Western Specialty: Harlan’s Red-tailed Hawk

Photo by © Brian L. Sullivan of Carmel Valley, California: Harlan’s Red-tailed Hawk (Buteo jamaicensis harlani) Farmington Bay, Utah, 8 February 2008.

The Red-tailed Hawk’s plumage varies greatly across the species’ broad North American range, with most variation found in the West, and the Harlan’s the most divergent of the subspecies. Harlan’s breeds primarily in Alaska, but the light morph may breed as far south as the northern Great Plains (see Sullivan and Liguori 2010; North American Birds 64:368–372). Harlan’s is a long-distance migrant, wintering as far south as Texas and Louisiana, but primarily on the southern Great Plains; it also concentrates in small pockets farther west (e.g., Colorado, Utah, Idaho). On the Pacific coast it is sparse, reaching central California in very small numbers each winter. Classic field marks of Harlan’s evident in this photo include the blackish plumage with white breast streaks, mottled flight feathers, and white tail with smudgy dark tip.
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Front cover photo by © Martijn Verdoes/www.agami.nl of Menlo Park, California: Great-winged Petrel (Pterodroma macroptera), Monterey Bay, Santa Cruz County, California, 18 September 2010, representing the third North American record of this Southern Hemisphere species.

Back cover “Featured Photos” by © Dwight Porter of Portland, Oregon: apparent hybrid Townsend’s × Audubon’s Yellow-rumped Warbler (Dendroica townsendi × D. coronata auduboni), Malheur National Wildlife Refuge, Harney County, Oregon, 6 June 2010.

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 North America west of the 100th meridian, including Alaska and Hawaii, northwestern Mexico, and the northeastern Pacific Ocean.

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

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.
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

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

ABSTRACT: Published estimates of elevation ranges of Sierra Nevada birds are based primarily on anecdotal observations and professional opinion rather than systematic surveys. Continuing climate change is likely to alter the elevation ranges of Sierra bird species, and is perhaps already doing so, but published data are inadequate for describing elevation ranges rigorously. We present elevation ranges of 75 common Sierra Nevada birds based on data from Sequoia and Kings Canyon national parks in the southern Sierra Nevada and Yosemite National Park in the central Sierra Nevada. The mean elevation of a species was significantly higher at Sequoia/Kings Canyon than at Yosemite, by an average of 103 m. When we excluded species restricted to low-elevation habitats that are better represented at Sequoia/Kings Canyon than at Yosemite, and species that disperse upslope and we detected well above their likely breeding ranges, the mean difference between the two areas in the mean elevation of the remaining 59 species was even greater, 219 m. These descriptions of elevation ranges will facilitate future assessments of range shifts, and, more immediately, will provide managers of more intensively managed lands in the Sierra Nevada outside the parks with reference information from the relatively pristine parks.

Climate-change models suggest that by late in the 21st century, the average annual temperature in the Sierra Nevada of California could increase by as much as 3.8°C beyond that at the beginning of the century (Snyder et al. 2002). More precipitation will fall as rain rather than as snow, and the spring snowpack may decline by up to 30–70% (Hayhoe et al. 2004, Franco et al. 2006). Some scenarios suggest that the frequency of wildfire, which has already increased over the past several decades (Westerling 2006), may increase in northern California as much as 90% over that from 1961 to 1990 (Franco et al. 2006). Throughout the Sierra, the composition of plant communities is projected to change substantially, with losses of 60–80% of the subalpine and alpine ecosystems over the same time period (Hayhoe et
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

al. 2004, Franco et al. 2006). These interrelated phenomena—increased temperature, decreased snowpack, altered fire regimes, and shifting plant communities—will likely alter the ranges of Sierran bird species and restructure bird assemblages (Stralberg et al. 2009).

Around the world, the ranges of many species of plants and animals that are restricted to mountaintops have contracted severely, and the first populations and even species that have been extirpated because of climate change are of mountaintop biota (Parmesan 2006). Mountain-dwelling birds have already responded to climate change in many parts of the world by shifting their ranges upslope (Pounds et al. 1999, Root et al. 2003, 2005). In the Sierra Nevada, Tingley et al. (2009) found evidence that the distributions of many bird species have changed during the past century, with distributions generally tracking species’ preferred temperature and/or precipitation conditions over time.

The boundaries of many birds’ ranges are correlated with climatic factors (Bohning-Gaese and Lemoine 2004), particularly at the upper latitudinal and elevational boundaries, where cold temperatures may impose physiological constraints (Root 1988, Root and Schneider 1993, Newton 2003). At lower latitudinal and elevational limits biotic factors such as competition and predation may be more important than abiotic factors, but physiological constraints associated with heat stress or water limitation may play a role there as well (Bohning-Gaese and Lemoine 2004).

Occurrence data can yield important insights into historical change (Tingley and Beissinger 2009), and a clear snapshot of the current occurrence patterns and elevational distributions of Sierra birds will facilitate understanding how birds respond to current and future climate change in the Sierra Nevada. Existing characterizations of the elevation ranges of Sierra Nevada birds (Gaines 1992, Siegel and DeSante 1999, Stock and Espinoza 2009) are based primarily on anecdotal observations and professional opinion rather than systematic surveys. Here we describe the elevation ranges of common Sierra Nevada birds on the basis of recent data from national parks on the west slope of the southern and central Sierra Nevada. These descriptions will facilitate future assessments of shifts in these elevation ranges and, more immediately, will provide managers of more intensively managed Sierra lands outside the parks with better reference information from more pristine park ecosystems. Serving as “reference sites” for assessing the effects of regional land-use and land-cover changes is a major role of the national park system (Silsbee and Peterson 1991, Simons et al. 1999).

METHODS

Study Area

We studied the distribution of birds in Yosemite and Sequoia and Kings Canyon national parks. Sequoia and Kings Canyon are contiguous and managed as one unit by the National Park Service. Both areas lie on the western slope of the Sierra Nevada, and both contain large tracts of mid-elevation and subalpine conifer forest, as well as substantial acreage of chaparral, oak woodland, meadows, and alpine plant communities. Yosemite’s total area
is 308,074 ha, extending from the upper foothill zone to the Sierra crest. Sequoia/Kings Canyon is slightly larger, comprising 350,843 ha, and also extends from the foothills to the Sierra crest but differs from Yosemite in that its western boundary is considerably lower, and it includes more area dominated by foothill plant communities.

The Sierra Nevada extends over 600 km from north to south and so has a substantial north–south gradient in the elevational boundaries of various forest types. On the basis of data from Yosemite in the central Sierra and Sequoia/Kings Canyon in the southern Sierra, we were able to characterize birds’ elevation ranges in two distant areas spanning a large swath of this gradient.

Sample Design

As part of the National Park Service’s Inventory and Monitoring Program, we counted birds at points away from trails in Yosemite in 1999 and 2000 and in Sequoia/Kings Canyon in 2003 and 2004. We established count points in a geographic information system (GIS) by randomly selecting starting points for transects of point counts. We constrained the starting points to within 2 km of a trail or road, a buffer that encompassed 71% and 83% of the park’s total area at Sequoia/Kings Canyon and Yosemite, respectively. Observers hiked to starting points, where they counted birds, then randomly selected a cardinal or semi-cardinal direction of travel. The observer made up to 11 additional point counts (as many as he or she could complete within 3.5 hours of local sunrise), spaced 250 m apart, along the direction of travel, unless the route was blocked by an obstacle such as a cliff or uncrossable stream. When the observer encountered such an obstacle, he returned to the previous count point, then changed his direction of travel clockwise to the next cardinal or semi-cardinal direction that would permit continued travel.

Data Recording

Prior to the start of the field season each year, all observers participated in a rigorous 2-week training program in bird identification and point-count methods and were required to pass a certification exam that tested their ability to identify virtually all birds occurring regularly in the Sierra Nevada by sight and sound.

At Sequoia/Kings Canyon, our surveys took place from 14 May to 20 July, at Yosemite from 18 May to 28 July. Within each park, we surveyed lower-elevation transects first, moving to higher-elevation transects as the season progressed and most snow melted. Point counts lasted 5 min, during which observers recorded all birds detected by sight or sound at any distance. Distances to each bird were estimated and recorded but were not used in the analysis we report here.

Observers used hand-held Global Positioning System units and topographic maps to determine the coordinates of each count point. Later, using GIS, we extracted elevations of count points from digital elevation models of the parks (resolution 10 m). Coordinates described the points’ locations rather than the birds’ actual locations, likely introducing a small amount of
random error into our results, as individual birds could have been upslope or downslope from the point.

Data Analysis

We used data from 2599 point counts along 273 transects at Yosemite (Figure 1) and 1732 point counts along 224 transects at Sequoia/Kings Canyon (Figure 2). Elevation of count points ranged from 1146 to 3673 m (mean 2382 m) at Yosemite and from 314 to 3880 m (mean 2527 m) at Sequoia/Kings Canyon. Transects were well distributed across the area and elevation gradient within each park (Figures 1 and 2).

We categorized each species detected at least 20 times at either Yosemite or Sequoia/Kings Canyon, as either detected or not detected at each count point, then calculated summary statistics to describe the range of elevations at which the species was detected in each park: the mean elevation of detection and its standard deviation, as well as the upper and lower quantiles encompassing 95% of detections. Our threshold of 20 detections was somewhat arbitrary, but inspection of the data indicated that species with at least 20 detections had distributions that consistently spanned the range of elevations where our field experience in the parks suggests they occur. We estimated quantiles by interpolation with method 7 (the default method) of the quantile function in R (see Hyndman and Fan 1996 for details). We used two-tailed paired $t$ tests to compare the mean elevation of count points where a species was detected in the two parks, with mean elevations of detection of each species representing matched pairs.

We graphed the distribution of stations with and without detections of each species by means of bean plots, which we generated with the “beanplot” package (Kampstra 2008) in R version 2.9.2 (R Development Core Team 2009). Bean plots facilitate comparison of distributions of data points by displaying the data simultaneously with density traces of the data. Here we used asymmetrical bean plots to show elevational distributions of points with detections of each species alongside the distributions of points without detections at each park. Individual data points (i.e., count points) in the bean plots were represented by short line segments displayed as a one-dimensional scatterplot, or strip chart. Elevations represented by multiple points were displayed as longer lines representing the summed lengths of the line segments for the various count points. The sizes and shapes of density traces in bean plots reflect the distributions of data along the elevation gradients and a bandwidth (smoothing) parameter whose value we determined by the Shaether–Jones method (Shaether and Jones 1991). The width of the density trace (along the x axis) is selected by an algorithm that incorporates the sample size and the distribution of values to generate a shape that illustrates relative differences (within a species) in density of detections (or non-detections) at various elevations. The shape of the density trace reflects not the ratio between detections and non-detections at a given elevation but the proportion of detections or non-detections at that elevation with respect to the entire elevational distribution of points of detection or non-detection—the reason why the traces for detection and non-detection are not exactly complementary. See Venables and Ripley (2002:126–129) for additional detail on density traces and their implementation in R.
Figure 1. Locations of 273 point-count transects (black circles) surveyed at Yosemite National Park in 1999 and 2000. Each transect comprised 7–12 point counts spaced 250 m apart. Background shading indicates elevation, with lowest elevations in the park indicated with dark gray and highest elevations indicated with white. Inset map shows the location of Yosemite National Park within California.
Figure 2. Locations of 224 point-count transects (black circles) surveyed at Sequoia and Kings Canyon national parks in 2003–2004. Each transect comprised 7–12 point counts spaced 250 m apart. Background shading indicates elevation, with lowest elevations in the park indicated with dark gray and highest elevations indicated with white. Inset map shows the location of Sequoia and Kings Canyon national parks within California.
RESULTS

Seventy-five species met our threshold of at least 20 point counts with detections in either Yosemite or Sequoia/Kings Canyon. Table 1 presents the summary statistics describing the observed elevation ranges of each. Figure 3 contains the bean plots indicating actual detections and density traces of distributions of each species at each park.

The mean elevation of detection of the 74 species detected at both Yosemite and Sequoia/Kings Canyon (the California Quail was not detected during surveys at Yosemite) was significantly higher at Sequoia/Kings Canyon than at Yosemite (two-tailed paired t test; \( t = 2.38, \text{df} = 73, P = 0.02 \)), by an average of 103 m (standard error 43 m). This difference cannot be explained simply by the mountain peaks at Sequoia/Kings Canyon being higher than at Yosemite, as only a few species were detected at Sequoia/Kings Canyon at elevations higher than the highest survey stations at Yosemite, and those only in low numbers. However, two groups of species, described below, may present special cases that could confound the comparison of elevation ranges in the two parks.

Low-Elevation Species

Because Sequoia/Kings Canyon has much more extensive (and lower-elevation) foothill habitat than does Yosemite, several species (California Quail, Acorn Woodpecker, Ash-throated Flycatcher, Western Scrub-Jay, Oak Titmouse, Bewick’s Wren, Wrentit, and California Towhee; see Table 1 for scientific names) had mean elevations of detection at Sequoia/Kings Canyon that were lower than the lowest count point at Yosemite (Figure 3).

Upslope Migrants

In the Sierra Nevada, many species of birds disperse upslope in mid-to-late summer after nesting (Gaines 1992). We made no attempt to verify that the individual birds detected during point counts were local breeders. Most of our detections were of singing birds that, on the basis of the seasonal timing of our surveys, were likely still on breeding territories. However, individuals of some species can remain fairly conspicuous as they move upslope from their breeding territories and could have been counted by surveyors. Elevation profiles of eight species that are known (e.g., Gaines 1992) to move well upslope of the breeding range in the late summer after the breeding season—the Band-tailed Pigeon, Anna’s Hummingbird, House Wren, Orange-crowned Warbler, Nashville Warbler, Lazuli Bunting, Lesser Goldfinch, and Evening Grosbeak—show substantial numbers of detections hundreds of meters higher than previous descriptions of breeding ranges based on expert opinion and known nest records (e.g., Gaines 1992). These high-elevation detections likely represent post-breeding individuals that had already moved upslope beyond their usual breeding ranges. Another species, the Rufous Hummingbird, does not breed anywhere in the Sierra Nevada (Healy and Calder 2006) but is conspicuous during its southbound migration through the Sierra in mid and late summer. For each of these species our results should be interpreted broadly as describing ranges during early and mid-summer rather than strictly breeding ranges.
Table 1  Summary Statistics of Data on Elevational Distribution of the 75 Species\(^a\) Most Frequently Detected during Point Count surveys at Sequoia and Kings Canyon National Parks 2003–2004 and Yosemite National Park 1999–2000

<table>
<thead>
<tr>
<th>Species</th>
<th>Elevation (m) of count stations with detections</th>
<th>Sequoia/Kings Canyon</th>
<th>Yosemite</th>
<th>n(^b)</th>
<th>Mean (SD)</th>
<th>2.5–97.5% quantiles</th>
<th>n(^b)</th>
<th>Mean (SD)</th>
<th>2.5–97.5% quantiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sooty Grouse, <em>Dendragapus fuliginosus</em></td>
<td></td>
<td>55</td>
<td>2523 (451)</td>
<td>1795–3155</td>
<td>50</td>
<td>2404 (298)</td>
<td>1950–2925</td>
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<tr>
<td>Mountain Quail, <em>Oreortyx pictus</em></td>
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<td>194</td>
<td>2082 (627)</td>
<td>665–3084</td>
<td>421</td>
<td>2010 (390)</td>
<td>1308–2740</td>
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<td>California Quail, <em>Callipepla californica</em></td>
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<td>21</td>
<td>708 (117)</td>
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<td>Spotted Sandpiper, <em>Actitis macularia</em></td>
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<td>15</td>
<td>2932 (279)</td>
<td>2540–3389</td>
<td>35</td>
<td>2381 (629)</td>
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<td>Band-tailed Pigeon, <em>Patagioenas fasciata</em></td>
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<td>10</td>
<td>2331 (786)</td>
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<td>22</td>
<td>2039 (488)</td>
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<td>Anna’s Hummingbird, <em>Calypte anna</em></td>
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<td>67</td>
<td>1952 (543)</td>
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<td>Rufous Hummingbird, <em>Selasphorus rufus</em></td>
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<td>Acorn Woodpecker, <em>Melanerpes formicivorus</em></td>
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<td>Williamson’s Sapsucker, <em>Sphyrapicus thyroideus</em></td>
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<td>Red-breasted Sapsucker, <em>Sphyrapicus ruber</em></td>
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<td>Hairy Woodpecker, <em>Picoides villosus</em></td>
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<td>2502 (508)</td>
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<td>White-headed Woodpecker, <em>Picoides albolaratus</em></td>
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<td>Pileated Woodpecker, <em>Dryocopus pileatus</em></td>
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<td>2018 (375)</td>
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<td>1845 (272)</td>
<td>1369–2295</td>
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<td>Olive-sided Flycatcher, <em>Contopus cooperi</em></td>
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<td>175</td>
<td>2558 (317)</td>
<td>1895–3050</td>
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<td>2133 (350)</td>
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<td>Western Wood-Pewee, <em>Contopus sordidulus</em></td>
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<td>213</td>
<td>2155 (511)</td>
<td>719–2888</td>
<td>282</td>
<td>1957 (440)</td>
<td>1200–2680</td>
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<td>Oak Titmouse, <em>Baeolophus inornatus</em></td>
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<td>Mountain Bluebird, <em>Sialia currucoides</em></td>
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<td>2872</td>
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<td>2880</td>
<td>2340</td>
<td>3310</td>
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<td>Townsend’s Solitaire, <em>Myadestes townsendi</em></td>
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<td>2655</td>
<td>1427</td>
<td>3331</td>
<td>305</td>
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<td>Hermit Thrush, <em>Catharus guttatus</em></td>
<td>336</td>
<td>2942</td>
<td>1963</td>
<td>3449</td>
<td>289</td>
<td>2608</td>
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<td>American Robin, <em>Turds migratorius</em></td>
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<td>2382</td>
<td>1064</td>
<td>3348</td>
<td>440</td>
<td>2154</td>
<td>1200</td>
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<td>Wrentit, <em>Chamaea fasciata</em></td>
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<td>1085</td>
<td>621</td>
<td>2012</td>
<td>35</td>
<td>1488</td>
<td>1183</td>
<td>1850</td>
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<td>Orange-crowned Warbler, <em>Oreothlypis celata</em></td>
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<td>1150</td>
<td>646</td>
<td>3001</td>
<td>5</td>
<td>1992</td>
<td>1328</td>
<td>3018</td>
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<td>196</td>
<td>1962</td>
<td>963</td>
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<td>385</td>
<td>1872</td>
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<td>13</td>
<td>2073</td>
<td>1343</td>
<td>2843</td>
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<td>707</td>
<td>2678</td>
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<td>985</td>
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<td>1433</td>
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<td>Black-throated Gray Warbler, <em>Dendroica nigrescens</em></td>
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<td>1426</td>
<td>708</td>
<td>2201</td>
<td>119</td>
<td>1679</td>
<td>1223</td>
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<td>Hermit Warbler, <em>Dendroica occidentalis</em></td>
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<td>2186</td>
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<td>3062</td>
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<td>1881</td>
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<td>210</td>
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<td>1363</td>
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<td>759</td>
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<td>2213</td>
<td>1335</td>
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<td>344</td>
<td>1994</td>
<td>688</td>
<td>2760</td>
<td>446</td>
<td>1943</td>
<td>1200</td>
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<td>2608</td>
<td>1944</td>
<td>2992</td>
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<td>546</td>
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<td>California Towhee, <em>Melzone crissalis</em></td>
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<td>471</td>
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<td>955</td>
<td>3341</td>
<td>53</td>
<td>2191</td>
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<td>2407</td>
<td>1823</td>
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<td>440</td>
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<td>21</td>
<td>2246</td>
<td>1494</td>
<td>2918</td>
<td>44</td>
<td>1639</td>
<td>1184</td>
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<td>Lincoln’s Sparrow, <em>Melospiza lincolnii</em></td>
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<td>2564</td>
<td>1889</td>
<td>3101</td>
<td>46</td>
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<td>Yosemite</td>
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<td>Mean (SD)</td>
<td>2.5–97.5% quantiles</td>
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<td>White-crowned Sparrow, Zonotrichia leucophrys</td>
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<td>3203 (327)</td>
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<td>2993 (262)</td>
<td>2560–3377</td>
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<td>Dark-eyed Junco, Junco hyemalis</td>
<td>800</td>
<td>2620 (554)</td>
<td>1433–3427</td>
<td>1245</td>
<td>2457 (505)</td>
<td>1337–3230</td>
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<td>Black-headed Grosbeak, Pheucticus melanoleucus</td>
<td>149</td>
<td>1301 (452)</td>
<td>595–2032</td>
<td>226</td>
<td>1598 (302)</td>
<td>1200–2268</td>
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<td>Lazuli Bunting, Passerina amoena</td>
<td>58</td>
<td>1523 (705)</td>
<td>594–2787</td>
<td>75</td>
<td>1722 (401)</td>
<td>1195–2714</td>
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<td>Red-winged Blackbird, Agelaius phoeniceus</td>
<td>4</td>
<td>2685 (125)</td>
<td>2525–2800</td>
<td>40</td>
<td>1722 (635)</td>
<td>1200–2794</td>
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<td>Brewer’s Blackbird, Euphagus cyanoccephalus</td>
<td>13</td>
<td>2854 (454)</td>
<td>2385–3535</td>
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<td>1880 (772)</td>
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<td>Brown-headed Cowbird, Molothrus ater</td>
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<td>1143 (574)</td>
<td>531–2243</td>
<td>12</td>
<td>1536 (335)</td>
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<td>Gray-crowned Rosy-Finch, Leucosticte tephrocutis</td>
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<td>3134–3570</td>
<td>41</td>
<td>3228 (217)</td>
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<td>Pine Grosbeak, Pinicola enucleator</td>
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<td>2502–3388</td>
<td>26</td>
<td>2772 (354)</td>
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<td>Purple Finch, Carpodacus purpureus</td>
<td>52</td>
<td>1952 (693)</td>
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<td>63</td>
<td>1930 (510)</td>
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<td>Cassin’s Finch, Carpodacus cassinii</td>
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<td>479</td>
<td>2727 (393)</td>
<td>1606–3234</td>
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<td>Red Crossbill, Loxia curvirostra</td>
<td>34</td>
<td>2987 (470)</td>
<td>1488–3355</td>
<td>38</td>
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<td>Pine Siskin, Carduelis pinus</td>
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<td>2875 (380)</td>
<td>2014–3340</td>
<td>379</td>
<td>2715 (417)</td>
<td>1459–3255</td>
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<td>Lesser Goldfinch, Carduelis psaltria</td>
<td>38</td>
<td>1060 (674)</td>
<td>430–2747</td>
<td>31</td>
<td>1714 (475)</td>
<td>1202–2905</td>
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<td>Evening Grosbeak, Coccothraustes vespertinus</td>
<td>59</td>
<td>2392 (337)</td>
<td>1860–3145</td>
<td>50</td>
<td>2087 (445)</td>
<td>1213–2986</td>
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</table>

$^a$≥20 detections in at least one park.

$^b$Numbers of count points at which we detected the species in the park.
Data for three additional species—Hammond’s Flycatcher and Hermit Warbler at Sequoia/Kings Canyon and the Purple Finch at both parks—yielded upper quantiles that appear surprisingly higher than previous (albeit unsystematically determined) range descriptions (e.g., Gaines 1992) in one or both parks, even though the species are not generally thought of as upslope migrants (Figure 3). Misidentification of the species is a possibility for Hammond’s Flycatcher, which can easily be confused with the higher-ranging Dusky Flycatcher, but our results suggest the other two species, which we detected repeatedly well above their previously described elevation ranges, could have recently colonized these higher elevations.

Overall, individual species were detected at higher mean elevations at Sequoia/Kings Canyon than at Yosemite with remarkable consistency (Figure 4). However the low-elevation species and the upslope migrants listed above did not adhere well to this pattern (Figure 4). The low-elevation species and the upslope migrants excluded, the mean difference between the two parks in the mean elevation of detection of the remaining 59 species was even greater (two-tailed paired t test; \( t = 6.55, \text{df} = 58, P = 0.0001 \)), averaging 222 m (standard error 34 m) higher at Sequoia/Kings Canyon.

DISCUSSION

We report here the first quantitative data on elevation distributions of Sierra Nevada birds, on the basis of a rigorous sampling design involving extensive point counts in two protected areas that span a large latitudinal swath of the region. We show important differences in the elevational distributions of species between parks, and by extension, between the southern Sierra and the central Sierra. In part, these differences reflect differing elevation ranges of the parks; Sequoia/Kings Canyon boundaries extend farther downslope into foothill habitats than Yosemite boundaries, and the high mountain peaks at Sequoia/Kings Canyon are higher than the peaks at Yosemite. But even without these factors, most species occur at higher elevations at Sequoia/Kings Canyon than at Yosemite, presumably because of the tendency for similar plant communities to occur at higher elevations with decreasing latitude.

Our results may be useful for assessing bird assemblages in less pristine and more heavily managed habitats throughout the west slope of the central and southern Sierra. Bird survey results from such lands can be compared with assemblages from the appropriate elevation zones at Yosemite and Sequoia/Kings Canyon to identify species that may be missing, perhaps due to unfavorable management regimes.

Perhaps more importantly, these data will serve as an important baseline for documenting future changes in bird distributions and assemblages in the Sierra Nevada due to climate change. Many bird species’ distributions in the Sierra have already changed in historical times, apparently in response to climate change (Tingley et al. 2009), and larger changes are expected in the coming decades (Stralberg et al. 2009). Breadth of elevation range is a major predictor of birds’ risk of extinction in the context of climate change (Sekercioglu et al. 2008), and better data are needed on both elevation ranges and elevation-range shifts of birds worldwide (Sekercioglu et al. 2008).
Figure 3. Elevational distributions of count points where birds listed in Table 1 were detected and not detected during bird surveys at Sequoia/Kings Canyon and Yosemite national parks. White tick marks left of the vertical center line represent single points where the species was detected; longer tick marks represent multiple points at the same elevation. Shaded regions delineate density traces of the data. For each park,
sites of detection are shown to the left of vertical center lines and are described by dark gray density traces; density traces of sites of non-detection are shown to the right of vertical center lines in lighter gray. Black horizontal lines show mean elevations of count points where the species was detected (left of center) and not detected (right of center). The dashed line shows the mean elevation of all stations surveyed across both parks.
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

Figure 3 (Continued).
Figure 3 (Continued).
Figure 3 (Continued).
Figure 3 (Continued).
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

Figure 3 (Continued).
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

Figure 3 (Continued).
Figure 3 (Continued).
For the species we considered, our results can thus help assess the risk of climate-driven local extirpations within the Sierra Nevada’s national parks, as well as their broader regional and rangewide risks. The utility of these results from the southern and central Sierra Nevada could be further extended with similar data from the northern end of the Sierra Nevada.

ACKNOWLEDGMENTS

This project was made possible by funding from the National Park Service Sierra Nevada Network’s Inventory and Monitoring Program and Sequoia and Kings Canyon National Parks’ Natural Resources Condition Assessment. We thank numerous National Park Service personnel at Yosemite and Sequoia/Kings Canyon for assistance, support, and collegiality, particularly Jennifer Akin, Les Chow, Alice Chung-MacCoubrey, Angela Evenden, David Graber, Sylvia Haultain, Rachel Mazur, Joe Meyer, Linda Mutch, Sarah Stock, Charisse Sydiorisk, Steve Thompson, Jan van Wagendonk, and Harold Werner. We are especially grateful to our outstanding field crews: Clay Anderson, Katie Christie, Neil Clipperton, Stephanie Dolrenry, Diony Gamoso, Liz Guillorn, Dan Hernandez, Eric Hollingstad, Katie Hughes, Susan Jackson, Juliette Juillerat, Kristin Kusic, Chad Landrum, Jonah Liebes, Annie McMillan, Ron Melzer, Lauren Mork, Susan Mortenson, Kevin Pietrzak, Eric Sawtelle, Victor Sepulveda, and Arden Thomas. We thank David DeSante at The Institute for Bird Populations for developing the original study design at Yosemite and providing helpful comments on an earlier draft of the manuscript. Helpful comments were also provided by Tom Gardali, L. Jay Roberts, Morgan Tingley, and Philip Unitt. Finally, we thank Lauren and Bill Nickell for their warm hospitality at the Sunset Inn during our fieldwork at Yosemite. This study was completed by The Institute for Bird Populations’ Sierra Nevada Bird Observatory and is contribution 399 of The Institute for Bird Populations.
Figure 4. Mean elevation of detection of 74 bird species (all species in Table 2 except for the California Quail, which we did not detect at Yosemite) at Yosemite National Park plotted against the species’ mean elevation of detection at Sequoia and Kings Canyon national parks. Triangles, species restricted to lower-elevation habitats in the parks; squares, species that disperse upslope after breeding and for which we may have detected substantial numbers of individuals higher than their breeding range; diamonds, three species for which our results diverge from previous descriptions of the species’ elevational range (Hammond’s Flycatcher, Hermit Warbler, Purple Finch); circles, the remaining 56 species.

LITERATURE CITED

Healy, S., and Calder, W. A. 2006. Rufous Hummingbird (Selasphorus rufus), in
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE

Siegel, R. B., and D. F. DeSante. 1999. Draft avian conservation plan for the Sierra Nevada Bioregion: A report to California Partners in Flight. The Institute for Bird Populations, P. O. Box 1346, Point Reyes Station, CA 94956.
ELEVATION RANGES OF BIRDS ON THE SIERRA NEVADA’S WEST SLOPE


Accepted 17 December 2010

Hermit Thrush

Sketch by Irene Horiuchi
AN OUTPOST FOR DESERT BIRDS ON THE COASTAL SLOPE OF SOUTHERN CALIFORNIA

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ABSTRACT: Aguanga, California, is located on the Pacific slope of Riverside County and has no direct connection to the Colorado Desert. However, isolated populations of birds associated with the desert occur in the arid shrublands surrounding this small community. Even more unexpectedly, three of these desert species coexist with closely related counterparts on the coastal slope: Gambel’s Quail (Callipepla gambelii) occurs with the California Quail (C. californica), the Ladder-backed Woodpecker (Picoides scalaris) occurs with Nuttall’s Woodpecker (P. nuttallii), and the Black-tailed Gnatcatcher (Polioptila melanura) occurs with the California Gnatcatcher (P. californica). My observations near Aguanga document range extensions for a number of species in an area that has received little ornithological attention.

Aguanga is located in southwestern Riverside County 25 km east of Interstate 15 along Temecula Creek, which becomes the Santa Margarita River and drains into the Pacific Ocean. The nearest divide between the coastal and desert slopes lies 18 km to the east, and the nearest true desert habitat is 26 km to the east of Aguanga in Anza-Borrego Desert State Park (Figure 1). There are other locations where desert birds have established populations on the coastal slope, such as Miller Valley in San Diego County, San Jacinto and Cactus valleys in Riverside County, and Cuyama Valley in Santa Barbara and Ventura counties. None of these locations, however, hosts the variety of arid-land birds that I have noted at Aguanga.

Previous ornithological work near Aguanga has been limited. The U.S. Fish and Wildlife Service initiated the Oak Grove Breeding Bird Survey route, which passes through Aguanga. I recognized the uniqueness of this area while participating in three of these surveys, 1992–1994, with D. Rorick and G. Athens. The San Diego County Bird Atlas (Unitt 2004) covered areas near Aguanga immediately south of the Riverside County line from 1997 to 2002. I was the principal observer at these locations. The County of Riverside Transportation and Land Management Agency tracks locations of sensitive species through its Multiple Species Habitat Conservation Plan. These include several species characteristic of coastal sage scrub but no characteristically desert birds that occur on the coastal slope other than the Cactus Wren (Campylorhynchus brunneicapillus). The Santa Ana Watershed Association also maintains a data base of sensitive species in western Riverside County based on a variety of sources including environmental impact reports as well as incidental observations.

STUDY AREA AND METHODS

My observations were concentrated within 12 km of the Aguanga post office, located just west of the intersection of state highways 79 and 371 (Cahuilla Road). I focused my surveys on seven areas where native vegetation remains largely intact. Within each area, I established a survey route where I primarily, but not exclusively, observed the birdlife. Five of the study areas...
areas are located entirely in Riverside County, while two locations straddle the San Diego County line.

My surveys took place throughout the year from October 1995 to April 2010 with the greatest concentration of visits from 1995 to 1997 and from 2003 to 2005. I visited the survey routes and nearby areas a total of 126 days while logging more than 360 hours in the field. I completed 22 of these visits while participating in the San Diego County Bird Atlas project.

I determined breeding status by following criteria prescribed by Laughlin et al. (1982), while designations regarding abundance are derived from Garrett and Dunn (1981). I calculated the dominant vegetation along each

Vegetation

Moisture from the Pacific Ocean is largely blocked from reaching Aguanga by the Santa Ana Mountains to the west and the Palomar Range to the south. Detailed weather data from the area are lacking. However, the lack of rainfall is very evident in the plant life, which includes a large component of species shared with the Colorado Desert. Botanical surveys that I completed with the help of my colleagues S. Yamaguchi and J. Dillane revealed that 42% of the native species (81 of 195 species) that we identified are characteristic of the desert. These include such plants as honey mesquite (*Prosopis glandulosa*), desert-willow (*Chilopsis linearis*), jojoba (*Simmondsia chinensis*), beavertail cactus (*Opuntia basilaris*), Acton’s encelia (*Encelia actoni*), and desert needlegrass (*Achnatherum speciosum*). On the basis of our surveys, I also recognize three distinct types of vegetation: dry wash scrub, coastal sage scrub, and chaparral. These correspond most closely to the plant associations described by Sawyer and Keeler-Wolf (1995) as the scalebroom–four-wing saltbush association, the jojoba–cane cholla–California buckwheat association, and the redshank–chamise–cane cholla association, respectively.

Dry wash scrub occupies the smallest area. It is restricted to young alluvial floodplain deposits as found along sections of Tule and Temecula creeks, as well as smaller areas in Dameron Valley (Figures 2 and 3). At these locations 50–60% of native plant species are shared with the Colorado Desert. The tallest shrubs reach 3–6 m in height. Scalebroom (*Lepidospartum squamatum*) and four-wing saltbush (*Atriplex canescens*) are especially prominent. Waterjacket (*Lycium andersonii*) forms locally dense stands. All three of these species are widespread in the desert. The wash of Temecula Creek also supports desert-willow, while blue elderberry (*Sambucus mexicana*) is particularly abundant along washes in Dameron Valley. A few scattered trees typical of riparian woodland, such as western cottonwood (*Populus fremontii*) and red willow (*Salix laevigata*), also occur in the washes along Tule and Temecula creeks.

Coastal sage scrub (Figure 4) occurs in upland areas with a southern or western exposure. It is found on very old alluvial fan deposits and on soils underlain by sandstone. Coastal sage scrub also occupies low-lying locations immediately above seasonal water courses or washes where it grows on young alluvial floodplain deposits. The dominant sub-shrub is California buckwheat (*Eriogonum fasciculatum*), which reaches a height of about 1 m and also occurs in the desert. Jojoba and sugar bush (*Rhus ovata*) are the primary emergent shrubs, growing to 2.5 m in height. Cane cholla (*Cylindropuntia californica*) and Mojave yucca (*Yucca schidigera*) are frequently abundant. Additional succulent plants, such as a hedgehog cactus (*Echinocereus engelmannii*) and two species of prickly pear (*Opuntia basilaris* and *O. phaeacantha*), contribute to the desertlike appearance of locations dominated by coastal sage scrub. All plants listed above except the hedgehog cactus are also present in dry wash scrub.
Chaparral (Figure 5) grows in upland areas on soils similar to those occupied by coastal sage scrub. It dominates north- and east-facing slopes as well as expanses of eroded “badlands.” Redshank (*Adenostoma sparsifolium*) and chamise (*A. fasciculatum*) are the dominant shrubs. These plants are absent from the Colorado Desert. Redshank typically grows 3–4
m in height, while chamise reaches 2–3 m. Because of nutrient-poor soils in many areas, chamise is frequently stunted, growing to a height of only about 1 m. Cane cholla and Mojave yucca are components of some stands of chaparral, generally occurring as scattered individuals.

Figure 4. Coastal sage scrub east of Sage Road. Areas dominated by coastal sage scrub and dry wash scrub share many plants with the high desert including cholla, prickly pear, and yucca.

Photo by K. L. Weaver

Figure 5. Chaparral along High Point Road. Birds of desert origin avoid dense chaparral stands near Aguanga.

Photo by K. L. Weaver
Survey Routes

Each survey route that I established (Figure 6) largely traverses one major shrub association. All routes, however, include small areas of another association because of variations in slope, soil type, and fire history. Elevation ranges and lengths stated of survey routes are approximate. I defined the number of surveys per “season” by spring (March–May), summer (June–August), fall (September–November), and winter (December–February). It should be noted, though, that migration and breeding actually begin as early as February, and most winter residents are present October–April.

1. The 4.7-km Sage Road route is dominated by coastal sage scrub with some stands of redshank and stunted chamise. Elevation range: 640–820 m. Surveys: spring, 12; summer, 8; fall, 4; winter, 2.

2. The 1.8-km route below Cahuilla Road is dominated by coastal sage scrub, although scattered stands of redshank also occur. Elevation range: 760–920 m. Surveys: spring, 5; summer, 2; fall, 2; winter, 2.

3. The 4.0-km loop through Dry Ranch includes a portion of the usually dry streambed of Tule Creek. Dry wash scrub is dominant with a fairly dense but varied cover of saltbush, scalebroom, sugarbush, blue elderberry, and waterjacket. Coastal sage scrub occupies the margins of the wash immediately above the floodplain. Redshank-dominated chaparral borders the coastal sage scrub as elevation increases to the south of the wash. Elevation range: 730–830 m. Surveys: spring, 9; summer, 8; fall, 9; winter, 3.

4. The 2.0-km route through the hills above the Aguanga post office is dominated by coastal sage scrub with a few small stands of redshank. Several draws support thickets of honey mesquite. Elevation range: 640–690 m. Surveys: spring, 10; summer, 4; fall, 6; winter, 5.

5. The 3.5-km loop through Aguanga Valley includes portions of the usually dry streambed of Temecula Creek. Dry wash scrub is dominant. Small areas of coastal sage scrub occupy terrain immediately above the creek bed, but development of a large campground limits its extent. Elevation range: 590–660 m. Surveys: spring, 4; summer, 3; fall, 8; winter, 5.

6. The 3.1-km route along High Point Road (Forest Service Road 8S05) primarily features chaparral. Both redshank and chamise occur in extensive stands. Coastal sage scrub occupies the lower elevations. Burned areas at higher elevations feature California buckwheat and deerweed (Lotus scoparius). Elevation range: 660–1000 m. Surveys: spring, 9; summer, 2; fall, 2; winter, 5.

7. The 2.0-km Dameron Valley route is dominated by coastal sage scrub. Blue elderberry lines a series of interconnected sandy draws that contain elements of dry wash scrub, such as saltbush and scalebroom. Elevation range: 830–920 m. Surveys: spring, 12; summer, 12; fall, 4; winter, 9.

RESULTS

Overview

I recorded 119 species of birds in the shrublands near Aguanga (see Appendix). Over 60 species occurred annually. I observed fledglings of all 37 species listed as confirmed, while nine additional species met the criteria for probable breeding (see Appendix).
Species diversity is greatest in the spring when winter and summer residents overlap in occurrence and transients are passing through. The number of species recorded per month ranged from a high of 71 in May to a low of 45 in January, July, and September. Transients are relatively sparse with observations largely confined to dry washes or patches of mesquite where cover is fairly dense. For birds, the major event of the year, in June and July, is the ripening of elderberries, which attracts a diversity of local birds as well as flocks of the mountain-dwelling Band-tailed Pigeon (*Patagioenas fasciata*). Many of the maximum counts of species I recorded are from Dameron Valley, where elderberries are particularly abundant.
Many of the birds recorded in shrublands near Aguanga are typical of chaparral and coastal sage scrub, as would be expected on a geographical basis. Seventeen of the recorded species (including certain subspecies) were listed by Miller (1951) as having a primary preference for “hard” or “soft” chaparral, the latter currently referred to as coastal sage scrub. These include such species as Wrentit (Chamaea fasciata), California Thrasher (Toxostoma redivivum), and Spotted Towhee (Pipilo maculatus).

The ubiquitous House Finch (Carpodacus mexicanus) aside, another 17 species that Miller listed as preferring desert lands occur at Aguanga. Eight of these, such as Costa’s Hummingbird (Calypte costae), Northern Mockingbird (Mimus polyglottos), and Phainopepla (Phainopepla nitens), are also widespread west of the desert.

Nine species, though, are of local or unlikely occurrence on the coastal slope, according to their distribution as outlined by Grinnell and Miller (1944), Garrett and Dunn (1981), and Unitt (2004). D. Rorick, G. Athens, and I noted the Cactus Wren, Black-throated Sparrow (Amphispiza bilineata), and Scott’s Oriole (Icterus parisorum) during the Breeding Bird Surveys. I observed six additional desert species during my individual surveys. I confirmed breeding by the three species listed above plus the Ladder-backed Woodpecker (Picoides scalaris) and Black-tailed Gnatcatcher (Polioptila melanura). I noted that two more species, the Verdin (Auriparus flaviceps) and Brewer’s Sparrow (Spizella breweri), regularly winter in the area and may possibly breed. These observations document range extensions for these seven species beyond their previously known areas of occurrence. The status of two species, Harris’s Hawk (Parabuteo unicinctus) and Gambel’s Quail, remains to be determined. I discuss these nine species in greater detail below.

Drastic swings in populations are characteristic of the birds of the Aguanga area. Breeding success appears to be greater in years of abundant rainfall. Even arid-adapted species are affected by long-term drought. In 1996 I recorded eleven singing Cactus Wrens along the Cahuilla Road survey route. In 2003, following four years with very little precipitation, I found only one. In the exceptionally dry year of 2002, I observed no nests or fledglings of any species near Sage Road, the only site that I monitored that breeding season. The same year, in San Diego County, Bolger et al. (2005) also found nearly complete nesting failure of four coastal sage scrub species. The correlation between rainfall, abundance of species, and breeding success deserves further study.

Six species have appeared near Aguanga since 2004 with the establishment of recreational campgrounds: the Rock Pigeon (Columba livia), American Crow (Corvus brachyrhynchos), American Robin (Turdus migratorius), Brewer’s Blackbird (Euphagus cyanocephalus), Great-tailed Grackle (Quiscalus mexicanus), and House Sparrow (Passer domesticus). Although these species are largely attracted to the lawns and man-made ponds of the campgrounds, they occasionally forage in shrublands along the wash of Temecula Creek in Aguanga Valley or nearby in the hills northwest of the intersection of State Highway 79 and Cahuilla Road.
Desert Birds

Harris’s Hawk (*Parabuteo unicinctus*). I first recorded this desert raptor just north of the Riverside–San Diego County line in Dameron Valley on 27 March 1997. J. Wells and S. Quartieri noted an individual “near Dripping Springs and Oak Grove,” in both Riverside and San Diego counties, from 20 September 2006 to 14 February 2007 (Heindel and Garrett 2008). F. Baker (fide D. Aguillard) and I also noted presumably the same individual at several locations along State Highway 79 in 2006 and 2008, most frequently west of the intersection of Highway 79 and Cahuilla Road (Appendix). Multiple reports of a Harris’ Hawk, presumably the same individual, from Aguanga southeast to Warner Springs as recently as 19 February 2010, have been accepted as representing a natural occurrence by the California Bird Records Committee. A pair of Harris’ Hawks nested successfully west of the desert at McCain Valley in San Diego County from 2000 to 2002 (Unitt 2004). This species is popular with falconers, so many recent sightings in southern California are believed by the California Bird Records Committee to be of escapees.

Cactus Wren (*Campylorhynchus bruneicapillus*). I recorded this species on all seven survey routes as well as at other locations near State Highway 79, Cahuilla Road, and Wilson Valley Road. Although it is widespread, it adheres strictly to coastal sage scrub and dry wash scrub where an abundance of cane cholla provides nesting sites. In the field, the birds appear identical to the desert-dwelling Cactus Wren (*C. b. anthonyi*) rather than the geographically closer populations of *C. b. sandiegensis* inhabiting coastal San Diego County. The Aguanga population features a more distinct chest patch and smaller abdominal spotting than typical of *C. b. sandiegensis* (Rea and Weaver 1990). Both *C. b. anthonyi* and the Cactus Wrens of Aguanga sing a territorial song faster-paced than that of *C. b. sandiegensis*. Areas that have supported eight or more pairs include Sage Road, Cahuilla Road, Dry Ranch, and Dameron Valley. Most Cactus Wrens listed in the data base of the Santa Ana Watershed Association from the Aguanga area were recorded from 2005 to 2008 in the vicinity of Wilson Valley Road (M. Aimar pers. comm.). Although this species occurs very locally on the coastal slope in six southwestern California counties, I believe that its declining populations warrant highlighting it here.

Verdin (*Auriparus flaviceps*). I first recorded this species in the fall of 2003, when it appeared in the hills north of the Aguanga post office, in Aguanga Valley, and at Dry Ranch. It has since reappeared annually 2004–2009 at Dry Ranch in the fall, except I have no records for fall 2007 when I did not visit the area. My observations are most likely due to increased fall–winter coverage of these areas rather than a recent invasion. The Verdin is typically considered to be sedentary, but the fall–winter records of this species in the Tijuana River valley in coastal San Diego County from 1962 to 1975 (Unitt 2004) also indicate regular movement away from breeding sites at times. I noted individuals near the Aguanga post office and at Dry Ranch constructing this species’ characteristic oval-shaped nests in mesquite and waterjacket and found two completed nests at the latter site. The Verdin, though, constructs nests for roosting as well as raising young. To date I have observed no definite indication of breeding and have no records of its presence June–August. Breeding, though, may be indicated by the observations of a single individual at Dry Ranch on 1 May 2004 and two recent nests at the same location on 16 and 24 June 2004.

Brewer’s Sparrow (*Spizella breweri*). This species, which breeds primarily in the Mojave and Great Basin deserts, winters commonly in the Colorado Desert of southern California (Garrett and Dunn 1981), though numbers in the Anza-Borrego Desert vary greatly with rainfall (Unitt 2004). Brewer’s Sparrow also winters near Aguanga, where I recorded it on all seven survey routes within coastal sage scrub and dry wash scrub. It is especially abundant most years at the Sage Road and Dameron Valley sites,
with flocks totaling 50 or more individuals at each. I observed no evidence of breeding near Aguanga, although several late dates of occurrence for wintering birds suggest the possibility: 11 individuals near Sage Road on 17 April 2010, 14 individuals near Cahuilla Road on 20 April 1996, 36 individuals near Sage Road on 24 April 2010, and a single individual north of the Aguanga post office on 1 May 2004. In 2001 Brewer’s Sparrow bred in San Diego County on the desert slope in Montezuma Valley and McCain Valley (Unitt 2004). R. McKernan confirmed nesting on the coastal slope near Winchester, Riverside County, 36 km northwest of Aguanga, in May 1992 (McCaskie 1992). L. Hargrove and P. Unitt noted two individuals occupying territories on the coastal slope in Garner Valley, Riverside County, approximately 29 km north of Aguanga, in May 2010 (P. Unitt pers. comm.). Brewer’s Sparrow bred formerly (1919 and before) on the coastal slope in San Fernando Valley in Los Angeles County, in Simi Valley in Ventura County, and in San Bernardino Valley in San Bernardino County (Willett 1933).

Black-throated Sparrow (*Amphispiza bilineata*). I observed this species on all survey routes. S. J. Montgomery (McCaskie 1994a) noted three territorial birds at Aguanga in May 1994 but did not confirm breeding. The Black-throated Sparrow is actually a common breeder in the area and is particularly numerous in stands of coastal sage scrub at Cahuilla and Sage roads, where 10 or more pairs typically occur at each site. Its distribution overlaps with the Sage Sparrow (*Amphispiza belli*) in coastal sage scrub, but the Sage Sparrow does not regularly occur in dry wash scrub as the Black-throated does. The Black-throated Sparrow has nested at other sites west of the desert including Cuyama Valley (Garrett and Dunn 1981).

Scott’s Oriole (*Icterus parisorum*). In the Aguanga area, this species is closely associated with coastal sage scrub and dry wash scrub with an abundance of Mojave yucca, in which it nests. I recorded the oriole at all sites except Aguanga Valley and the hills above the Aguanga post office. It is most numerous at Dry Ranch and in Dameron Valley, both of which support up to a half dozen pairs each breeding season. It has also nested on the coastal slope in the Cuyama Valley, near Irvine in Orange County (McCaskie and Garrett 2006), and at a few scattered locations in arid chaparral in San Diego County such as Miller Valley (Garrett and Dunn 1981, Unitt 2004). This bird winters in small numbers in San Diego County (Unitt 2004, pers. obs.). I have no winter records from the study area, but R. Smith (McCaskie 1994b) observed this oriole to the west of Aguanga in Temecula on 12 December 1993.

Occurrence of Counterpart Species

Gambel’s Quail (*Callipepla gambelii*) and California Quail (*C. californica*). I readily identified nearly all quail observed closely as California Quail, one of the most abundant birds of the shrublands. However, I noted three male Gambel’s Quail near High Point Road on 3 February 2000 and a single male near Sage Road on 7 June 2003. On both occasions the birds were associating with California Quail. Coastal sage scrub dominates both locations. I am unaware that Gambel’s Quail has been previously recorded on the coastal slope. As with the Harris’s Hawk, there is a possibility that my observations are based on escapees, although Gambel’s Quail could be easily overlooked in the large quail flocks that inhabit the Aguanga area.

Ladder-backed Woodpecker (*Picoides scalaris*) and Nuttall’s Woodpecker (*P. nuttallii*). The Ladder-backed Woodpecker is widely distributed near Aguanga in coastal sage scrub and dry wash scrub. Dry Ranch, Sage Road, and Dameron Valley typically support three or four pairs each, while one or two pairs occur at the other four sites surveyed for this study. Unitt (2004) considered the availability of agaves and yuccas to be the key factor in the occurrence of this bird in the deserts of San Diego County. Its nesting requirements are more flexible near Aguanga, where I
observed its nest cavities in mesquite, elderberry, scrub oak (*Quercus* sp.), a dead willow, and telephone poles. Nuttall’s Woodpecker typically inhabits oak and riparian groves. However, I observed it on a number of occasions within shrublands, often at a fair distance from any woodland habitat. Most individuals are readily identified as to species. However, I noted two individuals with the width of facial markings and the extent of black on the back intermediate, which may indicate hybridization. There are records of the Ladder-backed Woodpecker from other locations on the coastal slope. Grinnell and Swarth (1913) obtained specimens of the Ladder-backed Woodpecker from Valle Vista in Riverside County in early September 1908. House et al. (2010) reported several occurrences, including an observation of nesting, near Redlands and Devore in San Bernardino County. The species was also recorded nesting in Miller Valley on the coastal slope of southeastern San Diego County on 22 June 2000 (L. Hargrove Unitt 2004).

Black-tailed Gnatcatcher (*Polioptila melanura*) and California Gnatcatcher (*P. californica*). These counterpart species reach their western and eastern range limits, respectively, in Riverside County near Aguanga. I previously reported the occurrence of these two species at Aguanga (Weaver 1998), although I have now found both species at additional locations. Both species inhabit dry wash scrub and coastal sage scrub. They occur together at four locations within the study area: Sage Road, Cahuilla Road, Dry Ranch, and Aguanga Hills. I recorded the Black-tailed Gnatcatcher in Dameron Valley also. The most frequent sightings of the Black-tailed Gnatcatcher are from Dry Ranch. I have never observed more than a single family group of this species during a survey. The California Gnatcatcher is most numerous at the Sage Road site, where I have recorded as many as eight pairs. In January 2006, I noted these two species plus the Blue-gray Gnatcatcher (*Polioptila caerulea*) in the same feeding flock at Dry Ranch. The San Diego County Bird Atlas project (Unitt 2004) produced two records of the Black-tailed Gnatcatcher during the breeding season west of the desert near Warner Springs.

**DISCUSSION**

The wide distribution of arid-land birds throughout the Aguanga area is evidence of long-term occupancy by desert life. This is reinforced by the presence of more than 80 species of plants shared with the desert as well as populations of the White-tailed Antelope Ground Squirrel (*Ammospermophilus leucurus*), Long-nosed Leopard Lizard (*Gambelia wislizenii*), and Zebra-tailed Lizard (*Callisaurus draconoides*), all typical sedentary desert dwellers (C. Mahrdt pers. comm., pers. obs.).

The possible origin of Aguanga’s contingent of desert-adapted species deserves consideration. The closest true desert lands lie approximately 26 km east of Dameron Valley in Alder and Coyote canyons in Anza Borrego State Park and have six of the desert species that occur at Aguanga: the Ladder-backed Woodpecker, Verdin, Cactus Wren, Black-tailed Gnatcatcher, Brewer’s Sparrow, and Black-throated Sparrow (Unitt 2004). Weathers (1983) and Grinnell and Miller (1944) recorded small numbers of five desert species (Gambel’s Quail, Ladder-backed Woodpecker, Brewer’s Sparrow, Black-throated Sparrow, and Scott’s Oriole) ranging into the Pinyon Flats area southwest of Palm Desert, 38 km northeast of the closest of the Aguanga study areas. These locations may serve as possible dispersal routes. However, they are separated from Aguanga by grassland and extensive stands of chaparral. San Diego County Atlas observers thoroughly covered
Pacific slope locations between Aguanga and the desert country directly to the east. They only reported a few sightings of two desert species, the Black-tailed Gnatcatcher and Scott’s Oriole, from this portion of the county (Unitt 2004). My observations also reflect a lack of any desert species near the town of Anza, which is located midway between Pinyon Flats and Aguanga as well as midway between the Coyote Canyon section of Anza-Borrego Desert State Park and Aguanga. To judge by the paucity of records of desert birds from intervening areas, it appears that chaparral and grassland may serve as partial barriers to the spread of arid-adapted species.

Another less obvious route actually shows more potential. A band of semi-desert vegetation, now fragmented in occurrence and degraded in composition, extends around the northern and western bases of Mount San Jacinto. This band connects, more or less, with the true desert associations of the Coachella Valley. Chamise generally dominates ridges, while California buckwheat dominates lower slopes between Aguanga and the San Jacinto Valley located west of Mount San Jacinto. Emergent shrubs and succulents are generally sparse in this region, indicating elimination by fire and grazing. However, there have been observations of some of the desert birds that occur near Aguanga in remnant patches of this vegetation. Archives of the San Jacinto Lake Christmas bird count (http://www.audubon.org/bird/cbc/hr/index.html) conducted in the San Jacinto Valley of Riverside County over the past 28 years include observations of several species noted near Aguanga that are characteristic of the desert. These include fairly frequent sightings of the Black-throated Sparrow (11 records), Cactus Wren (10 records), and Brewer’s Sparrow (10 records), while Scott’s Oriole (2 records) and Verdin (1 record) have also been noted. The center of this count circle is located 43 km north of the nearest of my survey sites at Sage Road. Grinnell and Swarth (1913) reported the Ladder-backed Woodpecker, Black-throated Sparrow, and Brewer’s Sparrow at a now-developed collecting site at Valle Vista 26 km north of the Sage Road site. In September 2008 I noted the Black-throated Sparrow and Brewer’s Sparrow in Cactus Valley, only 17 km distant. While conducting breeding bird surveys, G. Athens (pers. comm.) observed Scott’s Oriole near Red Mountain Road 11 km to the north of the Sage Road site. The Ladder-backed Woodpecker and Black-throated Sparrow were also recorded by participants in the San Diego County Bird Atlas project at Oak Grove Valley, 3 km to the east of Dameron Valley (Unitt 2004). Prior to the initiation of the atlas surveys, I encouraged participants to watch for these birds, as the plant life is an eastern extension of the vegetation found near Aguanga.

These records suggest that in the past the Aguanga area functioned as the southern terminus of a region once hosting a wider variety of arid-land birds. The continuing presence of desert birds at Aguanga is likely due to the relatively intact condition of the native vegetation compared with the largely disturbed lands to the north.

The future of this area, most of which is in private ownership, is very much in doubt.

Shrublands were once nearly continuous in the area, separated by narrow bands of riparian vegetation along portions of Tule, Temecula, Cottonwood, and Wilson creeks. Present and future threats center on the rapidly increasing human population. Since the 1980s, development for housing and agricul-
ture has greatly fragmented the native vegetation (D. Rorick pers. comm., G. Athens pers. comm.). Typically, one of the first acts of new residents is to clear most or all natural vegetation from their property, as I have personally observed. Such rapid habitat fragmentation creates an uncertain future for shrub-preferring birds, as many species of both coastal and desert regions require substantial tracts of native vegetation (Soulé et al. 1988, Bolger et al. 1997, Latta et al. 1999). The Ladder-backed Woodpecker, Cactus Wren, Verdin, Black-tailed Gnatcatcher, and Black-throated Sparrow are among the desert species that are likely to be affected. Additional threats, because of their potential as fire hazards, include target shooting and off-road vehicle driving. In my experience, both are prevalent activities among the human population of the area. Some areas, most notably along Wilson Valley Road and Highway 79, have burned several times since I initiated this study.

Coastal sage scrub along portions of Happy Valley Road east of Cahuilla Road as well as west of Cahuilla Road and south of Wilson Valley Road is currently protected as conservation land by the county of Riverside (www.wrc-rca.org/RCA_Prev_Acquisitions.html). The Bureau of Land Management (BLM) protects coastal sage scrub in isolated parcels located east and west of Sage Road, along the lower section of High Point Road, north of the Aguanga post office, and east of Cahuilla Road. The BLM lands, however, have been slated for sale in the past, and their future is uncertain. The Center for Natural Lands Management, a nongovernmental conservation organization, also protects stands of coastal sage scrub in two mitigation banks north and south of Wilson Valley Road (www.cnlm.org/cms/index.php?option=com_content&task=view&id=19&Itemid=175). A small area of dry wash scrub is protected by the County of Riverside along Temecula Creek. Otherwise this plant association is subject to future destruction. From the current rate of development, I believe that natural habitats outside of the locations mentioned above are facing elimination within the coming decade, if not sooner. Key locations that urgently need protection include the Dry Ranch area with its extensive dry wash scrub, the elderberry-lined draws of Dameron Valley, the eastern and central sections of Aguanga Valley, and the south-facing slopes below Cahuilla Road south of its intersection with Wilson Valley Road.

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LITERATURE CITED

APPENDIX. Birds Recorded in the Aguanga Shrub Lands

Notation: * breeding confirmed; + breeding probable; visitor, no trend in records, no indication of breeding; max, maximum number of individuals recorded on a single date. The following abundance notations refer to the proper season and the proper habitat: abundant, almost always encountered in large numbers; common, almost always encountered in moderate numbers; fairly common, usually encountered in
small numbers; uncommon, missed more often than encountered, but occurs annually; rare, missed more often than encountered, does not occur annually. Locations: AH, Aguanga Hills; AV, Aguanga Valley; CR, Cahuilla Road; DR, Dry Ranch; DV, Dameron Valley; HP, High Point Road; SR, Sage Road.

Mallard (*Anas platyrhynchos*). Rare visitor, max 2, AV, 9 Aug 2008.

+Mountain Quail (*Oreortyx pictus*). Uncommon resident, max 4, HP, 12 Apr 1997.

*California Quail (*Callipepla californica*). Common to abundant resident, max 192, DV, 22 Oct 2005.

Gambel’s Quail (*Callipepla gambelii*). Uncertain status, max 3, HP, 3 Feb 2000.

Turkey Vulture (*Cathartes aura*). Uncommon visitor, max 2, DR, 26 Apr 2005.

Golden Eagle (*Aquila chrysaetos*). Rare visitor, max 2, AV, 3 May 2005.


Cooper’s Hawk (*Accipiter cooperii*). Fairly common visitor, max 2, DV, 6 Aug 2005.

Harris’s Hawk (*Parabuteo unicinctus*). Rare visitor, 1, DV, 27 Mar 1997; 2 km west of Dripping Springs Campground, 10 Dec 2006; 1 Hwy. R6, 4 Jul and 2 Aug 2008.


Red-shouldered Hawk (*Buteo lineatus*). Single record, 1, 1.0 km north of Radec, 26 Jan 2007.


Ferruginous Hawk (*Buteo regalis*). Rare winter resident, 1, DV, 13 Dec 1997; 1, DV, 12 Dec 1998.

Rough-legged Hawk (*Buteo lagopus*). Single record, 1, DV, 6 Feb 1999.

American Kestrel (*Falco sparverius*). Rare visitor, max 2, 2 Aug 2008.


*Mourning Dove (*Zenaida macroura*). Fairly common to common resident, max 22, AV, 26 Jan 2007.


+Barn Owl (*Tyto alba*). Fairly common resident, max 5, along Hwy 79 and 371, 8 Jul 2006.

+Great Horned Owl (*Bubo virginianus*). Fairly common resident, max 2, HP, 26 May 2005.


+Common Poorwill (*Phalaenoptilus nuttallii*). Fairly common resident, max 12, HP, 26 May 2005.


Vaux’s Swift (*Chaetura vauxi*). Single record, 1, Wilson Valley Road, 20 Apr 1996.


*Costa’s Hummingbird (*Calypte costae*). Fairly common to common summer resident, rare winter resident, max 22, DV, 27 Jun 1998.

Lewis’s Woodpecker (*Melanerpes lewis*). Single record, 1, DR, 12 Mar 2003.

*Ladder-backed Woodpecker (*Picoides scalaris*). Fairly common resident, max 8, DV, 6 Aug 2005.


Gray Flycatcher (*Empidonax wrightii*). Rare winter resident (Jan–Mar), 1, DR, 20 Jan 2006; 1, DR, 30 Mar 2006.


*Say’s Phoebe (*Sayornis saya*). Uncommon summer resident, fairly common winter resident, max 5, AV/DR, 18 Oct 2003; AH, 6 May 2005.


Western Wood-Pewee (*Contopus sordidulus*). Single record, 1, AH, 5 Aug 1996.


Warbling Vireo (*Vireo gilvus*). Single record, 1, CR, 4 May 1996.

*Western Scrub-Jay (*Aphelocoma californica*). Common resident, max 36, DV, 6 Aug 2005.


*Common Raven (*Corvus corax*). Fairly common resident, max 8, DV, 10 Apr 1999; SR, 7 Jun 2003.

*Horned Lark (*Eremophila alpestris*). Uncommon to fairly common resident, max 5, SR, 8 Jun 2005.

Northern Rough-winged Swallow (*Stelgidopteryx serripennis*). Uncommon summer visitor (Mar–Aug), max 3, CR, 20 Apr 1996.

Tree Swallow (*Tachycineta bicolor*). Uncommon transient (Apr), max 5, Wilson Valley Road, 20 Apr 1996.


Cliff Swallow (*Petrochelidon pyrrhonota*). Fairly common summer visitor (Apr–Sep), max 70, SR, 7 Jun 2003.


*Oak Titmouse (*Baeolophus inornatus*). Fairly common resident, max 4, DV, 2 May 1998; DV, 12 Jan 2002.

*Bushtit (*Psaltriparus minimus*). Fairly common to common resident, max 36, DV, 22 Oct 2005.

Verdin (*Auriparus flaviceps*). Uncommon winter resident (Sep–May), max 4, DR, 27 Sep 2003; DR, 6 Sep 2004.

*Cactus Wren (*Campylorhynchus brunneicapillus*). Fairly common resident, max 19, DV/CR, 1 Jun 1996.

**DESERT BIRDS ON THE COASTAL SLOPE OF SOUTHERN CALIFORNIA**

+Canyon Wren (*Catherpes mexicanus*). Uncommon resident, max 2, HP, 10 Jul 1998.


*Blue-gray Gnatcatcher (*Polioptila caerulea*). Uncommon summer resident, fairly common winter resident, max 4, DV, 4 Apr 1998.


Ruby-crowned Kinglet (*Regulus calendula*). Fairly common winter resident (Oct–Apr), max 5, HP, 26 Nov 2005.

*Wrentit (*Chamaea fasciata*). Fairly common to common resident, max 22, HP/DV, 12 Apr 1997.


Hermit Thrush (*Catharus guttatus*). Fairly common winter resident, (Nov–Apr), max 6, HP, 27 Mar 1998; DR, 10 Apr 1999.

American Robin (*Turdus migratorius*). Uncommon winter resident (Feb), max 7, AV, 22 Feb 1997.

*Northern Mockingbird (*Mimus polyglottos*). Fairly common resident, max 10, DR, 17 May 2003.


Sage Thrasher (*Oreoscoptes montanus*). Rare transient, max 1, DV, 1 Mar 1997; SR, 12 Mar 2002.


Phainopepla (*Phainopepla nitens*). Common to abundant summer resident, rare winter resident, max 71, DV, 6 Aug 2005.


Yellow Warbler (*Dendroica petechia*). Rare transient (May), max 2, DR, 17 May 2003.

Yellow-rumped Warbler (*Dendroica coronata*). Uncommon to common winter resident (Oct–Apr), max 29, AV, 4 Nov 2005.


Common Yellowthroat (*Geothlypis trichas*). Status uncertain, max 3, AV, 28 Sep 1996.

Wilson’s Warbler (*Wilsonia pusilla*). Uncommon transient (May), max 2, DR, 17 May 2003.


*Rufous-crowned Sparrow (*Amphila ruficeps*). Fairly common to common resident, max 13, HP, 26 May 2005.

*California Towhee (*Melozone crissalis*). Abundant resident, max 80, SR, 7 Jun 2003.


Brewer’s Sparrow (*Spizella breweri*). Fairly common to abundant winter resident (Sep–May), max 107, SR, 25 Mar 2009.

Vesper Sparrow (*Pooecetes gramineus*). Rare winter resident, max 10, DV, 6 Feb 1999.

*Lark Sparrow* (*Chondestes grammacus*). Fairly common summer resident, common winter resident, max 40, DV, 6 Feb 1999.


Savannah Sparrow (*Passerculus sandwichensis*). Uncommon winter resident (Sep–Feb), max 2, AV, 28 Sep 1996; DV, 6 Feb 1999.


+Song Sparrow (*Melospiza melodia*). Rare resident, max 3, DR, 1 Jun 1996.

Lincoln’s Sparrow (*Melospiza lincolnii*). Rare winter resident (Sep–Apr), max 2, DV, 6 Feb 1999.

Harris’s Sparrow (*Zonotrichia querula*). Single record, 1, DV, 6 Feb 1999.

White-crowned Sparrow (*Zonotrichia leucophrys*). Abundant winter resident (Sep–May), max 156 DR/AH, 31 Jan 2004.

Golden-crowned Sparrow (*Zonotrichia atricapilla*). Uncommon winter resident (Nov–Apr), max 6 DR, 30 Mar 2006.


*Black-headed Grosbeak* (*Pheucticus melanocephalus*). Fairly common to common summer resident (Apr–Aug), max 29, DV, 16 Jul 2005.

Blue Grosbeak (*Passerina caerulea*). Single record, 1, SR, 4 May 1996.


Tricolored Blackbird (*Agelaius tricolor*). Erratic visitor, max 200, DV, 2 May 1998.

Colonies previously existed 1.7 km south of Aguanga, 0.5 km east of Oak Grove, and 3.5 km west of Oak Grove.

*Western Meadowlark* (*Sturnella neglecta*). Uncommon to fairly common resident, max 26, SR, 12 Mar 2002.


Hooded Oriole (*Icterus cucullatus*). Uncommon transient (May), max 2, SR, 4 May 2003.


*House Finch* (*Carpodacus mexicanus*). Common to abundant resident, max 240, AV, 26 Jan 2007.

Cassin’s Finch (*Carpodacus cassini*). Single record, 6, AV, 22 Feb 1996.

Lesser Goldfinch (*Spinus psaltria*). Fairly common to common visitor, max 20, AV, 14 Jan 1996.

Lawrence’s Goldfinch (*Spinus lawrencei*). Uncommon visitor, max 4, DR, 27 Apr 2006.


NOTES

FIRST RECORD OF THE BRIDLED MORPH OF THE COMMON MURRE IN THE PACIFIC

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The Common Murre (Uria aalge) is one of the most numerous marine birds in the Northern Hemisphere (Ainley et al. 2002), widely distributed in both the Atlantic and Pacific oceans. In the Atlantic, breeding colonies range from eastern Canada to Iceland, the British Isles, and Norway. In the Pacific, the species breeds in the Gulf of Alaska, Bering Sea, Sea of Okhotsk, and down the west coast of North America into California (Gaston et al. 1998). Northern populations tend to move south in the winter and are generally restricted to waters of the continental shelf (Gaston et al. 1998).

Atlantic populations are frequently dimorphic, with the “bridled” morph distinguished from the nonbridled by having a white eye-ring and white extending down the auricular groove. Bridling is thought to be controlled by a recessive variant of a single gene on one of the autosomes (Jefferies and Parslow 1976). The proportion of the bridled morph in Atlantic increases from south to north, particularly in the eastern Atlantic, from 0% bridled in Portugal through Britain and Norway to 50% bridled at Bear Island, Svalbard (Birkhead 1984). Aside from a report of a single male with incomplete bridling (white down the auricular groove but not around the eye) at Cape Thompson, Alaska (Swartz 1966), the bridled morph has never been reported in the Pacific.

Here, we report on the first sighting in the Pacific of a completely bridled adult Common Murre at a colony in central California. On the afternoon of 15 June 2008, Schmidt observed a single bridled individual from a blind on Southeast Farallon Island, part of the Farallon National Wildlife Refuge, California (37° 42′ N, 123° 00′ W). The individual was characterized by a thin but complete white ring around both eyes that extended back along the auricular groove. All other plumage characteristics appeared normal. The bird was in the middle of a dense colony of breeding nonbridled murres in an area regularly monitored by biologists. It did not appear to have a mate nor was wandering among other breeding birds, most of which were rearing chicks, occasionally interacting with apparently random individuals. The bridled bird stayed long enough for Schmidt to return to the field station, retrieve a camera, and bring Warzybok to the blind to confirm the sighting. The total observation time was approximately 30 minutes. The individual behaved normally and did not appear to attract any special attention from the other murres. We did not approach or capture it because of the risk of disturbing the breeding murres, but Schmidt photographed it (Figures 1–3), from a maximum distance of 5 meters. The area was monitored regularly for the remainder of the breeding season as part of a continuing study, but the bridled bird was not seen again. It is possible that it remained on the island but in an area not visible to biologists.

Common Murres have been studied in detail at Southeast Farallon Island since 1968, and several plumage variations have been observed at this colony, including incomplete attainment of breeding plumage, leucism, and melanism. There have been no records of individuals with any form of bridling, however (PRBO unpublished data).
Figure 1. Bridled morph of the Common Murre on Southeast Farallon Island, 15 June 2008. A murre of the typical unbridled morph can be seen to the left.

*Photo by Annie E. Schmidt*

Figure 2. Bridled morph of the Common Murre on Southeast Farallon Island, 15 June 2008. View from the right as the bird wandered through the colony.

*Photo by Annie E. Schmidt*
There are several possibilities for the origin of this unusual individual. It is possible that a bridled individual from an Atlantic population found its way to California. Atlantic murres tend to have slightly shorter bills and wings than Pacific murres (Gaston et al. 1998). The photos do not show any conclusive size difference but since we could take no measurements, we cannot rule out this possibility. There are no published reports of Atlantic alcids in the Pacific. However, Pacific alcids have occasionally been recorded in the Atlantic (e.g., Haraldsson 1995, Hopkins et al. 2006). The recent occurrence of a Pacific Gray Whale (*Eschrichtius robustus*) in the Mediterranean Sea (reported in popular media in May 2010, e.g., http://news.bbc.co.uk/earth/hi/earth_news/newsid_8672000/8672970.stm and www.cbsnews.com/stories/2010/05/11/tech/main6472926.shtml) suggests it is now more possible for marine organisms to take the Northwest Passage, perhaps increasing the chance that individuals may move from the Atlantic to the Pacific.

A second alternative is that the gene for the bridled variant also occurs in the Pacific, either sharing its origin with the Atlantic populations or arising independently. As this allele is thought to be recessive, it may occur in the Pacific population at such low frequencies that it is rarely expressed because of the infrequency of pairings of individuals carrying the allele. Because relatively few Pacific murre colonies are monitored intensively, an extremely small number of bridled individuals may be going unnoticed. A further possibility is that a new mutation arose in this individual and was expressed immediately. In the lack of a genetic sample from this individual, distinguishing between these alternatives it is impossible.

We are grateful to the U.S. Fish and Wildlife Service for its continued support of and collaboration with PRBO’s research on Southeast Farallon Island. We also thank the Farallon Patrol for its assistance in transportation to and from the island. This paper was improved by comments from Russell Bradley and Steve N. G. Howell. This is PRBO contribution 1719.
NOTES

LITERATURE CITED


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On 27 October 2009, 25 km east of Chugwater, Platte County, Wyoming, I spotted a male Northern Harrier (*Circus cyaneus*) approximately 900 m away hunting at a height of 1–2 m over a pasture. As it flew, the harrier frequently flushed passerine birds, which it did not pursue. After approximately 30 seconds, the harrier suddenly turned 180° and flew east at a faster rate of speed. I then noticed a Merlin (*Falco columbarius*) that had come in from the west and was now close to the harrier. The Merlin began following approximately 5–10 m behind the harrier and using it as a beater, chasing the passerines being flushed by the larger raptor, which had resumed its slower hunting speed.

I watched the two raptors for approximately 3–4 minutes, during which time the birds were at least 600 m away from me. The Merlin followed the harrier for most of that time and chased, but did not catch, passerines flushed by the harrier approximately 6–9 times. On two occasions the Merlin chased a flushed passerine up to about 10–15 m above ground level but did not catch it and resumed following the harrier. Another time the Merlin raced back and forth several times along a low area for approximately 15 seconds in pursuit of a passerine, then turned away and caught up with the harrier again and continued to follow it. After 3–4 minutes the Northern Harrier flew out of my view, followed by the Merlin. The harrier had, since the time I first noticed the Merlin, flown approximately 1.25 km, including two sharp changes of direction. During that time I did not observe the Merlin behave aggressively toward the harrier. Similarly, other than possibly its initial 180° turn at the beginning of my observation, I did not observe the harrier respond to the Merlin.

Similar behavior between these species has been reported, though not from mainland North America. In the Bahamas, Van Tyne and Mayfield (1952) saw a Merlin following a harrier in a fashion similar to that I describe on three dates, but they did not note that the Merlin(s) chased flushed prey. Dickson (1984) reported seeing the behavior eight times in Ireland with these two species, and also recorded that two other observers had seen it an unspecified number of times. Watson (1977) reported seeing it on one occasion in England. Cudworth and Massingham (1986) noted one instance of a somewhat similar interaction in England, and also noted that the harrier did not react to the Merlin’s presence. No prey captures by the Merlin were reported for any of these observations in the British Isles, but Kenyon (1942) reported several Merlins following a train in Mexico and capturing passerines that were flushed by the train.

The harrier’s active hunting style, slow flight, and habit of continually flushing passerines seems to present a situation favorable for hunting for a quick, opportunistic Merlin. Harriers that I have watched in Wyoming invariably flush passerines as they fly low over a field, but they do not pursue the flushed birds—they ignore them and instead attack prey still on the ground (also see Cudworth and Massingham 1986). And with the Merlin trailing the harrier, the latter would encounter potential prey first. The harrier, then, appears to be unaffected by the tailgating Merlin, which suggests a commensal relationship if the Merlin is in fact successful at obtaining prey by this strategy.

Lawrence Semo, Paul Swiby, and Doug Faulkner made several suggestions to improve the manuscript.
NOTES

LITERATURE CITED


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BOOK REVIEWS


A lot of birders know very little about molt, even though for a bird molt is as fundamental a part of the life cycle as breeding. Two recent publications attempt to help one better understand this tricky topic. The goal of *Molt in North American Birds* is to be an easy-to-read reference explaining the patterns of molt by family. Although the title says “North American,” the book covers molts of only species occurring north of Mexico, though much of the information on families also applies to many Mexican species. *Feather-Watching* attempts to explain feather terminology and molt in an interactive CD format.

The question “what is molt?” could fill an entire book and is beyond the scope of these publications, though Howell gives an excellent, if brief, answer to this very complex and not fully understood question. Instead, the book focuses on the various “strategies” or patterns of molt in each family of birds and how these fit within their natural history. Though much of the information is a summary of previously published work from many sources (see Plan of the Family Accounts, p. 2), the way in which it is organized and presented here is new.

Howell is directing this work at an audience that has at least a basic familiarity with molt and feather tracts, but the style is understandable even for those whose knowledge of the topics is rudimentary. The audience is the birder who wants to understand the patterns he or she is seeing in the field, as well as those who want to improve their ability to identify birds. Though the book is directed more toward birders, professional ornithologists will be interested as well, as the book is a summary of what is known of each family’s molt. It helps that the book is very well written with only a few minor typographical/grammatical errors.

In *Feather-Watching*, Hug attempts to make the terminology and process of molt understandable to beginning birders and ornithology students, through an interactive PowerPoint presentation. The CD runs for 80 minutes and includes several quizzes. The presentation starts with an excellent overview of feather tracts, then continues with an overview of the Humphrey–Parkes system of plumage-cycle terminology (Humphrey and Parkes 1959). It compares the life-history system and the Humphrey–Parkes system without going into detail of the uses of each (something Howell does not cover at all). It ends with a brief coverage of seeing molt in the field. The PowerPoint style makes it easy to pause and go back and review slides that you may want to see and hear a second time and so is a productive way to teach molt, especially to those who are more auditory learners.

*Molt in North American Birds* starts with a long introduction, 77 pages, which should be read first, even by those who already have an understanding of molt. It is formatted as a series of thought-provoking and wide-ranging questions and answers, a must read for every birder that helps explain birds’ appearance in the field. For example, how molt and pigmentation of feathers are not necessarily linked, how to see molt in the field, and why one should care about molt. The terminology follows the Humphrey–Parkes system as modified by Howell et al. (2003, 2004). Because these modifications have been much debated, a summary of the reasons for them could have added value. Instead, Howell states that this debate is beyond the scope of the book and interested readers will have to turn elsewhere for a discussion of the topic (Howell et al. 2004 and references therein). He does, however, give an excellent overview of the chosen system as well as molt strategies and how they may have evolved. These sections are brief and not overly detailed, an approach that generally
works, but I would have liked to have seen a little bit more on the causes of wear, something I think birders don’t always understand.

The family accounts that make up the bulk of the book are, like the introduction, well written. Following the classification of Handbook of the Birds of the World (del Hoyo et al. 1997–2007), these accounts vary from 11 pages (sandpipers) to under a half a page, in which case the accompanying photo may take up as much room as the text. This discrepancy arises because each account varies in content, though each follows the same basic pattern. Each account begins with a header which includes the family name, subgroups within the family, what molt strategies the family follows, and how many species occur in the area covered (if only one species is represented, sometimes that species is named but sometimes it’s not, e.g., “Northern Jacana” vs. “flamingoes”). The text contains a brief overview of natural history, followed by the patterns of molt within the family, and ends with a longer discussion linking molt and natural history. These longer discussions are often omitted from families with “simple” molts and on occasion even ones with more complex molt, such as the oystercatchers. Given that the oystercatchers’ molt strategies aren’t well known, a longer discussion could have worthwhile.

The natural-history information is usually brief and covers how long birds take to mature, migration patterns, and, where relevant, family- or species-level taxonomy, and sometimes distribution. The familial relationships of the Wrentit aren’t discussed, and there were a few mistakes with respect to distribution.

Discussion of the actual molt varies from a single paragraph to multiple pages under various headings for each molt. Confusingly, the preformative molt is sometimes under its own heading or, in some accounts, in the section on first-cycle molt. These accounts can be extremely informative and often suggest areas of further research. The accounts of the waterfowl and game birds highlight the strengths of this book, managing to sort through the confusion these families have caused over the past 100 years and inform the reader of what is now known (and how little that really is). This confusion has arisen from ignorance of the number of molts a bird has each year; before a bird’s life cycle can be understood, this basic point must be clear. Although Howell addresses these unknowns, at times it is confusing why he describes a family as following one molt strategy and not another. For example, the oystercatchers are said to have a preformative molt, and the possibility of a prealternate molt is briefly discussed, yet the family is identified as following the “simple alternate” strategy, which does not include a preformative molt. If a species has both an alternate and a preformative molt, shouldn’t its pattern be “complex alternate,” as with some grebes? This possibility is not mentioned at all, though Howell does mention the possibility of the “complex basic” strategy (in which there is no prealternate molt). Although the information and confusion originate from Pyle (2008), I would have expected some discussion. These inconsistencies recur in a small number of accounts (e.g., pelicans, flamingoes, swifts).

The photographs (important for a book on molt) are almost all of high quality, and the author should be congratulated for choosing photos that illustrate his points so well. The illustrated differences in feather wear, for example, can actually be seen in all of the photos in my copy! This is not always true in articles discussing molt. The large size of the photos used in this book certainly helps, though I could see how a magnifying glass and a strong light might help with some photos, such as those of the frigatebirds (p. 108). However, a few photos appear to have been chosen only because they are aesthetically pleasing, such as those of the California Quail (p. 86) or Chestnut-backed Chickadee (p. 196) and not because they illustrate the author’s point. Unfortunately, a couple of photos are of poor quality (though some may at least be on point), and I find it hard to believe that better photos couldn’t have been found (e.g., Olive Warbler, p. 220). The captions expand on points in the text or give interesting facts. Each caption also gives the photo’s exact date and location, information that should accompany all published photos and is especially critical to discussion of molt. Again, these captions are well written, and I found only two mistakes in them.
In Feather-Watching, unfortunately, the photos illustrating various points are generally mediocre to poor, and in several I had trouble actually seeing the feathers being discussed. While species (not all are identifiable from the photos) and dates are given for every photo, locations are not.

As Molt in North American Birds is largely a summary of previous work, not a presentation of original data, the book is peppered with citations. As the introduction states, the references cited are not an exhaustive list of papers and books on molt (for which see Pyle 1997 and 2008), but still cover 11 pages. A more complete bibliography might have made the book more useful to professional ornithologists and might have improved the family accounts. For example, a possible answer to questions about buntings of the Passerina (p. 234) may be found in Greene et al. (2000). The book also has a nice glossary in the back, giving concise definitions, which should help most readers.

Although I liked the style of Feather-Watching and the good-natured narration by Lisa Hug (including her playing music), the CD tries to cover too much too quickly, even if the presentation is broken into multiple viewings, as she suggests. Having the script in front of you will help, but I’m afraid that a beginner will still throw up his hands in defeat. I also felt the quizzes weren’t utilized to their fullest and add little to the work’s overall effect. The graphics are amateurish and, while correct, are at times misleading. Despite this, the information given is generally excellent and informative. The narration was well done, and I found only one mistake in the presentation.

While Molt in North American Birds could have been more complete, which would have added value to researchers, its main audience of birders will find all the information, they need, and some may appreciate the brevity of the book. It would have been even more valuable overall had Howell been clearer in some accounts why he says a family follows one strategy of molt rather than another. Nevertheless, Molt in North American Birds is unique in summarizing what’s known (and not known) in one convenient book. Again, the introduction should be read by every birder. This book should help birders understand molt as an important aspect of a bird’s natural history and may inspire some field ornithologists to study it.

My minor quibbles with the book should by no means detract from what it does accomplish: it is an easy to read reference on molt, for which it isn’t necessary to have read technical papers on the subject. Molt in North American Birds deserves a place on the bookshelf of every birder and ornithologist. On the other hand, while I enjoyed the style (very useful for teaching a class) and information in Feather-Watching, the execution just wasn’t what I hoped for.

LITERATURE CITED


David Vander Pluym
BOOK REVIEWS


The topics of global climate change and its potential effects on species and ecosystems have recently entered a major spotlight of public attention. Research in these areas has also recently surged. My search of the ISI Web of Science (available at university libraries), with the simple search criteria “birds” and “climate change,” yielded 592 journal articles relating to birds and climate change published in the last 4-year period, 2007–2010, compared to only 32 from 1997 to 2000. Because of the many variable ramifications of climate change and complex interactions, however, it’s exceedingly difficult to link climate change to measurable effects on particular species. *Effects of Climate Change on Birds* is an edited volume that gives an overview of our current level of knowledge and current research on the biological consequences of climate change on birds. Although the take-home message is that we have much yet to learn, the editors suggest that birds may serve as a useful model for climate-change effects because of the large amounts of historical data, continuing monitoring, and the sensitivity of birds to environmental change. The book attempts to take a synthesis approach with the aim of stimulating future research, and the target audience is the next generation of ornithologists.

The papers included in this book are intended to cover our knowledge of changes (due primarily to contemporary climate warming) already observed and all levels of associated causes and consequences. The editors admit that it is necessarily biased toward a few well-studied species and sites, and there is definitely an emphasis on migratory passerines in Europe. The book begins with a brief introductory chapter, followed by a very detailed chapter on the science of climate change, including natural cycles such as El Niño–Southern Oscillation, and evidence for human acceleration of global warming. That is followed by a section of six chapters on the methods for studying climate-change effects on birds, with somewhat cursory reviews of available datasets and analysis techniques. The final, largest section includes 11 chapters that cover our current knowledge of the biological consequences of climate change, followed by a brief conclusion. Coverage of topics includes the effects of climate change on timing of breeding and reproductive success, population consequences, range shifts, sexual selection, complex interactions, community-level effects, and evidence for evolutionary responses (or lack thereof).

The volume is similar in style and content to a special-topic work published six years ago by the same editors and including papers by some of the same authors: *Birds and Climate Change* (Møller et al. 2004). The current volume builds on the contributions of the previous volume and also adds many new chapters and perspectives. In the previous volume, the editors listed 16 areas most in need of research relating to the effects of climate change on birds, but in the current volume the same editors state that hardly any of these recommendations have been pursued, and they trim the list to five areas in need of special emphasis for future research. The current volume is essential to any student or researcher interested in studying the effects of climate change on birds because there are so few other published books. There have only been a few texts published recently on the biological effects of climate change, including *Wildlife Responses to Climate Change: North American Case Studies* (Schneider et al. 2001), *Climate Change and Biodiversity* (Lovejoy and Hannah 2006), and *Climate Change Biology* (Hannah 2010), and only one other recent book on birds and climate change, *Bird Migration and Global Change* (Cox 2010).

Despite the emphasis on Europe and migratory passerines, this volume makes an impressive attempt at broad coverage of the topic, with the chapters mostly complementary, and is sensibly organized. However, the chapters are also very independent
in that there is some overlap, little cross-referencing among chapters, and a few
contradictions. For example, after Chapter 12 demonstrates that evidence of evolution-
ary response to contemporary climate change is lacking, the opening sentence
of Chapter 13 states: “Global climate change is rapidly altering natural selection on
living organisms, and there is mounting evidence that a range of taxa have responded
with adaptive change at least to some degree.” The brevity of the introduction and
conclusion and separate reference lists for each chapter make this volume much more
a series of papers on a related topic rather than a synthesis.

There are many interesting chapters with some novel and creative ideas and con-
cepts, and much useful information. For example, Table 8.1 lists all of the published
software packages for predictive modeling of habitat suitability, with reference papers
and web links, and Table 10.1 summarizes the changes to dates of egg laying of 68
species of birds from long-term studies. However, the chapters vary in quality and
usefulness, with some poorly written and plagued with typographical errors. Some
of the reviews of methods for analyzing effects of climate change are rather cursory
and vague, with presentations of theoretical models and equations lacking in sufficient
detail or references. For example, when “path analysis” is mentioned as a useful way of
analyzing causation chains, no specific examples of studies or references are given.

Some of the chapters boldly tackle complex topics that are lacking in research but
have little to offer beyond speculation. For example, we often see conclusions such
as the one at the end of the chapter on host–parasite interactions and climate change
that “Our current knowledge of the effects of climate on host–parasite interactions is
extremely limited.” Much space that is devoted to speculation on ways that climate
change could possibly affect birds would be made more useful with more specific
examples of successful studies and methods used. The broadness and complexity of
the topic is part of the problem, leading to an overly cursory review. Without focus,
asking “What are the effects of climate change on birds?” starts to become “the
possible effects of everything on everything.” We have long understood the general
importance of climate and its effects on species, so perhaps the questions would be
more practical if focused, such as on the magnitude, scale, and variation in effects
among species and populations.

Despite these shortcomings, this volume is essential to students and researchers
interested in studying the effects of climate change on birds. It certainly provides a
broad array of papers with some good summaries of useful information, stimulating
perspectives, and ideas for future research. We are left with the impression that there
are large quantities of unused information that could be analyzed in the context of
climate change, and that there is much research yet to be done.

LITERATURE CITED

D. C.
University Press, New Haven.
Møller, A. P., Fiedler, W., and Berthold, P., eds. 2004. Birds and Climate Change. Ad-
Schneider, S. H., and Root, T. L., eds. 2002. Wildlife Responses to Climate Change:

Lori Hargrove
On 6 June 2010 I was birding at the headquarters complex at Malheur National Wildlife Refuge in southeastern Oregon when I noticed what appeared to be a slightly odd-looking Townsend’s Warbler (Dendroica townsendi) in one of the trees. I lost track of the bird and shortly thereafter heard what sounded like a rather plain song of a Yellow-rumped Warbler (D. coronata). A moment later the Townsend’s-like bird came back into view and sang the same song. Townsend’s Warblers have a rather varied sound repertoire, and I have heard them sing shortened or partial songs, but I had never heard one sing a sweet, rich “cheddle cheedle cheedle” like a Yellow-rumped Warbler before.

As I watched the bird, I realized that it had a longitudinal yellow spot in the center of the crown, an extensive black area on the upper breast with a mixed black-and-yellow throat showing a pattern unlike that of a typical first-year male Townsend’s, and a whitish rear to the supercilium, none of which a Townsend’s should have. At that point Duncan Evered, co-director of the Malheur Field Station, arrived. He was able to get the bird in his scope and saw that the left wing had more white than expected for Townsend’s. The greater coverts on that wing showed two feathers with an extended white edge of the kind that an Audubon’s Warbler (D. c. auduboni) usually has and which the Myrtle Warbler (D. c. coronata) usually does not. The right wing had a simple dual wingbar pattern like that of a Townsend’s.

We concluded that the bird was a hybrid Townsend’s × Yellow-rumped Warbler on the basis of the distribution of yellow and black on the throat, green mixed with gray and black on the back, a yellowish suffusion on the rump, song, and the extended white on the left wing. The bird could not be found the following day or thereafter.

From the white wing feathers, I first concluded that the bird was probably a Townsend’s × Audubon’s hybrid, but certain details suggest that the Yellow-rumped parent might be Myrtle Warbler. First, the song was a simple extended warble on one pitch, which in my experience is a song type associated with the Myrtle Warbler, while Audubon’s tends to change pitch partway through, typically dropping lower. However, there is considerable variation in the songs of the two forms. Also, the supercilium turned from yellow to white at the rear of the face, which seems a more likely feature of Myrtle parentage than of Audubon’s, given that the Myrtle has a thin white supercilium and Audubon’s does not. I do not think that a definitive assignment of the Yellow-rumped parent to subspecies can be made from the available evidence.

This hybrid combination appears to be quite rare. Audubon’s was not listed as having hybridized with Townsend’s by Cockrum (1952), McCarthy (2006), Pyle (1997), or Dunn and Garrett (1997). Hybridization between the Myrtle and Townsend’s was mentioned by Dunn and Garrett (1997) as having been reported twice and was listed as “possible” by Pyle. A hybrid Myrtle × Townsend’s Warbler was in Carpinteria, California, 23 November–3 December 1983 (Lehman 1994; specimen to Carnegie Museum of Natural History, Pittsburgh).

The maps in Dunn and Garrett (1997) imply that the zone of overlap of Townsend’s and Audubon’s includes a large area from the central Oregon Cascades north and east to the Blue Mountains, most of montane Washington, southern British Columbia, and the Rocky Mountains of southwestern Alberta. Townsend’s overlaps with the Myrtle in a smaller but still substantial region including the southern Canadian.
Rockies, southwestern Yukon, southeastern Alaska, and the northwestern corner of British Columbia.

Troy Corman found and photographed another Yellow-rumped × Townsend’s Warbler hybrid near the confluence of the Agua Fria and Gila rivers, Maricopa County, Arizona, on 28 April 2010 (Figure 1). The Arizona bird also has ambiguous Yellow-rumped parentage (a compact area of yellow on the throat suggests Audubon’s, but the wing bars are very simple, and the supercilium has a whitish rear, suggesting the Myrtle). It had an unusual song (Corman 2010).

I thank Dwight Porter, a professional photographer based in Portland, Oregon, for remaining at the Malheur headquarters all morning, generating the superb photos featured on this issue’s back cover. Special thanks to Troy Corman of Arizona for granting permission for use of his photos. Sievert Rohwer, Troy Corman, Kimball Garrett, and David VanderPluym offered helpful comments on a draft of this article, especially on the question of whether the bird’s non-Townsend’s parent could be identified clearly as the Myrtle or Audubon’s. Joe Morlan assisted with reference material.

LITERATURE CITED


Figure 1. Hybrid Yellow-rumped × Townsend’s Warbler near the confluence of the Augua Fria and Gila rivers, Maricopa County, Arizona, 28 April 2010.

Photo by Troy Corman
THANK YOU TO OUR SUPPORTERS

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C. Fred Zeillemaker, Ola, ID
Wing your way to...

WESTERN FIELD ORNITHOLOGISTS’
THIRTY-SIXTH ANNUAL CONFERENCE
Sierra Vista, Arizona, 17–21 August 2011

Join us for our 36th annual conference at the Windemere Hotel and Conference Center in Sierra Vista, Arizona, 17–21 August 2011 (Wednesday to Sunday). Events include presentations of research papers on Friday and Saturday afternoons and workshops on flycatcher identification, bird-skin preparation, bird banding and running a MAPS station, and wilderness first aid. Panels of experts will tackle problems in bird identification by sight and sound on Friday and Saturday afternoons. The banquet and annual members’ meeting will be on Saturday evening, featuring a keynote talk by Peter Pyle on molt migration. A wide variety of field trips will cover most of the habitats of southeastern Arizona, and vans will be provided for most field trips. The late-summer monsoons in this area can create conditions for breeding of some species and, for others, ideal conditions for molting before migration to the winter range. The remarkable diversity of habitats and birds, combined with the phenomena associated with the monsoon, make the area and time among the greatest for birding in North America.

The hotel’s rate for participants in this meeting is $79.00 per room per night, which includes a free hot breakfast and a drink in the evening. The nearest major airport is Tucson International, which is 70 miles from Sierra Vista. For further information about the meeting and instructions for submitting papers, visit our website, www.westernfieldornithologists.org. Contacts for the meeting are ED PANDOLFINO, Meeting Committee Chair (erpfromca@aol.com), and co-chairs of the scientific program, DEBBIE VAN DOOREMOLEN (debbie.vandooremolen@snwa.com) and DAVE QUADY (davequady@att.net).

Please consider this opportunity to share your research.
Join us to learn new advances in the identification and biology of birds
And bird southeastern Arizona with your fellow members of WFO!
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Membership dues, for individuals and institutions, including subscription to Western Birds: Patron, $1000.00; Life, $600 (payable in four equal annual installments); Supporting, $75 annually; Contributing, $50 annually; Family $40; Regular U.S. $35 for one year, $60 for two years, $85 for three years. Dues and contributions are tax-deductible to the extent allowed by law.

Send membership dues, changes of address, correspondence regarding missing issues, and orders for back issues and special publications to the Treasurer. Make checks payable to Western Field Ornithologists.

BACK ISSUES OF WESTERN BIRDS WITHIN U.S. $40 PER VOLUME, $10 FOR SINGLE ISSUES, INCLUDING SHIPPING AND HANDLING. OUTSIDE THE U.S. $55 PER VOLUME, $15 FOR SINGLE ISSUES, INCLUDING SHIPPING AND HANDLING.

The California Bird Records Committee of Western Field Ornithologists revised its 10-column Field List of California Birds in July 2009. The new list covers 641 species, plus 6 species on the supplemental list. Please send orders to WFO, c/o Robbie Fischer, Treasurer, 1359 Solano Drive, Pacifica, CA 94044. Price for 9 or fewer, $2.75 each, for 10 or more, $2.50 each, which includes tax and shipping. Order online at http://checklist.westernfieldornithologists.org.

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Photo by © Larry Sansone of Los Angeles, California:
Little Stint (*Calidris minut*ut)
Owens Lake, Inyo County, California, 30 August 2009.
This Old World species occurs in western North America as a casual migrant only. Though most records are coastal, several are from inland areas, including eastern Washington, North Dakota, New Mexico, and the Mojave Desert of California. This photo represents the first record for Inyo County and the 12th for California.