species are reported to feed "commonly" by scavenging. This is very likely the result of observing the species away from their natural habitat and in close contact with human beings, where they act as commensals.

There is considerable evidence that some of the species reported in this work as commonly scavenging actually feed mainly by catching small fish in open waters, or by kleptoparasitizing other seabirds, usually well away from people. For almost half of the North American species the synopsis of feeding and food habits is either incomplete or biased. This could be the result of the authors relying on sources of information that are too summarized and a lack of exhaustive review of the relevant literature related to these topics. It is unfortunate that such an important landmark work with respects to molts and plumages includes a section not based on a thorough literature review and logical development of the system—at least providing citations of primary literature. For example, the authors mention that Heermann's Gull "feeds commonly by scavenging, also forages in intertidal and surface waters for marine invertebrates." There is ample evidence, however, that Heermann's Gull feeds mostly on small pelagic fish and, therefore, finds its food mostly in open waters; although it may scavenge from fishing boats dumping refuse after a catch, and steals fish from other seabirds, these are not its "common" ways of feeding. And, although Heermann's Gull may occasionally be observed by landlubbers foraging on stranded or otherwise healthy marine invertebrates, this again is not its main feeding method (Cassin 1856, Anthony 1906, Dawson 1909, Jewett et al. 1953, Velarde et al. 1994, Velarde et al. 2004).

The authors state that the Yellow-footed Gull nests in small colonies of up to 40 pairs. It has, however, been reported to nest in colonies of between 80 and several hundred pairs (Hand et al. 1981, Spear and Anderson 1989, Velarde and Anderson 1994, Velarde et al. 2005). The account continues with "it feeds commonly by scavenging; also forages in intertidal and surface waters for marine invertebrates and preys on eggs and young birds, also on small adult seabirds at their colonies." While this species does scavenge sometimes, it also takes fish in oceanic and coastal waters by plunging, feeds on shellfish and decapods it captures among boulders along shores, and preys on seabirds such as storm-petrels and the Eared Grebe over open waters (Hand et al. 1981, Dunning 1988, Baird 1996). Similar errors and omissions related to diet and feeding habits affect the accounts of various other species.

I detected just one typographical error: on pages 71 and 72 photo 7.2 refers the reader to photo 7.9 whereas it should refer to 7.10.

The guide's inclusion of hybrids, and treating them as independent "species," providing field-identification characteristics, is an additional excellent point, particularly because these hybrids are quite common in some of the parent species' ranges and are frequently encountered by observers in these areas.

In summary, this great book would have been even better if the authors had confined themselves to their own areas of real interest, identification, distribution, plumages, and molt. This is definitely a book to have in your library if you are seriously interested in gull and gull age-class identification.

LITERATURE CITED

Anthony, A. W. 1906. Random notes on Pacific coast gulls. Auk 23:129–137.

Baird, R. W. 1996. Yellow-footed Gull (*Larus livens*) preys on a Black Storm-Petrel (*Oceanodroma melania*). Colonial Waterbirds 19:260–261.

Cassin, J. 1856. Illustrations of the Birds of California, Texas, Oregon, British and Russian America. J. B. Lippincott, Philadelphia.

Dawson, W. L. 1909. The Birds of Washington, vol. II. Occidental, Seattle.

Dunning, J. B., Jr. 1988. Yellow-footed Gull kills Eared Grebe. Colonial Waterbirds 11:117–118.

Hand, J. L., Hunt, G. L., Jr, and Warner, M. 1981. Thermal stress and predation: Influences on the structure of a gull colony and possibly on breeding distributions. Condor 83:193–203.

Jewett, S. G., Taylor, W. P., Shaw, W. T., and Aldrich, J. W. 1953. Birds of Washington State. Univ. of Wash. Press, Seattle.

Spear, L. B., and Anderson, D. W. 1989. Nest-site selection by Yellow-footed Gulls. Condor 91:91–99.

Velarde, E., Tordesillas, M. S., Vieyra, L., and Esquivel, R. 1994. Seabirds as indicators of important fish populations in the Gulf of California. Calif. Coop. Fish. Invest. Rep. 35:137–143.

Velarde, E., and Anderson, D. W. 1994. Conservation and management of seabird islands in the Gulf of California: Setbacks and successes, in Seabirds on Islands: Threats, Case Studies and Action Plans. (D. N. Nettleship, J. Burger, and M. Gochfeld, eds.), pp. 721–765. Birdlife Cons. Ser. 1, BirdLife Int., Cambridge, England.

Velarde, E., Ezcurra, E., Cisneros-Mata, M. A., and Lavin, M. F. 2004. Seabird ecology, El Niño anomalies, and prediction of sardine fisheries in the Gulf of California. Ecol. Appl. 14:607–615.

Velarde, E., Cartron, J.-L. E., Drummond, H., Anderson, E. W., Rebón Gallardo, F., Palacios, E., and Rodríguez, C. 2005. Nesting seabirds of the Gulf of California´s offshore islands: Diversity, ecology and conservation, in Biodiversity, Ecosystems, and Conservation in Northern Mexico, (J.-L. E. Cartron, G. Ceballos, and R. S. Felger (eds.), pp. 452–470. Oxford Univ. Press, New York.

Enriqueta Velarde

Bird Voices of Northern California: An Audio Guide to Bird Identification, by Ron LeValley and David Fix. 2007. Mad River Biologists, Arcata, California (ordering information at www.madriverbio.com). Double CD set, $27.95.

Bird sounds are an important component of field identification, and these days numerous compilations of recordings are available, usually for families of birds or for geographic regions. This pair of CDs (hereafter *Bird Voices*) includes the voices and other sounds of 190 species found in northern California, ranging from the Marbled Murrelet to the House Sparrow, from the Sandhill Crane to the Wrentit. The region covered is not defined but appears to be truly northern California (north of Sonoma county), rather than including central California. The species covered are listed on a simple insert (adorned with some nice color photos), which notes that the recordings were made primarily by LeValley, with help from the California Department of Fish and Game, Sean McAllister, Mark Higley, and Seth Bunnell. The insert also informs us that most recordings were made in Humboldt, Trinity, and Siskiyou counties, and that Fix wrote and spoke the accompanying narration.

Bird Voices is essentially a greatly expanded version of a tape cassette produced some years ago by the same team, which was a tool aimed to help field biologists recognize bird vocalizations for censusing purposes (hence the long samples of species such as the Marbled Murrelet and Spotted Owl). The emphasis on real-life sounds means that some recordings are deemed of "marginal quality" by the authors, but these are included because they aid in identification. The species are "arranged following the American Ornithologists' Union checklist" (version not specified), starting with geese, although the California Towhee is misplaced between the Lazuli Bunting and Red-winged Blackbird. Also, the names Aleutian Cackling Goose, Red-shafted Flicker, and Audubon's Warbler are used, rather than Cackling Goose, Northern Flicker, and Yellow-rumped Warbler, but no scientific names are provided. As well as giving scientific names, the insert could have benefited from giving the date (even just month) and location of the recordings (at least those made outside of the three main counties). Other than a skimpy insert, my main gripe is "I want more," and I hope the authors expand upon this invaluable compliation and produce another version before too many years pass.

The typical format on bird CDs, of a neutered voice announcing, say, "number 98, the Warbling Vireo," can stifle one's ability to learn sounds. LeValley and Fix eschew this format so that the sounds come first, followed by the narration and species' identity (set your CD player to "shuffle" and see if you can identify every sound before you are told!). At least on my CD player, the narration sounded a little distorted if listened to at the volume at which the bird sounds were best heard, and I found it distracting to have constantly to increase and decrease volume.

The selection of species is somewhat eclectic. Surprising omissions include the American Kestrel, Peregrine Falcon (but the Prairie Falcon is included), Allen's Hummingbird, and Say's Phoebe, and the range of calls given for the Acorn Woodpecker is rather limited. Perhaps inevitably, the emphasis is on songs rather than calls, and an expanded version could include many commonly heard calls that can be confusing in the field, as well as the song of Black-capped Chickadee. In particular, more calls of swallows, vireos, and sparrows (such as the White-crowned and Golden-crowned) would be nice. On the other hand, it is great that there are numerous examples of species with variable songs, such as the Nashville, Wilson's, Black-throated Gray, and Hermit warblers, and the Fox Sparrow. In this last species, it may be confusing that the songs are of "Thick-billed" Fox Sparrows whereas the calls are of "Sooty" Fox Sparrows; although the narration discusses the differences in calls it does not explicitly state which call is included.

Context is often important in the identification of birds sounds, and the narration to *Bird Voices* is a gold mine of tips on other sounds not included, seasonal occurrence, habitat, abundance, and behavior, such as how one may hear an adult and accompanying juvenile Caspian Tern calling back and forth as they fly over at night, or the comments about Hammond's, Gray, and Dusky flycatchers. This is hard-won, priceless information for which there never seems to be enough room in a conventional field guide.

Those familiar with wordsmith David Fix will not be disappointed by the narration, although some may find it a little "northern California" in style—but then it is a CD of the birds of northern California! We are told, for example, that the "steamy, dreamy whistles" of the Pigeon Guillemot suggest a "wet waxwing," that Killdeers "seem haunted by chronic anxiety," and that a singing male Anna's Hummingbird sounds like "a cricket in the bug shop for a tune-up." For commonly heard sounds absent from the recordings, Fix sometimes tries to imitate them; this works better for some species (e.g., the Virginia Rail) than others (e.g., the juvenile Caspian Tern), but when you know a sound these imitations can be helpful reminders. A few slips inevitably crept into the writing, such as under the Yellow-billed Magpie, where we are told this is the only species endemic to California (the Island Scrub-Jay may not have been split when the text was written) and that the Black-billed Magpie is now known as the American Magpie. Also, at least in central California, the Eared Grebe and accipiters are not silent in the non-breeding season.

The specter of misidentified calls haunts any collection of sounds, and *Bird Voices* may be free from this plague. However, the putative Barn Owl sounds disconcertingly like a begging juvenile Great Horned Owl, despite the narration that "the toneless scraping hiss of a Barn Owl is unlike any other night sound commonly heard," and the comment under the Great Horned Owl that a begging juvenile (no recording included) "can be a very puzzling sound for the uninitiated to identify." At the very least, the listener should have been made aware of this very real pitfall. See (well, hear) what you think.

One might ask, how does *Bird Voices* compare to *Bird Songs of California*, by Geoffrey Keller, a set of three CDs covering 231 species and produced by the Cornell Laboratory of Ornithology? *Bird Voices* includes 40 species not on the Cornell CDs, mainly waterbirds such as geese and shorebirds; the only passerines not represented on the Cornell CDs are the American Redstart, White-throated Sparrow, and House Sparrow. The Cornell recordings are generally clearer (some so good that they can sound "unnatural"), and the recordings and narration (coming first, "as usual") are balanced in volume. While a very few sounds on *Bird Voices* seem a little unnatural, such as the calls of the Red-shouldered Hawk and Ring-billed Gull, most ring true of a real-life field experience. The Cornell insert provides some identification tips that can be read as one listens to the recordings, but these do not reach the level of Fix's perceptive narration on *Bird Voices*. The Cornell compilation is a useful reference for the state as a whole, but *Bird Voices* offers additional recordings and a fresh perspective, and is still worth owning if you have the Cornell CDs.

In conclusion, *Bird Voices of Northern California* is an excellent learning tool that should be obligatory listening for any field biologist censusing birds in northern California (as well as in adjacent southern Oregon and central California). It should also benefit any birder in the region who wishes to improve his or her field skills.

Steve N. G. Howell

Atlas of the Breeding Birds of Nevada, by Ted Floyd, Chris S. Elphick, Graham Chisholm, Kevin Mack, Robert G. Elston, Elisabeth M. Ammon, and John D. Boone. 2007. University of Nevada Press, Reno and Las Vegas. Forewords by Sen. Harry Reid and by C. Richard Tracy. 581 pages, numerous color maps and habitat photographs. Hardcover, $60. ISBN-13:978-0-87417-695-7.

The first bird atlas I owned was *Montana Bird Distribution*, 2nd ed., by P. D. Skaar, published in 1980. Resolution was poor, with winter and summer occupancy each presented in 47 grid cells—an average pixel size (to use today's jargon for spatial resolution) of over 3100 square miles! The obvious upside to poor resolution, however, was that maps for nine species fitted on a single page, making the entire atlas only 66 pages long. Using the options found on manual typewriters, *Montana Bird Distribution* managed to convey information on the distribution and relative abundance of species, confidence of records in the grid cells, spring arrivals, and state rarities.

Despite the limitations imposed by manual typewriters, this is what I think a good bird atlas should do—tell me what species I can expect to find, and where. (My major disappointment from this atlas was that it was never able to convert Water Pipits into Sprague's Pipits for me when I was in the field.) Some atlases seem compelled to serve multiple functions, including trying to be a field guide and give extensive life-history information not relevant to distribution and abundance. The *Atlas of the Breeding Birds of Nevada* meets my first set of criteria for a good bird atlas, then exceeds it. It provides breeding-distribution maps for 275 species and a table of relative habitat use in the state. In addition, there is a narrative of each species' conservation status in the state and related management issues. This type of information is not normally found in bird atlases, and it is a welcome addition—it is one of several reasons to own this excellent volume.

But how did the authors get the information on birds' breeding distributions in Nevada? Anyone who has looked at Breeding Bird Survey (BBS) results for the U.S. will understand what a challenge making a breeding-bird atlas for Nevada must have been. BBS statewide summary maps often show Nevada as a blank space, denoting coverage insufficient for reliable distribution maps or trend estimates. Nevada is the most urban state in the U.S.; that is, it has the highest proportion of its inhabitants living in cities. Because breeding-bird surveys, and bird atlases in general, tend to rely heavily on volunteers, having very few people spread across a very large area is a disadvantage. Nevada is larger than Indiana, Ohio, and West Virginia combined but has only 130,000 people living outside of its cities. To complicate matters, there are few roads, and large parts of the state are military bases with restricted access. So how does one go about effectively surveying such a large area with limited resources? Floyd and colleagues accomplished this prodigious task using a scientific approach, dividing the state into habitat types, randomly sampling within each type in proportion to its extent, and using statistical models to fill in expected distributions between sampling areas. Almost 800 habitat blocks were surveyed over four years, with over 14,000 observer-hours of field work. Survey blocks, however, made up a small proportion of the state. Consequently, birds' occupancies of most of the state are predicted on the basis of observed distributions and habitat affiliation. The authors' approach takes advantage of simple statistical tools that can be used to predict the likelihood a site is occupied, combined with the powerful map-making capabilities of geographic information system (GIS) software. Because models are simplifications of the real world, some of the predicted distributions will turn out to be incomplete or in error. The authors state this up front and discuss the strengths and shortcomings of their approach early in the book. This limitation does not bother me at all. Subsequent surveys in the extrapolated areas will be used to improve subsequent editions of the atlas, and in the meantime I have the best distributional maps that limited survey coverage can provide.

From the surveys and models, two excellent statewide maps are provided for each species. The smaller map is coded in multiple colors, with colors depicting degrees of likelihood that a species will occupy a particular area. A second, larger map gives detailed information on occupancy and abundance of the species in the survey blocks. The larger map represents the actual survey results from which the smaller map is made. If I have any complaint about the book it is that the county boundaries (found on the larger map) are too faint, and I probably would have switched the relative sizes of the two maps. I find the intricate detail of the predicted distributions fascinating and useful—if the map were larger, predicted distributions would be easier to determine (particularly for rare species). But this is a pretty minor complaint relative to the excellent job that has been done in creating this breeding-bird atlas.

I would be remiss in this review if I did not say a few words about the bird illustrations in the *Atlas of the Breeding Birds of Nevada*. First, the cover and frontispiece by David Sibley, featuring the Sage and Black-throated Sparrows, are excellent illustrations of birds in native vegetation. These species are featured because sparrows are particularly abundant in Nevada—Brewer's Sparrow was the species most commonly encountered during the surveys, followed closely by Common Raven. (OK, so the Mountain Bluebird is more colorful, but why not a sparrow for a state bird?) Second, beyond distribution maps, it has become *de rigueur* for bird atlases to illustrate each of the birds it covers. The illustrations in the *Atlas of the Breeding Birds of Nevada* exploit a tactic different from what you often encounter—they're fun! Instead of the typical adult perched to exhibit field marks, in the Nevada Atlas Ray Nelson provides a sketch for each species that often emphasizes behavior or field views—but not traditional views—and sometimes he even lets humor creep into the illustrations. I won't give away all of the fun, but I need to mention a few examples: a Canada Goose nesting on a rooftop, copulating Green-winged Teal, a Sharp-shinned Hawk carrying a dead Steller's Jay, Black-necked Stilt chicks and the feet of an adult, Cliff Swallow nests (but no birds), and a Chipping Sparrow in hand in a bander's grip exposing a brood patch. Among the more light-hearted illustrations are of a Northern Goshawk attacking a birder and a Gilded Flicker tail disappearing into a nesting cavity.

The *Atlas of the Breeding Birds of Nevada* is a great addition to any birder's book collection (particularly if you enjoy atlases or go birding in Nevada). In addition, I think other states considering new or revised atlases would benefit from (at least considering) the statistical approach to creating distribution maps found in this atlas, particularly if the state is large and its survey coverage is limited.

J. Michael Reed

FEATURED PHOTO

ATTEMPED KLEPTOPARASITISM BY A SOUTH POLAR SKUA ON A LAYSAN ALBATROSS

STEVE N. G. HOWELL, P. O. Box 423, Bolinas, California 94924

DEBRA L. SHEARWATER, Shearwater Journeys, P. O. Box 190, Hollister, California 95024

As a group, the skuas and jaegers are well known as kleptoparasites, i.e., species that pirate food from other species. In general, the victimized species are smaller than the kleptoparasites, but sometimes victims are larger, the best-known instance of this being the Northern Gannet (*Morus bassanus*) relative to the Great Skua (*Catharacta skua*) (Furness 1987, Spear et al. 1999). Attacks by skuas on albatrosses have been reported on only a few occasions, but such attacks are rarely successful, and those noted to date have involved the relatively large Brown (or Subantarctic) Skua (*C. antarctica*) (Spear et al. 1999).

At 12:50 on 30 September 2007, during an organized pelagic trip to Cordell Bank National Marine Sanctuary, we were watching birds flying at the stern of the boat when Howell noted an apparent South Polar Skua (*C. maccormicki*) approaching the wake. (The specific identity of skuas off California remains uncertain, although most appear to be the South Polar; Howell 2005.) Birds in the wake of the boat included numerous Western Gulls (*Larus occidentalis*) and California Gulls (*L. californicus*), a few Pink-footed Shearwaters (*Puffinus creatopus*) and Black-footed Albatrosses (*Phoebastria nigripes*), and a single juvenile (aged by its uniformly fresh plumage and lack of smoky-gray auriculars) Laysan Albatross (*P. immutabilis*). We had already seen several skuas that day, some of which had made attacks on gulls and Pink-footed Shearwaters, the skua's two commonest targets off central California in fall (pers. obs.).

The skua approached the boat while flying steadily at about 20 m above the sea; the Laysan Albatross was wheeling along at 1 to 5 m above the sea behind the boat. On nearing the mass of birds behind the boat the skua picked up speed and stooped at about a 45° angle directly toward the albatross. The skua pulled in close behind and slightly above the albatross, as seen in the photo featured on this issue's back cover, causing the latter to change direction and begin flapping rather than sailing flight. The skua then pulled up over the albatross and dropped its legs as if to strike the albatross (Figure 1), which stalled and dropped to the water. The skua then pulled up and away, leaving the albatross and the other birds, and flew off from the boat. The skua was completing its primary molt, indicating that it was more than one year old but probably not an adult (Howell 2004). We had not seen the Laysan Albatross feeding recently, and were surprised that the skua chose it over the numerous other seemingly suitable targets following the boat.

The average mass of the South Polar Skua (various samples) is 1155–1421 g for breeding birds, with females averaging heavier (Ainley et al. 1985, Higgins and Davies 1996), and 1250 g for ten nonbreeding birds collected at sea (Spear and Ainley 1993). The average mass of nesting Laysan Albatrosses is 2990 g for females and 3310 g for males (Tickell 2000). Although the Laysan is a relatively small albatross, the South Polar is a relatively small skua; the albatross is potentially 2.33–2.86 times heavier than the skua, which is around or above the threshold of the ratio (2.4:1) for skua and jaeger victims other than albatrosses (Spear et al. 1999).

Once off central California in the late 1990s we also observed attempted kleptoparasitism (unsuccessful) by a presumed South Polar Skua on a Black-footed Albatross. Such attacks appear to be rare, however, and given the relative abundance of

Figure 1. South Polar Skua causing juvenile Laysan Albatross to stall just prior to alighting on the sea. Near Cordell Bank, Marin County, California, 30 September 2007.

Photo by Steve N. G. Howell

albatrosses and skuas off California, they may simply be opportunistic or learning forays by inexperienced immature skuas, as suggested by Spear et al. (1999).

We thank Shearwater Journeys and our fellow birders for making it possible to be out on the ocean, and David Ainley and Ron LeValley for comments on the manuscript.

LITERATURE CITED

Ainley, D. G., Spear, L. B., and Wood, R. C. 1985. Sexual color and size variation in the South Polar Skua. Condor 87:427–428.

Furness, R. W. 1987. The Skuas. T. & A. D. Poyser, Calton, England.

Higgins, P. J., and Davies, S. J. J. F. (eds.). 1996. Handbook of Australian, New Zealand, and Antarctic birds, vol. 3. Oxford Univ. Press, Melbourne, Australia.

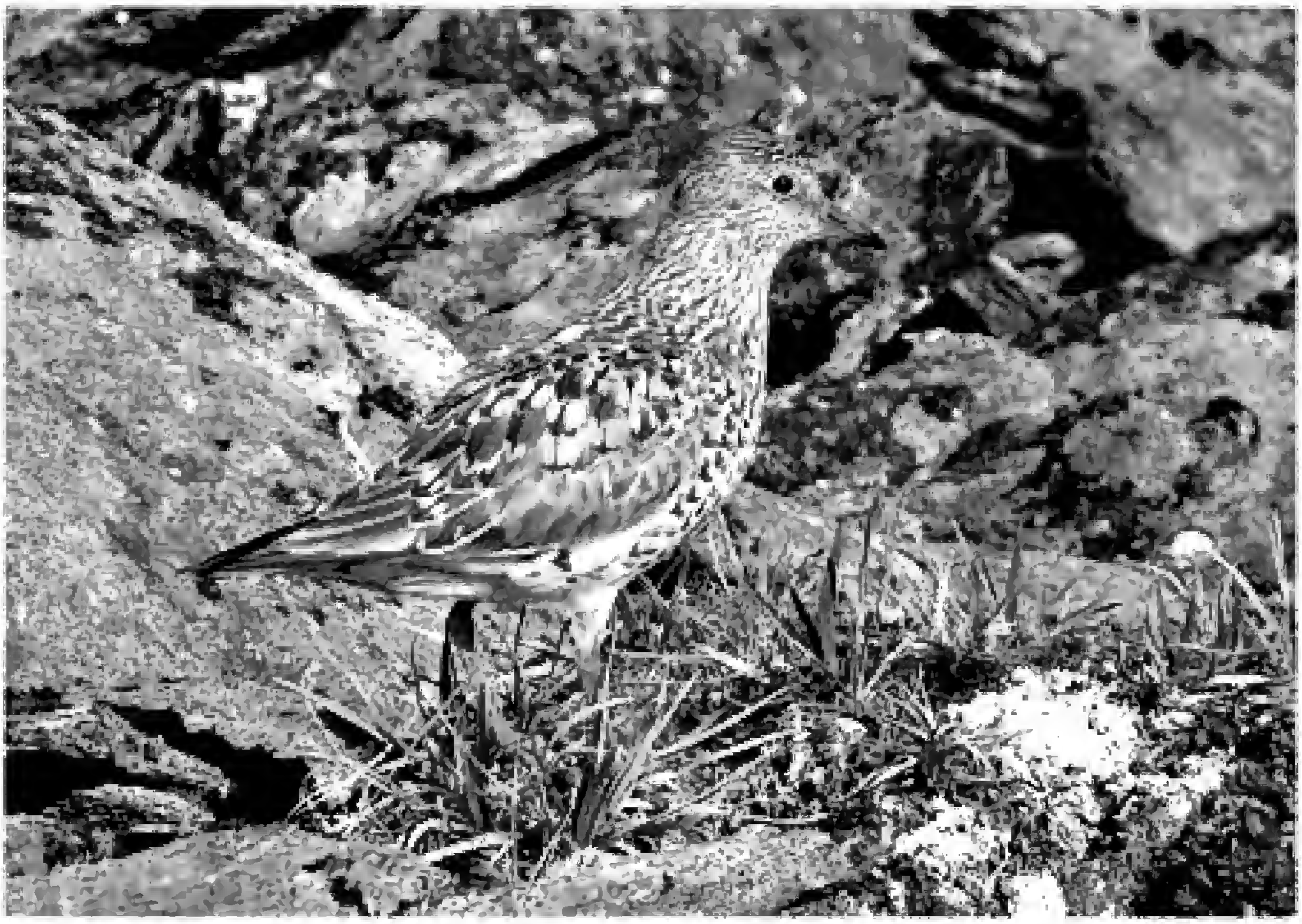
Howell, S. N. G. 2004. South Polar Skuas off California. Birding World 17:288–297.

Howell, S. N. G. 2005. Revisiting an old question: How many species of skua occur in the North Pacific? W. Birds 36:71–73.

Spear, L. B., and Ainley, D. G. 1993. Kleptoparasitism by Kermadec Petrels, jaegers, and skuas in the eastern tropical Pacific: Evidence of mimicry by two species of *Pterodroma*. Auk 110:222–233.

Spear, L. B., Howell, S. N. G., Oedekoven, C. S., Legay, D., and Bried, J. 1999. Kleptoparasitism by Brown Skuas on albatrosses and giant-petrels in the Indian Ocean. Auk 116:545–548.

Tickell, W. L. N. 2000. Albatrosses. Yale Univ. Press, New Haven, CT.



Adult Surfbird (*Aphriza virgata*) in early July
on the breeding grounds in the Ruby Range, Yukon Territory

Photo by © Dominik Thiel

Adult Wandering Tattler (*Tringa incana*) amid *Cassiope tetragona*
on the breeding grounds in the Ruby Range, Yukon Territory

Photo by © Dominik Thiel

WESTERN BIRDS

Vol. 39, No. 2, 2008

Western Specialty:
Western Screech-Owl

Photo by © Michael Pollack / www.untamedimages.com of Cupertino, California:
Western Screech-Owl (*Megascops kennecottii*)
Rancho San Antonio Open Space Preserve, Santa Clara County, California, 6 September 2006.
These extremely tolerant owls roosted for several months alongside one of the most popular trails in Santa Clara County, to the delight of many hundreds of hikers, joggers and birders.

Volume 39, Number 2, 2008

Nest Spacing in Elegant Terns: Hexagonal Packing Revisited
Charles T. Collins and Michael D. Taylor 62

Reassessment of Tropical Parula Subspecies in Baja California Sur
Marshall J. Iliff, Richard A. Erickson, and Mark J. Billings 69

Habitat Fragmentation and Scrub-Specialist Birds: San Diego Fragments Revisited *Autumn R. Sartain and Allison C. Alberts* 82

NOTES

First Documented Breeding Colony of Caspian Terns on the Copper River Delta, Alaska *Tyee G. Lohse, Teal K. Lohse, Trae W. Lohse, and Aaron Lang* 94

Caspian Terns Nesting in Alaska: Prophecy, Serendipity, and Implications for Regional Climate-Related Change
Robert E. Gill, Jr. 97

Breeding Behavior and Dispersal of Radio-Marked California Clapper Rails *Michael L. Casazza, Cory T. Overton, John Y. Takekawa, Tobias Rohmer, and Kenneth Navarre* 101

Book Reviews *Richard C. Hoyer and Nathan Pieplow* 107

Featured Photo: Great Gray Owls Nesting in Fresno County, California *David E. Quady* 110

Front cover photo by © Matt Sadowski of Chula Vista, California: Bridled Tern (*Onychoprion anaethetus*), Santa Margarita River mouth, San Diego County, California, 14 August 2007. Second Bridled Tern identified in California and first to be photographed. The species' northernmost known nesting site in the eastern Pacific is in Nayarit, central western Mexico.

Back covers (inside and outside) "Featured Photos" by © Gary L. Woods of Fresno, California: Great Gray Owl (*Strix nebulosa*) female and young at nest, Shaver Lake area, Fresno County, California, 1 June 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.wfo-cbrc.org/journal.html).

WESTERN BIRDS

Volume 39, Number 2, 2008

NEST SPACING IN ELEGANT TERNS: HEXAGONAL PACKING REVISITED

CHARLES T. COLLINS and MICHAEL D. TAYLOR, Department of Biological Sciences, California State University, Long Beach, California 90840 (current address of Taylor: Santiago Canyon College, 8045 East Chapman Ave., Orange, California 92869); ccollins@csulb.edu

ABSTRACT: Within an important breeding colony in southern California, Elegant Terns (*Thalasseus elegans*) nest in one to several tightly packed clusters. Inter-nest distances within these clusters average 31.2 cm. This value is less than that reported for the larger-bodied Royal Tern (*T. maximus*) and Great Crested Tern (*T. bergii*). For Elegant Terns, the modal number of adjacent nests was six (range 5–7). This type of nest arrangement has been previously described as hexagonal packing and now appears to be typical of all *Thalasseus* terns for which data are available.

Many seabirds nest in large, often traditional, colonies (Coulson 2002, Schreiber and Burger 2002). The ontogeny of annual colony formation has been reviewed by Kharitonov and Siegel-Causey (1988), and the evolutionary processes which have led to coloniality have been considered by a number of authors (Lack 1968, Fischer and Lockley 1974, Wittenburger and Hunt 1985, Siegel-Causey and Kharitonov 1990, Coulson 2002).

Seabird colonies may be rather loosely organized aggregations of breeding pairs of one to several species at a single site. At the other extreme, they may be dense, tightly packed, largely monospecific clusters where distances between nests are minimal. A graphic example of the latter is the dense clustering of nests recorded for several species of crested terns (Buckley and Buckley 1972, 2002, Hulsman 1977, Veen 1977, Symens and Evans 1993, Burness et al. 1999, Shealer 1999) currently included in the genus *Thalasseus* (Bridge et al. 2005, AOU 2006).

In their detailed analysis of the nest spacing of the Royal Tern (*Thalasseus maximus*) Buckley and Buckley (1977) determined that densities had been nearly maximized. In most cases individual nests were surrounded by, and in direct contact with, six neighboring nests as predicted by the theory of Voronoi polygons and represented hexagonal packing (Buckley and Buckley 1977, 2002).

The data for other species of crested terns are, however, somewhat disparate in that some authors have reported only nest densities (nests/m^2;

Hulsman 1977, Suter 1986, Symens and Evans 1993, Meininger et al. 1994), nest area (m^2; K. Hulsman in Cramp 1985), or inter-nest distances (nest rim to nest rim [Shealer pers. comm.] or nest center to nest center [Stirling et al. 1970, K. Hulsman in Cramp 1985, this study]). We report here data on nest spacing in an additional crested tern, the Elegant Tern (*T. elegans*).

We made three predictions: (1) since the distance between nests seems dictated by the distance a bird can stretch its neck and lunge at a neighbor (Buckley and Buckley 1972), these distances should be smaller in the smaller crested terns, including the Elegant, with shorter bills and greater in the larger species such as the Royal and Great Crested (*T. bergii*); (2) the modal number of bordering nests should be 6, as predicted by hexagonal packing; and (3) since hexagonal packing maximizes density, there should be no significant difference in inter-nest distances between peripheral nests and nests located more centrally within the colony.

METHODS

We measured distances between nests of Elegant Terns in 1996 and 2001 at the Bolsa Chica State Ecological Reserve in coastal southern California, where the species has nested since 1987 (Collins et al. 1991, Collins 2006a). In both years, Elegant Tern nests were in one to several separate tightly packed clusters (Figure 1) on a 1.7-ha man-made sand island also used by Caspian Terns (*Hydroprogne caspia*; Collins 2006b), Royal Terns, Forster's Terns (*Sterna forsteri*), and Black Skimmers (*Rynchops niger*).

Figure 1. Cluster of nesting Elegant Terns on North Island, Bolsa Chica State Ecological Reserve, Orange County, California, 1996.

Photo by C. T. Collins

The few Royal Tern nests were generally mixed among those of the Elegant Terns, providing us the opportunity to measure distances between nests of two Elegant Terns, between an Elegant and a Royal Tern, and between two Royal Terns. We used a metric tape measure and recorded the results to the nearest 1.0 cm. We repeated these measurements in 2001 to look for year-to-year differences. We categorized the measurements as from peripheral nests (<1 m from edge of nest cluster) or central nests (>2 m from edge of nest cluster); all measurements were of different pairs of eggs chosen at random. In addition, we analyzed ten focal nests by choosing a nest at random and measuring the distance to each of the six adjoining nests. All measurements were made from the center of the egg in one nest to the center of the egg in the neighboring nest. We determined the number of adjoining nests for a sample of 138 randomly chosen nests representing both peripheral and central areas in both small (< 300 nests) and large (>500 nests) clusters of nests. We used Mann–Whitney tests in all comparisons of inter-nest distances.

RESULTS

In 1996, the mean distance between nests in randomly chosen pairs of peripheral Elegant Tern nests (30.8 cm ± 4.3 cm standard deviation, n = 38) did not differ signifcantly from that of central nests (31.4 ± 4.4 cm, n = 16) (W = 1025.5, p = 0.7). Neither did it differ from the mean distance in a sample (30.7 ± 2.6 cm, n = 39) measured in 2001 in which peripheral and central nests were pooled (W = 2519.5, p = 0.9). Similarly, the mean distances of the six adjacent nests from each of the ten focal nests were not different from each other and the distances between randomly chosen nests; the pooled value for all recorded inter-nest distances of Elegant Terns was 31.2 ± 4.1 cm, n = 153, range 22–42). The mean distance between Elegant Tern nests and those of neighboring Royal Terns (6 measured in 1996, 6 in 2001) was 33.9 ±3.3 cm, n = 12, range 30–40). The distance between two Royal Tern nests (2 measured in 1996, 5 in 2001) at Bolsa Chica was 36.6 ± 3.2 cm, n = 7).

For the Elegant Tern, the modal number of neighboring nests for any given nest (n = 138) was 6 (95 nests) and ranged from 5 (23 nests) to 7 (20 nests). In the comparison between large and small clusters of nests there was no difference in the number of neighboring nests. Neither was there a difference in this number between nests peripheral or central in a cluster. We excluded nests on the outer edge of clusters as they lacked neighbors on all sides.

DISCUSSION

The mean inter-nest distance of 31.2 cm for Elegant Terns in our study is smaller than the 37 cm previously reported for Royal Terns (Buckley and Buckley 1977) and the 36.6 cm for Royal Terns we found at Bolsa Chica. These results support our first prediction based on differences in body size (Burness et al. 1999, Buckley and Buckley 2002). That the mean distance between an Elegant Tern nest and an adjoining Royal Tern nest was intermediate between those for nests of conspecific pairs of Elegant or Royal Tern nests also supports this prediction. Despite this apparent trend, regression analyses of three measures of size (culmen length, wing length, and body weight) in several species of crested terns against reported inter-nest distances failed to show any significant relationships ($R^2 = 15.8–28.2$, $p = 0.09–0.23$, A. del Nevo pers. comm.). This may be due to the small sample of data available and some possible variation in the way the data were collected. The extremely low inter-nest distances previously reported for the Sandwich Tern (*T. sandvicensis*) (24.8 ± 12.6 cm; Shealer 1999) were actually measurements made from nest rim to nest rim (D. Shealer pers. comm.) rather than from the centers of the nests, the method we used at Bolsa Chica.

We found support for our second prediction in the modal number of adjacent nests (6; Figure 2), indicating that Elegant Terns provide an additional example of the hexagonal packing previously reported for Royal Terns (Buckley and Buckley 1977). The observed lack of difference in inter-nest distance between peripheral and central nests indicates that this hexagonal packing is minimizing these distances, supporting our third prediction.

Although our study of Elegant Terns revealed no apparent difference in inter-nest distance in clusters of differing size or from year to year, this constancy does not seem to prevail in other crested terns. In the Lesser Crested Tern (*T. bengalensis*) nest densities, and hence inter-nest distances, vary considerably with nests sometimes being rather loosely spaced and other times tightly packed (Hulsman 1977, P. Symens pers. comm.). L. Nicholson (pers. comm.) found much larger inter-nest distances (51.6 ± 16.4 cm, $n = 58$) in a mixed colony of Lesser Crested and Great Crested Terns (*T. bergii*) on Abutilon Island, Australia; 27% of these distances were ≥60 cm. Elsewhere, densities of

Figure 2. Nests and eggs of Elegant Terns on North Island, Bolsa Chica State Ecological Reserve, Orange County, California, 1993.

Photo by C. T. Collins

Lesser Crested Terns appear significantly higher in areas where nesting space is limited than in areas with more extensive open areas available for nesting. They also seem to be greater in larger colonies (>10,000 pairs) than in smaller colonies (<200–300 pairs; P. Symens pers. comm.). In the Netherlands, Veen (1977) found most Sandwich Tern nests to be tightly packed with 54.7% of the inter-nest distances falling in the 31–40-cm range but some being more loosely spaced, with some up to 80–100 cm and 9.7% being ≥60 cm.

The tight clustering of nests is widely thought to be, in part, an antipredator behavior, mutual defense decreasing losses of eggs and chicks to predators, particularly gulls. As noted by Hulsman (1977), Great Crested Terns in the center of nesting clusters help defend the eggs of neighbors from Silver Gulls (*Larus novaehollandiae*). On the periphery, the "gulls were unhampered by terns when dealing with an unattended nest because nests were far apart" (Hulsman 1977). In Sandwich Terns, hatching success is higher in older birds, which also tend to be early breeders with nests in the more densely packed central portions of the colony (Veen 1977).

If predators, particularly gulls, exert strong influence on nest spacing we might expect hexagonal packing (inter-nest distances of 30–40 cm, as we measured) to be characteristic where predation is most intense and more loosely placed nests (inter-nest distances >50 cm) to be more typical where predation is reduced or minimal. This expectation is not met in all cases. Even where gull predation is intense nests may be widely spaced (Hulsman 1977, Veen 1977, L. Nicholson pers comm.). On the other hand, in most years at Bolsa Chica Elegant Terns face only a minimal threat of predation from gulls (pers. obs.) but still have uniformly tightly packed nests. This behavior may be an evolved response to the more intense predation pressure the species typically faces from Heermann's Gull (*L. heermanni*) at its principal nesting colony at Isla Rasa in the Gulf of California, Mexico (Burness et al. 1999, Velarde et al. 2005). On the island of Aruba Cayenne Terns (*T. sandvicensis eurygnatha*) have uniformly tightly packed nests and also face intense predation pressure from Laughing Gulls (*L. atricilla*), which are quick to grab an undefended egg (A. del Nevo pers. comm.).

The risk of predation could also influence the spacing of nests within clusters. Terns nesting on the periphery of nesting clusters are seemingly at the highest risk (Fischer and Lockley 1974, Hulsman 1977, Veen 1977) and might be expected to "crowd in," decreasing inter-nest distances. As noted earlier, our data did not support this hypothesis. The opposite seems true for Great Crested Terns in Australia, among which inter-nest distances tend to be less for central nests (31.4 ±4.9 cm, *n* = 59) than for edge nests (32.5 ± 5.0 cm, *n* = 43), although these differences are small and apparently not statistically significant (Stirling et al. 1970). The risk of predation and its effect on nest spacing may vary with the type of predator and prey species. In a more loosely packed colony of Least Terns (*Sternula antillarum*) predation by Black-crowned Night Herons (*Nycticorax nycticorax*) was most intense in the central area, while predation by American Crows (*Corvus brachyrhynchos*) was restricted to the periphery (Brunton 1997). In mixed colonies of Cayenne and Royal Terns, Kelp Gulls (*L. dominicanus)* were more successful in preying on the eggs of the smaller-bodied Cayenne Terns, whereas the larger-bodied Royal Terns could defend their eggs more efficiently (Yorio and Quintana 1997).

Additional studies are needed to clarify the selective pressures influencing inter-nest distances in crested terns and other colonial seabirds. Of particular value will be observations of banded birds whose age and past breeding experience are known and can be related to behavioral decisions made with respect to the degree of nest dispersion and hexagonal packing.

ACKNOWLEDGMENTS

Permission to conduct studies at Bolsa Chica State Ecological Reserve was granted by the California Department of Fish and Game. We are indebted to the several biologists working on other crested terns who have shared unpublished information: A. del Nevo, P. Symens, L. Nicholson, D. Shealer, and K. Hulsman. A. del Nevo and K. Molina provided invaluable statistical analyses. Comments from K. Molina, S. Emslie, and an anonymous reviewer improved earlier drafts of this paper.

LITERATURE CITED

American Ornithologists' Union. 2006. Forty-seventh supplement to the American Ornithologists' Union Check-list of North American Birds. Auk 123: 926–936.

Bridge, E. S., Jones, A. W., and Baker, A. J. 2005. A phylogenetic framework for the terns (Sternini) inferred from mtDNA sequences: Implications for taxonomy and plumage evolution. Molecular Phylogenetics and Evolution 35:459–469.

Brunton, D. H. 1997. Impact of predators: Center nests are less successful than edge nests in a large nesting colony of Least Terns. Condor 99:372–380.

Buckley, F. G., and Buckley, P. A. 1972. The breeding ecology of Royal Terns *Sterna (Thalasseus) maxima maxima*. Ibis 114:344–359.

Buckley, P. A., and Buckley, F. G. 1977. Hexagonal packing of Royal Tern nests. Auk 94:36–43.

Buckley, P. A., and Buckley F. G. 2002. Royal Tern (*Sterna maxima*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 700. Birds N. Am., Philadelphia.

Burness, G. P., Lefevre, K., and Collins, C. T. 1999. Elegant Tern (*Sterna elegans*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 404. Birds N. Am., Philadelphia.

Cramp, S. (ed.). 1985. Birds of the Western Palearctic, vol. 4. Oxford Univ. Press, Oxford, England.

Collins, C. T. 2006a. Banding studies of Elegant Terns in southern California. N. Am. Bird Bander 31:17–22.

Collins, C. T. 2006b. Banding studies of Caspian Terns in southern California. N. Am. Bird Bander 31:10–17.

Collins, C. T., Schew, W. A., and Burkett, E. 1991. Elegant Terns breeding in Orange County, California. Am. Birds 45:393–395.

Coulson, J. C. 2002. Colonial breeding in seabirds, in Biology of Marine Birds (E. A Schreiber and J. Burger, eds.), pp. 87–113. CRC Press, Boca Raton, FL.

Fischer, J., and Lockley, R. M. 1974. Sea-Birds. Collins, London.

Hulsman, K. 1977. Breeding success and mortality of terns at One Tree Island, Great Barrier Reef. Emu 77:49–60.

Kharitonov, S. P., and Siegel-Causey, D. 1988. Colony formation in seabirds. Current Ornithol. 5:223–272.

Lack, D. 1968. Ecological Adaptations for Breeding in Birds. Methuen, London.

Meininger, P. L.,Wolf, P. A., Hadoud, D.A., and Essghaier, M. S. A. 1994. Rediscovery of Lesser Crested Terns breeding in Libya. Br. Birds 87:160–170.

Schreiber, E. A., and Burger, J. (eds.) 2002. Biology of Marine Seabirds. CRC Press, Boca Raton, FL.

Shealer, D. 1999. Sandwich Tern (*Sterna sandvicensis*), in The Birds of North America, (A. Poole and F. Gill, eds.), no. 405. Birds N. Am., Philadelphia.

Siegel-Causey, D., and Kharitonov, S. P. 1990. The evolution of coloniality. Current Ornithol. 7:285–330.

Stirling, I., Stirling, S. M., and Shaughnessy, G. 1970. The bird fauna of South Neptune Islands, South Australia. Emu 70:189–192.

Suter, W. 1986. Mit sanftmut zum Erfolge: Brutnachbarschaft von Eilseeschwalbe *Sterna bergii* und Hartlaubmowe *Larus hartlaubii*. Ornithologische Beobachter 83:269–274.

Symens, P., and Evans, M. I. 1993. The impact of Gulf War oil spills on Saudi Arabian breeding populations of terns *Sterna* in the Arabian Gulf, 1991. Sandgrouse 15:18–36.

Veen, J. 1977. Functional and causal aspects of nest distribution in colonies of the Sandwich Tern (*Sterna s. sandvicensis* Lath.). Behaviour Supplement 20:1–193.

Velarde, E., Carton, J.-L. E., Drummond, H., Anderson, D. W., Palacios, E., and Rodriguez, C. 2005. Nesting seabirds of the Gulf of California's offshore islands: Diversity, ecology, and conservation, in Biodiversity, Ecosystems and Conservation in Northern Mexico (J.-L. Carton, G. Ceballos, and R. S. Felger, eds.), pp. 452–470. Oxford Univ. Press, New York.

Wittenburger, J. L., and Hunt, G. L., Jr. 1985. The adaptive significance of coloniality in birds, in Avian Biology (D. S. Farner, J. R. King, and K. C. Parkes, eds.) vol. 8, pp. 1–78. Academic Press, Orlando, FL.

Yorio, P., and Quintana, F. 1997. Predation by Kelp Gulls *Larus dominicanus* at a mixed-species colony of Royal Terns *Sterna maxima* and Cayenne Terns *Sterna eurygnatha* in Patagonia. Ibis 139:536–541.

Accepted 22 February 2008

REASSESSMENT OF TROPICAL PARULA SUBSPECIES IN BAJA CALIFORNIA SUR

MARSHALL J. ILIFF, 282 Perham St., West Roxbury, Massachusetts 02132; miliff@aol.com

RICHARD A. ERICKSON, LSA Associates, 20 Executive Park, Suite 200, Irvine, California 92614; Richard.Erickson@lsa-assoc.com

MARK J. BILLINGS, 3802 Rosecrans St., PMB #334, San Diego, California 92110; markjbillings@yahoo.com

ABSTRACT: Three records of the Tropical Parula (*Parula pitiayumi*) from southern Baja California Sur in the 1920s have long been considered to represent the endemic Socorro Island subspecies *graysoni*. After discovering an adult female Tropical Parula in the same area in May 2006 that did not appear to be *graysoni*, we examined specimens and the literature, finding that the two 1920s specimens are not *graysoni* but most consistent with subspecies *insularis*, occurring primarily on Nayarit's Tres Marías Islands. The pattern of yellow on the throat, distinct white wing bars, and distinct white tail spots preclude *graysoni*; the relatively small white tail spots and longer tarsi and tails suggest *insularis* rather than *pulchra* of mainland western Mexico.

The Tropical Parula (*Parula pitiayumi*) is a widespread neotropical warbler that breeds from southern Texas to South America but rarely occurs as a vagrant outside its regular range. In the United States, *P. p. nigrilora* strays casually to the Edwards Plateau, Big Bend, and the Davis Mountains of Texas (Lockwood and Freeman 2004). There are three records of apparent *P. p. pulchra* from southeastern Arizona: Madera Canyon 14 July–13 September 1984; Miller Canyon 22 June–14 July 2001; Cave Creek Canyon 16–23 June 2006 (Arizona Bird Committee data, M. M. Stevenson pers. comm.). Northwestern Texas has two well-documented records: Buffalo Gap, Taylor County, 13 May 1998 and Lubbock, Lubbock County, 18 May 2003 (photographed, M. W. Lockwood pers. comm.). The farthest-flung records are from Louisiana (at least five records; Dunn and Garrett 1997), Ft. Collins, Colorado (apparent *nigrilora*; 18 June–4 July 2004; photographs in Wood et al. 2006), and the Gila River Bird Area, New Mexico (within the Gila National Forest between Redrock and Cliff), 30 April 2005, the last a single-observer sighting not reviewed by the New Mexico Bird Records Committee but well-documented with a written description (Williams 2005, S. O. Williams III pers. comm.). Two specimens and an additional sight record from Baja California Sur have been attributed to the island endemic *P. p. graysoni* (Lamb 1925) and also treated as vagrants. Our discovery of a Tropical Parula in Baja California Sur in May 2006 and our efforts to determine that bird's subspecific identity eventually led us to reconsider and reidentify the earlier specimens as apparent *P. p. insularis,* most closely associated with the Tres Marías Islands, off Nayarit in western Mexico.

2006–2008 RECORD FROM BAJA CALIFORNIA SUR

On 19 May 2006 we found and photographed a Tropical Parula at Todos Santos, a small town on the Pacific coast near the southern tip of the

Baja California Peninsula (Figure 1; another photograph in *N. Am. Birds* 60:468). The parula did not associate with other birds and seemed to prefer the middle levels of large guamúchil trees (*Pithecellobium dulce*) at the edge of a cleared pasture. Given the late spring date, and knowing of previous records from the area, we hoped to discover another adult or fledglings that would indicate breeding. Despite much effort and playing recorded songs of the Northern Parula (*Parula americana*), we found no other individuals.

Identification to species was straightforward; both Iliff and Erickson had seen Tropical Parulas of various subspecies on numerous previous occasions. Although the bird at Todos Santos was superficially similar to the Northern Parula, the lack of white eye arcs, the yellow malar region, and the clear yellow breast eliminated that species. Photographs showed that the bird was an adult (after second year) on the basis of the color and lack of contrast in the primary coverts and supported by the shape of the rectrices (P. Pyle pers. comm.). The bird's sex and subspecific identity were more difficult to determine.

Various observers looked unsuccessfully for the bird from July 2006 to January 2007, but Iliff saw and photographed an apparent female Tropical Parula at the same location on 4 March 2007 (Figure 2). It frequented a large guamúchil within about 40 m of the trees used in May 2006. Comparison of photographs taken in the two years revealed no differences, and we consider the bird seen in March 2007 most likely the same individual as in May 2006. It was seen again on 14 March 2007 by Richard E. Webster and 8 April 2007 by Peter A. Gaede and Kurt A. and Cindy Radamaker, always in the same grove of trees. Billings and Erickson could not find the bird on 14 July 2007, but on 21 March 2008 Steven G. Mlodinow saw it in the exact same area.

These observations make the fourth record of the Tropical Parula for the Baja California Peninsula and for the state of Baja California Sur. Remarkably, Chester C. Lamb (1925) was responsible for all three prior records: a probable male collected at Todos Santos 3 November 1923, one seen at El Oro (about 35 km north-northeast of Todos Santos) 5 February 1924, and an adult female collected at Todos Santos 23 July 1924 [specimens now at the Field Museum of Natural History (FMNH), Chicago; Figures 3, 4]. Lamb (1925) reported that both specimens represent *graysoni*, and the statement by the AOU (1998) that the *pitiayumi* group (including all subspecies except *graysoni*) is "casual in southern Baja California" is without foundation. The AOU (1998) included *graysoni* as casual to Baja California Sur as well but prophetically cautioned that "confirmation of these records is needed." We asked Thomas S. Schulenberg to examine and photograph those specimens. The Todos Santos specimens had been identified as *Parula graysoni* by Louis B. Bishop and confirmed by Harry C. Oberholser (Lamb 1925, Schulenberg pers. comm.). The former specimen was not identified to sex originally but was identified as a "male adult" by a later examiner, perhaps Bishop (Schulenberg pers. comm.).

The only other report of the Tropical Parula in Baja California Sur, of an adult female at Isla Espíritu Santo, off La Paz, 22 June 1999 (Carmona et al. 2005; R. Carmona pers. comm.) was not documented. Through 2007, at least 11 Northern Parulas have been found in southern Baja California

Figure 1. Tropical Parula at Todos Santos 19 May 2006. This view shows the relatively bright underparts, bold wing bars, well-defined greenish back, and extensive yellow throat which all combine to eliminate *Parula pitiayumi graysoni*. Discrimination of *P. p. insularis* and *pulchra* would require better photographs of the undertail.

Photo by Marshall J. Iliff

Sur between January and April, and one was at Miraflores on 14 July 2006 (*N. Am. Birds* 60:583).

SUBSPECIES OF THE TROPICAL PARULA

The Tropical Parula has 14 currently recognized subspecies (Regelski and Moldenhauer 1997, Dunn and Garrett 1997), eight of which occur in North and Middle America, five in Mexico.

The dull *inornata* ranges from southern Veracruz and Chiapas to northern Honduras and is distinctive in that it is comparatively pale and typically lacks wing bars (Regelski and Moldenhauer 1997, Dunn and Garrett 1997).

Figure 2. Tropical Parula at Todos Santos 4 March 2007. In this view the white on the underside of rectrix 6 shows well and is quite restricted, indicating *P. p. insularis*. The rather faint wash of cinnamon on the flanks is visible. The lack of a dark mask was more easily seen in the field and suggests a female, but the white in the tail is extensive enough that it may be a male.

Photo by Marshall J. Iliff

Parula p. nigrilora, the subspecies most familiar to North American birders, is resident east of the Sierra Madre Oriental from northern Oaxaca north to southernmost Texas. It is a brightly colored and well-marked subspecies, with extensive white in the tail, bold white wing bars, extensive bright yellow on the throat and underparts, a fairly bright orangish wash across the central breast (brightest in adult males), and prominent black lores in adult males. Its counterpart in western Mexico is *pulchra*, which is similar but has a well-defined wash of buff or cinnamon on the flanks, is larger and longer tailed, and has more extensive white tips to the greater secondary coverts (Dunn and Garrett 1997). It is resident on the coastal slope of the Sierra Madre Occidental from southern Oaxaca north to central Sonora (Howell and Webb 1995), and this subspecies presumably accounts for the three summer records of vagrants to southeastern Arizona (M. M. Stevenson pers. comm.).

The two remaining Mexican subspecies are island taxa. *Parula p. insularis* is fairly close in appearance to *pulchra* but has a longer tail on average and slightly more restricted white tail spots (Ridgway 1902, Dunn and Garrett 1997; see below). It is nearly endemic to the Tres Marías Islands off central Nayarit (360 km east-southeast of Cabo San Lucas), where it is one of the most common breeding landbirds (Stager 1957, R. A. Hamilton pers. comm.). Stager (1957) pointed out that "there appears to be considerable movement by this species between the island group and the adjacent mainland of Nayarit." Hellmayr (1935) described the range of *insularis* more extensively as "Tres Marías islands and coastal region of western Mexico from Labrados, Sinaloa, to San Blas, Nayarit." At the Moore Laboratory of Zoology (MLZ), Occidental College, Los Angeles, there are six specimens of the Tropical Parula from San Blas taken by Lamb in March 1948. Four of these are labeled *pulchra* × *insularis* (MLZ 47899, 47895, 47907, 47911; see Table 1) and two appear to be typical *insularis*. We reassessed the identification of these birds and found them intermediate in measurements and plumage scores between series of *insularis* and *pulchra*; we concur that they most likely represent hybrids. Presumably some individuals of *insularis* disperse to the mainland in winter, but it is not clear whether *insularis* breeds on mainland Nayarit. The hybrids cited above may have originated from mainland pairings of *insularis* with *pulchra* but could have come from mixed pairs on the Tres Marías Islands as well. The extent and geography of the introgression between these two taxa begs further study.

The last subspecies, *graysoni*, is endemic to Socorro Island in the Revillagigedo group, about 450 km south-southwest of Cabo San Lucas. Other than the purported Baja California Sur records, it is not known away from Socorro, where it is the most abundant bird (Wehtje et al. 1993, Rodríguez-Estrella et al. 1994). Also known as the Socorro Warbler (e.g., Lamb 1925) or Socorro Parula (Howell and Webb 1995), *graysoni* variously has been considered a species in its own right (Ridgway 1902, AOU 1957), a subspecies of the Tropical Parula (AOU 1998), or even possibly a close relative or subspecies of the Northern Parula (Dunn and Garrett 1997:209). It is by far the most distinctive of the four northerly Tropical Parula subspecies, being most like *insularis* but overall duller and with a fairly long tail, with white in the outer rectrices restricted to a narrow patch at the distal end of the

Table 1 Taxonomically Informative Measurements[a] of Two Subspecies of the Tropical Parula from Western Mexico

	n[b]	Tarsus[c]	Tail	R6 white (shaft)[d]	R6 white (margin)[d]	R5 white (shaft)[d]	R5 white (margin)[d]	R4[d]
♂ *insularis*	6	17.3–18.6 (18.0, 0.4)	45–50 (47.8, 1.7)	6–8 (6.8, 1.2)	11–17 (14.5, 2.1)	0–3 (0.5, 1.2)	0–17 (12.2, 6.2)	1–2 (1.2, 0.4)
♀ *insularis*	3[e]	17.5–18.2 (17.9, 0.6)	45–47 (46, 1.4)	0 (0, 0)	9 (9, 0)	0 (0, 0)	13 (13, 0)	1 (1, 0)
unsexed *insularis*	1	17.6	49	0	12	1	11	1
♂ *insularis* × *pulchra*	1[f]	17.0	42	0	8	1 (trace)	1 (trace)	0
♀ *insularis* × *pulchra*	3[f]	17.3–17.6 (17.4, 0.2)	42–45 (44.7)	0–5 (1.7, 2.9)	9–12 (10.3, 1.5)	0 (2 w/ trace)	14 (2 others w/ trace)	0–1 (0.7, 0.6)
♂ *pulchra*	39[g]	15.1–17.0 (16.1, 0.4)	38–44 (41.0, 1.38)	7–15 (11.7, 1.9)	10–24 (17.2, 3.1)	5–11 (8.1, 1.9)	10–20 (14.8, 2.4)	2–8 (4.2, 2.5)
♀ *pulchra*	23[h]	14.6–16.7 (14.6, 0.5)	37–42 (39.1, 1.41)	6–12 (9.5, 1.5)	8–16 (13.3, 2.0)	2–9 (6.4, 2.0)	5–15 (12.1, 2.4)	1–4 (2.3, 0.9)
♂ FMNH 176050	1	17.1	46.1	5.0	11.5	0	8.6	0
♀ FMNH 176051	1	18.2	43.6[i]	3.9	12.8	0	10.5	0

[a] In millimeters; ranges, with means and standard deviations in parentheses.

[b] Since tails and tarsi were damaged in some specimens, the number of specimens measured varies.

[c] Measured from the last (distal) visible scale before the toes emerge to the bend at the intertarsal joint (often the end of the bare region).

[d] Rectrix white measured along shaft and outer margin does not include edges, but rather measures from first point of widening from an edge.

[e] One specimen lacked its tail.

[f] Specimens at MLZ (see specimen numbers in text).

[g] Number of specimens for tail; for tarsus 46, for white in tail 34.

[h] Number of specimens for tail; for tarsus 26, for white in tail 17.

[i] Tail somewhat worn, so measurement may not reflect full tail length.

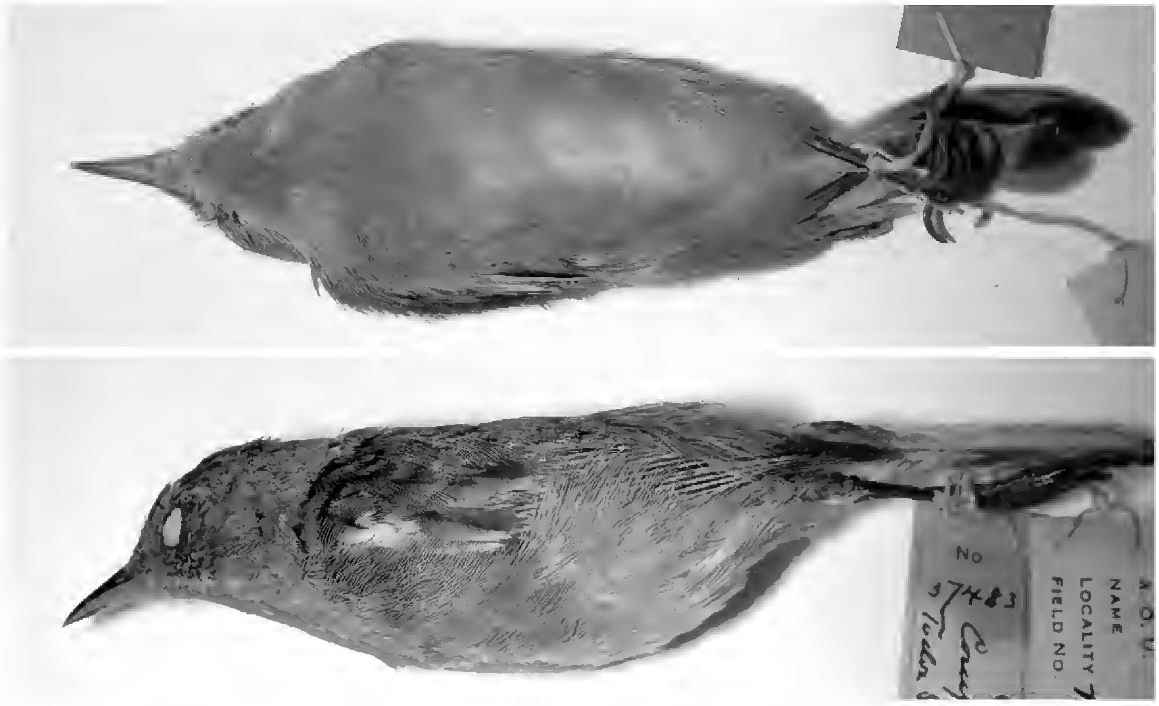


Figure 3. Side view of specimens of the Tropical Parula from Todos Santos, Baja California Sur. Upper, collected 3 November 1923 (FMNH 176050); lower, female collected 23 July 1924 (FMNH 176051). Note the buff flanks and fairly broad wing bars on both birds.

Photos by Mary Hennen

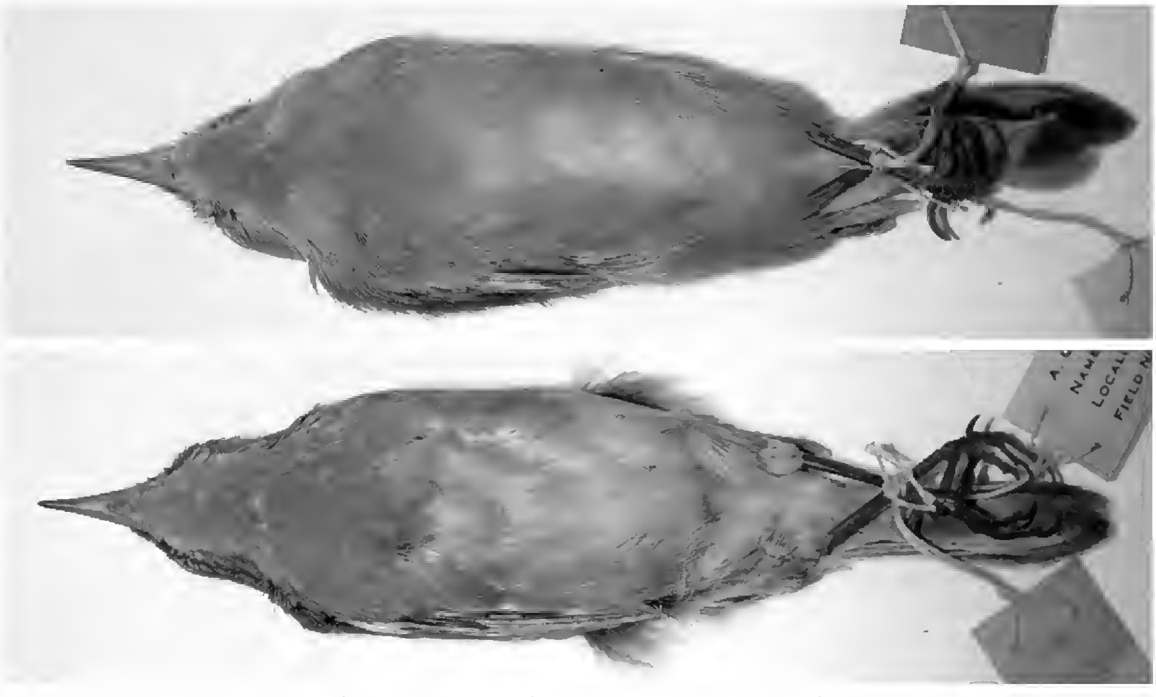


Figure 4. Ventral view of specimens of the Tropical Parula from Todos Santos, Baja California Sur (male upper, female lower). In this view both birds show extensive yellow on the throat and significant white in the tail, eliminating *P. p. graysoni*. The white in the tail is not extensive enough for *P. p. pulchra*.

Photos by Mary Hennen

inner web, narrower and more poorly defined wing bars, olive-gray flanks, less blue-gray upperparts, and the yellow below paler and more restricted (Figure 5). In contrast to those of *insularis*, adult males lack black in the lores (Ridgway 1902, Dunn and Garrett 1997, K. L. Garrett pers. comm.). Dunn and Garrett (1997) also pointed out that in *graysoni* the blue-gray along the sides of the lower throat projects inward to restrict the yellow throat, a feature typical of the Northern Parula. From below, the yellow throat of *graysoni* appears to have parallel sides, whereas on all other subspecies of the Tropical Parula the edges of the yellow throat widen toward the breast, giving the throat a triangular appearance.

IDENTIFICATION OF THE BIRDS IN BAJA CALIFORNIA SUR

We first suspected that the individual we found in 2006 would prove to be *graysoni*, given its dull appearance and the reports by Lamb (1925). Review of the literature and examination of specimens, however, confirmed that our bird was not *graysoni* because of its broad yellow throat, conspicuous white tail spots, and fairly bright and well-defined wing bars. The wash of buff along the flanks appears to eliminate the geographically unlikely *nigrilora*, and *inornata* is eliminated by the strong wing bars and relatively bright plumage. The only two remaining candidates are the other two subspecies that are geographically probable: *insularis* and *pulchra*. Although we thought that the dull plumage suggested *insularis* more than *pulchra*, we investigated the question further.

Ridgway (1902) provided the best account for differentiating *insularis* from *pulchra*: *insularis* is "Similar to *C. p. pulchra*, but larger; flanks darker,

Figure 5. Specimen of *P. p. graysoni* from Socorro I., Mexico, 10 May 1897 (FMNH 24297). Note the blue-gray constriction on the throat, the overall dull appearance, the minimal cinnamon on the flanks, and the near-complete lack of white on the undertail.

Photos by Mary Hennen

much tinged with grayish and more or less strongly tinged with chestnut; white on wing-coverts more restricted (as in *C. p. nigrilora*); subterminal white spots on inner web of lateral rectrices smaller, present on only one or two, instead of two or three; adult male with lores and orbits not distinctly darker than pileum and auricular region or at least not approaching black." In addition to the characters mentioned by Ridgway, Dunn and Garrett (1997) pointed out the longer tail of *insularis*. Regelski and Moldenhauer (1997) provided no new information on distinguishing *insularis* from *pulchra*, repeating information from Ridgway (1902).

Perhaps because of the small sample sizes (e.g., only four specimens of *pulchra*) on which Ridgway (1902) characterized the subspecies of *Parula pitiayumi*, our measurements of the Baja California Sur specimens do not clearly identify these birds by his criteria. Culmen measurements are outside of the range in Ridgway (1902; Table 2), wing chord is ambiguous, and tail length supports *insularis* for FMNH 176050 (♂) but not FMNH 176051 (♀). Tarsus lengths support *insularis* for FMNH 176051 but not FMNH 176050. To identify the Baja California Sur specimens, we needed measurements from a larger sample of specimens and to quantify the amount of white in the tail. We visited MLZ and the Natural History Museum of Los Angeles County (LACM) to measure the tails and tarsi on a larger series of specimens: 72 of *pulchra*, 10 of *insularis*, and the 4 hybrids mentioned above (Table 1). We also developed a scoring system to assess the amount of white in the rectrices. For rectrices 6 and 5 (outermost two rectrices) we measured the length of the white along the shaft and that along the feather's inner margin (Table 1); when the feather had a nearly complete white fringe we measured the white only from the point where the fringe began to widen. For the other rectrices, which typically have very little white, we scored three areas for a composite score of white inside of r5: the edge of r4 (0 = no white, 1 = trace, 2 = edge, 3 = strong edge), the interior of r4 (0 = no white, 1 = tiny spot, 2 = small spot, 3 = spot, 4 = white nearly to shaft, 5 = white extending to shaft), and r3 (0 = no white, 1 = edge; only one specimen of *pulchra* had a score for r3). Thus 9 would be the score for a bird with maximal white (although 8 was the highest score we actually recorded) and 0 would be the score for a bird with no white on those feathers. Measurements of culmen length by Ridgway (1902) and Schulenberg (Table 2) varied substantially and did not appear to be a strong character in subspecies diagnosis; we did not measure culmens.

Our measurements of the tail of *insularis* match those of Ridgway (1902), but those of the tarsus are up to 1 mm shorter than his values for both sexes. Our tarsus measurements ranged from 14.6 to 17.0 mm, a somewhat greater range than reported in Ridgway's small sample. For *pulchra*, our measurements reveal that tail length is consistent within the sexes, ranging from 37 to 44 mm, with males' tails averaging 2 mm longer than those of females.

On the basis of our investigations, we conclude that *insularis* is diagnosable on the basis of the extent of white on the outer three rectrices; diagnosis is supported by the measurements of the tarsus and tail. As reported by Ridgway (1902) and others, *insularis* has much less white in the tail than does

Table 2 Measurements[a] of Two Specimens of the Tropical Parula from Baja California Sur Compared with Measurements by Ridgway (1902)

	FMNH 176050	FMNH 176051	*pulchra*[b]		*insularis*[b]		*graysoni*[b]	
	♂	♀	♂	♀	♂	♀	♂	♀
n	1	1	3	1	12	6	4	3
Length	105	111	99.1–101.6 (99.8)	96.5	106.7–115.6 (113)	106.7–109.2 (108.4)	107.9–111.8 (109.7)	110.5–114.3 (112.3)
Wing chord	55	55	53.3–56.9 (54.6)	51.8	54.1–59.2 (57.4)	53.3–55.4 (54.6)	52.1–53.3 (52.6)	52.1–53.3 (52.8)
Tail length	46.1	43.6	39.1–43.9 (41)	39.6	45.7–52.6 (48.8)	46–49 (47.2)	46.7–48.3 (47.2)	46.2–47 (46.7)
Culmen[c]	13.2	12.9	9.6–9.9 (9.7)	—	9.4–10.4 (9.9)	9.6–10.2 (9.9)	9.6–10.2 (9.9)	9.9–10.2 (10.1)
Tarsus	17.1	18.2	15.5–16 (15.7)	15.7	18.5–19.8 (19)	18–18.5 (18.3)	17.8–19 (18.5)	19–19.3 (19.1)
Middle toe	9.3	9.1	9.6–10 (9.9)	9.6	9.9–10.4 (10.2)	9.6–10.4 (9.9)	10.7–10.9 (10.8)	9.9–10.7 (10.2)

[a] In millimeters.

[b] Ranges, with means in parentheses, from Ridgway (1902).

[c] The variation in culmen measurements probably indicates a difference in measurement practice or a typographical error in Ridgway (1902); we were unable to replicate the lengths he reported.

pulchra, although males have somewhat more white than females. *Parula p. insularis* almost never shows more than a trace or a thin edge of white on r4, whereas males of *pulchra* always have and females almost always have a prominent spot of white on this feather. The white on r5 averages less on *insularis* than on *pulchra*, and only on *insularis* (both males and females) does white fail to reach the shaft (white is always more extensive on the distal margin). On r6 of *insularis*, white reaches the shaft on all males but not on females; by contrast, all specimens of *pulchra* that we examined had significant white extending to the shaft. Tarsus and tail measurements proved to be consistent characters for distinguishing *insularis* and *pulchra*; although the difference was as little as 1 mm in some cases, the extremes did not overlap. The four birds labeled as *pulchra* × *insularis* hybrids have intermediate measurements in tarsus, tail, and size of the tail spots, leading us to conclude that their identification is correct. In other features the specimens of *insularis* (and hybrids) closely matched *pulchra*, and we do not consider the subspecies distinguishable by plumage characters other than tail pattern: the wing bars of the two specimens of *insularis* in MLZ were as strong as on many of those of *pulchra*, and the extent of black in the lores and color of the flanks and underparts also overlapped with *pulchra*.

The two Baja California Sur specimens (Figures 3, 4) clearly are not *graysoni*, as both have moderate amounts of white in the tail, extensive yellow on the throat (not constricted as in *graysoni*), medium buff on the flanks (stronger on male), and are too brightly colored above for that subspecies. The one sexed as a male has a small amount of blackish in the lores, and the female has a faint wash of orange across the central breast; in short, they closely resemble the bird we photographed in 2006 and 2007. Their plumage indicates that the specimens represent either *insularis* or *pulchra*. On the basis of tail pattern we conclude that they are *insularis*; the minimal amount of white on r5 and the inner tail (r4) fall outside of the range of all specimens of *pulchra* (n = 62) that we examined. On r6, the white of the male (FMNH 176050) lies at the lower limit for males of *insularis*. That of the female (FMNH 176051) is more extensive than in the three females of *insularis* we measured but matches the lower limit of the males and is well outside the extreme of *pulchra*. Although the tarsus measurement of the female matches *insularis* well, that of the male is intermediate between those of *pulchra* and *insularis*. The tail lengths are more supportive of *insularis*, with the male having a tail length (46.1 mm) well within the range for *insularis* but more than 2 mm longer than the longest tail of *pulchra*. The tail length of the female (43.6 mm) is intermediate but still 1.6 mm longer than in any female of *pulchra* we measured (our sample size for *insularis* was small). Schulenberg (pers. comm.) noted that this bird's tail was worn and the true tail length may have been longer. Thus both specimens match *insularis* better than any other known subspecies of the Tropical Parula. Because some measurements are intermediate, however, we cannot eliminate the possibility that the two specimens represent hybrids or intergrades with *pulchra*.

The Tropical Parula photographed at Todos Santos is not *graysoni*, and its appearance is consistent with *insularis*. In particular, the extent of white visible in the tail in Figure 2 strongly suggests *insularis*. Although only r6 is visible in the photograph, the white is minimal and matches the specimens of *insularis* we examined. At LACM, we measured the width of r6 on two specimens of *pulchra* (6.5 and 7 mm; both males) and two of *insularis* (7 mm male, 7 mm female). Therefore we assumed a rectrix width of 7 mm and used Figure 2 to estimate the white in the tail, getting the following values: r6 white along shaft 4 mm, r6 white along edge 6 mm. These measurements compare favorably with our measured values for *insularis* (Table 1). Photographs taken on 19 May 2006 appear to show minimal white on the underside of r6 as well but do not show the tail well enough to be definitive (but we assume that both sightings pertain to the same individual). On the basis of this character, and the precedent for *insularis* in Baja California Sur, we conclude that the bird in 2006 and 2007 was *insularis* as well.

IMPLICATIONS OF TROPICAL PARULA RECORDS IN BAJA CALIFORNIA SUR

Although most birds endemic to islands have little propensity to wander away from their home island(s), Grayson's Thrush (*Turdus rufopalliatus graysoni*), another Tres Marías endemic, also moves away from the islands to winter on the adjacent mainland (Phillips 1981, Howell and Webb 1995). Similarly, several published references and a handful of specimens support the occurrence of *insularis* on the Mexican mainland, illustrating its potential to occur away from the Tres Marías Islands. The four records of the Tropical Parula from Baja California Sur, however, have no seasonal pattern suggesting vagrancy, and their location (clustered northwest of the Sierra de La Laguna) is counterintuitive for vagrants presumably arriving from the southeast. Lamb (1925) speculated that "the taking of these two birds, in the winter and summer of two successive years, would indicate that the species is of more or less regular occurrence in the Cape Region of Lower California. The capture of a specimen in July suggests the possibility of breeding at the point of record." We still consider it at least possible that this region has hosted a small resident population of the Tropical Parula over some or all of the past century.

The Pacific coast of Baja California Sur between the Vizcaíno Peninsula and Todos Santos (i.e., the Magdalena Plain and vicinity) is famous for its cacti draped in mosses and lichens (as near Puerto San Carlos); although rainfall is minimal, condensation of fog on the desert vegetation permits the growth of these mosses and lichens in this "fog desert." It seems that the Todos Santos region is unique in the Cape District in that mosses and lichens can be found on the vegetation here as well, presumably also because of condensation of Pacific moisture. Indeed, Todos Santos may be the only area in Baja California Sur with such growth on trees (pers. obs.), as fairly lush stands of *Pithecellobium dulce*, palms, planted avocados (*Persea* sp.), and *Citrus* grow around the town. Both the Northern and Tropical Parulas depend on certain bromeliads and Spanish moss for their nests (e.g., *Usnea* in the northeastern U.S. and *Tillandsia* in the southeastern U.S.; Dunn and Garrett 1997), and it seems that the occurrence of the Tropical Parula in this region of Baja California Sur could be tied to the growth of these lichens.

ACKNOWLEDGMENTS

John C. Hafner and Kimball L. Garrett arranged for permission to examine the collections at the Moore Laboratory of Zoology (Occidental College) and the Natural History Museum of Los Angeles County, respectively. Nate Upham at MLZ was also very helpful and gracious during our visits. We very much appreciate Thomas S. Schulenberg's assistance and willingness to locate and examine the Todos Santos specimens at the Field Museum of Natural History. Schulenberg also provided extensive comments on earlier drafts of this paper. Mary Hennen graciously photographed those specimens on our behalf. Jeremiah R. Trimble and Bob Stymeist assisted Iliff with examination of Tropical Parula skins at the Museum of Comparative Zoology, Cambridge, Massachusetts. Peter Pyle helped determining the age of the parula photographed in 2006, and Mark M. Stevenson sent us details of the three Arizona records. Jon P. Rebman of the San Diego Natural History Museum assisted with identification of *Pithecellobium dulce*. Richard C. Banks and Michael A. Patten read the final version of the paper and gave detailed comments that greatly improved it. A number of other individuals assisted at various other points in this process, including Roberto Carmona, Garrett, Robert A. Hamilton, Matthew T. Heindel, Steve N. G. Howell, Mark W. Lockwood, Sartor O. Williams III, Patten, Pyle, Kurt A. and Cindy Radamaker, Peter A. Gaede, Steven G. Mlodinow, and Richard E. Webster.

LITERATURE CITED

American Ornithologists' Union. 1957. Check-List of North American Birds, 5th ed. Am. Ornithol. Union, Baltimore.

American Ornithologists' Union, 1998. Check-List of North American Birds, 7th ed. Am. Ornithol. Union, Lawrence, KS.

Carmona, R., Ruiz-Campos, G., Castillo-Guerrero, J. A., and Brabata, G. 2005. Patterns of occurrence and abundance of land birds on Espíritu Santo Island, Gulf of California, México. Southwestern Naturalist 50:440–447.

Dunn, J. L., and Garrett, K. L. 1997. A Field Guide to the Warblers of North America. Houghton Mifflin, Boston.

Hellmayr, C. E. 1935. Catalogue of birds of the Americas and the adjacent islands. Field Mus. Mat. Hist. Zool. Ser. 13, part 8.

Howell, S. N. G., and Webb, S. 1995. Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Lamb, C. C. 1925. The Socorro Warbler added to the A. O. U. Check-List. Condor 27:36–37.

Lockwood, M. W., and Freeman, B. 2004. The TOS Handbook of Texas Birds. Tex. A&M Univ. Press, College Station.

Miller, A. H., Friedmann, H., Griscom, L., and Moore, R. T. 1957. Distributional checklist of the birds of Mexico, part 2. Pac. Coast Avifauna 33.

Phillips, A. R. 1981. Subspecies vs. forgotten species: The case of Grayson's Robin (*Turdus graysoni*). Wilson Bull. 93:301–309.

Regelski, D. J., and Moldenhauer, R. R.. 1997. Tropical Parula (*Parula pitiayumi*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 293. Acad. Nat. Sci., Philadelphia.

Ridgway, R. 1902. The Birds of Middle and North America, part 2. Bull. U.S. Natl. Mus. 50.

Rodríguez Estrella, R., Rivera Rodríguez, L., and Mata, E. 1994. Avifauna terrestre, in La Isla Socorro, Reserva de la Biosfera Archipielago de Revillagigedo, México (A. Ortega Rubio and A. Castellanos Vera, eds.), pp. 199–224. Centro de Investigaciones Biológicas del Noroeste S.C. Publ. 8.

Stager, K. E. 1957. The avifauna of the Tres Marias Islands, Mexico. Auk 74:413–432.

Wehtje, W., Walter, H. S., Rodriguez Estrella, R., Llinas, J., and Castellanos Vera, A. 1993. An annotated checklist of the birds of Isla Socorro, Mexico. W. Birds 24:1–16.

Williams, S. O. III. 2005. Spring season: New Mexico. N. Am. Birds 59:472–475.

Wood, C. L., Leukering, T. R., and Schmoker, B. 2006. Summer season: Colorado and Wyoming. N. Am. Birds 59:629–630.

Accepted 19 February 2008

HABITAT FRAGMENTATION AND SCRUB-SPECIALIST BIRDS: SAN DIEGO FRAGMENTS REVISITED

AUTUMN R. SARTAIN, Section of Ecology, Evolution, and Behavior, Division of Biology, University of California at San Diego, La Jolla, California 92093; autumn.sartain@yahoo.com (current address 3205 Nile St., San Diego, California 92104)

ALLISON C. ALBERTS, Conservation and Research for Endangered Species, Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido, California 92027

ABSTRACT: We resurveyed six fragments of scrub vegetation near San Diego for eight scrub-specialist bird species sampled in two previous studies (Soulé et al. 1988 and Crooks et al. 2001) to determine if species' distributions are changing over time and whether previously reported patterns of occurrence are persisting. We found that these habitat fragments tended to lose resident populations of scrub-specialist birds over the last 20 years, that the number of species detected was positively related to area, that extirpations were negatively related to area, and that local recolonizations were negatively related to the isolation of the fragment. In addition, sensitivity to fragmentation seems to be related in part to differences in body size and dispersal capability.

Habitat fragmentation is considered one of the most significant threats to biodiversity and a primary cause of extinction (Harris 1984, Wilcox and Murphy 1985). When a habitat is fragmented, deleterious effects on animals occupying that habitat may include reduced population size, genetic isolation, and inbreeding depression (Templeton et al. 1990). These effects can be exacerbated further by the loss of opportunity for immigration if fragments are remote from each other (Wilcox and Murphy 1985). Negative consequences birds can experience from habitat fragmentation include increased nest predation and parasitism (Paton 1994) and reduced overall fecundity (Donovan and Lamberson 2001). The result for many birds is an increasing risk of local extirpation with decreasing fragment size (Temple and Cary 1988, Soulé et al. 1992, Crooks et al. 2004).

The effects of fragmentation can change over time (Debinski and Holt 2000), and long-term effects may be difficult to assess, as the length of time a habitat is fragmented can be short in comparison to evolutionary time (Ewers and Didham 2006). Immediately after initial fragmentation, for example, the abundance of species may increase as a result of the population's being compressed into remaining habitat (Hagan et al. 1996) or faunal release caused by elimination of predators (Adler and Levins 1994). Such effects, however, usually diminish after one year (Debinski and Holt 2000). Therefore, long-term studies are important for understanding the true effects of fragmentation.

Soulé et al. (1988) examined the effects of fragmentation in San Diego County, California, through surveys of eight scrub-specialist bird species (species that require coastal sage scrub and/or chaparral habitat for breeding). For these species, Soulé et al. (1988) surveyed 37 canyons vegetated with coastal sage scrub and/or chaparral and isolated from similar canyons by various forms of urban development. These areas of surviving native vegetation (referred to hereafter as fragments) ranged in size from 0.4 to 102.8 ha. The fragments had been isolated from other areas of native habitat for lengths of time ranging from 2 to 86 years. Soulé et al. (1988) revealed that the number of scrub-specialist bird species in a fragment tended to increase with increasing fragment area and native vegetation cover but decrease with time since fragmentation (fragment age).

Ten to eleven years after the initial surveys, in 1997, Crooks et al. (2001) surveyed these fragments again for the same bird species. Of the 34 fragments they examined, 30 had been covered from 1985 to 1987 by Soulé et al. (1988). Crooks et al. (2001) found more extirpations (21) than recolonizations (12) in the fragments surveyed. The proportions of extirpations and recolonizations were significantly related to the area but not to the age or isolation of the fragments. In addition, the percent cover of native vegetation decreased significantly as a fragment's age increased. Their results supported the finding of Soulé et al. (1988) that the number of species in a fragment is positively correlated with its area and negatively correlated with its age.

In our study, 20 years after the surveys of Soulé et al. (1988), we assessed extirpations and recolonizations within six of the fragments studied by both Soulé et al. (1988) and Crooks et al. (2001). We chose fragments representing a range of sizes that contained five or more of the eight species in 1988. The results of the previous studies showed a negative correlation between the age of a fragment and the number of bird species within that fragment; they found that the number of extirpations exceeded the number of recolonizations. We therefore expected extirpations to exceed recolonizations in the six fragments we studied and to find evidence of lower persistence in smaller and more isolated fragments.

METHODS

We resurveyed six of the fragments surveyed by Soulé et al. (1988) and Crooks et al. (2001) in April and May 2006. These six fragments, vegetated with coastal sage scrub and/or chaparral, range from about 15 to 35 km north of downtown San Diego (Figure 1). Two are in Solana Beach (Mil Cumbres and Solana Drive), two in Encinitas (Oakcrest and Montanosa; Figure 2), one in La Jolla (Alta La Jolla), and one in Pacific Beach (Kate Sessions Park; Figure 3) (Table 1). As of 2006, each fragment had been completely surrounded by development, including homes, golf courses, churches, and businesses, for 20 to 35 years. These six fragments ranged in size from 3 to 34 ha, had been isolated for ≤16 years at the time of the original study 1985–87, and supported at least five of the eight scrub-specialist bird species at that time. None of the six fragments we studied showed signs of recent fire at the time of our surveys.

The eight target species were the California Quail (*Callipepla californica*), Greater Roadrunner (*Geococcyx californianus*), Wrentit (*Chamaea fasciata*), Bewick's Wren (*Thryomanes bewickii*), Cactus Wren (*Camplyorhynchus brunneicapillus*), California Gnatcatcher (*Polioptila californica*), California Thrasher (*Toxostoma redivivum*), and Spotted Towhee (*Pipilo maculatus*).

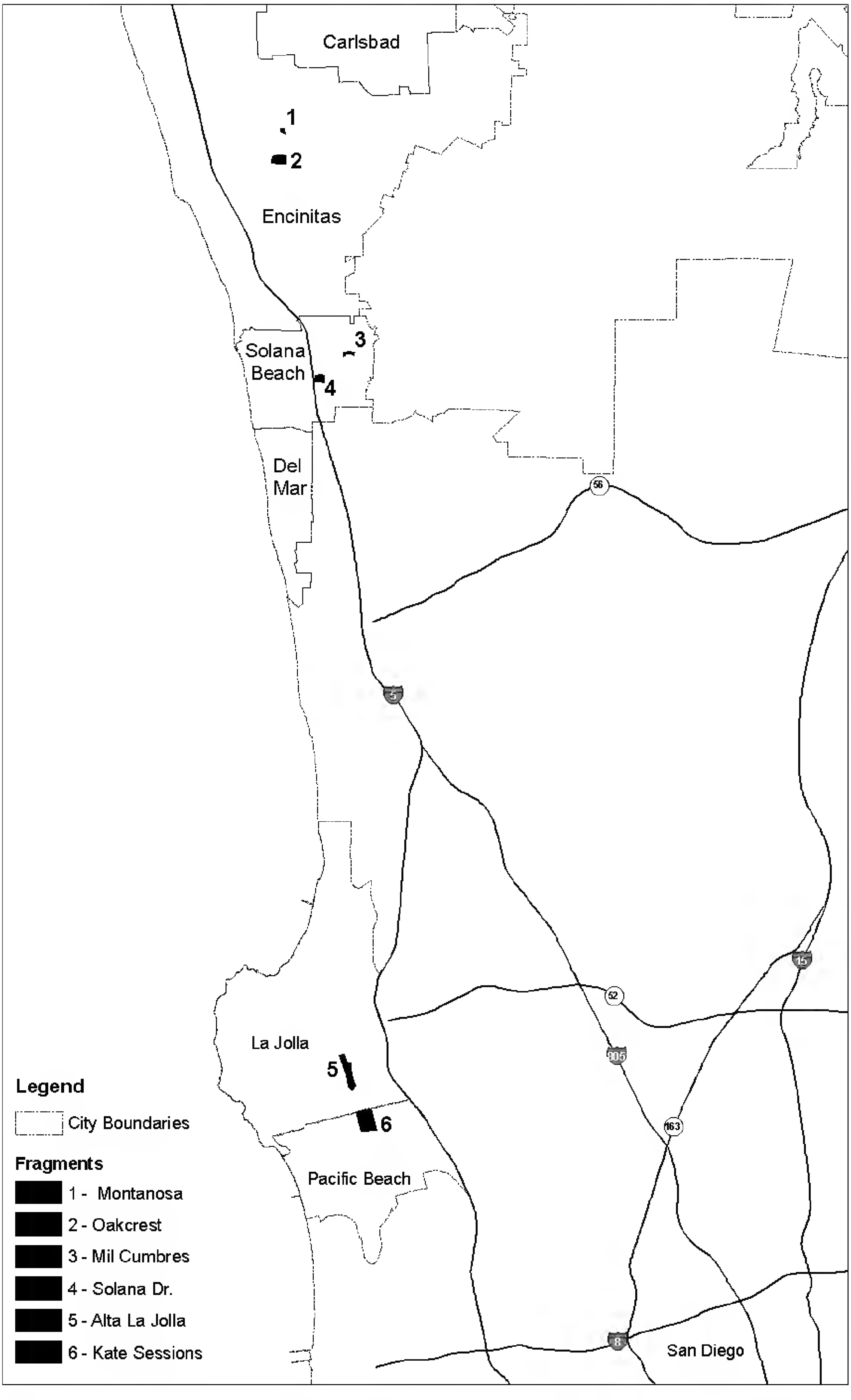


Figure 1. Locations in coastal San Diego County, California, of six fragments of native scrub surveyed for scrub-specialist birds in 2006.

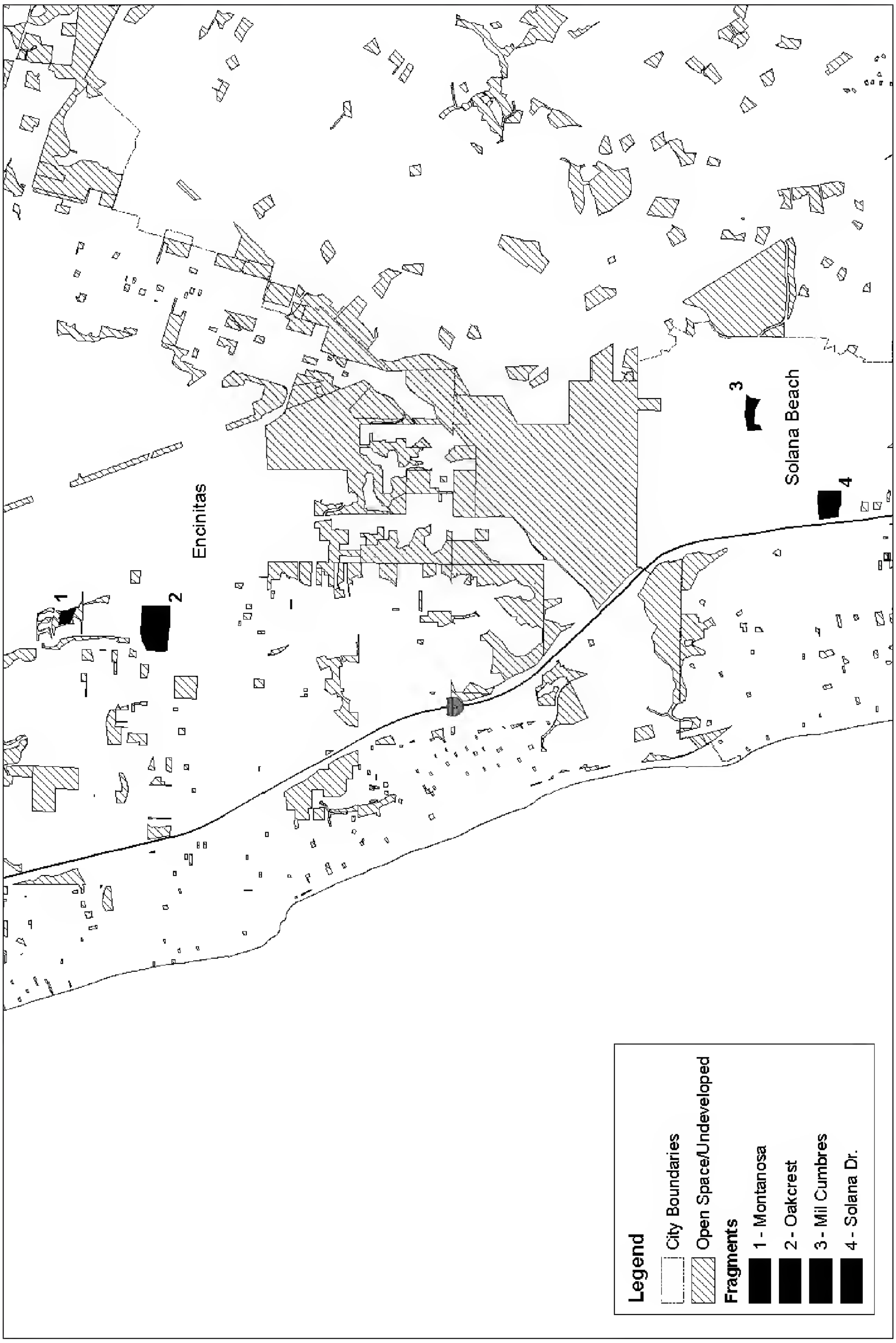


Figure 2. Setting of Montanosa, Oakcrest, Mil Cumbres, and Solana Drive fragments among nearby developed and undeveloped areas.

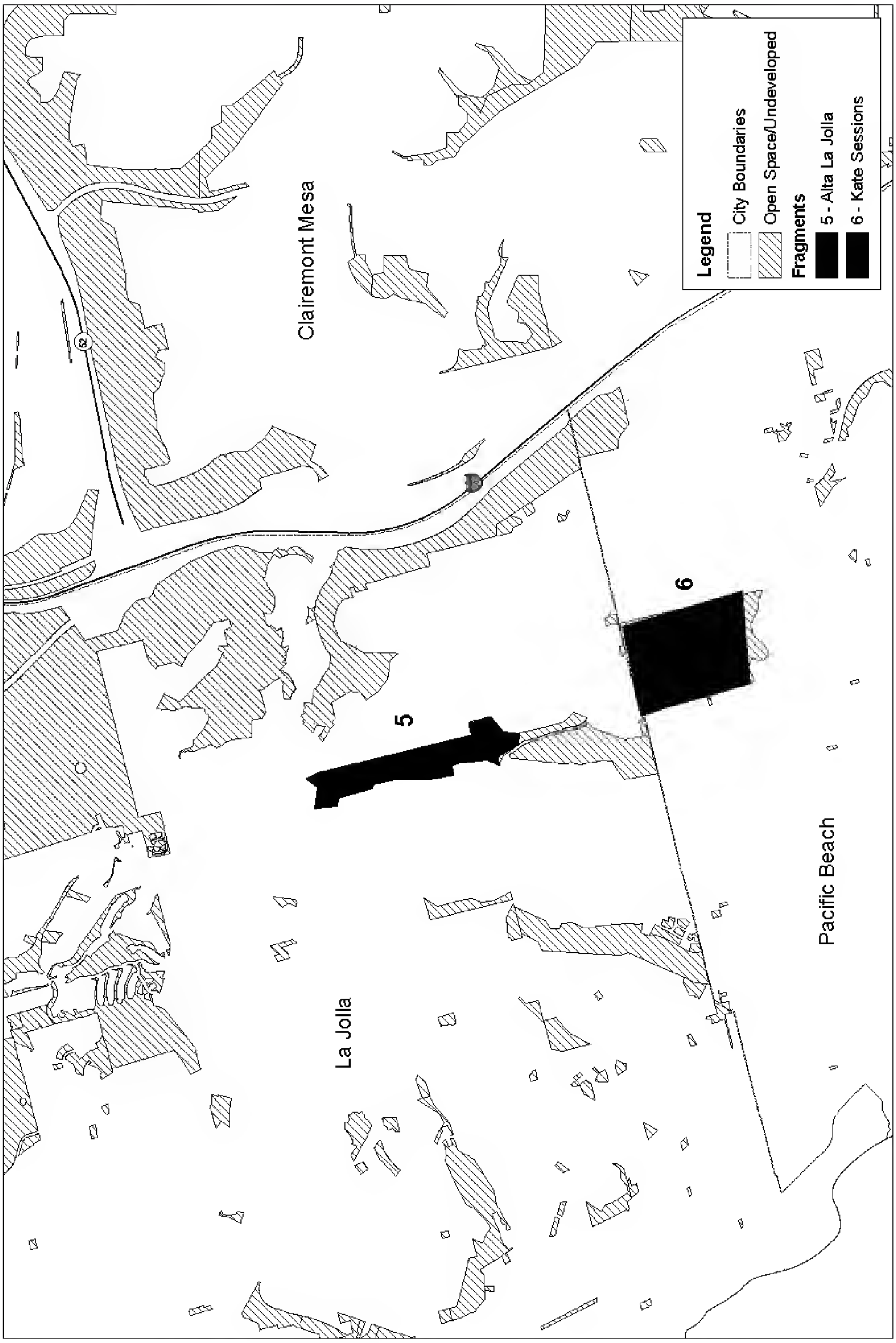


Figure 3. Setting of Alta La Jolla and Kate Sessions Park fragments among nearby developed and undeveloped areas.

Table 1 Fragments of Native Scrub Resurveyed in 2006

	Fragment					
	Alta La Jolla	Kate Sessions	Mil Cumbres	Montanosa	Oakcrest	Solana Dr.
Area (ha)[a]	34	31	6	3	6	8
Isolation distance (m)	121	121	550	91	400	550
1985–87						
Age[b]	14	16	11	2	6	11
Number of species[c]	6	6	6	5	6	7
1997						
Age	23	25	20	11	15	20
Number of species[d]	4	5	4	3	3	4
Extirpations	2	2	2	3	3	3
Recolonizations	0	1	0	1	0	0
2006						
Age	32	34	29	20	24	29
Number of species	5	5	3	4	4	4
Extirpations	0	0	1	0	0	0
Recolonizations	1	0	0	1	1	0

[a] From Crooks et al. (2001).

[b] Number of years since fragment was isolated from other areas of native scrub.

[c] Of eight possible, from Soulé et al. (1988).

[d] Of eight possible, from Crooks et al. (2001).

Our survey methods followed those of Soulé et al. (1988) and Crooks et al. (2001) as closely as possible. To conduct the surveys, Sartain and Cindy Dunn or Erin Reddy walked slowly together along a transect from one end of the fragment, through the interior of the fragment, to the other end. Surveys began at sunrise. Birds were detected by sight and/or sound and recorded regardless of distance from the transect. This same transect was then slowly walked a second time, beginning at the opposite end, and repeated a third and fourth time. On the fourth survey we made 8-minute point counts approximately every 250 meters. Survey time was proportional to the size of the fragment and ranged from half an hour for the smallest fragment to two hours for the largest, averaging one hour per visit per fragment. We surveyed each fragment twice, switching observers so that a total of three people surveyed each fragment. The rotating three-person survey team provided a control for detection bias. The time between the two surveys ranged from 7 to 14 days. Although the 1988 study's methods entailed three visits to each fragment, Crooks et al. (2001) found that the number of times a fragment was surveyed did not significantly influence the number of bird species detected when the effects of variation in the fragments' areas were controlled.

To assess changes in the number of target species in the fragments over time, we performed a one-way ANOVA on the number of species detected in the six fragments by each of the three studies, followed by a post-hoc Holm-Šidák test.

To determine if the presence of the target species was related to fragment size or age, we performed linear regressions with the number of species detected in 2006 as the dependent variable and fragment area (AREA) and fragment age as of 2006 (AGE) as independent variables.

Given small sample sizes, we combined extirpations and recolonizations from 2006 with those from 1997 in order to examine extirpations and recolonizations since the initial Soulé et al. (1988) study. As these combined variables included surveys conducted at different times, we did not use them to examine effects of fragment AGE. However, as area was assumed to remain relatively constant between 1997 and 2006, we performed linear regressions to determine if fragment AREA influenced the number of recolonizations or extirpations.

In addition, we determined how combined 1997 and 2006 recolonizations and extirpations were related to the distance by which the fragments were isolated from similar natural habitat (ISOLATION). Soulé et al. (1988) defined isolation distances in two ways, as the distance to the nearest fragment that contained scrub-specialist species and as the distance to the nearest fragment of equal or greater area. In this study, we used the latter definition. We performed linear regressions to detect the influence of ISOLATION on the number of recolonizations and extirpations.

RESULTS

Our study revealed one extirpation, defined as a species' disappearance in 2006 from a fragment where it was present in 1997: the Wrentit from Mil Cumbres. It revealed three recolonizations, defined as a species' reappearance in 2006 in a fragment where it was absent in 1997 but present in 2006: the California Quail in Alta La Jolla, California Thrasher in Montanosa, and California Gnatcatcher in Oakcrest (Table 2).

Table 2 Distribution of Scrub-Specialist Birds in Fragments Surveyed in 2006[a]

Fragment	Bewick's Wren	Spotted Towhee	Wrentit	Calif. Thrasher	Calif. Quail	Calif. Gnatcatcher	Greater Roadrunner	Cactus Wren
Alta La Jolla	1	1	1	1	**1**[e]	0	0[b]	0
Kate Sessions	1	1	1	1	0[b]	1[c]	0[b]	0
Mil Cumbres	1	1	**0**[b,d]	0[b]	1	0	0[b]	0
Montanosa	1	1[b]	1	**1**[e]	0[b]	0	0[b]	0
Oakcrest	1	1	1	0[b]	0[b]	**1**[c,e]	0[b]	0
Solana Dr.	1	1	1	1	0[b]	0[b]	0[b]	0

[a] Ordered by decreasing frequency. 1, present; 0, absent.

[b] Extirpation since 1985–87 (Soulé et al. 1988).

[c] Recolonization since 1985–1987 (Soulé et al. 1988).

[d] Extirpation since 1997 (Crooks et al. 2001)..

[e] Recolonization since 1997 Crooks et al. (2001).

Our ANOVA results showed that the number of target species in the fragments has decreased significantly over time ($F_{2,15} = 15.98$, $P < 0.001$, power 0.997). That is, the number of species found in the fragments 1985–87 (6.0 ± 0.63) was significantly higher than in 1997 (3.8 ± 0.75) ($t = 5.25$, $P < 0.001$) and 2006 (4.2 ± 0.75) ($t = 4.44$, $P < 0.001$). The difference between 1997 and 2006 was not significant ($t = 0.81$, $P = 0.43$).

AREA explained a significant proportion of the variation in the number of target species found in the fragments in 2006, revealing a positive relationship between the two variables ($R^2 = 0.71$, $P = 0.03$, power 0.57). That is, more species occurred in larger fragments. AGE did not explain a significant proportion of the variation ($R^2 = 0.21$, $P = 0.36$); however, the power of the AGE regression was low (0.14), likely as a result of the small sample size.

AREA also explained a significant proportion of the variation in the number of extirpations, 1997 and 2006 combined, revealing a significant negative relationship ($R^2 = 0.98$, $P < 0.001$, power 0.997), That is, more extirpations occurred in smaller fragments. AREA did not explain a significant proportion of the variation in the number of recolonizations, 1997 and 2006 combined ($R^2 = 0.01$, $P = 0.90$); however, the power of this test was very low (0.03).

ISOLATION explained a significant proportion of the variation in the number of recolonizations, 1997 and 2006 combined ($R^2 = 0.72$, $P = 0.03$, power 0.58), revealing a negative relationship. That is, as isolation distance increased, the number of recolonizations decreased. ISOLATION did not explain a significant proportion of the variation in number of extirpations ($R^2 = 0.42$, $P = 0.16$), but again the test's power was low (0.27), so the results should be interpreted with caution.

DISCUSSION

Both Soulé et al. (1988) and Crooks et al. (2001) found the number of bird species in fragments to be positively related to fragment area and negatively related to fragment age. In our study, we confirmed that the number of species in a fragment is positively related to its area. We did not find a significant effect of fragment age on the number of bird species; however, we did find a significant decrease in the number of species over the three studies combined (from 1985–87 to 2006). The lack of a direct relationship of species number with fragment age may be partially explained by our limited sample size, as we surveyed only 16% and 18% of the fragments studied by Soulé et al. (1988) and Crooks et al. (2001), respectively. The low power of the regression of species number against fragment age suggests that these negative results should be interpreted with caution. A larger sample size could provide more statistical power for this test and clarify the relationship between the number of species and fragment age. Also, if species richness is negatively related to fragment age in an exponential manner, then the effects of fragment age will become less pronounced over time. We selected fragments to include those with five or more of the target species remaining in 1985–87 study and to cover a range of sizes.

Unfortunately, this resulted in the two largest fragments also being the two oldest. As a result, some patterns may have been obscured because of a lack of variation in the age/size combinations represented. The significant decline in the number of species over the course of the three studies indicates a decreasing ability of these fragments to support scrub-specialist birds over time. Soulé et al. (1988) did not have the ability to compare species gains or losses over time and based their conclusions on the assumption that all species were present at the time of fragmentation. Subsequently, Crooks et al. (2001) confirmed their findings and showed a higher proportion of extirpations relative to recolonizations over the intervening 11 years. When we examined six of the fragments, the number of bird species still showed a significant decline relative to the original 1985–87 study, confirming the observations of Crooks et al. (2001).

We found no significant change in the number of target species from 1997 to 2006, although the change from 1985–87 to 2006 was significant. In addition to calling for study of a larger sample of fragments to elucidate changes in the system, this observation supports the need for long-term habitat-fragmentation studies, especially where sample size is limited.

Species whose persistence rate Crooks et al. (2001) found to be low were similar to those we identified, with the Cactus Wren and Greater Roadrunner absent from all six fragments in both studies. This was expected, as the Cactus Wren has specific habitat requirements and depends exclusively on large stands of cactus for breeding. Crooks et al. (2001) estimated the minimum fragment area in which a species could persist with a 95% chance over the next 100 years, suggesting the Greater Roadrunner needed a minimum of 157 ha. Unitt (2004) estimated it may need at least 400 ha. The absence of the Greater Roadrunner was therefore expected, as the largest fragment we surveyed was only 34 ha.

Crooks et al. (2001) noted high persistence and a net gain in recolonizations among the fragments they studied for the Bewick's Wren, Spotted Towhee, and California Gnatcatcher. In 2006 we observed a similar pattern, with the Bewick's Wren and Spotted Towhee persisting at the highest rate; they were the only two species present in all six fragments. The California Gnatcatcher's persistence rate was also high, given that it was one of only three species to have recolonized a fragment between 1997 and 2006.

The only extirpation we observed was of the Wrentit, one of the smallest of the eight target species. However, the Wrentit was the third most frequent species, present in five of the six fragments. The fragment from which it had been extirpated, Mil Cumbres, was one of the three smallest fragments (6 ha) and was 29 years old. Only two fragments were older, and both of these were much larger (Alta La Jolla at 34 ha and Kate Sessions at 31 ha). The one fragment of a similar age (Solana Dr.) was larger by 2 ha. Because Mil Cumbres was the oldest small fragment, we expected that an extirpation would be more likely there.

The three species for which we found a recolonization were the California Quail, California Thrasher, and California Gnatcatcher. Recolonization by California Quail occurred in the largest fragment (Alta La Jolla, 34 ha), while recolonization by California Thrashers occurred in the least isolated fragment (91 m from suitable habitat). Crooks et al. (2001) found thrashers recolonizing the most isolated fragment they studied (2865 m), suggesting that this bird may be able to travel between fragments separated by large distances.

Crooks et al. (2001) found extirpations and recolonizations to be significantly related to a fragment's area. When we combined the extirpation we recorded with those recorded by Crooks et al. (2001), the pattern of more extirpations in smaller fragments remained. We were unable to detect a significant relationship between recolonization and fragment area; however, these negative results should be considered with caution as the power of statistical test was very low. A larger sample size could improve the statistical power of this test and reveal additional undetected patterns.

Our results show that extirpation from a fragment can be temporary, as we found three recolonizations among the six fragments we surveyed. We found a significant negative relationship between recolonization and isolation distance, however. This relationship suggests that recolonizations may be limited by the isolation of fragments and the ability of a species to reach distant fragments.

The eight species we studied are nonmigratory, and their dispersal is generally thought to be limited. Unitt (2004) assessed the dispersal capabilities of the Greater Roadrunner, California Quail, California Thrasher, Wrentit, and Bewick's Wren as minimal. The Cactus Wren is thought to disperse rarely up to 3 km, the Spotted Towhee has been shown to disperse up to 9.7 km (averaging 6.4 km), and the California Gnatcatcher typically disperses less than 3 km (Unitt 2004). Poor dispersal may explain the decline of these species in fragments over time.

Although these species are thought to be poor dispersers in general, a California Gnatcatcher has moved approximately 20 km, albeit mainly over natural habitats, with the exception of a freeway (K. Fischer pers. comm.). Further studies of other scrub-specialist species could reveal greater dispersal capabilities than previously recorded. The general decline in species diversity in these fragments over time, however, as well as the negative relationship between recolonization rates and isolation distance, suggests the dispersal capabilities of scrub-specialist birds are, on average, not adequate to maintain their populations within an urban matrix.

Crooks et al. (2001) found larger body size to be related to a faster time to extirpation (i.e., low persistence), while Soulé et al. (1988) found larger body size to be related to better persistence. The two recolonizations we observed were by two of the three largest species (California Quail and California Thrasher, mean weights 184 g and 94 g, respectively; Crooks et al. 2001). In addition, the only extirpation we noted was of a small bird (Wrentit, mean weight 14 g). At the same time, one of the two species with the highest persistence (Spotted Towhee, 37 g) and one of the two birds with the lowest persistence (Cactus Wren, 40 g) were of intermediate size. It is likely that body size is only one factor combined with many life-history factors that make a species in this system more or less vulnerable to extirpation.

The amount of suitable habitat within the fragments can affect the presence of these bird species. Soulé et al. (1988) and Crooks et al. (2001) found that the cover of native vegetation was more important than area *per se*, and that this cover decreased with fragment age. Assessing changes in native vegetation cover was not within the scope of our study, but a thorough and accurate longitudinal vegetation analysis that considers the percent cover of both native and nonnative plants would be useful in elucidating the observed patterns of birds' occurrence and persistence.

The area, age, and isolation of the fragments combined to influence the observed pattern of overall decline in the number of scrub-specialist species. It is interesting that no major fluctuations of species occurred in the fragments over the past nine years. There was a fluctuation of only zero to one species in each fragment. Crooks et al. (2001) found two to three extirpations in these same fragments. At the time of the Soulé et al. (1988) study, extirpations ranged from one to three under the assumption that all species were present at the time of fragmentation. The low number of fluctuations we observed may be a reflection of the lower number of species available to be extirpated or they could be due to an initial faunal compression that has now reached a balance. Variation in the sensitivity of each species to fragmentation is likely based on multiple factors, including body size, dispersal capability, dependence on specific microhabitats for breeding, and varying resource requirements.

ACKNOWLEDGMENTS

We thank David Woodruff, Doug Bolger, and Michael Soulé for comments on drafts, as well as Lisa Nordstrom and Kristen Hart for statistical guidance. We thank Cindy Dunn and Erin Reddy for field assistance and Teal Zeisler for help making the figures.

LITERATURE CITED

Adler, G. H., and Levins, R. 1994. The island syndrome in rodent populations. Q. Rev. Biol. 69:473–490.

Crooks, K. R., Suarez, A. V., Bolger, D. T., and Soulé, M. E. 2001. Extinction and recolonization of birds on habitat islands. Conserv. Biol. 15:159–172.

Crooks, K. R., Suarez, A. V., and Bolger, D. T. 2004. Avian assemblages along a gradient of urbanization in a highly fragmented landscape. Biol. Conserv. 115:451–462.

Debinski, D. M., and Holt, R. D. 2000. Review: A survey and overview of habitat fragmentation experiments. Conserv. Biol. 14:342–355.

Donovan, T. M., and Lamberson, R. H. 2001. Area-sensitive distributions counteract negative effect of habitat fragmentation on breeding birds. Ecology 82:1170–1179.

Ewers, R. M., and Didham, R. K. 2006. Confounding factors in the detection of species responses to habitat fragmentation. Biol. Rev. 81:117–142.

Hagan, J. M., Vander Haegen, W. M., and McKinley, P. S. 1996. The early development of forest fragmentation effects on birds. Conserv. Biol. 10:188–202.

Harris, L.D. 1984. The Fragmented Forest: Island Biogeographic Theory and the Preservation of Biotic Diversity. Univ. of Chicago Press, Chicago.

Paton, P. W. C. 1994. The effect of edge on avian nest success: How strong is the evidence? Conserv. Biol. 8:17–26.

Soulé, M. E., Bolger, D. T., Alberts, A. C., Sauvajot, R., Wright, J., Sorice, M., and Hill, S. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. Conserv. Biol. 2:75–92.

Soulé, M. E., Alberts, A. C., and Bolger, D. T. 1992. The effects of habitat fragmentation on chaparral plants and vertebrates. Oikos 63:39–47.

Temple, S. A., and Cary, J. R. 1988. Modeling dynamics of habitat-interior bird populations in fragmented landscapes. Conserv. Biol. 2:340–347.

Templeton, A. R., Shaw, K., Routman, E., and Davis, S. K. 1990. The genetic consequences of habitat fragmentation. Ann. Missouri Bot. Garden 77:13–27.

Unitt, P. 2004. San Diego County bird atlas. San Diego Soc. Nat. Hist. Proc. 39.

Wilcox, B. A., and Murphy, D. D. 1985. Conservation strategy: The effects of fragmentation on extinction. Am. Nat. 125:879–887.

Accepted 24 March 2008

Wrentit

Sketch by George C. West

NOTES

FIRST DOCUMENTED BREEDING COLONY OF CASPIAN TERNS ON THE COPPER RIVER DELTA, ALASKA

TYEE G. LOHSE, TEAL K. LOHSE, and TRAE W. LOHSE, P. O. Box 14, Cordova, Alaska 99574

AARON LANG, P. O. Box 1542, Cordova, Alaska 99574; aaron_lang8@yahoo.com

Since 1980, along the Pacific coast of North America, the population of the Caspian Tern (*Hydroprogne caspia*) has more than doubled in size (Suryan et al. 2004), and the species' range has been steadily expanding north (Gill and Mewaldt 1983). The Caspian Tern first reached southeast Alaska in 1981 (Gibson and Kessel 1992), and two years later it was recorded in south-central Alaska with the sighting of two birds in eastern Prince William Sound (Isleib and Kessel 1989). Caspian Terns have long been suspected of breeding in the Prince William Sound/Copper River delta area, but despite annual observations of the species, including increasing numbers of hatching-year birds and systematic surveys by boat and small plane (Bishop 1999, 2002), nesting in the region has previously gone unconfirmed. Here we report the first nesting of Caspian Terns in south-central Alaska on the Copper River delta and the species' largest nesting colony in Alaska.

The Caspian Tern was first observed in the Prince William Sound/Copper River delta region in the summer and fall of 1983, including a sighting of two birds in Orca Inlet (adjacent to the western edge of the Copper River delta) on 14 August 1983. On 12 August 1988, a flock of about 20 Caspian Terns in Orca Inlet included two hatching-year birds—the first such juveniles recorded in the region. Caspian Terns have since been recorded annually around Prince William Sound and the Copper River delta, including frequent and increasing accounts of hatching-year birds in August and September (Bishop 1999, 2002; pers. obs.).

In early June 2005, while fishing commercially offshore of Kokinhenik Bar, a barrier island off the Copper River delta, Tyee and Teal Lohse observed a large number of Caspian Terns flying overhead. After going to shore and walking a short distance from the beach we discovered a large nesting colony of Caspian Terns and estimated that it contained at least 100 pairs, but a precise count was not done. During that visit we did not have a camera to document the discovery, and further visits to the site were not possible during the summer of 2005. The following spring, on 15 May 2006, Tyee Lohse and Lang returned to Kokinhenik Bar and counted approximately 30 Caspian Terns loafing in pairs on the beach near the colony; however, engine problems prevented further investigation at that time.

On 4 June 2006, Tyee and Trae Lohse returned to the tern colony discovered in June 2005 and again found Caspian Terns nesting there. The colony is located on the east side of Kokinhenik Bar (60° 14′ N, 145° 10′ W; Figure 1), approximately 100 m west of the Kokinhenik navigational light and about 500 m from the outside beach. When we approached within 70 m, the adults flew from their nests and circled high overhead. They were very vocal, giving rasping cries, and unlike Arctic Terns (*Sterna paradisaea*) they did not dive on us as we approached the colony. We counted 118 nests scattered in a roughly circular area approximately 20 m across. The nests were small depressions in the sand with no nesting material added, and they were tightly arranged, most spaced less than 1 m apart. Each nest contained one to three eggs, most commonly two. The eggs varied in color from dark olive with heavy brown spotting to very pale, nearly white, with light spotting. There appeared to be possible nest depressions that did not contain eggs. The nesting area is flat, sandy, and sparsely

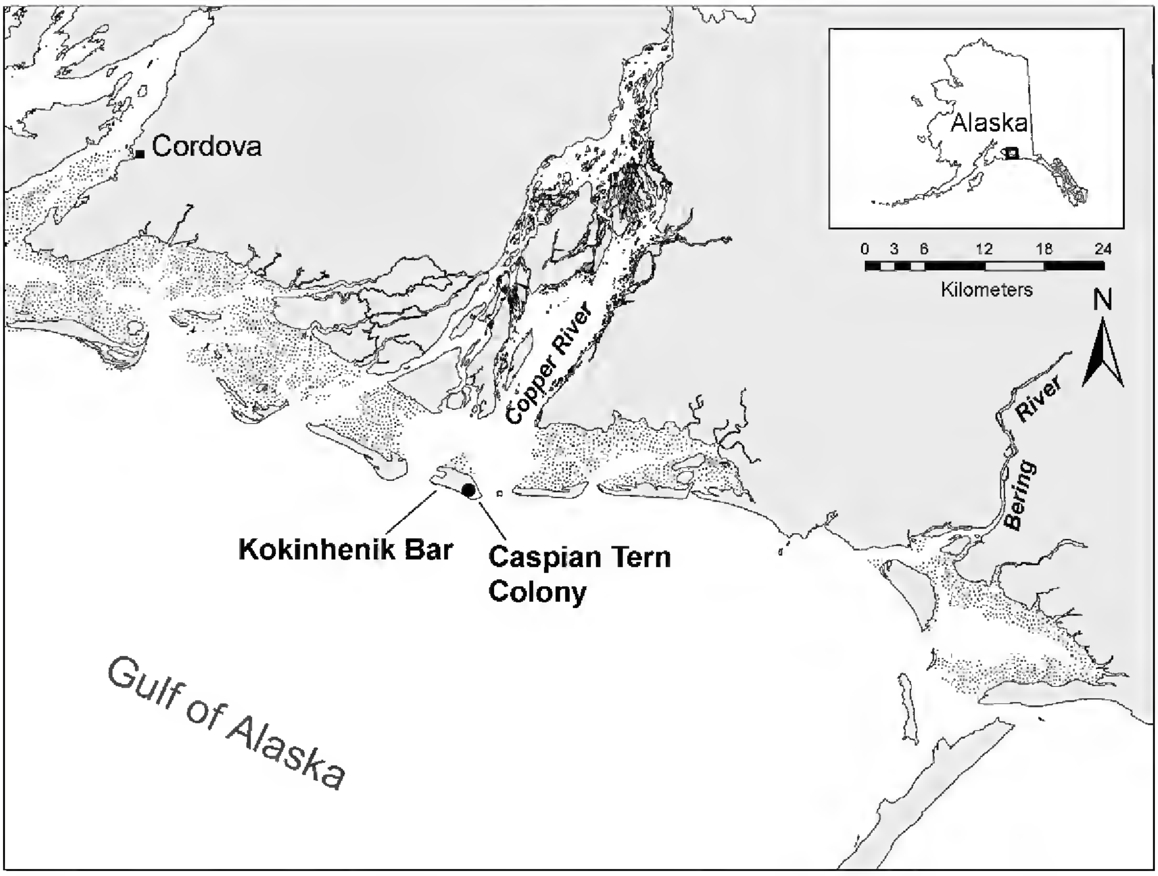


Figure 1. Copper River Delta showing the location of the Caspian Tern colony on Kokinhenik Bar. Dotted shading near shores indicates tidal mudflats.

vegetated. Kokinhenik Bar measures approximately 4 km by 2.5 km at high tide, and the highest point on the island is <10 m above mean high water. The entire island is sparsely vegetated and covered throughout with large pieces of driftwood. Glaucous-winged Gulls (*Larus glaucescens*) also nest commonly on the island; however, their nests were mainly on the dunes closer to the beach—none were located within the tern colony. Bishop (2002) surveyed Kokinhenik Bar in June 2002 and found no evidence of Caspian Terns on the island, reporting only Glaucous-winged Gulls nesting there. This difference suggests that Caspian Terns have colonized Kokinhenik Bar quite recently. During this visit we photographed the colony (Figure 2) and took photos and video of the circling adults.

To date there have been five other known nestings of Caspian Terns in Alaska. Alaska's first nests were found in 1996 on Neragon Island, north of Cape Romanzoff, in the Bering Sea, where three nests were found; three nests were again found on Neragon Island the following summer (McCaffery et al. 1997). In 2005, nesting was observed on the central Yukon–Kuskokwim Delta near the mouth of the Kashunuk River, approximately 96 km south of Neragon Island (see R. E. Gill, this issue). In southeast Alaska nesting has been observed in two locations: at Taku Inlet, near Juneau, where in 2000 at least four nests were found (Johnson 2003), and in Icy Bay, approximately 200 km east along the coast from Kokinhenik Bar, where 25 pairs of Caspian Terns were found nesting in 2006 (M. Kissling pers. comm.).

The comments and suggestions of Daniel D. Gibson, Robert E. Gill, Jr., and Mary Anne Bishop greatly improved this note. We thank Milo Burcham for assistance creating the map. Lynn Denlinger, Michelle Kissling (U.S. Fish and Wildlife Service), and R. E. Gill, Jr. (U.S. Geological Survey), provided information on other nesting Caspian Terns in Alaska. Many thanks to the crew of the fishing vessel *Alaska Pacific* for towing us back to town on 15 May 2006.

Figure 2. Caspian Tern colony on Kokinhenik Bar, Copper River Delta, Alaska, 4 June 2006, showing at least 34 of the 118 nests.

Photo by Trae W. Lohse

LITERATURE CITED

Bishop, M. A. 1999. Aerial survey for Caspian Terns, Copper River Delta, Alaska. Report to U.S. Dept. Energy, Bonneville Administration (order from P. O. Box 2396, Cordova, AK 99574).

Bishop, M. A. 2002. Aerial survey for terns, Copper River Delta, Alaska. Report to U.S. Fish Wildlife Service, Prince William Sound Science Center, P. O. Box 705, Cordova, AK 99574.

Gill, R. E., Jr., and Mewaldt, L. R. 1983. Pacific coast Caspian Terns: Dynamics of an expanding population. Auk 100:369–381.

Gibson, D. D., and Kessel, B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467.

Isleib, M. E., and Kessel, B. 1989. Birds of the north gulf coast–Prince William Sound region, Alaska. Addendum in 1989 reprint of 1973 Biol. Papers Univ. Alaska 14.

Johnson, J. A. 2003. Breeding bird communities of major mainland rivers of southeastern Alaska. M.S. thesis, Utah State University, Logan.

McCaffery, B. J., Harwood, C. M., and Morgart, J. R. 1997. First nests of Caspian Terns (*Sterna caspia*) for Alaska and the Bering Sea. Pacific Seabirds 24:71–73.

Suryan, R. M., Craig, D. P., Roby, D. D., Chelgren, N. D., Collis, K., Shuford, W. D., and Lyons, D. E. 2004. Redistribution and growth of the Caspian Tern population in the Pacific coast region of North America, 1981–2000. Condor 106:777–790.

Accepted 6 March 2008

CASPIAN TERNS NESTING IN ALASKA: PROPHECY, SERENDIPITY, AND IMPLICATIONS FOR REGIONAL CLIMATE-RELATED CHANGE

ROBERT E. GILL, JR., U.S. Geological Survey, Alaska Science Center, 4210 University Dr., Anchorage, Alaska 99508; robert_gill@usgs.gov

In 1982, Richard Mewaldt and I suggested that the Caspian Tern (*Hydroprogne caspia*), with its current rate of population expansion along the Pacific Coast, could soon be found nesting in Alaska (Gill and Mewaldt 1983). And indeed it was, but not until 1996 (McCaffery et al. 1997), and then in a region of the state far removed from the Copper River delta, where numerous observations had suggested actual nesting may have occurred since the early 1980s (Gibson and Kessel 1992, Lohse et al., this issue)—hence the prophecy part of this story.

On 30 July 2005, while studying shorebirds in western Alaska, I heard the unmistakable—and for me unforgettable—alarm call of a Caspian Tern. I was on a small (3 ha), low-relief (<1 m above mean high tide) barrier island in outer Angyoyaravak Bay (61.272° N, 165.811° W), ~4 km offshore from the coast of the central Yukon–Kuskokwim delta and ~60 km south of Cape Romanzof, near where McCaffery et al. (1997) had observed the terns nesting on a similar island in 1996. Upon searching where I was standing when I first heard the tern, I found a nest with two cold eggs and a dead adult with two newly hatched but dead chicks beneath it (Figure 1). Colleagues accompanying me then found three other cold eggs and a nest with three warm eggs, all within a 3-m radius of the dead adult. The most adults seen in the air at any time that day was five. I next visited the island on 4 August when I found a three-week-old chick and the same three-egg clutch being incubated, and on 11 August when I saw a single volant juvenile being tended by two alarm-calling adults. Despite over 30 field seasons in south-central and western Alaska, I have seen Caspian Terns in the state on only one other occasion, that involving an adult flying over another very unusual place—my home in Anchorage on 6 July 1991 (Tobish and Isleib 1991). This observation from the Yukon–Kuskokwim Delta represents one of five confirmed nesting sites in Alaska (see Lohse et al., this issue). Although we weren't the first to fulfill the prophecy, being involved in documenting the third nesting site for the state certainly can be described as serendipitous.

The Caspian Tern is clearly now an established nesting species in south-central Alaska (Lohse et al. this issue), but observations suggest the northern and western extent of the population's breeding range in Alaska may be limited by habitat and stochastic events. Cuthbert and Wires (1999) concluded that the primary factor limiting Caspian Tern populations appears to be the availability of high-quality nest sites protected from storms and free of mammalian and avian predators. Alaska has extensive systems of barrier islands suitable for nesting by Caspian Terns (USFWS 2006), but most support nesting colonies of large gulls (i.e., the Glaucous, *Larus hyperboreus*, or Glaucous-winged, *L. glaucescens*)—known predators of tern eggs and chicks—or are accessible to foxes (*Vulpes vulpes*, *Alopex lagopus*), more serious predators of ground-nesting birds. Among all of the barrier islands along Alaska's west coast, those off the Yukon–Kuskokwim delta appear unique in that they are far enough offshore that foxes rarely reach them when the water is open. Nevertheless, these islands have such low relief that storm-driven tides occasionally inundate them. The former factor would promote nesting by many species of birds, including terns, but the latter introduces a major element of unpredictability in terms of nesting effort and reproductive success.

For instance, during my initial visit in July 2005 there was evidence that the island had recently been flooded with enough water to displace eggs from scrapes. I suspect the same event killed the two day-old chicks found tucked into the dead adult's brood patches. Both the chicks and the adult appear to have died from hypothermia. No Caspian Terns were observed at this island in summer 2006, when there was evidence that it had been washed over by waves in early July and early August. In 2007, I did not visit the island until 18 August, when I neither saw nor heard terns, but did note that recent storm-driven tides had washed completely over the island, clearing it of all drift logs and what sparse vegetation (the grass *Leymus mollis*) had managed to become established there. During that visit I also found several dead downy Common Eiders (*Somateria mollissima*) that I assume had been hatched on the island but had died from hypothermia, probably when the island was flooded during a recent storm. Later that summer, however, biologists (D. Ruthrauff pers. comm.) did observe adult Caspian Terns in the area (an adult with a volant juvenile on 4 and 6 September), but it is not known if they were associated with earlier nesting attempts on the island or were from a nesting site elsewhere (e.g., just north, McCaffery et al. 1997).

Though based largely on anecdotal evidence, the ephemeral nature of the barrier islands and hence tern nesting habitat off the Yukon–Kuskokwim delta is apparent. Whether or not this has always been the case is unknown, but what has been documented recently is an accelerated rate of coastal erosion—a presumed effect of climate change—in western and northern Alaska (Fienup-Riordan 1999, Mars and Houseknecht 2007, Jones 2008). Several recent global climate-change models are predicting an increase in both the frequency and intensity of storms in the North Pacific and Bering Sea (e.g., Salathé 2006, Pinto et al. 2007, Raible 2007, Löptien

Figure 1. Biologists inspecting a dead adult Caspian Tern that attempted to nest on a low-relief barrier island off the coast of the central Yukon–Kuskokwim River Delta, Alaska, 30 July 2005. One of two small downy chicks found dead under the adult rests next to the adult's head and two eggs from another scrape appear in the foreground near the adult.

Photo by Robert E. Gill, Jr.

et al. 2008), while other studies have documented an increase over the last 50 years in the frequency of flooding of low-lying coastal areas in western Alaska (Mason et al. 1996, Jorgenson and Ely 2001, Hinzman et al. 2005). As long as the population of Caspian Terns on the Pacific coast of North America continues to grow there will be pioneering attempts to nest in marginal habitat like that I describe here, but it seems unlikely that these terns can continue to expand their range in Alaska, or maintain what they have established, under current and projected changes in environmental conditions.

I thank Jesse Conklin, David Melville, Adrian Riegen, Lee Tibbitts, Dick Veitch, and Nils Warnock for sharing the experience, especially the trips to the island in often too-small boats. Dan Ruthrauff, Colleen Handel, Vern Byrd, and Dan Gibson kindly reviewed an earlier version of this paper.

LITERATURE CITED

Cuthbert, F. J., and Wires, L. R. 1999. Caspian Tern (*Sterna caspia*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 403. Birds N. Am., Philadelphia.

Hinzman, L. D., Bettez, N. D., Bolton, W. R., Chapin, F. S., Dyurgerov, M. B., Fastie, C. L., Griffith, B., Hollister, R. D., Hope, A., Huntington, H. P., Jensen, A. M., Jia, G. J., Jorgenson, T., Kane, D. L., Klein, D. R., Kofinas, G., Lynch, A. H., Lloyd, A. H., McGuire, A. D., Nelson, F. E., Oechel, W. C., Osterkamp, T. E., Racine, C. H., Romanovsky, V. E., Stone, R. S., Stow, D. A., Sturm, M., Tweedie, C. E., Vourlitis, G. L., Walker, M. D., Walker, D. A., Webber, P. J., Welker, J. M., Winker, K. S., and Yoshikawa, K. 2005. Evidence and implications of recent climate change in northern Alaska and other artctic regions. Climatic Change 72:251–298.

Fienup-Riordan, A. 1999. Yaqulget qaillun pilartat (What the birds do): Yup'ik Eskimo understanding of geese and those who study them. Arctic 52:1–22.

Gibson, D. D., and Kessel, B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467.

Gill, R. E., Jr., and Mewaldt, L. R. 1983. Pacific coast Caspian Terns: Dynamics of an expanding population. Auk 100:369–381.

Jones, B. J., Hinkel, K. M., Arp, C. D., and Eisner, W. R. 2008. Modern erosion rates and loss of coastal featues and sites, Beaufort Sea coastline, Alaska. Arctic 61: in press.

Jorgenson, T., and Ely, C. 2001. Topography and flooding of coastal ecosystems on the Yukon–Kuskokwim delta, Alaska: Implications for sea-level rise. J. Coastal Research 17:124–136.

Lohse, Tyee, Lohse, Teal, Lohse, Trae, and Lang, A. 2008. First documented breeding colony of Caspian Terns on the Copper River Delta, Alaska. W. Birds 39:94–96.

Löptien, U., Zolina, O., Gulev, S., Latif, M,, and Soloviov, V. 2008. Cyclone life cycle characteristics over the Northern Hemisphere in coupled GCMs. Climate Dynamics (online edition): DOI 10.1007/s00382-007-0355-5 (http://www.springerlink.com/content/100405/?Content+Status=Accepted&sort=p_OnlineDate&sortorder=desc&v=condensed&o=30).

Mars, J. C., and Houseknecht, D. W. 2007. Quantitative remote sensing study indicates doubling of coastal erosion rate in past 50 yr along a segment of the Arctic coast of Alaska. Geology 35:583–586.

Mason, O. K., Salmon, D. K., and Ludwig, S. L. 1996. The periodicity of storm surges in the Bering Sea from 1898 to 1993, based on newspaper accounts. Climate Change 34:109–123.

McCaffery, B. J., Harwood, C. M., and Morgart, J. R. 1997. First nests of Caspian Terns (*Sterna caspia*) for Alaska and the Bering Sea. Pacific Seabirds 24:71–73.

Pinto, J. G., Ulbrich, U., Leckebusch, G. C., Spangehl, T., Reyers, M., and Zacharias, S. 2007. Changes in storm track and cyclone activity in three SRES ensemble experiments with the ECHAM5/MPI-0M1 GCM. Climate Dynamics 29:195–210.

Raible, C. C. 2007. On the relation between extremes of midlatitude cyclones and the atmospheric circulation using ERA40. DOI 10.1029/2006GL029084. Geophysical Research Letters 34:L07703.

Salathé, E. P., Jr. 2006. Influences of a shift in North Pacific storm tracks on western North American precipitation under global warming. DOI 10.1029/2006GL026882. Geophysical Research Letters 33:L19820.

Tobish, T. G., Jr., and Isleib, M. E. 1991. Alaska Region. Am. Birds 45:1149–1151.

U.S. Fish and Wildlife Service. 2006. Beringian Seabird Colony Catalog—computer database and colony status record archives. U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Road, Anchorage, Alaska 99503.

Accepted 6 March 2008

BREEDING BEHAVIOR AND DISPERSAL OF RADIO-MARKED CALIFORNIA CLAPPER RAILS

MICHAEL L. CASAZZA and CORY T. OVERTON, U.S. Geological Survey, Western Ecological Research Center, Dixon Field Station, 6924 Tremont Rd., Dixon, California 95620; mike_casazza@usgs.gov

JOHN Y. TAKEKAWA, U.S. Geological Survey, Western Ecological Research Center, San Francisco Bay Estuary Field Station, 505 Azuar Drive, Vallejo, California 94592

TOBIAS ROHMER, University of California, Ecology Graduate Group, One Shields Ave., Davis, California 95616

KENNETH NAVARRE, Water Quality Control Plant, 195 Belle Air Road, South San Francisco, California 94080

The San Francisco Bay estuary is highly urbanized, and as a result roughly 80% of its historic tidal marshes have been lost (Goals Project 1999). The California Clapper Rail (*Rallus longirostris obsoletus*), now restricted to the San Francisco Bay estuary (Gill 1979), is listed as endangered by both the U. S. Fish and Wildlife Service (1973) and California Department of Fish Game (Leach et al. 1976). Secretive birds found in the dense vegetation of tidal salt marshes, California Clapper Rails forage on crustaceans and other salt-marsh invertebrates (Eddleman and Conway 1998). California Clapper Rails usually lay eight eggs and often renest after failed nesting attempts (Eddleman and Conway 1998). The sexes are similar in plumage, but males tend to be larger. Recent estimates of the population range between 1200 and 1500 individuals (Harvey 1988, Garcia 1995, Albertson and Evens 2000). Because California Clapper Rails are difficult to observe little is known about their dispersal and breeding behavior. Radio telemetry on individual birds, however, provides a valuable tool for investigating these and other aspects of California Clapper Rail ecology.

In January 2007, we initiated a radio-telemetry study to track California Clapper Rails. The effects of radio transmitters on Clapper Rails have not been well documented, although Eddleman and Conway (1998) suggested that radio-marking reduced the ability of Yuma Clapper Rails (*R. l. yumanensis*) to fly and avoid predation. California Clapper Rails have been recorded at scattered locations away from their normal habitat (Grinnell and Miller 1944), but there are few records of point-to-point dispersal, critical for determining metapopulations and conservation of the subspecies (Foin et al. 1997). In this paper, we report the first published observation of copulation and long-distance dispersal of radio-marked California Clapper Rails.

We captured nine California Clapper Rails from January to February 2007 at the confluence of Colma and San Bruno creeks (i.e., Colma Marsh), north of San Francisco International Airport in San Mateo County, California. The birds were sighted from boats or from land and caught with a dipnet or by hand. Each bird was aged, sexed, and banded. Feathers and blood were taken for diet and contaminant analyses. We marked the rails with a 10-g transmitter with a lifespan of 14 months (model A1120, Advanced Telemetry Systems, Isanti, MN), affixed to their back with a Teflon harness as described by Albertson (1995). We released them within an hour near where we captured them .

Clapper Rails vocalize frequently with various distinctive calls (Eddleman and Conway 1998). Zembal and Massey (1985) described the use of the *kek-burr* call by the female Light-footed Clapper Rail (*R. l. levipes*): *kek-burr* is the primary attractant call used by both mated and unmated females to either find ("rally") their mate or attract males in general (Zembal and Massey 1985). Initiation of the vocalization by a mated female appears to be triggered by a period of the male's absence. After the female calls, the male responds, often returning quickly to the location of the female (Zembal and Massey 1985). We observed similar behavior by California Clapper Rails during the peak of their breeding season.

Beginning at 10:07 on 5 April 2007, along Colma Creek, we photographed a radio-marked female California Clapper Rail copulating during an observation lasting 23 minutes. We observed the event from an adjacent parking lot on the opposite channel bank approximately 30–40 m from the radio-marked bird. We initially observed her drinking and bathing at the edge of the creek. She then moved to an exposed patch of matted smooth cordgrass and spent the next 22 minutes alternating between preening and resting. At 10:29, the female stood erect with her head and neck extended vertically and began to call (Figure1A). Her call consisted of 3 *kek-burr* vocalizations with the first call lasting 4 seconds and the two subsequent calls lasting 2 seconds spaced by 1-second intervals. Three nearby rails responded with multiple *kek* vocalizations, otherwise known as the male's primary attractant call (Eddleman and Conway 1998). Immediately after the response calls, we observed a male California Clapper Rail moving quickly toward the radio-marked female from 40–45 m away. He moved through rather than around vegetation and other obstacles during his hurried approach. When the male arrived, the female leaned forward while extending her head and neck toward the ground. Copulation commenced almost immediately with minimal display or greeting (Figure 1B and C). Copulation lasted 10–12 seconds, and the female appeared to terminate the activity by standing up to cause the male to disengage (Figure 1D). The male then moved to the creek, drank from the channel, and moved back toward his original position.

Our radio-telemetry study documented the greatest known dispersal distance of a California Clapper Rail. Foin et al. (1997) recognized the importance of dispersal data for rail conservation and marsh-restoration planning and the potential usefulness of such data in modeling the rail's population dynamics on a geographic information system. In the only previous radio-telemetry study of California Clapper Rails (Albertson 1995), the longest movement documented was of a female rail that moved 2.1 km over a span of 3 days during the early breeding season. We observed a much greater distance dispersal of a radio-marked male captured on 29 January 2007. This bird remained at Colma Marsh until early April 2007, when it disappeared between 21:30 on 2 April and 07:00 on 3 April. For the next month, we were unable to locate the bird in South San Francisco Bay during our regular searches from the ground. It was later detected by radio telemetry during an aerial survey on 15 May 2007 in a tidal salt marsh near John McInnis County Park on San Pablo Bay in Marin County (Figure 2). We confirmed the presence of the bird by radio detection and visual observation during reconnaissance from the ground. This male traveled a distance of 44.8 km. If this distance is averaged over the 43 days between 3 April and 15 May, its average daily movement was >1 km per day. A movement of >20 km in a single flight, however, is more likely, as there are no sizable marshes (>4 ha) likely to serve as a stopover location between the southern edge of San Francisco and Sausalito to the north. Though 44.8 km is the farthest documented dispersal of a California Clapper Rail, on North America's east coast Clapper Rails from the northern end of the breeding range are suspected of migrating as far as 120–160 km per day (Adams and Quay 1958), and we suspect that this male may have moved from Colma Marsh to McInnis County Park in one flight or with only a few stopovers.

Our results suggest that radio telemetry may be a key tool for investigating the ecology and behavior of California Clapper Rails. Although marking birds with transmitters may cause behavioral effects (Eddleman and Conway 1998, Ackerman et al. 2004), the activities we observed could not be documented otherwise. Our radio telemetry did not reveal any negative effects of radio-marking on dispersal and breeding behavior and provided unique and critical insights for the conservation of a secretive species. Expanding studies to determine movements within and among remnant fragments of

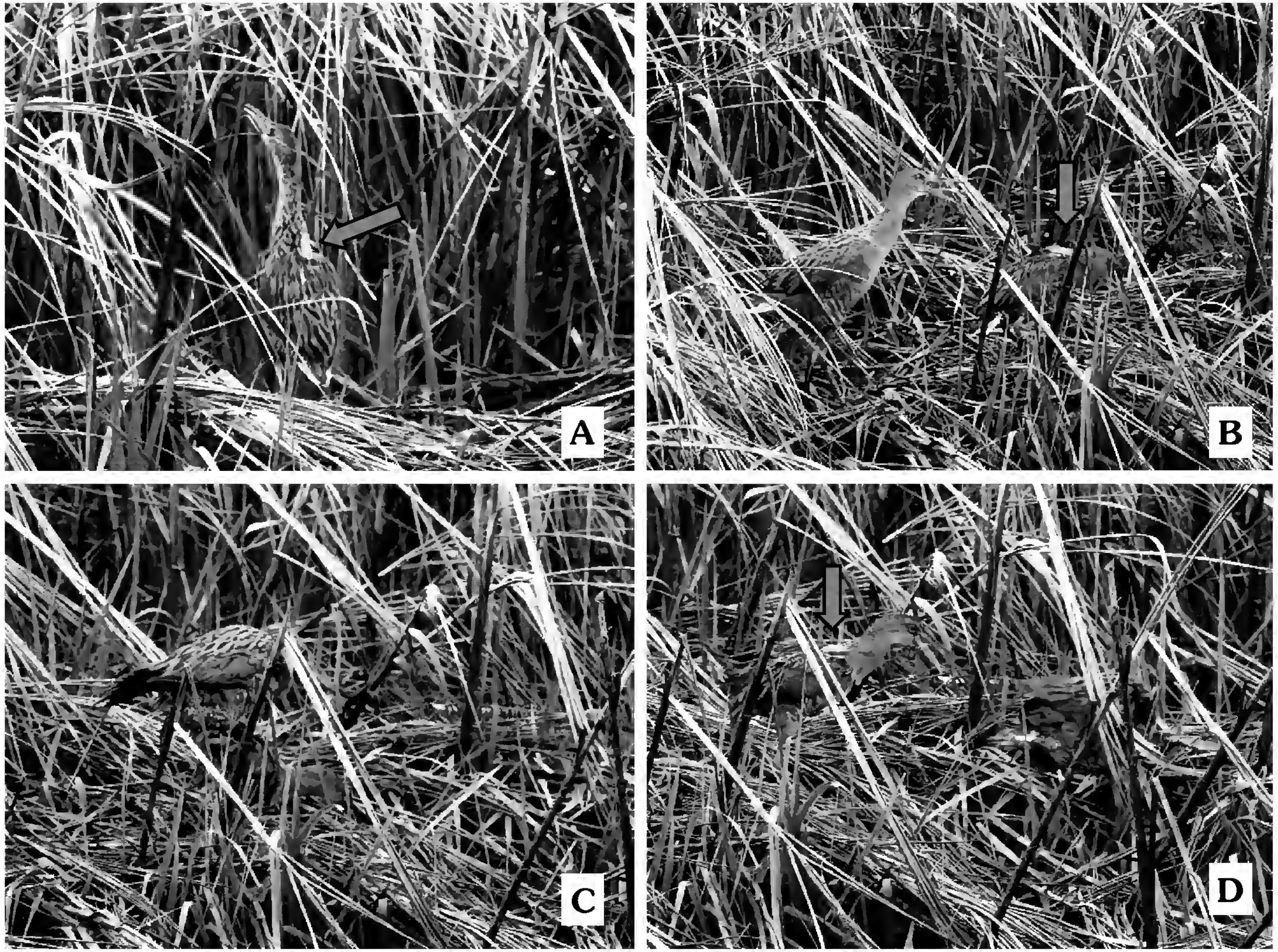


Figure 1. Vocalization and mating sequence of a radio-marked female California Clapper Rail. Red arrow indicates placement of radio transmitter. (A) Radio-marked female rail calling from an exposed patch of matted smooth cordgrass. (B) Posturing of the female rail upon approach by the male (copulation commenced almost immediately). (C) Copulation. (D) The female terminates the copulation by standing erect, causing the male to disengage.

Photos by Ken Navarre

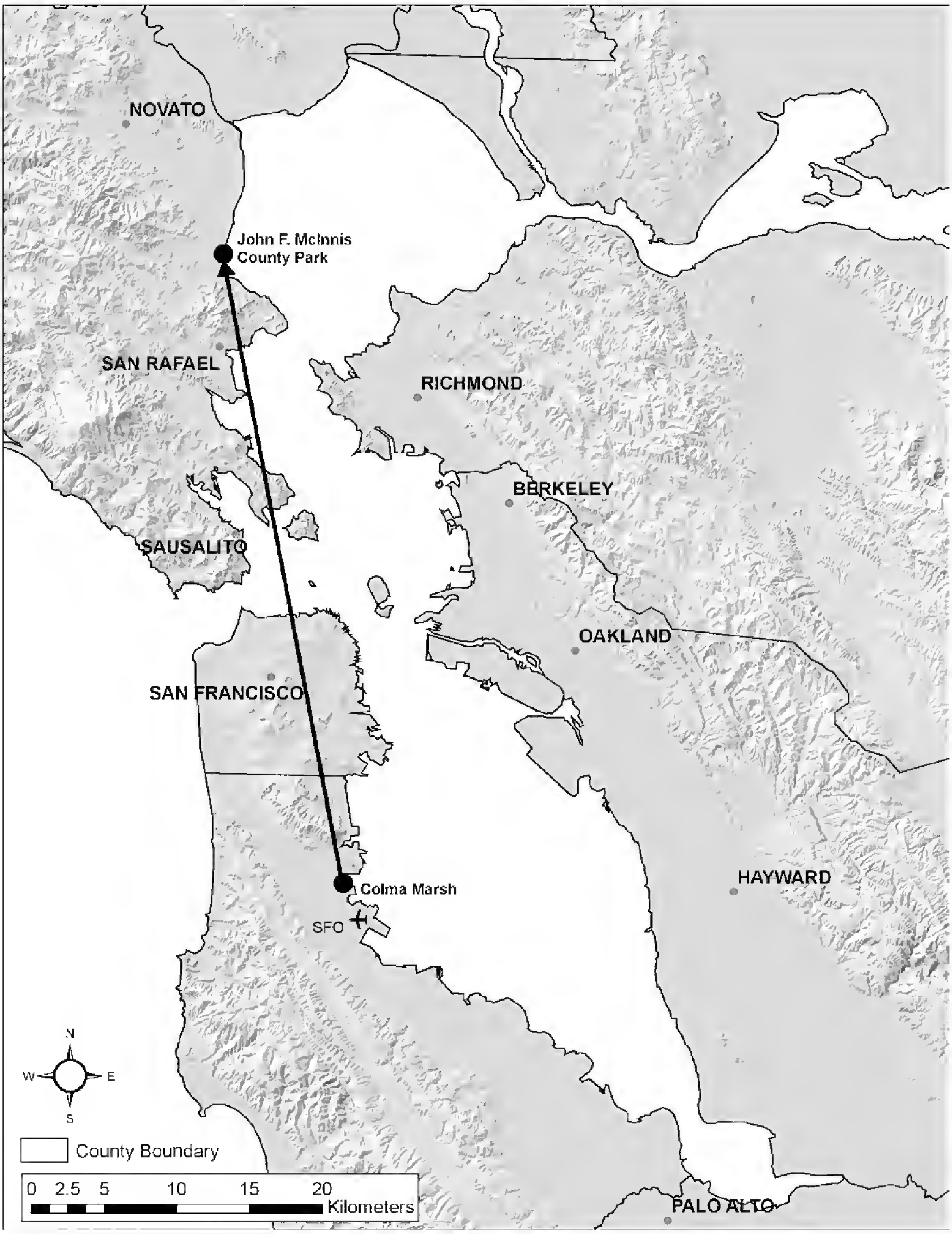


Figure 2. Breeding-season dispersal (44.8 km) of a male radio-marked California Clapper Rail from Colma Creek in South Bay (San Mateo County) to McInnis County Park in San Pablo Bay (Marin County), representing the longest documented movement of a Clapper Rail on the west coast of North America.

tidal marshes in San Francisco Bay will be critical to ensuring the California Clapper Rail's survival through identification and protection of its major metapopulations.

This study was funded by the U.S. Geological Survey Western Ecological Research Center (Steve Schwarzbach), Invasive Spartina Project (ISP, Peggy Olofson), California Coastal Conservancy (Maxine Spellman), and U. S. Fish and Wildlife Service (FWS)

San Francisco Bay Estuary Program (Richard Morat) with logistic support from FWS Ecological Services Endangered Species Recovery Program (Valary Bloom), Don Edwards San Francisco Bay National Wildlife Refuge (Joy Albertson), East Bay Regional Parks (Steven Bobzien), and University of California at Davis (Donald Strong). We thank Jennifer McBroom (ISP) and Ode Bernstein (U.S. Geological Survey), for assistance with capture. Telemetry searches were coordinated by Annie K. Schultz (U.S. Geological Survey). We thank Jules Evens (Avocet Research Associates), Mark Herzog (PRBO Conservation Science), Isa Woo, Tom Suchanek, and Melissa Farinha (U.S. Geological Survey) for helpful reviews of earlier drafts. California Clapper Rail studies were permitted under FWS endangered species permit TE-020548, California Department of Fish and Game memorandum of understanding and scientific collecting permits, U.S. Geological Survey Banding Laboratory permit 21142, and the U.S. Geological Survey Western Ecological Research Center Animal Care and Use Committee. Use of trade names does not imply government endorsement.

LITERATURE CITED

Ackerman, J. T., Adams, J., Takekawa, J. Y., Carter, H. R., Whitworth, D. L., Newman, S. H., Golightly, R. T., and Orthmeyer, D. L. 2004. Effects of radio transmitters on the reproductive performance of Cassin's Auklets. Wildlife Soc. Bull. 32: 1229–1241.

Adams, D. A., and Quay, T. L. 1958. Ecology of the Clapper Rail in southeastern North Carolina. J. Wildlife Mgmt. 22:149–156.

Albertson, J. D. 1995. Ecology of the California Clapper Rail in south San Francisco Bay. M. S. thesis, San Francisco State Univ.

Albertson, J. D., and Evens, J. G. 2000. California Clapper Rail, in Baylands ecosystem species and community profiles: Life histories and environmental requirements of key plants, fish and wildlife (P. R. Olofson, ed.), pp. 332–341. San Francisco Bay Regional Quality Control Board, 1515 Clay St., suite 1400, Oakland, CA 94612.

Eddleman, W. R., and Conway, C. J. 1998. Clapper Rail (*Rallus longirostris*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 340. Birds N. Am., Philadelphia.

Foin, T. C., Garcia, E. J., Gill, R. E., Culberson, S. D., and Collins, J. N. 1997. Recovery strategies for the California Clapper Rail (*Rallus longirostris obsoletus*) in the heavily-urbanized San Francisco estuarine ecosystem. Landscape and Urban Planning 38:229–243.

Garcia, E. J. 1995. Conservation of the California Clapper Rail: An analysis of survey methods and habitat use in Marin County, California. M. S. thesis, Univ. of Calif., Davis.

Gill, R. Jr. 1979. Status and distribution of the California Clapper Rail (*Rallus longirostris obsoletus*). Calif. Fish & Game 65:36–41.

Goals Project. 1999. Baylands ecosystem habitat goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, 75 Hawthorne St., San Francisco, CA 94105.

Grinnell, J., and Miller A. H. 1944. The distribution of the birds of California. Pac Coast Avifauna 27.

Harvey, T. E. 1988. Breeding biology of the the California Clapper Rail in South San Francisco Bay. Trans. W. Sect. Wildlife Soc. 24:98–104.

Leach, H. R., Nicola, S. J., and Brode, J. M. 1976. At the crossroads, a report on California's endangered and rare fish and wildlife. Proj. W-54-R-8, Job I-1, Calif. Dept. Fish & Game, 1416 9th Street, Sacramento, CA 95814.

U. S. Fish and Wildlife Service. 1973. United States list of endangered fauna. Office of Endangered Species and International Activities. U.S. Fish and Wildlife Service, 1849 C Street, NW Washington, DC 20240.

Zembal, R., and Massey, B. W. 1985. Function of a rail "mystery" call. Auk 102:179–180.

Accepted 26 March 2008

BOOK REVIEWS

Birds of the Aleutian Islands, Alaska, by Daniel D. Gibson and G. Vernon Byrd. 2007. Nuttall Ornithological Club and American Ornithologists' Union. 351 pages, 33 color photographs. Hardback, $40.00. ISBN 978-0-943610-73-3

This book is essentially a "status and distribution" account of a fascinating avifauna, with a notable departure from the standard in that the accounts are quantified on the basis of actual surveys, specimens, and archived or published photos. As the first in a *Series in Ornithology*, the format is that of a scientific paper appearing in a journal, opening with an abstract and introduction followed by sections titled "Study Area," "Methods," "Annotated List," "Discussion," and "Literature Cited." Lengthy appendices, a gazetteer of island names, and an index (to bird names only) conclude the volume.

Based on over 30 years of field work by the authors and many others as well as an amazing amount of specimen and literature research, the presented information is intended to "describe the avian diversity...and to provide a basis for evaluating future changes." This is indeed accomplished nearly flawlessly. There appears to be absolutely nothing wrong with the data this book presents, and it probably represents one of the most thoroughly researched compendia for any area in North America (and certainly is so for any area that covers as many degrees of longitude).

In general, however, I found this book hard to use, mostly because of its formatting, as there is little to quibble about the content. It all reads rather like one huge appendix, and perhaps that is how most users will treat it. Need to know the population of Cassin's Auklet? Curious how many records of the Oriental Cuckoo there are? You will find the answers here and have no reason to doubt their veracity. But you'll have to work a bit to get the information. For one, the font has unusually thin lines and is hard to read. Also, the running heads on each page spread are the same throughout and utterly unnecessary: authors on the left page and the title of the book on the facing page. They would make sense were this work simply one short paper among several in a periodical, but given that this is a volume on its own, a more useful heading would be the actual section, such as "Species Accounts" or "Appendix 1—Avian Specimens."

You'll learn that a little black triangle before a bird name means you're in the middle of the species accounts, but you won't know where you are in the book if you don't see one. Finally, separate bits of information within the species accounts are difficult to discern, as the same font size is used throughout and the many bits of data are separated by commas, while the records are separated only by semicolons. To figure the total number of records for, say, the Oriental Greenfinch, one must carefully sift through a constellation of commas to count the semicolons. Here a few graphs would have been wonderful, but there are none. A real delight to break up this monotony is the photos. While they mostly show the variety of habitats used by birds on the islands, a few endemic subspecies are illustrated, and the mass of Short-tailed Shearwaters has to be seen to be believed.

Perhaps this is just a personal preference, but I find it a chore to have to look up all "hypothetical" species in a separate appendix. It would have not distracted from the rigor of the specimen- and photo-based data presented in other species accounts to have these species listed in the main section. Some are historically interesting, while others were surely correctly identified (and it's only a matter of time before a photo or specimen is obtained for such species as the White-crowned Sparrow and Gray-cheeked Thrush).

The "Discussion" section is one of the best parts of the book, with subchapters on the origin of the species inhabiting the islands, analysis of migration, habitat use, and changes in habitat and populations. The use of tables is liberal. There is some discussion worth parsing out of the species accounts as well, such as how populations have reacted to introductions of the fox and subsequent eradication programs (see the Common Eider and Cackling Goose accounts, for example) and notes on taxonomy (see Green-winged Teal). Missing from the Cackling Goose account is information on how many separate island populations are now extinct. Throughout I noticed the frequent use of the past tense, which takes some adjustment but makes sense, considering that this is a description of an avifauna during a very limited interval in history. It works to give a sense of potential change and seems to encourage the idea of continuing studies to measure the birds and their habitats.

This book clearly accomplishes what it sets out to do, and, on the basis of its content, sets a very high standard for future publications in this series. Birders and ornithologists from western North America know the Aleutian Islands as a unique bridge between the Old World and the New, giving this book global relevance.

Richard C. Hoyer

Birding Colorado: Over 180 Premier Birding Sites at 93 Locations, by Hugh Kingery. 2007. Globe Pequot Press, Guilford, CT. 336 pages. Paperback, $19.95. ISBN 978-0-7627-3960-8

I have purchased and used in the field at least two birding guides in the Falcon series (*Birding Minnesota* and *Birding Texas*) and found them the glitzier cousins of the ABA/Lane guides, geared towards more casual or less experienced birders. The latest title in the series, Hugh Kingery's *Birding Colorado*, fits the mold perfectly. Novice and intermediate birders should be thrilled by it; more serious target-oriented birders will find it an excellent basic reference but not a superlative addition to the canon.

Perhaps the biggest asset of this book is its author. Hugh Kingery—editor of the first Colorado Breeding Bird Atlas and one of the founding fathers of Colorado birding—not only knows the state inside out, he writes beautifully and has a knack for pointing out the more colorful aspects of the sites he describes. Asides like the one on page 107, which describes how the original surveyors of Barr Lake piled buffalo chips to outline their vision of the future reservoir, add a welcome depth and wry humor to the prose that many such guides are lacking.

The site descriptions are extremely accurate and up to date. Although it introduces a couple of birding sites that were new to me (such as Red Sandstone Road in Vail) and invents a couple (such as "Raven Lane" in Kiowa County, a novel rural route for nesting Chihuahuan Ravens), the book remains pretty squarely on the beaten track as defined by birders. Faced with the difficult task of prioritizing Colorado's many birding sites, Kingery has done a nearly flawless job of picking the very best.

In terms of getting you there, the guide is pretty good but not outstanding. The regional maps at the beginning of each section suffice quite well as overviews, and in a few cases will navigate you around larger sites when such detail can be seen. When you *really* need a supplemental map, the book almost always provides one. Particularly useful are the close-up maps of urban sites in Fort Collins, Loveland, Boulder, Colorado Springs, and Pueblo. The Denver metro regional map, however, is too complex and busy to be very helpful, and the need for supplemental clarification there goes unfulfilled. DeLorme atlas grid coordinates are a nice addition to this guide that enhance its usability considerably, but more maps would greatly help it stand alone as a reference.

The guide's greatest weakness is in its treatment of target species. For the most part it will get you to the best-known sites for Colorado's most sought-after birds, but not all of them: try finding a Chukar with this book. The "Specialty Species" headers at the top of site descriptions are frustrating; they frequently fail to highlight principal target species at prime locations, such as the Dusky Grouse at Black Canyon of the Gunnison National Park, Black Rail at John Martin Reservoir, and Burrowing Owl at

Pawnee National Grasslands—even though the text discusses all these species quite adequately at these sites. The header for Tamarack State Wildlife Area lists the Carolina Wren as a resident, a mistake not made in the text. Such hiccups suggest that the headers were put together by someone with far less savvy than Kingery.

Outside the headers, the treatment of species is better but still uneven. The book correctly crowns Pagosa Springs as the Lewis's Woodpecker capital of the state but makes no mention of that species at Cottonwood Canyon; the book rightly highlights Grace's Warbler in the Durango area but completely ignores it in Pagosa Springs. Although some species lists in text are detailed and quite useful—such as the one for Blue Lake/Adobe Creek Reservoir—others suffer from the perennial pitfalls of such guides, failing to adequately differentiate birds by abundance and season—as when the book lists the Eastern Bluebird (a breeder), Willow Flycatcher (a migrant), and Inca Dove (a single-record vagrant) in the same list as birds "possible" at Flagler State Wildlife Area.

The book's back matter, the key reference area for listers, reflects this same uneven quality. The listing of expected species in each habitat is useful and very well done; the referencing of sites for specialty species is also quite good and more extensive than in many ABA/Lane guides. A complete Colorado checklist is a real plus, but unfortunately it is divided into three separate lists: List A, with birds "apt to be seen"; List B, with birds you have a "slight chance" of finding; and List C, with birds recorded 10 or fewer times in the state. Serious listers, accustomed to seasonal bar graphs of abundance, may find the trichotomy a bit clunky.

On the whole, regardless of your birding style, if you are planning to spend any significant time birding in Colorado soon, I recommend this work. It is far more up-to-date than the now 10-year-old Lane Guide, and, in conjunction with a DeLorme atlas, existing online references, and recent tips from local birders, it will serve you very well in the field—and likely entertain you along the way.

Nathan Pieplow

FEATURED PHOTO

GREAT GRAY OWLS NESTING IN FRESNO COUNTY, CALIFORNIA

DAVID E. QUADY, 39 The Crescent, Berkeley, California 94708;
davequady@att.net

At two meetings in June 1772 of the Royal Society in London, Johann Reinhold Forster described the specimens of birds, fishes, and mammals that Hudson's Bay Company naturalists had collected and sent to England on their summer 1771 trade ships (Houston et al. 2003). Among them were five birds new to science. Andrew Graham, the factor at Severn River, provided most of these, including a specimen and accompanying notes that enabled Forster (1772) to describe a "fine non-descript [i.e., undescribed] owl," which he named the Grey Owl, *Strix nebulosa*. The other four were the birds we now know as the Eskimo Curlew (*Numenius borealis*), Boreal Chickadee (*Poecile hudsonicus*), Blackpoll Warbler (*Dendroica striata*), and White-crowned Sparrow (*Zonotrichia leucophrys*).

Status and Distribution

Two subspecies of the holarctic Great Gray Owl have long been recognized. *Strix n. lapponica* breeds across Eurasia from northern Scandinavia east through northern Siberia and south to central European Russia, northern Mongolia, northern Manchuria, Amurland, and Sakhalin (Holt et al. 1999). In comparison to *nebulosa* it is slightly smaller in body mass and wing length, slightly paler, and more prominently streaked below (Bull and Duncan 1993).

Nominate *nebulosa* breeds in North America from central Alaska east through the boreal forest of Canada and south locally in the interior to the mountains of north-central Washington, south-central Oregon, California to the southern Sierra Nevada, northern Idaho, western Montana, western Wyoming, southwestern and central Alberta, central Saskatchewan, southern Manitoba, northern Minnesota, northern Wisconsin, northern Michigan (casually), and south-central Ontario (AOU 1998).

Great Gray Owls winter throughout their breeding range in North America, but birds of the central and eastern populations wander south casually as far as Nebraska, Iowa, Indiana, Ohio, Pennsylvania, and New Jersey (AOU 1998). The winter of 2004–05 produced the largest irruption on record. Thousands of birds appeared in Ontario, with 501 found and reported dead (Jones 2005). Daily counts of more than 100 birds were reported as routine in Minnesota in December and January (Granlund 2005). In comparison, fewer than 60 wandering birds were noted in any winter from 1890 through 1965, and the peak irruption reported by Bull and Duncan (1993), in 1991–92, was of fewer than 500 birds. Suggested causes for these southward wanderings include attempts to avoid deep snow cover and shortages of prey in the breeding range (Bull and Duncan 1993).

Early California Records

Newberry (1857) was the first to report the Great Gray Owl in California: "This large and handsome owl is generally disseminated over the western part of the North American continent, at least we obtained proofs of its existence in the Sacramento valley, in the Cascade mountains, in the Des Chutes basin, and on the Columbia, in Oregon." He didn't indicate the nature of these proofs. Baird et al. (1874) mentioned Newberry's report without comment and reported a June specimen from near the mouth of the Columbia River. Apparently on the basis of only those two reports from the western United States south of Alaska, they stated, "On the Pacific coast it is resident as far south as the mouth of the Columbia, and is found in winter in Northern California." More specifically, Belding (1890) wrote that "Mr. Wm. Proud has a specimen, which he informed me was brought to him in flesh soon after it had been shot, in the hills near Chico." Belding reported no further details, and the disposition of that specimen is unknown. Grinnell (1914) reported a still extant specimen collected on 26 September 1913, about 10 km south of McCloud, Siskiyou County. In addition to this specimen, Grinnell (1915) cited the reports by Newberry (1857) and Belding (1890) when he reckoned the owl's status as a "rare winter visitant to the north end of the state." Noting the absence of extant specimens that would support the reports of Baird et al. or Belding, and the lack of subsequent records substantiating Newberry's claim from the Sacramento Valley, Winter (1986) judged that these three early California reports are best considered hypothetical.

Grinnell and Miller (1944) summarized records from California, including some apparently unknown to Grinnell in 1915. The earliest specimens they cited were three collected by Edward Garner in the vicinity of Quincy, Plumas County. Bryant (1920) examined one of these, a female taken on 12 May 1894. All that remains of these three specimens is a photograph, showing one mounted specimen, on file in the Plumas County Museum (Winter 1986). Other records cited include a 17 September 1937 specimen from 5 km south of Mt. Ingalls, Plumas County, a male and female—probably a mated pair (Grinnell and Storer 1924)—taken 18 June 1915 near Mono Meadow in Yosemite National Park, Mariposa County, and a specimen collected between Coarsegold and Finegold, Madera County, in May or June 1930 (Abbott 1943).

While researching this paper I located another extant specimen, one that predates by 16 years the 1894 specimen reported by Bryant (1920). Harvard's Museum of Comparative Zoology (MCZ) catalogs an adult male (MCZ specimen number 35407) collected by Ferdinand Gruber on 13 January 1878 in the "Sierra Nevada Mts." of California. Alison Pirie (pers. comm.) reported that MCZ reexamined this mounted specimen five years ago and confirmed its identification and data before returning the specimen to Phillips Andover Academy, which holds it on extended loan. Gruber (1830–1907), was an early California collector, taxidermist, and ornithologist who was curator of the Golden Gate Park Museum in San Francisco at the time of his death (Palmer 1928).

Current Status in California and Oregon

The Great Gray Owl was placed on California's endangered species list in June 1980. In the Department of Fish and Game's first five-year status report on the species Gould (1987) noted that it has suffered from two forms of habitat loss. The zones of mixed conifers and red fir forest, where the majority of owls have been located during their breeding season, had by 1987 experienced well over 100 years of large-scale commercial logging, which had reduced substantially the quantity of mature forest and the number of large trees on which the owl depends for nest sites. Second, long-term overgrazing of montane meadows had reduced their grass cover, lowering the water table and increasing the gullying of watercourses through the meadows. These changes reduced the ability of meadows to sustain voles and pocket gophers, reported by Winter (1986) as the owl's main prey in the Sierra Nevada.

The California Department of Fish and Game continues to classify the species as endangered, meaning that it is in danger of extinction throughout all or a significant portion of its range within the state. A rough estimate of California's current population is approximately 300 birds (K. O'Connor pers. comm.).

In Oregon, the Great Gray Owl is a fairly widespread breeder in the Blue, Cascade, and Siskiyou mountains (Janes 2003). Just north of the state line, the Oregon Breeding Bird Atlas (Adamus et al. 2001) confirmed breeding in seven contiguous hexagonal blocks with centers lying roughly along an east–west line between Kerby Peak in Josephine County and Cox Butte in Jackson County. Surveys in the Siskiyou Mountains of southwestern Oregon in 1996 and 1997 found 25 sites where nests, fledglings, or pairs were confirmed. Sixteen of those sites were at atypically low elevations, below 915 m (Fetz et al. 2003). At those low-elevation sites Great Gray Owls inhabit rugged topography where north-facing slopes support mature Douglas-firs (*Pseudotsuga menziesii*) near south-facing slopes with meadows, Oregon white oak (*Quercus garryana*) woodlands, and chaparral. Stewart Janes (pers. comm.) suggests that similar low-elevation habitat in California may also host breeding Great Gray Owls.

California Breeding Records

Grinnell and Storer (1924) reported the earliest evidence of the Great Gray Owl breeding in California—and the first breeding south of Canada known to them—when Grinnell noted a large brood patch on the female he collected in Yosemite National Park, Mariposa County, on 18 June 1915. With well over 100 sight records accepted by Winter (1986), the central Sierra Nevada, especially the Yosemite area, remains the species' center of abundance in California.

The Great Gray Owl has been confirmed nesting at few locations in the Sierra Nevada outside of the Yosemite region. To the north, breeding was confirmed in El Dorado County in 2002, on private land near Plummer Ridge (G. I. Gould, Jr., pers. comm.). Farther north, systematic surveys in Plumas National Forest since 2004 have repeatedly yielded Great Gray Owls near Lake Davis, Plumas County, including near the site of the 1937 specimen. Pairs have been detected, and fledglings believed to be Great Gray Owls have been heard and seen (B. Shaw pers. comm.). But Gary Rotta (pers. comm.) reports that no nest has yet been found. In the California portion of the Sierra Nevada–Cascade range north of Lake Davis, Winter (1986) listed few observations of Great Gray Owls, and Chris Stermer (pers. comm.) reports that there is no firm evidence of breeding. In the Oregon Cascades, the most southerly confirmed nesting found by the Oregon Breeding Bird Atlas was in a block straddling the Jackson/Klamath county line, just west of Upper Klamath Lake (Adamus et al. 2001). That location is about 300 km from Lake Davis.

Fetz et al. (2003) reported sightings of a pair of Great Gray Owls in Siskiyou County about 5 km south of the Oregon line over multiple years. I have been unable, however, to locate any confirmed reports of nesting there or elsewhere in northwestern California.

In 2007 the National Park Service and the U.S. Forest Service embarked on a three-year study to address two questions related to the central Sierra Nevada population of Great Gray Owls (S. Stock pers. comm.). First, is that apparently geographically isolated population genetically different from Great Gray Owls in other parts of North America, and deserving of greater conservation attention? Second, what ecological factors limit the distribution of the central Sierra Nevada population? Blood and feather samples collected in the Yosemite region in 2007 will be compared with those from Oregon and Canada to assess the genetic distinctiveness of the central Sierra population. The second question will be addressed by assessing the current population status and by comparing the habitat at known foraging and nesting sites with sites where the owls are absent, to generate predictive habitat-association models.

South of Yosemite, the first Madera County nest was found in 2002, near Beasore Meadow in the Sierra National Forest (K. O'Connor pers. comm.). Nesting near that location has also been confirmed in several subsequent years (C. Stermer pers. comm.). In Fresno County, nesting was confirmed first in 1998 near Shaver Lake and again there in most subsequent years, including 2007 (S. Byrd pers. comm.; see photo featured on this issue's back cover photo). Farther south, Tulare County's first report of a Great Gray Owl was of one observed at Wolverton Meadow in Sequoia National Park on 23 July 1965 (Winter 1986). The California Natural Diversity Data Base (CNDDB) contains a report of nesting near Jackass Creek in the Sequoia National Forest in 1986. A Great Gray Owl was detected there on more than one occasion in 1986, but Steve Anderson (pers. comm.) reports that nesting was not confirmed. Since then, Great Gray Owls have been reported at several other locations in Tulare County, and a juvenile believed to be of this species was seen in mid-August 2007 (G. Lindquist pers. comm.), but no nest has yet been found (S. Anderson pers. comm.). Fresno County remains the most southerly location in the world where a Great Gray Owl nest has been found.

Biologists are interested in gaining a better understanding of the southern extent of the Great Gray Owl's range in the Sierra Nevada. Birders interested in helping to expand knowledge of the species are requested to contact first the biologist for the land management agency responsible for an area of interest. Making such a contact will allow the Forest Service or California Department of Fish and Game to coordinate efforts, avoid excessive disturbance of individual birds, improve the quality and integrity of observations, and ensure the reporting of observation results. For the Sequoia National Forest contact Steve Anderson at (760) 376-3781. He can also direct interested parties to the appropriate biologists with other agencies in the southern Sierra Nevada.

The Photographs

Gary Woods took the photograph on this issue's outside back cover, showing an adult female Great Gray Owl and one of its two nestlings near Shaver Lake, Fresno County, on 1 June 2007. The female has spread its rictal bristles and associated feathers, exposing its entire bill in a mild threat display; compare with its more relaxed facial expression in Figure 1. Woods' photograph on this issue's inside back cover shows both Great Gray Owl nestlings on 1 June. Their grayish facial disks and grayish plumage overall help distinguish them from Great Horned Owl nestlings, whose facial disks and overall plumage are brownish. The nest is about 9 m above the ground in

Figure 1. Adult female Great Gray Owl near its nest, Shaver Lake area, Fresno County, California, 1 June 2007. Note that the tips of the rectrices appear to be broad and fresh.

Photo by Gary Woods

the top of a broken white fir (*Abies concolor*) snag with an estimated diameter of 66 cm at breast height and 50 cm at the nest. The canopy closure around the nest tree is about 50%. The nest is 200 m from a meadow in which the adult owls sometimes foraged, but the adult male hunted mostly in a larger meadow about 400 m from the nest. The forest that includes the nest tree was extensively logged prior to 1914, so only a small proportion of its trees is now >100 years old. Since 1979 the area around the nest has undergone three episodes of selective single-tree logging. This logging was intended to recreate an uneven-aged forest of mainly yellow and sugar (*Pinus lambertiana*) pines, like the forest prior to European settlement. Great Gray Owls successfully fledged two young from the same nest in 2006, and a juvenile found nearby in 2005 strongly suggests that the same nest was also used then, although the nest could not be located that year (S. Byrd pers. comm.).

The nest's location in a broken snag is typical of the species (Bull and Duncan 1993). Its height is typical of nests studied in southeastern Idaho and northwestern Wyoming, and the nest tree's diameter is typical of snag nests that Franklin (1988) studied there. Its diameter is also similar to that of nest trees Beck and Winter (2000) measured in Stanislaus National Forest but smaller than the 115 cm (at breast height) average they found in Yosemite National Park. The nest's distance from nearby meadows seems consistent with the distances Winter (1986) reported from the Yosemite area. Nest sites are often reused for several years, and in Oregon, Idaho, and California pairs probably remain together as long as both individuals live. Great Gray Owls breed rarely at an age of one year, occasionally at two years, and more commonly at three years (Bull and Duncan 1993).

No reliable way to determine the sex of an adult Great Gray Owl by plumage is known (Pyle 1997). We may safely assume, however, that the adult in these photographs is the female, because only the female broods the nestlings (for 2–3 weeks, beginning immediately after hatching), after which it starts roosting near the nest (Bull and Duncan 1993). Peter Pyle (pers. comm.) notes that this adult displays at least two generations of post-juvenal secondaries (see photograph on back cover) and that the tips of its rectrices (see Figure 1) appear to be both broad and fresh, indicating that it is at least three years old and probably at least four years old. The older estimate is supported by known or suspected nesting probably by the same female in two preceding years.

One of the two nestlings at Shaver Lake left its nest on the windy night of 5 June 2007; its sibling was still in the nest the next day. On 8 June, Woods photographed one fledgling on the ground (see Figure 2), while the other called softly and unseen from ferns nearby. One fledgling was seen regularly around the nest over the next three weeks, including in the canopy near the nest tree on 14 June. A single fledgling was last observed several hundred meters away during the first week of September (S. Byrd, G. Woods pers. comm.).

ACKNOWLEDGMENTS

Jon Winter applied his many years of experience with Great Gray Owls to a thoughtful review of this paper. I thank him for his many helpful comments. The following individuals graciously provided information on the owl's historic and current status in California and southern Oregon: Steve Anderson, Bob Barnes, Steve Byrd, Dave Clayton, Jeff Cordes, Joe Croteau, Sam Cuenca, Jeff Davis, Debby Derby, Bruce Deuel, Ray Ekstrom, Richard A. Erickson, Robin Galloway, Steve Glover, Steve Godwin, Dave Graber, Tom and Jo Heindel, John Hunter, Stewart Jones, Robert J. Keiffer, Gary Lindquist, Russell Nickerson, Kevin O'Connor, Gary Potter, Adam Rich, Gary Rotta, Brian Shaw, Rodney Siegel, Sarah Stock, Chris Stermer, Brad Stovall, Jim Tietz, Harold Werner, Jerry White, Brian Woodbridge, Jon Winter, Gary Woods, and Bob Yutzy.

Figure 2. Fledgling Great Gray Owl near its nest, Shaver Lake area, Fresno County, California, 8 June 2007.

Photo by Gary Woods

LITERATURE CITED

Abbott, C. G. 1943. Another record of the Great Gray Owl in California. Condor 45: 37.

Adamus, P. R., Larsen, K., Gillson, G., and Miller, C. R. 2001. Oregon Breeding Bird Atlas (CD-ROM). Ore. Field Ornithol., P. O. Box 10373, Eugene, OR 97440.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Baird, S. F., Brewer, T. M., and Ridgway, R. 1874. A History of North American Birds. Land Birds, vol. III. Little, Brown, Boston:.

Beck, T. W., and Winter, J. 2000. Survey protocol for the Great Gray Owl in the Sierra Nevada of California. USDA Forest Service Pacific Southwest Region, 1323 Club Dr., Vallejo, CA 94592.

Belding, L. 1890. Land Birds of the Pacific District. Occ. Pap. Calif. Acad. Sci. 2:1–174.

Bryant, H. C. 1920. Edward Garner, a pioneer naturalist. Condor 22:33.

Bull, E. L., and Duncan, J. R. 1993. Great Gray Owl (*Strix nebulosa*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 41. Acad. Nat. Sci., Philadelphia.

Fetz, T. W., Janes, S. W., and Lauchstedt, H. 2003. Habitat characteristics of Great Gray Owl sites in the Siskiyou Mountains of southwestern Oregon. J. Raptor Res. 27:315.

Forster, J. R. 1772. An account of the birds sent from Hudson's Bay; with observations relative to their natural history; and Latin descriptions of some of the most uncommon. Trans. R. Soc. London 62:382–433.

Franklin, A. B. 1988. Breeding biology of the Great Gray Owl in southeastern Idaho and northwestern Wyoming. Condor 90:689–696.

Gould, G. I., Jr. 1987. Five year status report, Great Gray Owl. Calif. Dept. Fish and Game, Nongame Wildlife Invest. Rep., Proj. W-54-R-4, Job II-3.

Granlund, J. 2005. Western Great Lakes region. N. Am. Birds 59:270–272.

Grinnell, J. 1914. The Great Gray Owl in California. Condor 16:94.

Grinnell, J. 1915. A distributional list of the birds of California. Pac. Coast Avifauna 11.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Grinnell, J., and Storer, T. I. 1924. Animal Life in the Yosemite. Mus. Vert. Zool., Univ. Calif. Press, Berkeley.

Holt, D. W., Berkley, R., Deppe, C., Enríquez Rocha, P. L., Petersen, J. L., Rangel Salazar, J. L., Segars, K. P., and Wood, K. L. 1999. Great Grey Owl, in Handbook of the Birds of the World (J. del Hoyo, A. Elliott, and J. Sargatal, eds.), vol. 5, pp. 203–204. Lynx Edicions, Barcelona.

Houston, S., Ball, T., and Houston, M. 2003. Eighteenth-Century Naturalists of Hudson Bay. McGill–Queen's Univ. Press, Montreal.

Janes, S. W. 2003. Great Gray Owl, in Birds of Oregon: A General Reference (D. B. Marshall, M.G. Hunter, and A. L. Contreras, eds.), pp. 322–324. Ore. State Univ. Press, Corvallis.

Jones, C. D. 2005. The Ontario Great Gray Owl irruption of 2004–2005: Numbers, dates and distribution. Ontario Birds 23:106.

Newberry, J. S. 1857. Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean, vol. 6, part 4, no. 2: Report upon the Birds. War Dept., Washington, D.C.

Palmer, T. S. 1928. Notes on persons whose names appear in the nomenclature of California birds. Condor 30:281–307.

Pyle, P. 1997. Identification Guide to North American Birds, part 1. Slate Creek Press, Bolinas, CA

Winter, J. 1986. Status, distribution and ecology of the Great Gray Owl (*Strix nebulosa*) in California. M.A. thesis, San Francisco State University.

WESTERN BIRDS

Vol. 39, No. 3, 2008

Volume 39, Number 3, 2008

The 32nd Report of the California Bird Records Committee: 2006 Records *Matthew T. Heindel and Kimball L. Garrett* 121

Shorebird Use of Muted Tidal Wetlands in a California Estuary *Sarah Connors* 153

NOTES

Purple Martin Distribution and Nesting Habitat at Shasta Lake, California *Len Lindstrand III* 166

Sap Feeding on Birch Trees by American Three-toed Woodpeckers *Theodore N. Bailey* 171

First Records of the Brown Creeper Breeding along the Middle Rio Grande in Central New Mexico *Jean-Luc E. Cartron, David L. Hawksworth, and Deborah M. Finch* 176

Book Reviews *Jan Hodder, George A. Jobanek, and Ted Floyd* 179

Featured Photo: First Documentation of a Eurasian Kestrel in California *Angus C. Hull, Michael G. Armer, Bethany J. Sturgeon, and Allen M. Fish* 184

Front cover photo by © Bob Steele of Inyokern, California: Arctic Warbler (*Phylloscopus borealis*), Galileo Hill, Kern County, California, 7 September 2007, one of three Arctic Warblers found and photographed in California 6–13 September 2007. Away from Alaska, this species had been recorded in North America only seven times previously, twice in northwestern Canada, four times in California, and once in Baja California.

Back cover "Featured Photos" by © Michael Armer of Mountain View, California: Eurasian Kestrel (*Falco tinnunculus*), juvenile female, banded at the Marin Headlands, Marin County, California, 23 October 2007. Southernmost record of this species for western North America, following 11 for Alaska, one for British Columbia, and one for Washington.

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.wfo-cbrc.org/journal.html).

Good photographs of rare and unusual birds, unaccompanied by an article but with caption including species, date, locality and other pertinent information, are wanted for publication in *Western Birds*. Submit photos and captions to Photo Editor. Also needed are black and white pen and ink drawings of western birds. Please send these, with captions, to Graphics Manager.

WESTERN BIRDS

Volume 39, Number 3, 2008

THE 32ND REPORT OF THE CALIFORNIA BIRD RECORDS COMMITTEE: 2006 RECORDS

MATTHEW T. HEINDEL, 2837 Corte Papaya, Carlsbad, California 92009; mtheindel@aol.com

KIMBALL L. GARRETT, Section of Ornithology, Natural History Museum of Los Angeles County, Los Angeles, California 90007; kgarrett@nhm.org

ABSTRACT: The California Bird Records Committee reached decisions on 264 records involving 83 species evaluated during 2006, endorsing 225 of them. New to California were Ross's Gull (*Rhodostethia rosea*) and the Taiga Flycatcher (*Ficedula albicilla*); the Little Shearwater (*Puffinus assimilis*) was removed from the state list. Adjusted for these changes, California's bird list stands at 633 species, ten of which are non-native; three additional species recently accepted will be covered in the next report.

This 32nd report of the California Bird Records Committee (hereafter the CBRC or the committee) is the first annual report to be published after the publication of Rare Birds of California (CBRC 2007), a book summarizing the status of all vagrants and rare migrants in the state and detailing all of the committee's decisions from its inception through 2004. In this book, Appendix H covers selected records from 2004 through 2006 but does not include all records from that period; therefore, the simple addition of records in this report to those in the book could result in incorrect totals since some records were covered in Appendix H and others were not. This report discusses the evaluation of 264 records of 83 species. Although most records pertain to birds found in 2006, the period covered by this report extends from 1915 through 2007. The committee accepted 225 records involving 221 individuals of 77 species, for an acceptance rate of 85%. Thirty-four records of 26 species were not accepted because of insufficient documentation or because descriptions were inconsistent with known identification criteria. Five additional records of four species were not accepted because of questions concerning the birds' natural occurrence. Counties best represented by accepted records are Imperial (22 records), San Diego (21), Los Angeles (15), Humboldt (12), Monterey (12), Riverside (11), San Francisco (10, all from Southeast Farallon I.), Inyo (9), Santa Barbara (9), Marin (8), Mendocino (8), Orange (8), Santa Cruz (7), and Kern (6).

Highlights of this report include California's first Ross's Gull (*Rhodostethia rosea*) and Taiga Flycatcher (*Ficedula albicilla*), second American Woodcock (*Scolopax minor*), and the earliest accepted records of the Wedge-tailed Shearwater (*Puffinus pacificus*), Crested Caracara (*Caracara cheriway*), Slaty-backed Gull (*Larus schistasagus*), and Ruddy Ground-Dove (*Columbina talpacoti*). A previous decision to accept the Little Shearwater (*Puffinus assimilis*) was reversed.

In 2007 the committee accepted first records for California of Newell's Shearwater (classified as subspecies *Puffinus auricularis newelli* of Townsend's Shearwater in the current A.O.U. checklist [1998]), Lesser Frigatebird (*Fregata ariel*), and Wood Sandpiper (*Tringa glareola*); complete details will be published in the next report. In addition, the committee currently is considering potential first state records of Tristram's Storm-Petrel (*Oceanodroma tristrami*), Swallow-tailed Kite (*Elanoides forficatus*), Great Black-backed Gull (*Larus marinus*), Yellow Grosbeak (*Pheucticus chrysopeplus*), and Common Rosefinch (*Carpodacus erythrinus*). With the addition of two species in 2006, three in 2007, and the removal of Little Shearwater, California's list stands at 636 species, ten of which are nonnative and two of which have been extirpated within historical times.

This report's acceptance rate of 85% exceeds the average of 79.6% for all reports, perhaps because of the increasing use of digital photography to support identifications that otherwise might have been supported only with written descriptions. The total of 264 records reviewed in this report is above the average of 214.4 records per report over the committee's first 30 reports.

The list of species reviewed by the CBRC is posted at the Western Field Ornithologists' (WFO) web site (www.westernfieldornithologists.org). This site also includes the entire California state list, the committee's bylaws, a reporting form for the direct e-mail submission of records to the CBRC, the addresses of current committee members, a photo gallery of recent submissions, including some of several birds addressed in this report, and other information about the CBRC, WFO, and its journal, *Western Birds*.

All documentation reviewed by the CBRC, including copies of descriptions, photographs, videotapes, audio recordings, and committee members' comments on records submitted are archived at the Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, CA 93012, and are available for public review. The CBRC solicits and encourages observers to submit documentation for 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 2008 annual meeting consisted of David M. Compton (chair), Jon L. Dunn (vice-chair), Alvaro Jaramillo, Kristie N. Nelson, James E. Pike, Peter Pyle, Brian L. Sullivan, Scott B. Terrill, and Jim Tietz. Guy McCaskie continued in his role as non-voting secretary. Additional committee members who also voted on many of the records in this report include Kimball L. Garrett, Matthew T. Heindel, Marshall J. Iliff, Joseph Morlan, and Daniel S. Singer.

As noted by Shuford (2006) and Iliff 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 can be accessed through that site.

Format and Abbreviations. As in other recent CBRC reports, records are generally listed chronologically from earliest to latest date of occurrence, and/ or geographically, from north to south. Each record includes the location, county abbreviation (see below), and date span. The date span usually follows that published in *North American Birds* (formerly *American Birds* and *Field Notes*). If the CBRC accepts a date span that differs from 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 as 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. In such cases 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. 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 our opinion, based on the evidence in the files and committee members' comments. Our terminology for age follows that used by the CBRC (2007).

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 county abbreviations for all 58 California counties is available on the WFO–CBRC web site 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 (SBNHM), and the Western Foundation of Vertebrate Zoology, Camarillo (WFVZ).

RECORDS ACCEPTED

EMPEROR GOOSE *Chen canagica* (87, 4). Three records of four birds were accepted as follows: one was photographed in the Smith R. bottoms, DN, 2–10 Apr 2006 (OH†; 2006-048); two were seen at the mouth of the Big R., MEN, *24* Nov 2006 (DT; RHu, DJ; 2007-007), and one was photographed at Arcata, HUM, 27–28 Nov 2006 (KR†; 2006-195). The April record is one of California's few of this species in spring.

TRUMPETER SWAN *Cygnus buccinator* (75, 8). A vocal flock of eight near Willows, GLE, 15–17 Jan 2006 was with Tundra Swans (*C. columbianus*), providing great comparisons of these two species (CL, LL‡; 2006-010). See also records not accepted, identification not established and records not accepted, identification accepted but natural occurrence questionable.

ARCTIC LOON *Gavia arctica* (5, 1). A severely ill bird was picked up at Newport Beach, ORA, and euthanized 5 Jul 2006 (SK, KLG; LACM #114223; 2006-106). The culmen measurements were within the norm of the Arctic and exceeded those of the largest male Pacific (*G. pacifica*) from the LACM collection; all plumage criteria fit the Arctic as well. This specimen is the first of the Arctic Loon for California and represents the first record for California south of San Luis Obispo, though there is a more southerly record from Baja California, 21 Feb 1997 (Erickson and Howell 2001).

YELLOW-BILLED LOON *Gavia adamsii* (76, 2). One in molt, suggesting it summered in our waters, was photographed on Humboldt Bay, HUM, 13 Aug–22 Sep 2006 (CBu; SC†, KB, RFo; 2006-104), earlier than the previous early record of 17 Aug 2002 from Westport, MEN, also likely of a summering bird (Cole and McCaskie 2004). A juvenile was at Pescadero, SM, 18–27 Nov 2006 (FT; LBl†, AE, KHL†, CLo†, JM†, DSS, SBT†; 2006-187; Figure 1; photo also in *N. Am. Birds* 61:136). See also records not accepted, identification not established.

SHORT-TAILED ALBATROSS *Phoebastria albatrus* (18, 2). An immature was seen 10 mi. sw. of Morro Bay, SLO, 19 Apr 2006 (PEL; 2006-060); a juvenile was

Figure 1. This crisp, close-up photograph provides great detail on the key identification marks of the Yellow-billed Loon (*Gavia adamsii*) at Pescadero, San Mateo County, 18–27 November 2006. The large pale bill is angled sharply on the lower mandible. Pale areas around the eye contrast with a darker crown and auricular; the back feathers are broadly edged paler, indicating a young bird.

Photograph by Len Blumin

found dead at Morro Bay, SLO, 5 Aug 2006 (TME†; SBNHM #8593; 2006-100). The latter bird had been banded as a chick on 25 Apr 2006 on Torishima, Izu Islands, Japan, the species' main breeding site.

MOTTLED PETREL *Pterodroma inexpectata* (59, 1). One was photographed at 32.086° N, 120.584° W off San Nicolas I., VEN, 6 Apr 2006 (JDY, ABD†; 2006-055), at a season when the Mottled Petrel has occurred previously far offshore.

GALAPAGOS/HAWAIIAN PETREL *Pterodroma phaeopygia/sandwichensis* (21, 3). Three fall records fit the emerging pattern of this complex; 17 of 21 records are from mid-July to mid-September. Most surprising was one seen from shore, California's first such record, while it was sitting on the water and then flying away from Pt. Dume, LA, 12 Aug 2006 (KLG; 2006-036). One was photographed off Fort Bragg, MEN, 13 Aug 2006 (M&MB†, DD†, EDG†, OJ, MM†; 2006-109; Figure 2; photo also in *N. Am. Birds* 61:136). The third was photographed 75 n. miles sw. of San Nicolas I. 6 Sep 2006 (SNGH†, WTH; 2006-128). Our understanding of features distinguishing the Hawaiian from the Galapagos Petrel is still evolving, though addressed by Force et al. (2007). Those authors suggested that at least some of the records for California represent the Hawaiian Petrel. See also records not accepted, identification not established.

STREAKED SHEARWATER *Calonectris leucomelas* (15, 2). One photographed off Cypress Point, MTY, 30 Sep 2006 (SNGH, BLS†, SBT, LST†; 2006-135; photo in *N. Am. Birds* 61:137) looked subtly different on the underwing from another photographed on Monterey Bay, MTY/SCZ, 15 Oct 2006 (SNGH†, JJ†, OJ, CL, DVP; 2006-150; Figure 3; photo also in *N. Am. Birds* 61:137). All California's accepted Streaked Shearwaters are from fall; 15 Oct is our latest date for this species yet.

Figure 2. The combination of head, nape, and underwing pattern identify this bird photographed 13 August 2006 off Ft. Bragg, Mendocino County, as a Galapagos/Hawaiian Petrel (*Pterodroma phaeopygia/sandwichensis*). Force et al. (2007) highlighted the pattern of the dark hood as a feature distinguishing the two taxa formerly classified as one species, the Dark-rumped Petrel; they suggested that California records represent the Hawaiian Petrel.

Photograph by Matthew Matthiessen

GREATER SHEARWATER *Puffinus gravis* (6, 1). One was photographed on Monterey Bay, MTY/SCZ, 15 Oct 2006 (SNGH†, JJ†, OJ, CL, DVP; 2006-151; photo also in *N. Am. Birds* 61:138) for our sixth record, fifth from Monterey Bay.

WEDGE-TAILED SHEARWATER *Puffinus pacificus* (5, 1). While examining specimens at MVZ, Steve N. G. Howell came across a bird labeled as a Short-tailed Shearwater (*P. tenuirostris*) taken in Santa Cruz, SCZ, 1 Apr 1915 (SNGH†; MVZ #91142; 2007-048); he reidentified it as a dark morph Wedge-tailed Shearwater (Howell 2007). This specimen predates all other Wedge-tailed Shearwaters for California by 71 years and represents the lone spring record of the species for California; Oregon also has a spring record, from Newport on 26 Mar 1999 (Marshall et al. 2003).

*MANX SHEARWATER *Puffinus puffinus* (97, 10). Ten records were accepted, comprising one off Pt. Vicente and 5 mi. w. of Marina del Rey, LA, 30 Dec 2005–6 Jan 2006 (JFe, 2006-036); one 10 mi. w. of Humboldt Bay, HUM ,23 Apr 2006 (GSL; 2007-066); one from Pigeon Point, SM, 2 May 2006 (RSTh; 2006-091); one off Pt. Pinos, MTY, 1 Aug 2006 (MB; 2006-101); one off Humboldt Bay, HUM, 10 Aug 2006 (RFo, KR; 2006-114); one from Southeast Farallon I., SF, 23 Aug 2006 (MB; 2007-032); one from Pigeon Pt., SM, 23 Sep 2006 (RSTh; 2007-025); and one off Pt. Pinos, MTY, 15 Oct 2006 (DR; 2006-160). An apparent juvenile on Monterey Bay, SCZ, 15 Oct 2006 provided evidence of the likely breeding of this species in the North Pacific (SNGH†, OJ, JJ†; 2006-167). It was in uniformly fresh plumage, a condition not expected in an adult at this season (S. N. G. Howell pers. comm.). A bird molting its primaries was in Monterey Bay, SCZ, 22 Oct 2006 (OJ, CK†, CAM, LST†, DVP†; 2006-155; photo in *N. Am. Birds* 61:138).

Figure 3. This photograph of a Streaked Shearwater (*Calonectris leucomelas*) taken in Monterey Bay on 15 October 2006 shows that the crown is pale, a dingy white, contrasting with a darker mantle. Some mantle feathers are edged pale, imparting the scaly look this species often shows. The dark-tipped bill is a pale straw color. Note the long dark tail, which has some pale whitish upper tail coverts; these upper tail coverts are quite variable, ranging from dark to an obvious white U-shaped band.

Photograph by Steve N. G. Howell

The Manx Shearwater is now regular in California, averaging over seven records per year. At the 2008 meeting, the committee voted to discontinue reviewing records of it after 2007.

MASKED BOOBY *Sula dactylatra* (13, 1). A subadult was on the breakwater in San Pedro, LA, 14 Oct 2006 (KLG, SKr†; 2006-155; photo in *N. Am. Birds* 61:143); the yellow rather than orange bill eliminated the similar Nazca Booby (*S. granti*). In addition to the 13 records of the Masked Booby, California has seven records of the Masked or Nazca not identifiable to species (CBRC 2007).

BLUE-FOOTED BOOBY *Sula nebouxii* (89, 7). A mini-invasion reached the Salton Sea with up to two individuals at the north end of the sea, RIV, 5 Aug–1 Sep 2006 (MJB†, MB, HD†, OJ†, CAM, GMcC, CMcG†, SJM†, JPu, MSanM, DVP†, 2006-096; photo in *N. Am. Birds* 61:142) and up to five around Mullet I., IMP, 25 Aug–19 Dec 2006 (GMcC, MJB†, KB, RST; 2006-115)—the largest numbers in California since 1977, when 11 were noted (Roberson 1993).

*BROWN BOOBY *Sula leucogaster* (97, 11). Eleven accepted records of single birds, including ten in one year, is a new high count for the state: an immature was found dead at the Tijuana R. mouth, SD, 2 May 2006 (MJB†, SDNHM #51276; 2006-061); an adult male *brewsteri*, the only race of the Brown Booby recorded in California, was seen near Imperial Beach, SD, 8 Jul 2006 (GMcC; 2006-081); a subadult was photographed in Mission Bay, SD, 18-19 Aug 1987 (NK†; 2006-012); one in its second or third fall was photographed in Monterey Bay, SCZ,15 Oct 2006 (SNGH†, CL, DVP†; 2006-149); one in its a first fall was taken into rehabilitation from Newport Beach, ORA, 10 Oct 2006 and successfully released on 27 Oct (SKr†; 2006-148); one was near Imperial Beach, SD, 1–2 Oct 2006 (DH; TRS†; 2006-140); an adult male was in Bear Harbor, MEN, 8–9 Aug 2006 (JRW; 2006-119); an adult female was w. of San Clemente I., LA, 3 Oct 2006 (MSm†; 2006-180); a worn subadult was photographed w. of San Clemente I., LA, 12 Oct 2006 (MSm†; 2006-182); an adult female was near Trinidad, HUM, 3–7 Dec 2006 (BAc†, BD, KR, COg; 2006-200); and another adult female was at Monterey, MTY, 28 Dec 2006–21 Jan 2007 (DW; MB, DEQ, DR†, RST†; 2006-222).

Given the Brown Booby's continuing increase in California, presumably due in part to its colonization of Los Coronados Islands (35 individuals by 2007, Whitworth et al. 2007) just south of our waters, the committee voted to discontinue reviewing records of Brown Boobies seen after 2007. See also records not accepted, identification not established.

RED-FOOTED BOOBY *Sula sula* (17,2). A total of two in one year exceeds the average. A hatch-year female was captured 1.1 mi. nw. of the mouth of Las Flores Creek, Camp Pendleton, SD, 5 Aug 2006 (BF†; SDNHM #51340; 2006-097); the fishing hook in its stomach proved fatal, and it died on 9 Aug. A second-fall bird was photographed off Palos Verdes, LA, 14 Oct 2006 (KLG, SKr†; 2006-156).

TRICOLORED HERON *Egretta tricolor* (50**, 6). A total of six records of this southern heron is a little above average; as expected, most records came from San Diego. An adult was in San Elijo Lagoon, SD, 10 Jul 2006 (RTP; 2006-083); another adult was at the San Diego R. mouth, SD, 1 Aug 2006–28 Jan 2007+ (PAG; MJB†, MB, GMcC; 2006-095); a first-fall bird was at San Elijo Lagoon, SD, 16 Oct 2006 (KM; JeS; 2006-152); one was at the Salton Sea, IMP, 1–25 Sep 2006 (OJ†, CW, DVP; GMcC; 2006-124); an adult near Red Hill, IMP, 9 Sep 2006 (MJSanM; 2006-192) was judged to be the same bird as one seen there 28 Oct–25 Dec 2006 (TEW, LLA; ES; 2006-204); one was in Imperial Beach, SD, 8 Oct 2006–15 Mar 2007 (JeS; GMcC; 2006-154).

YELLOW-CROWNED NIGHT-HERON *Nyctanassa violacea* (32, 5). An adult was at Famosa Slough, San Diego, SD, 27 Apr–29 May 2006 (MJB†, TJM, MFP-R†; 2006-056); a subadult was in Prado Basin, RIV, 3 Jul 2006 (JEP†; 2006-080; photo in *N. Am. Birds* 60:579); and three juveniles in Imperial Beach SD 4 Jul–10 Sep 2006 represented the first nesting of the Yellow-crowned Night-Heron in California (GMcC, VM†, MMe†; 2006-080; photo in *N. Am. Birds* 60:579); the accepted record of the adults was published by Iliff et al. (2007).

WHITE IBIS *Eudocimus albus* (3, 1). Quite surprising was a report from the north end of the Salton Sea, RIV, 5 Aug 2006 (BO; 2006-121). Given the paucity of previous California records, committee members were concerned about a one-day record without photographs. But the description was thorough, the observer considered the possibility of a leucistic White-faced Ibis (*Plegadis chihi*), and the accompanying sketch had detail sufficient to convince the committee. This record is the first of the White Ibis for California since 1977. Arizona has eight records (Rosenberg et al. 2007), and this species also occurs in Sonora, Mexico (Russell and Monson 1998).

GLOSSY IBIS *Plegadis falcinellus* (12, 3). An adult was well described from Prado Basin, RIV, 8 Jun 2006 (JEP; 2006-087); an adult in alternate plumage was near Calipatria, IMP, 26–31 Jul 2006 (GMcC; OJ†, CAM, TMcG†, MSanM, DVP†; 2006-092); and another adult was near Calipatria, IMP, 26 Aug 2006 (ToE†, GMcC; 2006-116). Oregon and Arizona have recently added this species to their state lists, providing further evidence for the increase in records of the Glossy Ibis throughout the West (Nehls 2007, Rosenberg et al. 2007). See also records not accepted, identification not established.

ROSEATE SPOONBILL *Platalea ajaja* (129**, 7). J. S. Rowley collected a one-year-old male at the south end of the Salton Sea, IMP, 22 May 1927 (Pemberton 1927; PP†; MVZ #51702; 2004-303); one in its second fall was at Salton Sea, IMP, 1 Sep 2006 (OJ†, DVP†; 2006-123); and up to five were around the Salton Sea, IMP, 21 Oct 2006–26 Apr 2007 (HBK; WF, W&EH†, OJ†, CAM, GMcC, SBT, ET†, DVP; 2006-163; photo in *N. Am. Birds* 61:143).

MISSISSIPPI KITE *Ictinia mississippiensis* (38, 2). A juvenile was photographed in Imperial Beach, SD, 6–9 Sep 2006 (GMcC; DWA†, MJB†, AM†, MS†, SES; 2006-125; Figure 4; photo also in *N. Am. Birds* 61:184). One in its first spring was photographed at Furnace Cr. Ranch, INY, 26–28 May 2006 (EPa; DC†, OJ†, LST†, DVP†; 2006-069; photo in *N. Am. Birds* 60:436).

COMMON BLACK-HAWK *Buteogallus anthracinus* (4, 0). An adult returning to near Santa Rosa, SON, 30 Apr–9 Oct 2006 (SM†; 2006-057) was presumed to be the same as the one there 14 May–29 Oct 2005 (Iliff et al 2007). Its schedule and prolonged stay raise many questions about its movements and vagrancy of the Common Black-Hawk in general. See also records not accepted, identification not established.

Figure 4. This juvenile Mississippi Kite (*Ictinia mississippiensis*) at Imperial Beach, San Diego County, 6–9 September 2006 was seen repeatedly capturing and devouring green fig beetles (*Cotinis mutabilis*), sometimes eating them on the wing. The tail is heavily banded with white, and the underparts are streaked brown.

Photograph by Anthony Mercieca

HARRIS'S HAWK *Parabuteo unicinctus* (49, 3). One was seen flying north at the south end of the Salton Sea, IMP, 5 Mar 2006 (KLG; 2006-031); another was at Borrego Springs, SD, 25 Apr 2006 (RT; 2006-054); and one was near Dripping Springs and Oak Grove, RIV/SD, 20 Sep 2006–14 Feb 2007 (SQ†, JWe†; 2007-044). This species always confronts the committee with the question of natural occurrence, as Harris's Hawks are kept by falconers, and evidence of past captivity in escapees is not always easily seen. Yet this species is also believed to irrupt on occasion (Patten and Erickson 2000). See also records not accepted, identification accepted but natural occurrence questionable

CRESTED CARACARA *Caracara cheriway* (21, 14). The caracara also challenges the committee with the question whether escapees are responsible for some (or most) California records. While the number of accepted records continues to grow, each record has had at least one detractor on the committee. Furthermore, some or many of these records may represent a single individual; indeed, all of the records for northern California listed below could have been of the same adult. When considering these questions future committees will benefit from more information about both the origin and number of individuals, but the current committee does not have the luxury of time before making a decision. See CBRC (2007) for a more complete discussion.

The following records have been accepted: an adult at Morro Bay, SLO, 1–2 Jun 2005 (EF; TME, BKS†, SSh, AFS†; 2005-071); a returning adult bird near Davenport, SCZ, 14 Aug 2005–10 Apr 2006 (DW; MB, SG, CL, LML‡, JeP†, LSe†, KSt, RST, DSS, 2005-100); an adult at Pt. Reyes, MRN, 3–6 May 2005 (DAp†, KH‡, LML‡; 2005-070; photo in *N. Am. Birds* 60:574), considered to be the same as an adult at Rodeo Lagoon, MRN, 2–3 Aug 2005 (JMe†, CB, AF; 2005-097); an adult near Casper, MEN, 2 May 2005 (PRe, 2005-057); an adult at Fort Dick, DN, 13 Jun–12 Jul 2005 (ADB†; 2005-086), considered the same as one near Alton, HUM, 19 Jul 2005 (KB; 2005-089); one at the Santa Clara R. mouth near Ventura, VEN, 5 Jan 2006 (DLG†; 2006-004; photo in *N. Am. Birds* 60:285); one at Bixby Ranch, SBA, 10 Jan 2006 (JS; 2006-042); an adult at Big Sur, MTY, 28 Mar–20 Sep 2006 (DR†; MB; 2006-047), considered to be the same as one at Carmel, MTY, 10 Apr–13 May 2006 (DR†, MB; 2006-051); presumably a single adult at Occidental Beach and Shell Beach, SON, 23 Apr–9 May 2006 (RRu, EDu; 2006-129); an adult at Pt. Reyes, MRN, 17–20 Jun 2006 (J&DD†; 2006-078); and an adult at Humboldt Bay, HUM, 13–14 Jul 2006 (SMc†; 2006-084).

In light of the addition of this species to the California list and the numerous records recently accepted, the committee decided to reconsider some previously rejected records. Given the more lenient treatment of records of late, previous decisions on the following records have been reversed and they now stand accepted: an adult at Mono Lake, MNO, 13 Sep–16 Oct 1987, now serving as our earliest record (RS; LBa†, JLD, GMcC; 1987-267A); one near Fort Dick, DN, 28–30 Apr 1989 (GSL, LPL; 1989-096A); another near Westmorland, IMP, 14 Dec 1993 (RH; 1993-196A); and one at Chula Vista, SD, 9 Feb 1995 (RCh, DWA, JL†, BCM; 1995-021A). The total of 14 accepted records doubles the previous total. See also records not accepted, identification not established and records not accepted, identification accepted but natural occurrence questionable.

AMERICAN GOLDEN-PLOVER *Pluvialis dominica* (23**, 13). Spring records of golden-plovers are difficult for the committee to assess because our knowledge of the differentiating characteristics of birds molting into alternate plumage is still evolving. In spring, the Pacific Golden-Plover (*P. fulva*) molts early so adult males are in crisp plumage by April, whereas *dominica* molts en route to its breeding grounds and is often still largely in basic plumage when at the latitude of California in April and early May. In its first spring *fulva* may also remain in a plumage like the basic, but it has more worn, brownish primaries rather than the fresh black primaries shown by all ages of *dominica* in spring. The best feature is the longer primaries of *dominica*, which extend more noticeably past the tail than in *fulva*. Birds that appear intermediate in plumage and structure might best be left unidentified in the field. Ones near El Centro, IMP, 18 Apr 2004 (SNGH; 2004-060) and near Calipatria, IMP, 27 Apr 2004 (GMcC; 2004-061) prompted much debate before being accepted. One nearing alternate plumage (later in spring than the two records just listed) was at the Wister Unit, Imperial W. A., IMP, 18 May 2006 (GMcC; 2006-066).

In fall, a juvenile was photographed at Edwards Air Force Base, KER, 19 Oct 2005 (MSanM, TMcG†; 2005-156); one was near Fort Bragg, MEN, 1–5 Oct 2006 (MM†; 2006-217; photo in *N. Am. Birds* 61:139); up to two were near Davis, YOL, 24–26 Oct 2006 (SSc†; JRy; 2007-030); one was at Goleta, SBA, 1 Nov 2006 (NL†; DMC; 2006-173); up to four were near Arcata, HUM, 1–8 Nov 2006 (KR†; SC†, RFo†; 2006-186); one was at Coyote Creek, SCL, 6–12 Nov 2006 (SCR; WGB†, PD†, DEQ, RWR†, MMR; 2006-178); and a very late juvenile was with a flock of Black-bellied Plovers (*P. squatarola*) in Sacramento, SAC, 6–17 Nov 2006 (ChC†; 2006-223). Six records in fall seems rather high for one year, but noteworthy was the number of birds lingering well into November, when most American Golden-Plovers have reached their South American wintering grounds.

WILSON'S PLOVER *Charadrius wilsonia* (11, 1). One was well studied in Coronado, SD, 11 Oct 2006 (DP; TRC, GMcC; 2006-146); six of the 11 records for California are from San Diego County. This record is the third for fall.

PIPING PLOVER *Charadrius melodus* (4, 1). An adult was on the southeastern shore of the Salton Sea, IMP, 7 Aug–19 Dec 2006 (OJ†, MB, RST†; MJB, CAM, GMcC, DWN†, MMR†, MJSanM, DVP; 2006-099; photo in *N. Am. Birds* 61:144), the first Piping Plover for California since 1980 and first for the state's interior. Its long stay and molt of primaries led many to expect it to remain through the winter, an expectation not realized.

AMERICAN OYSTERCATCHER *Haematopus palliatus* (35, 2). Like many of California's American Oystercatchers, one photographed in Goleta, SBA, 8 Apr 2006 showed signs of some introgression with the Black Oystercatcher (*H. bachmani*), including a slightly uneven breast demarcation and an intermediate tail pattern (DMC†, WF†; 2006-077; photo in *N. Am. Birds* 60:438). With this species, the committee believes that a few signs of intergradation are insufficient for rejecting a record. Another photographed at Pt. Loma and La Jolla, SD, 26 Aug 2006–8 Mar 2007 appeared as close to "pure" as American Oystercatchers get in our area (DWA†, MJB†, JDe, DE†, CAM, GMcC, AMo†, MMR†, LST†, 2006-117). The hybridization between the two species can make assessment of these records difficult; to the extent possible, we apply the index developed by Jehl (1985) so that decisions can be reached according to standardized criteria. The index was intended for use on specimens, and its use on birds in the field is less accurate though, the committee believes, still useful. See also records not accepted, identification not established.

UPLAND SANDPIPER *Bartramia longicauda* (27, 5). In 2006 two records were for spring: Twentynine Palms, SBE, 18–19 May 2006 (JZ; B&KT; 2006-067); and Galileo Hill, KER, 4–8 Jun 2006 (RST†, OJ†; ToE†, KHL, TMcG†, MSanM†, RSt†; 2006-072; photo in *N. Am. Birds* 60:472). Three were for fall: Long Beach, LA, 23 Sep 2006 (ML, LL†, KGL; CAM; 2006-133); Bishop, INY, 1 Oct 2006 (CG, LaN; 2006-210), and near Oxnard, VEN, 28 Oct 2006 (N&MF†; 2006-175). The total of five records is far more than we expect in one year; the 28 Oct date is now the latest for California.

BAR-TAILED GODWIT *Limosa lapponica* (30, 1). A juvenile photographed at Fort Bragg, MEN, 6–16 Aug 2006 was quite early for a young bird in California (MM†; GC, ED, OJ†; 2006-108; Figure 5; photo also in *N. Am. Birds* 61:183) and

Figure 5. Superficially similar to the Marbled Godwit (*Limosa fedoa*), this Bar-tailed Godwit (*L. lapponica*) near Ft. Bragg, Mendocino County, 13 August 2006 differs structurally with shorter legs and a shorter, straighter bill. The face pattern is bolder; note the bold white postocular line. Also, the wing coverts lack any cinnamon tones and they are streaked, indicating a juvenile. There is no strong contrast between the coverts and the scapulars, whereas a juvenile Marbled has these coverts less marked, making them contrast more.

Photograph by Oscar Johnson

two weeks earlier than any other record of a presumed juvenile. The photos show a short-legged, short-billed godwit, likely a male, and the barred rump indicates the expected subspecies *L. l. baueri*.

RED-NECKED STINT *Calidris ruficollis* (11, 1). An adult was videotaped at L. Talawa, DN, 11 Aug 2006 (LB‡; 2006-118). The date is late, as California's other accepted records fall primarily from mid to late July with none later than 29 July. Because of plumage wear this bird had only hints of orange left on its face and throat, but it still showed dark spotting on the breast below the orange, a key feature distinguishing this species from the Little Stint (*C. minuta*). Juvenile Red-necked Stints remain undocumented in California, undoubtedly because of the difficulty of finding and identifying them.

LITTLE STINT *Calidris minuta* (8, 1). An adult was in Alviso, SCL, 16–20 Jul 2006 (MB†, OJ; MJM, SCR; 2006-088). The quality of the photographs was marginal, but the report was strengthened by excellent written details, demonstrating the importance of writing notes even of birds that have been photographed. In this case, the white throat, the brighter edges of the coverts and at least one tertial, and the spots contained within the wash across the breast are all features of the Little and not expected on an alternate-plumaged Red-necked Stint.

WHITE-RUMPED SANDPIPER *Calidris fuscicollis* (20, 1). An adult that had started its molt into basic plumage was photographed at China L., KER, 15 Aug 2006 (SSt; LLA, AEK; RSt†; 2006-110; Figure 6 photo also in *N. Am. Birds* 61:145). Like most adults seen at this season, this bird was mostly gray with a few streaks below and warm fringes to some scapulars visible only at close range. All California records of this species are for spring or of adults in fall. In contrast to all other shorebirds known from western North America, no juvenile White-rumped Sandpipers have been documented west of the Rockies!

CURLEW SANDPIPER *Calidris ferruginea* (36, 1). The description of an adult at San Elijo Lagoon, SD, 9 Jul 2006 (SES; 2006-098) was accompanied by an excellent sketch. This record fits the expected pattern of adults in fall, which occur primarily from early July to mid-August.

AMERICAN WOODCOCK *Scolopax minor* (2, 1). An astounding set of circumstances attended the discovery of a woodcock at Desert Center, RIV, 8–11 Nov 2006 (DGo; JG, CMcG†; LACM #114224; 2006-176). The bird was first found in a restricted area on 8 Nov, and a small group of birders was allowed access on a follow-up visit. Observers on 11 Nov saw the bird fly past them as it flushed and headed out to the desert; as they watched it for a half-mile, a Prairie Falcon (*Falco mexicanus*) pursued and then captured the woodcock in mid-air. After a cross-country trek, the birders found the falcon eating the woodcock while perched on a telephone pole. The falcon flushed, allowing the observers to retrieve some rectrices and other feathers, now archived at LACM, the first physical evidence of this species for California. The only other woodcock recorded in California was at the Iron Mtn. Pumping Plant, SBE, 3–9 Nov 1998 (Patten et al. 1999).

Figure 6. This stunning picture of a White-rumped Sandpiper (*Calidris fuscicollis*), taken at China Lake, Kern County, on 15 August 2006 shows not only the white rump but other subtle diagnostic features. Fall adults in molt are often dull grayish brown with few distinguishing features. This bird has molted in fresh gray scapulars of the basic plumage but retains some telltale feathers of the alternate plumage, including rufous-edged scapulars and streaking along the sides. The mandible has a pale orange base, another consistent feature of this species.

Photograph by Bob Steele

LITTLE GULL *Larus minutus* (95, 3). Three for the year was about average: one in its first spring was photographed at the south end of the Salton Sea, IMP, 12 Apr–26 Jul 2006 (KLG; MJB†, MJI†, KZK†, GMcC; 2006-049; photo in *N. Am. Birds* 60:599); another in its first spring at Salton City, IMP, 29 Apr 2006 had a slightly different tail pattern so was different from the previous one (ToE†; GMcC; 2006-058); one in its first fall was photographed at the north end of the Salton Sea, RIV, 19 Nov 2006 (ToE†, TaE†; 2006-189).

ICELAND GULL *Larus glaucoides* (4, 1). A first-winter bird was at Clear Lake, LAK, 16 Jan–26 Feb 2006 (FEH†; MM†, LML‡; 2006-035). Reports of the Iceland Gull are difficult for the committee to assess because of the wide range of variation in Thayer's Gull (*L. thayeri*) and the poor understanding of features that distinguish these taxa. Individuals at the pale extreme of Thayer's and the dark extreme of Kumlien's Gull (*L. glaucoides kumlieni*) have occurred with some regularity in California, contributing to the confusion surrounding the species' status here. The committee believes that Kumlien's Gull may occur rarely but regularly in California and has accepted birds that would not seem out of place in Newfoundland. Although they may look right for Kumlien's, however, it is still possible that they are not pure Iceland Gulls. The birds with plumage outside our current understanding of Thayer's Gull, like the well-documented one at Clear Lake, have pale primaries, checkered rectrices, and patterned tertials. See also records not accepted, identification not established.

LESSER BLACK-BACKED GULL *Larus fuscus* (31, 3). Three for the year is about average, but two immatures in one year is unusual since only five of the previous 28 records are of young birds. An adult was photographed at Red Hill, IMP, 22 Feb–4 Mar (KLG†; HD†, GMcC, MSanM; 2006-023; photo in *N. Am. Birds* 60:286); a first-winter immature was photographed at Salt Creek, RIV, 22 Feb 2006 (KLG†; 2006-024); and, a second-fall immature was photographed at the north end of the Salton Sea, RIV, 9 Sep 2006 (ToE, TaE†; 2006-168). The one on 9 Sep was the earliest recorded for the state. The next earliest record is 14 Sep 1986, also from the Salton Sea (Langham 1991). See also records not accepted, identification not established.

SLATY-BACKED GULL *Larus schistisagus* (17, 11). Ten accepted records of this species during the winter of 2005–2006 seems unthinkable, given that the first was accepted only in 2005 (Iliff et al 2007). Most have come from Half Moon Bay, SM, where a large gull flock also attracts a steady flow of birders. Committee member Jaramillo has been instrumental in assessing identifications and settling the same-bird issues attending reports of this species. Accepted records from Half Moon Bay are as follows: one adult 2 Dec 2005–8 Mar 2006 (RSTh; 2006-044), considered different from another adult 21 Feb 2006 (RSTh; 2006-045). A first-winter bird 3 Jan 2006 raised concerns over how little we know about variation in the Slaty-backed Gull's immature plumages, but the committee was unanimous in concluding that this bird matches our current understanding of this species, and there were no obvious signs of hybridization (AJ†; 2006-001). From its retention of substantial black on the bill an adult 13 Jan–8 Mar 2006 was considered to be a returning individual, (RSTh; LWC†, ToE†, AJ†,OJ†, 2006-008; see record 2005-048, Iliff et al. 2007). An adult on 6 Feb 2006 (RST†, DVP†, DSS†, 2006-020) generated discussion because it lacked the extensive head streaking the Slaty-backed Gull typically shows in winter, but the remainder of the plumage and structure were consistent with this species, and Howell and Dunn (2007) noted that head molt can rarely be completed by February. A first-year immature 7 Jan–6 Feb 2006 (AJ†; LWC†, DWN†, LL‡, DSS†; 2006-026) was considered to be the same as that seen 21 Feb 2006 (DSS†; 2006-062). A second-year bird 4 Feb 2006 generated debate as a possible hybrid, a real problem that can be invoked on many claims of this species, but even those questioning the record did not have a viable alternative (AJ†; 2006-027). A third-year bird on 4 Feb

2006 (AJ†; LML†, EPr†, DSS†; 2006-028) was slightly paler than typical for the Slaty-backed Gull, reminding us of the poor understanding we have of this species' variation in mantle color (see King and Carey 1999). Finally, a second-winter bird was present 27 Jan 2006 (MJI†, MTH†, GMcC, DSS†; 2006-016).

Away from Half Moon Bay, accepted records are of an adult in Alviso, SCL, 14 Jan 2006 (AJ†; 2006-009) and a third-winter bird in Fremont, ALA, 9 Mar 2006 (AJ†; 2006-034).

In addition, because of the pattern of distribution now emerging, a second-winter bird at the Ventura Marina, VEN, 5 Feb 1995 (DDJ†; 1995-053A), previously rejected because of the lack of a written description of the bird or photograph of a spread wing (Rottenborn and Morlan 2000), was reconsidered. The bird photographed standing, however, looks perfect for the species, leading the committee to reverse itself and endorse the record. The reconsideration of records demonstrates an important aspect of the committee's process; all records archived can be reassessed as our knowledge improves or patterns emerge.

ROSS'S GULL *Rhodostethia rosea* (1, 1). An adult, a welcome addition to the California list, was at Red Hill, Salton Sea, IMP, 17–19 Nov 2006 (GMcC; HD†, DG†, ToE†, WF†, N&MF†, OJ†, KZK†, MM†, CMcG†, TMcG†, BM†, DWN†, MSanM†, GLR, LS†, BKS†, SSo†, TRS†, MSt†, LST†, SBT†, PW†, 2006-183; McCaskie 2007, which see for details and photos, as well as the cover of *Western Birds* 38(2) and *N. Am. Birds* 61:176. This Ross's Gull was documented by more birders than perhaps any other bird reported to the CBRC.

THICK-BILLED MURRE *Uria lomvia* (46, 1). An adult in alternate plumage was found dead in Pacific Grove, MTY, 1 Aug 2006 (MB, BLS†, SBNMH #8768; 2006-102). It is the earliest Thick-billed Murre found in California in fall by ten days and one of only five documented during August.

LONG-BILLED MURRELET *Brachyramphus perdix* (19, 1). One photographed near Trinidad Harbor, MEN, 30 Aug–2 Sep 2003 (PAH†; SMc†, LPL, KR; 2003-117A) was debated through several circulations as the committee waited for photos not originally circulated with the record.

*RUDDY GROUND-DOVE *Columbina talpacoti* (108, 1). The committee has twice rejected the report of one near Fillmore, VEN, 24–26 Nov 1978 (REW; 1981-031A; Binford 1985, Howell and Pyle 1997). It now reverses itself, given the pattern of this species' distribution emerging in the last decade. The acceptance was not without controversy, as this record predates not only all previous California records by six years but also the earliest records from Sonora and Arizona by a few years. Nevertheless, most members now believe that the bird was a harbinger and an early pioneer. Furthermore, supporters noted the lack of evidence of caged ground-doves, as the question of escape from captivity was a significant reason for the record's prior rejection.

SNOWY OWL *Bubo scandiacus* (59, 2). A first-winter male was near Dixon, SOL, 13–14 Jan 2006 (TaE†, ToE, EDG†, JFH†, DL, CAM, DWN†, DEQ, WFW†; 2006-007; photo in *N. Am. Birds* 60:281) and was the first Snowy Owl reported in California since early 1978. Another first-winter bird was at Grizzly Bay, SOL, 30 Dec 2006–22 Feb 2007 (CAS†; DWA†, MB, JM†, JCS†; 2006-224; Figure 7; photo also in *N. Am. Birds* 61:325). The winter of 2006–07 saw a number of Snowy Owls reach southern British Columbia and points farther south.

BROAD-BILLED HUMMINGBIRD *Cynanthus latirostris* (71, 2). Two spring records in 2006 are significant because there was only one prior California record of the Broad-billed Hummingbird for that season. An adult male was near Ramona, SD, 14–18 Apr 2006 (BC†; GMcC,2006-050). An adult male in El Centro, IMP, 20–21 Apr 2006 represents the first record for Imperial County (GMcC; TMcG†, MSanM;

Figure 7. This Snowy Owl (*Bubo scandiacus*) was photographed on 19 January 2007 during its nearly month-long stay at Grizzly Bay, Solano County. It occurred approximately one year after another Snowy Owl nearby, so the question of whether this was a different individual arises. The heavily marked wings suggest a young bird, although some adult females are heavily marked too. Features not visible in this photo, such as an extensive white nape, thin tail bars, and uniform flight feathers support the conclusion that this was a first-winter bird. Older birds would likely show two generations of remiges.

Photograph by Douglas W. Aguillard

2006-052; photo in *N. Am. Birds* 60:438). A female in Mission Viejo, ORA, 25 Nov 2006–14 Jan 2007 (DRW†; 2006-220) was judged to be the same as the one there 17 Dec 2005–22 Jan 2006, returning (Iliff et al. 2007). The vast majority of California's Broad-billed Hummingbirds have occurred in fall.

VIOLET-CROWNED HUMMINGBIRD *Amazilia violiceps* (6, 1). Most unusual was a Violet-crowned Hummingbird videotaped at Grass Valley, NEV, 8 Feb 2006 (B&JC‡; 2006-030). The videotape was critical to the acceptance of this report, given the unprecedented location away from the coastal plain.

RUBY-THROATED HUMMINGBIRD *Archilochus colubris* (9, 1). A first-fall male was photographed at Arroyo Grande, SLO, 17–25 Oct 2006 (MB, DMC, TME†, OJ†, CAM, DEQ, BKS†, DVP†; 2006-157; Figure 8). This bird stayed for several days, allowing extended study of the latest Ruby-throated Hummingbird found in California in fall. Arizona has just added this species to its list on the basis of a winter record from Tucson (20 Dec 2004–14 Apr 2005, Rosenberg et al. 2007).

GREATER PEWEE *Contopus pertinax* (39, 2). One in the old zoo area of Griffith Park, Los Angeles, LA, 17 Apr 2006 (RBa; MSanM, LS†; 2006-053; photo in *N. Am. Birds* 60: 472) was considered to have likely wintered in the vicinity since there are no California records of spring migrants known not to have wintered where

Figure 8. This Ruby-throated Hummingbird (*Archilochus colubris*) visited feeders in Arroyo Grande, San Luis Obispo County, 17–25 October 2006 (here 20 October). The narrow inner primaries indicate the genus *Archilochus*, eliminating more expected species like Anna's Hummingbird (*Calypte anna*), which can share this upperpart coloration. The bright green upperparts, extending to the top of the crown, are a good feature for the Ruby-throated; the Black-chinned (*A. alexandri*) is invariably grayish on the forecrown (and only rarely bright green on the back). The straight bill is a further distinguishing feature but not diagnostic on its own. Barely visible at the tip of the wing is a narrow feather; this is the tip of primary 10, narrow and pointed in the Ruby-throated but blunt and rounded in the Black-chinned. Not visible in this photograph are two red gorget feathers that clinch the identification of this first-year male Ruby-throated Hummingbird.

Photograph by Brad K. Schram

they were found. Another had wintered annually at this same site from 1979–80 to 1983–84. One on Clark Mt., SBE, 27 May–3 Jun 2006 (SBT, LST; DHu; 2006-086) was just the second found in summer in montane coniferous forest in California and adds another species of Madrean montane woodlands to the list of birds recorded on this small "sky island" in the eastern Mojave Desert. In Arizona, apparently nonbreeding Greater Pewees have been recorded in summer as close to California as the Hualapai Mts., Mohave Co., 150 km to the southeast of Clark Mtn. (Corman and Wise-Gervais 2005).

EASTERN WOOD-PEWEE *Contopus virens* (11, 1). One in full song was near the Mace Avenue bridge along Putah Creek, SOL, just south of Davis, on 4 Jun 2006 (JS; ToE†, FO; 2007-049); although voice recordings could not be obtained, multiple *pee-o-wee* songs were heard by observers familiar with *Contopus* vocalizations. Of the ten previously accepted Eastern Wood-Pewees for California, all but two were in June and early July, most singing on territory. Arizona has just three records of this species, all of singing birds (Rosenberg 2001). See also records not accepted, identification not established.

YELLOW-BELLIED FLYCATCHER *Empidonax flaviventris* (20, 1). A juvenile was captured, measured, and photographed on Southeast Farallon I., SF, 27–28 Aug 2005 (MB; BH†, RST†; 2005-202; Figure 9). This record was accepted only when excellent in-hand photographs (not referred to or included with the original submission) were made available. Previous California records of the Yellow-bellied Flycatcher extended from 3 September to 16 October, so this one is the earliest yet. See also records not accepted, identification not established.

ALDER FLYCATCHER *Empidonax alnorum* (5, 1). A juvenile captured, measured, and photographed on Southeast Farallon I., SF, 8–11 Sep 2006 (MB, JT‡; RFo†, RST; 2007-034; Figure 10; photo also in *N. Am. Birds* 61:140) fit comfortably within the range of Alder in plumage, measurements, and wing formula. The value of formula R, incorporating wing tip shape and wing, tail and bill length (Pyle 1997), was especially useful in eliminating an eastern Willow Flycatcher (*E. traillii traillii*). The more striking differences with the three western subspecies, notably the more subdued tertial patterning of the latter, were evident in side-by-side comparison with a migrant of *E. t. brewsteri*.

GREAT CRESTED FLYCATCHER *Myiarchus crinitus* (48, 2). The two accepted in 2006 fit within the latter half of a well-established interval of fall coastal vagrancy. One was at outer Pt. Reyes, MRN, 12 Oct 2006 (JJ†; 2006-185; photo in *N. Am. Birds* 61:140), the other was netted, measured and photographed at the Big Sur River mouth, MTY, 13 Oct 2006 (NT†; 2007-047).

THICK-BILLED KINGBIRD *Tyrannus crassirostris* (17, 0). One at Banning Park, Wilmington, LA, 4 Nov 2006–9 Mar 2007 had apparently returned for its second consecutive winter (KGL; MB, KLG†, RST; 2006-179); nearly a third of California's Thick-billed Kingbirds have returned for more than one winter.

FORK-TAILED FLYCATCHER *Tyrannus savana* (2, 1). One was photographed at the intersection of Tierra Buena and Eager roads nw. of Yuba City, SUT, 28 Sep 2006 (KP†; 2007-005; photo in *N. Am. Birds* 61:141). The committee was cautious with a second state record, especially one supported by only a single photograph initially submitted. Correspondence with the observer confirmed the location where the photograph was taken and additional photographs were submitted. The apparent rectrix molt and pale nape were advanced by some committee members as characters suggesting the northerly breeding *T. s. monachus*. California's previous Fork-tailed Flycatcher, at Bridgehaven, SON, 4–8 Sep 1992 was thought to be of the nominate subspecies, a migrant from the Southern Hemisphere (McCaskie and Patten 1994).

YELLOW-THROATED VIREO *Vireo flavifrons* (110, 4). One was at Butterbredt Spring, KER, 14 May 2006 (TEW, LLA; 2006-074). One was singing at Old Mission Dam near Santee, SD, 31 May 2006 (CH; DA, EA, BaC, TRS†; 2006-068; photo in *N. Am. Birds* 60:439). Fall vagrants were at Mendoza Ranch on Pt. Reyes, MRN, 1 Oct 2006 (SE†, RFi, SH; 2006-144) and China Ranch, INY, 13 Oct 2006 (JEP†; 2006-205). Records of the Yellow-throated Vireo show a strong peak in May, with a weaker fall peak in late September and October. The bird at China Ranch is among the latest for the interior, matched only by one at Panamint Springs, INY, 13–14 Oct 1990 (CBRC 2007).

BLUE-HEADED VIREO *Vireo solitarius* (45, 2). A singing bird at Mad River County Park, HUM, 9 Sep 2006 (DC; 2007-121) matched the earliest accepted fall record for California. An additional record predating the 1997 split of the Solitary Vireo complex (AOU 1997) was accepted from Panamint Springs, INY, 3 Oct 1989 (JLD; 2007-078). See also records not accepted, identification not established.

YELLOW-GREEN VIREO *Vireo flavoviridis* (88, 2). Two immatures were found during the identical date spans of 30 Sep–2 Oct 2006 at two coastal sites: at Road Forks Pool, Pt. Reyes, MRN (MB, ToE†, RFi, EDG†, DHa†, JM; 2006-141), and Oceano State Park, Oceano, SLO (TME, MaS; BB†, DMC, CAM, MSanM, BKS†; 2006-134; photo in *N. Am. Birds* 61:146). The latter bird was described by all observers as having brown eyes, but one close-up profile photograph taken with a flash appeared to show bright red irides. The committee cautions that short-distance side-on flash photography can accentuate the "red eye" effect, possibly leading to misinterpretations in birds with age-dependent eye color. The California pattern of records is of fall dispersants, almost all immature, whereas that for Arizona is of summer dispersants in late June or July (Rosenberg 2001).

TAIGA FLYCATCHER *Ficedula albicilla* (1, 1). This remarkable bird, first for California and mainland North America, was along Putah Creek below Monticello Dam, SOL/YOL, 25 Oct 2006 (JCS†, SBT†; ToE, DEQ; 2006-169; photo in *N. Am. Birds* 61:183); more details and photographs are in Appendix H of CBRC (2007:H6, H25). Several experts (see Acknowledgments) advised the committee on the distinctions between the Taiga and the more westerly Red-breasted Flycatcher (*F. parva*), formerly considered conspecific. Cederroth et al. (1999) and Svensson et al. (2005) covered the identification of these species well. *Ficedula albicilla* breeds from 50° E in eastern European Russia east through the taiga of Siberia, as far northeast as the Anadyr R. basin; it winters in the Indian subcontinent (mainly the eastern half), southern China, and Indochina (Cramp and Perrins 1993).

WOOD THRUSH *Hylocichla mustelina* (22, 1). One remained at Crystal Spring in the Kingston Mts., INY, from 19 Aug to 10 Oct 2006 (BD†; JLD, GMcC, SJM†, DR†; 2006-111; photo in *N. Am. Birds* 61:146). During this two-month stay the bird lost then regrew all of its rectrices. With one exception California's previous Wood Thrushes are distributed bimodally, from 2 to 19 June (8 records) and from 19 October to 23 March (12 records). So it seems likely that the bird at Crystal Spring arrived in late spring or early summer. The one previous Wood Thrush known for California in August, at Glendale, LA, 1–11 Aug 1968 (Roberson 1993), may also have summered locally.

RUFOUS-BACKED ROBIN *Turdus rufopalliatus* (15, 1). One was photographed and reported through the Cornell Laboratory of Ornithology's BirdSource "Project Feederwatch" at a vacation property just west of the Coachella Canal, RIV (just north of the Imperial County line near the Imperial Hot Mineral Spa RV Park), on 23 Oct 2006 (AK†; 2006-201; Figure 11). Nine of the 15 California records are from the deserts of Imperial and Riverside counties.

CURVE-BILLED THRASHER *Toxostoma curvirostre* (18, 1). One was at Big River on the west bank of the Colorado R., SBE, 30–31 Oct 2006 (DGo; 2006-177). Because no calls were heard and the identification was based largely on plumage and bill shape, acceptance was not unanimous.

WHITE WAGTAIL *Motacilla alba* (27, 1). The committee reconsidered the record of one at Coyote Creek Riparian Station (now Coyote Creek Field Station), Alviso, SCL, 15–17 Dec 1991 (AJF; ER; 1992-219A) that had not been accepted because it was supported only by a brief description on a Christmas Bird Count "supporting details" reporting form. The reconsideration was occasioned by the surfacing of a duplicate of a convincing sketch that had been submitted to the National Audubon Society Christmas Bird Count editors but apparently discarded. The committee reached no consensus as to whether this bird was of the subspecies *M. a. ocularis* or *M. a. lugens*, the Black-backed Wagtail. See also records not accepted, identification not established.

Figure 9. With difficult *Empidonax* identifications, extensive and multifaceted documentation is required. This bird, California's earliest fall Yellow-bellied Flycatcher (*E. flaviventris*), was captured and photographed on Southeast Farallon Island, San Francisco County, on 27 August 2005; it did not gain unanimous acceptance until a series of in-hand photographs was added to the record prior to its third circulation. Note the thin eye-ring (showing a slight "teardrop" projection at the rear), the strong green tints to the plumage, and the yellow-white wingbars, all plumage characters supporting the identification as the Yellow-bellied rather the Western Flycatcher (*E. difficilis/occidentalis*), in which juveniles have ochre wingbars.

Photograph by Brett Hartl

SPRAGUE'S PIPIT *Anthus spragueii* (97, 13). Up to eight were in agricultural fields n. of Calipatria, IMP, 28 Oct 2006–3 Feb 2007 (OJ, GMcC, DVP; MB, KHL†, JM†, RST, PW†; 2006-171). As many as five were about 4 km away in fields near the Calipatria State Prison, IMP, 20 Nov–19 Dec 2006 (MJSM†; OJ†; 2006-202). It is clear that Sprague's Pipits winter regularly in fields of Bermuda grass and mown alfalfa in the Imperial Valley, particularly around Calipatria. See also records not accepted, identification not established.

BLUE-WINGED WARBLER *Vermivora pinus* (40, 2). A singing male was at the Cosumnes River Preserve, SAC, 28 May 2006 (JTr; 2007-028). One was at the Carmel River mouth, Carmel, MTY, 27 Oct 2006–9 Jan 2007 (MB; LWC, DEQ, DR†; 2006-170; photo in *N. Am. Birds* 61:141); this bird attempted to winter and was netted and banded on 21 Dec 2006. California's only prior winter Blue-winged Warbler was at Ferndale, HUM, 2 Jan–7 Mar 1993 (Erickson and Terrill 1996).

GOLDEN-WINGED WARBLER *Vermivora chrysoptera* (69, 1). A female at Montana de Oro State Park, SLO, 23 Sep 2006 (JSR; 2006-206) was the second Golden-winged Warbler for San Luis Obispo County. See also records not accepted, identification not established.

YELLOW-THROATED WARBLER *Dendroica dominica* (113, 5). Spring vagrants were at Wilson Cove, San Clemente I., LA, 10–11 May 2006 (SWS†; 2006-071) and at Cabrillo National Monument, Pt. Loma, SD,15 May 2006 (AM†; 2006-063; photo in *N. Am. Birds* 60:440). In fall, one was at Nunes Ranch, Pt. Reyes, MRN,

Figure 10. Acceptable documentation for an Alder Flycatcher (*Empidonax alnorum*) in California ideally involves extensive close examination and measurements, as shown here in these profile and spread-wing views of bird captured on Southeast Farallon Island, San Francisco County, 8 September 2006. Structural and plumage characters distinguishing this bird from the three western subspecies of the Willow Flycatcher (*E. traillii*) included the relatively stout bill, thin eye-ring, bold white tertial borders (diffuse in western Willow Flycatchers), auricular–throat contrast, and green tones to the dorsal plumage. Discrimination of the Alder from the much more problematic eastern Willow Flycatcher (*E. traillii traillii*) requires a battery of measurements and wingtip-shape characters (ideally supplemented by diagnostic call notes, which were not heard from this captured individual).

Photograph by Rob Fowler

16–29 Sep 2006 (RA†, BAc†, MB, MD, EDG†, PL†, LML‡, BrM†, DWN†; 2006-132) and one was south of Needles, SBE, 14–17 Nov 2005 (KDE; 2006-076). All of these were of subspecies *D. d. albilora*, which accounts for nearly all of California's Yellow-throated Warblers in both spring and fall. One at Tewinkle Park, Costa Mesa, ORA, 12 Nov 2006–2 Feb 2007 (DRW†; DWA†, BAi†, JLD, MJI†, CAM, JM, JEP†, SSo†; 2006-188), however, had a long bill and some yellow in the supraloral area. The committee reached no consensus on its subspecific identity, but several members believed that these characters specify nominate *dominica*, which apparently accounts for about half of California's now nine midwinter Yellow-throated Warblers.

GRACE'S WARBLER *Dendroica graciae* (52, 4). Fort Rosecrans National Cemetery, Pt. Loma, SD, has proven to be a consistent site for this species, with four in 2006. A female returning for its second winter remained from 22 Sep 2006 to 19 Mar 2007 (MTH†, GMcC, CAM; 2006-136; same bird as 2005-146, Iliff et al. 2007). Another female returned for its fourth winter 3 Sep 2006–14 Apr 2007 (MB, MTH†, CAM, GMcC; 2006-142; same bird as 2005-125). Two additional dull birds, presumed to be females, were at the cemetery 15 Oct 2006 (MTH, GMcC; 2006-165, 2006-166). Away from Pt. Loma, one was at Waller Park, Santa Maria, SBA, 22 Feb–27 Mar 2006 (JMC; DMC, WTF†, OJ†, NL; 2006-025; photo in *N. Am. Birds* 60:284); it returned for its second winter 30 Sep 2006–19 Mar 2007

(DMC; CAM; 2006-137). A fall vagrant was at DeForest Park, Long Beach, LA, 12 Oct 2006 (RBa; KSG; 2006-196).

PINE WARBLER *Dendroica pinus* (80, 7). One dull bird, presumably a second-year female, was at Waller Park, Santa Maria, SBA, 26 Feb–18 Apr 2006 (DMC, JMC†; MB, OJ; 2006-033). Three individuals were at North Vandenberg AFB, SBA, in October 2006: a first-year male 13 Oct (JMC†; 2006-211), a female about 0.5 mi. away 19 Oct (JMC; 2006-212), and another female was at the same location 30–31 Oct 2006 (JMC; 2006-213). Because of the 11-day gap between the two sightings, the observer's daily coverage of the site, and the site's limited appropriate habitat (pines), the committee concluded there were most likely two individuals. A first-winter female was at Mile Square Park, Fountain Valley, ORA, 3–11 Jan 2006 (JEP; 2006-039). A first-fall male was in Bart Speedlove Park, Mission Viejo, ORA, 4 Nov 2006 (PC†; 2006-221). A male was in Tewinkle Park, Costa Mesa, ORA, 12 Nov 2006 (JEP†; 2006-219). As expected, all of these birds were found in parks or other open areas with planted pines on the coastal slope. In California, the Pine Warbler is most frequent in winter, as also in Arizona (Rosenberg 2001) and New Mexico (S. O. Williams pers. comm.).

WORM-EATING WARBLER *Helmitheros vermivorum* (103, 2). One was found by biologists censusing monarch butterflies at the Esalen Institute 10 mi. north of Lucia, MTY, 18 Dec 2006 (JeG; 2007-093). Another was on the campus of University of California, Irvine, ORA, 31 Dec 2006–*18 Mar* 2007 (DWA†, MJI†, CAM, JEP; 2007-013; photo in *N. Am. Birds* 61:329).

CONNECTICUT WARBLER *Oporornis agilis* (108, 7). Southeast Farallon I., SF, remains the premier spot for this skulking species in California. Single birds were there 3–6 Sep 2006 (banded, MB†, RST; 2007-037), 6–7 Sep 2006 (MB; JT; 2007-038), 13–14 Sep 2006 (banded, MB†; 2007-039), and 29 Oct 2006 (banded, JT†; 2007-041); the last is the latest for California by 11 days and among the latest ever convincingly documented for North America (Dunn and Garrett 1997). Three others were found away from Southeast Farallon I. One at Butterbredt Spring, KER, 23 May 2006 (SSu; 2006-085) is the earliest yet found in California in spring. Although it was seen rather briefly, an experienced observer provided a convincing description. One was photographed and videotaped at Shay Park, Arcata, HUM, 15 Sep 2006 (KR, DC; SMc†,‡; 2006-130). One was at Scotty's Castle, Death Valley National Park, INY, 1 Oct 2006 (JHi; 2006-214). See also records not accepted, identification not established.

MOURNING WARBLER *Oporornis philadelphia* (134, 3). One in Birchim Canyon north of Bishop, INY, 22–*24* Aug 2002 (JLD; DJH; 2006-207) was identified by both plumage and the distinctive call that is diagnostically different from calls of MacGillivray's Warbler (*O. tolmiei*). Other birds were well studied and photographed at Galileo Hill Park, KER, 16 Sep 2006 (KHL†, TEW, AEK; JLD, RSt†; 2006-131) and Southeast Farallon I., SF, 11–12 Sep 2006 (MB, RFo†; 2007-036).

SCARLET TANAGER *Piranga olivacea* (137, 3). Males were at Wilderness Park, Redondo Beach, LA, 17 Oct 2006 (DLM; 2006-216), Wilson Cove, San Clemente I., LA, 19 Oct 2006 (SWS; 2006-218), and Southeast Farallon I., SF, 27 Oct 2006 (JT; 2007-042). Curiously, each was described as having all-black wings, implying that they were adult. Unless the wings of a Scarlet Tanager are described in detail, however, the committee prefers to consider such birds as of unknown age.

CASSIN'S SPARROW *Aimophila cassinii* (48, 1). A singing male, whose performance included one "skylarking" flight song, was in open Joshua tree scrub with abundant exotic annual grasses at the intersection of Panorama and Largo Vista roads southeast of Pearblossom, LA, 27 May 2003 (JSk; 2006-032).

SNOW BUNTING *Plectrophenax nivalis* (111, 2). Two were together on the north jetty of Humboldt Bay, HUM, 3 Dec 2006 (DC†; 2006-199); photos showing the two birds together were submitted after the record circulated. See also records not accepted, identification not established.

RUSTY BLACKBIRD *Euphagus carolinus* (8**, 3). The committee discontinued reviewing the Rusty Blackbird in 1974 then resumed in 2006 after California reports of this boreal forest breeder declined steeply. The drop-off in California coincided with a major decline of the species' population as a whole (Niven et al 2004). A female was at the Alexandre Dairy near Ft. Dick, DN, 4–15 Feb 2006 (OH†; 2006-022). One was on Southeast Farallon I., SF, 31 Oct–4 Nov 2006 (AP, JE, BW†; 2007-043; Figure 12). One was at Furnace Creek Ranch, INY, 21 Oct 2006 (RSt†; 2006-158). See also records not accepted, identification not established.

COMMON GRACKLE *Quiscalus quiscula* (73, 1). A first-winter female at Kuhn's Dairy west of Seeley, IMP, 1 Dec 2006–20 Jan 2007 (GMcC; JLo, MJB; 2006-197) was the second Common Grackle found in Imperial County. See also records not accepted, identification not established.

STREAK-BACKED ORIOLE *Icterus pustulatus* (8, 1). A striking adult male was at Zzyzx, SBE, 9–16 Oct 2006 (MJSM; HC†, PAG†, CAM, GMcC, TMcG†, MSanM, SJM, RSt†; 2006-145). The relatively fine and interrupted back streaking and deep orange-red tones to the head confirmed this bird as the expected northernmost subspecies *microstictus*. Photographs are on the front cover of *Western Birds* 38(3), in CBRC (2007:H28), and *N. Am. Birds* 61:184.

RECORDS NOT ACCEPTED, IDENTIFICATION NOT ESTABLISHED

TRUMPETER SWAN *Cygnus buccinator* A report of six near Weed, SIS, 14 Nov 2006 was not supported by much detail (2006-184). The lack of yellow on the bill, as reported in this case, is of no value in distinguishing swans, as many Tundra Swans (*C. columbianus*) lack yellow. Furthermore, judging size without direct comparisons is nearly impossible and can be difficult even when both species are together. Observers should provide as much detail as possible on characteristics of the head and bill, as outlined by Patten and Heindel (1994).

STELLER'S EIDER *Polysticta stelleri*. An adult male, an age–sex class relatively unlikely in California, was reported from Humboldt Bay, HUM, 22 Dec 2005 (2006-208). Many committee members suspect that the identification was correct, as hunters, who reported this bird, are often quite skilled at identification. Although an adult male is possible, a thorough, convincing description is needed. In this case, the description of the flanks as grayish or whitish, rather than buff or tan, was enough to cause concern. California has only three accepted records of Steller's Eider.

YELLOW-BILLED LOON *Gavia adamsii*. An incomplete description of one reported from Pt. Delgada, HUM, 1 Nov 2006 (2007-023) had mixed support. While some details were intriguing, key field marks, such as an auricular mark, specific color of the culmen, and age of the bird (or sufficient detail from which its age could be deduced), were described minimally or not at all.

GALAPAGOS/HAWAIIAN PETREL *Pterodroma phaeopygia/sandwichensis*. One reported off Pt. Pinos, MTY, 25 Aug 2006 (2006-120) may have been identified correctly, but key field marks such as the dark carpal bars on the underwing were not described.

STEJNEGER'S PETREL *Pterodroma longirostris*. This bird was originally reported as a Galapagos/Hawaiian Petrel (*P. phaeopygia/sandwichensis*), 2 mi. west of Moss Landing, MTY, 4 May 2003 (2005-019A). Steve N. G. Howell reviewed the photograph and maintained it was of a Stejneger's. Acceptance as a Stejneger's

Figure 11. This Rufous-backed Robin (*Turdus rufopalliatus*) was fortuitously documented on camera during a brief visit to a remote desert feeding station east of the Salton Sea in Riverside County on 23 October 2006; the photograph and accompanying details had been submitted through the Cornell Laboratory of Ornithology's "Project Feederwatch."

Photograph by Ann Kern

Figure 12. This first-year female Rusty Blackbird (*Euphagus carolinus*) was captured and banded on Southeast Farallon Island on 31 October 2006. Opportunities for finding and documenting Rusty Blackbirds in California have declined steeply in recent years in parallel to the species' overall significant decline.

Photograph by Bobby Walsh

was complicated when a second-hand report relayed that the observer thought the bird was approximately the size of a large shearwater, clearly too large for one of the *Cookilaria* petrels. The photos are blurry, and the observers wrote no description. California's six previous Stejneger's Petrels have been at least 60 n. miles from shore and in July (two) or November (four).

LITTLE SHEARWATER *Puffinus assimilis*. One photographed on Monterey Bay, MTY, 29 Oct 2003 was previously accepted as the only record for California (San Miguel and McGrath 2005, 2003-149A). Steve N. G. Howell challenged this conclusion, offering as an alternative hypothesis that the bird was an aberrant Manx Shearwater (*P. puffinus*). He suggested that molt and lighting compounded some plumage oddities, even though other features, such as leg color, were incorrect for Manx. His analysis was comprehensive and compelling, and the decision to remove this species from the state list was unanimous. The committee is grateful to Howell for his contribution.

There is still disagreement over the identification of the bird depicted in these photographs. Some committee members believe it is a Manx, although a majority believes it is more likely a Little. Despite these differences, the entire committee, which includes one of the observers, agrees that a record of this significance needs to be irreproachable to be accepted. Beyond the complications of interpreting features that seem to vary from one image to the next, the taxonomic status of the Little Shearwater complex is unsettled. If the bird was a Little Shearwater in the broad, traditional sense (e.g., Jouanin and Mougin 1979), its identification to subspecies or species in a narrower sense remains problematic. Several committee members (and Howell) emphasized that this sighting could involve an undescribed taxon; the last chapter on the record may yet be written.

*BROWN BOOBY *Sula leucogaster*. A report of one 12 mi. nw. of San Diego, SD, 12 Aug 2006 (2006-103) lacked detail sufficient to distinguish a Brown from a Red-footed Booby (*S. sula*). Another sulid off Imperial Beach, SD, 15 Oct 2006 (2006-162) was seen at too great a distance for boobies to be distinguished; the observer acknowledged that he could not eliminate a Blue-footed Booby (*S. nebouxii*) with certainty. Given the recent trends in booby sightings off San Diego (see Records Accepted), both of these were most likely Brown Boobies. At its 2008 meeting, the committee voted to discontinue reviewing records of Brown Boobies seen after 2007.

GLOSSY IBIS *Plegadis falcinellus*. The report of an adult in basic plumage near Calipatria, IMP, 29-31 Jul 2006 (2006-094) failed because the two observers' descriptions of certain marks conflicted and one of the observers expressed some doubt about the identification. Given the hybridization between the Glossy and White-faced Ibises, the committee approaches reports of the Glossy cautiously. Any indication of red in the eye or facial skin, or white facial stripes, however slight, will likely lead to a vote not to accept.

COMMON BLACK-HAWK *Buteogallus anthracinus*. A second-hand report of one seen while the observers were stuck in traffic near Cajalco, SBE, 6 Jan 2006 had detail insufficient for any committee member to support it (2006-013). A juvenile reported from Montclair, SBE, 15 Jan 2006 did not inspire confidence as the details were sparse, and the described proportions (lanky instead of stocky) were wrong. Acceptance of a juvenile Common Black-Hawk, an age unrecorded for this species in California, would require far more complete details (2006-011).

CRESTED CARACARA *Caracara cheriway*. One reported from Monterey Bay 15 Feb 1916 was published in *Condor* (Heath 1919) and had been previously rejected by the committee (Roberson 1993; 1993-155A). While a majority of members agreed the bird in question must have been a caracara, there was no description of the bird whatsoever, so again the committee did not accept the record.

AMERICAN OYSTERCATCHER *Haematopus palliatus*. According to Jehl's (1985) index, an oystercatcher at Long Beach, LA, 29 Apr 2006 (2006-059) was likely a hybrid. Since some features were not visible, complete scoring was impossible, and the committee declined to accept the record.

HUDSONIAN GODWIT *Limosa haemastica*. The report of one near Davis, YOL, 1 Sep 2006 lacked the detail necessary for acceptance (2007-022). Although the wings were said to have had a diagnostic pattern, there was no description of this pattern; the tail was said to be all black, but the Hudsonian and Black-tailed (*L. limosa*) godwits both have white at the base of the tail.

ICELAND GULL *Larus glaucoides*. The committee concluded that a first-winter gull reported as a Iceland from Orick, HUM, 11–2 Feb 2006 (2006-019) was either a Thayer's or a bird intermediate between Thayer's and Iceland gulls. The primaries were a little too dark, the tertials were not as finely marked as expected for the Iceland, and the written details were too sparse for a species of this rarity.

LESSER BLACK-BACKED GULL *Larus fuscus*. The report of an adult at Goleta, SBA, 18 Jan 2006 (2006-043) was not accepted on the second round. The description lacked some important characteristics of the claimed species, such as streaking around the eye and contrastingly pale eye; it is possible that these details were missed because the flock of gulls flew before the bird was viewed through a telescope. Given the problems with hybrid gulls, the committee takes a conservative stance with incompletely described gulls.

EASTERN WOOD-PEWEE *Contopus virens*. A pewee reported as the Eastern from Thompson Reservoir, Santa Catalina I., LA, 12 May 2006 (2006-065) was seen briefly, photographed, and heard to vocalize. Because of the date three weeks earlier than any Eastern Wood-Pewee previously accepted for California, the committee needed especially thorough documentation. Several members were not convinced that the described upslurred call ruled out some rising whistled vocalizations given by the Western Wood-Pewee (*C. sordidulus*). Most members believed the single photograph was consistent with but not diagnostic for the Eastern, especially given the low angle of the sun, which may have over-emphasized olive coloration. They concluded that the documentation was insufficient to support so unusual a record.

YELLOW-BELLIED FLYCATCHER *Empidonax flaviventris*. A bird observed fairly briefly by a single observer on Southeast Farallon I., SF, 7 Oct 2006 (2007-035) was identified solely on the basis of plumage characters; the description did not mention structural characteristics, and no vocalizations were heard. This record received no support from the committee.

BLUE-HEADED VIREO *Vireo solitarius*. Six records, mostly predating the AOU's (1997) split of the Solitary Vireo complex, lacked documentation sufficient to make the difficult discrimination of the Blue-headed from Cassin's Vireo (*V. cassinii*). The rejections of these records, four of which came from observers with a combined 56 years of experience on the CBRC, stemmed from the brevity of documentation written before this taxon was reviewed by the CBRC: Tijuana River valley, SD, 27 Sep 1972 (2002-065); Southeast Farallon I., SF, 25–27 Sep 1974 (2002-067); Santa Barbara, SBA, 7 Jan 1981 (2002-073); and Carpinteria, SBA, 30 Sep–5 Oct 1985 (2002-077). The documentation was also too brief for birds reported from Shipley Nature Center, Huntington Beach, ORA, 22 Sep 1990 (2002-101) and Capetown, HUM, 10 Sep 2005 (2006-112). Photographs accompanying the latter report suggested the Blue-headed to some committee members, Cassin's to others. Virtually all committee members believe that this identification problem is more complex than appreciated even a few years ago.

SEDGE WREN *Cistothorus platensis*. One reported near the junction of Big Chico Cr. and the Sacramento R., BUT, 28–29 Oct 2006 (2006-194) was seen briefly by different observers on two consecutive days, but the only documentation was submitted by the observer on the latter day. A slight majority of the committee concluded that the description failed to eliminate a drab Marsh Wren (*C. palustris*); in particular, it did not mention the hallmark bright buff coloration on the breast, sides, and flanks of a Sedge Wren, and no vocalizations were heard.

WHITE WAGTAIL *Motacilla alba*. One was reported at Joshua Tree National Park, RIV, 5 May 2006 (2006-064) by an observer visiting from out of state. Although the description strongly suggested a bird in the White Wagtail complex, committee members were troubled by the lack of useful behavioral information. The report did not mention the exaggerated tail-wagging so typical of wagtails.

SPRAGUE'S PIPIT *Anthus spragueii*. One seen near Blythe, RIV, 19 Dec 2004 (2005-041) was in an area and in habitat (alfalfa field) where this species is now almost "expected" in winter. But the brief description was insufficient for several committee members to accept the record.

GOLDEN-WINGED WARBLER *Vermivora chrysoptera*. One at Butterbredt Spring, KER, 12 May 2005 (2005-062) received the support of a majority of committee members on all but the fourth and final round of voting; concerns centered on the brevity of the observation and the early spring date. Only one accepted California record is earlier, from Oasis, MNO, 8 May 1992 (Howell and Pyle 1997).

CONNECTICUT WARBLER *Oporornis agilis*. The report of one on Southeast Farallon I. 1 Oct 2006 (2007-040) was not accepted because the two observers' descriptions conflicted on whether the bird walked (as expected in the Connecticut) or hopped and the description conflicted internally on whether the head was grayish (unexpected in the Connecticut in fall) or olive brown.

SNOW BUNTING *Plectrophenax nivalis*. One reported at the mouth of Redwood Cr., HUM, 19 Oct 2006 (2007-006) failed to gain acceptance because of the brevity of the description, relayed through a second party. If the record had been accepted, the date would have been the earliest for a Snow Bunting in California.

RUSTY BLACKBIRD *Euphagus carolinus*. One reported in Santa Maria, SBA, 27 Sep 2006 (2006-138) gained little support. The date is earlier than previous fall records by five days, and the single photo appears to show an unusually brownish first-fall male Brewer's Blackbird.

COMMON GRACKLE *Quiscalus quiscula*. One at Nunes Ranch, Pt. Reyes, MRN, 19 Jun 2006 (2006-105) was supported only by a two-line description. The report of one from Kelso, SBE, 10 Oct 2006 (2006-147) did not convince several committee members that the Great-tailed Grackle was eliminated.

COMMON REDPOLL *Carduelis flammea*. A flock of ten was reported at Fredonyer Peak near Susanville, LAS, 21 Dec 2005 (2006-174), but the description was rather brief. Furthermore, there was no significant flight of redpolls into the northwestern United States during winter 2005–06, so a flock of ten in California would have been most surprising.

RECORDS NOT ACCEPTED, IDENTIFICATION ACCEPTED BUT NATURAL OCCURRENCE QUESTIONABLE

BLACK-BELLIED WHISTLING-DUCK *Denrocygna autumnalis*. A previously rejected record from Newport Beach, ORA, 18 Jul–1 Aug 1970 (1986-358) was reconsidered because of recent increases in the number of reports from California and adjacent areas. But because of the possibility of escapees from the nearby Lion Country Safari the committee did not reverse itself.

TRUMPETER SWAN *Cygnus buccinator.* One was photographed in Long Valley and at Crowley L., MNO, 16 Jun–22 Oct 2006 (JeZ†; 2006-113). The neck collar indicated that the bird had been relocated to Idaho, and the committee questioned whether it would have reached California without the relocation.

HARRIS'S HAWK *Parabuteo unicinctus*. One at Bishop, INY, 26 Sep–15 Oct 2006 (DDu; JLD, JHe, TSH†, KHL†, TV†, JeZ†; 2006-209) was seen, upon close study after the initial observations, to be wearing a faded band, apparently not a metal band issued by the U. S. Fish and Wildlife Service. Raptors suspected of having escaped from captivity should be scrutinized closely for leg bands, which may not be obvious.

CRESTED CARACARA *Caracara cheriway*. A photograph of one near Oceano, SLO, 1 Jan 1967 (2004-032A) was published in the *San Luis Obispo Telegram Tribune*. No details accompanied the photograph, however, and the bird seemed to allow very close approach, leading the committee to withhold acceptance. One at Alameda, ALA, 7–10 Aug 1972 (1987-369A) was rejected by five committee members concerned by the bird's being near a major human population center and to the north of where they expected a natural vagrant.

ACKNOWLEDGMENTS

The committee thanks the following persons for advice on records contained in this report: Hiroshi Hasegawa for information on a banded Short-tailed Albatross; Steve N. G. Howell for his analysis of the Stejneger's Petrel and Little Shearwater records, as well as providing the committee with species accounts from his upcoming book to aid in identification of various species of petrels; Lauri Hanauska-Brown for information regarding a translocated Trumpeter Swan; and Stephen F. Bailey, Andy Birch, Lee G. R. Evans, and Paul E. Lehman for their comments on the Taiga Flycatcher. This report would not have been possible without the support of 242 observers who submitted reports to the committee. Many helpful comments on earlier drafts of the manuscript were made by Jon L. Dunn, Marshall J. Iliff, David Irons, Guy McCaskie, Joseph Morlan, Peter Pyle, Daniel S. Singer, James E. Pike, Philip Unitt, and Sandy Williams. Several museums also deserve our thanks, for housing important specimens and data and helping us on several of these records: thanks to 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 (SBNHM), and the Western Foundation of Vertebrate Zoology, Camarillo (WFVZ). We particularly thank Western Foundation of Vertebrate Zoology staff members Linnea Hall, René Corado, Peg Stevens, and Chrystal Klabunde for their support and housing of the CBRC archives.

CORRIGENDA

The following corrections are for the CBRC's previous report (Iliff et al 2007): The Hawaiian/Galapagos Petrel (2005-109) was seen during a survey cruise, not an organized pelagic trip as reported. The Brown Booby at Piedras Blancas, SLO, was seen through 21 Aug 2005 (2005-053). There are three records of the Glossy Ibis away from Imperial County, not two as reported. The American Golden-Plover at Arcata Marsh, HUM, 28 Aug–3 Sep 2004 (2004-134) was found by Rob Fowler (RFo). The Long-billed Murrelet (2003-151) was reported without the year; it was seen in 2003. The Eastern Yellow Wagtail (*Motacilla tschutschensis*) in Mendocino County (2005-118) was found by Dorothy Tobkin. The Blue-winged Warbler 7 Jul 2005 at Hayfork, TRI (2005-093), was photographed but not banded, as reported. We thank Bruce Deuel, Rob Fowler, Steve N. G. Howell, Robert Keiffer, Curtis Marantz, and David Suddjian for bringing these discrepancies to our attention.

MISCELLANEOUS

Sightings from 2006 published in *North American Birds*, for which **no** documentation was submitted to the CBRC: Three Trumpeter Swans at Shasta Valley Wildlife Area, SIS, 22 Dec 2006 (*N. Am. Birds* 61:321); one Manx Shearwater on Monterey Bay, MTY, 4 May 2006 (*N. Am. Birds* 60:432) and 12–15 off the coast between Humboldt and Monterey counties during fall 2006 (*N. Am. Birds* 61:136; the CBRC received documentation for 9 or 10 birds); one Brown Booby at Pt. St. George, DN, 1 Nov 2006 (*N. Am. Birds* 61:136); one Crested Caracara near Gilroy, SCL, 8 Oct 2006 (*N. Am. Birds* 61:137); two American Golden-Plovers in Marin County in Sep 2006 (*N. Am. Birds* 61:137); one Little Gull at Patrick's Pt., HUM, 4 May 2006 (*N. Am. Birds* 60:433); three Blue-headed Vireos in northern California between 9 Sep and 3 Oct 2006 (*N. Am. Birds* 61:139); one Connecticut Warbler on Pt. Reyes, MRN, 27–29 Aug 2006 (*N. Am. Birds* 61:140); and one Scarlet Tanager on Southeast Farallon I., SF, 20 May 2006 (*N. Am. Birds* 60:434). In addition, from the *Central Valley Bird Club Bulletin*, spring 2007, is a report of three Kumlien's Iceland Gulls near Davis, YOL. We welcome submission of details on these records, but until the committee has documentation to review, we recommend they not be treated as valid records.

CONTRIBUTORS

Brian Acord (BAc), Don Adams, Roger Adamson, Douglas W. Aguillard, Bruce Aird (BAi), Eitan Altman, David Appleton (DAp), Liga L. Auzins, Larry Ballard (LBa), Alan D. Barron, Richard Barth (RBa), Cathy Bell, Mark J. Billings, Len Blumin (LBl), Michael and Malcolm Boswell, William G. Bousman, Bill Bouton, Matt Brady, Mark P. Brown, Lucas Brug, Charlie Bukoski (CBu), Kenneth Burton, Scott Carey, Barbara Carlson (BaC), Butch Carter (BC), George Chaniot, Jamie M. Chavez, Ross Christie (RCh), Herbert Clarke, Therese R. Clawson, Daryl Coldren, Luke W. Cole, Barbara & Jan Collins, David M. Compton, Chris Conard (ChC), Peyton Cook, Jeff N. Davis, Edward DeBellevue, Bill Deppe (BiD), Dave DeSante, Jay Desgrosellier (JDe), Don DesJardin (DDJ), Henry Detwiler, Bruce Deuel, Joe and Debbie Devine, Matthew Dodder, Peggy Don, Don Doolittle, Annie B. Douglas, Elmer Dudik (EDu), Douglas Dunaway (DDu), Jon L. Dunn, Tanner Easterla (TaE), Todd Easterla (ToE), Thomas M. Edell, K. Dean Edwards, Al Eisner, Deirdre Encarnacion, Sid England, Jennifer Erbes, Jon Feenstra (JFe), Erin Feinblatt, Aaron J. Fink, Robbie Fischer (RFi), Allen Fish, Brian Foster, Rob Fowler (RFo), Nick & Mary Freeman, Wes Fritz, Doug Galasko, Carolyn Gann, Daniel L. Gant; Kimball L. Garrett, Steve Gerow, Karen S. Gilbert, Peter A. Ginsburg, Dave Goodward (DGo), Edward D. Greaves, John Green, Jessica Griffiths (JeG), David Hamilton (DHa), Keith Hansen, Warren and Eleanor Harrington, Brett Hartl, Christine Harvey, Steve Hayashi, Floyd E. Hayes, Owen Head, Jo Heindel (JHe), Matthew T. Heindel, Thomas S. Heindel, Pablo A. Herrera, Roger Higson, Justin Hite (JHi), James F. Holmes, David Holway, Debbie J. House, Steve N. G. Howell, Richard Hubacheck (RHu), Richard Hughes (RHu), W. Terry Hunefeld, Darrell Hutchinson (DHu), Marshall J. Iliff, Jukka Jantunen, Alvaro Jaramillo, David Jensen, Oscar Johnson, Susan Kaveggia, Clay Kempf, Ann Kern, Howard B. King, Alexander E. Koonce, Nerses Kozanjian, Stacy Krueger (SKr), Kenneth Z. Kurland, Kevin G. Larson, Jean Lawton, Paul E. Lehman, Phil Leighton, Linda LeRoy, Gary S. Lester, Lauren P. Lester, Nick Lethaby, Kelli Heindel Levinson (KHL), Cindy Lieurance, Leslie M. Lieurance, Daniel Lockshaw, Jim Lomax (JLo), Mickey Long, Calvin Lou (CLo), Eugene and Akiko Makashima, Michael J. Mammoser, Curtis A. Marantz, Matthew Mathiesen, Sean McAllister (SMc), Guy McCaskie (GMcC), Chet McGaugh (CMcG), Todd McGrath (TMcG), Joe Medley (JMe), Anthony Mercieca, Martin Meyers (MMe), Kurt Miethke, Bob Miller, Brooke Miller (BrM), David L. Moody, Barbara Coffin Moore, Stan Moore, Joseph Morlan, Arthur Morris (AMo), Vic Murayama, Stephen J. Myers, Thomas J. Myers, Larry Nahm (LaN), David W. Nelson, Chet Ogan (COg), Frances Oliver, Lewis W. Oring, Bruce Ostyn, Ed Pandolfino (EPa), Dennis Parker, Robert T. Patton, Andy Pfeffer, James E. Pike, Mary F. Platter-Rieger, Jeff Poklen (JeP), Eric Preston (EPr), John Puschock (JPu), Kevin Putman, Peter Pyle, David E. Quady, Steve Quartieri, Paul Reiber (PRe), Robert W. Reiling, Don Roberson, Geoffrey L. Rogers, Michael M. Rogers, Edward Rooks, Kerry Ross, Stephen C. Rottenborn, Jim S. Royer, Tobin Rummel, Jennifer Rycenga (JRy), Ruth Rudesill (RRu), Matt Sadowski, Mike San Miguel (MSanM), Michael J. San Miguel, Jr. (MJSanM), Larry Sansone, Brad K. Schram, Steve Schubert (SSh), Stefan Schlick (SSc), Alan F. Schmierer, Larry Selman (LSe), Daniel S. Singer, Jeff Skevington (JSk), Maggie Smith (MaS), Michael Smith (MSm), Susan E. Smith, Jim H. Snowden, Steve Sosensky (SSo), Rich Stallcup, Trent R. Stanley, Robert Steele (RSt), Susan Steele (SSt), John C. Sterling, Mark Stevenson (MSt) Jeremiah Stock (JeS), Katy Stonebloom (KSt), John Storrer, Emilee Strauss, Charles A. Strickland, Sam W. Stuart, Brian L. Sullivan, Steve Summers (SSu), Linda S. Terrill, Ryan S. Terrill, Scott B. Terrill, Robert Thériault, Edward Thomas, Ronald S. Thorn (RSTh), Nellie Thorngate, Jim Tietz, Dorothy Tobkin, Francis Toldi, John Trochet (JTr), Bill and Kathy Truesdell, David Vander Pluym, Todd Vogel, William F. Walker, Bobby Walsh, Dave Weber, Peter Weber, Richard E. Webster, Jeff Wells (JWe), Jerry R. White, Colin Wilkinson, Thomas E. Wurster, Jason D. Yakich, Joe Zarki, Jerry Zatorski (JeZ).

LITERATURE CITED

American Ornithologists' Union. 1997. Forty-first supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 114:542–552.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Binford, L. C. 1985. Seventh report of the California Bird Records Committee. W. Birds 16:29–48.

California Bird Records Committee (R. A. Hamilton, M. A. Patten, and R. A. Erickson, eds.). 2007. Rare Birds of California. W. Field Ornithol., Camarillo, CA.

Cederroth, C., Johansson, C., and Svensson, L. 1999. Taiga Flycatcher *Ficedula albicilla* in Sweden: The first record in western Europe. Birding World 12:460–468.

Cole, L. W., and McCaskie, G. 2004. Report of the California Bird Records Committee: 2002 records. W. Birds 35:2–31.

Cole, L. W., Nelson, K. N., and Sterling, J. C. 2006. The 30th report of the California Bird Records Committee: 2004 records. W. Birds 37:65–105.

Corman, T. E., and Wise-Gervais, C., eds. 2005. Arizona Breeding Bird Atlas. Univ. N. M. Press, Albuquerque.

Cramp, S., and Perrins, C. M., eds. 1993. The Birds of the Western Palearctic, vol. 7. Oxford Univ. Press, Oxford, England.

Dunn, J. L., and Garrett, K. L. 1997. A Field Guide to the Warblers of North America. Houghton Mifflin, Boston.

Erickson, R. A., Hamilton, R. A., and Howell, S. N. G. 2001. New information on migrant birds in northern and central portions of the Baja California Peninsula, including species new to Mexico. Am. Birding Assoc. Monogr. Field Ornithol. 3:112–170.

Erickson, R. A., and Terrill, S. B. 1996. Nineteenth report of the California Bird Records Committee: 1993 records. W. Birds 27:93–126.

Force, M. P., Webb, S. W., and Howell, S. N. G.. 2007. Identification at sea of Hawaiian and Galapagos Petrels. W. Birds 38:242–248.

Heath, H. 1919. The Caracara in California. Condor 21:125.

Howell, S. N. G. 2007. A California specimen of the Wedge-tailed Shearwater. W. Birds 227–228.

Howell, S. N. G., and Pyle, P. 1997. Twentieth report of the California Bird Records Committee: 1994 records. W. Birds 28:117–141.

Howell, S. N. G., and Dunn, J. L. 2007. Gulls of the Americas. Houghton Mifflin, Boston.

Iliff, M. J., McCaskie, G., and Heindel, M. T. 2007. The 31st report of the California Bird Records Committee: 2006 records. W. Birds 38:161–205.

Jehl, J. R., Jr. 1985. Hybridization and evolution of oystercatchers on the Pacific coast of Baja California. Ornithol. Monogr. 36:484–504.

Jouanin, C., and Mougin, J.-L. 1979. Order Procellariiformes, in Check-List of Birds of the World (E. Mayr and G. W. Cottrell, eds.), vol. 1, 2nd ed., pp. 48–121. Mus. Comp. Zool., Cambridge, MA.

King, J. R., and Carey, G. J. 1999. Slaty-backed Gull hybridization and variation in upperparts colour. Birders' J. 8:88–93.

Langham, J. M. 1991. Twelfth report of the California Bird Records Committee. W. Birds 22:97–130.

Marshall, D. B., Hunter, M. G., and Contreras, A. L. 2004. Birds of Oregon: A General Reference. Ore. State Univ. Press, Corvallis.

McCaskie, G., and Patten, M. A. 1994. Status of the Fork-tailed Flycatcher (*Tyrannus savana*) in the United States and Canada. W. Birds 25:113–127.

McCaskie, G. 2007. A Ross's Gull reaches southern California. W. Birds 38:137–140.

Nehls, H. 2007. Report of the Oregon Bird Records Committee 2006–2007. Ore. Birds 32:133–137.

Niven, D. K., Sauer, J. R., Butcher, G. S., and Link, W. A. 2004. Christmas Bird Count provides insight into population change in land birds that breed in the boreal forest. Am. Birds 58:10–20.

Patten, M. A., and Erickson, R. A. 2000. Population fluctuations of the Harris's Hawk (*Parabuteo unicinctus*) and its reappearance in California. J. Raptor Res. 34:187–195.

Patten, M. A., and Heindel, M. T. 1994. Identifying Trumpeter and Tundra Swans. Birding 26:306–318.

Patten, M. A., McCaskie, G., and Morlan, J. 1999. First record of the American Woodcock for California, with a summary of its status in western North America. W. Birds 30:156–166.

Pemberton, J. R. 1927. The American Gull-billed Tern breeding in California. Condor 29:253–258.

Pyle, P. 1997. Identification Guide to North American Birds, part I. Slate Creek Press, Bolinas, CA.

Roberson, D. 1986. Ninth report of the California Bird Records Committee. W. Birds 17:49–77.

Roberson, D. 1993. Fourteenth report of the California Bird Records Committee. W. Birds 24: 113–166.

Roberson, D. 2002. Monterey Birds, 2nd ed. Monterey Peninsula Audubon Soc., Carmel, CA.

Rosenberg, G. H. 2001. Arizona Bird Committee report: 1996–1999 records. W. Birds 32:50–70.

Rosenberg, G. H., Radamaker, K., and Stevenson, M. M. 2007 Arizona Bird Committee report: 2000–2004 records. W. Birds 38:74–101.

Rottenborn, S. C., and Morlan, J. 2000. Report of the California Bird Records Committee: 1997 records. W. Birds 31:1–37.

Russell, S. M., and Monson, G. 1998. The Birds of Sonora. Univ. of Ariz. Press, Tucson.

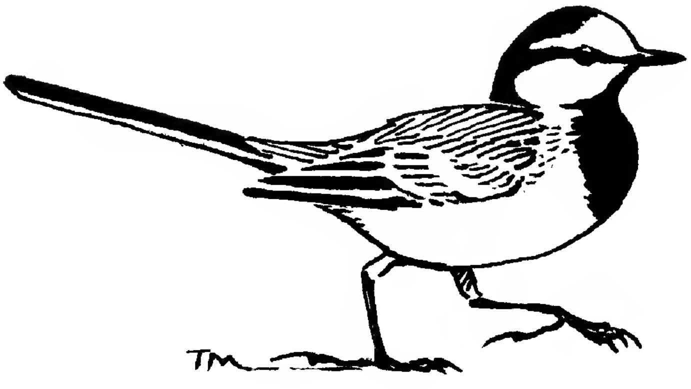
San Miguel, M., and McGrath, T. 2005. Report of the California Bird Records Committee: 2003 records. W. Birds 36:78–113.

Shuford, W. D. 2006. Back issues of Western Birds now online! W. Birds 37:122.

Svensson, L., Collinson, M., Knox, A. G., Parkin, D. T., and Sangster, G. 2005. Species limits in the Red-breasted Flycatcher. Br. Birds 98:538–541.

Whitworth, D. L., Carter, H. R., Koepke, J. S., and Young, R. J. 2007. Colonization of the Brown Booby at the Coronado Islands, Baja California, Mexico. W. Birds 38:268–279.

Accepted 16 April 2008



SHOREBIRD USE OF MUTED TIDAL WETLANDS IN A CALIFORNIA ESTUARY

SARAH CONNORS, Moss Landing Marine Laboratories, Moss Landing, California 95039; sarah.connors@yahoo.com

ABSTRACT: At Elkhorn Slough, an estuary on Monterey Bay, California, the number of shorebirds using muted tidal wetlands at high and low tide differs significantly. At all seasons, small sandpipers are significantly more abundant in muted tidal wetlands at high tide. In contrast, numbers of the Black-necked Stilt (*Himantopus mexicanus*) and American Avocet (*Recurvirostra americana*) do not differ significantly by tide except in winter, when they are more abundant at high tide. Manipulation of water level by adjustment of tide-gate settings enhances the suitability of muted tidal wetlands for many species. These areas provide an additional habitat dimension within the slough, enabling shorebirds to feed and roost at high tide when fully tidal mudflats are unavailable.

Intertidal mudflats provide important feeding areas for coastal shorebirds along the Pacific Flyway. The mixed semidiurnal tidal regime along the Pacific coast (two high and two low tides of different elevations in 24 hours), however, limits shorebirds' access to their prey as the extent of exposed mudflats varies (Recher 1966). Shorebirds exploit multiple strategies for foraging, particularly when their demand for energy is high (Evans 1979, Connors et al. 1981, Schneider and Harrington 1981). One important strategy is to shift to alternative foraging areas when the intertidal zone is flooded at high tide. Alternative foraging habitats include coastal beaches (Burger et al. 1977, Connors et al. 1981), agricultural fields and pastures (Colwell and Dodd 1995, Rottenborn 1996, Long and Ralph 2001), and impoundments where the tides are muted, such as salt-evaporation ponds (Masero and Perez-Hurtado 2001, Parsons 2002, Warnock et al. 2002, Strong 1990).

Many coastal wetlands have areas where the tide is restricted, either naturally or more often because of diking and restoration. The benefit of these areas to shorebirds during migration and winter has been little studied. In addition to offering alternative sites for foraging, muted tidal habitat can provide greater protection from human disturbance and wind than other high-tide roosts such as coastal beaches (Davidson and Evans 1986, Helmers 1993). For coastal wetlands to be managed successfully and maximize habitat quality for birds, baseline information on seasonal and daily patterns of use of various habitats within these wetlands is needed.

Elkhorn Slough supports one of the largest concentrations of shorebirds in California's coastal wetlands (Page et al. 1992). Elkhorn Slough's wetland complex includes both mudflats exposed to full tidal influence and impoundments where tidal flow is restricted. I evaluated shorebird use of muted tidal habitat and tested the hypothesis that it supports a greater number of shorebirds at high tide than at low tide.

METHODS

Study Area

Elkhorn Slough's wetlands comprise several mudflats to which the flow of tidal water is restricted through culverts. I studied three of these areas: North Marsh, the salt ponds, and Moro Cojo Slough (Figure 1). North Marsh, bordering the main channel of Elkhorn Slough and within Elkhorn Slough National Estuarine Research Reserve, covers 42.2 ha and contains elevated areas of pickleweed marsh (*Salicornia virginica*) interspersed with

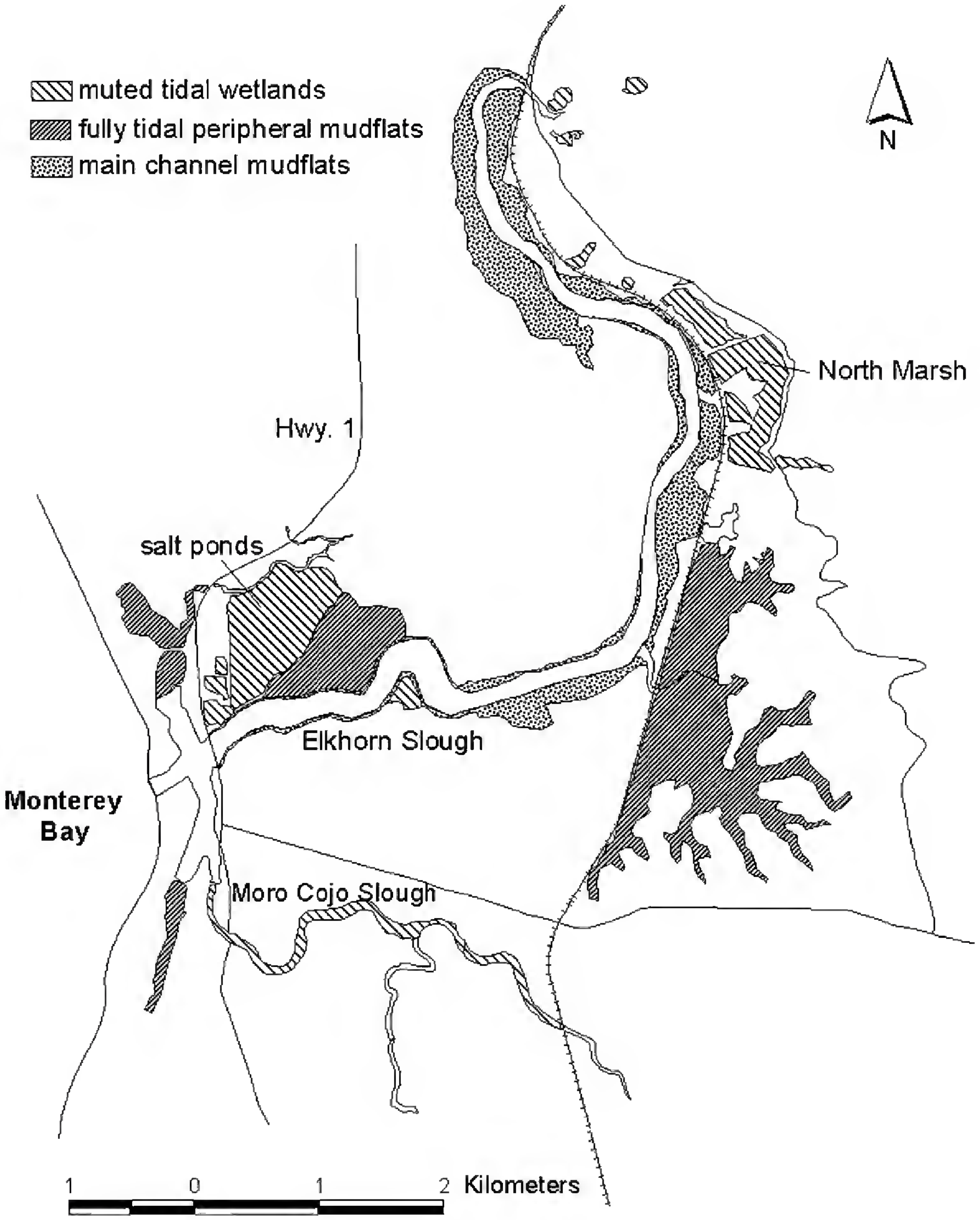


Figure 1. Mud habitat within Elkhorn Slough's wetlands on Monterey Bay, California, in 1999 and 2000.

bare mudflat (approximately 14 ha). This site receives water from Elkhorn Slough through four culverts. Salinity readings taken throughout the year ranged from 18 to 56 parts per thousand (ppt). This area was closed to the public during my study.

The salt ponds, bordering the lower portion of Elkhorn Slough and encompassing approximately 49 ha, were used as evaporation ponds for salt mining from 1916 until 1973 (Gordon 1996). During my study, this site was an important nesting area for the Snowy Plover (*Charadrius alexandrinus*) and was closed to the public to reduce disturbance to it and other nesting birds. The salt ponds consist of four principal ponds, each with tide gates. Manipulation of the water level during the breeding season (managed by PRBO Conservation Science) provides exposed mud for foraging, roosting, and nesting shorebirds. The ponds' salinity, influenced by rainfall and evaporation, ranges from brackish to hypersaline.

Moro Cojo Slough, less than 2 km to the south of Elkhorn Slough, is exposed to minimal tidal influence at its connection with Moss Landing Harbor, where the tide is restricted through culverts. This site covers approximately 5.4 ha of mudflats from the harbor to the railroad tracks 3.5 km to the east. The channel is bordered by salt marsh, agricultural land, and rangeland actively grazed by cattle. Salinity readings ranged from 2 to over 100 ppt throughout the year, influenced by distance from the harbor, rainfall, and evaporation.

Data Collection

From 1 March 1999 through 30 June 2000 I surveyed the three study sites for shorebirds two to three times monthly within a 6-hour period around low tide and a 6-hour period around high tide on the same day, using 8 × 40 binoculars and a spotting scope with a 20–60 zoom lens. I followed the same routes consistently on foot at North Marsh and the salt ponds. I used a kayak at Moro Cojo Slough when the water level permitted; otherwise, I surveyed this site on foot. The duration of surveys depended on the number of birds in the area. All shorebirds on mudflats were counted and identified to species when visibility permitted. The Dunlin (*Calidris alpina*), Western Sandpiper (*C. mauri*), and Least Sandpiper (*C. minutilla*) were counted as "peeps" when visibility was compromised. At high tide I recorded behavior, categorizing it as feeding, roosting (including preening), or "other." I placed water-depth gauges, consisting of posts 2 inches in diameter with alternating black and white bands 2 inches wide, at each study site to record the water's depth on each survey. I did not survey when high water made a study site unavailable to small shorebirds; consequently, the number of surveys varied by site.

Data Analysis

I categorized my results by season: winter (1 December to 28 February), spring (1 March to 30 May), and fall (1 July to 30 November). I evaluated statistically only species that made up 5% or more of the total counted in a study area in all seasons combined. Red-necked Phalaropes (*Phalaropus lobatus*) were relatively abundant for a brief period during fall only and so were not evaluated statistically. Only counts that totaled at least 10% of each species' peak count within a season were included in data analysis. Data from the three sites were combined for statistical analysis. I used a paired t test to compare abundances of shorebirds at high and low tides. When the data were not normally distributed, I used the Wilcoxon signed-rank test. The level of significance was defined as $p < 0.05$. I evaluated abundances rather than density because the change in the extent of mudflat between high and low tide was minimal. In spring, to reduce disturbance to nesting Snowy Plovers, I surveyed the salt ponds from their outer boundaries but did not include these data in analyses because of compromised visibility.

RESULTS

Shorebird Abundance and Diversity

During high-tide surveys from 1 March 1999 to 1 July 2000 I recorded 25 species of shorebirds totaling 166,142 individuals. During low-tide surveys I recorded 22 species (a subset of those recorded at high tide) totaling 21,939 individuals. Four species occurred year round: the American Avocet (*Recurvirostra americana*), Black-necked Stilt (*Himantopus mexicanus*), Killdeer (*Charadrius vociferus*), and Snowy Plover. All others were migrants. Small sandpipers were the most abundant shorebirds, accounting for 77% of all birds recorded (unidentified peeps 27%, Least Sandpiper 26%, Western Sandpiper 17%, Dunlin 6%). The greatest count of peeps during high tide at a site was more than 12,000 individuals on 18 January 2000 at the salt ponds.

Species following peeps in order of abundance were dowitchers (*Limnodromus scolopaceus* and *L. griseus*, not differentiated; 6%), American Avocet (5%), Black-necked Stilt (3%), and Red-necked Phalarope (3%). All three study sites were similar in the number of shorebird species recorded (North Marsh and Moro Cojo Slough: 19; salt ponds: 20), though the composition of the assemblages differed subtly.

High Tide vs. Low Tide

Eighty-eight percent of all shorebirds recorded during the study were observed at high tide. At all seasons the abundance of sandpipers of the genus *Calidris* at high tide significantly exceeded numbers at low tide (Table 1, Figure 2). In winter the abundances of Black-necked Stilts and American Avocets were significantly greater at high tide than at low tide, but in fall and spring there was no significant difference (Table 1, Figure 2).

In contrast to the difference in shorebird abundance by tide phase, the overall number of species recorded at each study site at high and low tide did not differ markedly (Table 2).

Behavior

The principal behaviors of shorebirds during high tide at all seasons were feeding and roosting (Figure 3). During fall and winter most of the small sandpipers were roosting (73% and 66% respectively). In contrast, during spring (pre-migration) 60% were feeding. Of the larger shorebirds, most avocets, stilts, and dowitchers were feeding at high tide in all seasons (Figure 3).

Table 1 Results of Statistical Tests Comparing Shorebird Abundance at High and Low Tide in Muted Tidal Habitat at Elkhorn Slough, California, 1999–2000

	N[a]	*t*[b]	*Z*[c]	*P*
Fall				
Black-necked Stilt	26	—	0.7113	>0.05
American Avocet	16	—	1.4230	>0.05
Dowitchers	20	—	0.2407	>0.05
Dunlin	8	2.4813	—	<0.05
Western Sandpiper	22	—	3.1039	<0.01
Least Sandpiper	22	4.4782	—	<0.001
All peeps combined	22	—	4.0007	<0.0001
Winter				
Black-necked Stilt	11	—	2.7603	<0.01
American Avocet	11	2.7323	—	<0.05
Dowitchers	8	4.0678	—	<0.01
Dunlin	11	—	2.8896	<0.01
Western Sandpiper	11	—	2.8480	<0.01
Least Sandpiper	11	5.7701	—	<0.001
All peeps combined	11	4.4019	—	<0.01
Spring				
Black-necked Stilt	15	—	0.2558	>0.05
American Avocet	14	—	0.0314	>0.05
Dowitchers	11	2.3884	—	<0.05
Western Sandpiper	11	1.8593	—	>0.05
Least Sandpiper	11	—	1.4240	>0.05
All peeps combined	11	2.3922	—	<0.05

[a] Number of surveys included in the analysis.
[b] Results of paired *t* tests.
[c] Results of Wilcoxon signed-rank tests.

DISCUSSION

Habitat Use at Different Tides

This study emphasizes the value of muted tidal habitat in coastal wetlands for shorebirds as foraging and roosting grounds during migration and winter, particularly at high tide when intertidal mudflats are unavailable. Over 75% of all shorebirds using this habitat were small sandpipers, a proportion similar to that in the larger Elkhorn Slough wetland complex during winter (68%), spring (65%), and fall (77%) of 1999 (Connors 2003). Earlier surveys at Elkhorn Slough also found small sandpipers to be the most abundant species, accounting for over 80% of all shorebirds at all seasons (Ramer et al. 1991).

The importance of muted tidal habitat for shorebirds may depend largely on its proximity to intertidal feeding grounds. Muted tidal areas at Elkhorn Slough are less than 2 km from the principal feeding area along the main

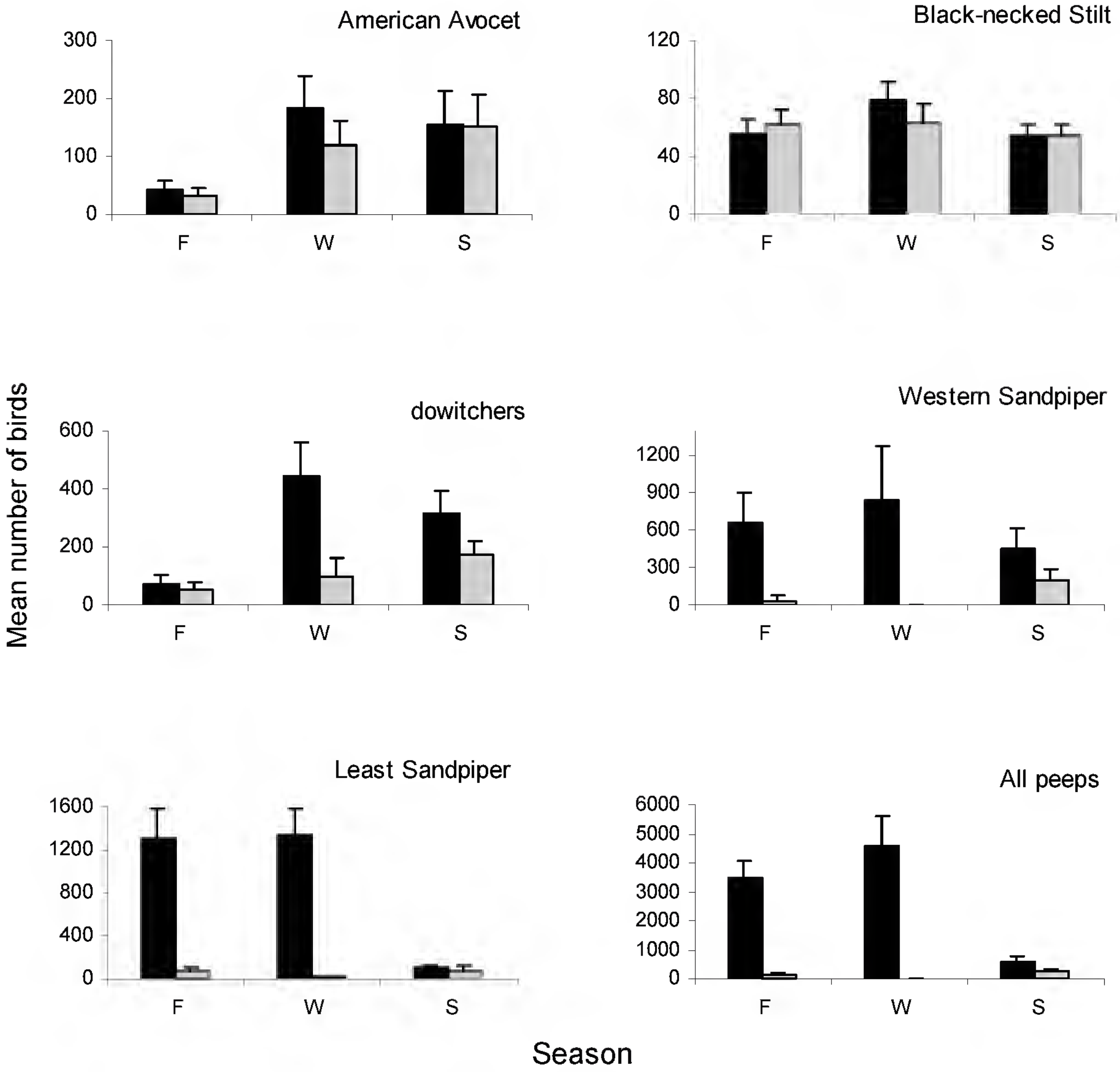


Figure 2. Mean number of shorebirds recorded during surveys at consecutive high and low tides (± standard error) at muted tidal wetlands at Elkhorn Slough from March 1999 through June 2000. F, fall; W, winter; S, spring. Black bar, high tide; gray bar, low tide; see Table 1 for values of *N*.

channel of the slough. Over 80% of all shorebirds recorded during this study were observed at North Marsh or the salt ponds, both sites immediately adjacent to the main channel. Connors (2003) found the abundance of small sandpipers decreasing dramatically in February 2000, possibly because of the flooding of most muted tidal areas after substantial rainfall in January. Commuting to more distant high-tide roosts may have been too costly, resulting in the birds' relocating to another complex of wetlands. The less time spent in transit between intertidal foraging areas at low tide and foraging or roosting sites at high tide, the less energy is expended in transportation costs and time that could be spent feeding or resting. Farmer and Parent (1997) determined that the more disconnected a wetland complex, the less likely are Pectoral Sandpipers to move among foraging and roosting sites. They concluded that, with increasing distance between sites in a wetland system, the less energetically beneficial is the complex for shorebirds and the shorter the period that migrating birds will reside in the area.

Table 2 Proportions of Shorebirds by Tide at Sites with Muted Tides at Elkhorn Slough, California, 1 March 1999–1 July 2000[a]

	High tide		Low tide
North Marsh (*N* = 23)			
Unidentified peeps	0.42	American Avocet	0.27
Least Sandpiper	0.17	Dowitchers	0.21
Western Sandpiper	0.16	Least Sandpiper	0.12
Dowitchers	0.07	Black-necked Stilt	0.12
Dunlin	0.06	Red-necked Phalarope	0.12
American Avocet	0.05	Western Sandpiper	0.07
Marbled Godwit	0.02	Marbled Godwit	0.04
Black-necked Stilt	0.02	Dunlin	0.02
Red-necked Phalarope	0.02	Willet	0.01
Total number of shorebirds	88,655	Semipalmated Plover	0.01
Moro Cojo Slough (*N* = 21)		Total number of shorebirds	13,005
Least Sandpiper	0.49	Western Sandpiper	0.24
Unidentified peeps	0.12	Red-necked Phalarope	0.21
Western Sandpiper	0.09	Black-necked Stilt	0.20
Dowitchers	0.08	Dowitchers	0.11
Black-necked Stilt	0.06	American Avocet	0.10
Red-necked Phalarope	0.06	Least Sandpiper	0.08
Dunlin	0.05	Killdeer	0.03
American Avocet	0.03	Dunlin	0.01
Killdeer	0.01	Greater Yellowlegs	0.01
Total number of shorebirds	23,899	Total number of shorebirds	7505
Salt Ponds (*N* = 8)			
Least Sandpiper	0.35	Black-necked Stilt	0.26
Western Sandpiper	0.25	American Avocet	0.19
Unidentified peeps	0.20	Least Sandpiper	0.14
Dunlin	0.10	Red-necked Phalarope	0.09
Marbled Godwit	0.03	Snowy Plover	0.07
Willet	0.01	Willet	0.06
American Avocet	0.01	Long-billed Curlew	0.06
Black-bellied Plover	0.01	Greater Yellowlegs	0.04
Black-necked Stilt	0.01	Black-bellied Plover	0.02
Semipalmated Plover	0.01	Killdeer	0.02
Snowy Plover	0.01	Dowitchers	0.01
Total number of shorebirds	53,588	Sanderling	0.01
		Semipalmated Plover	0.01
		Unidentified peeps	0.01
		Total number of shorebirds	1429

[a] Species with proportions <0.01 are not shown; *N*, number of surveys conducted. Species whose scientific names are not in the text: Black-bellied Plover (*Pluvialis squatarola*), Semipalmated Plover (*Charadrius semipalmatus*), Willet (*Tringa semipalmata*), Greater Yellowlegs (*Tringa melanoleuca*), Long-billed Curlew (*Numenius americanus*), Marbled Godwit (*Limosa fedoa*), Sanderling (*Calidris alba*).

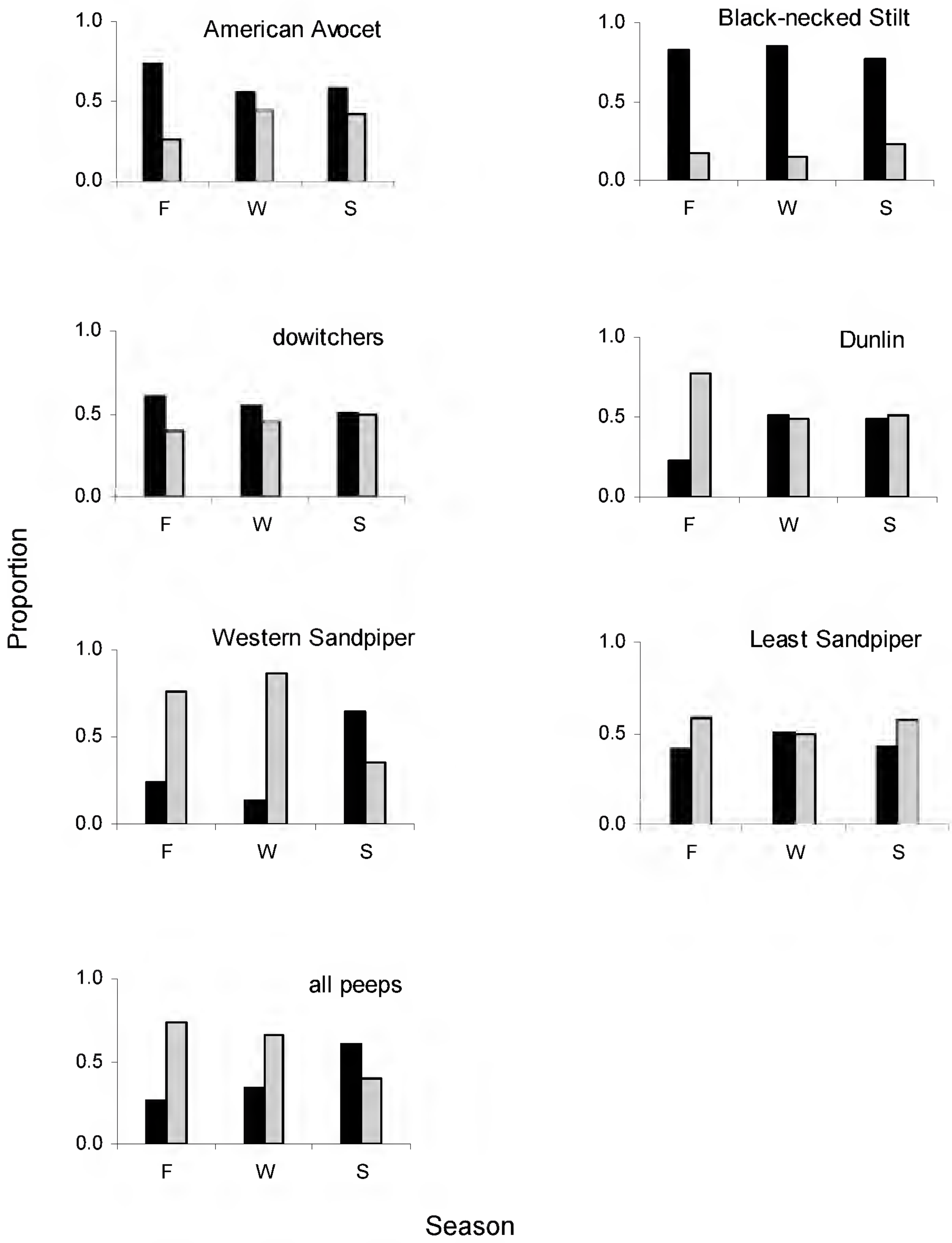


Figure 3. Proportion of total number of shorebirds recorded during high-tide surveys that were feeding (black bar) and roosting (gray bar) at muted tidal wetlands at Elkhorn Slough from March 1999 through June 2000. F, fall; W, winter; S, spring; see Table 1 for values of *N*.

At all seasons I found shorebird use of muted tidal areas to be most pronounced during high tide. The reduced tidal amplitude at these sites provides birds a place to feed and rest at high tide. Strong (1990) observed a similar pattern at Elkhorn Slough's salt ponds in the late 1980s. Davidson and Evans (1986) reported comparable results at man-made peripheral wetlands in England, with most shorebird species present in far greater numbers at high tide than at low tide.

Species diversity at muted tidal sites at Elkhorn Slough does not differ markedly by tidal phase; species composition, however, does. Small *Calidris* sandpipers dominate the shorebird assemblage on high tides, then relocate to the intertidal zone as the tide recedes. Warnock et al. (2002) observed a similar pattern of shorebird species composition on salt ponds in San Francisco Bay, where *Calidris* sandpipers dominate at high tide (constituting 46% and 55% of all birds in two consecutive years) but account for less than 5% of all birds at low tide.

Some shorebirds at Elkhorn Slough, primarily residents, use muted tidal areas throughout the tide cycle, implying that this habitat meets their daily requirements for feeding and roosting. Stilts and avocets use muted tidal wetlands surrounding Elkhorn Slough throughout the tide cycle during fall and spring and nest in this habitat. Similarly, Velasquez and Hockey (1992) found little difference in the abundance of resident waterbirds on saltpans between high and low tide but migrants to be markedly more abundant at high tide than at low tide.

Muted tidal wetlands offer two principal benefits to migratory shorebirds: providing an alternative place to feed when intertidal mudflats are inaccessible and a place to rest during interludes between foraging at low tide. The behavior of the most abundant shorebirds using muted tidal wetlands, the small sandpipers, was not consistent throughout the year. In fall and winter (July through February), the majority of *Calidris* sandpipers roosted at high tide. During spring (March through May), however, they spent most of their time feeding. Potential causes of this pattern during spring are shortage of available food at low tide in the intertidal zone, time constraints during feeding on intertidal mudflats, seasonal increases in energy demands, and seasonal variations in availability of prey in muted tidal habitat (Evans 1976, Evans and Dugan 1984, Schneider and Harrington 1981, Velasquez and Hockey 1992). Masero and Perez-Hurtado (2001) documented a greater proportion of Redshanks (*Tringa totanus*) foraging in peripheral wetlands before migration than in winter, coinciding with a decrease in the biomass of prey in adjacent intertidal habitat. Shorebirds' demand for energy increases during migration. Birds that arrive at their breeding grounds in optimal condition can use surplus fat and protein to accelerate egg production (Davidson and Evans 1988). If a bird cannot meet its caloric needs during the diurnal low tide cycle, it may enhance its intake by foraging at night or in habitats exposed at high tide. A study of the composition and seasonal availability of prey in muted tidal wetlands at Elkhorn Slough may elucidate corresponding patterns of shorebird behavior.

Management Considerations

Water depth at muted tidal sites is influenced by rainfall, evaporation, and extent of tidal exchange and can be manipulated to provide habitat for various species of birds. Awareness of shorebirds' migratory schedule, which varies considerably by species, is needed to manage water levels successfully and enhance habitat for shorebirds.

Management of water level may also be influenced by other variables unique to a site. For example, during late spring, summer, and early fall, a thick layer of algae (*Ulva* sp. and *Enteromorpha* sp.) formed on the water surface in North Marsh, providing an alternative feeding and roosting substrate for small shorebirds. Deeper water was maintained when algae were present, providing habitat for other birds such as ducks and herons while still supporting short-legged species such as the Western and Least Sandpipers. The presence of algal mats on the water surface may have increased foraging success for some shorebirds. Allen (1992) found more amphipod crustaceans within algal mats overlying mudflats than on mudflats without algae.

Various studies have examined the site fidelity of migrating and breeding shorebirds (Gratto et al. 1985, Warnock and Takekawa 1996, Takekawa et al. 2002). Although many shorebirds maintain some degree of site fidelity during migration and winter (Kelly and Cogswell 1979, Smith and Houghton 1984), they also use suitable habitat opportunistically as soon as it becomes available (Rundle and Fredrickson 1981, Skagen and Knopf 1994). Minor adjustments in water depth at muted tidal sites can make a tremendous difference in habitat availability to small shorebirds (Helmers 1992, Safran et al. 1997, Collazo et al. 2002, pers. obs.) and can attract migrants quickly.

Boettcher et al. (1994) found that variation in bottom topography and gradual flow of water into an impoundment create a variety of microhabitats. At North Marsh, a given water level provides a diversity of water depths suiting a broad assemblage of species. Whereas small sandpipers use mudflats covered by up to 5 cm of water, some larger shorebirds such as avocets and stilts feed in water as deep as 17 cm (Helmers 1992, Boettcher et al. 1995, Isola et al. 2000).

Water-level adjustments have longer-lasting benefits if they are made in small increments. Small shorebirds tend to feed along the receding water's edge; thus, a gradual drawdown provides suitable feeding habitat for a longer period of time (Rundle and Fredrickson 1981, Fredrickson and Taylor 1982). Velasquez (1992) found that if water level is decreased gradually, both shorebird abundance and diversity increase. Alternatively, managing for a relatively constant water level reduces the risk of flooding nests and may serve other purposes as well, including reduction of mosquito populations (P. Ghormley, N. Salinas Valley Mosquito Abatement District, pers. comm.). By June at Elkhorn Slough, migrant shorebirds have vacated the region, and resident species have established nests. Gradual drawdowns, which benefit small migratory shorebirds, are not critical at this time. Rather, managing for stable water levels would be a strategy appropriate to preclude flooding of resident birds' nests. As migrants begin to return to the slough in July, drawdowns can commence in anticipation of the arrival of large numbers of small sandpipers.

The conservation and management of muted tidal wetlands can enhance a coastal wetland system by providing an additional habitat dimension for migrating and wintering birds. Mudflats with restricted tidal flow are an important component of Elkhorn Slough's wetlands for most shorebirds. Use of these sites at high tide underscores their value for shorebirds. With knowledge of patterns of shorebirds' habitat use, seasonal requirements, and regional habitat limitations, mudflats with muted tidal flow can be managed effectively to optimize habitat quality for shorebirds.

ACKNOWLEDGMENTS

Funding was provided by a NOAA National Estuarine Research Reserve graduate fellowship, the Thomas Harvey Scholarship Fund, the Dr. Earl and Ethel Myers Oceanographic and Marine Biology Trust, a Packard Foundation scholarship, and a Marianna Pisano scholarship. Much thanks to Jim Harvey for guidance in all aspects of this study, Carleton Eyster for field assistance and ongoing encouragement, the Elkhorn Slough staff, particularly Becky Christensen and Kerstin Wasson, and Alan Baldridge, Greg Cailliet, Richard Callas, Jim Harvey, Tim Manolis, Skyli McAfee, Steven Morgan, Lewis Oring, Gary Page, Lynne Stenzel, Nils Warnock, and Kerstin Wasson for perceptive comments on earlier drafts of the manuscript.

LITERATURE CITED

Allen, J. K. 1992. Benthic invertebrates living in macroalgal mats on intertidal mudflats of Elkhorn Slough, California. M.S. thesis, San Jose State University.

Boettcher, R., Haig, S. M., and Bridges, W. C., Jr. 1994. Behavioral patterns and nearest neighbor distances among nonbreeding avocets. Condor 96:973–986.

Boettcher, R., Haig, S. M., and Bridges, W. C., Jr. 1995. Habitat-related factors affecting the distribution of nonbreeding American Avocets in coastal South Carolina. Condor 97:68–81.

Burger, J., Howe, M. A., Hahn, D. C., and Chase, J. 1977. Effects of tide cycles on habitat selection and habitat partitioning by migrating shorebirds. Auk 94:743–758.

Collazo, J. A., O'Harra, D. A., and Kelly, C. A. 2002. Accessible habitat for shorebirds: Factors influencing its availability and conservation implications. Waterbirds 25 (Spec. Publ. 2):13–24.

Colwell, M. A., and Dodd, S. L. 1995. Waterbird communities and habitat relationships in coastal pastures of northern California. Conserv. Biol. 9:827-834.

Connors, P. G., Myers, J. P., Connors, C., and Pitelka, F. A. 1981. Interhabitat movements by Sanderlings in relation to foraging profitability and the tidal cycle. Auk 98:49–64.

Connors, S. 2003. Shorebird distribution in a changing environment: Patterns at Elkhorn Slough. M.S. thesis, San Jose State University.

Davidson, N. C., and Evans, P. R. 1986. The role and potential of man-made and man-modified wetlands in the enhancement of the survival of overwintering shorebirds. Colonial Waterbirds 9:176–188.

Davidson, N. C., and Evans, P. R. 1988. Prebreeding accumulation of fat and muscle protein by Arctic-breeding shorebirds. Proc. Int. Ornithol. Congress 19:342–352.

Evans, P. R. 1976. Energy balance and optimal foraging strategies in shorebirds: Some implications for their distributions and movements in the non-breeding season. Ardea 64: 117–139.

Evans, P. R. 1979. Adaptations shown by foraging shorebirds to cyclical variations in the activity and availability of their intertidal invertebrate prey, in Cyclic Phenomena in Marine Plants and Animals (E. Naylor and R. G. Hartnoll, eds.), pp. 357–366. Pergamon Press, Oxford, England.

Evans, P. R., and Dugan, P. J. 1984. Coastal birds: Numbers in relation to food resources, in Coastal Waders and Wildfowl in Winter (P. R. Evans, J. D. Goss-Custard, and W. G. Hale, eds.), pp. 8–28. Cambridge Univ. Press, Cambridge, England.

Farmer, A. H., and Parent, A. H. 1997. Effects of the landscape on shorebird movements at spring migration stopovers. Condor 99:698–707.

Fredrickson, L. H., and Taylor, T. S. 1982. Management of seasonally flooded impoundments for wildlife. U.S. Dept. Interior, Fish & Wildlife Serv. Resource Publ. 148.

Gordon, B. L. 1996. Monterey Bay Area: Natural History and Cultural Imprints, 3rd ed. Boxwood Press, Pacific Grove, CA.

Gratto, C. L., Morrison, R. I. G., and Cooke, F. 1985. Philopatry, site tenacity, and mate fidelity in the Semipalmated Sandpiper. Auk 102:16–24.

Helmers, D. L. 1992. Shorebird management manual. Western Hemisphere Shorebird Reserve Network, P. O. Box 1770, Manomet, MA 02345.

Helmers, D.L. 1993. Enhancing the management of wetlands for migrant shorebirds. Trans. N. Am. Wildlife Nat. Resources Conf. 58:335–344.

Isola, C. R., Colwell, M. A., Taft, O. W., and Safran, R. J. 2000. Interspecific differences in habitat use of shorebirds and waterfowl foraging in managed wetlands of California's San Joaquin Valley. Waterbirds 23:196–203.

Kelly, P. R., and Cogswell, H. L. 1979. Movements and habitat use by wintering populations of Willets and Marbled Godwits. Studies Avian Biol. 2:69–82.

Long, L. L., and Ralph, C. J. 2001. Dynamics of habitat use by shorebirds in estuarine and agricultural habitats in northwestern California. Wilson Bull. 113:41–52.

Masero, J. A., and Perez-Hurtado, A. 2001. Importance of the supratidal habitats for maintaining overwintering shorebird populations: How redshanks use tidal mudflats and adjacent saltworks in southern Europe. Condor 103:21–30.

Page, G. W., Shuford, W. D., Kjelmyr, J. E., and Stenzel, L. E. 1992. Shorebird numbers in wetlands of the Pacific Flyway: A summary of counts from April 1988 to January 1992. Point Reyes Bird Observatory, 3820 Cypress Dr. #11, Petaluma, CA 94954.

Parsons, K. C. 2002. Integrated management of waterbird habitats at impounded wetlands in Delaware Bay, U.S.A. Waterbirds 25 (Spec.Publ. 2):25–41.

Ramer, B. A., Page, G. W., and Yoklavich, M. M.. 1991. Seasonal abundance, habitat use, and diet of shorebirds in Elkhorn Slough, California. W. Birds 22:157–174.

Recher, H. F. 1966. Some aspects of the ecology of migrant shorebirds. Ecology 47:393–407.

Rottenborn, S. C. 1996. The use of coastal agricultural fields in Virginia as foraging habitat by shorebirds. Wilson Bull. 108:783–796.

Rundle, W. D., and Fredrickson, L. H. 1981. Managing seasonally flooded impoundments for migrant rails and shorebirds. Wildlife Soc. Bull. 9:80–87.

Safran, R. J., Isola, C. R., Colwell, M. A., and Williams, O. E. 1997. Benthic invertebrates at foraging locations of nine waterbird species in managed wetlands of the northern San Joaquin Valley, California. Wetlands 17:407–415.

Schneider, D. C., and Harrington, B. A. 1981. Timing of shorebird migration in relation to prey depletion. Auk 98:801–811.

Skagen, S. K., and Knopf, F. L. 1994. Migrating shorebirds and habitat dynamics at a prairie wetland complex. Wilson Bull. 106:91–105.

Smith, P. W., and Houghton, N. T. 1984. Fidelity of Semipalmated Plovers to a migration stopover area. J. Field Ornithol. 55:247–249.

Strong, C. 1990. Bird use of the Moss Landing Wildlife Management area, April 1988 to April 1989. Report to Santa Clara Valley Audubon Society, 22221 McClellan Rd., Cupertino, CA 95014.

Takekawa, J. Y., Warnock, N., Martinelli, G. M., Miles, A. K., and Tsao, D. C. 2002. Waterbird use of bayland wetlands in the San Francisco Bay estuary: Movements of Long-billed Dowitchers during the winter. Waterbirds 25 (Spec. Publ. 2):93–105.

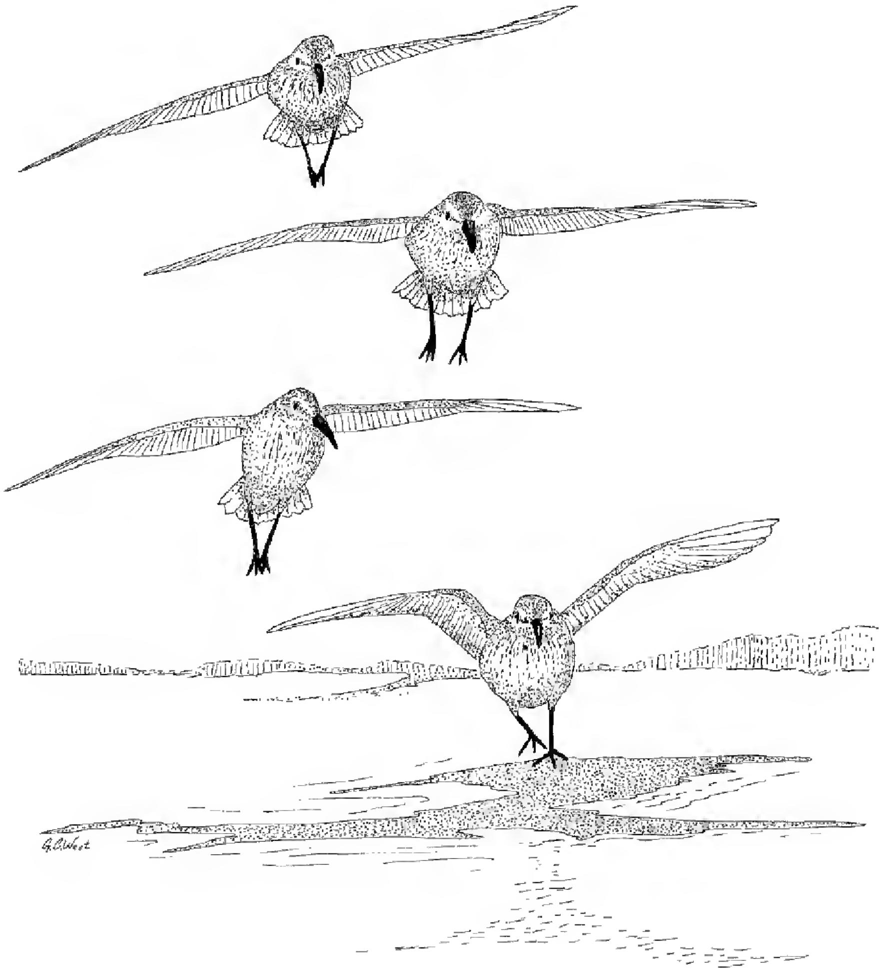
Velasquez, C. R. 1992. Managing artificial saltpans as a waterbird habitat: Species' responses to water level manipulation. Colonial Waterbirds 15:43–55.

Velasquez, C. R., and Hockey, P. A. R. 1992. The importance of supratidal foraging habitats for waders at a south temperate estuary. Ardea 80:243–253.

Warnock, N., Page, G. W., Ruhlen, T. D., Nur, N., Takekawa, J. Y., and Hanson, J. T. 2002. Management and conservation of San Francisco Bay salt ponds: Effects of pond salinity, area, tide, and season on Pacific Flyway waterbirds. Waterbirds 25 (Spec. Publ. 2):79–92.

Warnock, S. E., and Takekawa, J. Y. 1996. Wintering site fidelity and movement patterns of Western Sandpipers *Calidris mauri* in the San Francisco Bay estuary. Ibis 138:160–167.

Accepted 1 May 2008



Western Sandpipers

Sketch by George C. West

NOTES

PURPLE MARTIN DISTRIBUTION AND NESTING HABITAT AT SHASTA LAKE, CALIFORNIA

LEN LINDSTRAND III, North State Resources, Inc., 5000 Bechelli Lane, Suite 203, Redding, California 96002; lindstrand@nsrnet.com

The Purple Martin (*Progne subis*) is a local and generally uncommon to rare summer visitor in the western U.S. Once considered fairly common in California (Grinnell and Miller 1944), it has suffered population decline over much of its former breeding range (Remsen 1978, Airola and Williams 2008). It is currently designated as a species of special concern by the California Department of Fish and Game (Shuford and Gardali 2008). Most of the known California population nests in the northwestern portion of the state, but the species also nests at scattered locations throughout the state's non-desert regions (Small 1994, Airola and Williams 2008). In the Central Valley of northern California, the Purple Martin is known to nest only at several urban locations around Sacramento (Airola and Grantham 2003, Airola and Kopp 2007). In interior northern California, the only recent known breeding locations are scattered in central Siskiyou and eastern Shasta counties, the latter including a regular population at Shasta Lake (Williams 1998, Airola and Williams 2008). The Shasta Lake population is large for the interior portion of California and has been monitored better than the other sites. Because of the Purple Martin's wide distribution, low density, use of relatively inaccessible areas, and use of ephemeral, wildfire-created habitats (Airola and Williams 2008) its population trends are difficult to track. Therefore any information on local populations as an indication of the species' overall trend is useful.

Purple Martins have been known to nest at Shasta Lake for at least 30 years, as reported by Williams (1988) and Hill et al. (2004). Since 2001, however, their distribution, population status, and nesting habitats in this area have not been reported. Most previous nests were in partially submerged snags of drowned conifers in the Pit River arm of the lake. This section is the only part of the lake's footprint that was not logged before the reservoir was filled, leaving an abundance of submerged snags in this arm and its many tributaries.

During studies related to reservoir management at Shasta Lake between 2003 and 2006, I recorded anecdotal information on the Purple Martin's presence and distribution. Additionally, I evaluated historical information and results of a lakewide breeding-bird survey in 2007 to determine the martins' general locations. These data suggested where Purple Martin surveys should be focused, that is, in the Pit River arm. In 2007, I followed through with the survey.

Shasta Lake lies 16 km north of Redding in Shasta County, California (Figure 1). It consists of the main body and five primary arms: Big Backbone and Squaw creeks and the Sacramento, McCloud, and Pit rivers. Shasta Lake covers 121 km^2 and has 676 km of shoreline. The full-pool elevation of the lake is 326 m, and the surrounding terrain is moderate to steep.

I surveyed for nesting Purple Martins over 20 hours on five days between 9 May and 25 June 2007. I located and identified active nests by scanning and listening for Purple Martins and observing nesting behaviors, including nest building, feeding nestlings, nestlings seen or heard, or birds remaining in a cavity as if incubating. I conducted surveys by boat during all daylight hours, though most took place during the morning when the birds were more active near their nests.

I found eleven nest colonies at eight general locations (Figure 1). Colonies ranged in size from one to three pairs using one or two individual nest trees. Thirty-eight individual Purple Martins were observed. Sixteen nesting pairs and their individual

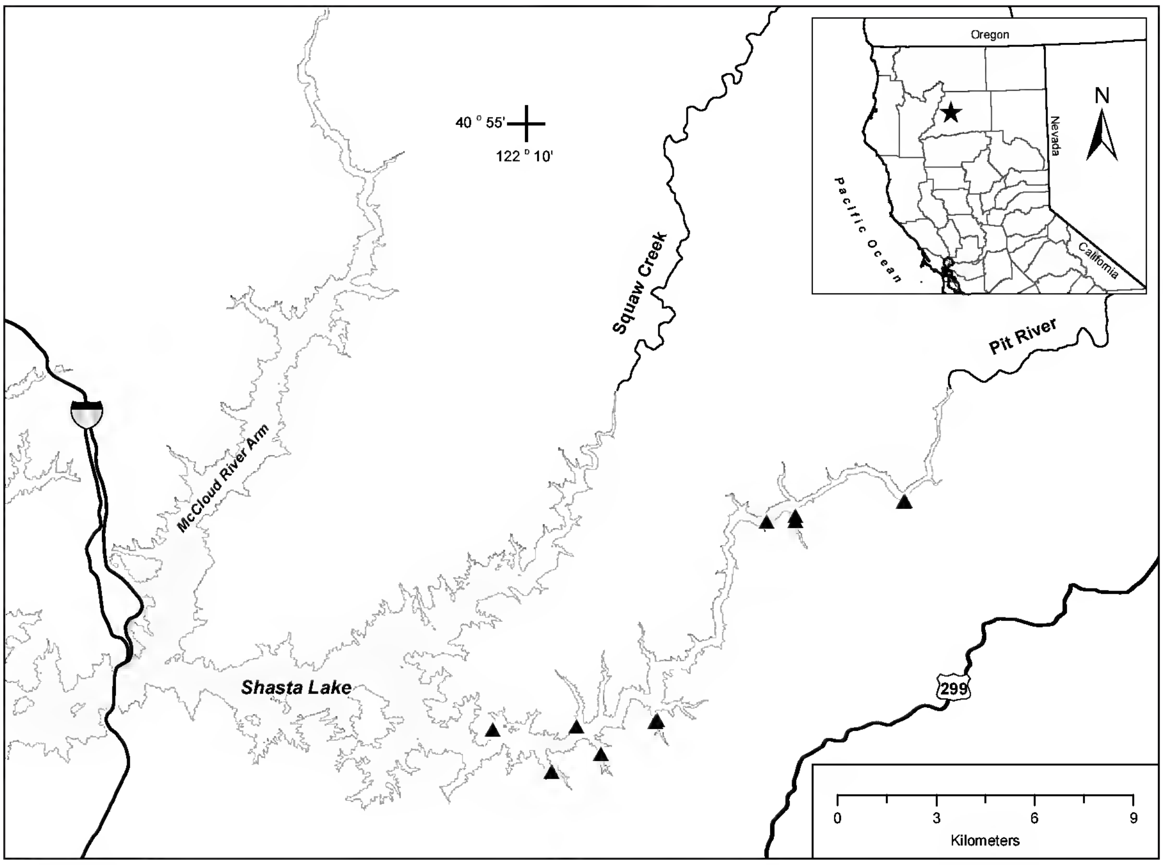


Figure 1. Purple Martin nest colony locations at Shasta Lake, Shasta County, California during 2007.

nest cavities were confirmed, while two additional nesting pairs were suspected but their nest cavities were not confirmed. Collectively, 18 nesting pairs were confirmed and/or suspected. All nests were located in old Acorn Woodpecker (*Melanerpes formicivorus*) nest cavities within conifer snags. All nest colonies but one were located in submerged snags within the lake's normal inundation zone (e.g., Figures 2, 3). The only colony not in a submerged snag, at Reno Canyon, was on a small ridge top above the lake in a large (81 cm diameter at breast height) ponderosa pine (*Pinus ponderosa*) snag. I observed five Purple Martins regularly at this location and confirmed two pairs using two separate nest cavities.

These results are similar to those reported by Williams (1988) and Hill et al. (2004) in which 17, 14, 19, and 18 pairs were counted during 1978, 1994, 1995, and 2001, respectively, indicating that the Purple Martin's population levels at Shasta Lake are generally stable. Shasta Lake continues to support an important component of the overall northern California Purple Martin population, ranging from 14 to 51% of the interior northern California population estimated by Williams (1988) and Airola and Williams (2008).

Although there are several historical records from the McCloud River arm (S. Glover pers. comm.), Purple Martins now occur mainly in the Pit River arm of Shasta Lake, likely because of the abundance of inundated snags in this portion of the lake. Additionally, adjacent upland habitats in this area also have more conifers than do most of the uplands around other areas of the lake. In 1999 and 2004 two large wildfires also burned around the southwestern portion of the Pit River arm, leaving an abundance of snags adjacent to the lake. Over time, primary cavity-nesting birds will create additional potential nesting habitat for Purple Martins in these areas.

Following the same general techniques and at the same level of effort as in 2007, I surveyed Shasta Lake for Purple Martins again from May to July 2008, finding 14

Figure 2. Purple Martin nest site in a flooded snag at Roberts Canyon, Shasta Lake.

Photo by Len Lindstrand III

Figure 3. Male Purple Martin at nest cavity, Shasta Lake.

Photo by Len Lindstrand III

nest colonies at 10 general locations. Colonies ranged in size from one to five pairs using one or two individual nest trees. I confirmed 20 nesting pairs and their nest cavities and suspected but did not confirm the cavity of one additional pair. All nests were in conifer snags, and all but one were within the lake's inundation zone. One colony, near Jones Valley, was on a small ridge above the lake in a large ponderosa pine snag in an area burned by the recent wildfires.

I thank the U.S. Bureau of Reclamation Mid-Pacific Region for its support, G. Bolen for reviewing an early version of the draft manuscript, D. Airola and B. Williams for reviewing the draft manuscript, and the North State Resources, Inc., staff who supported this survey effort.

LITERATURE CITED

Airola, D. A., and Grantham, G. 2003. Purple Martin population status, nesting habitat characteristics, and management in Sacramento, California. W. Birds 34:235–251.

Airola, D. A., and Kopp, D. 2007. Breeding population status and mortality assessment of Purple Martins in Sacramento in 2006. Central Valley Bird Club Bull. 10:34–44.

Airola, D. A., and Williams, B. C. D. 2008. Purple Martin (*Progne subis*), in California bird species of special concern (W. D. Shuford and T. Gardali, eds.), pp. 293–299. Studies of Western Birds 1. W. Field Ornithol., Camarillo, Calif., and Calif. Dept. Fish & Game, Sacramento.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Hill, J. R., III, Kostka, S., and Kostka, K. 2004. The snag-nesting Purple Martins of California, Oregon, and Washington. Purple Martin Update 13:1–7.

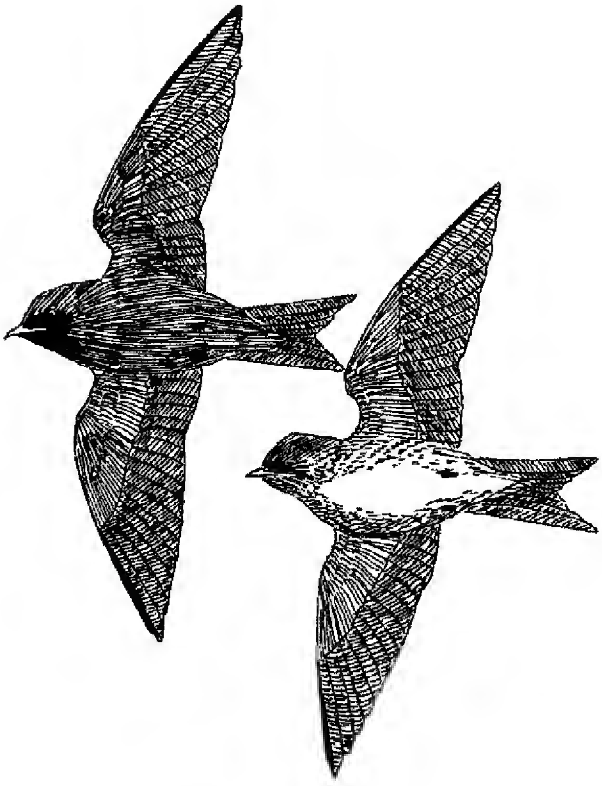
Remsen, J. V., Jr. 1978. Bird species of concern in California: An annotated list of declining or vulnerable bird species. Calif. Dept. of Fish and Game Wildlife Mgmt. Branch Admin. Rep. 78-1.

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

Small, A. 1994. California Birds: Their Status and Distribution. Ibis Publ., Vista, CA.

Williams, B. D. C. 1998. Distribution, habitat associations, and conservation of Purple Martins breeding in California. M.S. thesis, Calif. State Univ., Sacramento.

Accepted 23 April 2008



Purple Martins

Sketch by George C. West

NOTES

SAP FEEDING ON BIRCH TREES BY AMERICAN THREE-TOED WOODPECKERS

THEODORE N. BAILEY, 36915 Hakala Road, Soldotna, Alaska 99669; tnbailey@alaska.net

The American Three-toed Woodpecker (*Picoides dorsalis*) is a beetle specialist that feeds primarily on phloem-boring insects that occur only in the inner bark and cambium of attacked trees; apparently it seldom feeds on sap from trees (Murphy and Lehnhausen 1998, Leonard 2001). In Quebec, Imbeau and Desrochers (2002) observed it to spend only 0.6–1.4% of its time feeding on sap from Black Spruce (*Picea mariana*) trees, and in northern Manitoba Villard (1994) found only one individual feeding on sap. Short (1974, 1982) reported that *P. dorsalis* presumably does not drill its own holes for sap but occasionally takes it from wells drilled by sapsuckers (*Sphyrapicus* spp.). Villard (1994) speculated that sap feeding is less well developed in the American Three-toed than it is in the European Three-toed Woodpecker (*P. tridactylus*) because the sap-feeding niche in North America is already taken by sapsuckers, a conclusion questioned by Imbeau and Desrochers (2002). I found no definitive published reports of *P. dorsalis* drilling and feeding from sap wells in birch trees (*Betula* spp.).

However, on 26 August 2007 on the Kenai Peninsula, Alaska, near the town of Soldotna (60° 29′N, 151° 03′W), I watched a male American Three-toed Woodpecker drum four times on a dead aspen (*Populus tremuloides*), then fly down and land <50 m away on a birch tree (*Betula kenaica*; diameter at breast height [dbh] 22.1 cm) riddled with numerous old (gray) and fewer recently drilled (brown) sap wells, where it began to seek out and presumably feed at the recently drilled sap wells. Within a minute two others of the same species, an apparent adult female and an immature, joined it. All three investigated recently drilled sap wells in the first tree and later in two adjacent birch trees (18.1 cm and 34.7 cm dbh). Most old and recently drilled wells were oriented in horizontal rows 11–13 cm long with each well approximately 10 mm long, 6 mm high, and spaced 11 mm apart (Figure 1). Several nearby accessible and recently drilled wells were 6 mm deep (Figure 2). The first birch tree contained an estimated 120–130 rows of wells, all on the west-facing side of the tree. The three woodpeckers sought out, carefully inspected, and pecked into the recently drilled wells in the three birch trunks for about five minutes before departing closely together.

Previously, on 1 and 2 September 2005, I had observed hundreds of yellowjackets (*Vespula* sp.) and several butterflies (*Nymphis antiopa*) feeding on sap emanating from numerous recently drilled sap wells in three birch trees about 100 m from the 26 August 2007 observation (Figure 3). Over the past 30 years I also periodically observed numerous birch trees with similar horizontal rows of sap wells in mixed boreal forests throughout the northwestern lowlands of the Kenai Peninsula but was uncertain of their origin. I did not observe similar drilled sap wells in numerous Black Spruce, White Spruce (*P. glauca*), aspen, or cottonwood (*P. balsamifera*) trees. The sap of Paper Birch (*Betula papyrifera*) apparently has a relatively high sugar concentration (16%) compared to other species of trees (Southwick and Southwick 1980).

Although the Black-backed Three-toed (*Picoides arcticus*), Hairy (*P. villosus*), and Downy (*P. pubescens*) woodpeckers also inhabit the Kenai Peninsula, they apparently do not drill sap wells in birch trees, although the Hairy and Downy may occasionally take sap from wells drilled by sapsuckers (Dixon and Saab 2000, Jackson and Ouellet 2002, Jackson et al. 2002). The Red-naped Sapsucker (*Sphyrapicus nuchalis*) is not found in Alaska, and the Red-breasted (*S. ruber*) breeds primarily in coastal forest in the southeastern part of the state (Kessel and Gibson 1978, Armstrong 1995, Walters et al. 2002b). On the Kenai Peninsula, the Red-breasted is accidental in the fall and rare in the winter, only on the southern coast of the peninsula (West 1994).

Figure 1. Older sap wells in birch tree used by American Three-toed Woodpeckers, 27 August 2007.

Photo by Theodore N. Bailey

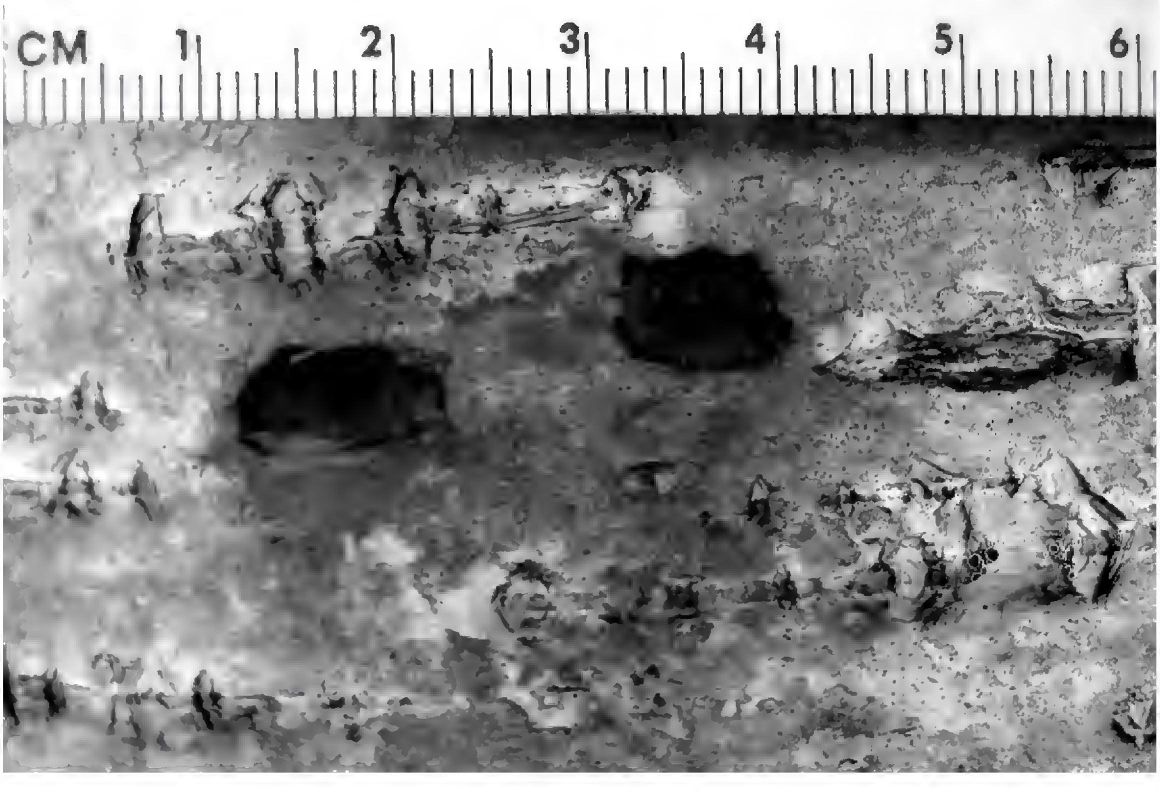


Figure 2. Recently drilled sap wells in nearby birch tree, 23 September 2007.

Photo by Theodore N. Bailey

Figure 3. Numerous recently drilled sap wells in a birch tree that attracted hundreds of yellowjackets (*Vespula* spp.) and several butterflies (*Nymphis antiopa*), 2 September 2005.

Photo by Theodore N. Bailey

Yellow-bellied Sapsuckers (*S. varius*) often drill holes for sap in birch trees (Kilham 1964, Eberhardt 2000), but in Alaska they are of casual occurrence only (Checklist of Alaska birds, www.uaf.edu/museum/collections/bird/projects/checklist.pdf). Almost all sightings of Yellow-bellied Sapsuckers in Alaska are from the eastern interior part of the state (Gibson and Kessel 1992); that species is not known on the Kenai Peninsula (see West 1994).

Interestingly, Walters et al. (2002a) cited a personal communication by B. Scher that holes drilled in birch trees in interior Alaska presumably by Yellow-bellied Sapsuckers, and reported by Kessel (1986), might have been made by American Three-toed Woodpeckers. The sap wells I observed appear identical to the spacing and horizontal rows of sap wells shown in Figure 2 of Kessel (1986), wells she believed were "primary sap bands" (from Tate 1973) and attributed to the Yellow-bellied Sapsucker. The sap wells I observed on the northwestern Kenai Peninsula were always in horizontal rows, not in vertical chains as often reported for those made by Yellow-bellied Sapsuckers (Kilham 1964, Eberhardt 2000).

My observations, the apparent physical differences between the sap wells of Yellow-bellied Sapsuckers and those of American Three-toed Woodpeckers, the absence of Yellow-bellied Sapsuckers on the Kenai Peninsula, and the numerous old sap wells in birch trees drilled by perhaps many generations of American Three-toed Woodpeckers on the Kenai Peninsula (and perhaps elsewhere in Alaska) suggest that sap feeding on birch trees by American Three-toed Woodpeckers may be more common and widespread than previously realized or may vary in frequency across the species' range.

LITERATURE CITED

Armstrong, R. H. 1995. Guide to the Birds of Alaska, 4th ed. Alaska Northwest Books, Seattle.

Dixon, R. D., and Saab, V. A. 2000. Black-backed Woodpecker (*Picoides arcticus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 509. Birds N. Am., Philadelphia.

Eberhardt, L. S. 2000. Use and selection of sap trees by Yellow-belled Sapsuckers. Auk 117:41–51.

Gibson, D. D., and Kessel, B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467.

Imbeau, L., and Desrochers, A. 2002. Foraging ecology and use of drumming trees by Three-toed Woodpeckers. J. Wildlife Mgmt. 66:222–231.

Jackson, J. A., and Ouellet, H. R. 2002. Downy Woodpecker (*Picoides pubescens*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 613. Birds N. Am., Philadelphia.

Jackson, J. A., Ouellet, H. R., and Jackson, B. J. S. 2002. Hairy Woodpecker (*Picoides villosus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 702. Birds N. Am., Philadelphia.

Kessel, B. 1986. Yellow-bellied Sapsucker, *Sphyrapicus varius*, in Alaska. J. Field Ornithol. 57:42–47.

Kessel, B., and Gibson, D. D. 1978. Status and distribution of Alaska birds. Studies Avian Biol. 1.

Kilham, L. 1964. The relations of breeding Yellow-bellied Sapsuckers to wounded birch and other trees. Auk 81:520–527.

Leonard, D. L., Jr. 2001. Three-toed Woodpecker (*Picoides tridactylus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 588. Birds N. Am., Philadelphia.

Murphy, E. C., and Lehnhausen, W. A. 1998. Density and foraging ecology of woodpeckers following a stand-replacement fire. J. Wildlife Mgmt. 62:1359–1372.

Short, L. L. 1974. Habits and interactions of North American three-toed woodpeckers (*Picoides arcticus* and *Picoides tridactylus*). Am. Mus. Novitates 2547.

Short, L. L. 1982. Woodpeckers of the World. Del. Mus. Nat. Hist. Monogr. Ser. 4

Southwick, E. E., and Southwick, A. K. 1980. Energetics of feeding on tree sap by Ruby-throated Hummingbirds in Michigan. Am. Midland Nat. 104:328–334.

Tate, J., Jr. 1973. Methods and annual sequence of foraging by the sapsucker. Auk 90:840–857.

Villard, P. 1994. Foraging behavior of Black-backed and Three-toed Woodpeckers during spring and summer in a Canadian boreal forest. Can. J. Zool. 72:1957–1959.

Walters, E. L., Miller, E. H., and Lowther, P. E. 2002a. Yellow-bellied Sapsucker (*Sphyrapicus varius*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 662. Birds N. Am., Philadelphia.

Walters, E. L., Miller, E. H., and Lowther, P. E. 2002b. Red-breasted Sapsucker (*Sphyrapicus ruber*) and Red-naped Sapsucker (*Sphyrapicus nuchalis*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 663. Birds N. Am., Philadelphia.

West, G. C. 1994. A Birder's Guide to the Kenai Peninsula, Alaska. Pratt Museum and Birchside Studios, Homer, AK.

Accepted 30 April 2008

FIRST RECORDS OF THE BROWN CREEPER BREEDING ALONG THE MIDDLE RIO GRANDE IN CENTRAL NEW MEXICO

JEAN-LUC E. CARTRON, Department of Biology, University of New Mexico, Albuquerque, New Mexico 87131; jlec@unm.edu

DAVID L. HAWKSWORTH and DEBORAH M. FINCH, Rocky Mountain Research Station, U.S. Forest Service, 333 Broadway SE, Suite 115, Albuquerque, New Mexico 87102-3497

In New Mexico, the Brown Creeper (*Certhia americana*) typically breeds in montane coniferous forests ranging in elevation from 2100 to 3300 m (Ligon 1961, Hubbard 1978). Since 2003, however, we have also noted breeding in the riparian cottonwood forest (hereafter bosque) along the middle Rio Grande, in the south valley of Albuquerque, Bernalillo County, New Mexico. One prior report by another observer (see below) suggests more widespread breeding by the species along the river.

The middle Rio Grande bosque in the south valley of Albuquerque lies at an elevation of approximately 1500 m. The local vegetation is dominated by stands of Rio Grande cottonwood (*Populus deltoides wislizenii*), which have been cleared of their understory of the exotic saltcedar (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*) during the last decade (see Cartron et al. 2007).

On 5 May 2003, Hawksworth observed a pair of Brown Creepers with one or both birds repeatedly carrying nesting material into a natural cavity (i.e., not a woodpecker hole but instead a rotted-out cavity where a branch was previously attached) 3.3 m high in a dead cottonwood. He checked the site five separate days later in the season but observed no further activity. In 2004, two Brown Creepers were again near this site from mid-May to mid-July. No nest or fledglings were discovered that year, but on 20 June Hawksworth observed one adult twice carrying food. On 9 June 2005, he found two adults feeding two fledglings approximately 7 m high in a cottonwood <30 m away from the 2003 site. Two years later, on 18 June 2007, Cartron discovered two Brown Creepers repeatedly visiting an opening behind loose bark 4.5 m high in a snag 2.6 km south of the 2003 site. Activity at that nest site continued throughout the rest of the month. On 2 July, two fledglings were on the ground at the base of the snag, tucked among dead branches, the adults feeding them multiple times.

The birds of the middle Rio Grande bosque have been studied intensively since the 1980s, primarily during the breeding season (e.g., Hink and Ohmart 1984, Farley et al. 1994, Ellis 1995, Cartron et al. 2004, 2007, Cartron and Mygatt 2006, Smith et al. 2007). The absence of prior records of breeding Brown Creepers suggests that this species is a recent addition to the breeding avifauna along the middle Rio Grande. The 2003, 2004, and 2005 observations—all in the same small area over three consecutive breeding seasons—likely represent a single pair. The distance between the 2003 presumed nest site and the 2007 nest site, however, could indicate colonization of the middle Rio Grande bosque by a small, and perhaps expanding, nesting population. This possibility is further suggested by Bill Howe's observation on 1 September 2004 of two birds together in the Corrales Bosque, more than 24 km north (upstream) of the 2003 presumed nest site (Williams 2005). In New Mexico, the Brown Creeper has rarely been recorded out of breeding montane habitat before the last week of September, with detections consistent (often multiple birds, including some banded) from then into October (Yong and Finch 2002, S. Williams pers. comm.). There are very few credible reports of early fall arrival from lowland areas in New Mexico, including 30 August (once, near Anthony, Doña Ana County), 4 September (once, near Kirtland, San Juan County), and 16 and 17 September (once each, at Shiprock, San Juan County, and Maxwell National Wildlife Refuge, Colfax

County) (Monson 1954, Hubbard 1974, 1975, S. Williams pers. comm.). Therefore, although Howe's record in the Corrales Bosque as an early fall arrival would not be unprecedented, we believe the two birds he detected on 1 September 2004 may have represented an additional summering pair.

To our knowledge, our observations represent the first nesting records of the Brown Creeper in New Mexico below 1600 m. At Cottonwood Gulch, McKinley County, adults were feeding a fledgling 23 July 1982 (Hubbard 1982), and a nest was found behind the bark of a small cottonwood in 1984 (Goodman 1984), both in cottonwood habitat. The elevation at Cottonwood Gulch, however, is approximately 2250 m, nearly as high as where breeding has also been reported on Mount Taylor (Cibola County) and in Black Canyon in the Black Range, Grant County (see Ligon 1961).

Breeding Bird Survey data reveal no statistically significant population trends for the Brown Creeper in New Mexico or at the larger scale of the entire Southwest (Sauer et al. 2007). The Brown Creeper represents one of three typically montane species now known to breed along the middle Rio Grande. The Mountain Chickadee (*Poecile gambeli*) has been observed nesting in the bosque—and occasionally hybridizing with the Black-capped Chickadee (*P. atricapillus*)—seemingly since the 1970s (Hubbard 1978, 1984). The Plumbeous Vireo (*Vireo plumbeus*) is found primarily in mountains and foothills during the nesting season, but it also breeds very locally along the middle Rio Grande. We have found three Plumbeous Vireo nests in the bosque at one location in northern Socorro County, about 1.6 km NNW of Veguita on the west side of the river, one in 2006, two in 2007. That species has also been recorded breeding farther south at the Bosque del Apache National Wildlife Refuge (Hubbard 1978).

In San Diego County, California, lowland breeding populations of several montane species have become established during the last two or three decades (Unitt 2004). The Pacific-slope Flycatcher (*Empidonax difficilis*) and Dark-eyed Junco (*Junco hyemalis*) are now nesting in mature lowland wooded habitats created artificially through tree planting or alteration of river flows (Unitt 2004). It is still too early to suggest a similar pattern in New Mexico. However, as we know it today, as a continuous strip of cottonwood woodland 280 km long, the middle Rio Grande bosque has very likely been in existence for only a few decades, replacing what were once smaller, scattered bosques as a result of dams and bank-stabilization efforts along the river (Cartron et al. in press). More monitoring may reveal nesting populations of additional montane species along the middle Rio Grande.

We are indebted to both Sandy Williams and Philip Unitt for information that helped place our records into a broader context. Williams provided us with all early lowland fall records for the Brown Creeper, while Unitt shared information on the downhill spread of breeding species in San Diego County. We also thank Greg Keller and Dave Krueper for perceptive and constructive comments on an earlier version of the manuscript. Funding for Cartron was provided by the U.S. Army Corps of Engineers. Funding for Hawksworth and Finch was provided by the U.S. Forest Service Rocky Mountain Research Station's Middle Rio Grande Ecosystem Management Unit, the Joint Fire Sciences Program, the Bosque Improvement Group, and the U.S. Forest Service Southwest Region State and Private Forestry. Additional support was provided by the Bosque del Apache National Wildlife Refuge and the U.S. Department of Agriculture's Plant Materials Center in Los Lunas. Access to our study sites along the middle Rio Grande was granted by the Rio Grande Nature Center State Park, the city of Albuquerque's Open Space Division, and the Middle Rio Grande Conservancy District.

LITERATURE CITED

Cartron, J.-L. E., and Mygatt, J. E. 2006. Nesting birds of a drained, post-fire, semipermanent wetland at the Bosque del Apache National Wildlife Refuge. New Mexico Ornithol. Soc. Bull. 34:12–14.

Cartron, J.-L. E., Dean, D. A. Stoleson, S. H., and Polechla, P. J., Jr. 2004. Nesting of the Swainson's Hawk (*Buteo swainsoni*) in riparian woodlands of New Mexico. New Mexico Ornithol. Soc. Bull. 32:91–94.

Cartron, J.-L. E., Lightfoot, D. C., Mygatt, J. E., Brantley, S. L., and Lowrey, T. K. In press. A Field Guide to the Plants and Animals of the Middle Rio Grande. Univ. New Mexico Press, Albuquerque.

Cartron, J.-L. E., Means, M. D., Hawksworth, D. L., and Finch, D. M. 2007. Colonization of the Eastern Bluebird along the middle Rio Grande in New Mexico. W. Birds 38:206–215.

Ellis, L. M. 1995. Bird use of saltcedar and cottonwood vegetation in the middle Rio Grande Valley of New Mexico, U.S.A. J. Arid Environments 30:339–349.

Farley, G. H., Ellis, L. M., Stuart, J. N., and Scott, N. J., Jr. 1994. Avian species richness in different-aged stands of riparian forest along the middle Rio Grande, New Mexico. Conserv. Biol. 8:1098–1108.

Goodman, R. A. 1984. New Mexico Ornithological Field Notes 23(2):21.

Hink, V. C., and Ohmart, R. D. 1984. Middle Rio Grande biological survey. Final report under contract DACB47-81-C-0015 to the U.S. Army Corps of Engineers, 4101 Jefferson Plaza, Albuquerque, NM 87109.

Hubbard, J. P. 1974. New Mexico Ornithological Society Field Notes 13(2):37.

Hubbard, J. P. 1975. New Mexico Ornithological Society Field Notes 14(2):35.

Hubbard, J. P. 1978. Revised check-list of the birds of New Mexico. New Mexico Ornithol. Soc. Publ. 6.

Hubbard, J. P. 1982. Southwest Region: New Mexico. Am. Birds 36:1006–1007.

Hubbard, J. P. 1984. New Mexico. Am. Birds 38:1050–1052.

Ligon, J. S. 1961. New Mexico Birds. Univ. of New Mexico Press, Albuquerque.

Monson, G. 1954. Southwest Region. Audubon Field Notes 8:33–36.

Sauer, J. R., Hines, J. E., and Fallon, J. 2007. The North American Breeding Bird Survey, results and analysis 1966–2006, version 10.13.2007. U.S. Geol. Survey Patuxent Wildlife Res. Center, Laurel, MD.

Smith, D. M., Kelly, J. F., and Finch, D. M. 2007. Avian nest box selection and nest success in burned and unburned southwestern riparian forest. J. Wildlife Mgmt. 71:411–421.

Unitt, P. 2004. San Diego County bird atlas. Proc. San Diego Soc. Nat. Hist. 39.

Williams, S. O., III. 2005. New Mexico, August through November 2004. N. Am. Birds 59:121–124.

Yong, W., and Finch, D. M. 2002. Stopover ecology of landbirds migrating along the middle Rio Grande in spring and fall. Gen. Tech. Rep. RMRS-GTR-99, U.S. Dept. Agric., Forest Service, Rocky Mountain Res. Sta., Ogden, UT.

Accepted 6 June 2008

BOOK REVIEWS

Storm-Petrels of the Eastern Pacific Ocean: Species Assembly and Diversity along Marine Habitat Gradients, by Larry B. Spear and David G. Ainley. 2007. American Ornithologists' Union (Ornithological Monographs no. 62.). 77 pages, 37 figures, 10 tables, 2 appendices. Paperback, $10.00, ISBN 0-943610-71-0.

The majority of information on storm-petrels comes from studies conducted on land, where these small nocturnal birds come to breed and are accessible to biologists. Few people have the fortitude and insight to spend sufficient time on the open ocean studying marine birds to begin to understand the bigger picture of their distribution, abundance, and ecological significance. Larry Spear and David Ainley are among the few who have accomplished this feat. Their monograph on eastern Pacific storm-petrels reports findings from 23 cruises over 26 years covering over 110,000 km^2 of the eastern Pacific Ocean, stretching from the California Current south through the Humboldt Current and out to 170° W. It summarizes observations of 36,005 storm-petrels from over 9000 hours of observation and provides a comprehensive overview of 23 forms or subspecies of 13 species of this smallest, most pelagic, and widespread group of marine birds. As Spear and Ainley note, "Storm-petrels in the eastern Pacific have a diversity greater than that of any other seabird group in a comparable area of ocean."

The monograph is based around the hypothesis that storm-petrel diversity reflects marine habitat complexity. It begins with a review of the existing information on the distribution and population size of each of the species, which for some species is remarkably meager. Spear and Ainley then use their copious data set and sophisticated data analyses, involving general additive models and principal-component analysis, to determine the birds' abundance, distribution, and habitat preferences at sea. The bulk of the monograph, and its greatest value, consists of population estimates and distribution maps for each of the taxa, which are treated individually in the text but are compared in the many figures and tables that add considerably to the volume. Abundance estimates imply that populations of most of the storm-petrels are robust, some containing a significant number of adult birds that are capable of breeding but do not because of a limitation in nesting habitat. Five taxa, however, have populations of fewer than 10,000 birds, and one subspecies of the White-bellied Storm-Petrel (*Fregetta grallaria*) is in imminent danger of extinction.

A summary of results compares patterns across species, focusing on habitat use in relationship to environmental gradients. Distributional patterns are correlated with ocean depth except in the three species endemic to the Humboldt Current off South America. Six taxa are strictly pelagic and are found only westward of the continental slope. Three taxa are most abundant over the slope, and six others are found most commonly over the continental shelf. The remaining taxa have broader habitat preferences. Within these depth preferences all taxa except two are distinct in their association with a suite of oceanographic variables, including gradients in sea-surface temperature and salinity, wind speed, and thermocline depth and strength. Sea-surface temperature, however, is the most important factor. These physical gradients affect ocean productivity, which plays a major role in influencing storm-petrel distribution.

The monograph includes new information on movement patterns, behavior at sea, and annual cycles of abundant taxa. The majority of storm-petrels are dispersers in that they occur at all distances within a given radius of the breeding site. The only long-distance migrants to the eastern Pacific are the Leach's (*Oceanodroma leucorhoa*) and Wilson's (*Oceanites oceanicus*) storm-petrels. The collection of birds at sea during some of the cruises allowed Spear and Ainley to establish breeding status and molt patterns for a number of taxa. The discussion ends with a synthesis that focuses on why storm-petrel diversity in the eastern Pacific is so high. Spear and Ainley speculate that the age, stability, and physical diversity of the habitat have played a major role in facilitating the birds' diversity and that the clumping of nesting habitats and the clumps' wide separation by ocean has encouraged speciation.

This review omits many of the finer details of the individual species and their associations, the details of which at times can be rather daunting for those of us who have little experience with all of the species. For readers interested in these poorly known birds, however, a deeper look at this monograph is profitable. Should you wish to learn more, Spear and Ainley, with W. A. Walker, published another monograph in 2007, "Foraging Dynamics of Seabirds in the Eastern Tropical Pacific Ocean" (*Studies in Avian Biology* no. 35). Spear and Ainley, through meticulous recording of observations at sea and subsequent thorough data analysis, have provided an unparalleled contribution to our understanding of these remarkable birds that will stand as a key reference for many years.

Jan Hodder

John Kirk Townsend: Collector of Audubon's Western Birds and Mammals, by Barbara and Richard Mearns. August 2007. B. & R. Mearns, Dumfries, Scotland. Hardback, 290 × 230 mm, 400 pages, approx. 350 illustrations (300 in color), 10 maps, 4 flow charts, 18 appendices, and bibliography. ISBN 978-0-9556739-0-0. Available from www.mearnsbooks.com.

When the young Quaker naturalist John Kirk Townsend returned to Philadelphia from the west coast of North America, where he had lived for two years, he began writing an account of his adventures for his family and friends. Published in 1839, his *Narrative of a Journey across the Rocky Mountains, to the Columbia River, and a Visit to the Sandwich Islands, Chili, &c., with a Scientific Appendix* was charming, full of encounters with native peoples and historic figures, mountain men, grizzlies, and bison, all viewed through the eyes of a greenhorn in his mid-twenties. Townsend captured the wonder of western travel, its danger, and his own barely restrained excitement at the new lands and new creatures he was discovering almost every step of the way. In 2001, the magazine *National Geographic Adventure* named it one of the 100 greatest adventure books of all time.

In 1905 the historian Reuben Gold Thwaites reprinted the *Narrative* in his series *Early Western Travels* but excised sections on Townsend's travels in the Hawaiian Islands and his sail home from the Northwest. Subsequent reprints were reprints of Thwaites's abridged edition. In 1999, Oregon State University Press produced the first unabridged reprinting of the *Narrative*, for which I provided an introduction and annotations.

Now Barbara and Richard Mearns have again reprinted the *Narrative*, marrying it with a great deal of new material of interest to historians and to natural scientists. The result is an indispensable treasure trove of Townsendia. The *Narrative* appears in context as part of a comprehensive biography of Townsend, from his earliest years in Philadelphia, his travels west, to Washington, D.C., where he worked as a taxidermist at the National Institute, then back to Philadelphia and his early death at just 41 years of age.

Of particular interest is the Mearnses' discussion of Townsend's complicated relationship with John James Audubon, who obtained some of Townsend's western specimens to paint for *Birds of America*. Audubon was a monumental talent, and a monumental ego, in American ornithology, and did not adequately credit his great debt to Townsend; I am pleased to see the Mearnses address this lapse and take Audubon to task.

The volume is lavishly illustrated. Photographs depict Townsend's actual type specimens of the many new species he collected during his time in the West. There are illustrations of plants, animals, and personalities Townsend encountered. The Mearnses' own photographs depict locations and habitats that Townsend experienced. Maps detail both the route his expedition followed and the locations where various species were collected or sighted. Drawings and paintings by Audubon are of the western species Townsend found.

The appendices are a valuable resource for understanding Townsend's contribution to natural science. They trace such topics as the dispersal of Townsend's natural history collection through North America and Europe, by means of flow charts, and list his new species; his catalogue of bird specimens, including those from Tahiti, Chile, and the Hawaiian Islands, where he was one of the earliest collectors. There are 18 appendices in all, as well as an extensive bibliography of both unpublished and published sources.

The *Narrative* is again abridged, for the Mearnses have edited out some of the ethnographic material, but they have added excerpts, most concerning zoology, from Townsend's journal and personal letters to his family to supplement the text. Inserted sections within the text discuss particular topics of history and zoology. The Oregon State University Press edition (1999) remains the only unabridged reprint of Townsend's 1839 original, but this new volume adds so much material of historical, biographical, and zoological interest that students of western history and the progress of natural history in the United States will find it invaluable, a book to savor, a book worthy of that remarkable young man who visited the '"Oregon country"' in the 1830s and returned to enchant us with his narrative.

George A. Jobanek

Birds of Western Colorado Plateau and Mesa Country, by Robert Righter, Rich Levad, Coen Dexter, and Kim Potter. 2004. Grand Valley Audubon Society, Grand Junction, CO. 214 + x pages; numerous color and black-and-white illustrations, range maps, charts, and graphs. Softcover, $29.95. ISBN 0-9743453-0-X.

There are a few tools that every field ornithologist needs—a serviceable pair of binoculars, for example, and an identification guide. Beginners are inclined toward porro prisms and a Peterson guide, whereas veteran field ornithologists tend toward high-end roof prisms and the Pyle guide. But the tools are basically the same.

There is another indispensable tool, a book on avian status and distribution ("S&D"). Like that for binoculars and identification guides, the need for this tool cuts across all levels of skill and experience. Beginners and veterans alike benefit immeasurably from owning—and regularly consulting—the major S&D guide or guides for their region. And in the case of S&D guides, there is basically no such thing as a beginner version vs. a veteran version: we all benefit from using our S&D guides regularly.

In my home state of Colorado, I refer to regional S&D guides daily. I take them into the bathroom with me. I read them to my kids at bedtime. I can't get enough of them. S&D guides help me to make sense of the complex and dynamic bird communities around my home in the Front Range region, and they also help me to appreciate the amazing avifaunal diversity of Colorado as a whole.

In Colorado and elsewhere, most bird populations are emphatically not evenly distributed across a state or province. Most observers know that in the case of uncommon and/or local populations—say, Grace's Warbler and Yellow-billed Cuckoo in Colorado. But we often fail to recognize distributional differences involving common species. An example in Colorado is the Swainson's Thrush, a species that occurs in ridiculous plenitude during spring migration on the eastern plains. Yet it is almost completely absent from Colorado's western valleys during spring migration, a fact that was gently pointed out to me by Coen Dexter following a talk that I gave in southwestern Colorado a few years ago. During my talk, I glibly stated that Swainson's Thrushes are common migrants in the lowlands—true enough in eastern Colorado, but completely false in western Colorado.

If I had done my homework, I would have known that. Robert Andrews and Robert Righter, in their *Colorado Birds: A Reference to Their Distribution and Habitat* (Denver Museum of Natural History, 1992), clearly state on p. 274 that the Swainson's Thrush is a common to abundant spring migrant on the eastern plains but that it "apparently is absent from the western valleys in migration, at least in the Grand Valley." I might also have consulted *Birds of Western Colorado Plateau and Mesa Country* (Grand Valley Audubon Society, 2004) by Robert Righter, Rich Levad, Coen Dexter, and Kim Potter. Righter and coauthors state on p. 143 that "even during spring and fall migration, [Swainson's Thrushes are] rarely found outside of breeding habitat."

Birds of Western Colorado Plateau and Mesa Country presents S&D data for 373 bird species in the area of coverage, an oblong region running north to south from Wyoming to New Mexico and east to west from Utah to a jagged curve connecting Steamboat Springs, Eagle, Gunnison, and Pagosa Springs. Most species accounts consist of four separate components that, taken together, present a remarkably detailed picture of S&D.

Let's look at these four components as they relate to the Swainson's Thrush. Naturally, we start with the map. It is a multi-color affair about 3 inches high and 1.5 inches wide. The map shows county borders (black dashes), rivers (blue lines), and elevation (shades of tan), and it indicates the breeding range of the Swainson's Thrush in burnt orange.

Of course, the Swainson's Thrush is not a permanent resident in western Colorado, so we turn to the second component: a bar graph showing seasonal abundance. The bar graph indicates that the Swainson's Thrush is uncommon to fairly common from mid-April to mid-May, then common to abundant from late May to late August, then uncommon to fairly common in early September, and then absent from the region thereafter.

The third component is one that I rarely see in S&D guides, but it is essential in any S&D guide for Colorado and, I would argue, for just about anywhere else in western North America. This third component is a graph that plots abundance as a function of elevation (vertical axis) and stage in the life cycle (horizontal axis). We see, for example, that in spring migration Swainson's Thrushes occur from 4500 to 8500 feet elevation but are rare everywhere. Fall migrants are rare, too, but they are annual to 10,500 feet and casual to 11,500 feet.

The fourth and final component is a written description. We learn here about microhabitat preferences on the breeding grounds, about altitudinal variation throughout the coverage region, and, oh yes, about the surprising paucity of birds found away from the breeding grounds.

We are all experts now on the status and distribution of the Swainson's Thrush in western Colorado. That expertise has immediate applications, of course, in the field. It importantly affects our judgments in the bird-identification arena, and it has clear implications in management and conservation settings. It is a sort of expertise that is also intrinsically satisfying. S&D is a fundamental aspect of field ornithology, not requiring any sort of "application." Understanding of S&D delights us in the same way that we are delighted by knowledge of molt and flight calls.

If there is one thing missing from the treatment of the Swainson's Thrush in *Birds of Western Colorado Plateau and Mesa Country*, it is information on subspecies. My assumption is that most or all of western Colorado's Swainson's Thrushes are of the widespread *swainsoni* group. Then again, we've seen that my assumptions regarding Swainson's Thrushes in western Colorado can be fallible. Do individuals of the *ustulatus* group pass through western Colorado? There have been a few recent reports from eastern Colorado, for what that's worth. I would have appreciated a little bit of discussion of the matter, even if it was as brief as "no confirmed occurrences of birds of *ustulatus* group" or "status of *ustulatus* group unknown in region." I hasten to point out that information on subspecies is, indeed, presented for many species in *Birds of Western Colorado Plateau and Mesa Country*. But it is missing for other species, such as the Swainson's Thrush. The treatment of subspecies by Righter and coauthors can most charitably be characterized as uneven, though this is due in part to the absence of recent taxonomic work.

Birds of Western Colorado Plateau and Mesa Country is a colorful book—literally and figuratively. I flipped forward a few pages to p. 114, where I see parti-colored maps, mildly psychedelic plots of altitude and life cycle, and gratuitous but pleasing cumulus clouds extending all the way across the top of the page. The text is colorful, too, and easy-going. In the treatment of the Western Kingbird at the bottom of p. 114, the text states that "western Colorado's entire breeding population seems to appear in about two or three days" and that "these birds disappear [in early September] almost as instantly as they appear in spring." Just as one speaks of "jizz" and "impression" in field identification, then, so one might refer to the essence and even the drama of S&D. Righter and coauthors tell us that "each day of the year, ravens probably soar over almost every square mile of western Colorado" (p. 126), and they describe "a memorable tanager-on-every-fencepost" fallout (p. 162). They tell us that the Grand Junction Christmas Bird Count records more Western Screech-Owls than does any other count (p. 84), and they speculate that the Calliope Hummingbird will soon be added to the list of confirmed breeders in Colorado (p. 100). It's exciting stuff, really.

S&D is fun, safe, and good for you, and that's how S&D is presented by Righter and coauthors. You'll learn a lot from this book. You'll become a better birder by using *Birds of Western Colorado Plateau and Mesa Country*. You might well apply it to important conservation and management actions. Mainly, though, you'll have a lot of fun.

Ted Floyd

FEATURED PHOTO

FIRST DOCUMENTATION OF A EURASIAN KESTREL IN CALIFORNIA

ANGUS C. HULL, MICHAEL G. ARMER, BETHANY J. STURGEON, and ALLEN M. FISH, Golden Gate Raptor Observatory, Bldg. 1064, Ft. Cronkhite, Sausalito, California 94965; bhull@parksconservancy.org

The Eurasian Kestrel (*Falco tinnunculus*) is among the most wide-ranging of raptors of the Old World, occurring as a breeder throughout Europe, North Africa, and much of Asia, including Japan (del Hoyo et al. 1994, Ferguson-Lees and Christie 2001). As many as eleven subspecies have been described (del Hoyo et al. 1994), and the AOU (1998) categorized the species as casual or accidental in North America.

The Eurasian Kestrel has not been confirmed previously in California. Rottenborn and Morlan (2000) discussed an account by Palmer (1988) of a putative *F. tinnunculus* that rode a ship from Japan to Humboldt Bay, California, in 1978. That bird was caught alive and turned over to Humboldt State University and, in 1979, was examined by falcon experts Clayton White and Sandy Boyce, who confirmed that it was a Eurasian Kestrel (C. White pers. comm.). Slides allegedly of this kestrel were received for review by the California Bird Records Committee in 1997. The images obtained, however, dated 1973, were of a different, larger falcon, possibly a hybrid, so that report remains enigmatic (see Hamilton et al. 2007).

The autumn movement of diurnal raptors over the Marin Headlands, on the north side of the Golden Gate and part of the Golden Gate National Recreation Area, was discovered in 1972 and described by Binford (1979). In 1983, Howell and Shor (1985) co-founded a long-term, volunteer-staffed banding station at the site, research now managed under the auspices of the Golden Gate Raptor Observatory (GGRO) with oversight from the National Park Service. Through 2007, GGRO banders had trapped 28,027 individual raptors of 15 species.

On 23 October 2007, during routine fall banding in the Marin Headlands, Marin County, California, we trapped, banded, and released a juvenile female Eurasian Kestrel, which we document here as the first occurrence of this species in California. The bird was caught in a spring-loaded bow-net at 14:56 hrs at Slacker Hill (elevation ~260 m) approximately 1.6 km northwest of the Golden Gate bridge's north landing.

The kestrel was weighed and measured (following Baldwin et al. 1931), photographed in the blind and in natural light, and subsequently released where captured at 16:14 hrs. We identified the bird by plumage characteristics, including facial and wing markings, as well as linear measurements and weight (Clark and Wheeler 2001). Note that in both photos featured on this issue's back cover the Eurasian Kestrel has a single malar stripe, in contrast with the American Kestrel's (*F. sparverius*) paired malars. In the bottom photo, the kestrel's extended left wing shows no light markings in the outer primaries. It lacks the light brown spots on the inner vanes of the American Kestrel's primaries, as seen in a dorsal view. Measurements of the larger and heavier Eurasian Kestrel are compared to those for 343 female American Kestrels banded in the Marin Headlands from 1983 through 2003 in Table 1.

In the field, the Lesser Kestrel (*F. naumanni*), another small Eurasian falcon, can be difficult to distinguish from *F. tinnunculus*, especially in juvenile and female plumages. The traits discernible in hand, however—talon color, facial markings, tail length, and relative lengths of primaries 7 and 10—distinguish them easily (Clark and Yosef 1998, Forsman 1999) and so did not confound our identification. The top photo shows one of these traits, the slight dark line behind the eye, a diagnostic characteristic of *F. tinnunculus* lacking in *F. naumanni* (Clark and Schmitt 1999).

Table 1 Measurements of Kestrels Captured in Marin County, California

	Female American Kestrels mean (range)	Eurasian Kestrel as measured
Band size	3, 3B	4
Mass	116 g (97–135)	207.7 g
Wing chord	194 mm (182–205)	238 mm
Tail	127 mm (117–137)	161 mm
Exposed culmen	12.1 mm (10.8–13.5)	14.2 mm
Tarsus depth	4.4 mm (3.8–5.1)	6.4 mm
Hallux	9.6 mm (8.4–10.8)	11.4 mm

We compared measurements of the banded kestrel to published measurements for *F. t. tinnunculus* (Cramp and Simmons 1980). The extensive size overlap between males and females did not allow us to identify the bird's age and sex from measurements alone, but plumage traits—the width of the dark brown barring on the back and upperwing coverts, wider dark tail bands, and heavy ventral streaking on breast and belly (Clark and Yosef 1998, Clark and Schmitt 1999, Forsman 1999)—allowed us to age and sex the bird with confidence.

Juvenile female Eurasian Kestrels have wide dark brown barring of even width on the back and upperwing coverts, whereas adult females have reddish brown coverts with short dark brown triangular bars (Clark and Schmitt 1999). Most juvenile males show some rufous back feathers with dark diamond-shaped markings (Clark and Yosef 1998, Forsman 1999) sparser than those of the juvenile female. Similar patterns are true for the dorsal aspect of the tail: the juvenile male has narrower dark bands than the juvenile female (Clark and Schmitt 1999). The bottom photo shows the dark barring of even width on the back and upper wing coverts, running down onto the tail, all indicating the juvenile female plumage.

The undertail shows another trait that distinguishes juveniles from the adult female. The black subterminal spot on the ventral side of the outer (#6) rectrix is moon- or bowl-shaped on juveniles; the adult female's rectrix spot is more squarish with a black point aligned upward with the feather shaft (Forsman 1999). Our photos show a clear bowl-shaped dark mark, with no upward point, on the underside of the outer tail feather.

On the adult female, the dorsal side of the tail is ash-gray to brownish gray with often incomplete blackish brown bars, an off-white tip, and black subterminal band (Cramp and Simmons 1980). Those of juvenile females are reddish brown with noticeably wider dark brown bands (Clark and Schmitt 1999). Our photos show a pattern like the juvenile female as described; however, our photos also show two dark-barred grayish uppertail coverts like those found on adult females. Clark and Schmitt (1999) noted that "new adult feathers of the proper sex begin showing on back and uppertail coverts by first autumn." By contrast, juvenile males would show unbarred gray new uppertail coverts (Clark and Yosef 1998). Forsman (1999) commented that 40% of Eurasian Kestrels in Britain show "at least some adult-type feathers by September." Similarly, almost all of more than 40 juvenile Eurasian Kestrels captured in autumn in Israel showed adult feathers on their backs and uppertail coverts (W. S. Clark pers. comm.).

No fault bars, often useful in distinguishing juveniles from adults, were detected in the flight feathers. Also, we found no evidence—in feather, bill, or talon wear, in condition of soft parts, or from communications with regional falconers—that this individual had been held in captivity.

Pranty et al. (2004) listed 18 verified records of the Eurasian Kestrel in North America, 11 of them from coastal Alaska. Two are from Canada (British Columbia, New Brunswick/Nova Scotia line), one each from New Jersey, Florida, and Washington state, and two from Massachusetts. The California record is the third and most southerly of the Eurasian Kestrel on the Pacific coast of North America south of Alaska.

One of the aforementioned Alaska records is based on a specimen collected on Shemya Island and identified to subspecies by R. C. Banks as *F. t. interstinctus*, the easternmost subspecies, occurring from northern Japan and mainland China south to Malaya and the Philippines (Gibson 1981). Whether or not other sightings from western North America have been of this subspecies is unknown, but the geographic and seasonal pattern of the records, from coastal Alaska (spring and fall) to British Columbia (winter; Campbell 1985), coastal Washington (fall–winter; Anderson 2005), and now coastal California (fall), suggests Asia as the likely source of these birds.

Finally, the bird we report here was reviewed by the California Birds Record Committee (CBRC 2007-272) and accepted unanimously as a new species for the state (J. Morlan pers. comm.).

ACKNOWLEDGMENTS

The GGRO banding program is made possible by the hard work of hundreds of volunteers, each of whom deserves a piece of the credit for documenting this kestrel. We are sponsored by the Golden Gate National Parks Conservancy and the National Park Service and are grateful to the staff and leaders of both organizations for their support. Reviews by William S. Clark and Daniel D. Gibson greatly improved this article. We also received critical comments and insights regarding the Eurasian Kestrel from Bud Anderson, Doug Bell, Hans Peeters, Peter Pyle, Lee Evans, and Pawel Malczyk. Thanks especially to Joe Morlan for suggesting this article and shepherding it forward. Photographs of the Eurasian Kestrel taken by Michael Armer are currently at: http://aworldofbirds.com. This is contribution number 65 from the Golden Gate Raptor Observatory.

LITERATURE CITED

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Lawrence, KS.

Anderson, C. M. 2005. Common Kestrel, in Birds of Washington (T. R. Wahl, B. Tweit, and S. G. Mlodinow, eds.), p. 122. Ore. State Univ. Press, Corvallis.

Baldwin, S. P., Oberholser, H. C., and Worley, L. G. 1931. Measurements of Birds. Cleveland Mus. Nat. Hist., Cleveland.

Binford, L. C. 1979. Fall migration of diurnal raptors at Pt. Diablo, California. W. Birds 10: 1–16.

Campbell, R. W. 1985. First record of the Eurasian Kestrel for Canada. Condor 87:294.

Clark, W. S., and Schmitt, N. J. 1999. A Field Guide to the Raptors of Europe, the Middle East, and North Africa. Oxford Univ. Press, Oxford, England.

Clark, W. S., and Wheeler, B. K. 2001. Hawks of North America, 2nd ed. Houghton Mifflin, Boston.

Clark, W. S., and Yosef, R. 1998. In-Hand Identification Guide to Palearctic Raptors. Internatl. Birdwatching Centre in Eilat, Eliat, Israel.

Cramp, S., and Simmons, K. E. L. (eds). 1980. The Birds of the Western Palearctic, vol. 2. Oxford Univ. Press, Oxford, England.

Del Hoyo, J., Elliott, A., and Sargatal, J., eds. 1994. Handbook of the Birds of the World, vol. 2. Lynx Edicions, Barcelona.

Ferguson-Lees, J, and Christie, D. A. 2001. Raptors of the World. Houghton Mifflin, Boston.

Forsman, D. 1999. The Raptors of Europe and the Middle East—A Handbook of Field Identification. T. & A. D. Poyser, London.

Gibson, D. D. 1981. Migrant birds at Shemya Island, Aleutian Islands, Alaska. Condor 83:65–77.

Hamilton, R. A., Patten, M. A., and Erickson, R .A., eds. 2007. Rare Birds of California. W. Field Ornithol., Camarillo, CA.

Howell, J. A., and Shor, S. W. 1985. New banding station supplies trapping success data. Park Science 5:22–23.

Palmer, R. S. 1988. Handbook of North American Birds, vol. 5. Yale Univ. Press, New Haven, CT.

Pranty, B., Kwater, E., Weatherman, H., and Robinson, H. P. 2004. Eurasian Kestrel in Florida: First record for the southeastern United States, with a review of its status in North America. N. Am. Birds 58:168–169.

Rottenborn, S. C., and Morlan, J. 2000. Report of the California Bird Records Committee: 1997 records. W. Birds 31:1–37.

Western Field Ornithologists 33rd Annual Meeting

9–12 October 2008, San Mateo, California

WFO will hold its 33rd annual meeting in San Mateo, California, this fall with Dr. Carla Cicero giving the keynote address on Saturday evening, 11 October—the Grinnell Resurvey Project: A Century of Avifaunal Change in California.

Visit WFO's website, www.westernfieldornithologists.org, for registration information, science session abstracts and speakers, and the schedule of activities, including workshops addressing field skills and all-day (Thursday and Sunday) and half-day (Friday and Saturday) field trips.

The registration fee includes science sessions on Friday and Saturday afternoons, exhibitors' displays, an opening reception, book signing, and expert sound- and slide-identification panels moderated by Nathan Pieplow and Ed Harper. A special reception on Friday evening 10 October highlights the launch of WFO's monograph series with Dave Shuford speaking on California Bird Species of Special Concern.

In conjunction with the meeting, Shearwater Journeys is offering two pelagic trips, one departing from Bodega Bay on Thursday 9 October, the other from Santa Cruz on Monterey Bay on Sunday 12 October. WFO members get a $30 discount on each trip.

We hope to see you in San Mateo!

WESTERN BIRDS

Vol. 39, No. 4, 2008

Volume 39, Number 4, 2008

Report of the Alaska Checklist Committee, 2003–2007 *Daniel D. Gibson, Steven C. Heinl, and Theodore G. Tobish, Jr.* 189

The Changing Status of the Gray Hawk in New Mexico and Adjacent Areas *Sartor O. Williams III and David J. Krueper* ...202

An Apparent Hybrid Black × Eastern Phoebe from Colorado *Nathan D. Pieplow, Tony Leukering, and Elaine Coley* 209

NOTES

Observations of Adult Peregrine Falcons Capturing Stoneflies *Jay Sumner and Kate Davis* 220

A *Fregetta* Storm-Petrel off Western Mexico *Rich Pagen, Peter Pyle, and Lisa T. Ballance* 225

Book Reviews *Michael A. Patten and Peter Pyle* 228

Featured Photo: Hybridization of a Yellow-crowned and Black-crowned Night-Heron in Southern California *Mary F. Platter-Rieger, Tiffany M. Shepherd, and Marie Molloy* 233

Outgoing President's Message *Dave J. Krueper* 242

WFO's 33rd Annual Conference: Retrospective *Jay Withgott* 243

Index *Philip Unitt* 246

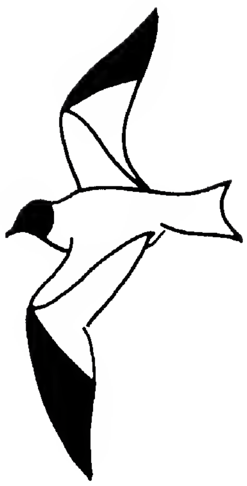
Front cover photo by © David E. Quady of Berkeley, California: Yellow Rail (*Coturnicops noveboracensis*), Arrowhead Marsh, Oakland, Alameda County, California, 21 January 2008. Before 1940 the Yellow Rail was apparently a regular winter visitor to the San Francisco Bay area. Since then it has been recorded there only about 10 times. Like other rails, it is most accessible to birders and predators during the highest tides of the year, as when this individual was photographed.

Back cover "Featured Photo" by © Mary F. Platter-Rieger of San Diego, California: Hybrid Yellow-crowned Night-Heron × Black-crowned Night-Heron (*Nyctanassa violacea* × *Nycticorax nycticorax*), Naval Air Station North Island, Coronado, San Diego County, California, 24 June 2007. Second known occurrence of this hybrid combination in the wild and first observation of an active nest of a hybridizing pair.

Western Birds solicits papers that are both useful to and understandable by amateur field ornithologists and also contribute significantly to scientific literature. 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; kmolina@nhm.org. For matters of style consult the Suggestions to Contributors to *Western Birds* (at www.wfo-cbrc.org/journal.html).

WESTERN BIRDS



Volume 39, Number 4, 2008

REPORT OF THE ALASKA CHECKLIST COMMITTEE, 2003–2007

DANIEL D. GIBSON, University of Alaska Museum, Fairbanks, Alaska 99775; avesalaska@gmail.com

STEVEN C. HEINL, P. O. Box 23101, Ketchikan, Alaska 99901

THEODORE G. TOBISH, JR., 2510 Foraker Drive, Anchorage, Alaska 99517

ABSTRACT: During the five years (2003–2007) since the last report of the Alaska Checklist Committee 21 species or subspecies have been added to the Alaska list, two subspecies have been raised to species status, and one subspecies has been deleted, resulting in a net total of 485 species and 115 additional subspecies of birds we maintain at the beginning of 2008 as occurring or having occurred naturally in Alaska.

For three decades, 1970–1999, a checklist of Alaska birds was maintained by Gibson at the University of Alaska Museum. Nine editions of a one-page checklist were published during that period—in 1970, 1973, 1977, 1980, 1983, 1986, 1990, 1993, and 1999. As an increasing percentage of avian taxa were added to the state list on the basis of photographic (rather than specimen) evidence, we found it useful to form a committee to review all potential additions, especially those substantiated (or not) by photos, as well as other business that would affect the state checklist. Founded in 2000, the Alaska Checklist Committee comprises three members, who must agree unanimously for passage of an item under discussion. The Checklist of Alaska Birds is now revised annually, and a new edition is posted at the University of Alaska Museum website—at www.uaf.edu/museum/collections/bird/projects/checklist.pdf—early in each new year.

Using the published inventory of Alaska birds (Gibson and Kessel 1997) and our previous report (Gibson et al. 2003) as a foundation, we have assembled here all additions to, systematic changes to, and deletions from the Alaska list during the years 2003–2007, inclusive. Occurrence of most of these 600 avian taxa—485 species and 115 additional subspecies—in Alaska is substantiated by archived voucher specimens or by published and/or archived photos accompanied by written details. For those taxa added to the Alaska list since 2002 we include all records and published reports through 2007. For those formerly included on the unsubstantiated list we refer to the reports on which that status was based. No avian species is added to the Alaska list in the absence of an archived voucher specimen, photo, videotape, or sound recording. Subspecies identified by inference are presented in parentheses; these are taxa either not represented by an extant Alaska specimen or they are represented by a specimen for which age, sex, or other criteria preclude certain identification to subspecies.

Because preserved *examples* of avian taxa (archived voucher specimens) make available manifold data about birds that can only be conjectured from *representations* (photos, videos, etc., used widely to corroborate identification and geographic occurrence of birds), we include here references to first Alaska specimens of taxa already on the Alaska list obtained, or brought to our attention, during this period of coverage.

STATUS CHANGES AND ADDITIONS TO THE ALASKA LIST

Anser serrirostris. Tundra Bean-Goose. Additional subspecies elevated to species rank. The taxa long maintained as the polytypic Bean Goose (*Anser fabalis*) are now recognized by the American Ornithologists' Union (AOU) as constituting two polytypic species, *A. serrirostris* and *A. fabalis*, with the English names Tundra Bean-Goose and Taiga Bean-Goose, respectively (Banks et al. 2007). RANGES (see Vaurie 1965): *A. serrirostris*—Eurasian tundra from the Northwestern Federal District of Russia (including Novaya Zemlya) to the Chukotski Peninsula, Anadyrland, and Koryakland (subspecies *serrirostris* occupies the range of the species east of Taimyr Peninsula); *A. fabalis*—Eurasian taiga from northern Scandinavia east to western Anadyrland (subspecies *middendorffii* occupies the range of the species in Siberia and the Russian Far East). HISTORY IN ALASKA: Subspecies *A. s. serrirostris* of the Tundra Bean-Goose occurs regularly in the western Aleutian Islands (see Gibson and Byrd 2007; two specimens); single specimens have been collected as well in the Pribilof Islands (Sladen 1966) and at St. Lawrence Island (Fay and Cade 1959). The Taiga Bean-Goose is known in Alaska from a Pribilof specimen of subspecies *A. f. middendorffii* (see Gabrielson and Lincoln 1959, Gibson and Kessel 1997) and from a recent Aleutian sighting (three together, 27 September 2007, Shemya Island, M. T. Schwitters, photos at University of Alaska Museum [UAM]). NOTES: A result of the taxonomic decision followed here is that many past Alaska sightings of Bean Geese must be referred to now as occurrences of "bean-geese (sp.)."

Branta hutchinsii (Richardson, 1832) {type locality: Melville Peninsula, Nunavut}. Cackling Goose. Additional subspecies elevated to species rank. On the basis of a number of genetic studies, the forms treated formerly as the polytypic Canada Goose (*Branta canadensis*) are now recognized to constitute at least two polytypic species (Banks et al. 2004). *Branta hutchinsii* comprises the taxa maintained formerly as the smaller subspecies of the Canada Goose. Of those recognized by the AOU (Banks et al. 2004), three are associated with Alaska: *B. h. leucopareia*, nesting in the Aleutians and in the Semidi Islands (Gibson and Byrd 2007); *B. h. minima*, nesting on the Bering and Chukchi coasts of the Alaska mainland from the Yukon–Kuskokwim delta to northwestern Alaska (except the Seward Peninsula; see Delacour 1951, 1954, Kessel 1989); and *B. h. taverneri*, nesting in northwestern and northern Alaska (away from the coast; Delacour 1951).

Additional subspecies: *Branta hutchinsii taverneri* Delacour, 1951 {Colusa, California}. The AOU (Banks et al. 2004) detached this taxon from *B. canadensis parvipes*, with which it had been synonymized frequently (cf. AOU 1957, Palmer 1976, Kessel 1989, Gibson and Kessel 1997—and see as well notes at AOU 1983:70 and AOU 1998:60). RANGE, HISTORY IN ALASKA, AND NOTES: Not better understood in

Alaska now than a half century ago. Subspecies *taverneri* was assessed by Delacour (1954:167–168), three years after he described it for science, as follows:

"Breeding areas...poorly known...probably...ten to fifty miles from the coast, from the base of the Alaska Peninsula...[north]. It intergrades with *minima* in the Wainwright area....It certainly also intergrades with *parvipes*, but the ranges and intergradation of the two forms are yet to be worked out. The identification of the various populations remains difficult, and until further knowledge is acquired we unite them under the name *taverneri*. Winters from Washington to Texas and Mexico, mostly in the large interior valleys of California.... [It]...replaces the larger *parvipes* in northern and western Alaska, but we know very little about the intergrading and distribution of the two....It behaves toward the smaller *minima* that breed on the shore tundra along the Bering Sea as *parvipes* to [nominate] *hutchinsii* along the shores of the northern Hudson Bay, breeding farther inland, migrating separately, and building different, much bulkier nests."

Melanitta fusca. White-winged Scoter. Additional subspecies: *Melanitta fusca* (*stejnegeri*) (Ridgway, 1887) {Bering Island, Commander Islands}. First records (no specimen; photos published and at UAM): adult ♂, 30 May 2001, Cape Nome; adult ♂, 2–4 June 2002, Gambell, St. Lawrence Island (Garner et al. 2004; includes photos); adult ♂, 17 June 2004, Nome, M. J. Iliff (photo at UAM). Also one reported 10 June 2005, Gambell, P. E. Lehman (*N. Am. Birds* [NAB] 59:640). RANGE: Central and eastern Russian Far East (see Vaurie 1965).

Thalassarche cauta (Gould, 1841) {Bass Strait, between Australia and Tasmania}. Shy Albatross. *Thalassarche cauta* (*salvini*) (Rothschild, 1893) {New Zealand}. One record (no specimen; photos published and at UAM): subadult, 4 August 2003, 18 km northwest of Kasatochi Island, central Aleutians (Benter et al. 2005). RANGE: Species breeds on islands off southern Australia and New Zealand and ranges widely in the South Pacific (AOU 1998); subspecies *salvini* breeds at the Snares, Crozet, and Bounty islands (Dickinson 2003). NOTES: Benter et al. (2005) referred to nine other records in the North Pacific.

Puffinus bulleri. Buller's Shearwater. First Alaska specimen: UAM 21852, ♀, 11 September 2005, Gulf of Alaska at 58° 40′ N, 148°20′ W, K. D. Bell. HISTORY IN ALASKA: Long reported from the northern Gulf of Alaska (see Day 2006 and citations therein), this species was only recently added to the Alaska list, by photo (Gibson et al. 2003:124).

Puffinus puffinus (Brünnich, 1764) {Faeroe Islands}. Manx Shearwater. First substantiated records (no specimen; photos at UAM, Figures 1 and 2): two together, perhaps a pair prospecting for a possible nest site, 12 May 2005, Middleton Island (59° 26′ N, 146° 20′ W), Gulf of Alaska, B. M. Guzzetti; two together in that area 3–24 July 2005, B. M. Guzzetti and N. Bargmann (NAB 59:640); one bird (still?) there, in company with Short-tailed Shearwaters (*P. tenuirostris*) on 26 September 2005 (G. H. Rosenberg, R. A. MacIntosh, S. C. Heinl, and T. G. Tobish, Jr., NAB 60:120, 2006). RANGE: According to AOU (1998) this species breeds only on islands in the North Atlantic Ocean, with records from the South Atlantic, South Pacific, and North Pacific in California and Washington. Most of the North Pacific records are recent. In Washington waters there were 31 records from the late 1990s through 2002, March–October (Wahl 2005); in California waters, where the species has been recorded annually since1993, there were 97 records through 2006, in every month but November (Hamilton et al. 2007, Heindel and Garrett 2008).

HISTORY IN ALASKA: In the absence of any Alaska specimens of the taxonomically complicated and incompletely understood group of which this species is a member (see NOTES, below), the Manx Shearwater is known here from sketchy information. Prior Alaska sightings of Manx-type shearwaters include a number from the northern

Figure 1. Manx Shearwaters along beach at Middleton Island, 12 May 2005.

Photo by B. M. Guzzetti

Gulf of Alaska: one, 4 June 1975, off Barren Islands; one "dark-vented," 4 July 1976, Gulf of Alaska at 57° 26′ N, 145° 10′W; one "dark-vented," 5 August 1976, Chiniak Bay, Kodiak Island (all Kessel and Gibson 1978); one, 17 May 1981, between the Barren Islands and Homer, C. J. Hohenberger (*Am. Birds* [AB] 35:852); one "white-vented," 19 June 1986, between Kodiak and Seward, D. J. Fisher, J. L. Dunn, B. Hallett, and C. Gottlund (AB 40:1242); one, 17 July 1995, off Kodiak Island, C. Dexter (*Field Notes* [FN] 49:963); five birds, 8–10 July 2004, between Cape Fairweather and Lituya Bay, P. M. Suchanek (NAB 58:583); one, 1 September 2004, off Cape Suckling, S. Zimmerman and others (NAB 59:129). There is also one sighting from the southern Bering Sea (one, 8 June 1998, Bristol Bay at 56° 05′ N, 162° 25′ W, R. A. MacIntosh).

Following the Middleton Island activity in 2005, outlined above, there were three reports the following year: one, 25 May 2006, off Sitka, G. Meyer (NAB 60:421, photo 60:422); one, 15 June 2006, near the Chiswell Islands, K. J. Zimmer and others (NAB 60:565); and one, 29 June 2006, near Coronation Island, B. Tweit (NAB 60:565). NOTES: "Species limits in the superspecies complex that includes *P. puffinus*... [and *P. yelkouan, P. gavia*, *P. opisthomelas*, *P. auricularis*, *P. newelli*, and *P. huttoni*] are uncertain" (AOU 1998:21).

Pelecanus occidentalis Linnaeus, 1766 {Jamaica}. Brown Pelican. *Pelecanus occidentalis* (*californicus*) Ridgway, 1884 {La Paz, Baja California}. First records (no specimen; photos published and at UAM): one immature, 23 May 2003, Clarence Strait, between Kasaan Peninsula and Gravina Island, K. Turley (NAB 57:390, photos at UAM); one adult, 24–28 May 2003, Clover Passage, near Ketchikan, M. Pattison, S. C. Heinl, and others (NAB 57:390, includes photo; photo also published in the *Anchorage Daily News*, B-3, 5 June 2003). RANGE: Breeds locally from southern California south; ranges north along the coast regularly to southwestern British Columbia (AOU 1998). HISTORY IN ALASKA: An immature was reported to have reached

Figure 2. One of two Manx Shearwaters along beach at Middleton Island, 12 May 2005.

Photo by B. M. Guzzetti

Ketchikan aboard a fishing vessel on 18 April 1996, "two or three days" after it had landed aboard that vessel, northbound in Canadian waters (Tobish 1996:319), and an immature was reported on 21 December 2002 in Clarence Strait, near Gravina Island (L. Johnson). NOTES: Since the 1970s this species has steadily increased in numbers as a visitant along the Pacific Northwest coast (Campbell et al. 1990, Gilligan et al. 1994, Wahl and Tweit 2000). At the latest turn of century, compared with 30 years before, it arrived increasingly earlier in the spring and lingered later in the fall; small numbers began to remain regularly in winter on the southern Oregon coast (Marshall et al. 2003), where unprecedented numbers were recorded well into December 2002 (NAB 57:247).

Ardea cinerea Linnaeus, 1758 {Sweden}. Gray Heron. *Ardea cinerea* (*jouyi*) Clark, 1907 {Seoul, Korea} First substantiated record (no specimen; photos at UAM): one, 1–2 October 2007, St. Paul Island, Pribilofs, R. Hoyer, J. Mohlmann, and others. RANGE: Widespread in Eurasia and Africa; subspecies *jouyi* breeds in Asia, as far east and north as Korea and Hokkaido (see Vaurie 1965). HISTORY IN ALASKA: One prior report (one, 1–2 August 1999, St. Paul Island, Pribilofs, Burton and Smith 2001).

Ardea alba. Great Egret. *Ardea alba egretta* Gmelin, 1789 {Cayenne}. First Alaska specimen: UAM 20049, adult ♀, found dead 6 January 2004, Juneau, M. W. Schwan; bird present alive 31 December 2003–5 January 2004, M. W. Schwan, G. B. van Vliet, K. Hart, and others (see NAB 58:268). RANGE: Breeds in the Americas, from southern Canada to Patagonia (Dickinson 2003). HISTORY IN ALASKA: Subspecies *egretta* had been discussed as the likely taxon involved in earlier, photo-supported sightings of this species in southeastern and south-central Alaska, mid-May to early July (Gibson and Kessel 1992).

Additional subspecies: *Ardea alba modesta* J. E. Gray, 1831 {India}. First Alaska specimens: UAM 22607, adult ♂, and UAM 22608, adult unsexed, found dead 25 May and 28 May 2006, respectively, Buldir Island, western Aleutians (Gibson and Byrd 2007). RANGE: Breeds in southern and eastern Asia north to southern Japan and south to Australasia (Dickinson 2003). HISTORY IN ALASKA: Subspecies *modesta* had been discussed as the likely taxon involved in earlier, photo-supported sightings of this species in the Aleutian Islands in fall and winter (Gibson and Kessel 1997).

Mesophoyx intermedia (Wagler, 1829) {Java}. Intermediate Egret. *Mesophoyx intermedia intermedia* (Wagler, 1829). One record (specimen): UAM 22603, adult ♂, found dead 30 May 2006, Buldir Island, western Aleutians (Lorenz and Gibson 2007). RANGE: Species breeds from southern India to Japan, Philippines, the Greater Sundas, southern Moluccas, New Guinea, and Australia; also in Africa from Sudan to Cape Province (Dickinson 2003); the nominate subspecies breeds throughout the range of the species, except Africa (Dickinson 2003) and from the Moluccas to New Guinea and Australia (Vaurie 1965).

Accipiter gentilis. Northern Goshawk. Additional subspecies: *Accipiter gentilis* (*albidus*) (Menzbier, 1882) {eastern Siberia, Amurland, and Kamchatka}. First records (no specimen; one photo UAM): adult, 25–27 May 2001; one (white morph), 17 September 2001, both at Shemya Island, western Aleutians (Gibson and Byrd 2007). RANGE: Northeastern Russian Far East, east to Kamchatka and Anadyrland (see Vaurie 1965).

Buteo lagopus. Rough-legged Hawk. Additional subspecies: *Buteo lagopus kamtschatkensis* Dementiev, 1931 {Kikhchik River, Kamchatka}. First Alaska specimen: UAM 21100, adult ♂, 8 May 2005, Shemya Island, western Aleutians (Gibson and Byrd 2007). RANGE: Sea of Okhotsk coast, northern Kuril Islands, and Kamchatka (Dickinson 2003). HISTORY IN ALASKA: This taxon is of intermittent occurrence (less than annual, ≥30% of years) in spring in the western Aleutians (Gibson and Byrd 2007).

Vanellus vanellus (Linnaeus, 1758) {Sweden}. Northern Lapwing. One record (specimen): UAM 22699, adult ♀, 12 October 2006, Shemya Island, western Aleutians (Schwitters 2007). RANGE: Widespread in Eurasia, from western Europe to Ussuriland (see Vaurie 1965). HISTORY IN ALASKA: In their hypothetical list, Gabrielson and Lincoln (1959:827) referred to a 19th-century report by Dall and Bannister (1869:293), who had written, "A bird was described to me by one of the Russian hunters as having been killed on one of the small islands in Norton Sound, off the mouth of Golsova River. From this description, which could apply to no other bird of the country, and agreed well with the colors and crest of the lapwing, I am induced to believe that stragglers of that species may occasionally occur there."

Calidris alpina. Dunlin. Additional subspecies: *Calidris alpina sakhalina* (Vieillot, 1816) {Sakhalin}. First Alaska specimens: at least six UAM specimens, 19 May–1 June, from Attu, Shemya, Buldir, and Amchitka, in the western and central Aleutians (Gibson and Byrd 2007). RANGE: Northeastern Russian Far East (see Kistchinski 1980, 1988). HISTORY IN ALASKA: This taxon is rare or uncommon in spring in western Aleutians (Gibson and Byrd 2007).

Larus crassirostris. Black-tailed Gull. First Alaska specimen: UAM 23503, adult ♀, 22 April 2007, Shemya Island, western Aleutians, M. T. Schwitters. HISTORY IN ALASKA: There have been more than 25 widely scattered Alaska records, the first in 1980 (see Gibson and Kessel 1992, Heinl 1997, Gibson and Byrd 2007). Early records documented by archived photos (UAM) encompass western and southwestern Alaska (adult, 2 June 1988, St. Lawrence Island, N. B. Broadbooks, G. H. Rosenberg), the Aleutians (adult, 19 June 1991, off Buldir Island, E. V. Klett), southeastern Alaska (second-summer/adult winter, 21 August–8 October 1992, Ketchikan, S. C. Heinl; adult, 1 August 1993; first-summer, 6 and 28–30 September 1995, Petersburg, P. J. Walsh), and south-central Alaska (adult, 15 June 1995, Homer, K. Brock). Photos of the bird at Ketchikan were published (AB 47:166, 1993, Heinl 1997).

Larus fuscus. Lesser Black-backed Gull. Additional subspecies: *Larus fuscus heuglini* Bree, 1876 {Zeila, British Somaliland}, including as a junior synonym *taimyrensis* Buturlin, 1911 (del Hoyo et al. 1996, Dickinson 2003). One record (specimen): UAM 21826, adult ♀, 15 September 2005, Shemya Island, western Aleutians (Gibson and Byrd 2007). RANGE: Northwestern Federal District of Russia east to about 125° E in Siberia (Vaurie 1965). NOTES: Informed insights into the identification of this specimen were provided by L. Jonsson (in litt.), P.-A. Crochet (in litt.), and M. Renner (in litt.).

Ninox scutulata (Raffles, 1822) {Sumatra}. Brown Hawk-Owl. *Ninox scutulata* (*japonica*) (Temminck and Schlegel, 1845) {Japan}. One record (no specimen; photos at UAM): one, 27 August–3 September 2007, St. Paul Island, Pribilofs, D. Radin, J. Mohlmann, G. L. Thomson, S. Sapora, K. Litle, and others (Yerger and Mohlmann 2008). RANGE: Eastern Asia (Vaurie 1965); subspecies *japonica* breeds in southern Korea and Japan (OSJ 2000).

Tyrannus forficatus (Gmelin, 1789) {Mexico}. Scissor-tailed Flycatcher. First substantiated record (no specimen; photos at UAM, Figure 3): one adult, 9 July 2003, Juneau, J. G. and M. L. King, P. M. Suchanek, G. B. van Vliet, and others (NAB 57:533). Subsequently, one was reported to have been seen 30 June 2003, at Klokachef Island, southwest of Chichagof Island, J. Miller and L. Brown.) RANGE: Breeds no closer to Alaska than western Great Plains, but "casual throughout most of North America outside the breeding range" (AOU 1998:415). HISTORY IN ALASKA: Three prior sightings are all from southeastern Alaska (one, 22 July 1972, Gustavus, B. B. Paige; one, 15 June 1983, Cape Fairweather, A. G. Bomford; one, 3 June 1993, Juneau, B. Bereman and D. Vogt).

Lanius excubitor. Northern Shrike. Additional subspecies: *Lanius excubitor* (*sibiricus*) Bogdanov, 1881 {Chukotski Peninsula}. One record (specimen): UAM

Figure 3. Scissor-tailed Flycatcher at Juneau, 9 July 2003.

Photo by R. H. Armstrong

21841, immature ♀?, 10 October 2005, Shemya Island, western Aleutians (Gibson and Byrd 2007). RANGE: Siberia and Russian Far East (Vaurie 1959, Kistchinski 1980, Dickinson 2003).

Acrocephalus schoenobaenus (Linnaeus, 1758) {s Sweden}. Sedge Warbler. One record (no specimen; photos published and at UAM): one, 30 September 2007, Gambell, St. Lawrence Island, Rosenberg and Lehman (2008). RANGE: Europe east to western Siberia (Dickinson 2003).

Phylloscopus proregulus (Pallas, 1811) {Ingoda River, southern Transbaikalia}. Pallas's Leaf-Warbler. One record (no specimen; photos published): one, 25–26 September 2006, Gambell, St. Lawrence Island (Lehman and Rosenberg 2007). RANGE: Southwestern Siberia to Russian Far East in Amurland, Ussuriland, and Sakhalin (Dickinson 2003). NOTES: We follow Dickinson (2003) in maintaining this species as monotypic.

Vermivora ruficapilla (Wilson, 1811) {near Nashville, Tennessee}. Nashville Warbler. Polytypic in two subspecies (AOU 1957, Dickinson 2003). We think that subspecies in Alaska cannot be reasonably inferred from the available evidence. First substantiated records (no specimen; photos published and at UAM): one, 5–7 September 2004, Gambell, St. Lawrence Island (Lehman 2005; NAB 59:186); also single birds on 19 October and 11 November 2005, Ketchikan, A. W. Piston, S. C. Heinl, and J. F. Koerner (NAB 60:123, photo of latter bird published at 60:121), and on 6 November 2006, Sitka, M. Goff (NAB 61:126). RANGE: The western subspecies *ridgwayi* van Rossem breeds as far north as southern interior and southwestern British Columbia; the eastern subspecies nominate *ruficapilla* (Wilson) breeds as far west as southern Manitoba (AOU 1957). HISTORY IN ALASKA: Two prior reports (one, 12 September 1971, Cordova, Isleib and Kessel 1973; and probably two individuals, 20–21 September 1981, Middleton Island, Gulf of Alaska, T. G. Tobish, Jr., AB 36:208).

Pooecetes gramineus (Gmelin, 1789) {New York}. Vesper Sparrow. *Pooecetes gramineus* (*confinis*) Baird, 1858 {Loup Fork of Platte River, Nebraska}. One record (no specimen; photos at UAM): one, 4 June 2007, Hyder, I. Bruce. RANGE: Breeds as close to Alaska as southern interior British Columbia (AOU 1998).

Emberiza chrysophrys Pallas, 1776. {Transbaikalia}. Yellow-browed Bunting. One record (no specimen; photos published and at UAM): one, 15 September 2007, Gambell, St. Lawrence Island, P. E. Lehman, P. Mayer, D. W. Sonneborn, and H. Irrigoo (Lehman 2008). RANGE: East-central Siberia and central Russian Far East (Vaurie 1959).

Spiza americana (Gmelin, 1789) {New York}. Dickcissel. One record (no specimen; photo published and at UAM): ♂, 22–23 May 2004, Juneau, B. Maybank, D. MacPhail, and others (see NAB 58:420, photo published at 58:463). RANGE: Breeds no closer to Alaska than southern Saskatchewan and eastern Montana; casual in southern British Columbia (AOU 1998).

Icterus bullockii (Swainson, 1827) {Temascaltepec, state of México}. Bullock's Oriole. First substantiated records (no specimen; photos at UAM, Figure 4): three immatures, 13 September 2007, A. Lang and others, and 23–24 September 2007 and 23–29 September 2007, G. H. Rosenberg, P.E. Lehman, and others, all at Gambell, St. Lawrence Island. RANGE: Breeds no closer to Alaska than southern British Columbia (AOU 1998). HISTORY IN ALASKA: Four prior sightings: adult male visited sugar-water feeders, 22–25 May 1980, Petersburg, J. H. Hughes, L. J. Westphal, R. Pederson, and M. R. Voltz, AB 34:807; adult male, 25–26 April 1996, Ketchikan, P. Meredith, FN 50:320; immature, 2 September 2003, Ketchikan, S. C. Heinl and A. W. Piston, NAB 58:128); one female or immature, 3 October 2004, Gambell, St.

Figure 4. Bullock's Oriole at Gambell, St. Lawrence Island, 13 September 2007.

Photo by A. Lang

Lawrence Island, Lehman (2005). NOTES: We follow Patten et al. (2003) in maintaining this species as monotypic.

DELETIONS

Under *Passerculus sandwichensis* the Savannah Sparrow, we follow Rising (2007) in submerging subspecies *anthinus* Bonaparte in nominate *sandwichensis*, which by this action becomes the only subspecies of Savannah Sparrow recognized in Alaska. Nominate *sandwichensis*—*Emberiza sandwichensis* Gmelin, 1789 {Unalaska Island, Aleutians}—thus includes four junior synonyms named from Alaska (cf. Rising 2007): *Emberiza chrysops* Pallas, 1811 {Unalaska Island, Aleutians}, *Passerculus anthinus* Bonaparte, 1853 {Kodiak Island, Kodiak archipelago}, *Ammodramus sandwichensis xanthophrys* Grinnell, 1901 {Kodiak Island, Kodiak archipelago}, and *Passerculus sandwichensis crassus* Peters and Griscom, 1938 {Sitka, Baranof Island, Alexander Archipelago}.

POSTSCRIPTS

A proliferation during 2006 and 2007 of records of collared doves, genus *Streptopelia*, in southeastern and south-central Alaska from Ketchikan to Yakutat remains under discussion. It has not been established with certainty that any of these represents the Eurasian Collared-Dove (*S. decaocto*), which has spread explosively across North America south of Alaska (see Smith 1987, Romagosa 2002). That species has recently been found with increasing frequency in the Pacific Northwest (e.g., NAB 60:429, 2006). As noted by Romagosa and McEneaney (1999), this species is kept in captivity, and individual doves found in the wild might be the result of local introduction. In at least one case in Alaska, birds determined to have been local escapes from captivity have clouded the issue.

A remarkable Long-eared Owl (*Asio otus*) photographed on 19 May 2006 aboard a ship in the northern Bering Sea at 63° 15′N, 173° 44′W, southwest of St. Lawrence Island, was almost certainly a migrant from Asia (and a would-be first Alaska record of nominate *otus*), but we judge the lone photo (Figure 5) inadequate for identification below the species level. The very few prior Alaska records of this species are all from the southeastern Alaska mainland, where the North American subspecies *wilsonianus* (including *tuftsi*) is known from two specimens (Museum of Vertebrate Zoology 9786, ♂, 26 September 1909, Taku River, H. S. Swarth; UAM 18100, ♀, 1 February 2003, Gustavus, B. B. Paige).

ACKNOWLEDGMENTS

We thank Jon L. Dunn and Kimball L. Garrett for their helpful reviews of the manuscript.

LITERATURE CITED

American Ornithologists' Union. 1957. Check-list of North American Birds, 5th ed. Am. Ornithol. Union, Baltimore.

American Ornithologists' Union. 1983. Check-list of North American Birds, 6th ed. Am. Ornithol. Union, Lawrence, KS.

Figure 5. Long-eared Owl aboard a ship in the northern Bering Sea, 19 May 2006.

Photo by E. Labunski

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, DC.

Banks, R. C., Chesser, R. T., Cicero, C., Dunn, J. L., Kratter, A. W., Lovette, I. J., Rasmussen, P. C., Remsen, J. V., Jr., Rising, J. D., and Stotz, D. F. 2007. Forty-eighth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 124:1109–1115.

Banks, R. C., Cicero, C., Dunn, J. L., Kratter, A. W., Rasmussen, P. C., Remsen, J. V., Jr., Rising, J. D., and Stotz, D. F. 2004. Forty-fifth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 121:985–995.

Benter, R. B., Renner, H. M., and Renner, M. 2005. First record of a Shy Albatross in Alaska. W. Birds 36:135–137.

Burton, K. M., and Smith, S. D. 2001. First report of the Gray Heron in the United States. W. Birds 32:88–90.

Campbell, R. W., Dawe, N. K., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W., and McNall, M. C. E. 1990. The Birds of British Columbia, vol. 1. Royal Br. Columbia Mus., Victoria.

Dall, W. H., and Bannister, H. M. 1869. List of the birds of Alaska, with biographical notes. Trans. Chicago Acad. Sci. 1 (Art. IX):267–310.

Day, R. H. 2006. Seabirds in the northern Gulf of Alaska and adjacent waters, October to May. W. Birds 37:190–214.

Delacour, J. 1951. Preliminary note on the taxonomy of Canada Geese, *Branta canadensis*. Am. Mus. Novitates 1537.

Delacour, J. 1954. The Waterfowl of the World, vol. 1. Country Life Books, London.

Del Hoyo, J., Elliott, A., and Sargatal, J. (eds.). 1996. Handbook of the Birds of the World, vol. 3. Lynx Edicions, Barcelona.

Dickinson, E. C. (ed.). 2003. The Howard and Moore Complete Checklist of the Birds of the World, 3rd ed. Princeton Univ. Press, Princeton, NJ.

Fay, F. H., and Cade, T. J. 1959. An ecological analysis of the avifauna of St. Lawrence Island, Alaska. Univ. Calif. Publ. Zool. 63:73–150.

Gabrielson, I. N., and Lincoln, F. C. 1959. The Birds of Alaska. Stackpole, Harrisburg, PA.

Garner, M., Lewington, I., and Rosenberg, G. 2004. Stejneger's Scoter in the western Palearctic and North America. Birding World 17:337–347.

Gibson, D. D., and Byrd, G. V. 2007. Birds of the Aleutian Islands, Alaska. Nuttall Ornithol. Club and Am. Ornithol. Union Series in Ornithology 1.

Gibson, D. D., Heinl, S. C., and Tobish, T. G., Jr. 2003. Report of the Alaska Checklist Committee, 1997–2002. W. Birds 34:122–132.

Gibson, D. D., and Kessel, B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467.

Gibson, D. D., and Kessel, B. 1997. Inventory of the species and subspecies of Alaska birds. W. Birds 28:45–95.

Gilligan, J., Smith, M., Rogers, D., and Contreras, A. (eds.). 1994. Birds of Oregon: Status and Distribution. Cinclus, McMinnville, OR.

Hamilton, R. A., Patten, M. A., and Erickson, R. A. (eds.) 2007. Rare Birds of California. W. Field Ornithol., Camarillo, CA.

Heindel, M. T., and Garrett, K. L. 2008. The 32nd report of the California Bird Records Committee: 2006 records. W. Birds 39:121–152.

Heinl, S. C. 1997. New information on gulls in southeastern Alaska. W. Birds 28:19–29.

Isleib, M. E., and Kessel, B. 1973. Birds of the North Gulf Coast–Prince William Sound region, Alaska. Biol. Papers Univ. Alaska 14.

Kessel, B. 1989. Birds of the Seward Peninsula, Alaska. Univ. Alaska Press, Fairbanks.

Kessel, B., and Gibson, D. D. 1978. Status and distribution of Alaska birds. Studies Avian Biol. 1.

Kistchinski, A. A. 1980. Birds of the Koryak Highlands [in Russian] (published posthumously—L. S. Stepanyan, ed.). Izdatel'stvo Nauka, Moscow.

Kistchinski, A. A. 1988. Avifauna of Northeast Asia [in Russian] (published posthumously—V. D. Ilychev and Yu. A. Isakov, eds.). Izdatel'stvo Nauka, Moscow.

Lehman, P. 2005. Fall bird migration at Gambell, St. Lawrence Island, Alaska. W. Birds 36:2–55.

Lehman, P. E. 2008. First North American record of Yellow-browed Bunting (*Emberiza chrysophrys*) at Gambell, Alaska. N. Am. Birds 62:10–13.

Lehman, P., and Rosenberg, G. H. 2007. First North American record of Pallas's Warbler (*Phylloscopus proregulus*) at Gambell, Alaska. N. Am. Birds 61:4–8.

Lorenz, S., and Gibson, D. D. 2007. Intermediate Egret (*Egretta intermedia*) in the Aleutian Islands, Alaska. W. Birds 38:57–59.

Marshall, D. B., Hunter, M. G., and Contreras, A. L. (eds.). 2003. Birds of Oregon: A General Reference. Ore. State Univ. Press, Corvallis.

Ornithological Society of Japan. 2000. Check-List of Japanese Birds, 6th rev. ed. Ornithol. Soc. Japan, Tokyo.

Palmer, R. S. (ed.) 1976. Handbook of North American Birds, vol. 2. Yale Univ. Press, New Haven, CT.

Patten, M. A., McCaskie, G., and Unitt, P. 2003. Birds of the Salton Sea: Status, Biogeography, and Ecology. Univ. Calif. Press, Berkeley.

Rising, J. D. 2007. Named subspecies and their significance in contemporary ornithology, *in* Festschrift for Ned K. Johnson: Geographic Variation and Evolution in Birds (C. Cicero and J. V. Remsen, Jr., eds.), pp. 45–54. Ornithol. Monogr. 63.

Romagosa, C. M. 2002. Eurasian Collared-Dove (*Streptopelia decaocto*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 630. Birds N. Am., Philadelphia.

Romagosa, C. M., and McEneaney, T. 1999. Eurasian Collared-Dove in North America and the Caribbean. N. Am. Birds 43:348–353.

Rosenberg, G. H., and Lehman, P. E. 2008. First North American record of Sedge Warbler (*Acrocephalus schoenobaenus*) at Gambell, Alaska. N. Am. Birds 62:178–181.

Schwitters, M. T. 2007. First record of a Northern Lapwing in Alaska and western North America. W. Birds 38:145–146.

Sladen, W. J. L. 1966. Additions to the avifauna of the Pribilof Islands, Alaska, including five species new to North America. Auk 83:130–135.

Smith, P. W. 1987. The Eurasian Collared-Dove arrives in the Americas. Am. Birds 41:1370–1379.

Tobish, T. G., Jr. 1996. The spring season. Alaska region. Natl. Audubon Soc. Field Notes 50:318–321.

Vaurie, C. 1959. The Birds of the Palearctic Fauna. Passeriformes. H. F. & G. Witherby, London.

Vaurie, C. 1965. The Birds of the Palearctic Fauna. Non-Passeriformes. H. F. & G. Witherby, London.

Wahl, T. R. 2005. Manx Shearwater, *in* Birds of Washington: Status and Distribution (T. R. Wahl, B. Tweit, and S. G. Mlodinow, eds.), p. 92. Ore. State Univ. Press, Corvallis.

Wahl, T. R., and Tweit, B. 2000. Seabird abundances off Washington, 1972–1998. W. Birds 31:69–88.

Yerger, J. C., and Mohlmann, J. D. 2008. First North American record of Brown Hawk Owl (*Ninox scutulata*) on Saint Paul Island, Alaska. N. Am. Birds 62:4–8.

Accepted 7 May 2008

THE CHANGING STATUS OF THE GRAY HAWK IN NEW MEXICO AND ADJACENT AREAS

SARTOR O. WILLIAMS III, Division of Birds, Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico 87131; sunbittern@earthlink.net

DAVID J. KRUEPER, U.S. Fish and Wildlife Service, Migratory Bird Program, P. O. Box 1306, Albuquerque, New Mexico 87103; dave_krueper@fws.gov

ABSTRACT: Historical accounts indicate that the Gray Hawk (*Buteo nitidus*) was decidedly rare and irregular in New Mexico, with no certain nesting, through the 1980s. The species began to increase in numbers and distribution in southwestern New Mexico in the 1990s, and was documented nesting there in 2004. It arrived in southeastern New Mexico in the lower Pecos River valley in 2005, first nesting there in 2007. Several reports from the Rio Grande valley in south-central New Mexico in 2006 suggest possible expansion into that area as well. The spread in New Mexico coincides with increased numbers and an expanded range in adjacent Arizona and Texas, suggesting the Gray Hawk has been expanding generally northward and higher in elevation for several decades; recent records from the northern Mexican Plateau indicate interior northern Mexico is also included in this expansion. While improved habitat conditions may have aided this increase in local areas, the scale of the range expansion suggests other factors, possibly including increasingly warmer temperatures, may be facilitating this southern raptor to expand northward.

The Gray Hawk (*Buteo nitidus*), a neotropical raptor found from the extreme southwestern United States south to Argentina, has a long history of occurrence in Arizona and Texas but has had a checkered—and occasionally contentious—history in New Mexico. Originally attributed to the state on the basis of two egg sets collected by Frank Stephens at Fort Bayard, Grant County, 23 April 1876, New Mexico was for years included within the range of the species (e.g., Bendire 1892, Bailey 1928, A.O.U. 1931). Some 75 years passed, however, before the species was again reported, when two birds were seen in the Gila River valley near Cliff, Grant County, in July 1953 (Ligon 1961). Noting the similarity of the collected eggs (only one of which was extant) to those of Cooper's Hawk (*Accipiter cooperii*) plus the apparent oddity of the habitat where collected (foothill oak woodland) and Stephens' inexperience at the time, Hubbard (1974) suggested the eggs may in fact have been those of Cooper's Hawk and, in the absence of any unquestioned occurrence, concluded that Gray Hawk should be considered unverified in New Mexico. Zimmerman (1976) countered that argument with new information, citing a feather collected near Mangas Springs, Grant County, 13 October 1974 and a photograph of an adult in the Mimbres River valley, Grant County, 8 May 1975 to confirm the species' presence in the state. He also reported sightings of an adult at the same location in the Mimbres Valley 16 May 1973 and an apparently territorial pair there on various dates 2 May–6 August 1975. In addition, he reported credible observations by others of single birds seen at San Simon Cienega, Hidalgo County, 10 April 1961 and in the Gila Valley near Redrock, Grant County, 23 August 1973. By the late 1970s, consensus was achieved that the Gray Hawk was at best decidedly rare and apparently irregular in occurrence in southwestern New Mexico, with no satisfactory proof of nesting (e.g., Hubbard 1978).

RECENT OCCURRENCES IN NEW MEXICO

Following the 1975 observations, no additional credible reports were forthcoming from southwestern New Mexico for almost two decades. There were, however, a handful of reports from farther east in the state during that period: one seen soaring high over Las Cruces, Doña Ana County, 31 March 1979 (Am. Birds 33:796); one seen flying from a grove of trees on the plains east of Roswell, Chaves County, 22 April 1979 (Am. Birds 33:796); one briefly seen at Rattlesnake Springs, Eddy County, 17 September 1988 (Am. Birds 43:149); and one seen soaring near Socorro, Socorro County, 22 September 1989 (Am. Birds 44:138). All were reported by competent observers, but apparently none had prior experience with the Gray Hawk. We reviewed the original documentation for each of these reports and concluded that, although suggestive, none was entirely satisfactory for the species. While one or more of these may have represented the Gray Hawk, the timing and location of the reports together with distant, brief, and/or incomplete views suggest that the Broad-winged Hawk (*Buteo platypterus*), now understood as a regular spring and fall transient through New Mexico from the Rio Grande valley eastward (including at the above four locales), or some other species may have been involved in all instances. Noteworthy during that period was a report of an immature near Artesia, Eddy County, 24 September–1 October 1980 that was captured, measured, and photographed, and was initially announced as the "second unquestioned [New Mexico] record and the first from the southeast" (Am. Birds 35:212). Close analysis of the photographs, however, showed the bird to be an immature Broad-winged Hawk, not a Gray Hawk (Am. Birds 35:852).

This somewhat muddled picture of the status of the Gray Hawk in New Mexico began to change in the early 1990s, when raptor biologist R. W. Skaggs (in litt.) observed one or two adults along the Gila River near Cliff on several dates 20 April–3 May 1992; from the behavior, he suspected they were a nesting pair, although no nest was seen. Subsequently, an adult was seen and extensively detailed in the southern Animas Valley at Clanton Cienega, Hidalgo County, 22 July 1994 (Field Notes 48:974). That was followed by two (an adult and an immature) in the middle Animas Valley along Animas Creek 5 July 1996, with the immature (photographed by J. R. Oldenettel) remaining through 10 August 1996 (Field Notes 50:980; 51:99). Next was a detailed report of an immature near Cliff 9 July 1998 (S. H. Stoleson in litt.).

By 2000, reports of Gray Hawks in New Mexico began to accelerate; in fact, the species has been found in the state annually since then, typically at multiple locales each year, and including at sites with no previous history of the species. Perhaps no place illustrates this expansion better than Guadalupe Canyon, on the Mexico border in Hidalgo County, New Mexico, and adjacent Cochise County, Arizona. One of the most visited and studied bird locales in the Southwest over the past 50 years, the canyon became famous for harboring Mexican species at the northern edge of their ranges and was regularly searched for novelties from the 1950s into the 1990s without, apparently, any record of the Gray Hawk. That changed when A. Moorhouse reported one in the Arizona portion of the canyon 5 June 1998

(T. E. Corman in litt.). Nesting was first documented in the Arizona portion in 2000, and a single adult was seen in the New Mexico portion 25 July 2000 (N. Am. Birds 54:409). The species subsequently was found nesting in the Arizona portion each year thereafter, but it was slower to colonize the upper canyon, with no New Mexico reports in 2001, only a single individual seen in 2002, and none again in 2003. In 2004, a pair established a territory in the upper canyon April–June, and an adult was tending a large nestling there 25 July, providing the first certain nesting for New Mexico (N. Am. Birds 58:576). A pair reoccupied the same territory April–July 2005, and the adults were seen feeding two juveniles there 9 August (N. Am. Birds 60:113). In 2006, the territory in the upper canyon was again occupied, and a new territory was established down-canyon closer to the state line, and both territories were successful by late July–early August. A raptor survey of the canyon 8 May 2007 revealed two Gray Hawk nests in New Mexico in the same general locales as the 2006 territories, as well as two additional nests and a third occupied territory in the Arizona portion (N. Moore-Craig in litt.).

Concurrent with the Guadalupe Canyon colonization were additional records of the Gray Hawk from the nearby west side of the Peloncillo Mountains in Hidalgo County and immediately adjacent Arizona. These included single individuals in Arizona at the mouth of Skeleton Canyon 1 July 2001, 27 July 2002, and 28 June 2004 (J. E. Parmeter, J. R. Oldenettel, Williams pers. obs.), and at or near Rodeo, Hidalgo County, 24 April and 6 October 2004 and 16 July–1 October 2006 (R. E. Webster). In addition, records have continued from the Animas Valley, located just east of Guadalupe Canyon and the Peloncillo Mountains, where one was seen in the middle portion along Animas Creek 15 September 2005 (D. J. Beatty in litt.) and single birds were photographed at three locales in the middle and southern valley 21 July–23 September 2006, including Animas Creek and the vicinity of Clanton Cienega (N. Am. Birds 60:558, 61:115); an apparent adult pair was at the latter site 12 May 2007 (N. Moore-Craig in litt.). Meanwhile, there have been additional records from the Gila Valley, with an adult along the Gila River near the Arizona line at Virden, Hidalgo County, 19 April 2002 (N. Am. Birds 56:341) and another adult on the Gila River downstream from Redrock at the mouth of Nichols Canyon, Grant County, 29 May 2006 (N. Am. Birds 60:413).

Across the state in the lower Pecos River valley, an adult was seen and convincingly described at Rattlesnake Springs 26–27 April 2005 (R. A. Meyer in litt.), providing the first credible report for Eddy County and southeastern New Mexico. The following year, at least one adult was there on various dates 24 April–28 May 2006 (N. Am. Birds 60:413), but there were no summer reports that year. In 2007, however, an adult pair was present by late April and was documented and photographed by many through May; it was actively nesting in June (Williams pers. obs., photograph of nest by R. H. Doster), but the effort is believed to have failed, perhaps owing to human disturbance. Meanwhile, the lower Rio Grande valley in south-central New Mexico witnessed an unprecedented flurry of Gray Hawk reports in 2006, although none were confirmed by photograph. These were single birds at Mesilla, Doña Ana County, 13 April 2006, along Las Animas Creek west of Caballo Lake, Sierra County, 22 April 2006, and along the river south of San Marcial, Socorro County, 13 May 2006 (N. Am. Birds 60:413).

SPREAD IN ARIZONA

The increased observations in New Mexico in recent years mirror similar increases reported in adjacent Arizona and Texas. In Arizona, where the Gray Hawk has been known as a summer resident since territorial days, Phillips et al. (1964) reported the center of its abundance was the Santa Cruz River valley near Tucson; they noted the species had become scarce there by the 1940s, apparently owing to habitat destruction. In recent decades, however, the species has repopulated the Santa Cruz Valley. It has increased in numbers and expanded in range west to the Baboquivari Mountains, northwest to the vicinity of Phoenix, north to the vicinity of Roosevelt Lake in the Salt River drainage, northeast to the vicinity of San Carlos Lake in the Gila River drainage, and eastward through Cochise County to near the New Mexico line (Glinski 1998, Bibles et al. 2002, Wheeler 2003, Bibles and Mannan 2004, Corman and Wise-Gervais 2005). Although recorded from the San Pedro River valley in early years (Swarth 1914), the Gray Hawk went unreported there for many decades, until it was discovered nesting there in the early 1960s (Phillips et al. 1964, Bibles et al. 2002). It has substantially increased there since the late 1980s, e.g., within the San Pedro Riparian National Conservation Area the population increased from 11 pairs in 1986 to 25 pairs by 1995 (Krueper 1999); the San Pedro River may now host nearly half of Arizona's breeding population. Farther east in Cochise County, the species had been detected at least once in the San Bernardino Valley in the late 1940s (Phillips et al. 1964), but it was not until the 1980s that a pair was found nesting (Glinski 1998), and it was only in the 1990s that the species increased substantially as a summer resident there, with a minimum of four nesting pairs annually by the early 2000s (W. R. Radke in litt.). Meanwhile, the Gray Hawk has continued to expand east along the Gila River during the 2000s, recently approaching New Mexico in the Gila Box National Conservation Area east of Safford (Krueper pers. obs.). While some increases in numbers in Arizona can be linked to improved habitat in historic strongholds (e.g., Bibles et al. 2002), the species has nevertheless spread far west, north, and east of historic range (e.g., Corman and Wise-Gervais 2005), expanding from its historical core range along the Santa Cruz River north to Tucson (ca. 1000 m, latitude 31° 34' N) to sites approaching 1760 m in the Huachuca Mountains (Krueper, W. H. Howe pers. comm.) and to latitude 33° 36' N in central Arizona (Glinski 1988, Corman and Wise-Gervais 2005).

SPREAD IN TEXAS

In Texas, the Gray Hawk was historically known only from the lower Rio Grande valley in the southernmost portion of the state, with breeding documented in Webb County in 1892 and 1913 (Oberholser 1974). It largely disappeared from there, perhaps owing to habitat destruction, as the 20th century progressed, with few reports and no nesting documented for many decades (Oberholser 1974, Brush 2005). In the early 1970s, however, the Gray Hawk began a comeback in the lower valley, where in subsequent years it continued to spread to new locales, and it is now well established in Cameron, Hidalgo, and Starr counties upstream at least to Falcon Dam (Brush 2005, Petrikeev 2007). Farther west, the species apparently arrived in trans-Pecos Texas in Big Bend National Park around the 1970s (Wauer 1973), where reports increased in frequency during the 1980s and nesting was first documented in 1988 (Wauer 1996). To the north of the Big Bend region, single Gray Hawks were sporadically reported in the Davis Mountains by the mid-1970s, but the species did not become regular there until the late 1990s, with the first evidence of nesting in 2000 (Bryan and Karges 2001); by 2006, at least three pairs were nesting there (J. P. Karges pers. comm.). Within Texas, the Gray Hawk has expanded from near sea level up to ca. 1600 m in the Davis Mountains and in latitude from 26° 10′ N to 30° 38′ N.

DISCUSSION

Taken together, the steady increase in numbers and expansion of range, first noted in Arizona by the 1960s and 1970s, subsequently in Texas by the 1970s and 1980s, and eventually in New Mexico by the 1990s, suggest the Gray Hawk has been progressively expanding generally northward and higher in elevation across a broad front for several decades. Historically unreported from the northern Mexican Plateau (e.g., Howell and Webb 1995, Bibles et al. 2002), recent documentation of the species in the states of Durango, Coahuila, and Chihuahua from 2003 through 2007 (N. Am. Birds 57:408, 61:337, 61:519) suggests this expansion is occurring in interior northern Mexico as well. In the United States, some increases can be attributed to locally improved habitat conditions, including establishment of tall trees in riparian areas for nesting and brush encroachment in adjacent uplands for foraging; however, to rely entirely on that supposition would imply that riparian habitat conditions have improved generally across the region, a view at odds with most recent assessments of riparian conditions in the southwestern United States. While we agree that habitat conditions favorable to Gray Hawk have indeed improved in some local areas, we suggest that riparian habitat recovery *per se* may not entirely explain this broad range expansion and that other factors may be involved. One such factor may be increasing temperatures, both globally and regionally, in recent decades (Crick 2004, Inkley et al. 2004), which may be playing a role in allowing this primarily tropical species to expand northward. In particular, expansion and maturation of upland brush (e.g., mesquite, *Prosopis* spp.) may be a key feature, with increasing temperature possibly facilitating increased range and numbers of principal prey species (e.g., *Cnemidophorus* lizards). In effect, warming temperatures may benefit the Gray Hawk by increasing foraging habitat via prey abundance (Bibles et al. 2002, B. D. Bibles in litt.).

ACKNOWLEDGMENTS

For answering our request for status information we thank Timothy Brush, Troy E. Corman, Aaron D. Flesch, William H. Howe, John P. Karges, William R. Radke, Mark M. Stevenson, and Scott L. Wilbor. The manuscript benefited from careful reviews by Robert H. Doster and Brent D. Bibles. We acknowledge all those who have taken the time through the years to document their New Mexico observations with written details or photographs, and for providing that information to the New Mexico Ornithological Society; the recent observations of Narca Moore-Craig and Richard E. Webster from Hidalgo County have been especially useful.

LITERATURE CITED

American Ornithologists' Union. 1931. Check-list of North American Birds, 4th ed. Am. Ornithol. Union, Lancaster, PA.

Bailey, F. M. 1928. Birds of New Mexico. New Mexico Dept. Game & Fish, Santa Fe.

Bendire, C. 1892. Life histories of North American birds. U.S. Natl. Mus. Spec. Bull. 1.

Bibles, B. D., Glinski, R. L., and Johnson, R. R. 2002. Gray Hawk (*Asturina nitida*) in The Birds of North America (A. Poole and F. Gill, eds.), no. 652. Birds N. Am., Philadelphia.

Bibles, B. D., and Mannan, R. W. 2004. Productivity and nest-site characteristics of Gray Hawks in southern Arizona. J. Raptor Res. 38:238–242.

Brush, T. 2005. Nesting Birds of a Tropical Frontier: The Lower Rio Grande Valley of Texas. Texas A&M Univ. Press, College Station.

Bryan, K. B., and Karges, J. P. 2001. Recent bird records in the Davis Mountains. Texas Birds 3:40–53.

Corman, T. E., and Wise-Gervais, C., eds. 2005. The Arizona Breeding Bird Atlas. Univ. of New Mexico Press, Albuquerque.

Crick, H. Q. P. 2004. The impact of climate change on birds. Ibis 146 (Suppl. 1):48–56.

Glinski, R. L., ed. 1998. The Raptors of Arizona. Univ. of Ariz. Press, Tucson.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Hubbard, J. P. 1974. The status of the Gray Hawk in New Mexico. Auk 91:163–166.

Hubbard, J. P. 1978. Revised check-list of the birds of New Mexico. New Mexico Ornithol. Soc. Publ. 6.

Inkley, D. B., Anderson, M. G., Blaustein, A. R., Burkett, V. R., Felzer, B., Griffith, B., Price, J., and Root, T. L. 2004. Global climate change and wildlife in North America. Wildlife Soc. Tech. Rev. 04-2. Wildlife Soc., Bethesda, MD.

Krueper, D. J. 1999. Annotated Checklist of the Birds of the Upper San Pedro River Valley, Arizona. Bureau of Land Mgmt., Tucson.

Ligon, J. S. 1961. New Mexico Birds and Where to Find Them. Univ. of New Mexico Press, Albuquerque.

Oberholser, H. C. 1974. The Bird Life of Texas, vol. 1. Univ. of Texas Press, Austin.

Petrikeev, M. 2007. Notes on the nesting of the Gray Hawk (*Buteo nitidus*) in Bentsen–Rio Grande Valley State Park, Texas. Texas Birds Annual 3:14–15.

Phillips, A., Marshall, J., and Monson, G. 1964. The Birds of Arizona. Univ. of Ariz. Press, Tucson.

Swarth, H. S. 1914. A distributional list of the birds of Arizona. Pac. Coast Avifauna 10.

Wauer, R. H. 1973. Birds of Big Bend National Park and Vicinity. Univ. of Texas Press, Austin.

Wauer, R. H. 1996. A Field Guide to the Birds of the Big Bend, 2nd ed. Gulf Publ. Co., Houston.

Wheeler, B. K. 2003. Raptors of Western North America. Princeton Univ. Press, Princeton, NJ.

Zimmerman, D. A. 1976. On the status of *Buteo nitidus* in New Mexico. Auk 93:650–655.

Accepted 4 September 2008

Gray Hawk

Sketch by Dale Zimmerman

AN APPARENT HYBRID BLACK × EASTERN PHOEBE FROM COLORADO

NATHAN D. PIEPLOW, University of Colorado, 317 UCB, Boulder, Colorado 80309; npieplow@indra.com

TONY LEUKERING, P. O. Box 660, Brighton, Colorado 80601

ELAINE COLEY, 290 Riker Court, Loveland, Colorado 80537

ABSTRACT: From 21 April to 11 May 2007 an apparent hybrid male Black × Eastern Phoebe (*Sayornis nigricans* × *S. phoebe*) was observed in Loveland, Larimer County, Colorado. The bird's plumage was intermediate between the species, with paler upperparts, darker flanks, and a less distinct border between dark and white on the breast than expected on the Black Phoebe and darker upperparts, less head/back contrast, and a darker and more sharply demarcated upper breast than expected on the Eastern. Sonograms of the bird's territorial song show numerous characteristics intermediate between the typical songs of the two species. Although the Colorado bird provides the first strong evidence of hybridization in *Sayornis*, other sightings suggest the Black and Eastern Phoebes may have hybridized on other recent occasions. Range expansions of both species may increase the frequency of hybridization in the future.

The Black (*Sayornis nigricans*) and Eastern (*S. phoebe*) Phoebes are similar medium-sized flycatchers that historically occupied allopatric breeding ranges. The Eastern Phoebe is a common breeding species of mixed woodlands, riparian gallery forest, and human-altered habitats, nesting on cliffs, banks, and man-made structures in the eastern two-thirds of the lower 48 states and in Canada from Nova Scotia west and north to southwestern Nunavut and northeastern British Columbia (Weeks 1994). The Great Plains were probably a barrier to the species' range expansion until channelization and stabilization of river banks encouraged the growth of extensive gallery forests along east-flowing rivers, particularly the South Platte and Arkansas (Knopf 1991). The Black Phoebe is mostly resident in a wide latitudinal range from the western United States south through Central and South America (A.O.U. 1998). In the United States it was formerly restricted to areas west of the continental divide, except in southern New Mexico and western Texas.

Recent eastward and northward expansion of range by the Black Phoebe into Colorado and northern New Mexico (Faulkner et al. 2005) and concomitant expansion west by the Eastern Phoebe into the southeastern foothills of Colorado (Andrews and Righter 1992) and northern New Mexico (S. O. Williams pers. comm.) have brought the two species into contact at a few locations in those two states (Leukering pers. obs.). With such contact comes the possibility of hybridization, a phenomenon previously unknown in the genus *Sayornis* (Weeks 1994, Wolf 1997, Schukman and Wolf 1998). Below, we provide details on an individual that we believe was a hybrid Black × Eastern Phoebe and provide additional information on previous occurrences of suspected hybridization by the two species.

Figure 1. The Loveland phoebe, 26 April 2007.

Photo by Rachel Hopper

Figure 2. The Loveland phoebe, 26 April 2007. Note that in lighting such as this, the bird looked very dark and was easily mistaken for a Black Phoebe.

Photo by Rachel Hopper

Figure 3. The Loveland phoebe, 29 April 2007. Note that in lighting such as this, the bird looked paler and more similar in coloration and pattern to an Eastern Phoebe.

Photo by Tony Leukering

OBSERVATION

The suspected hybrid phoebe was first found 21 April 2007 by Coley near a dam and water-diversion structure on the Big Thompson River just east of Wilson Avenue in Loveland, Larimer County, Colorado (40.398° N, 105.107° W). On 25 April, Coley found a Black Phoebe in association with the apparent hybrid, and both were present daily until 6 May, the last date that the Black Phoebe was seen. The apparent hybrid continued, though became difficult to find, until at least 11 May.

From 21 to 25 April the putative hybrid sang frequently during the day and was best located by song. As singing by female phoebes is fairly rare and brief (Smith 1969), we believe that the singer was a male. After 25 April, the male was heard to sing almost exclusively between 0515 and 0545 hrs, usually from low perches overhanging the water just upstream from the dam; the only other vocalizations heard with any frequency were contact notes. Both birds were reliably found within about a 100-meter radius of the dam, usually right along the main watercourse.

On 26 April, Rachel Hopper (pers. comm.) reported apparent nesting behavior, with visits to a potential nest site in the water-control structure. Subsequently, we found some minimal additions of fine nest materials to an old Barn Swallow (*Hirundo rustica*) nest. Larger, thicker, flatter mud nests that resembled old phoebe nests were visible on other parts of the dam, but apparently none were being occupied or modified. The activity at the suspected nest site, particularly the interest in the Barn Swallow nest, seemed to taper off prior to the Black Phoebe's disappearance on 6 May.

At approximately 0900 hr on 24 April, Pieplow was able to record approximately 1 minute of the male phoebe's advertising song. Weather conditions were poor and did not allow much recording, but analysis of the recordings made a strong case for the bird's hybrid parentage. Pieplow made more recordings of the song and some calls on 2 May and 6 May, when the male vocalized nearly continuously from approximately 0515 to 0545 hrs but only briefly or not at all thereafter. The recordings made on these dates total 68 minutes. That the male sang at 0900 hr on dates before the second phoebe was observed, and for only a half-hour at dawn thereafter, is consistent with the hypothesis that the birds were paired (Smith 1969).

Plumage

With only brief views, the putative hybrid could easily be (and was) misidentified as an Eastern Phoebe. Closer inspection, however, disclosed characteristics intermediate between those of the two likely parental species. On all parts of the bird where the Black Phoebe is black or blackish, the Loveland bird was paler and browner, though this coloration was darker (for most parts) than is typical for the Eastern Phoebe (Figures 1, 2, 3). Table 1 provides a suite of characters in which the Loveland phoebe differed in appearance from both the Black and Eastern Phoebes.

We believe that the Say's Phoebe (*S. saya*) is readily eliminated from consideration as a parental species, as it probably would have provided some warm tones to the bird's plumage, particularly on the belly, that were not present. Say's lacks white in the outer web of rectrix 6, and we believe that had it been one of the parental species, the outer web of the Loveland phoebe would have been less extensively white. Finally, the vocalizations of the Say's Phoebe differ significantly from those of its congeners, and the vocalizations of the Loveland bird, discussed below, do not reflect these differences.

Vocal Evidence

As is considered typical for suboscine passerines (e.g., Kroodsma 2005), Eastern Phoebes do not learn their songs. Song in this species is apparently controlled completely by genetic factors (Kroodsma 1985, Kroodsma

Table 1 Plumage Characters Distinguishing Black and Eastern Phoebes and Phenotype of the Loveland Phoebe

Plumage character	Black Phoebe	Loveland phoebe	Eastern Phoebe
Head color	black	dark brown	dark brown
Throat color	black	intermixed dark brown and whitish	whitish
Chest color	black	dark brown with darker streaking	pale with smudgy dark streaking
Back color	black	medium to dark brown	dark olive
Belly color	white	whitish with a few dark streaks	pale yellow (wears to whitish)
Chest/belly interface	strong demarcation	vague demarcation with streaks	vague demarcation with blurry streaks on sides
Tail color	black	dark brown	dark brown
R6[a] outer web color	white	basal 2/3 white, distal 1/3 brown	basal 1/2 white, distal 1/2 brown

[a]R6, rectrix 6 (outermost tail feather).

and Konishi 1991), and we assume that the Black Phoebe is similar in that regard. Several authors working with a variety of avian taxa have convincingly demonstrated that genetically determined vocalizations take intermediate form in hybrid individuals (e.g., *Coturnix* quail, Collins and Goldsmith 1998; *Alectoris* partridges, Ceugniet et al. 1999; *Streptopelia* doves, de Kort et al. 2002, den Hartog et al. 2007; *Callipepla* quail, Gee 2005). Berner and Kroodsma (2005) used intermediate vocalizations as a primary line of evidence to argue for hybrid origin of an apparent Acadian × Least Flycatcher (*Empidonax virescens* × *E. minimus*).

The advertising song of the Eastern Phoebe was well studied by Smith (1969), who termed it the "regularly repeated vocalization" (RRV). Smith found that the RRV in this species consists of two phrase types, RR1 (Figure 4a) and RR2 (Figure 4b), which he correlated with the phonetic transliterations "phee-bee" and "phee-b-be-bee," respectively. Smith (1970a) also provided the most complete description and analysis of the vocal repertoire of the Black Phoebe, but it is much less detailed than was his study of the Eastern Phoebe. He identified an RR1 (Figure 4c) and RR2 (Figure 4d) in the

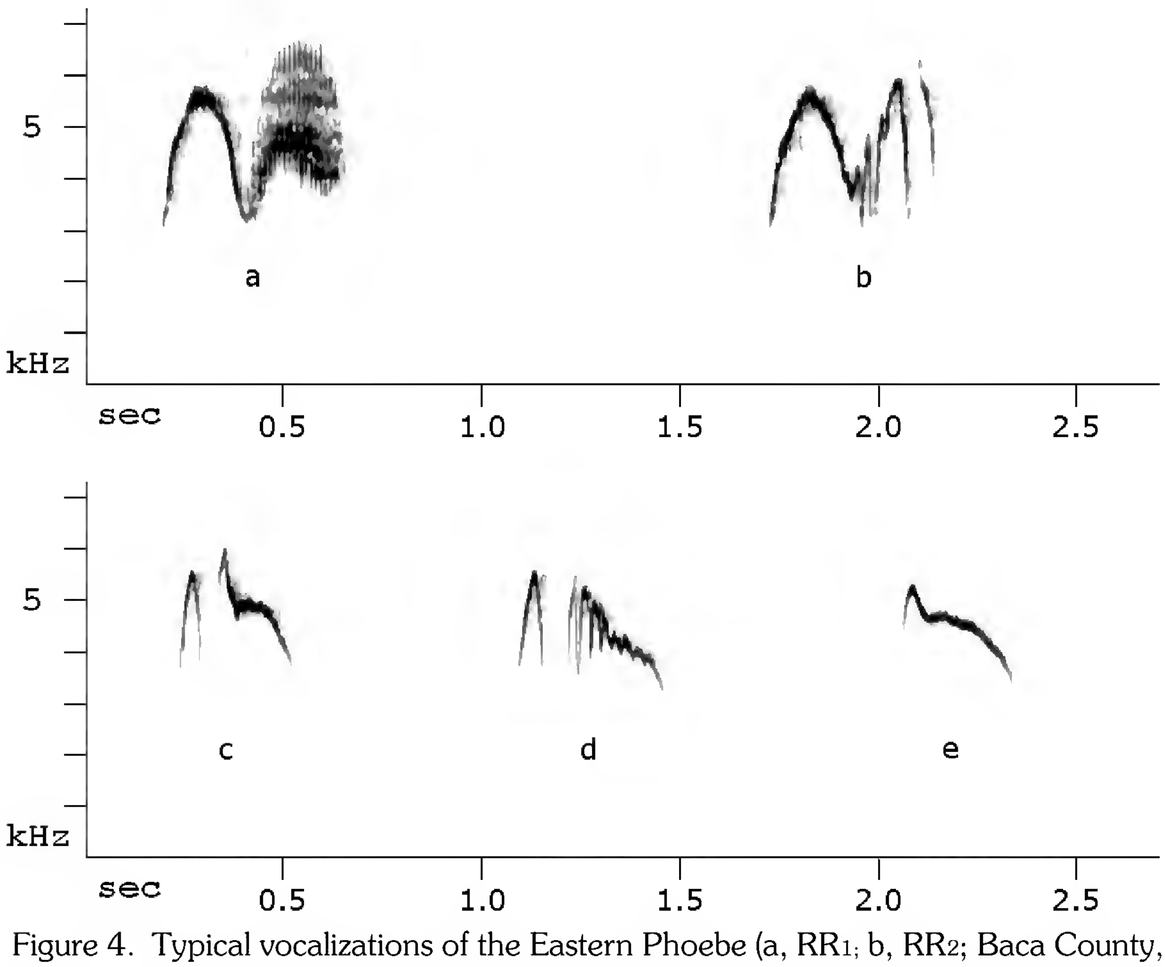


Figure 4. Typical vocalizations of the Eastern Phoebe (a, RR1; b, RR2; Baca County, Colorado, 15 April 2006) and Black Phoebe (c, RR1; d, RR2; e, htIPV; Clark County, Nevada, 30 September 2007). Note that all RRV phrases in both species consist of an introductory portion, which is identical in both phrases, and a terminal portion, which distinguishes the RR1 from the RR2.

Recordings and sonograms by Nathan Pieplow

Black Phoebe's repertoire but also noted that the Black's "song-like displays," unlike those of the Eastern, frequently include a third component which he named the "high-tailed initially peaked vocalization" or htIPV (Figure 4e). In predawn singing, the htIPV is frequently given "alone, or occasionally in strings of two or three units, amid RR1s and RR2s"; Smith considered it an "important component of the song" (1970a). As is considered typical in the Tyrannidae, all song (RRV) components of both these species are quite stereotyped, with minimal individual and geographical variation (Kroodsma 1985, Weeks 1994), although the htIPV is somewhat more variable (Smith 1970a).

The advertising song of the Loveland phoebe consisted of three somewhat variable but easily distinguished phrase types; its first phrase (Figure 5, a–c) and second phrase (Figure 5, d–f) appear most similar to RRV phrases of the two putative parent species, while its third phrase (Figure 5, g–i) appears most similar to the htIPV of the Black Phoebe.

In the Black and Eastern Phoebes, each RRV consists of two parts, an introductory note and a terminal portion. In both species, the introductory notes of RR1 and RR2 are identical; the two song phrases are distinguished entirely by their terminal portions (see Figure 4, a–d). The Loveland phoebe's introductory notes were highly variable, while its terminal portions were much more stereotyped. The full range of variation of introductory notes was used with both terminal portions; note the similarity in these notes between Figures 5b and 5e and between Figures 5c and 5f. In general, the introductory notes of the Loveland bird were quite similar to those of the Black Phoebe and very different from those of the Eastern Phoebe.

The terminal portion of the Loveland bird's first phrase (Figure 5, a–c) appears intermediate between the terminal portions of the Eastern Phoebe's RR1 (Figure 4a) and the Black Phoebe's RR2 (Figure 4d); in particular, it begins like the latter, but it quickly develops much faster and more intense modulations than the Black Phoebe's RR2 ever does; this is a trait of the terminal portion of the Eastern Phoebe's RR1. Meanwhile, the terminal portion of the Loveland bird's second phrase (Figure 5, d–f) varies little from a rounded "M" shape very similar to the terminal portion of the Eastern Phoebe's RR2 (Figure 4b) and very different from any terminal portion of any Black Phoebe phrase.

The Loveland bird's third phrase (Figure 5, g–i) appears very similar to the htIPV of the Black Phoebe (Figure 4e), except that it is always strongly and rapidly modulated or "burry." Smith (1970a) illustrated a number of variants of the IPV; the variant most frequently given during bouts of RRV closely matches the Loveland bird's third phrase in overall shape, and one of the variants does include some slight modulation, but it does not come close to matching the Loveland bird in rate or intensity of modulation. This may indicate influence from the terminal portion of the Eastern's RR1 or from the Eastern Phoebe call that Smith (1969) termed the "locomotory hesitance vocalization" (LHV), which contains modulations at a rate similar to those of the Eastern's RR1 and which in certain variations somewhat resembles the Loveland bird's third phrase.

The variability of the Loveland phoebe's third phrase, and of the introductory notes of the RRV phrases, may be an additional indicator of hybridization.

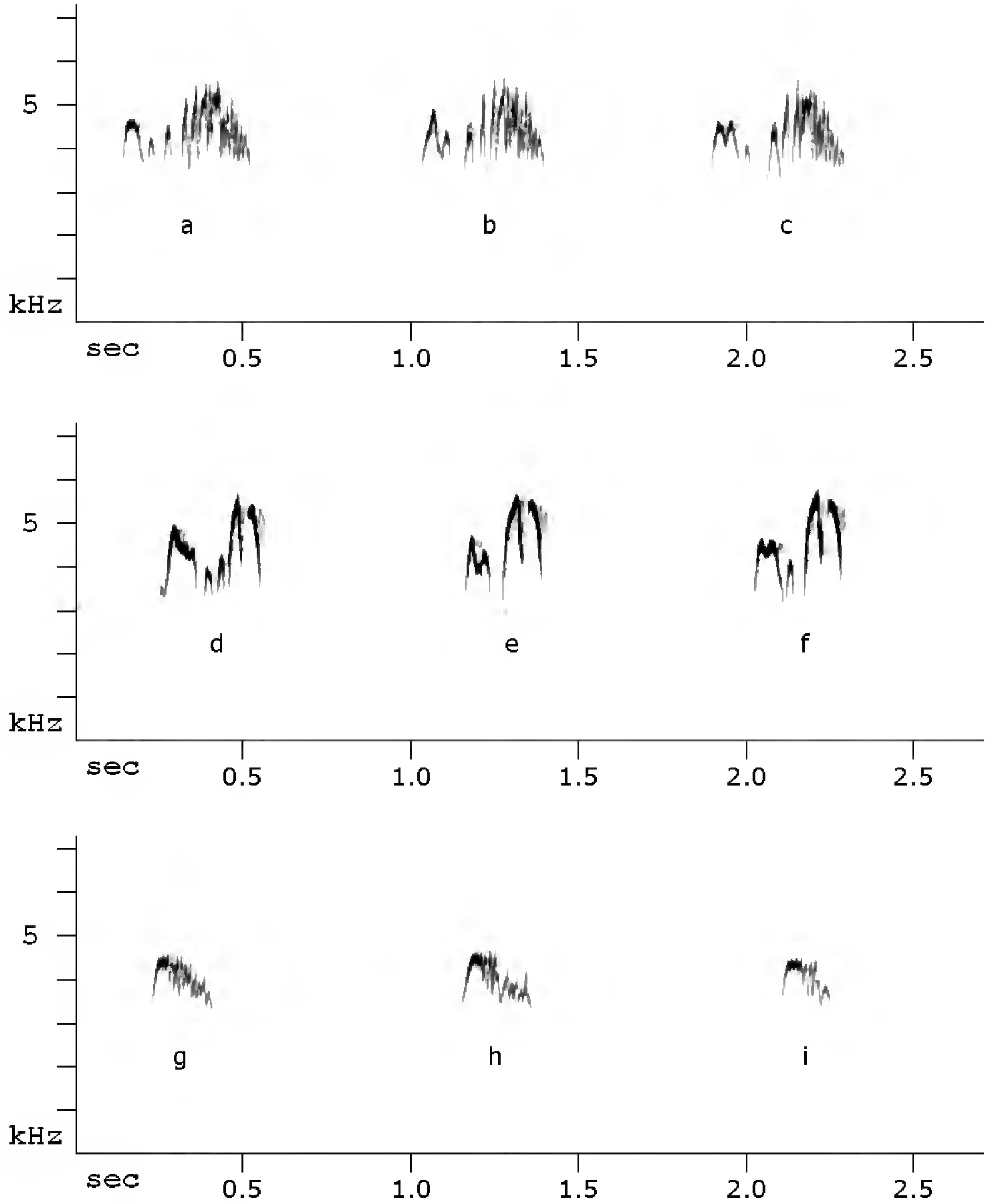


Figure 5. Vocalizations of the Loveland phoebe (a, b, c, phrase type 1; d, e, f, phrase type 2; g, h, i, phrase type 3), 2 May 2007. Three examples of each phrase type are given to represent the bird's full range of variation. Note that phrase types 1 and 2 consist of a variable introductory portion and a more stereotyped terminal portion. The introductory portion varies independently of the terminal portion and somewhat resembles the introductory portion of the Black Phoebe's RRV phrases. However, the modulation of the terminal portion of phrase type 1 is more rapid than that in any Black Phoebe vocalization and more closely resembles the terminal portion of the Eastern Phoebe's RR1. In addition, the terminal portion of phrase type 2 resembles the terminal portion of the Eastern Phoebe's RR2.

Recordings and sonograms by Nathan Pieplow

In addition to intermediate form, at least one study has found that hybrids may have vocalizations less stereotyped than those of the parental species (Collins and Goldsmith 1998). In late summer and autumn at least some Black and Eastern Phoebes do give distinctly variable renditions of their RRV phrases (Pieplow pers. obs.), a phenomenon that may have to do with seasonal hormonal levels. No authors, however, have noted this variability in spring.

In some respects the sounds of the Loveland bird resemble those of the Black Phoebe more closely than they resemble those of the Eastern Phoebe, and it is possible that the bird is a backcross hybrid with the Black Phoebe. On the basis of an appearance relatively equidistant from both parental species, however, and the distinct similarity of the terminal portions of the Loveland bird's second phrase and the Eastern Phoebe's RR2, we believe it more likely that the Loveland bird is a first-generation (F1) hybrid.

OTHER POSSIBLE HYBRIDS

We are aware of the following reports of possible hybridization or interspecific pairing in *Sayornis*. Berner and Kroodsma (2005), citing a personal communication from J. P. Hubbard, mentioned a report of a possible Black × Eastern Phoebe hybrid in New Mexico. This report apparently refers to a pair of phoebes seen by Hubbard along the upper Pecos River in San Miguel County, New Mexico, on 4 April 1981. Hubbard reported these birds as a pair of Eastern Phoebes but noted "one darker, may be hybrid with Black Phoebe?" (NMOS 2007, database record 14355). Sartor O. Williams (pers. comm.) notes that although Eastern Phoebes had colonized this area as early as 1969, April 1981 produced the first report of (pure) Black Phoebes at this location, and that both species have apparently continued to breed there since without subsequent reports of hybridization, though the area may not receive much attention from observers.

On 19 May 2000, Leukering encountered an apparent mixed pair of phoebes at the Burnt Mill Bridge on the St. Charles River in Pueblo County, Colorado (Leukering and Wood 2000), and these birds were seen again on 21 May by Leukering and others. On both dates, both birds responded to playback of Eastern Phoebe song and calls and did not interact agonistically. Other observers noted this pair until sometime in July. But when Leukering walked 2 km of the river on 4 June, he did not detect any phoebe at or near the bridge. He did, however, observe three pairs of Eastern Phoebes and one pair of Black Phoebes in typical linear territories (Leukering and Wood 2001). Summer reports of the possible mixed pair included the finding of a nest, but no details of whether the nest was attended or whether the birds produced young were provided (Leukering and Wood 2001).

Brandon K. Percival (pers. comm.) found an intermediate-appearing phoebe at Rock Canyon in Pueblo Reservoir State Park, Pueblo County, Colorado, on 29 August 2007; the site is less than 20 miles from the Burnt Mill Bridge. The bird appeared fairly similar to the Loveland bird, but no photographs or sound recordings were obtained.

On 20 July 2008, Ted Floyd and Chip Clouse (pers. comm.) found up to three possible hybrid phoebes along the Purgatoire River and Trinchera Creek in Las Animas County, Colorado. They reported that one bird "looked like a dark Eastern, and gave a call like a Black," while the other two appeared darker than normal for an Eastern Phoebe; one of these gave an "atypical" vocalization. In the same area on the same day, they found ten adult and juvenile Eastern Phoebes and one adult Black Phoebe.

DISCUSSION

The plumage and vocalizations of the Loveland phoebe are strong evidence of hybridization between a Black and an Eastern Phoebe. Virtually all of the plumage characters were intermediate between those of the suggested parental species, and the songs incorporated unique aspects of songs of both species. As suboscines have been found to have genetically determined vocalizations, a hybrid would be expected to sing intermediate songs.

In Colorado (and, presumably, in northern New Mexico), both the Black and Eastern Phoebes are near-obligates of riparian habitat (Leukering pers. obs.). The Black Phoebe is usually found in canyons. The Eastern Phoebe is typical of the flatter stretches of rivers on the eastern plains, though it also occupies canyons in southeastern Colorado. The Loveland location is, interestingly, outside the known breeding range of both species in Colorado, being west of the known breeding range of the Eastern Phoebe in northern Colorado (Andrews and Righter 1992) and north of the known breeding range of the Black Phoebe in eastern Colorado (Faulkner et al. 2005). However, like the St. Charles River site farther south in Pueblo County, the Loveland site is very close to the foothill/plains interface. The habitat criteria for both species may be met in such situations, increasing the likelihood of contact between these two otherwise generally segregated species. From Leukering's surveys along the St. Charles River canyon at and below the Burnt Mill Bridge in summers 2000–02, we believe that in situations where the two species are syntopic, they typically occupy mutually exclusive linear territories. As populations are quite small (probably <12 pairs of Black and Eastern phoebes, combined, within 15 km of the Burnt Mill Bridge), it seems likely that a lack of males of the appropriate species might encourage surplus females to accept as a mate a male of the other species.

As both species continue to expand their ranges, such juxtapositions may become more widespread and may enable more instances of *Sayornis* hybridization. Such hybridization should be sought particularly along the foothill/plains interface in eastern Colorado and northern New Mexico. Interestingly, though the Say's Phoebe breeds syntopically with the Black Phoebe in western Colorado and with the Eastern Phoebe in eastern Colorado (and on the uplands adjacent to the St. Charles River canyon), hybridization involving Say's remains unreported. This is perhaps unsurprising given that a molecular phylogeny by Cicero and Johnson (2002) suggests that the Eastern and Black Phoebes are sister taxa and that Say's is the outlier in this genus.

ACKNOWLEDGMENTS

We appreciate discussions about the Loveland phoebe with a number of Colorado birders, particularly Nick Komar, who first suggested that the bird in question was a hybrid. We thank Sartor Williams and Donald Kroodsma for valuable information regarding the possible hybrid phoebe in New Mexico. We also greatly appreciate the careful reading of a previous version of the manuscript by Komar, Doug Faulkner, and Lawrence S. Semo. Leukering thanks the Great Outdoors Colorado Fund (through the Colorado Division of Wildlife) for funding *Monitoring Colorado's Birds* (a program of the Rocky Mountain Bird Observatory, Brighton, CO), which supported his surveys of the St. Charles River.

LITERATURE CITED

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Andrews, R. and Righter, R. 1992. Colorado Birds: A Reference to their Distribution and Habitat. Denver Mus. Nat. Hist., Denver.

Berner, M., and Kroodsma, D. E. 2005. A probable Acadian Flycatcher × Least Flycatcher hybrid. Passenger Pigeon 67:337–343.

Ceugniet, M., Aubin, T., Bernard-Laurent, A., and Soyez, D. 1999. Vocal signatures of the rally call of Red-legged and Rock Partridges and of their hybrids. Comptes Rendus de l'Académie des Sciences, Série III, Sciences de la Vie 322:887–895.

Cicero, C., and Johnson, N. K. 2002. Molecular phylogeny and character evolution in the *Empidonax* group of tyrant flycatchers. Mol. Phylogen. Evol. 22:289–302.

Collins, S. A., and Goldsmith, A. R. 1998. Individual and species differences in quail calls (*Coturnix c. japonica*, *C. c. coturnix* and a hybrid). Ethology 104:977–990.

De Kort, S. R., den Hartog, P. M., and ten Cate, C. 2002 . Diverge or merge? The effect of sympatric occurrence on the territorial vocalizations of the Vinaceous Dove *Streptopelia vinacea* and the Ring-necked Dove *S. capicola*. J. Avian Biol. 33:150–158.

Den Hartog, P. M., de Kort, S. R., and ten Cate, C. 2007. Hybrid vocalizations are effective within, but not outside, an avian hybrid zone. Behav. Ecol. 18:608–614.

Faulkner, D., Dexter, C., Levad, R., and Leukering, T. 2005. Black Phoebe breeding range expansion into Colorado. W. Birds 36:114–120.

Gee, J. M. 2005. No species barrier by call in an avian hybrid zone between California and Gambel's Quail (*Callipepla californica* and *C. gambelii*). Biol. J. Linnean Soc. 86:253–264.

Knopf, F. 1991. Ecological succession and conservation confusion in the South Platte floodplain, in South Platte River Resource Management: Finding a Balance (Conference Proceeding) (R. C. Woodring, ed.). Colo. Water Resources Res. Inst., Information Series 66.

Kroodsma, D. E. 1985. Development and use of two song forms by the Eastern Phoebe. Wilson Bull. 97: 21–29.

Kroodsma, D. E. 2005. The Singing Life of Birds: The Art and Science of Listening to Birdsong. Houghton Mifflin, Boston.

Kroodsma, D. E., and Konishi, M. 1991. A suboscine bird (Eastern Phoebe, *Sayornis phoebe*) develops normal song without auditory feedback. Animal Behavior 42:477–487.

Leukering, T., and Wood, C. 2000. News from the field: Spring 2000 report (March–May). J. Colo. Field Ornithol. 34:228–246.

Leukering, T. and C. Wood 2001. News from the field: Summer 2000 report (June–July). J. Colo. Field Ornithol. 35:46–61.

New Mexico Ornithological Society. 2007. NMOS Field Notes Database. Natural Heritage New Mexico (database designer/server), Albuquerque. Retrieved from http://nhnm.unm.edu/partners/NMOS.

Schukman, J. M., and Wolf, B. O. 1998. Say's Phoebe (*Sayornis saya*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 374. Birds N. Am., Philadelphia.

Smith, W. J. 1969. Displays of *Sayornis phoebe* (Aves, Tyrannidae). Behaviour 33:283–322.

Smith, W. J. 1970a. Song-like displays of *Sayornis* species. Behaviour 37:64–84.

Smith, W. J. 1970b. Displays and message assortment in *Sayornis* species. Behaviour 37:85–112.

Weeks Jr., H. P. 1994. Eastern Phoebe (*Sayornis phoebe*), in The Birds of North America (A. Poole and F. Gill, eds.), no 94. Acad. Nat. Sci., Philadelphia.

Wolf, B. O. 1997. Black Phoebe (*Sayornis nigricans*), in The Birds of North America (A. Poole and F. Gill, eds.), no 268. Acad. Nat. Sci., Philadelphia.

Accepted 23 May 2008

NOTES

OBSERVATIONS OF ADULT PEREGRINE FALCONS CAPTURING STONEFLIES

JAY SUMNER, Montana Peregrine Institute, P. O. Box 317, Arlee, Montana 59821; peregrine@blackfoot.net

KATE DAVIS, Raptors of the Rockies, P. O. Box 250, Florence, Montana 59833; raptors@montana.com

Ecologists are beginning to appreciate the complex energetic links between aquatic and terrestrial systems (Baxter et al. 2005). It has been estimated that in some riparian systems, 25–100% of the energy and carbon budgets of terrestrial birds, bats, lizards, and spiders can be derived from aquatic insects. Most studies of energy and nutrient fluxes from aquatic to terrestrial ecosystems have focused on the smaller insectivorous passerine birds (reviewed by Baxter et al. 2005). Our focus is on the importance of insects, specifically the California Stonefly (*Pteronarcys californica*), in the diet of the Peregrine Falcon (*Falco peregrinus*).

The California Stonefly, following a year of embryonic development and another four years in aquatic larval stages (Townsend and Pritchard, 1998), emerges as an adult and swarms in western North America from mid-April to early August. The largest swarms on the Blackfoot and Gallatin rivers occur during June. Because emergences of stoneflies and other aquatic insects tend to be extremely synchronous, these can provide predictable and significant, albeit typically brief, pulses of concentrated food.

We first observed adult peregrines capturing California Stoneflies (commonly known as salmonflies) on 9 June 2004 near the falcons' eyrie along the Blackfoot River across from Johnsrud Park in Missoula County, Montana. Using spotting scopes from a distance of 60 to 100 m, we watched two feeding bouts in the early afternoon (Table 1). In the first instance, the adult female circled about 15–80 m over the river near the nesting cliff and made shallow dips along her flight path. With each dip, she captured a stonefly in her talons and, without pause, transferred it to her beak and swallowed it whole. Figures 1, 2, and 3 show the adult female Peregrine Falcon approaching, catching, and transferring a stonefly to her beak. During the 3-minute flight, the female captured 23 stoneflies with no apparent misses before landing out of sight on the cliff (Table 1). The average time between captures was 8 seconds. The stoneflies were emerging in large numbers, and the high rate of capture we observed may have been directly related to the density of the insects.

In the second foraging bout, we observed the adult male, in the same manner, capture 14 stoneflies over the course of the 2.5-minute flight. He missed one stonefly during this flight, and averaged a capture every 11 seconds. Afterward, the male flew to the eyrie and remained there for slightly more than 1 minute, then flew out of sight down the river. During this visit, we were unable to see either of the two 3-week-old young because they were out of view at the back of the nesting ledge.

During 2007, we observed 15 foraging flights by Peregrine Falcons at two eyries along the Blackfoot River near Bonner and Johnsrud Park. Observation distances ranged from 50 to 200 m. The foraging flights varied in duration from 1.5 to 29.5 minutes. We counted the number of stoneflies captured per minute during six of these flights (Table 1). The intervals between captures ranged from 3 to 128 seconds. The feeding bouts occurred during emergences of the California Stonefly and two other species of stonefly, the Elongate Springfly (*Isogenoides elongatus*) and Golden Stone (*Hesperoperla pacifica*). The larger California Stonefly ranges in length from 38 to 76 mm. The Elongate Springfly (length 15–20 mm) and the Golden Stone (length 19–30 mm) are much smaller.

Figure 1. Adult female Peregrine Falcon approaching a stonefly (located in upper right corner of photo).

Photo by Kate Davis

Figure 2. Adult female Peregrine Falcon catching a stonefly.

Photo by Kate Davis

Figure 3. Adult female Peregrine Falcon transferring stonefly to her beak.

Photo by Kate Davis

On 8 June 2007 (13:20), we observed the adult male Peregrine Falcon near Bonner capturing and eating stoneflies. He appeared to be selecting the largest stoneflies ascending from the river. At the peak of his foraging flights, the male consumed three to four stoneflies per minute. Later (14:30–17:08), the adult female made 11 separate foraging flights for stoneflies, returning to the nesting cliff after each flight. We were able to establish a capture rate of four flies in 1.5 minutes during only one of these foraging bouts.

On 9 June 2007 (12:12), the male Peregrine near Bonner was again foraging on stoneflies. Other raptors were also observed feeding on the stoneflies as their

Table 1 Rates of Capture of Stoneflies and Estimated Caloric Intake during Eight Foraging Flights by Adult Peregrine Falcons

Date	Sex	Location	Time	Duration (min)	Stoneflies captured	Rate (number/min)	Estimated energy intake (cal/min)[a]
9 Jun 2004	F	Johnsrud Park	14:15	3	23	8	960
9 Jun 2004	M	Johnsrud Park	14:19	2.5	14	6	720
8 Jun 2007	M	Bonner	13:20	10.5	22	2	240
8 Jun 2007	M	Bonner	14:30	1.5	4	3	360
9 Jun 2008	M	Bonner	12:12	5	14	3	360
9 Jun 2007	M	Bonner	12:38	29.5	51	2	240
11 Jun 2007	M	Johnsrud Park	13:41	3	3	1	120
19 Jun 2007	F	Storm Castle	16:30	1.7	7	4	480

[a] On the basis of a rough estimate of 800 cal/g wet weight of stoneflies (average wet mass 0.15 g).

front of emergence moved upstream. An American Kestrel (*Falco sparverius*) flew from a perch several times to catch insects, returning to the perch to feed. Later, the kestrel made longer foraging flights and began transferring the stoneflies to its bill in mid-air in the same manner as the Peregrine Falcons. Two Red-tailed Hawks (*Buteo jamaicensis*) foraged similarly on the stoneflies. Finally, two non-resident Peregrine Falcons joined in, and the mixed group of raptors fed simultaneously on the emerging insects, often at heights of over 100 m. Eventually, the raptors disappeared around a bend in the river, following the insects' front of emergence.

We again observed both adult Peregrine Falcons from the Johnsrud eyrie hunt the stoneflies on 11 June 2007. On 19 June 2007, we observed the adult female at the Storm Castle eyrie perform similar foraging flights over the Gallatin River near Bozeman, Montana. Here, the adult female was joined by four Common Ravens (*Corvus corax*). The ravens also caught the stoneflies in mid-air, but, unlike the peregrines, they captured the stoneflies directly with their beaks.

To estimate the energetic rewards of this foraging strategy, we captured some emerging stoneflies and measured their fresh wet mass on a Mettler Toledo balance. The average wet mass of stoneflies was 0.15 g (n = 16). As a rough estimate of the caloric value of the stoneflies, we used 800 cal/g for wet weight (Cummins and Wuycheck 1971). The peak observed capture rate of eight stoneflies per minute would result in an energy gain of about 960 cal/min, but lower capture rates of two to three flies per minute would still provide substantial energy rewards of 240–360 cal/min.

The Peregrine Falcon feeds primarily on birds but does, on occasion, take insects (White et al. 2002). Sherrod (1983) observed recently fledged peregrines capturing mostly butterflies and found remains of insects of the orders Coleoptera, Lepidoptera, and Odonata in pellets. In the only observation described, an adult bird captured and ate a large beetle. Pruett-Jones et al. (1980) also reported cicadas (Homoptera) and grasshoppers (Orthoptera) as prey in peregrine eyries in Australia. Craig and Enderson (2004) saw perched adult Peregrine Falcons feeding on Mormon Crickets (*Anabrus simplex*) as they swarmed past their nesting perch. White et al. (2002) listed insects as uncommon food items, with most records coming from the orders Orthoptera (grasshoppers and crickets) and Odonata (dragonflies and damselflies). White and Brimm (1990) described once seeing a male Peregrine Falcon in Fiji catching locusts. White (pers. comm.) also believes Peregrine Falcons take the African flying termites (alates), because they are so common and are reported to be major food items of other African falcons, the African Hobby (*Falco cuvieri*), the Red-footed Falcon (*Falco vespertinus*), and the Amur Falcon (*Falco amurensis*), as reported by Brown et. al. (1982). In Oregon, Henny and Pagel (2003) recorded four species of insects as Peregrine Falcon prey and observed adults and subadult Peregrine Falcons catching swarming mayflies. Ellis et. al. (2007) reported 91 distinct incidents of predation on insects by adult Peregrine Falcons during 11 feeding bouts in Arizona. Cicadas (family Cicadidae) were identified as the prey in 41 (69%) of these.

We found no accounts in the literature of peregrines feeding on insects of the order Plecoptera (stoneflies). Our observations, however, suggest that Peregrine Falcons breeding along rivers forage on the pulsed emergences of large species of stoneflies routinely, and that this opportunistic foraging strategy likely results in substantial energy rewards.

We owe special thanks to Erick Greene who observed and tallied the stonefly capture rates during many of the 2007 Peregrine Falcon foraging flights. In addition, Erick weighed the stoneflies, calculated the caloric intake values, and wrote the introduction and methodology related to caloric intake. Sally Phillips helped with the counting of stoneflies captured at Johnsrud Park. Kathy Fewlass and Byron Crow assisted with the counts at Johnsrud Park in 2004. Montana Fish, Wildlife and Parks, the U.S. Fish and Wildlife Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Bureau of Reclamation, the U.S. Forest Service, Raptors of the Rockies, and the

Montana Peregrine Institute provided funding for the project. Jerome McGahan and John Mitchell reviewed the manuscript.

LITERATURE CITED

Baxter, C. V., Fausch, K. D., and Saunders, W. C. 2005. Tangled webs: Reciprocal flows of invertebrate prey link streams and riparian zones. Freshwater Biol. 50: 201–220.

Brown, L., Urban, E. K., and Newman, K. 1982. The Birds of Africa, vol. 1. Academic Press, London.

Craig, G. R., and Enderson, J. H. 2004. Peregrine Falcon biology and management in Colorado 1973–2001. Colo. Div. Wildlife Tech. Publ. 43.

Cummins, K. W., and Wuycheck, J. C. 1971. Caloric equivalents for investigations in ecological energetics. Internationale Vereinigung für Theoretische und Angewandte Limnologie 18.

Ellis, D. H., LaRue, C. T., Fackler, J. K., and Nelson, R. W. 2007. Insects predominate in Peregrine Falcon predation attempts in Arizona. W. Birds 38:261–267.

Henny, C. J., and Pagel, J. E.. 2003. Peregrine Falcon (*Falco peregrinus*), in Birds of Oregon: A General Reference (D. B. Marshall, M. G. Hunter, and A. Contreras, eds.), pp. 166–170. Ore. State Univ. Press, Corvallis.

Pruett-Jones, S. G., White, C. M., and Devine, W. R. 1981. Breeding of the Peregrine Falcon in Victoria, Australia. Emu 80:253–269.

Sherrod, S. K. 1983. Behavior of Fledgling Peregrines. Peregrine Fund, Ithaca, NY.

Townsend, G. D., and Pritchard, G. 1998. Larval growth and development of the stonefly *Pteronarcys californica* (Insecta: Plecoptera) in the Crowsnest River, Alberta. Can. J. Zool. 76: 2274–2280.

White, C. M., Clum, N. J., Cade, T. J., and Hunt, W. G.. 2002. Peregrine Falcon (*Falco peregrinus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 660. Birds N. Am., Philadelphia.

White, C. M., and Brimm, D. 1990. Insect hawking by a Peregrine Falcon (*Falco peregrinus*) in Fiji. Notornis 37: 140.

Accepted 18 July 2008

A *FREGETTA* STORM-PETREL OFF WESTERN MEXICO

RICH PAGEN, NOAA Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, California 92037; rpagen@whale-mail.com

PETER PYLE, The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, California 94956; ppyle@birdpop.org

LISA T. BALLANCE, NOAA Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, California 92037; lisa.ballance@noaa.gov

On 29 November 2006, Pagen observed and photographed a storm-petrel of the genus *Fregetta*, most likely a White-bellied Storm-Petrel (*F. grallaria*), at 14° 50.52′N, 112° 35.46′W, 952 km (514 nautical miles) southwest of Cabo Corrientes, Mexico, and 456 km (246 nautical miles) southeast of Isla Clarion, Mexico. This location is over 1600 km from any previous record for this genus in the eastern Pacific Ocean.

The observation was made from the NOAA ship *David Starr Jordan*, which was surveying dolphins of the genus *Stenella* and assessing the ecosystem of the eastern tropical Pacific Ocean for the Southwest Fisheries Science Center (SWFSC). At 16:37, the ship was maneuvering to document a Minke Whale (*Balaenoptera acutorostrata*). Pagen was looking off the ship's stern with a Nikon D70 digital SLR camera and Tokina 80–400 lens, but without binoculars, when he noticed a small flash of white at about 300 m distance. At first he thought the bird was a phalarope, but after a couple seconds of observation its banking flight indicating a storm-petrel became apparent. Realizing that a storm-petrel with a white belly was unusual at this location, he shot 12 frames with the camera at about 300 m distance (Figures 1 and 2). The bird flew along with the ship for another 10 seconds or so, remaining beyond 300 m, before disappearing from sight.

The bird was a small storm-petrel, appearing slightly larger in size than a Wilson's Storm-Petrel (*Oceanites oceanicus*), although no other birds were nearby at the time for comparison. It propelled itself with its feet, leaving small "rooster-tailed" splashes on the water (Figure 2), a characteristic of *Fregetta* and closely related genera of storm-petrels. The storm-petrel appeared to have a dark throat, a square or rounded tail, clear white underparts, white underwing coverts, and white uppertail coverts.

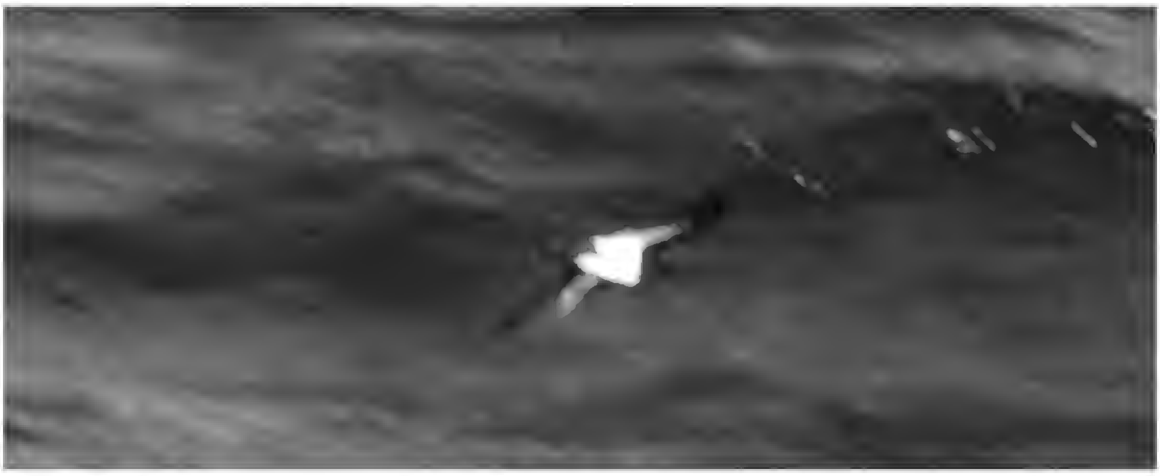


Figure 1. *Fregetta* storm-petrel, presumed White-bellied Storm-Petrel (*F. grallaria*), 456 km SE of Isla Clarion, Mexico (14° 50.52′ N, 112° 35.46′ W), 29 November 2006. Note the apparently entirely white belly and white underwing coverts contrasting with the blackish breast and head.

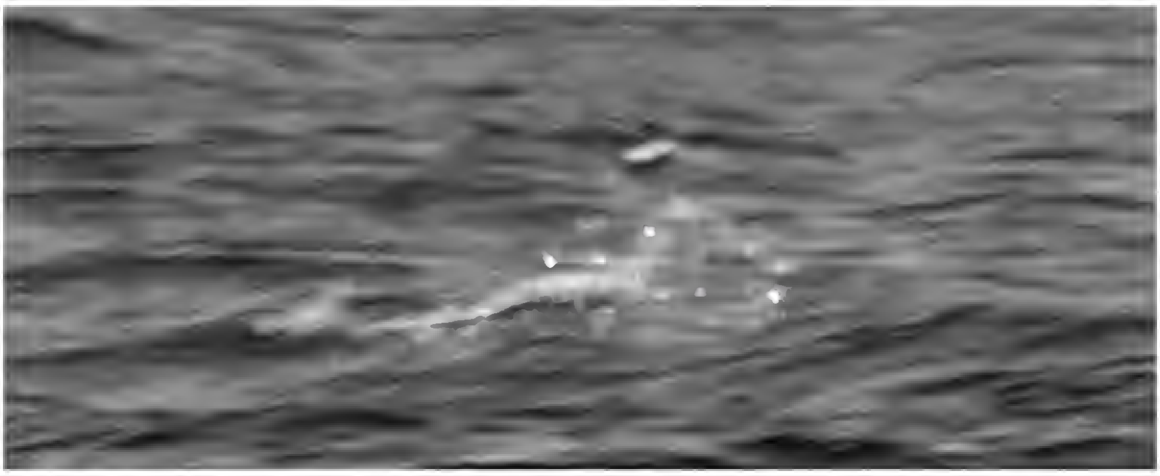


Figure 2. *Fregetta* storm-petrel, presumed White-bellied Storm-Petrel (*F. grallaria*), 456 km SE of Isla Clarion, Mexico (14° 50.52′ N, 112° 35.46′ W), 29 November 2006. Note the distinct white uppertail coverts and "rooster-tail" splash characteristic of *Fregetta* and related genera of storm-petrels.

Among storm-petrels found in the Pacific Ocean, all features are consistent with those of the White-bellied Storm-Petrel (Harrison 1983, 1987, Marchant and Higgins 1990, Shirihai and Jarrett 2002, Onley and Scofield 2007). The White-throated Storm-Petrel (*Nesofregetta fuliginosa*) has a white throat (creating the appearance of having a dark breast band), a notched tail, is larger, and has a different manner of flight (Harrison 1983, 1987, Onley and Scofield 2007). The only other possibility is the Black-bellied Storm-Petrel (*F. tropica*), which usually has a variable black stripe through the belly, darker and browner upperparts, and longer legs with feet projecting noticeably beyond the tail (Marchant and Higgins 1990). Except for the entirely white belly, however, these differences cannot be adequately assessed in the photographs. According to Marchant and Higgins (1990) and Onley and Scofield (2007), a small proportion of the Black-bellied Storm-Petrels breeding at Tristan de Cunha and Gough islands in the southern Atlantic Ocean may have entirely white bellies; however, the taxonomic status of these populations appears to be unresolved. It is unlikely that birds of these populations reach the Pacific Ocean, and Pitman (1986) and Spear and Ainley (2007) inferred that white-bellied *Fregetta* storm-petrels they observed in the Pacific were *F. grallaria*. We follow these authors in assuming the storm-petrel we observed was a White-bellied, although we acknowledge that a Black-bellied Storm-Petrel with a white belly cannot be ruled out from our observation.

The White-bellied Storm-Petrel breeds in south-temperate waters of the Southern Hemisphere, with Pacific breeding colonies located around Lord Howe, on Kermadec, and on other smaller islands in the southwestern Pacific (*F. g. grallaria*), on Rapa Island in the Iles Australes in the south-central Pacific (*F. g. titan*), and in the Juan Fernandez Islands in the southeastern Pacific (*F. g. segethi*) (Marchant and Higgins 1990, Brooke 2004).

The distribution of the White-bellied Storm-Petrel at sea in the Pacific has been summarized by Murphy (1936), Pitman (1986), and Spear and Ainley (2007). Pitman (1986) observed at least 20 White-bellied Storm-Petrels during 4333 hours of observation in the eastern tropical Pacific from 1974 to 1984. These ranged from the equator to 12° S and from 86° to 109° W, with the closest observation (0° 00′ N, 109° 51′ W on 8 August 1980) 1678 km south-southeast of the location of the bird seen off of Mexico. Spear and Ainley (2007) recorded and collected seabirds in the eastern and central Pacific west to 175° W during 9308 hours of observation from 1980 to 1995. In the central Pacific they collected 15 and observed an additional

16 White-bellied Storm-Petrels from 4° N to 20° S and from 110° to 175° W that they concluded from plumage, measurements, molt patterns, and other factors were of the nominate subspecies. They collected 7 and observed 406 within 1700 km of the South American coast (east of 100° W), from 1° N to 36° S, separated by 3500 km from the other group, which they identified as *segethi*. On 16 July 1987 in the Gulf of Panama, at 0° 35.4′ N, 80° 33.0′ W, Spear and Ainley (1999) also observed a White-bellied Storm-Petrel that they assumed was *segethi*. The location of this observation is 3860 km southeast of that of our observation off Mexico.

Spear and Ainley (2007) found *segethi* most frequently over sea-surface temperatures of 8–15° C. The apparent White-bellied Storm-Petrel we report was over a surface temperature of 28° C, well above the temperature range observed by Spear and Ainley (2007), suggesting that it was crossing unfavorable habitat. Because the ship was making frequent turns to approach a Minke Whale at the time of this observation, it is not clear what direction the bird was traveling when it encountered the ship, that is, whether it may have been migrating north or south.

We thank Chris Cutler, Michael Force, Sophie Webb, Steve N. G. Howell, and Lindsey Peavey for their dialogue on the identification of the White-bellied Storm-Petrel. Comments from an anonymous reviewer resulted in substantial improvements to the manuscript.

LITERATURE CITED

Brooke, M. 2004. Albatrosses and Petrels across the World. Oxford Univ. Press, Oxford, England.

Brooke, M. de L. 1987. The birds of the Juan Fernandez Islands, Chile., Int. Council Bird Preserv. Study Rep. 16.

Harrison, P. 1983. Seabirds: An Identification Guide. Houghton Mifflin, Boston.

Harrison, P. 1987. Seabirds of the World: A Photographic Guide. Christopher Helm, London.

Marchant, S., and Higgins, P. J., eds. 1990. Handbook of Australian, New Zealand, and Antarctic Birds, vol. 1. Oxford Univ. Press, Melbourne, Australia.

Murphy, R. C. 1936. Oceanic Birds of South America, vol. 2. Am. Mus. Nat. Hist., New York.

Onley, D., and Scofield, P. 2007. Albatrosses, Petrels, and Shearwaters of the World. Princeton Univ. Press, Princeton, NJ.

Pitman, R. L. 1986. Atlas of seabird distribution and relative abundance in the eastern tropical Pacific. Southwest Fisheries Center Admin. Rep. LJ-86-02C, Southwest Fisheries Center, 8604 La Jolla Shores Drive, La Jolla, CA 92037.

Shirihai, H., and Jarrett, B. 2002. The Complete Guide to Antarctic Wildlife: Birds and Marine Mammals of the Antarctic Continent and the Southern Ocean. Princeton Univ. Press, Princeton, NJ.

Spear, L. B., and Ainley, D. G. 1999. Seabirds of the Panama Bight. Waterbirds 22:175–198.

Spear, L. B., and Ainley, D. G. 2007. Storm-petrels of the eastern Pacific Ocean: Species assembly and diversity along marine habitat gradients. Ornithol. Monogr. 62.

Accepted 29 May 2008

BOOK REVIEWS

Festschrift for Ned K. Johnson: Geographic Variation and Evolution in Birds, by Carla Cicero and J. V. Remsen, Jr. (eds.). 2007. *Ornithological Monographs* no. 63, American Ornithologists' Union. viii + 114 pp. Softback, $10.00 ($9.00 for members of the American Ornithologists' Union; add $4.00 for domestic shipping, $5.00 for foreign shipping). Available from Buteo Books, 3130 Laurel Road, Shipman, VA 22971. ISBN 978-0-943610-75-7.

We lost a towering figure in North American ornithology with the passing of Ned K. Johnson in 2003. It is thus only fitting that a *festchrift* should appear in his honor. With any such publication, the reviewer must be careful to review the publication and not the person. Anyone interested in thoughtful reviews of Johnson's life and work is referred to Barrowclough and Zink's obituary in the *Ibis* (2004, vol. 146, pp. 567–568) and the editors' introductory chapter to this monograph.

Following the introduction, this book—really a volume in the A.O.U.'s long-standing occasional publication *Ornithological Monographs*—has eight chapters devoted to various aspects of avian systematics, taxonomy, and biogeography, the three pillars of Johnson's career. The first two of these chapters are more general in scope: one by Allan J. Baker on molecular studies of geographic variation and speciation, the other by Kevin Winker et al. on species concepts.

All but one of the remaining chapters focus on specific systems. James D. Rising addresses Savannah Sparrow (*Passerculus sandwichensis*) subspecies, William B. Monahan and Robert J. Hijmans hybridization in the Barred (*Strix varia*) and Spotted (*S. occidentalis*) Owls, Kristen Ruegg divergence of Swainson's Thrush (*Catharus ustulatus*) subspecies groups, Cicero (with Johnson as co-author) evolution in the Sage Sparrow (*Amphispiza belli*), and Storrs L. Olson systematics of a Pleistocene hawk. The exception is the chapter by Burns et al., a biogeographic analysis of congruence among evolutionary histories of three western endemics, the White-headed Woodpecker (*Picoides albolarvatus*), Wrentit (*Chamaea fasciata*), and California Thrasher (*Toxostoma redivivum*).

It is inevitable with any collection of papers that contributions will be uneven in quality and depth. This *festschrift* is no exception. Olson's short paper, for example, merges the long-extinct *Wetmoregyps daggetti* into *Buteogallus* on the basis of sound evidence, but his discussion almost functions as a commentary in which he dismisses past attempts to infer the species' ecology in favor of his own (plausible) interpretation. Rising's chapter seems to position itself as a treatise on the value and application of subspecies, provided taxa are defined rigorously. His reference to *t* tests and ANOVAs (p. 47) may suggest a lack of understanding that subspecies cannot be defined on the basis of average differences, but he adopts an admirably conservative approach—after all, too many subspecies have been named on trivial grounds—and issues fair warning about relying too heavily on genetic data. Rising then proceeds to dismiss all but seven of the 28 named subspecies but does so without presenting any of the relevant data and despite many of the dismissed forms being upheld in detailed, quantitative studies elsewhere (e.g., Hubbard 1974, *Nemouria* 12:1–21). Moreover, and previous warnings aside, his current divisions seem to be influenced largely by recent molecular research to which he contributed (Zink et al. 2005, *Condor* 107:21–28).

A refreshingly balanced approach can be found in Baker's chapter, which reads much like a short primer, replete with clear examples (drawn from his own research), on the use of molecular genetics to study avian speciation and biogeography. In addition to wise advice about using multiple markers and determining population number, his summary of recent findings on diversification of moas (Baker et al. 2005, *Proc. Natl. Acad. Sci. USA* 102:8257–8262), penguins (Baker et al. 2006, *Proc. Royal Soc.* B 273:11–17), and neotropical parrots (Tavares et al. 2006, *Syst. Biol.* 55:454–470) is well presented and intelligible while (usually) avoiding the technical nitty gritty of the original papers. In this respect they serve as a good introduction into this important field of study.

Likewise, the chapter on species concepts by Winker, Rocque, Braile, and Pruett is a "fair and balanced" assessment of a highly contentious issue. Debates over species concepts are particularly divisive in ornithology and have often generated far more heat than light. Moreover, scientists tend to move forward cautiously on the basis of data accumulated slowly, but birders tend to want anything they deem identifiable in the field (rightly or wrongly) to be split. There is also a decided publication bias: it is "sexier" and thus easier to publish a novel taxonomic split, but almost no one thinks a taxonomic lump sexy. Given the urge—dare I say pressure?—to split, I would venture that in no other systematic endeavor is there a stronger tendency to make the data fit the hypothesis. Winker et al. work above this fray and describe a well-reasoned means of keeping the debate from having undue influence on the results.

The remaining four chapters deal with particular case studies. Like Baker's chapter, Ruegg's functions as a summary of her recent detailed research (e.g., Ruegg and Smith 2002, *Proc. Royal Soc. London* B 269:1375–1381; Ruegg et al. 2006, *J. Biogeogr.* 33:1172–1182; Ruegg et al. 2006, *Mol. Ecol.* 15:3147–3156; Ruegg 2008, *Evolution* 62:452–466) on divergence in migratory routes, ecology, behavior, voice, and genetics between russet-backed and olive-backed groups of Swainson's Thrush subspecies, which meet in a contact zone in western British Columbia. That these groups "reside in the interesting gray area between well-differentiated subspecies and recently diverged sister species" (p. 75) suggests that her system will be important to our understanding of avian speciation.

Cicero and Johnson's chapter tackles another putative contact zone, although a disputed one in this case (*cf.* Patten and Unitt 2002, *Auk* 119:26–35, and Cicero and Johnson 2006, *Auk* 123:266–274). Because I am a player in this controversy, I shall keep my comments brief and dispassionate. At issue is whether morphological variation is more or less smoothly clinal across the Mojave Desert and western Great Basin, as putative western and eastern subspecies differ solely in body size. Cicero and Johnson (2006) argued that our data were inappropriate because we included too many specimens that were not proven to be local breeders. I counter that discounting certain specimens, such as remarkably large birds taken in Tulare County, California, in July, well outside the species' known migratory schedule, biases results in favor of finding a step cline. Perhaps only uniformly spaced collecting along a transect through this region will settle the issue. Regardless, data presented on habitat use and genetic variation are fascinating and certainly point to the need for further study.

Monahan and Hijmans' contribution on range expansion of the Barred Owl and resultant hybridization with the Spotted Owl is thorough, so far as its geographic coverage allows. Like other such studies—e.g., on the Solitary Vireo (*Vireo solitarius* in the broad sense) complex (Johnson 1995, *Condor* 97:903–919)—the international border with Canada seems nonexistent while the international border with Mexico forms an impervious barrier. In this case we get the erroneous assertion that "the Mexican Spotted Owl (*S. o. lucida*) remains allopatric with the congeners" (p. 56), a statement ignoring the broad and apparently old zone of sympatry in central Mexico between *S. o. lucida* and the Barred Owl.

Indeed, given the interest in recent hybridization between the Spotted and Barred Owls, why has no researcher tried to determine the extent of their interbreeding in this part of Mexico? Still, this criticism in no way detracts from the depth of and care taken with their analyses. In addition to providing solid evidence of a natural cause for recent westward expansion of the Barred Owl, their findings that hybridization occurs across a broad range of environmental conditions, with "dispersal tendencies that favor parental backcrossing" (p. 62), may spell further trouble for the Spotted Owl, as "one taxon ultimately is expected to replace the other two" (p. 63).

A similar mistake aside—the Wrentit, which ranges north to the Columbia River on the Washington/Oregon border, is not "mostly restricted to California" (p. 97)—the phylogeographic analysis by Burns, Alexander, Barhoum, and Sgariglia doubtless would have made Johnson proud. It is a fine addition to recent analyses (Calsbeek et al. 2003, *Mol. Ecol.* 12:1201–113; Lapointe and Rissler 2005, *Am. Nat.* 166:290–299) of the evolutionary history of diversification across the California Floristic Province. In all three species they examined, the timing of diversification was similar and, in agreement with the earlier studies, they found a strong phylogenetic break at the Transverse Ranges. This broad congruence was discovered even though "evolutionary history of each species was complex and characterized by a diversity of processes" (p. 102).

This monograph is generally well produced and thought provoking, even provocative. Rather than a criticism, this last trait is a strong point. Who wants to read commentaries, essays, or short review papers that cater only to one's own pet views? It may be consoling, even flattering, to have one's opinions "validated" in this manner, but scientific progress is made only when we are forced to confront and accommodate uncomfortable disagreements.

Michael A. Patten

Barefoot on Lava: The Journals and Correspondence of Naturalist R. C. L. Perkins in Hawai'i, 1892–1901, edited by Neal L. Evenhuis. 2007. Bishop Museum Press, Honolulu. 412 pages, 49 figures including black-and-white photographs, maps, and reprints of newspaper clippings and correspondence. Cloth. $29.95. ISBN 978-1-58178-061-1.

What do Alfred R. Wallace, Rollo Beck, A. J. van Rossem, Ed Ricketts, and Larry Spear have in common? They were all what we might call "scroungers," biologists who would much prefer to be in the trenches, bitten by sand fleas, at sea in a rowboat, parched and dusty in Mexican deserts, soaked and covered with seaweed, or hauling rotten whales down an interstate, respectively, rather than fraternizing with fellow biologists at conferences or meetings. In short, these are my heroes. Now I can add a sixth name to this list, Robert Cyril Layton (R. C. L.) Perkins.

The birds of Hawaii, and in particular the endemic landbird family Drepanididae, were largely "discovered" and classified during a flurry of collecting from 1887 to 1895. Two highly competitive British museums were vying for the right to discover and name the most new Hawaiian birds. The British Museum of Natural History (BMNH) and its respected but somewhat pompous ornithologist Alfred Newton sent Scott B. Wilson out to the islands to collect birds in 1887 and 1888. Wilson did a fair job, describing 14 new species and compiling (with Arthur H. Evans) the first of four classic publications on Hawaii's avifauna within four years, *Aves Hawaiienses*, completed in 1899.

But Wilson was often moody and disinterested (later, back in Britain, he committed suicide), and the BMNH lacked the funding to keep him in the field. Newton asked his former student, the well-funded but taxonomically challenged Lord Walter Rothschild, to collaborate on continued collecting, but Rothschild decided that he would prefer to fund an independent effort for his Natural History Museum in Tring, and he sent an Australian ruffian, Henry C. Palmer, to the islands from 1890 to 1893. Palmer wound up collecting 10 new bird species before he returned to Australia and was murdered while panning for gold. Rothschild summarized Palmer's discoveries in the second classic of the time, the curiously named *The Avifauna of Laysan and* *the Neighbouring Islands; with a Complete History to Date of the Birds of the Hawaiian Possessions*, completed in 1900. Meanwhile, Newton and other distinguished British biologists and geologists formed the Sandwich Islands Committee and scraped together enough funds to send a single multi-talented collector to Hawaii from 1893 to 1897.

As much, if not more, an entomologist than an ornithologist, R. C. L. Perkins was able to combine insight gained from both insects and birds (e.g, dissecting the stomachs of his collected birds to see what they were eating) to form ecological perspectives on the Hawaiian fauna that the former collectors lacked. He was also the first to classify most drepanidids correctly and (despite Newton's skepticism) the first to suggest that they were all of one origin. Perkins ultimately published the fourth (Henry W. Henshaw produced yet another summary in 1902) and most comprehensive work on Hawaiian birds and ecology, *Fauna Hawaiiensis*, completed in 1903. Sadly, ecological disaster in the form of habitat destruction and introduced rodents, ants, and diseases destroyed much of Hawaii's fauna during and shortly after Perkins' time, so his observations are all that we have on the diet and habits of many species of birds, insects, and land snails, now extinct. Perkins saw what was happening and was also the first naturalist to press for conservation measures to try to avert the destruction of Hawaii's forest ecosystems.

Barefoot on Lava is a collection of journal entries and letters composed during Perkins' fieldwork in the Hawaiian Islands. Neil Evenhuis, an entomologist at the Bernice P. Bishop Museum, Honolulu, spent almost 10 years scrounging around in the archives of various museums to piece together a tapestry of Perkins and his colorful acquaintances during a colorful period in the colorful place that was Hawaii in the late 1800s. Through the book we obtain a complete snapshot of the triumphs, challenges, and travails that faced the pioneering collectors during this great era of biological discovery, along with the politics and funding issues facing their sponsors back in Europe.

Perkins' passion for his work pours through his journals. During a collecting trip to Moloka'i 11 May–29 June 1893 he spent almost every day slogging through mud, heavy rain, and near-impenetrable dwarf cloud forests from dawn to (at times) well after dark, often not eating for a day or two at a time, and camping in a leaky tent and shack. Yet he understated the difficulties and reported with satisfaction the discovery of every new insect or the collection of a fine bird specimen. His shining ornithological moment came during this trip, when he discovered the Black Mamo (*Drepanis funerea*) on 18 June. Newton and the other taxonomists were ecstatic about the discovery of this unique Hawaiian honeycreeper, but Perkins described the collocation of the first two specimens rather more matter-of-factly, dutifully finishing his daily journal with "I saw at once that I had no oo but a *Hemignathus* [Akialoa/Nukupu'u]-like creature with shorter lower mandible and excessively strong smell characteristic of the Drepanidae and of the Hawaiian finches. All of the feathers on the top of the skull of each were covered with a white sticky substance, apparently pollen of some flower, and they are, no doubt, honey-sucking birds. The cry is not of the loud character of the oo but is startlingly clear and could be heard at a considerable distance for this reason. I kept on some way but saw no other bird of note, just managing to reach the house by dark, probably a little after 7 p.m. Very tired. I got a few Carabidae under moss in the highest forest and some more large *Brachypeplus* under bark of the same tree as on the 15th. I shot several *Loxops* [Moloka'i 'Alauahio]." Perkins also gained an island-wide perspective during his many collecting trips, writing to his colleague Edward Poulton in 1897, "For these reasons (i) the birds of the islands are extremely specialized, so much so that many of them depend on almost a single species of insect or fruit for food. (ii) The only bird likely to eat the [insects] in question is [the 'Elepaio]. (iii) on one of the islands where no ['Elepaios] exist or even are likely to have existed [Maui] the insects tend to form a uniformity of colonizing peculiar to that island." *Barefoot on Lava* is packed with Perkins' perceptive observations such as this, published for the first time, which will be essential to ornithologists and historical ecologists in understanding what Hawaii's forests were like before and during the initial stages of decline.

Those with a wider interest in taxonomy of the period will enjoy reading the letters of Newton and David Sharp (preeminent entomologist at the BMNH) back to Perkins, which reflect, in the delightfully succinct yet compendious writing style of the era, the respect that these two scientists had for the collector. Perhaps reflecting his personality, Sharp tended to be conservative in his communications, focusing on logistical matters and insect taxonomy, whereas Newton was much more loquacious, sharing his views on all sorts of subjects and gossiping about prominent ornithologists and other personalities working in Europe at the time. None of the seminal taxonomists of the era was spared an opinion: Darwin, Gray, Sharpe, Finsch, Sclater, Stejneger, Ridgway, Cassin, Peale. But Newton saved his wryest comments for Rothschild, whom he called "the Golden Walter," and referred derisively to the genus *Palmeria* as "*Poacheria.*" [After Wilson first described the Crested Honeycreeper (as *Himatione dolei*), Rothschild redescribed it as *Palmeria mirabilis*, and the generic name remains as the first applied to this distinctive species.] Newton hated the practice of naming birds after people, several times indicating to Perkins that it was "abused" and an "insult," but we also gain more insight into his artful thinking on this subject when he proposed to Perkins, "what a fine joke it would be to send to the Hawaiian journal a note making a new genus *Rothschildia* for *D. funerea*. Its validity would never be admitted by anyone else, and the name as a generic term would be preoccupied for all future time!!!" Among many other gems from Newton are opinions about the scandalous affair of BMNH taxidermist William Ferrand, his views that giving degrees to women "does not much concern me as I am not likely to marry one because she is a B.A.ess," and his lamenting about BMNH's losing of type specimens with "the boasting of all concerned with that establishment is beyond belief." But we also see an endearing side to Newton, who supported Perkins fully by publishing his journals, giving him full reign of his time and schedule, advising him on how to avoid a serious cholera outbreak in 1895, and ever laboring to secure more funding to keep him in the field.

My only minor disappointment with *Barefoot on Lava* regards the appended material. A 16-page glossary is helpful but could have stood some proofreading, at least for the entries on birds, in which I found several typographical errors (the only ones I noticed in the book), errors of fact, and superfluous entries (e.g., for "pewee," hardly a Hawaiian bird!). This glossary is followed by a very brief bibliography, which, perplexingly, does not include any of Perkins' own published works. Perkins published at least five very perceptive papers on Hawaii's birds between 1893 and 1919, the last describing the Lana'i Hookbill (*Dysmorodrepanis munroi*) based on the single enigmatic specimen collected by his friend and colleague George Munro. He doubtlessly published much on entomology as well. Evenhuis should have completed the chapter on Perkins by including a bibliography and brief summary of each of his scientific contributions and at least mentioning the hookbill. These minor thoughts aside, I highly recommend Evenhuis' compilation to those interested not only in Hawaiian natural history but in the history of avian science and ornithological taxonomy during the turn of the 20th century.

Peter Pyle

FEATURED PHOTO

HYBRIDIZATION OF A YELLOW-CROWNED AND BLACK-CROWNED NIGHT-HERON IN SOUTHERN CALIFORNIA

MARY F. PLATTER-RIEGER, 2104 Crenshaw Street, San Diego California 92105-5130, mfpjrieger@cox.net

TIFFANY M. SHEPHERD, Naval Facilities Engineering Command Southwest, 1220 Pacific Highway, San Diego, California 92132; tiffany.shepherd@navy.mil

MARIE MOLLOY, Wildlife Assist Volunteers, 4203 Genesee Avenue #103, San Diego, California 92117, wildlifeassist@att.net

We report the second successful hybridization in the wild between a Yellow-crowned Night-Heron (*Nyctanassa violacea*) and a Black-crowned Night-Heron (*Nycticorax nycticorax*), and the first with observations of young on the nest.

Hybridization among herons is uncommon but has been reported previously for the Black-crowned Night-Heron (McCarthy 2006, Monson and Phillips 1981). These reports include a natural cross with either a Little Blue Heron (*Egretta caerulea*) or a Tricolored Heron (*E. tricolor*) where the exact identification was uncertain. In Java, Sulawesi, and the Philippines natural hybridization between the Black-crowned Night-Heron and Rufous Night-Heron (*Nycticorax caledonicus*) has been noted repeatedly (McCarthy 2006). In captivity a Black-crowned Night-Heron crossed with a Little Egret (*Egretta garzetta*), but these species' breeding ranges overlap so a natural hybrid is also possible (McCarthy 2006). A captive Black-crowned Night-Heron crossed with a Yellow-crowned Night-Heron in 1975 at the Dallas Zoo, Texas; these species' breeding ranges overlap as well (McCarthy 2006). In captivity many cases of hybridization are due to proximity and lack of choice in mates and never occur under natural circumstances in the wild.

Until recently, the only reported natural hybrid between the Yellow-crowned Night-Heron and the Black-crowned Night-Heron was collected in 1951 north of Prescott, Arizona (Monson and Phillips 1981). The immature bird was originally identified as a Yellow-crowned Night-Heron (Phillips et al. 1964), but after further examination the identification was later changed to a hybrid Black-crowned × Yellow-crowned Night-Heron (Monson and Phillips 1981).

In North America, the Yellow-crowned Night-Heron breeds throughout the southeastern United States with colonies north along the Atlantic coast to Connecticut and from the Gulf of Mexico north to Indiana and Illinois (Watts 1995). It breeds throughout the Caribbean and along both coasts of Mexico, north along the Pacific coast of Baja California to Laguna Ojo de Liebre and the San Benito Islands (Wilbur 1987), approximately 300 miles south of San Diego, California. Until 2005 the Yellow-crowned was a rare visitor to southern California, with as few as 23 individuals reported (Hamilton et al. 2007). The single specimen of an adult from California, collected at the Tijuana River mouth on 25 October 1963 (SDNHM 30758, McCaskie 1964) has the thick bill (depth at nostril 22.5 mm) typical of the subspecies *bancrofti*, originating from western Mexico, and too thick for *violaceus* from the eastern United States (McCaskie and Banks 1966, Unitt 1984).

A pair of Yellow-crowned Night-Herons in Imperial Beach, San Diego County, present since at least 27 June 2005, fledged three young in July 2006, establishing the first record for that species' nesting in California (McCaskie and Garrett 2007). They fledged three young in early August 2007 and again in July 2008, with one juvenile found two or three days dead on 30 August 2008 (spread wing and skeleton preserved, San Diego Natural History Museum 52127; G. McCaskie pers. comm.). In 1989 and 1992, a Black-crowned Night-Heron was observed nesting with a Yellow-crowned Night-Heron at a colony of the Black-crowned at the Scripps Institute of Oceanography in La Jolla, California, but these attempts did not produce young (Pyle and McCaskie 1992, Heindel and Patten 1996).

On 8 May 2007, at Naval Air Station North Island, Naval Base Coronado, Molloy photographed an adult Black-crowned Night-Heron on the same nest where an adult Yellow-crowned had been seen incubating two days earlier. The nest was located approximately 35 feet high in a fig tree (*Ficus* sp.) on the south side of Building 6 (latitude 32° 42.6310′ N, longitude 117° 11.5608′ W). Further observations on 12 May 2007 by Platter-Rieger and Molloy revealed the Black-crowned incubating or brooding from 0800 to 0915, at which time the Yellow-crowned took over. Another shift change took place sometime before 1500 because at 1530 the Yellow-crowned replaced the Black-crowned and again resumed incubation or brooding. At this time the adult Yellow-crowned put its head down in a feeding posture and we observed a small nestling. On the basis of the hatched shell fragments seen under the tree on 6 May 2007, at least one hybrid was at least seven days old, and begging calls indicated that there was more than one young. The calls were pitched higher and distinctly different from the vocalizations of nestling Black-crowned Night-Herons (Platter-Rieger pers. obs.). Later observations confirmed that two young were in the nest, one much larger than the other. The two hybrids on the nest were photographed by Anthony Mercieca on 19 May 2007 (Figure 1).

Figure 1. Both hybrid Yellow-crowned × Black-crowned Night-Heron young on the nest, showing the already large size difference between the older young, estimated age 14 days, and its smaller sibling, estimated age 10 days. Note the extensive yellow on the lower mandible.

Photo by Anthony Mercieca, 19 May 2007

With the help of the Naval Base Coronado Federal Fire Department Shepherd captured and banded the smaller of the two hybrids on 29 May 2007 (estimated age 20 days on the basis of the hatched shells seen on 6 May 2007) and recorded the following measurements: mass 360 g, tarsus length 42.27 mm, bill width 16.26 mm, and culmen length 35.28 mm. The wing chord was not measured because of insufficient feather growth. For future identification, the young was banded with a federal aluminum band covered in black electrical tape, and, for better detection later, the breast feathers were colored with a red marker. On 14 June 2007, Timothy Burr and Tamara Conkle made a second attempt to capture the larger hybrid. It was already too large and agile to be captured, but Burr photographed it (Figure 2). During this same attempt, the smaller hybrid was again captured and a red color band was placed on its opposite leg (Figure 3).

Figure 2. Older hybrid fledgling standing in the top of the *Ficus*. Note the thin white streaks over the dark brown color of the head and upper neck, as in a Yellow-crowned Night-Heron; the lower neck is patterned more like that of a Black-crowned Night-Heron.

Photo by Timothy Burr, 14 June 2007

Figure 3. Younger hybrid showing the rich yellow on the lower mandible, the backs of the legs, and bottoms of the feet. The green on the front of the legs is more yellow than that on a Black-crowned Night-Heron of similar size or age.

Photo by Tamara S. Conkle, 14 June 2007

On 21 June 2007 Platter-Rieger found the younger hybrid lying dead, abdomen down, on the pavement next to the curb and approximately 10 feet horizontally east from its nest. Death, at estimated age of 42 days, occurred sometime in the evening of 20 June 2007, most likely from a fall while climbing around the branches. This bird was collected and given to the San Diego Natural History Museum, where Philip Unitt prepared it as a study skin (SDNHM 51757). Both legs had the tibiotarsus broken; the right was an open break, the left was a closed break. Ants had already done some damage to the inner skin of the wings. Both bands remain on the study skin, as does the red marking on some breast feathers. Measurements of the specimen when picked up were mass 294 g, tarsus length 54 mm, bill width 16 mm, culmen length 40 mm, and flattened wing 172 mm. This heron was a male and small for his estimated age with a very low growth rate (Figures 4 and 5). The body was in poor nutritional condition; muscle mass was reduced, and there was no visible fat. There was some hemorrhaging around the heart and upper liver with a small amount of blood in both lungs. The brain, liver, and other internal organs had some post-mortem color changes but otherwise appeared normal in comparison to organs of other freshly dead young Black-crowned Night-Herons Platter-Rieger has seen in previous dissections. The stomach was empty.

Platter-Rieger photographed the older hybrid, resting calmly on the nest, on 24 June 2007 at an estimated age of 50 days (see this issue's back cover), and we assumed it fledged successfully since it appeared healthy and many surveys of the breeding site and nearby areas failed to yield a carcass. Note the breast feathers patterned like those of a Black-crowned Night-Heron and the "swollen" bill with a rich yellow on the lower mandible. Some downy feathers from preening are caught at the tip of the bill.

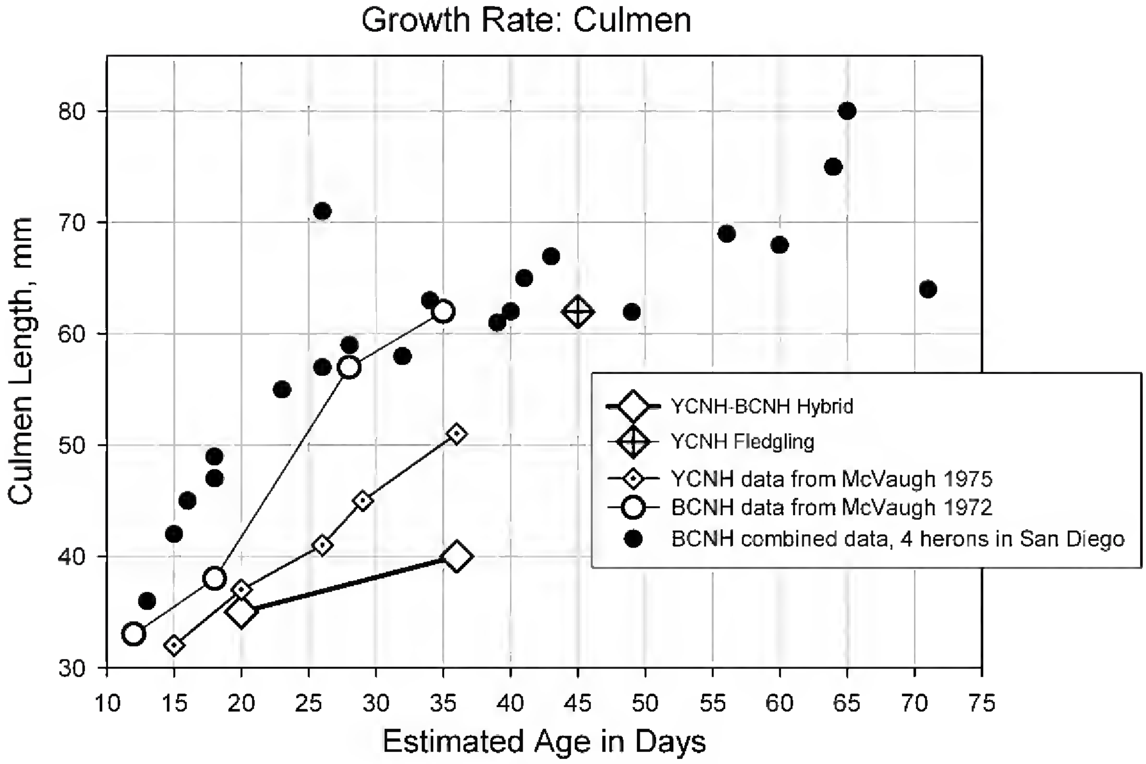


Figure 4. Growth of four young and healthy Black-crowned Night-Herons from San Diego raised at Project Wildlife. Repeated measurements of their culmen length are plotted with two measurements of the culmen of the youngest Yellow-crowned Night-Heron × Black-crowned Night Heron. The hybrid's growth rate was abnormally low for its age relative to growth rates of Black-crowned Night-Herons in both San Diego and North Carolina (McVaugh 1972), as well as of Yellow-crowned Night-Herons in North Carolina (McVaugh 1972). The culmen of the Yellow-crowned fledgling struck by a car in El Cajon, California, in 2005 is similar in length to a Black-crowned Night-Heron's.

For the purpose of this paper we define nestlings as young from hatching to fully feathered but retaining quill sheaths on the primaries, fledglings as those with natal down left on the crown but fully grown primaries with no quill sheaths remaining. Four healthy orphaned nestling Black-crowned Night-Herons received at Project Wildlife with down and primaries still in their sheaths enabled Platter-Rieger to make repeated measurements and quantify growth rates. All comparative measurements are taken from a database created and maintained by Platter-Rieger for research into local heron and egret mortality. Tarsus lengths were also compared, using culmen length as an indicator of age in nestlings and fledglings for a higher sample size and to eliminate starvation effects. Previous measurements (Platter-Rieger pers. obs.) demonstrated that of the various measurements culmen growth was the least affected by starvation.

The following comparisons are for individuals within the above age definitions. A fledgling Yellow-crowned Night-Heron found struck by vehicle in El Cajon, California, on 23 August 2005 (SDNHM 51156, Iliff et al. 2007) had a tarsus much longer than those of local fledgling Black-crowned Night-Herons (Figure 6). The longer tarsus is the most distinct structural difference between fledgling Yellow-crowned Night-Herons and Black-crowned Night-Herons, besides the laterally broadened bill (Figures 5 and 7). The hybrid's tarsus and culmen lengths fall below both those of nestling Yellow-crowned and Black-crowned Night-Herons when plotted by estimated age, indicating that its growth was extremely slow (Figures 4 and 5). When culmen length

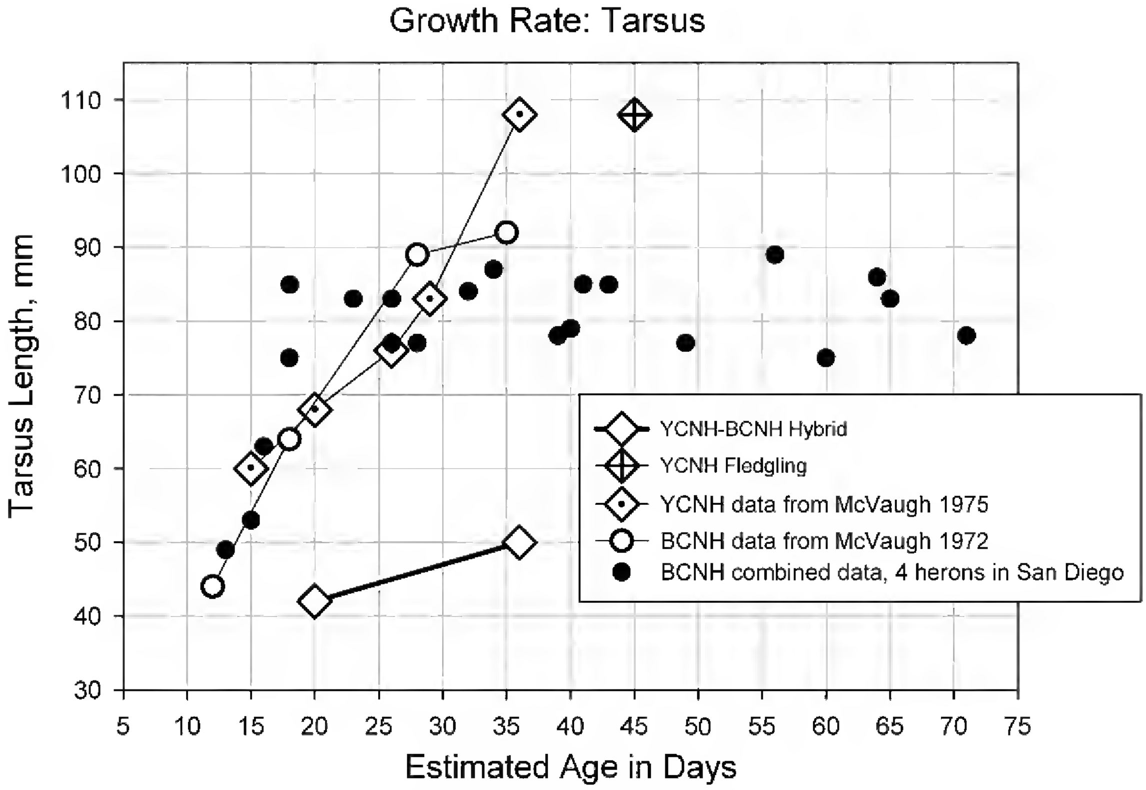


Figure 5. Repeated measurements of tarsus length plotted against estimated age for four young Black-crowned Night-Herons from San Diego rasied at Project Wildlife and one measurement of the fledgling Yellow-crowned Night-Heron from El Cajon are compared to two measurements for the younger hybrid Yellow-crowned × Black-crowned Night Heron. Again, the hybrid's growth rate was slow in comparison to both local night-herons and those in North Carolina measured by McVaugh (1972, 1975).

is used to estimate age and to eliminate the effects of starvation, the hybrid's tarsus length still falls among measurements for nestling Black-crowned Night-Herons but is on the high side (Figure 6). The measurement of bill width (Figure 7) at the distal edge of the nostril falls between measurements of the Yellow-crowned Night-Heron and the Black-crowned Night-Heron.

The hybrids differed from nestling Black-crowned Night Herons as follows. Bill: In the hybrids the lower mandible was a bright yellow (Figures 1, 2, 3, and back cover), much brighter than in the Black-crowned, in which the mandible is typically a light blue-green to grayish yellow. In the hybrids the bill appeared swollen and rounded, especially when seen from the top (Figure 7). In the Black-crowned the bill tapers to a sharp point when seen from the top.

Feet and legs: On the hybrids the backs of the legs and bottoms of the toes especially were a deep, rich yellow; the front of the legs and upper surfaces of the toes tended to a warm yellow-green. Nestling Black-crowned Night-Herons start with brilliant yellow-green legs and feet, which age into various shades of gray to blue-green in juveniles.

Plumage: The base color of the hybrids' plumage started out and remained a deep, very dark brown. Head and neck feathers were more distinctly "pin-striped" with whitish than in the Black-crowned Night-Heron. The moderate streaking on the back was more similar to that of the Black-crowned. All forward edges of the greater secondary wing coverts were consistently edged with ivory color. Lighter "tick marks" on the wing

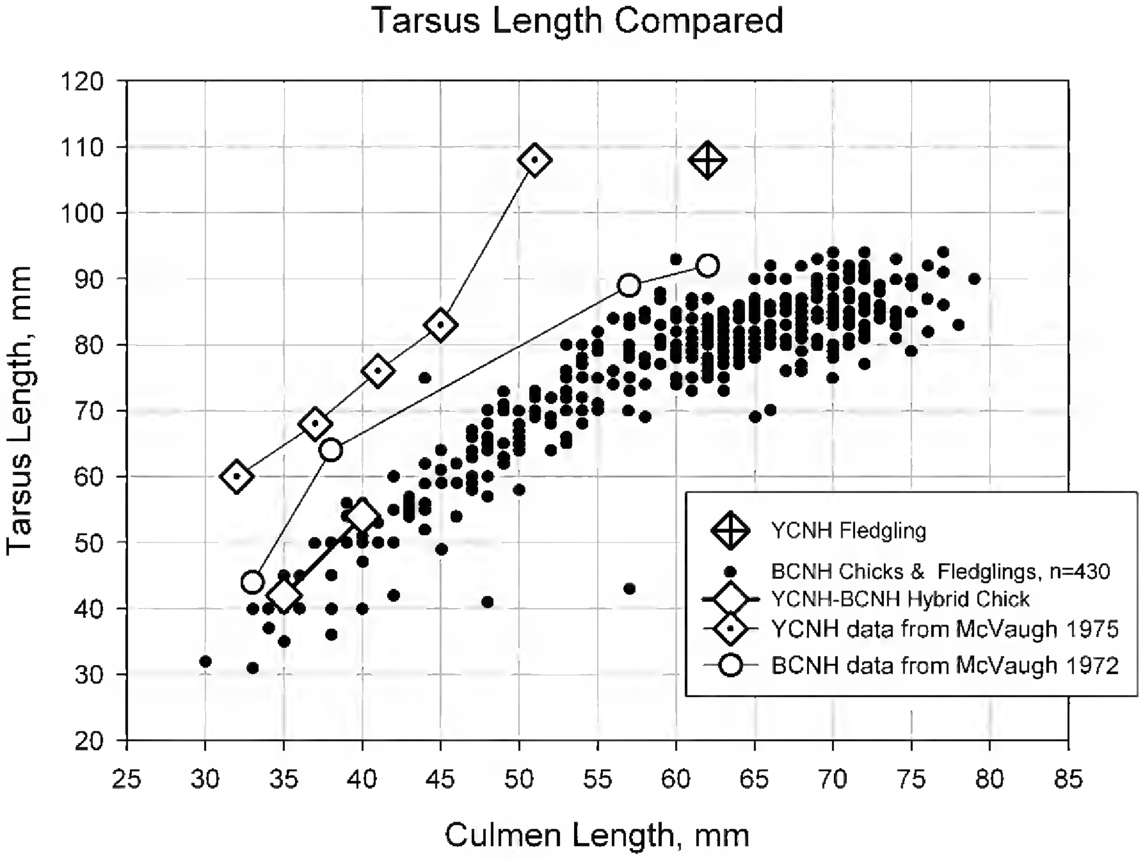


Figure 6. The ratio of tarsus to culmen is higher in the Yellow-crowned than in the Black-crowned Night-Heron. The hybrid's ratio is within the range of variation in the Black-crowned Night Heron.

coverts were thinner than the average "tick marks" seen on young Black-crowned Night-Herons. In the Black-crowned Night-Heron the base color of the juvenile plumage starts out as a deep, rich reddish brown, variable from light to dark, and fades with exposure to sunlight into a paler brown as seen in many older juveniles (past the fledgling stage and past year of hatching, Platter-Rieger pers. obs.). The head and neck feathers are broadly streaked with warm brown. The back usually has broad light brown streaks, but these can vary as small lines. Very little ivory-colored edging exists on the forward edges of the greater secondary wing coverts; if present it can be found at the very forward wing edge. Lighter "tick marks" on the wing coverts tend strongly toward large and broad but vary greatly in size.

The growth rate of the hybrid's culmen and tarsus were slow in comparison to those of the local Black-crowned Night-Herons and the fledgling Yellow-crowned Night-Heron from El Cajon (Figures 4 and 5). Its tarsus length is within, although to the higher side, the range of local Black-crowned Night-Herons of similar age.

ACKNOWLEDGMENTS

We thank Tammy Conkle of Naval Base Coronado, Commander Navy Region Southwest, for base access, photo permits, and help, along with Timothy Burr, in the capture and banding of the young hybrid. Thanks also go to Dave Salerno and the Ladder Truck 1 team of the Naval Base Coronado Federal Fire Department, Southwest Region Fire and Emergency Service, for use of their equipment to gain access to the nest. Timothy Burr and Anthony Mercieca provided photos. Philip Unitt, Tammy

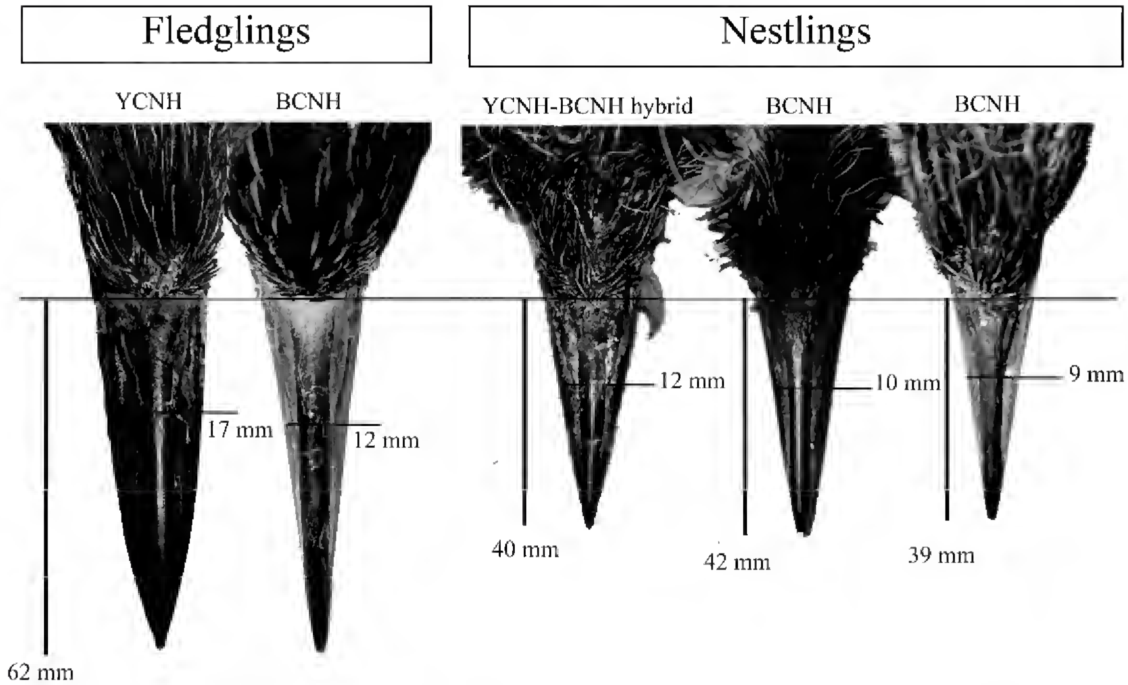


Figure 7. Dorsal view of the bills of Yellow-crowned and Black-crowned Night-Heron fledglings, defined as flying age but still with down on the crown (culmen of both 62 mm), in comparison to dorsal views of the young Yellow-crowned × Black-crowned Night-Heron (culmen 40 mm) and two nestling Black-crowned Night-Herons of similar ages. Left to right: Yellow-crowned Night Heron fledgling on 13 September 2005, Black-crowned Night-Heron fledgling on 3 June 2007, Yellow-crowned × Black-crowned Night-Heron on 21 June 2007, Black-crowned Night-Heron nestlings on 13 June 2008 and 3 July 2008.

Photos by Mary F. Platter-Rieger

Conkle, Timothy Burr, Anthony Mercieca, John Rieger, and Meryl Faulkner read drafts of the manuscript and provided comments for its improvement. We appreciate the excellent and helpful comments of our reviewers, John Kelly and Floyd Hayes.

LITERATURE CITED

Hamilton, R. A., Patten, M. A., and Erickson, R. A. 2007. Rare Birds of California. W. Field Ornithol., Camarillo, CA.

Heindel, M. T., and Patten, M. A. 1996. Eighteenth report of the California Bird Records Committee: 1992 records. W. Birds 27:1–29.

Iliff, M. J., McCaskie, G., and Heindel, M. T. 2007. The 31st report of the California Bird Records Committee: 2005 records. W. Birds 38:161–205.

McCarthy, E. M. 2006. Handbook of Avian Hybrids of the World. Oxford Univ. Press, New York.

McCaskie, R. G. 1964. Three southern herons in California. Condor 66:442–443.

McCaskie, R. G., and Banks, R. C. 1966. Supplemental list of birds of San Diego County, California. Trans. San Diego Soc. Nat. Hist. 14:157-168.

McCaskie, G., and Garrett, K. L. 2007. Southern California. N. Am. Birds 60:578–581.

McVaugh., W., Jr. 1972. The development of four North American herons. Living Bird 11:155–173.

McVaugh, W., Jr. 1975. The development of four North American herons, II. Living Bird 14:163–183.

Monson G., and Phillips, A. R. 1981. Annotated Checklist of the Birds of Arizona, 2nd ed. Univ. of Ariz. Press, Tucson.

Phillips, A., Marshall, J., and Monson, G. 1964. The Birds of Arizona. Univ. of Ariz. Press, Tucson.

Pyle, P., and McCaskie, G. 1992. Thirteenth report of the California Bird Records Committee. W. Birds 23:92–132.

Unitt, P. 1984. The birds of San Diego County. San Diego Soc. Nat. Hist. Memoir 13.

Watts, B. D. 1995. Yellow-crowned Night-Heron (*Nyctanassa violacea*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 161. Acad. Nat. Sci., Philadelphia.

Wilbur, S. R. 1987. Birds of Baja California. Univ. of Calif. Press, Berkeley.

THANKS TO *WESTERN BIRDS*' REVIEWERS AND ASSOCIATE EDITORS

Peer review is a critical step in the publication of a scientific journal. I thank the following people for their generosity in taking the time to provide this essential service sustaining the scientific quality of *Western Birds* for volume 39: David G. Ainley, Daniel A. Airola, Richard C. Banks, Brent D. Bibles, Mark J. Billings, G. Vernon Byrd, William S. Clark, Charles T. Collins, André Cyr, Robert H. Doster, Jon L. Dunn, Steven Emslie, Richard A. Erickson, Jules Evens, Kimball L. Garrett, Daniel D. Gibson, Robert E. Gill, Jr., Floyd Hayes, Steven C. Heinl, Steve N. G. Howell, David Irons, Alan Jenkins, Gregory S. Keller, Paul Kelly, Donald E. Kroodsma, David Krueper, Ron LeValley, D. Archibald McCallum, Chris McCreedy, Erica Nol, Lewis Oring, Pam Sinclair, David Shealer, Mark K. Sogge, Kyle Spragens, Andrew V. Suarez, Theodore G. Tobish, Jr., Eric L. Walters, Nils Warnock, Kenneth L. Weaver, Clayton M. White, Brian D. C. Williams, Jeffrey C. Williams, Sartor O. Williams III, and Jon Winter.

Many thanks too to our associate editors, Doug Faulkner, Daniel D. Gibson, Robert A. Hamilton, Ron LeValley, Tim Manolis, Kathy Molina, Michael A. Patten, and Dan Reinking, plus featured-photo editor Joseph Morlan, who serve also as reviewers themselves. Robb Hamilton and Michael Patten have had to step down this year, after providing us with many years of outstanding service. But we welcome Robert E. Gill and Thomas Gardali as new associate editors. The help of all these accomplished ornithologists as associate editors is vital to the quality of *Western Birds*.

Philip Unitt

OUTGOING PRESIDENT'S MESSAGE

I suppose that it is typical that when a person who has served in a leadership role steps down from that position, his or her thoughts move into a period of reflection. What was, what could have been, what worked well, what could have been done differently, and all of the other minutiae on which we second-guess ourselves. I find myself in this position as fall spreads across the diverse New Mexico landscape. I take several deep breaths and think about where we have been and what we've all accomplished as an organization over the past few years, as well as the excitement of the years to come under the leadership of Catherine Waters, our new president-elect.

I have served as a director for four years, as vice-president for three years, and now as president since 2006. When I first came on to the WFO board, I had wide eyes and more than a bit of a feeling of intimidation to serve with the luminaries on the board who sat around the table. Things settled down a bit, and as I got more involved and more seasoned, the camaraderie increased, and my respect for diverse opinions and recognition of different skill sets broadened my horizons. In these nine years, I have continually been amazed at the energy of the board as well as the skill with which its members handle the diverse challenges and issues that arise regularly within WFO. These folks are incredibly talented, and I have been quite fortunate to have been able to have them working with me (and for you) during this time. I am humbled and proud to have worked so closely with the directors, the officers, everyone associated with our outstanding publication *Western Birds* (a great number of very talented and dedicated people), and everyone else involved with making WFO such a first-class, field-oriented ornithological organization. When I think of these dedicated volunteers, the term "melting pot of talent" comes to mind, and that diversity and dynamism are, and will remain, a key to the vibrancy of the organization.

I am stepping down but not away, and will continue to be involved with the organization through participation in several committees and with the development of various projects. Thankfully this is the case, as a quick separation from my friends on the board seems too abrupt, and as the immediate past president I can stay involved and still remain in the thick of things with you, the membership. I sincerely thank the board of directors, the officers, and also you all, the *membership* of WFO, which is the heart and soul of this great organization. Remember that the key to continued success for WFO is the participation of our membership. Get involved in the organization and stay engaged. Give us your ideas, time, and expertise! As an organization, WFO will only be as strong as the talents and contributions of its collective membership. Thank you for your trust and support over the past few years. I look forward to seeing you all at future meetings, on various field trips and in the field throughout the western United States. Until then,

Very sincerely yours,
Dave Krueper
Corrales, New Mexico

WFO'S 33RD ANNUAL CONFERENCE: RETROSPECTIVE

A record-high 230 attendees flocked to San Mateo, California, from 9 to 12 October 2008 to partake in the 33rd annual conference of Western Field Ornithologists. Coordinated by WFO treasurer and membership secretary Robbie Fischer, the conference received rave reviews from its participants.

Organizational Business

Osvel Hinojosa-Huerta of Sonora and Dave Quady of California were elected to the board of directors. Osvel is WFO's first Mexican board member. Thomas Ryan and Jay Withgott were re-elected to second terms. Kimball Garrett and Robert Gill rotated off the board because of term limits and were thanked for their many years of dedicated service.

Catherine Waters was elected president of WFO. Judging by the energy that Cat has brought to our organization, we can look forward to an industrious next two years. Dan Gibson will act as WFO's vice-president, while Robbie Fischer continues as treasurer and membership secretary, and Jean Brandt continues as recording secretary. Dave Krueper stepped down after two fruitful and dynamic years as president. During this period of growth and change, WFO benefited immensely from Dave's steady hand and creative vision.

Scientific Program

This year's paper sessions, coordinated by Debbie Van Dooremolen, featured 30 presentations by field ornithologists from seven states and two nations. Abstracts of all papers are archived at www.westernfieldornithologists.org/conference.

The talks presented research on population trends, breeding biology, wintering raptors, ecological restoration, migration data from radiotelemetry, Mexican avifauna, and conservation issues in San Francisco Bay. Allen Fish of the Golden Gate Raptor Observatory shared the work of Ryan Jones, a promising young scientist who died tragically this year. Jones had begun creating a three-dimensional interactive online field guide featuring computer animations of birds. Concluding the sessions were reports from this year's field expedition to the Sierra de La Laguna Biosphere Reserve in Baja California Sur, run by WFO and the Sonoran Joint Venture. Carol Beardmore, Dave Krueper, Richard Erickson, and Nathan Pieplow focused on the many little-known subspecies endemic to this remote area.

All these talks proceeded despite a power outage that knocked out electricity in the hotel throughout the Saturday session. With the digital projector down, we were unable to project slides onto the screen, and viewers could only squint at a battery-powered laptop computer. But WFO rose to the challenge. With Debbie steering us through the crisis, the presenters soldiered on with their talks, board members worked behind the scenes with hotel staff, and the audience took it in stride, pulling out binoculars to view slides on the laptop's screen!

Keynote, Panels, and Book Event

Our keynote speaker, Carla Cicero of the Museum of Vertebrate Zoology, University of California, Berkeley, addressed the MVZ's efforts to resurvey sites first surveyed a century ago by pioneering biologist Joseph Grinnell. Dr. Cicero described how Berkeley biologists are comparing data from transects across California to data from Grinnell's original surveys and how this is revealing ways in which climate change is altering the distributions of birds and other animals.

This year Ed Harper moderated our photo-identification panel, presenting an impressive array of his own bird photos, while the panelists led us through identification tips. Sound-panel moderator Nathan Pieplow and panelists guided us through some challenging vocalizations, including a fascinating comparative tour of the six western species of thrasher. Panelists included Kimball Garrett, Steve Howell, Oscar Johnson, Jon Dunn, Ted Floyd, Alvaro Jaramillo, and Kristie Nelson.

A panel moderated by Dave Compton addressed bird-records committees. Representatives from California (Alvaro Jaramillo), Nevada (Martin Meyers), Alaska (Dan Gibson), and New Mexico (Dave Krueper) showed photos of recent rarities and discussed how these committees adapt to the unique conditions in each state.

In addition, WFO celebrated the publication of *California Bird Species of Special Concern*, a book edited by David Shuford and Thomas Gardali. Lyann Comrack and Kevin Hunting of the California Department of Fish and Game, which co-published the volume with WFO, helped us celebrate the occasion. Accompanying this event was a book-signing session involving numerous authors from WFO's membership, as well as a silent auction in the exhibitor area.

Workshops and Field Trips

Ed Pandolfino coordinated a series of innovative workshops. Caitlin Robinson led a group through San Francisco Bay's salt ponds, newly public lands now constituting one of the world's largest ecological restoration projects. John Muir Laws led workshops on techniques for sketching birds, while Steve Wood guided us in using GPS technology for field biology. Alvaro Jaramillo led a transect across the San Mateo Peninsula's ecological zones, and Brian Sullivan treated us to a hands-on exploration of the popular online sightings database eBird.

The field trips visited birding hotspots of the Bay Area: Golden Gate Park and the Presidio in San Francisco; Palo Alto Baylands, Coyote Point, Redwood Shores, and Hayward Shoreline along the bayshore; the coast from Point Reyes, Hawk Hill, and Rodeo Lagoon to Half Moon Bay; and upland sites at Jasper Ridge and San Bruno Mountain. In addition, Debra Shearwater led one of her acclaimed pelagic trips on Monterey Bay. Altogether, the trips recorded 215 species. See www.westernfieldornithologists.org/conference for a complete list, by trip.

Youth Scholarship Attendees

This year, WFO funded five promising young field ornithologists to attend our meeting: John Garrett of Pasadena, California; Neil Gilbert of Orange, California; Benjamin Knoot of San Carlos, California; Nora Papian of Costa Mesa, California; and Scott Wieman of Katonah, New York. John, Neil, Ben, Nora, and Scott livened things up, and we hope to see them at future conferences! Our thanks to Kate Grabenstein, coordinator of Sea and Sage Audubon's Junior Naturalist program, and Paul Wieman, principal and director of Rye Country Day School, New York, for accompanying them as chaperones. WFO aims to offer youth scholarships for future conferences and solicits sponsors; please donate at www.westernfieldornithologists.org/support.

WFO Gives Thanks

Many people contributed to the success of this conference, performing countless tasks behind the scenes. Bruce Webb ably coordinated the exhibitors. Jean Brandt handled on-the-ground logistics, with invaluable help from Larry Allen, Maureen O'Reilly, and Clarann Levakis. Volunteers from Sequoia Audubon included Sue Cossins, Sonny Mencher, Rita Jennings, and Leonie Batkin. Above all, our thanks go to conference organizer Robbie Fischer, who along with Joe Morlan was primarily responsible for the event's great success. We all enjoyed a wonderful mix of new faces and old friends, and we look forward to seeing everyone at **next year's conference in Boise, Idaho: 10–13 September 2009**.

Jay Withgott

WESTERN BIRDS, INDEX, VOLUME 39, 2008

Compiled by Philip Unitt

Accipiter cooperii, 202
  gentilis, 194
Acrocephalus schoenobaenus, 196
Aimophila cassinii, 142
  ruficeps, 43
Albatross, Black-footed, 54
  Laysan, 54–55
  Short-tailed, 124–125
  Shy, 191
Alberts, Allison C., *see* Sartain, A. R.
Amazilia violiceps, 136
Amphispiza belli, 43, 229
Anderson, Erik M., Cornelius Schlawe, and Stephen Lorenz, First record of the Lanceolated Warbler breeding in North America, 2–7
Anser fabalis, 190
  serrirostris, 190
Anthus spragueii, 140, 147
Aphriza virgata, 22, 23–26, 27, 27
Archilochus colubris, 136, 137
Ardea alba, 193–194
  cinerea, 193
Armer, Michael G., *see* Hull, A. C.
Asio otus, 198
Athene cunicularia, 43
Avocet, American, 153, 156–162

Ballance, Lisa T., *see* Pagen, R.
Bartramia longicauda, 131
Bean-Goose, Taiga, 190
  Tundra, 190
Billings, Mark J., *see* Iliff, M. J.
Blackbird, Rusty, 143, 144, 147
Black-Hawk, Common, 129, 145
Booby, Blue-footed, 127, 145
  Brown, 127–128, 145, 148, 149
  Masked, 127
  Red-footed, 128
Brachyramphus perdix, 135, 148
Brady, Ryan S., *see* Carlisle, J. D.
Branta canadensis, 190–191
  hutchinsii, 190–191
Bubo scandiacus, 135, 136
Bunting, Snow, 142–143, 147
  Yellow-browed, 196
Buteo jamaicensis, 223
  lagopus, 194
  nitidus, 202–208
  platypterus, 203
Buteogallus anthracinus, 129. 145
Calidris alba, 159
  alpina, 155, 156, 157, 159, 160, 194
  ferruginea, 133
  fuscicollis, 132–133
  mauri, 155–160, 162
  melanotos, 158
  minuta, 132
  minutilla, 155–160, 162
  ruficollis, 132
Callipepla californica, 83, 88, 90, 91
Calonectris leucomelas, 125, 127
Campylorhynchus brunneicapillus, 39–43, 83, 88, 90, 91
Caracara cheriway, 122, 130, 145, 148, 149
Caracara, Crested, 122, 130, 145, 148, 149
Carduelis flammea, 147
Carpodacus erythrinus, 122
Cartron, Jean-Luc E., David L. Hawksworth, and Deborah M. Finch, First records of the Brown Creeper breeding along the middle Rio Grande in central New Mexico, 176–178
Casazza, Michael L., Cory T. Overton, John Y. Takekawa, Tobias Rohmer, and Kenneth Navarre, Breeding behavior and dispersal of radio-marked California Clapper Rails, 101–106
Catharacta maccormicki, 54–55
  skua, 54
Certhia americana, 176–178
Chamaea fasciata, 83, 88, 90, 91
Charadrius alexandrinus, 155, 156, 159
  melodus, 131
  semipalmatus, 159
  vociferus, 156, 159
  wilsonia, 131
Chen canagica, 124
Chickadee, Black-capped, 177
  Boreal, 110
  Mountain, 177
Cistothorus platensis, 146–147
Clark, Kevin B., and Mark Dodero, Current status of the Cactus Wren in northwestern Baja California, 39–43

INDEX

Coley, Elaine, see Pieplow, N. D.
Collared-Dove, Eurasian, 197–198
Collins, Charles T., and Michael D. Taylor, Nest spacing in Elegant Terns: Hexagonal packing revisited, 62–68
Columbina talpacoti, 122, 135
Connors, Sarah, Shorebird use of muted tidal wetlands in a California estuary, 153–165
Contopus pertinax, 136–137
  sordidulus, 146
  virens, 137, 146
Corvus brachyrhynchos, 66
  corax, 223
Creeper, Brown, 176–178
Crow, American, 66
Curlew, Eskimo, 110
  Long-billed, 159
Cygnus buccinator, 124, 143, 148, 149
  columbianus, 124, 143
Cynanthus latirostris, 135–136

Davis, Kate, see Sumner, J.
DeCicco, Lucas H., and Nicholas Hajdukovich, First record of the Cassin's Vireo nesting in Alaska, 36–38
Dendrocygna autumnalis, 147
Dendroica dominica, 140–141
  graciae, 141–142
  pinus, 142
  striata, 110
DeSante, David F., see Siegel, R. B.
Dickcissel, 196
Dodero, Mark, see Clark, K. B.
Dove, Eurasian Collared, 197–198
  Ruddy Ground, 122, 135
Dowitcher sp., 156–160
Duck, Black-bellied Whistling, 147
Dunlin, 155, 156, 157, 159, 160, 194

Egret, Great, 193–194
  Intermediate, 194
  Little, 234
Egretta caerulea, 234
  garzetta, 234
  intermedia, 194
  tricolor, 128, 234
Eider, Common, 98
  Steller's, 143
Elanoides forficatus, 122
Emberiza chrysophrys, 196
Empidonax alnorum, 137, 141
  difficilis, 177
  flaviventris, 137, 146
  minimus, 213
  traillii, 8–21, 141
  virescens, 213
Erickson, Richard A., see Iliff, M. J.
Eudocimus albus, 128
Euphagus carolinus, 143, 144, 147

Falco amurensis, 223
  cuvieri, 223
  naumanni, 184
  peregrinus, 220–224
  sparverius, 184, 185, 223
  tinnunculus, 184–187
  vespertinus, 223
Falcon, Amur, 223
  Peregrine, 220–224
  Red-footed, 223
Ficedula albicilla, 121, 122, 139
  parva, 139
Finch, Deborah M., see Cartron, J.-L. E.
Fish, Allen M. see Hull, A. C.
Fix, David, Book review: Rare Birds of California, 44–47
Floyd, Ted, Book review: Birds of Western Colorado Plateau and Mesa Country, 181–183
Flycatcher, Acadian, 213
  Alder, 137, 141
  Fork-tailed, 137
  Great Crested, 137
  Least, 213
  Red-breasted, 139
  Scissor-tailed, 195
  Taiga, 121, 122, 139
  Willow, 8–21, 141
  Yellow-bellied, 137, 140, 146
Fregata ariel, 122
Fregetta grallaria, 225–227
  tropica, 226
Frigatebird, Lesser, 122

Gannet, Northern, 54
Garrett, Kimball L., see Heindel, M. T.
Gavia adamsii, 124, 125, 143
  arctica, 124
Geococcyx californianus, 83, 88, 90, 91
Gibson, Daniel D., Steven C. Heinl, and Theodore G. Tobish, Jr., Report of the Alaska checklist committee, 2003–2007, 189–201

Gill, Robert E. Jr., Caspian Terns nesting in Alaska: Prophecy, serendipity, and implications for regional climate-related change, 97–100
Gnatcatcher, California, 43, 83, 88, 90, 91
Godwit, Bar-tailed, 131–132
  Black-tailed, 146
  Hudsonian, 146
  Marbled, 159
Golden-Plover, American, 22, 27, 28, 130–131, 148, 149
  Pacific, 130, 131
Goose, Cackling, 190–191
  Canada, 190–191
  Emperor, 125
  Taiga Bean, 190
  Tundra Bean, 190
Goshawk, Northern, 194
Grackle, Common, 143, 147
Grosbeak, Yellow, 122
Ground-Dove, Ruddy, 122, 135
Gull, Black-billed, 33
  Black-headed, 33
  Black-tailed, 194
  Bonaparte's, 33
  California, 33, 54
  Glaucous, 97
  Glaucous-winged, 33–35, 95, 97
  Gray-hooded, 33
  Great Black-backed, 33. 122
  Heermann's, 66
  Herring, 33
  Iceland, 134, 146, 149
  Kelp, 33, 66
  Laughing, 33, 66
  Lesser Black-backed, 134, 146, 195
  Little, 134, 149
  Mew, 33
  Red-billed, 33
  Ring-billed, 33
  Ross's, 121, 122, 135
  Silver, 33, 66
  Slaty-backed, 122, 134–135
  Thayer's, 134, 146
  Western, 33, 54

Haematopus bachmani, 131
  palliatus, 131, 146
Hajdukovich, Nicholas, see DeCicco, L. H.
Hawk, Broad-winged, 203
  Common Black, 129, 145
  Cooper's, 202
  Gray, 202–208
  Harris's, 130
  Red-tailed, 223
  Rough-legged, 194
Hawk-Owl, Brown, 195
Hawksworth, David L., see Cartron, J.-L. E.
Heindel, Matthew T., and Kimball L. Garrett, The 32nd report of the California Bird Records Committee: 2006 records, 121–152
Heinl, Steven C., see Gibson, D. D.
Helmitheros vermivorus, 142
Heron, Black-crowned Night, 66, 234–242
  Gray, 193
  Little Blue, 234
  Rufous Night, 234
  Tricolored, 128, 234
  Yellow-crowned Night, 128, 234–242
Himantopus mexicanus, 153, 156–162
Hirundo rustica, 210
Hobby, African, 223
Hodder, Jan, Book review: Storm-Petrels of the Eastern Pacific Ocean: Species Assembly and Diversity along Marine Habitat Gradients, 179–180
Howe, William H., see Williams, S. O.
Howell, S. N. G., Book review: Bird Voices of Northern California: An Audio Guide to Bird Identification, 50–51; and Debra L. Shearwater, Attempted kleptoparasitism by a South Polar Skua on a Laysan Albatross, 54–55
Hoyer, Richard C., Book review: Birds of the Aleutian Islands, Alaska, 107–108
Hull, Angus C., Michael G. Armer, Bethany J. Sturgeon, and Allen M. Fish, First documentation of a Eurasian Kestrel in California, 184–187
Hummingbird, Broad-billed, 135–136
  Ruby-throated, 136, 137
  Violet-crowned, 136
Hydroprogne caspia, 63, 94–96, 97–100
Hylocichla mustelina, 139

Ibis, Glossy, 128, 145
  White, 128, 145

Icterus bullockii, 196–197
  pustulatus, 143
Ictinia mississippiensis, 129
Iliff, Marshall J., Richard A. Erickson, and Mark J. Billings, Reassessment of Tropical Parula subspecies in Baja California Sur, 69–81

Jobanek, George A., Book review: John Kirk Townsend: Collector of Audubon's Western Birds and Mammals, 180–181
Junco, Dark-eyed, 177
Junco hyemalis aikeni, 177

Kestrel, American, 184, 185, 223
  Eurasian, 184–187
  Lesser, 184
Killdeer, 156, 159
Kingbird, Thick-billed, 137
Kite, Mississippi, 129
  Swallow-tailed, 122
Krueper, David J., Outgoing president's message, 233; see also Williams, S. O.

Lang, Aaron, see Lohse, T. G.
Lanius excubitor, 195–196
Lapwing, Northern, 194
Larus argentatus, 33
  atricilla, 33, 66
  bulleri, 33
  californicus, 33, 54
  canus, 33
  cirrocephalus, 33
  crassirostris, 194
  delawarensis, 33
  dominicanus, 33, 66
  fuscus, 33, 134. 146, 195
  glaucescens, 33–35, 95
  glaucoides, 134, 146
  heermanni, 66
  marinus, 33, 122
  minutus, 134
  novaehollandiae, 33, 66
  occidentalis, 33, 54
  philadelphia, 33
  ridibundus, 33
  schistasagus, 122, 134–135
  scopulinus, 33
  thayeri, 134, 146
Leaf-Warbler, Pallas's, 196
Leukering, Tony, see Pieplow, N. D.
Limnodromus sp., 156–160
Limosa fedoa, 159
  haemastica, 146
  lapponica, 131–132
  limosa, 146
Lindstrand, Len III, Purple Martin distribution and nesting habitat at Shasta Lake, California, 166–170
Locustella lanceolata, 2–7
Lohse, Teal K., see Lohse, T. G.
Lohse, Trae W., see Lohse, T. G.
Lohse, Tyee G., Teal K. Lohse, Trae W. Lohse, and Aaron Lang, First documented breeding colony of Caspian Terns on the Copper River delta, Alaska, 94–96
Loon, Arctic, 124
  Yellow-billed, 124, 125, 143
Lorenz, Stephen, see Andersen, E. M.

Martin, Kathy, see Nouvet, S.
Martin, Purple, 166–170
Melanerpes formicivorus, 167
Melanitta fusca, 191
Mesophoyx intermedia, 194
Molloy, Marie, see Platter-Rieger, M. F.
Morus bassanus, 54
Motacilla alba, 147
  tschutschensis, 148
Murre, Thick-billed, 135
Murrelet, Long-billed, 135, 148
Myiarchus crinitus, 137

Navarre, Kenneth, see Casazza, M. L.
Nesofregetta fuliginosa, 226
Night-Heron, Black-crowned, 66, 234–242
  Rufous, 234
  Yellow-crowned, 128, 234–242
Ninox scutulata, 195
Nouvet, Sabine, Scott Wilson, and Kathy Martin, Breeding records of the Surfbird, Wandering Tattler, American Golden-Plover, and Upland Sandpiper in the southwest Yukon Territory, 22–30
Numenius americanus, 159
  borealis, 110
Nyctanassa violacea, 128, 234–242
Nycticorax caledonicus, 234
  nycticorax, 66, 234–242

Oceanodroma tristrami, 122
O'Donnell, Ryan P., Terrestrial foot-

paddling by a Glaucous-winged Gull, 33–35
Oporornis agilis, 142, 147, 149
philadelphia, 142
tolmiei, 142
Oriole, Bullock's, 196–197
Streak-backed, 143
Overton, Cory T., see Casazza, M. L.
Owl, Brown Hawk, 195
Burrowing, 43
Great Gray, 110–116
Long-eared, 198
Snowy, 135, 136
Oystercatcher, American, 131, 146
Black, 131

Pagen, Rich, Peter Pyle, and Lisa T. Ballance, A *Fregetta* storm-petrel off western Mexico, 225–227
Parabuteo unicinctus, 130, 148
Parula, Northern, 70
Tropical, 69–81
Parula americana, 70
pitiayumi, 69–81
Passerculus sandwichensis, 197
Patten, Michael A., Book review: Festchrift for Ned K. Johnson: Geographic variation and evolution in birds, 228–230
Pelecanus occidentalis, 192–193
Pelican, Brown, 192–193
Petrel, Black-bellied Storm, 226
Galapagos, 125, 126, 143, 148
Hawaiian, 125, 126, 143, 148
Mottled, 125
Stejneger's, 143, 145
Tristram's Storm, 122
White-bellied Storm, 225–227
White-throated Storm, 226
Pewee, Greater, 136–137
Eastern Wood, 137, 146
Western Wood, 146
Phalarope, Red-necked, 155, 156, 159
Phalaropus lobatus, 155, 156, 159
Pheucticus chrysopeplus, 122
Phoebastria albatrus, 124–125
immutabilis, 54–55
nigripes, 55
Phoebe, Black, 209–219
Eastern, 209–219
Say's, 210, 212, 217
Phylloscopus proregulus, 196
Picoides dorsalis, 171–175
pubescens, 171
tridactylus, 171
villosus, 171
Pieplow, Nathan, Book review: Birding Colorado: Over 180 Premier Birding Sites at 93 Locations, 108–109; and Tony Leukering and Elaine Coley, An apparent hybrid Black × Eastern Phoebe from Colorado, 209–219
Pipilo maculatus, 83, 88, 90, 91
Pipit, Sprague's, 140, 147
Piranga olivacea, 142, 149
Platalea ajaja, 129
Platter-Rieger, Mary F., Tiffany M. Shepherd, and Marie Molloy, Hybridization of a Yellow-crowned and Black-crowned Night-Heron in southern California, 234–242
Plectrophenax nivalis, 142–143, 147
Plegadis chihi, 145
falcinellus, 128, 145, 148
Plover, American Golden, 22, 27, 28, 130–131, 148, 149
Black-bellied, 131, 159
Pacific, 130, 131
Piping, 131
Snowy, 155, 156, 159
Wilson's, 131
Pluvialis dominica, 22, 27, 28, 130–131, 149
fulva, 130, 131
squatarola, 131, 159
Poecile atricapillus, 177
gambeli, 177
hudsonicus, 110
Polioptila californica, 43, 83, 88, 90, 91
Polysticta stelleri, 143
Pooecetes gramineus, 196
Progne subis, 166–170
Pterodroma inexpectata, 125
longirostris, 143, 145
phaeopygia, 125, 126, 143, 148
sandwichensis, 125, 126, 143, 148
Puffinus assimilis, 121, 122, 145
auricularis, 122
bulleri, 191
creatopus, 54
gravis, 126
newelli, 122
pacificus, 122, 126
puffinus, 126–127, 145, 149, 191–192, 193
tenuirostris, 191

Pyle, Peter, see Pagen, R.; Book review: Barefoot on Lava: The Journals and Correspondence of Naturalist R. C. L. Perkins in Hawai'i, 1892–1901, 230–232

Quady, David E., Great Gray Owls nesting in Fresno County, California, 110–116
Quail, California, 83, 88, 90, 91
Quiscalus quiscula, 143, 147

Rail, Clapper, 101–106
Rallus longirostris, 101–106
Raven, Common, 223
Recurvirostra americana, 153, 156–162
Redpoll, Common, 147
Redshank, Common, 161
Reed, J. Michael, Book review: Atlas of the Breeding Birds of Nevada, 52–53
Rhodostethia rosea, 122, 135
Roadrunner, Greater, 83, 88, 90, 91
Robin, Rufous-backed, 79, 139, 144
Rohmer, Tobias, see Casazza, M. L.
Rosefinch, Common, 122
Rynchops niger, 31–32, 63

Sanderling, 159
Sandpiper, Curlew, 133
  Least, 155–160, 162
  Pectoral, 158
  Upland, 131
  Western, 155–160, 162
  White-rumped, 132–133
  Wood, 122
Sapsucker, Red-breasted, 171
  Red-naped, 171
  Yellow-bellied, 173, 174
Sartain, Autumn R., and Allison C. Alberts, Habitat fragmentation and scrub-specialist birds: San Diego fragments revisited, 82–93
Sayornis nigricans, 209–219
  phoebe, 209–219
  saya, 210, 212, 217
Schlawe, Cornelius, see Andersen, E. M.
Scolopax minor, 122, 133
Scoter, White-winged, 191
Shearwater, Debra L., see Howell, S. N. G.
Shearwater, Buller's, 191
  Greater, 126
  Little, 121, 122, 145
  Manx, 126–127, 145, 149, 191–192, 193
  Newell's, 122
  Pink-footed, 54
  Short-tailed, 191
  Streaked, 125, 127
  Townsend's, 122
  Wedge-tailed, 122, 126
Shepherd, Tiffany M., see Platter-Rieger, M. F.
Shrike, Northern, 195–196
Siegel, Rodney B., Robert L. Wilkerson, and David F. DeSante, Extirpation of the Willow Flycatcher from Yosemite National Park, 8–21
Skimmer, Black, 31–32, 63
Skua, Great, 54
  South Polar, 54–55
Somateria mollissima, 98
Sparrow, Cassin's, 142
  Rufous-crowned, 43
  Sage, 43, 229
  Savannah, 197
  Vesper, 196
  White-crowned, 110
Sphyrapicus nuchalis, 171
  ruber, 171
  varius, 173, 174
Spiza americana, 196
Spoonbill, Roseate, 129
Stercorarius maccormicki, 54–55
  skua, 54
Sterna forsteri, 63
  paradisaea, 94
Sternula antillarum, 66
Stilt, Black-necked, 153, 156–162
Stint, Little, 132
  Red-necked, 132
Storm-Petrel, Black-bellied, 226
  Tristram's, 122
  White-bellied, 225–227
  White-throated, 227
Streptopelia decaocto, 197–198
Strix nebulosa, 110–116
Sturgeon, Bethany J., see Hull, A. C.
Sula dactylatra, 127
  leucogaster, 127–128, 145, 148, 149
  nebouxii, 127, 145
  sula, 128
Sumner, Jay, and Kate Davis, Observations of adult Peregrine Falcons capturing stoneflies, 220–224

Surfbird, 22, 23–26, 27, 27
Swallow, Barn, 210
Swan, Trumpeter, 124, 148, 149
  Tundra, 124

Takekawa, John Y., see Casazza, M. L.
Tanager, Scarlet, 142, 149
Tattler, Wandering, 22, 26–28, 29
Taylor, Michael D., see Collins, C. T.
Tern, Arctic, 94
  Caspian, 63, 94–96, 97–100
  Cayenne, 66
  Elegant, 62–68
  Forster's, 63
  Great Crested, 62, 63, 65, 66
  Least, 66
  Lesser Crested, 65, 66
  Royal, 62, 63, 64, 65, 66
  Sandwich, 65, 66
Thalassarche cauta, 191
Thalasseus bengalensis, 65, 66
  bergii, 62, 65, 66
  elegans, 62–68
  eurygnatha, 66
  maximus, 62, 63, 63, 64, 65, 66
  sandvicensis, 65, 66
Thrasher, California, 83, 88, 90, 91
  Curve-billed, 139
Thrush, Grayson's, 79
  Wood, 139
Thryomanes bewickii, 83, 88, 90, 91
Tobish, Theodore G., Jr., see Gibson, D. D.
Towhee, Spotted, 83, 88, 90, 91
Toxostoma redivivum, 83, 88, 90, 91
Tringa glareola, 122
  incana, 22, 26–28, 29
  melanoleuca, 159
  semipalmata, 159
  totanus, 161
Turdus rufopalliatus, 79, 139, 144
Tyrannus crassirostris, 137
  forficatus, 195
  savana, 137

Uria lomvia, 135

Vanellus vanellus, 194
Velarde, Enriqueta, Book Review: Gulls of the Americas, 47–50
Vermivora chrysoptera, 140, 147
  pinus, 140, 148
  ruficapilla, 196
Vireo, Blue-headed, 138, 146, 149
  Cassin's, 36–38, 146
  Plumbeous, 37, 177
  Yellow-green, 139
  Yellow-throated, 138
Vireo cassinii, 36–38, 146
  flavifrons, 138
  flavoviridis, 139
  plumbeus, 37, 177
  solitarius, 37, 138, 146, 149

Wagtail, Eastern Yellow, 148
  White, 139, 147
Warbler, Blackpoll, 110
  Blue-winged, 140, 148
  Connecticut, 142, 147, 148
  Golden-winged, 140, 147
  Grace's, 141–142
  Lanceolated, 2–7
  MacGillivray's, 142
  Mourning, 142
  Nashville, 196
  Pallas's Leaf, 196
  Pine, 142
  Sedge, 196
  Worm-eating, 142
  Yellow-throated, 140–141
Whistling-Duck, Black-bellied, 147
Wilkerson, Robert L., see Siegel, R. B.
Willet, 159
Williams, Sartor O. III, and William H. Howe, Black Skimmer occurrences in New Mexico, including a high elevation record, 31–32; and David J. Krueper, The changing status of the Gray Hawk in New Mexico and adjacent areas, 202–208
Wilson, Scott, see Nouvet, S.
Withgott, Jay, WFO's 33rd Annual Conference: Retrospective, 243–244
Woodcock, American, 122, 133
Woodpecker, Acorn, 167
  American Three-toed, 171–175
  Downy, 171
  European Three-toed, 171
  Hairy, 171
Wood-Pewee, Eastern, 137, 146
  Western, 146
Wren, Bewick's, 83, 88, 90, 91
  Cactus, 39–43, 83, 88, 90, 91
  Sedge, 146–147
Wrentit, 83, 88, 90, 91

Yellowlegs, Greater, 159

Zonotrichia leucophrys, 110