WESTERN BIRDS

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Western Specialty:
Black Rosy-Finch

Photo by © Neil Paprocki of Moscow, Idaho:
Black Rosy-Finch (*Leucosticte atrata*)
Uinta Mountains, Summit County, Utah, 4 July 2015.
In this issue of *Western Birds*, Neil Paprocki and Theresa Pope review the known distribution of the Black Rosy-Finch in Utah in the breeding season, identifying insufficiently explored mountain ranges where the species may yet be discovered or where its breeding has not yet been confirmed.

Volume 50, Number 1, 2019

Front cover photo by © Fred Petersen of Reno, Nevada: Black Scoter (*Melanitta americana*), at Warrior Point, Pyramid Lake, Washoe County, Nevada, 11–12 December 2016, representing the 13th record for Nevada endorsed by the Nevada Bird Records Committee. Nevada has had at least one record of the Black Scoter in 6 of the last 10 years.

Back cover "Featured Photo" by © Blaine H. Carnes of Coppell, Texas: White-eyed Vireo (*Vireo griseus*) at Freshwater Creek Forest Reserve, Orange Walk district, Belize, 20–22 February 2018. Note the active molt in the secondaries and tertials, unexpected at this time in a species with only a single prebasic molt per year. Evidently, the molt during the preceding fall had been suspended, then resumed while the bird was in its winter range.

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 Daniel D. Gibson, P. O. Box 155, Ester, AK 99725; avesalaska@gmail.com. For matters of style consult the Suggestions to Contributors to *Western Birds* (at westernfieldornithologists.org/docs/journal_guidelines.doc).

WESTERN BIRDS

Volume 50, Number 1, 2019

NEVADA BIRD RECORDS COMMITTEE REPORT FOR 2017

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ABSTRACT: In 2017, the Nevada Bird Records Committee reviewed 83 reports from the period 6 February 1940–1 November 2017; 66 were endorsed. Two new species, the White Ibis (*Eudocimus albus*) and the Arctic Warbler (*Phylloscopus borealis*) *sensu lato*, were added to the Nevada list following endorsement of the first state records. The endorsement of a record of the Black Rail (*Laterallus jamaicensis*) completed our years-long project to have endorsed records for every species on the Nevada list that the committee reviews. The Nevada state list now stands at 489 species, while the review list contains 141 species and two subspecies.

The Nevada Bird Records Committee (NBRC) began 2017 with 21 reports pending review. During 2017, we added 83 reports to the pending queue. The committee completed reviews of 83 reports during the year. One record was removed from the queue when it was combined with another as representing a "continuing" bird, and one record was withdrawn by the submitter before circulation. Thus the year ended with 19 in the pending queue. Since its founding in 1994, the NBRC has reviewed 1345 reports, endorsing 1213 (90.2%) of them.

At its founding in 1994, the committee decided not to review any sightings prior to that year, but it reversed that decision several years later. Fortunately, founding secretary James Cressman and his wife, Marian, continued to accumulate documentation for "pre-committee" reports. One of the committee's long-term goals since 2007 has been to organize and review as many of those reports as possible. In addition, the NBRC has also searched for additional reviewable documentation from multiple sources (e.g., museum specimens and journal articles) for early unreviewed reports. Since 2007, the committee has reviewed 233 reports of sightings prior to the year 2000. Of those, 197 have been endorsed. Of the 83 reports reviewed in 2017, 33 preceded the year 2000, and 27 of them were endorsed. Fourteen of those were the earliest NBRC-endorsed records for Nevada.

Of the 83 reports reviewed by the committee in 2017, 66 were endorsed. Photographs accompanied the documentation for 53 of the endorsed records. Of those 53, two were also accompanied by a video recording, another by an audio recording. Three were supported by video recordings alone (two to capture sound, with the bird not visible). Fourteen were supported by museum specimens. Of the 17 reports that were not endorsed, only three were supported by photographs; the rest were supported only by written descriptions, and none was supported by a video recording, audio recording, or specimen.

The NBRC has six voting members, one of whom serves as chair, and a nonvoting secretary. During 2017, the committee's voting members were Aaron Ambos, Paul Hurtado, Greg Scyphers, Justin Streit, Jeanne Tinsman, and Ben Zyla. The position of secretary continued to be held by Martin Meyers, and the postion of chairperson continued to be held by Jeanne Tinsman.

The NBRC's website at http:/gbbo.org/nbrc contains a statement of purpose, answers to frequently asked questions, links to a submission form that can be downloaded or completed online, the Nevada checklist, the review list, a list of current and past members, and the committee's bylaws. There is a link to a list of all submissions to the NBRC, with the status of each with respect to endorsement and, if available, a photograph. All previous NBRC reports are available through the website. NBRC reports through 2007 (1994–1996, 1997, 1998, 1999, 2000, 2004, 2005, and 2007) appeared in *Great Basin Birds*, published by the Great Basin Bird Observatory. Reports for 2008 through 2010 are available only at the NBRC website. Beginning with the 2011 report, annual reports have appeared in *Western Birds*.

REVISIONS TO THE NEVADA STATE LIST

In 2017, two species were added to the Nevada list, and one species was removed. The White Ibis (*Eudocimus albus*) and the Arctic Warbler (*Phylloscopus borealis*) *sensu lato* were added following endorsement of first state records. The Thayer's Gull (*Larus thayeri*) was removed from the Nevada list following its merger in the Iceland Gull as *Larus glaucoides thayeri* (Chesser et al. 2017). The Iceland Gull was already on the Nevada list on the basis of a single record, in 2011, of subspecies *kumlieni*.

Early in its history, the NBRC adopted an existing checklist (Titus 1996) based on numerous sources that constituted the most reliable information available at the time. By the end of 2016, the committee had nearly completed an extensive search for reviewable documentation for all of the rare species on that list (those constituting the review list; Tinsman and Meyers 2016). The only remaining rare species on the list without an endorsed record at the end of 2016 was the Black Rail (*Laterallus jamaicensis*), of which the committee had in its database two reports not endorsed. In 2017, two reports were received and reviewed; one was supported by an audio file and endorsed, and the other contained written documentation only and was not endorsed. See below for details.

At the end of 2017, the Nevada state list stood at 489 species.

REVISIONS TO THE NEVADA REVIEW LIST

Added to the Nevada review list in 2017 were the new additions to the Nevada checklist, the White Ibis and the Arctic Warbler (*Phylloscopus borealis*) *sensu lato*. Removed from the review list, on the basis of the taxonomic change described above, were the Thayer's Gull and the Iceland Gull; *L. glaucoides thayeri* is a regular visitor to the state.

There are currently 141 species on the Nevada review list, of which seven are exempt from review in some limited geographic area. In addition, two subspecies are currently on the review list: the Mexican Mallard (*Anas platyrhynchos diazi*) and Eurasian Green-winged Teal (*Anas crecca crecca*). The committee has endorsed four records of the Eurasian Green-winged Teal. The committee placed Mexican Mallard on the review list to accumulate data on its occurrence. We have five unreviewed reports of this subspecies but have decided to wait to review them until there is more clarity on this subspecies' taxonomic status and identification criteria.

SPECIES ACCOUNTS

Each species account is introduced with a header in the following format: English name; scientific name; and, in parentheses, the total number of endorsed records of the species (including those endorsed in this report), followed by the number of records endorsed in this year's report. An asterisk preceding the species' name signifies that the species is no longer on the Nevada review list. Two asterisks after the total of records denote that the number of records refers to a restricted review period, usually signifying that the species is no longer on the review list, was added to the review list because of a perceived drop in population, or is exempt from review in some locations.

After the heading for each species, each report of that species reviewed in 2017 is provided in the following format: NBRC report number, location (county in parentheses), and date or range of dates of observations submitted to the NBRC. If the report involved multiple birds, the number follows the date information. Then, for endorsed records, the name of each submitter, followed by the notation "(P)," "(V)," and/or "(A)" if he or she provided a photo, video, and/or audio recording, respectively; if there is no such annotation, only written documentation was provided. If the finder(s) sent documentation to the NBRC, their names are listed first. A semicolon follows the finders' names if other observers submitted additional documentation.

In cases where a specimen was the subject of review, the collector is identified, followed by the museum accession number along with sex, age, and condition as available. The museums cited in this report are the Marjorie Barrick Museum (MBM; formerly at the University of Nevada, Las Vegas; the collection is now housed at the University of Washington Burke Museum, Seattle [UWBM]); the Nevada State Museum in Carson City (NSM); and the University of Nevada, Reno, Museum of Natural History (UNMB), formerly the University of Nevada Museum of Biology. In all instances, the committee examined photographs of the specimens, and the photographs are included in the documentation.

Multiple observations of a species are ordered chronologically. Any discussion of the species in general, not specific to an observation, concludes the account if warranted.

BRANT *Branta bernicla* (8, 1). 2017-020, Ash Meadows National Wildlife Refuge (NWR) (Nye), 7 Apr 1996. M. Cressman (P, *Natl. Audubon Soc. Field Notes* 50:308, 1996). Adult, subspecies *nigricans*.

TRUMPETER SWAN *Cygnus buccinator* (4**, 1). 2017-003, Pahranagat NWR (Lincoln), 16 Jan 2017, two birds. P. Gaffey, C. Gaffey (P; Figure 1).

2017-012, Caliente (Lincoln), 19-21 Feb 2017. NOT ENDORSED. This juvenile bird showed features suggesting the Trumpeter Swan, notably, a "V" shape to the forehead feathering and a culmen straighter than in a typical Tundra Swan (*C. columbianus*). The bill showed no yellow at the base, but it did have a white patch in that location. Also, the eyes looked isolated from the bare parts of the lores and bill. Bruce Deuel, California Department of Fish and Wildlife biologist, stated, "none of the i.d. characters are definitive by themselves, especially in juveniles" (in litt., 2017). He pointed out that some Trumpeter-like anomalies of the bill should not be considered definitive in a juvenile. Also, the lack of any dark plumage on the body in February is a stronger indicator of the Tundra Swan than any of the features that pointed toward the Trumpeter.

BLACK SCOTER *Melanitta americana* (13, 1). 2016-060, Warrior Point, Pyramid Lake (Washoe), 11–12 Dec 2016. G. Scyphers (P); F. Petersen (P; see this issue's front cover). Adult female. Nevada has had at least one record of the Black Scoter in six of the last 10 years.

COMMON GROUND-DOVE *Columbina passerina* (7, 2). 2017-052, Corn Creek, Desert NWR (Clark), 9 Jun 1967. Collected by C. G. Hansen (MBM 1310 [B-965]/UWBM 97458; ♀, skull ossified, light fat). Earliest NBRC-endorsed record, though Austin (1968a) stated it was the fourth for Nevada.

2017-058, Carson City (Carson City), 1 Jul 1969. Collected by B. Arkell (NSM 177; ♀).

2017-042, Virgin River floodplain east of Logandale (Clark), 16 Jun 2017. NOT ENDORSED.

The NBRC has now endorsed three records of this species prior to 1973. Alcorn (1988:183) considered the Common Ground-Dove to be of "irregular occurrence in southern Nevada." In spite of additional reports he listed for 1976 and 1982, we have no well-documented reports from 1973 through 2009. We received documentation for six individuals reported between 2009, and the end of 2017, five had been endorsed by the committee and one was still pending review.

RUDDY GROUND-DOVE *Columbina talpacoti* (8, 5). 2017-069, Amargosa Valley (Nye), 25 Sep 1990. G. H. Rosenberg (P), P. E. Lehman (*Am. Birds* 45:133, 1991). Earliest NBRC-endorsed record.

2017-033, Indian Springs (Clark), 24 Oct 1991. M. Cressman (*Am Birds* 46:128, 1992).

2017-032, Amargosa Valley (Nye), 21 Oct 1992. S. Finnegan (P); P. E. Lehman (*Am. Birds* 47:125, 1993).

2017-070, Indian Springs (Clark), 23–25 Sep 1995, three birds. S. B. Terrill (P), M. A. Patten (*Natl. Audubon Soc. Field Notes* 50:87, 1996).

2017-038, Lake Las Vegas (Clark), 15 Jan 2017. J. Aufmann (P; Figure 2).

Five of Nevada's eight records are of birds observed between September 1990 and November 1995. The next record came nearly 10 years later in October 2005, another nine years passed before the species was observed again (2014).

Figure 1. Trumpeter Swans (*Cygnus buccinator*), 16 Jan 2017, Pahranagat National Wildlife Refuge, Lincoln County, Nevada.

Photo by C. Gaffey

CHIMNEY SWIFT *Chaetura pelagica* (0, 0). 2017-029, Dyer (Esmeralda), 26 May 1991. NOT ENDORSED.

BROAD-BILLED HUMMINGBIRD *Cynanthus latirostris* (8, 1). 2017-001, Mesquite (Clark), 4–18 Jan 2017. N. Batchelder (P; Figure 3); D. Boyarski (P). Banded by Batchelder.

BLACK RAIL *Laterallus jamaicensis* (1, 1). 2017-007, Duck Creek, Clark County Wetlands Park (Clark), 24 Sep 2009. NOT ENDORSED.

Figure 2. Ruddy Ground Dove (*Columbina talpacoti*) with Inca Dove (*Columbina inca*), 15 Jan 2017, Lake Las Vegas, Clark County, Nevada.

Photo by J. Aufmann

Figure 3. Broad-billed Hummingbird (*Cynanthus latirostris*), 4–18 Jan 2017, Mesquite, Clark County, Nevada.

Photo by N. Batchelder

2017-010, Virgin River floodplain east of Logandale (Clark), 8–16 Jun 2016. C. Klinger (V). First endorsed record for Nevada. While surveying for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) on 8 and 16 Jun 2016, Christy Klinger heard a Black Rail, loudly vocalizing its distinctive "kik-kee-doo." Though the rail was not visible, she submitted a cell-phone video with accompanying audio, along with written details. The endorsement of this record by the committee completed the years-long effort to have at least one endorsed record for every rare species on the Nevada checklist.

PURPLE GALLINULE, *Porphyrio martinica* (3, 2). 2017-057, Eureka (Eureka), 25 Nov 1965. Collected by A. Biale (MBM [B-1661]/UWBM 98430; Alcorn 1988). Earliest NBRC-endorsed record.

2017-056, Floyd Lamb Park (Clark), 8 Sep 1966. Collected by G. T. Austin (MBM 483 [B-668]/UWBM 98429; ♂, no fat). Austin (1968b) reported seeing it the previous day and another individual on 20 Sep, 12 days after collecting the specimen.

There have been no Nevada records since 1995.

AMERICAN GOLDEN-PLOVER *Pluvialis dominica* (9, 1). 2017-036, Mason Valley Wildlife Management Area (WMA) (Lyon), 8–9 May 2017. F. Welden (P), M. Andrews.

PACIFIC GOLDEN-PLOVER *Pluvialis fulva* (2, 1). 2017-031, Carson Lake (Churchill), 11 Aug 1988. P. E. Lehman. Earliest NBRC-endorsed record. Lehman's documentation specified features of *fulva*, though at the time the AOU checklist ranked it as a subspecies of *P. dominica*.

MOUNTAIN PLOVER *Charadrius montanus* (11, 2). 2016-055, Crystal Springs (Lincoln), 14 Oct 2016. J. F. Holmes (P).

2017-005, Washoe Lake State Park (SP) (Washoe), 31 Oct 2016. G. Scyphers (P).

Seven of Nevada's 11 endorsed records for this species, accounting for 28 of the

34 individuals reported, are from October. Of the remaining four records, one is from January and three are from August.

PARASITIC JAEGER *Stercorarius parasiticus* (16, 5). 2017-017, The Willows, Pyramid Lake (Washoe), 3 Sep 2016. N. Rosen (P).

2016-047, Henderson Bird Viewing Preserve (Clark), 4 Sep 2016. A. Harper, B. Miller (P).

2016-045, Washoe Lake (Washoe), 6 Sep 2016. J. Bleam (P).

2016-053, south end of Pyramid Lake (Washoe), 24 Sep 2016. C. Coxe (P), K. Drozd (P).

2016-059, south end of Pyramid Lake (Washoe), 29 Oct–6 Nov 2016. D. Ghiglieri (P), R. Strickland; C. Dodson, M. Meyers (P), G. Scyphers (P; Figure 4), P. Hurtado (V), J. Bleam (P), F. Petersen (P), C. Coxe (P).

2017-048, Las Vegas Bay, Lake Mead National Recreation Area (NRA) (Clark), 4 Sep 2017. NOT ENDORSED.

Of the 16 Nevada records of the Parasitic Jaeger, two are from August, 12 from September, and two from October.

LONG-TAILED JAEGER *Stercorarius longicaudus* (13, 1). 2017-018, The Willows, Pyramid Lake (Washoe), 3 Sep 2016. N. Rosen (P); F. Welden (P).

BLACK-LEGGED KITTIWAKE *Rissa tridactyla* (10, 2). 2017-019, Las Vegas Bay, Lake Mead NRA (Clark), 28 Nov 1987–19 Feb 1988. J. Kaplan (P, *Am. Birds* 42:301, 1988).

2016-056, Las Vegas Bay, Lake Mead NRA (Clark), 23–24 Oct 2016. B. Miller (P), A. Harper, B. Zyla.

LAUGHING GULL *Leucophaeus atricilla* (3, 1). 2017-045, Boulder Beach, Lake Mead NRA (Clark), 8 Jul 1995. M. Cressman (P; *Natl. Audubon Soc. Field Notes* 49:956, 1995). Nevada has had no records of the Laughing Gull since 2004.

WESTERN GULL *Larus occidentalis* (8, 0). 2017-015, Ash Meadows NWR (Nye), 9 Mar 2017. NOT ENDORSED.

YELLOW-BILLED LOON *Gavia adamsii* (9, 0). 2017-008, Ash Meadows NWR (Nye), 16 Dec 2016. NOT ENDORSED.

LITTLE BLUE HERON *Egretta caerulea* (5, 1). 2017-044, Pahranagat NWR (Lincoln), 7 Aug 2017. J. Taylor (P). Adult.

WHITE IBIS *Eudocimus albus* (1, 1). 2017-046, Clark County Wetlands Park and Henderson Bird Viewing Preserve (Clark), 13–21 Aug 2017. K. McGoohan; D. Crowe (P), P. Gaffey, C. Gaffey (P), J. Tinsman (P; Figure 5), G. S. Clemson (P). First endorsed record for Nevada. Adult. Originally observed along the Las Vegas Wash in the Clark County Wetlands Park, it made its way back and forth from that location to the nearby Henderson Bird Viewing Preserve over several days.

Utah has three records of the White Ibis. One of these was of an adult around the Great Salt Lake (7 Jun–27 Jul 2017) just prior to the discovery of the adult in southern Nevada (http://www.utahbirds.org/RecCom/RareBirdsIndex.html).

COMMON BLACK HAWK *Buteogallus anthracinus* (13**, 0). 2017-034, Pahrump (Nye), 21 Apr 2017. NOT ENDORSED. This species is exempt from review in the Meadow Valley Wash/Rainbow Canyon area, which accounts for seven of Nevada's 13 records (12 individuals) and where it has nested successfully (Meyers 2016).

HARRIS'S HAWK *Parabuteo unicinctus* (12, 4). 2017-051, Henderson (Clark), 1 Jul 1996. Road kill salvaged by the U.S. Fish and Wildlife Service (MBM 5269/UWBM 98130; ♀). Earliest NBRC-endorsed record.

2016-046, Summerlin, Las Vegas (Clark), 30 Aug–9 Sep 2016. N. McDonal; J. Thompson, N. Santos.

2017-014, Floyd Lamb Park (Clark), 21 Mar–2 Apr 2017, two birds. B. Morrison (P), P. Gaffey (P; Figure 6), J. Tinsman (P). A photo taken 2 Apr 2017 shows the pair copulating. Reports of this species continued on the NVBirds listserv, www.eBird.org, and Facebook until at least mid-April, and one post related that a single bird was observed into May. One of the birds was reportedly found injured in mid-April, and it did not survive. The specimen was not preserved.

2017-023, Searchlight (Clark), 10 Apr 2017. L. Harter, J. Tobin.

*BROAD-WINGED HAWK *Buteo platypterus* (8**, 0). 2016-038, Corn Creek, Desert NWR (Clark), 12 Apr 1992. NOT ENDORSED.

2016-039, Overton WMA (Clark), 17 Apr 1993. NOT ENDORSED.

TROPICAL KINGBIRD *Tyrannus melancholicus* (1, 0). 2017-009, Las Vegas (Clark), 5 Jul 2014. NOT ENDORSED.

SCISSOR-TAILED FLYCATCHER *Tyrannus forficatus* (12, 3). 2017-050, Diamond Valley (Eureka), 21 May 1965. Collected by A. Biale (MBM 1709 [B-1724]/UWBM 98858; ♂). Earliest NBRC-endorsed record.

2017-011, Bunkerville (Clark), 30 Jun 2016. C. Klinger (P), C. Tomlinson (P).

2017-064, Wendover (Elko), 5 Jun 2017. K. Kough (V).

WHITE-EYED VIREO *Vireo griseus* (8, 1). 2017-039, Ash Meadows NWR (Nye), 11 May 2017. D. Crowe (V).

HUTTON'S VIREO *Vireo huttoni* (0, 0). 2017-013, Spring Mountain Ranch SP (Clark), 28 Feb 2017. NOT ENDORSED. Though Alcorn (1988) mentioned a few observations and specimens collected in Nevada, the NBRC has uncovered no written documentation, photographs, or specimens despite an exhaustive search. Without such evidence, this species was removed from the Nevada checklist in September 2015. In the case of the report in 2017, the observer was sure of his identification but was unable to provide the level of documentation appropriate to reinstating Hutton's Vireo on the checklist as a first state record.

YELLOW-THROATED VIREO *Vireo flavifrons* (8, 1). 2017-037, Floyd Lamb Park (Clark), 9 May 2017. G. Scyphers (P, A).

PHILADELPHIA VIREO *Vireo philadelphicus* (5, 2). 2016-061, Spring Mountain Ranch SP (Clark), 23 Oct 2016. A. Jaramillo (P).

2017-049, Ruby Mountains (Elko), 6 Sep 2017. C. Chappell.

PURPLE MARTIN *Progne subis* (16, 2). 2016-051, Duck Creek, Clark County Wetlands Park (Clark), 1 Aug 2016. B. Zyla.

2017-016, Palm Gardens (Clark), 12 Mar 2017, four birds. C. Van Oosten.

2017-035, Currant Ranch (White Pine), 14 Apr 2017. NOT ENDORSED.

ARCTIC WARBLER *Phylloscopus borealis* (*sensu lato*) (1, 1). 2016-044, Warm Springs Natural Area (Clark), 9 Sep 2016. B. Zyla (P, V; Figure 7). First record for Nevada.

Chesser et al. (2014) split the Arctic Warbler into three species, including the Kamchatka Leaf Warbler (*P. examinandus*) and Japanese Leaf Warbler (*P. xanthodryas*). These similar-appearing species can be distinguished by song, mitochondrial DNA, and slight morphological differences. The visible characteristics needed to identify a silent bird in the field outside of its breeding range, however, have not been established. Withrow et al. (2016) discussed the occurrence of *P. examinandus* in Alaska, where *P. borealis* nests widely. So far as we know no specimen of this group has been collected in North America south of Alaska, but vagrants have been observed in California (nine September records; https://californiabirds.org/), and there is an October 1991 observation from Baja California Sur, Mexico (Pyle and Howell 1993).

Figure 4. Parasitic Jaeger (*Stercorarius parasiticus*), 29 Oct–6 Nov 2016, south end of Pyramid Lake, Washoe County, Nevada.

Photo by G. Scyphers

Figure 5. White Ibis (*Eudocimus albus*), 13–21 Aug 2017, Clark County Wetlands Park and Henderson Bird Viewing Preserve, Clark County, Nevada.

Photo by J. Tinsman

Figure 6. Harris's Hawk (*Parabuteo unicinctus*), 21 Mar–2 Apr 2017, Floyd Lamb Park, Clark County, Nevada.

Photo by P. Gaffey

The subject of this record was silent during the observation. We will revisit this record if additional information enabling field identification becomes available.

PURPLE FINCH *Haemorhous purpureus* (10, 1). 2017-006, Verdi (Washoe), 31 Jan–2 Feb 2017, 14 birds. G. Scyphers (P); M. Meyers (P; Figure 8), J. Bleam (P), A. de Queiroz (P), P. Hurtado. Different observers saw varying numbers of Purple Finches at this location, with 14 being the reported high count for the three-day period.

2017-047, Pahranagat NWR (Lincoln), 27 Aug 2017. NOT ENDORSED.

Of Nevada's 10 endorsed records of the Purple Finch, six are scattered between 2003 and 2014; one or two were recorded in a year, but not every year. Observations have taken place in the western part of the state from Washoe County south to Esmeralda County. Since 2014, observations have been increasing in frequency and number of birds per sighting. The three records in 2016 represented 10 birds, and for the first time Purple Finches were documented in southern Nevada (Clark County).

Though the NBRC endorsed only one record in 2017, at least 14 birds were seen over three days. Records slated for review in 2018 include 11 observations of 26 birds, in both western and southern Nevada.

Alcorn (1988:378) rated the Purple Finch as "rare" in Nevada. Though he listed 12 observations from 1958 through 1985, Ryser (1985) suspected that some sightings could have been of misidentified House Finches (*H. mexicanus*) or Cassin's Finches (*H. cassinii*). None of these reports have been reviewed by the NBRC.

Although the Purple Finch nests as close as the west slope of the Sierra Nevada in California, it is known to breed on the east slope at only two locations, around

Susanville (Lassen County) and near Markleeville (Alpine County), both in California (Beedy and Pandolfino 2013).

SNOW BUNTING *Plectrophenax nivalis* (3, 1). 2017-062, Lake Mead Fish Hatchery, Lake Mead NRA (Clark), 1–2 Jan 1984. J. Cressman, M. Cressman; M. Kasprzyk (P), C. S. Lawson (P, *Am. Birds* 38:341, 1984). Earliest NBRC-endorsed record.

*LARK BUNTING *Calamospiza melanocorys* (18**, 3). 2017-055, Boulder City (Clark), 6 Feb 1940. Collected by S. G. Jewett (MBM 2799/UWBM 97119, ♀). Earliest NBRC-endorsed record. Jewett (1940) reported the largest incursion of the Lark Bunting known in Nevada in February 1940, with up to eight at Corn Creek Ranch, about 100 between Las Vegas and Boulder City, and "a hundred or more" at Searchlight.

2017-053, Searchlight (Clark), 3 May 1952. Collected by G. W. Gullion (MBM 2797/UWBM 97118, ♂). Strangely, Gullion et al. (1959) mentioned only the collection of another specimen taken on the same date, currently housed in the Museum of Vertebrate Zoology, University of California, Berkeley. These birds were part of another incursion: from about 2 to 14 May 1952, Gullion et al. (1959) reported flocks around Searchlight, the Las Vegas Valley, Coyote Wells, Pahranagat Valley, Delamar Flats, and Meadow Valley.

2017-054, Overton WMA (Clark), 26 Aug 1996. Collected by D. F. Parmelee (MBM 4257/UWBM 97120, imm. ♀, moderate fat, no molt, skull not ossified).

GRASSHOPPER SPARROW *Ammodramus savannarum* (14, 2). 2017-066, Spring Mountain Ranch SP (Clark), 17 Oct 2017. B. Zyla (P).

2017-067, Ash Meadows NWR (Nye), 17 Oct 2017. D. Feener (P; Figure 9).

BALTIMORE ORIOLE *Icterus galbula* (13, 1). 2017-065, Floyd Lamb Park (Clark), 12 Sep 2017. J. Streit (P).

RUSTY BLACKBIRD *Euphagus carolinus* (6, 1). 2017-059, Henderson tailing ponds (Clark), 21 Mar 1978, two birds. Collected by C. S. Lawson (MBM 3067 [B-1697]/UWBM 101943; ♀, light fat, head and neck in molt; MBM 3068 [B-1696]/UWBM 101944; ♀, heavy fat, head and neck in molt; Alcorn 1988).

WORM-EATING WARBLER *Helmitheros vermivorum* (13, 1). 2017-043, Dyer (Esmeralda), 28 May 2017. G. Scyphers (P).

*PROTHONOTARY WARBLER *Protonotaria citrea* (15**, 1). 2017-025, Little Valley (Washoe), 31 May 1962. Collected by F. A. Ryser (UNMB 1222; ♂, found dead; Ryser 1963). Earliest NBRC-endorsed record.

*TENNESSEE WARBLER *Oreothlypis peregrina* (19**, 2). 2017-026, Corn Creek, Desert NWR (Clark), 26 May 1965. Collected by C. G. Hansen (MBM 2293 [B-872]/UWBM 98915; ♀, light fat, skull fully ossified).

2017-027, Corn Creek, Desert NWR (Clark), 26 May 1965. Collected by C. G. Hansen (MBM 2292 [B-873]/UWBM 98914; ♂, moderate fat, skull fully ossified).

The two specimens constitute the earliest NBRC-endorsed records, as they were collected on the same date (Austin 1969).

MOURNING WARBLER *Geothlypis philadelphia* (3, 1). 2017-030, Dyer (Esmeralda), 27–28 Sep 1991. P. E. Lehman; S. Finnegan (P; *Am. Birds* 46:129, 1992). Earliest NBRC-endorsed record.

*HOODED WARBLER *Setophaga citrina* (11**, 1). 2017-004, Dyer (Esmeralda), 22–23 May 1987. P. E. Lehman, D. Roberson (P; *Am. Birds* 41:469, 1987). Earliest NBRC-endorsed record.

Figure 7. Arctic Warbler (*Phylloscopus borealis*) *sensu lato*, 9 Sep 2016, Warm Springs Natural Area, Clark County, Nevada.

Photo by B. Zyla

BAY-BREASTED WARBLER *Setophaga castanea* (4, 1). 2017-041, Walker Lake (Mineral), 8 Jun 2017. F. Fogarty. Adult male.

BLACKBURNIAN WARBLER *Setophaga fusca* (9, 2). 2017-061, Floyd Lamb Park (Clark), 2 Oct 2017. P. Gaffey (P).

2017-063, Blue Diamond (Clark), 9–10 Oct 2017. B. Miller (P); C. Moqtaderi, B. Zyla (P).

Figure 8. Purple Finch (*Haemorhous purpureus*), 31 Jan–2 Feb 2017, Verdi, Washoe County, Nevada.

Photo by M. Meyers

Figure 9. Grasshopper Sparrow (*Ammodramus savannarum*), 17 Oct 2017, Ash Meadows National Wildlife Refuge, Nye County, Nevada.

Photo by D. Feener

*BLACKPOLL WARBLER *Setophaga striata* (13**, 1). 2017-028, Corn Creek, Desert NWR (Clark), 2 Oct 1974. Collected by C. S. Lawson (UNMB 1782; imm. ♀, moderate fat, skull unossified; Alcorn 1988). Earliest NBRC-endorsed record.

CANADA WARBLER *Cardellina canadensis* (8, 3). 2017-022, Hilltop Campground, Spring Mountains (Clark), 19 Jun 1982. M. V. Mowbray (*Am Birds* 36:1002, 1982). Earliest NBRC-endorsed record.

2017-021, Boulder City (Clark), 3 Oct 1982. M. Kasprzyk (*Am. Birds* 37:207, 1983).

2017-040, Key Pittman WMA (Lincoln), 31 May 2017. C. Hines (P).

HEPATIC TANAGER *Piranga flava* (2, 0). 2016-018, Floyd Lamb Park (Clark), 29–30 Dec 1973. NOT ENDORSED.

2016-017, Las Vegas (Clark), 30 May 1994. NOT ENDORSED.

2017-024, Blue Diamond (Clark), 7 Oct 1994. NOT ENDORSED.

The NBRC has reviewed eight reports of the Hepatic Tanager, including these three. Only two have been endorsed (2002 and 2014). Any of these listed here could have represented the earliest observation in Nevada, but documentation was not sufficient for endorsement.

SCARLET TANAGER *Piranga olivacea* (8, 1). 2017-068, Spring Mountain Ranch SP (Clark), 1 Nov 2017. C. Gaffey (P), P. Gaffey (P).

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LITERATURE CITED

Alcorn, J. R. 1988. The Birds of Nevada. Fairview West Publishing, Fallon, NV.

Austin, G. T. 1968a. Additional bird records for southern Nevada. Auk 85:692; doi 10.2307/4083386.

Austin, G. T. 1968b. The occurrence of certain nonpasserine birds in southern Nevada. Condor 70:391; doi 10.2307/1365941.

Austin, G. T. 1969. New and additional records of some passerine birds in southern Nevada. Condor 71:75–76; doi 10.2307/1366057.

Beedy, E. C., and Pandolfino, E. R. 2013. Birds of the Sierra Nevada: Their Natural History, Status and Distribution. Univ. Calif. Press, Berkeley.

Chesser, R. T., Banks, R. C., Cicero, C., Dunn, J. L., Kratter, A. W. Lovette, I. J., Navarro-Sigüenza, A. G., Rasmussen, P. C., Remsen, J. V. Jr., Rising, J. D., Stotz, D. F., and Winker, K. 2014. Fifty-fifth Supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 131:CSi–CSxv.

Chesser, R. T., Burns, K. J., Cicero, C., Dunn, J. L., Kratter, A. W., Lovette, I. J., Rasmussen, P. C., Remsen, J. V. Jr., Rising, J. D. Stotz, D. F., and Winker, K. 2017. Fifty-eighth Supplement to the American Ornithological Society's *Check-list of North American Birds*. Auk 134:751–773; doi 10.1642/AUK-17-72.1.

Gullion, G. W., Pulich, W. M., and Evenden, F. G. 1959. Notes on the occurrence of birds in southern Nevada. Condor 61:278–297; doi 10.2307/1365500.

Jewett, S. G. 1940. The Lark Bunting in southern Nevada. Condor 42:307.

Meyers, M. 2016. Nevada Bird Records Committee report for 2016. W. Birds 47:120–137; doi 10.21199/WB47.2.2.

Pyle, P., and Howell, S. N. G. 1993. An Arctic Warbler in Baja California, Mexico. W. Birds 24:53–56.

Ryser, F. A. 1963. Prothonotary Warbler and Yellow-shafted Flicker in Nevada. Condor 65:334.

Ryser, F. A. Jr. 1985. Birds of the Great Basin: A Natural History. Univ. Nev. Press, Reno.

Tinsman, J., and Meyers, M. 2016. Nevada Bird Records Committee report for 2015. W. Birds 47:274–290; doi 10.21199/WB47.4.2.

Titus, C. K. 1996. Field list of the birds of Nevada. Red Rock Audubon Soc., Las Vegas.

Withrow, J. J., Gibson, D. D., Gerasimov, Y., Gerasimov, N., Shestopalov, A., and Winker, K. 2016. Occurrence and taxonomy of Arctic Warblers (*Phylloscopus borealis*) *sensu lato* in North America. Wilson J. Ornithol. 128:268–277; doi 10.1676/wils-128-02-268-277.1.

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RETURN OF BEACH-NESTING SNOWY PLOVERS TO LOS ANGELES COUNTY FOLLOWING A 68-YEAR ABSENCE

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ABSTRACT: From 1950 through 2016, the Western Snowy Plover (*Charadrius nivosus nivosus*) did not nest on Los Angeles County beaches. But between 16 April and 21 May 2017, up to four pairs initiated five nests in Los Angeles County and one at a new site in Orange County. Between 12 May and 15 June 2017, ten eggs hatched, including one incubated at a wildlife care facility. From these, a minimum of three chicks were known to have fledged. One nest was destroyed by high winds, a second by either high winds or possibly human disturbance. Plovers selected sites within or adjacent to areas protected by fenced enclosures. We protected all nests with mini-exclosures. We suggest that this recolonization was due to the combination of protection of potential nesting sites, protection of individual nests, and exceptional recent productivity at other nesting sites in southern California. The fenced enclosures provided essential protection from vehicles and encouraged accumulation of beach wrack around the nests and feeding areas. Additionally, once nests were established, the placement of exclosures provided essential protection from native predators and pet and feral dogs and cats. Protection with both fencing and exclosures, combined with management to minimize disturbance, will be essential for maintaining this new nesting population.

Prior to 1950, the Western Snowy Plover (*Charadrius nivosus nivosus*) nested on sandy beaches and dunes in Los Angeles and Orange counties (Grinnell and Miller 1944, Western Foundation for Vertebrate Zoology unpubl. data, Allen et al. 2016). The sites included Redondo, Ballona (Venice/Playa Del Rey), Los Angeles, and Malibu beaches in Los Angeles County (Allen et al. 2016) and Sunset Beach, Bolsa Chica Beach, Newport Beach, and Balboa Beach in Orange County (Page and Stenzel 1981). Subsequently, the plovers' ability to nest on beaches was greatly reduced through increased disturbance by sand grooming (raking), recreation, predators, and regular vehicular traffic, including beach grooming, maintenance, and driving of police and lifeguard trucks. The last active nest of a plover on a Los Angeles County beach was reported at Manhattan Beach in 1949 (Stager 1949). Since then, no cases of a plover nesting within Los Angeles County have been documented (Allen et al. 2016), although the county's beaches were not systematically surveyed during the nesting season from the 1970s to 2004

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(G. Page pers. comm. 2010, Ryan et al. 2010). Nevertheless, plovers have continued to winter on Los Angeles County beaches, typically occurring from early July to April (Page et al. 1986, Ryan et al. 2010). In Orange County, a single pair nested in dunes along Balboa Beach in the city of Newport Beach in 2008, 2009, and 2013 (P. Knapp, R. Griswold pers. comm.).

Following the population's designation as threatened, the U.S. Fish and Wildlife Service (USFWS 2012) listed six segments of sandy beach in Los Angeles County and three segments of sandy beach in Orange County as critical habitat for the Snowy Plover, largely because of the importance of these sites for wintering. Los Angeles and Orange counties are within Recovery Unit 6 (RU6) of the species' recovery plan (USFWS 2007). Goals of the plan include protecting wintering plovers from wrack removal, vehicles, pets, and human-related disturbance, and increasing the breeding population in RU6 to 500 individuals. This plan encourages activities that could lead to recolonization of currently unoccupied suitable habitat across Los Angeles and Orange counties (USFWS 2007). Despite these recommendations and a letter to beach managers in 2016 (USFWS 2016) most local beach-management agencies continue to allow wrack removal and vehicles flushing plovers, while restrictions on pets are only rarely enforced (Ryan et al. 2010).

Signage and protective enclosures made of wood-slat fencing and rope to cordon off areas of sandy beaches have been used elsewhere in California, including state parks around Monterey Bay in San Luis Obispo County, Oceano Dunes State Vehicular Recreational Area, and Coal Oil Point Reserve (Sandoval and Nielsen 2018, California State Parks 2018a, b). These provide a visual indicator demarking habitat plovers occupy for roosting and breeding, minimizing intrusion into those habitats. Mini-exclosures are also used, even though at some sites they have increased depredation on incubating adults and fledglings (Neuman et al. 2004). These problems, however, have not arisen at other sites (Dinsmore et al. 2014). Between 2005 and 2016 four of these enclosures were installed at Malibu Lagoon State Beach, Santa Monica Beach, and Dockweiler State Beach. These enclosures have provided protection from disturbance and allowed for habitat recovery (Ryan et al. 2010). Nesting Snowy Plovers recovered after the installation of enclosures at the Coal Oil Point Reserve (Sandoval and Nielsen 2018). Here we document the return of nesting by Snowy Plovers to sandy beaches on the mainland of Los Angeles and Orange counties after similar management.

METHODS

In 2007, we began year-round systematic surveys for roosting plovers on sandy beaches suitable for plover breeding in Los Angeles County and extended these surveys to Orange County in 2014 (Ryan et al. 2017). Prior to this, Point Reyes Bird Observatory organized surveys in winter from 1979 to 1986 (Page et al. 1986) and continued subsequently though not all beaches were surveyed in all years. Then beach segments with known roosts were surveyed twice per year as part of the USFWS's winter and breeding season "window surveys," starting with Los Angeles County in 2004 and Orange County in 2008. Surveys concentrated on areas of known roosting, and not all beaches were covered prior to 2007 (Ryan et al. 2017). Since

2007 beach surveys have consisted of trained volunteers and permitted biologists surveying suitable habitat four times per year and roosts monthly (Ryan et al. 2017).

As part of these efforts, fenced enclosures (rope, wood-slat, or plastic, open on one side with signage) have been installed at four sites. Since 2008, the California Department of Parks and Recreation has maintained an enclosure measuring 120–180 × 30–90 m at Malibu (34° 1′ 55″ N, 118° 40′ 53″ W). Two sites are in Santa Monica: one installed by the city of Santa Monica at 34° 1′ 17″ N, 118° 30′ 45″ W measured 180 × 25 m in 2005 and 2006 and 90 × 25 m subsequently; the other, installed at 34° 1′ 27″ N, 118° 30′ 57″ W in 2016 in the Bay Foundation's Santa Monica Beach Restoration Area, measures 143 × 50 m. The fourth, at Dockweiler State Beach (33° 56′ 45″ N, 118° 26′ 40″ W) measures 100 × 33 m and has been maintained since 2010 by the Los Angeles County Department of Beaches and Harbors (Johnston et al. 2017, Ryan et al. 2017). Enclosures have helped reduce human disturbance and have encouraged wrack and dune habitats to begin forming (Johnston et al. 2017, Ryan et al. 2017). Additionally, the Bay Foundation's site in Santa Monica was seeded with native dune plants in 2016 with the goals of restoring coastal strand vegetation, increasing ecologically functional habitat on Los Angeles County beaches, and evaluating those beaches for their potential to improve coastal resilience (Johnston et al. 2017).

In order to protect nests found from common predators, we deployed mini-exclosures. We constructed these from 5 × 10-cm wire mesh, measuring 70 cm × 70 cm × 70 cm. The bottom 10 cm was sunk into the sand and anchored with aluminum tent stakes. Following installation, we observed the plovers to ensure that the adults returned to the nest within 20 minutes.

RESULTS

Malibu Lagoon State Beach

*Nest A***.** On 21 April 2017 C. Jauregui and J. Realegeno detected three plovers (one color-banded; right: blue/blue, left red/red [RR:BB]) and found a nest scrape with no eggs. On 28 April T. P. Ryan, F. Franken, and V. Franken-Ruiz observed one egg, two males, and one female (RR:BB) (Table 1). On 29 April, Dellith, J. King, and T. P. Ryan observed one egg (Figure 1) and installed a mini-exclosure over the nest. King, M. Moser, and M. Ryan extended the "symbolic" (rope) fencing 50 feet from the nest to provide a buffer from the public beach. Monitors observed one male and one female (RR:BB). On 5 May, Dellith and D. Lefer observed the exclosure was damaged, likely by people, or by a heavy object being blown into it. Unusually high winds from 18:00 on 27 April to 01:00 on 30 April had sustained speeds of 70 km/hr and gusts to 88 km/hr. Between 30 April and 5 May the plovers abandoned this nest. We consider nest A to have been unsuccessful.

Nest B. On 4 May 2017, G. Murayama and L. Loeher found a second nest with at least one egg, with an incubating male and the same female (RR:BB) (Table 1). With D. Lefer, J. King, and D. Deppe, they returned on 5 May to extend the symbolic fencing around the nest. That day Dellith

Table 1 Outcomes of Snowy Plover Nests in Coastal Los Angeles and Orange Counties, 2017

Location/ID	Encountered/ Estimated Initiation	Protected by/ Date	Eggs	Hatched/ Date	Fledged	Outcome
Malibu A[a]	28 April/ 27 April	Enclosure[b] and exclosure 29 April	1	0	0	Eggs destroyed by wind or human disturbance
Malibu B[a]	4 May/ 1–3 May	Enclosure[b] and exclosure 5 May	3	3 1–4 June	1	1 chick fledged, others likely depredated
Santa Monica	18 April/ 17 April	Enclosure and exclosure 24 April	3	0	0	Eggs destroyed by wind
Dockweiler A	27 April/ 11–12 April	Enclosure and exclosure 27 April	3	3 12–13 May	0	3 chicks depredated by Ring-billed Gull
Dockweiler B	9 May/ 6 May	Enclosure and exclosure 10 May	3	3 6-8 June	1	1 chick fledged, others likely depredated
Huntington State Beach	21 May/ 15 May	Enclosure[c] and exclosure 21 May	1	1[d] 15 June	1	1 chick fledged, with human assistance
Total	6 nests		14	10	3	

[a]Same banded female associated with both nests.

[b]Existing enclosure extended to provide 15-m buffer for nest.

[c]No existing enclosure; a ring of cones of radius 30 m was placed as an enclosure on 21 May, followed by an 45 × 45-m wood slat-fencing on 23 May.

[d]Adult plovers abandoned the nest, egg collected and incubated, chick hatched and fledged in captivity.

and Lefer also installed an exclosure around the nest, which contained two eggs and was being attended by both adults. On 9 May, Lefer completed installation of the remaining symbolic fencing and observed an adult plover incubating. Monitors observed incubation between 9 May and 3 June. They observed one egg on 1 June, an adult with two chicks and one egg in the nest on 3 June, and a smaller chick with an adult and no eggs in the nest on 4 June. We infer that three eggs successfully hatched between 1 and 4 June. Monitors observed a single plover chick on 9 June and 14 July. On 30 June two additional juvenile, possibly migrants, were observed; they were chased by the male. Monitors observed one juvenile plover attended by the male on 7 and 14 July. We consider nest B to have been successful.

Santa Monica State Beach: The Bay Foundation's Santa Monica Beach Restoration Area

Cooper found a single nest with one egg at this site on 18 April (Table 1, Figure 2). On 24 April, Dellith, T. P. Ryan, Plauzoles, and Johnston installed an exclosure around the nest, which then contained three eggs and was being attended by two males, one incubating eggs. After the exclosure was installed, the male immediately returned to the nest before the biolo-

Figure 1. A single Snowy Plover egg in a unique nest covered with driftwood at Malibu Lagoon State Beach, Los Angeles County, California, 29 April 2017.

Photo by Thomas P. Ryan

Figure 2. The first Snowy Plover nest located along the mainland coast of Los Angeles County since 1949, at Santa Monica by Daniel S. Cooper, 18 April 2017.

Photo by Thomas P. Ryan (24 April 2017) gists had exited the protected site (Figure 3). It remained on the nest during the subsequent observation period. Informative signage was posted around the perimeter of the restoration area restricting access to the area. In this area the unusually strong wind extended from 20:00 on 27 April to 02:00 on 29 April; sustained winds of 56 km/hr with gusts to 79 km/hr were recorded at the Santa Monica Pier, 1.5 miles south. The resulting blowing sand covered the nest and eggs. Cooper found no nest, eggs, or adult plovers within the restoration area on 30 April, but did observe three plovers at the top of the beach slope. On 4 May Plauzoles observed two females and one adult male plover south of the restoration area, approximately 15 m south of Lifeguard Tower 4, near the wrack line. We consider this nest to have been unsuccessful.

Dockweiler State Beach Plover Enclosure

Nest A. Vigallon found a plover nest with two or three eggs on 27 April 2017; later that day, K. Kughen and T. P. Ryan installed an exclosure and observed three eggs (Table 1). The nest was incubated by a female; three males were nearby. We estimate a nest-initiation date of 11–12 April as early-season clutches typically hatch on day 31 (Warriner et al. 1986). Three eggs hatched between 12 and 13 May. However, Vigallon observed the depredation of all three chicks by a Ring-billed Gull (*Larus delawarensis*) on 15 May. We consider nest A to have been unsuccessful.

Nest B. P. Prichard found a second nest with two eggs on 9 May 2017. The next day, S. West, Vigallon, and Realegeno installed an exclosure and observed three eggs (Table 1). The nest was likely initiated on 6 May. Monitors observed two chicks and one egg on June 7. Three eggs hatched between 6 and 8 June. All three chicks survived until 11 June, but only one chick was observed after 14 June. Migrant plovers began arriving at the site on 27 June. On that day the chick was observed with the male, which chased other plovers. The chick was stretching its wings, a pre-fledging behavior, on 7 July and flapping and running on 13 July. A fledgling, likely the same individual, was observed with the plover flock on 20 July. We consider nest B to have been successful.

Huntington State Beach

On 21 May 2017, B. Aird, C. George, and D. Lithgow, on a beach-wide survey, found a plover nest with one egg and a male and female in attendance at Huntington State Beach (Table 1). The park's personnel placed orange road cones and signage at a radius of 30 m around the nest, and Nguyen installed an exclosure around the nest at 12:35 that day. The plovers returned to the nest and were incubating within 15 minutes. On 23 May, the cones were replaced by a 45 × 45-m wood-slat wind fence that surrounded the nest on three sides. Adults incubated and foraged at the wrack line throughout its installation. No adults were observed incubating after 23 May. P. Knapp turned the egg up on 25 May in an attempt to determine if it was still being incubated. It remained turned up and no adults were observed. On 28 May he collected the egg, with approval from the USFWS, and delivered it to the Wetlands and Wildlife Care Center in Huntington Beach. It was placed in their incubator (Figure 4) and hatched on 15 June. The chick was banded

Figure 3. Snowy Plover upon return to its nest immediately after installation of a protective exclosure at Santa Monica, Los Angeles County, California, 24 April 2017. An American Crow was foraging in the background.

Photo by Thomas P. Ryan

and released at the Bolsa Chica State Ecological Reserve on 23 July (see photo on this issue's inside back cover). We consider this nest to have been successful with human assistance.

DISCUSSION

Between 16 April and 21 May 2017, plovers initiated five nests in Los Angeles County and one on a sandy outer beach in Orange County. In Los Angeles County, the plovers selected sites within or adjacent to areas already protected by enclosures. Our protecting all nests with exclosures of a standard design did not appear to influence mortality. One nest was

Figure 4. Snowy Plover eggs in the incubator at the Huntington Beach Wetlands and Wildlife Care Center, 17 June 2017.

Photo by Bruce Aird

destroyed by high winds, a second either by high winds or possibly by human disturbance. Between 11 April and 15 May six nests containing a combined total of 14 eggs were initiated (Table 1). Between 12 May and 15 June 2017, ten eggs hatched, including one incubated at the Wetlands and Wildlife Care Center (Table 1). From these, a minimum of three chicks fledged, including one assisted by the Wetlands and Wildlife Care Center. These were the first nests with eggs or to produce young along the coast of mainland Los Angeles County since 1949.

The female (RR:BB) that nested at Malibu hatched in 2016 from a nest 210 km west-northwest at Oceano Dunes State Vehicular Recreation Area, San Luis Obispo County (A. Clark pers.comm.). She was detected at both Malibu and Zuma Beach (14 km to the west) in 2016 (F. Bidstrup pers. comm.). We suggest that these nestings were due to the combination of increased protection of the sites with enclosures, protection of nests with exclosures, and exceptional recent productivity elsewhere in southern California (USFWS unpubl. data, 2016).

Currently, most sandy beaches of mainland Los Angeles County are subject to daily grooming, vehicles operate within areas used for roosting and feeding by nonbreeding plovers, and pet regulations are rarely enforced (Ryan et al. 2010). Grooming removes naturally occurring kelp as well as trash and drastically reduces the population of invertebrates that have adapted to break down kelp, including prey items favored by plovers (Dugan et al. 2003, Page et al. 2009). The enclosure also provides a buffer to disturbance. Lafferty (2001a, b) showed plovers are disturbed when approached within 30 m whether by dogs, humans, crows, and horses, with dogs disturbing the roosting plovers disproportionally. Additionally, Page et al. (1977) found that plovers left their nests 78% of the time when people were within 50 m and 34% of the time when people were within 100 m. Enclosures of wooden slats or symbolic fencing are used elsewhere, with notable success at Coal Oil Point Reserve in Santa Barbara where each year fencing is installed to protect both wintering (300–400 m) and breeding (800 m) plovers (Sandoval and Nielsen 2018). The placement of enclosures provided a buffer from disturbance and protection from vehicles, allowed natural beach topography to develop, and encouraged accumulation of beach wrack where plovers forage around the nests and feeding areas. Additionally, once nests were established, the placement of smaller exclosures provided protection from common beach predators such as the American Crow (*Corvus brachyrhynchos*), raccoon (*Procyon lotor*), and pet and feral dogs and cats, all of which continue to be observed at these sites. Although there have been reports of increased predation on fledglings and incubating adults from these types of exclosures at some sites (e.g., Neuman et al. 2004), we decided that without protection depredation of these nests was likely. We did not observe any mortality of adults or recent fledglings associated with the exclosure. All fledglings had moved away from the nest before they disappeared. We recommend that surveys and protective measures continue indefinitely. We further recommend the implementation of a minimum 150-m special-protection zone surrounding the center of plover roosts and nesting areas, in which grooming of and driving on beaches are curtailed or restricted with best-management practices, large recreational events are excluded, and enforcement of existing regulations regarding dogs on beaches is increased, as recommended by the USFWS (2016).

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LITERATURE CITED

Allen, L. W., Garrett, K. L., and Wimer, M. C. 2016. Los Angeles County Breeding Bird Atlas. Los Angeles Audubon Soc., Los Angeles.

California Department of Parks and Recreation (California State Parks). 2018a. Nesting of the California Least Tern and Western Snowy Plover at Oceano Dunes State Vehicular Recreation Area, San Luis Obispo County, California, 2018 Season. California Department of Parks and Recreation, Off-Highway Motor Vehicle Division, Oceano Dunes District, Oceano, California.; https://www.fws.gov/arcata/es/birds/wsp/documents/siteReports/California/2018%20Oceano%20Dunes%20State%20Vehicular%20Recreation%20Area%20Annual%20nesting%20report%20of%20western%20snowy%20plover%20and%20California%20least%20tern.pdf.

California Department of Parks and Recreation (California State Parks). 2018b. Annual Report for the Western Snowy Plover at San Luis Obispo Coast District in 2018. California State Parks, San Luis Obispo Coast District, San Simeon, California.; https://www.fws.gov/arcata/es/birds/wsp/documents/siteReports/California/2018%20San%20Luis%20Obispo%20Coast%20Annual%20WSP%20Report.pdf.

Dinsmore, S. J., Lauten, D. J., Castelein, K. A., Gaines, E. P, and Stern, M. A. 2014. Predator exclosures, predator removal, and habitat improvement increase nest success of Snowy Plovers in Oregon, USA. Condor 116:619–628; doi 10.1650/CONDOR-14-7.1.

Dugan, J. E., Hubbard, D. M., McCrary, M. D., and Pierson, M. O. 2003. The response of macrofauna communities and shorebirds to macrophyte wrack subsidies on exposed sandy beaches of southern California. Estuarine, Coastal and Shelf Sciences 58S:25–40; doi 10.1016/S0272-7714(03)00045-3.

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

Johnston, K., Grubbs, M., and Abbott, R. 2017. Santa Monica Beach Restoration Pilot Project: Year 1 annual report. Prepared by The Bay Foundation for the city of Santa Monica, California Coastal Commission, Metabolic Studio, U.S. Environmental Protection Agency, and California Department of Parks and Recreation; www.santamonicabay.org/wp-content/uploads/2014/04/SaMo-Beach-Project-Year-1-Report_FINAL_Aug2017.pdf.

Lafferty, K.D. 2001a. Birds at a Southern California beach: Seasonality, habitat use and disturbance by human activity. Biodiv. and Cons. 10:1949–1962; doi 10.1023/A:1013195504810.

Lafferty, K.D. 2001b. Disturbance to wintering western Snowy Plovers. Biol. Cons. 101:315–325; doi 10.1016/S0006-3207(01)00075-1.

Neuman , K., Page, G. W., Stenzel, L. E., Warriner, J. C., and Warriner, J. S. 2004. Effect of mammalian predator management on Snowy Plover breeding success. Waterbirds 27:257–263; doi 10.1675/1524-4695(2004)027[0257:EOMPMO]2.0.CO;2.

Page, G. W., and Stenzel, L. E. 1981. The breeding status of the Snowy Plover in California. W. Birds 12:1–40.

Page, G. W., Warriner, J. S., Warriner, J. C., and Halbeisen, R. M. 1977. Status of the Snowy Plover on the northern California coast. Part I: Reproductive timing and success. Calif. Dept. Fish and Game, Nongame Wildlife Investigations, Sacramento.

Page, G. W., Bidstrup, F. C., Ramer, R. J., and Stenzel, L. E. 1986. Distribution of wintering Snowy Plovers in California and adjacent states. W. Birds 17:145–170.

Page, G. W., Stenzel, L. E., Warriner, J. S., Warriner, J. C., and Paton, P. W. 2009. Snowy Plover (*Charadrius alexandrinus*), *in* The Birds of North America Online (A. Poole, ed.)., no. 154. Cornell Lab Ornithol., Ithaca, NY; doi 10.2173/bna.154.

Ryan, T. P., Vigallon, S., Plauzoles, L. , Almdale, C., Montijo, R., and Magier, S. 2010. The Western Snowy Plover in Los Angeles County, California. Prepared for the Calif. Dept. Fish and Wildlife, Sacramento, by Ryan Ecological Consulting, Pasadena, CA.; https://nrm.dfg.ca.gov/documents/DocViewer.aspx.

Ryan, T. P., Vigallon, S., Plauzoles, L. , Egger, C., Sheakley, S., Griswold, R., and Eastman, B. 2017. The Western Snowy Plover in Los Angeles and Orange counties, California: September 2014 to February 2017. Calif. Dept. Fish and Wildlife, Wildlife Branch, Nongame Wildlife Program Report 2017-01; www.fws.gov/arcata/es/birds/wsp/documents/siteReports/California/2014-2017%20Western%20Snowy%20Plover%20in%20Los%20Angeles%20and%20Orange%20Counties%20CA_Ryan%20et%20al.pdf.

Sandoval, C., and Nielsen, J. 2018. 2017 final report on the Western Snowy Plover, Coal Oil Point Reserve, University of California, Santa Barbara, CA. Marine Science Institute, University of California, Santa Barbara, CA.; https://copr.nrs.ucsb.edu/sites/default/files/images/COPR_WSP%20Report_2017_20180201.pdf.

Stager, K. E. 1949. Nesting season. Southern Pacific coast region. Audubon Field Notes 3:252.

U.S. Fish and Wildlife Service [USFWS]. 2007. Recovery plan for the Pacific coast population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*): Vol. I, Recovery plan. U.S. Fish and Wildlife Service, Sacramento.

U.S. Fish and Wildlife Service [USFWS]. 2012. Endangered and threatened wildlife and plants: Revised designation of critical habitat for the Pacific coast population of the Western Snowy Plover; final rule. Fed. Register 77 (118): 36728–36869.

U.S. Fish and Wildlife Service [USFWS]. 2016. Protective measures for Western Snowy Plover on beaches in Los Angeles County, California. U.S. Fish and Wildlife Service, Ventura, CA.

Warriner, J. S., Warriner, J. C., Page, G. W., and Stenzel, L. E. 1986. Mating system and reproductive success of a small population of polygamous Snowy Plovers. Wilson Bull. 98:15–37.

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HISTORICAL AND GEOGRAPHICAL PATTERNS IN *KNEMIDOKOPTES* MITE INFESTATIONS IN SOUTHERN CALIFORNIA BIRDS

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ABSTRACT: We investigated the causes of toe and foot loss and other deformities long observed in urban Brewer's Blackbirds (*Euphagus cyanocephalus*) in southern California. Histopathologic evaluation showed that afflicted individuals suffered from infestations of mites compatible with *Knemidokoptes* spp. (scaly-leg mites). We developed a case definition based on gross lesions in confirmed cases and the scientific literature to search two large ornithological collections for specimens exhibiting these lesions. In evaluating specimens among seven species of the family Icteridae, we found 34 specimens in the two collections with lesions consistent with *Knemidokoptes* spp. Species afflicted included the Red-winged Blackbird (*Agelaius phoeniceus*; 12 of 978 specimens), Brewer's Blackbird (10/337 specimens), Tricolored Blackbird (*A. tricolor*; 4/101 specimens), Brown-headed Cowbird (*Molothrus ater*; 4/828 specimens), and Great-tailed Grackle (*Quiscalus mexicanus*; 4/224 specimens). The earliest cluster of California specimens dated to 1962. Fourteen of the 34 specimens exhibiting the condition were collected since 1999. No specimens of the Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*; 0 of 214 specimens) or Western Meadowlark (*Sturnella neglecta*; 0/278) were found with the condition.

Flocking blackbirds of the genera *Agelaius*, *Molothrus*, *Euphagus*, and *Quiscalus* are generally abundant and highly visible members of local avifaunas. As such, they are excellent candidates or sentinel species for tracking the occurrence of disease in local bird populations. In the past several years, a noticeable prevalence of toe and foot loss and other foot deformities among urban Brewer's Blackbirds (*Euphagus cyanocephalus*) in southern California has resulted in public concern and media attention to this condition (e.g., Brennan 2013, Figure 1). We investigated the causes of this condition through histopathologic evaluation of several recently collected blackbirds. We also searched the collections of the Natural History Museum of Los Angeles County and San Diego Natural History Museum to locate specimens showing lesions consistent with those found in local wild populations, to investigate the geographical and temporal patterns of this condition.

One of the more prevalent but poorly understood ectoparasites afflicting wild bird populations worldwide is *Knemidokoptes*, a genus of mites (Acari; Astigmata; Epidermoptidae), commonly associated with proliferative lesions on the shanks of free-ranging backyard chickens. In birds, infestations of these mites can cause a condition known as scaly-leg (Turk 1950), because

Figure 1. Female Brewer's Blackbird in urban San Diego showing a missing toe and typical hyperkeratotic lesions due to *Knemidokoptes*.

Photo by Kevin B Clark

Figure 2. Red-winged Blackbird museum specimen with typical hyperkeratotic lesions due to *Knemidokoptes*.

Photo by Bruce Rideout

the mites induce a remarkable hyperkeratosis and thickening of the scales on the anterior portions of the legs.

These mites are typically transmitted through close proximity among roosting birds. Latta (2003) found that populations of birds that roost communally have higher rates of infection with *Knemidokoptes*, whereas those in which communal roosting is less prevalent have lower rates of infection.

METHODS

Complete postmortem exams were conducted on a selection of passerines submitted freshly dead to the San Diego Natural History Museum (SDNHM; n = 5) or through Project Wildlife, a wildlife-rehabilitation facility in San Diego County (n = 3). A complete representative set of tissues, including skin from legs and feet, was collected in 10% neutral-buffered formalin and processed routinely. Tissues were sectioned at 5 µm, stained with hematoxylin and eosin, and evaluated by light microscopy by a board-certified veterinary pathologist (Rideout). A diagnosis of *Knemidokoptes* spp. infection was made when ectoparasites of appropriate size (300–400 µm in diameter) and shape (round in transverse section), with short jointed appendages and striated muscles, were found in skin sections exhibiting marked hyperkeratosis and scaling. A diagnosis of poxvirus infection was made when pathognomonic eosinophilic cytoplasmic inclusions (Bollinger bodies) were found in markedly hyperplastic epidermal squamous cells.

We screened the ornithological collections of the San Diego Natural History Museum (SDNHM, ~50,000 specimens) and Los Angeles County Museum of Natural History (LACM, ~100,000 specimens) for additional cases compatible with *Knemidokoptes* sp. infection. We defined a case, on the basis of gross lesions observed in histopathologically confirmed cases (n = 5) and descriptions in the literature (Herman et al. 1962, Pence et al. 1999), as any bird with grossly evident regional hyperkeratosis and scaling affecting unfeathered portions of the legs and feet (e.g., Figure 2). Toes or the entire foot may have been lost, but the nodular thickenings and inflammatory crust typically associated with poxvirus infections must be absent. It is likely that incipient infections were missed.

In order to verify the predictive value of this case definition, we collected skin samples from one museum specimen (Red-winged Blackbird, *Agelaius phoeniceus*) and one fresh necropsy case (American Robin, *Turdus migratorius*, San Diego Zoo RP24085) that met the case definition for histopathologic evaluation described above, and extracted mites by dissection from anterior tibiotarsal skin lesions softened with sterile saline. In the laboratory, mites were cleared in lactophenol, mounted in Hoyer's medium, and subsequently identified morphologically as *Knemidokoptes jamaicensis* Turk by OConnor, on the basis of morphologic features and measurements established by Fain and Elsen (1967). Voucher specimens from these hosts are deposited in the University of Michigan Museum of Zoology.

We limited our analysis of specimens to species of the family Icteridae for which over 100 specimens were available between the two museum collections. This sample encompassed seven species, the Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), Red-winged Blackbird, Tricolored Blackbird (*A. tricolor*), Great-tailed Grackle (*Quiscalus mexicanus*), Brown-headed Cowbird (*Molothrus ater*), Brewer's Blackbird, and Western Meadowlark (*Sturnella neglecta*). Years of collection of the screened specimens ranged from 1886 to 2014 at LACM and 1876 to 2015 at SDNHM.

RESULTS

The mites extracted from both the fresh necropsy case and from the sample museum specimen were identified as *Knemidokoptes jamaicensis*. This mite species is prevalent in cases of scaly-leg keratosis in passerine birds in North America and other regions of the world (e.g., Kirmse 1966, Pence et al. 1999, Latta 2003, Munday 2006).

In the sample of 2960 specimens analyzed, we identified 34 (1.1%) with scaly-leg conditions (Table 1). Ranked by the number of specimens showing scaly-leg conditions these species were the Red-winged Blackbird (12 specimens), Brewer's Blackbird (10), Brown-headed Cowbird (4), Tricolored Blackbird (4), and Great-tailed Grackle (4). No Yellow-headed Blackbirds or Western Meadowlarks were found with scaly-leg condition.

The findings from the two museum collection searches were highly concordant. The earliest scaly-legged specimen at LACM was a Red-winged Blackbird collected in 1962 in Orange County, California. The SDNHM contains four specimens of the Red-winged Blackbird and three of the Tricolored Blackbird showing scaly-leg conditions collected by Amadeo M. Rea at San Luis Rey in adjacent northern San Diego County, also in 1962. Of the 800 LACM and SDNHM specimens of the Red-winged Blackbird collected prior to 1962 that we evaluated, none from western North America had scaly-leg lesions.

Of the seven species of Icteridae examined, only one other California specimen with scaly-leg predates 1962: a Brown-headed Cowbird collected in 1924 along the Colorado River in Imperial County, California (SDNHM 9364). Of the three remaining pre-1962 specimens with scaly-leg lesions, two, both Red-winged Blackbirds, are from the eastern United States: a 1935 specimen from Monroe Co., Michigan (SDNHM 19115), and a 1926 specimen from Roswell, Georgia (SDNHM 26433). The final pre-1962 specimen, a Brewer's Blackbird collected at San Bruno, Baja California, Mexico, in 1930 (SDNHM 15669), is questionable for scaly-leg conditions.

Table 1 Prevalence of Scaly-Leg among Seven Southern California Icterid Species Archived in the Collections of the San Diego Natural History Museum and the Natural History Museum of Los Angeles County

Species	Number of specimens with scaly-leg	Total number of specimens examined	Prevalence rate
Red-winged Blackbird	12	978	1.2%
Brewer's Blackbird	10	337	3%
Tricolored Blackbird	4	101	4%
Brown-headed Cowbird	4	828	0.5%
Great-tailed Grackle	4	224	1.8%
Yellow-headed Blackbird	0	214	0
Western Meadowlark	0	278	0

Fain and Elsen (1967) also reported a 1953 specimen of Brewer's Blackbird with scaly-leg from Pasadena, Los Angeles County.

Also notable is a Red-winged Blackbird collected from Santa Cruz Island in 1989 (SDNHM 46725), the only insular specimen with scaly-leg lesions we found. This condition has not been reported previously from the California Channel Islands, home to many endemic avian taxa.

After the Red-winged Blackbird, the species with next highest prevalence of scaly-leg lesions was Brewer's Blackbird. The ten Brewer's Blackbirds in the SDNHM with the condition were collected from 1968 to 2013, half since 2000. Though 237 Brewer's Blackbird specimens dated prior to 1968 are in the two collections, none clearly showed scaly-leg lesions. The five specimens found with the condition and collected since 2000 were among only 15 total specimens in the collections from that period (a 33% prevalence).

Among all species examined, 14 of the total 34 specimens with clinical signs of scaly-leg had been collected since 1999 (41% of the total), including specimens of the Brewer's Blackbird, Red-winged Blackbird, Tricolored Blackbird, and Great-tailed Grackle. The remaining 20 specimens spanned the period 1962–1999.

In addition to the species systematically searched in the collections, we found a few notable cases of *Knemidokoptes* mites among other species. These include a 2013 specimen of Cassin's Finch (*Haemorhous cassinii*; SDNHM 53926; Figures 3 and 4) from the San Jacinto Mountains in Riverside County and a 2007 specimen of the American Robin (SDNHM 51762) from urban San Diego. Also notable was a 2013 capture by Drew C. Stokes, incidental to mist-netting for bats, of a Spotted Towhee (*Pipilo maculatus*) in Camp Pendleton, northwestern San Diego County, with symptoms of severe mite infestation (www.inaturalist.org/observations/7605023).

We found males to be symptomatic at twice the rate of females (18 males vs. 9 females at SDNHM).

DISCUSSION

This paper presents the first temporal analysis of *Knemidokoptes* mite infestations in a defined geographical area. The apparently increasing prevalence of scaly-leg mites is concerning given recent population declines in some of the affected species. Brewer's Blackbird experienced a noticeable decline in abundance in southern California from the 1980s to the early 2000s (Unitt 2004), and that decline has continued since (Figure 5). While the role of scaly-leg mite infestation in causing a population decline is not clear, researchers have found correlations between mite infestation, body condition, and survivorship. Latta (2003) found a significant relationship between mite infestation and pectoral muscle scores, implicating mite infestations in weaker body condition. Latta also found that despite a return rate in successive years of >60% in the two species of wintering warblers studied, no individual identified as having any level of *Knemidokoptes* infestation ever returned the following year. Benkman et al. (2005) found that survival of adult Red Crossbills (*Loxia curvirostra*) with mites was 15% lower than that of adults without mites. Van Velden et al. (2017) found a decrease in nesting productivity associated with scaly-leg mite infestation.

Figure 3. Recent Cassin's Finch museum specimen with hyperkeratotic lesions of *Knemidokoptes*.

Photo by Bruce Rideout

Figure 4. Close-up of the Cassin's Finch specimen showing mite tunnels in the thick keratin layers.

Photo by Bruce Rideout

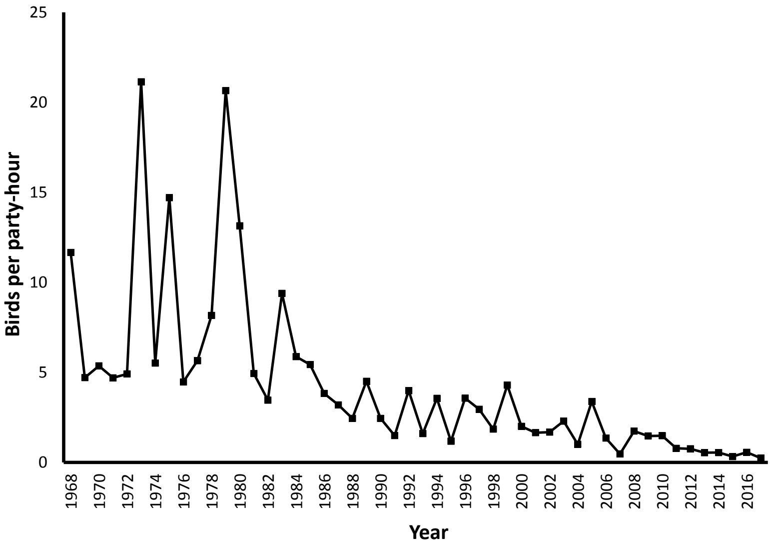

Figure 5. Occurrence of Brewer's Blackbird on the San Diego Christmas Bird Count, 1968–2017.

Although we found only four specimens of the Tricolored Blackbird with lesions of scaly-leg mite, this species had the highest rate of prevalence among the seven icterid species examined (4%). That this rapidly declining species is susceptible to infestation is of concern. Though the specimens in the collections represented individuals from modest-sized southern California populations, individuals recently captured from large breeding aggregations in the Central Valley of California have exhibited scaly-leg lesions as well (B. Barnes, R. J. Meese pers. comm.).

The overall rate of 1.2% of Red-winged Blackbird specimens exhibiting scaly-leg mite conditions is less than the 4.3% rate found in an analysis of 305 Red-winged Blackbird specimens from the Royal Ontario Museum (Kirmse 1966). Kirmse also reported rates in Red-winged Blackbirds wild-caught in marshes in Ontario ranging from 4 to 40%.

The prevalence of scaly-leg mite we found in the Brown-headed Cowbird (0.5%) is very similar to the rate of 0.6% found in an examination of over 8000 Brown-headed Cowbirds in Alabama (Stewart 1963). As in our sample, all cowbird specimens from Alabama showing the condition were males. Kirmse (1966) found a prevalence of scaly-leg mites in the Brown-headed Cowbirds in a marsh in Ontario, Canada, as high as 1.3%.

The presence of the scaly-leg condition in a Red-winged Blackbird from Santa Cruz Island is also notable. This island harbors a number of endemic subspecies of birds, as well as the endemic Island Scrub-Jay (*Aphelocoma insularis*). While North American jays have not been reported to be afflicted with the scaly-leg mite, other corvids such as the Common Raven (*Corvus corax*) in Europe (Dabert et al. 2011), and the American Crow

(*Corvus brachyrhynchos*; Pence 1972) have been reported as hosts of *Knemidokoptes*.

Carothers et al. (1974) reported a Cassin's Finch with scaly-leg at a feeding station in Flagstaff, Arizona, at a location with a high incidence of scaly-leg among resident Evening Grosbeaks (*Coccothraustes vespertinus*). The single Cassin's Finch with scaly-leg in the SDNHM collection was found in a natural area of Mount San Jacinto State Park, though only 6.5 km from the town of Idyllwild where numerous bird feeders are located.

While we are only aware of a single American Robin specimen from southern California exhibiting scaly-leg lesions, anecdotal observations of wild robins in the region with these symptoms indicate it is more common (Garrett pers. obs.). Pence et al. (1999) documented scaly-leg conditions in 60–80% of American Robins in several wintering flocks in Oklahoma.

We found males to exhibit scaly-leg symptoms more frequently than females (18 vs. 9 in SDNHM specimens). All specimens of the Tricolored Blackbird and Brown-headed Cowbird exhibiting the condition were males. Van Velden et al. (2017) found males to be more susceptible to scaly-leg mites in the Black Sparrowhawk (*Accipiter melanoleucus*) in South Africa. As male hawks, during the breeding season, do a majority of hunting for the mated pair and offspring, van Velden et al. (2017) speculated that one cause of the difference in incidence between the sexes may be greater opportunity for transmission from infected prey. But the icterids we studied do not prey upon birds, so *Knemidokoptes* must be transmitted among them through other mechanisms. The Brown-headed Cowbird is highly social, but it is unclear if there is a sexual difference in roosting behavior that would explain the difference in susceptibility. In southern California, some other urban species, such as the House Sparrow (*Passer domesticus*), appear to contract scaly-leg mites very rarely. We are aware of no House Sparrows observed or collected with the condition in the region, though they frequently associate with various blackbird species in urban situations. Nevertheless, in South Africa, *Knemidokoptes jamaicensis* has been identified in another urban adapter, the Cape Wagtail (*Motacilla capensis*) (Munday 2006).

While several recent and historic specimens were collected in remote locations, the recent trend in mite infestations seems to be an increased prevalence in human-modified landscapes. That sensitive and declining species, such as the Tricolored Blackbird, also mix with other blackbird species in these environments in the winter raises the question of whether this condition can be treated effectively in the wild. Among avian rehabilitators, this condition is reportedly readily treated with miticides (Maria Gonzalez pers. comm.). Methods for controlling outbreaks in specific locations could include baited trays of miticide-soaked pads over which these ground-foraging birds would walk.

That 41% (14 of 34) of the specimens found to show scaly-leg lesions were collected since 1999 implies that the prevalence of the condition in southern California is increasing, consistent with anecdotal observations (e.g., Brennan 2013). This sample includes 5 of 15 Brewer's Blackbirds in the collections within that period. Most of the older specimens were shot by collectors, so those individuals likely represent a more random sample than the recent specimens, most of which were received through wildlife rehabilitators and so presumably were more likely to be infected. The incidence of scaly-leg lesions in southern California needs better quantification, but the anecdotal evidence is considerable that the current incidence is likely high and increasing. For example, of six Red-winged Blackbirds trapped at Clover Flat in southeastern San Diego County in April 2018, two had obvious lesions (Unitt and Clark pers. obs.).

The reason for this increased prevalence is unclear. Van Velden et al. (2017) also reported an increased prevalence of this condition in recent decades in South Africa.

Two species analyzed did not show scaly-leg lesions. Both the Western Meadowlark and Yellow-headed Blackbird, like the other icterid species, flock in winter, so the opportunity for transmission of mites among individuals should be similar. However, of 49 specimens (of 214 total, or 22%) of the Yellow-headed Blackbird in the two museum collections dated post-1962, after the first outbreak among the Tricolored and Red-winged Blackbirds, none have the condition. This may be due to geographic patterns of mite infestations in the western U.S. Only six of the 34 mite-infested specimens of icterids found with the condition in the two collections are from desert regions (including three Great-tailed Grackles from Arizona). Yellow-headed Blackbirds nest locally in the region, primarily in desert wetlands, and reach the coast as wandering vagrants only (Patten et al. 2003, Jaramillo 2008). As mite infestations appear to be rare in the desert environments, Yellow-headed Blackbirds may escape exposure. Recent observations of urban Brewer's Blackbirds and captures of Brown-headed Cowbirds in desert cities and agricultural areas in the Coachella Valley and Salton Sink in California support the lower prevalence of mite infestations in these environments (Clark pers. obs.). Rosen (1959) reported an outbreak of scaly-leg in the White-winged Dove (*Zenaida asiatica*) near Calipatria, Imperial County, though columbids are parasitized by some different genera of knemidokoptids so this outbreak may have been due to different mite species.

Latta (2003) and van Velden (2017) suggested a positive relationship with mite infestation and dry climates. We found infestations more prevalent on the coastal slope where humidity and rainfall are higher than in inland desert regions. Latta observed more communal roosting at his drier sites than at higher-elevation moister sites, and suggested this behavior contributes to transmission of the mite among hosts. We know of no difference in roosting behavior in coastal versus desert blackbird populations and suggest that differences in mite infestation may be related to inherent limitations in the suitability of habitat microsites for mites in these regions. It is also noteworthy that our relatively moist coastal locations receive only 25–40 cm of precipitation per year, while inland desert locations receive <15 cm per year. Therefore, both of these areas would be considered dry in comparison to the sites in Latta's study.

In the case of the Red-winged and Tricolored Blackbirds, it is difficult to distinguish any effects at the population level of an increase in mite infestation from the effects of loss of foraging habitat to urbanization. But for Brewer's Blackbird, an urban adapter, knemidokoptiasis may be a leading cause of population decline. In San Diego, for example, the decrease in the average number of Brewer's Blackbirds recorded per party-hour on the Christmas Bird Count from 1971–1982 (9.3) to 2006–2017 (0.86) was over 90% (Figure 5). In the Oceanside count circle, 60 km to the north, the proportional decrease over the same period was even steeper, over 96%.

The behavior of the Western Meadowlark likewise differs from that of other icterids in the region. This species is restricted to open grasslands throughout the year, and it does not forage in urban or suburban landscapes. It does not roost in tight groups like other blackbirds. Therefore both its initial exposure to mites in human-modified landscapes and its ability to transmit the mites appears to be constrained.

This study demonstrates the utility of museum collections as repositories documenting outbreaks of a pathogen in avian populations in both space and time. We expect other collections to hold specimens with readily diagnosable pathogenic characteristics. Searching these collections would provide a valuable comparison to the geographic and species-specific patterns we observed. This study also points to the importance of continued collecting and preparation of museum specimens, to track changing conditions in regional avifaunas. The recent upsurge in mite-infested specimens since 1962 could be quantified only through the continued efforts to grow these collections.

Our study represents only a small step in any effort to understand the possibly increasing effect of infestation with *Knemidokoptes* on bird populations. For further research, we recommend

- Review of specimens in more museum collections, especially growing collections with a temporal coverage of decades, up to the present.
- Coverage of a broader geographic area, coupled with better quantification by biogeographic region, by habitat, and by aspects of life history such as sociality and urban adaptation.
- Broader taxonomic coverage, including quantification of incidence in species of birds in decline.
- Investigation of the life history and possible seasonality of *Knemidokoptes*, and of the modes and sites of its transmission.
- Quantification of mortality due to *Knemidokoptes*, of the progression of the disease, of its transmission from adult to their young, and of its effect on reproductive success.
- Regular quantification of rates of infestation by bird banders.
- Experiments in treatment, as outlined above. Areas where Tricolored Blackbirds congregate to feed would be especially appropriate, given that species' gregariousness and steep decline, to which *Knemidokoptes* may be contributing significantly.
- Further effort to collect, specifically identify, and voucher mite specimens is also needed.

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LITERATURE CITED

Benkman, C. W., Colquitt, J. S., Gould, W. R., Fetz, T., Keenan, P. C., and Santisteban, L. 2005. Can selection by an ectoparasite drive a population of Red Crossbills from its adaptive peak? Evolution 59:2025–2032; doi 10.1111/j.0014-3820.2005.tb01071.x.

Brennan, D. S. 2013. Why are blackbirds' feet deformed? San Diego Union-Tribune, 4 March 4 2013; http://www.utsandiego.com/news/2013/mar/03/blackbird-foot-malady-poses-scientific-mystery/

Carothers, S. W., Sharber, N. J., and Foster, G. F. 1974. Scaly-leg knemidokoptiasis in a population of Evening Grosbeaks. Wilson Bulletin 86:121–124.

Dabert, J., Mihalca, A. D., and Sándor, A. D. 2011. The first report of *Knemidokoptes intermedius* Fain et Macfarlane, 1967 (Acari: Astigmata) in naturally infected European birds. Parasitol. Res. 109:237–240; doi 10.1007/s00436-011-2390-8.

Fain, A., and Elsen, P. 1967. Les acariens de la famille Knemidokoptidae producteurs de gale chez les oiseaux (Sarcoptiformes). Acta Zool. Pathol. Antverpiensia 45:3–142.

Herman, C. M., Locke, L. N., and Clark, G. M. 1962. Foot abnormalities of wild birds. Bird-Banding 33:191–198; doi 10.2307/4510960.

Jaramillo, A. 2008. Yellow-headed Blackbird, *in* California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California (W. D. Shuford and T. Gardali, eds.), pp. 444–450. Studies of Western Birds 1. W. Field Ornithol., Camarillo, CA, and Calif. Dept. Fish and Game, Sacramento.

Kirmse, P. 1966. Cnemidocoptic mite infestations in wild birds. Bull. Wildlife Disease Assoc. 2:86–99; doi 10.7589/0090-3558-2.4.86.

Latta, S. C., 2003. Effects of scaley-leg mite infestations on body condition and site fidelity of migratory warblers in the Dominican Republic. Auk 120:730–743; doi 10.1642/0004-8038(2003)120[0730:EOSMIO]2.0.CO;2.

Munday, T. L. 2006. The search for the reasons causing feet abnormalities in the Cape Wagtail (*Motacilla capensis*). M.S. dissertation, Univ. of Johannesburg, South Africa.

Patten, M. A., McCaskie, G., and Unitt, P. 2003. Birds of the Salton Sea: Status, Biogeography, and Ecology. Univ. of Calif. Press, Berkeley.

Pence, D. B. 1972. *Picicnemidocoptes dryocopae* gen. et sp. n. (Acarina: Knemidokoptidae) from the Pileated Woodpecker, *Dryocopus pileatus* L., with a new host record for *Knemidokoptes jamaicensis* Turk. J. Parasitol. 58:339–342; doi 10.2307/3278100.

Pence, D. B., Cole, R. A., Brugger, K. E., and Fischer, J. R. 1999. Epizootic podoknemidokoptiasis in American Robins. J. Wildlife Disease 35:1–7; doi 10.7589/0090-3558-35.1.1.

Rosen, M.N. 1959. Killing them with kindness. Outdoor California 20:12–13.

Stewart, P. A. 1963. Abnormalities among Brown-headed Cowbirds trapped in Alabama. Bird-Banding 34:199–202; doi 10.2307/4511029.

Turk, F. 1950. A new species of parasitic mite, *Cnemidocoptes jamaicensis*, a causative agent of scaly-leg in *Turdus aurantiacus*. Parasitology 40:60–62; doi 10.1017/S003118200001787X.

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

Van Velden, J. L., Koeslag, A., Curtis, O., Gous, T., and Amar, A. 2017. Negative effect of mite (*Knemidokoptes*) infection on reproductive output in an African raptor. Auk 134:498–508; doi 10.1642/AUK-16-134.1.

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NOTES

BLACK ROSY-FINCH: UTAH BREEDING RANGE UPDATE AND SURVEY RECOMMENDATIONS

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The Black Rosy-Finch (*Leucosticte atrata*) is one of the least studied North American birds, owing to the inaccessibility and remoteness of its habitat (Johnson 2002). It breeds along cliffs and in talus in alpine areas from central Idaho east to western Montana and Wyoming, south to southern Utah, and west to Nevada and southeastern Oregon (Johnson 2002; Figure 1). The Wildlife Action Plan Joint Team of the Utah Division of Wildlife Resources (2015) has designated the Black Rosy-Finch a “species of greatest conservation need” in Utah because of inadequate understanding of its ecology and life history, particularly its breeding distribution. The species is threatened by climate change, as breeding habitat already constrained by mountain summits is predicted to rise in elevation (Romme and Turner 1991, Conrad 2015, Elsen and Tingley 2015). Here we summarize and update current knowledge of the Black Rosy-Finch’s breeding distribution in Utah and provide recommendations for survey protocols throughout the state.

During the June–August breeding season, the Black Rosy-Finch has been documented in Utah in the La Sal, Raft River, Tushar, Uinta, and Wasatch mountains (summarized by Johnson 2002; Figure 1, Table 1). More recently, reports during the breeding season via eBird.org have come principally from the Uinta and Wasatch mountains in northern Utah, especially from an expanse ~100 km long of alpine habitat within the Uinta Mountains (Conrad 2015; Figure 1). In the Wasatch Mountains of north-central Utah, E. C. Conrad (in 2013), Jay Langford (in 2015), and others (via eBird.org) have noted Black Rosy-Finches from the Broad’s Fork Twin Peaks to the Mount Timpanogos region.

Observations during the breeding season outside of the Uinta and Wasatch mountains are few (Figure 1). Behle et al. (1963) first reported Black Rosy-Finches in the southern La Sal Mountains, collecting the female from a pair at the head of Dark Canyon. Additional sightings have been made in the northern La Sal Mountains, where two observations of a fledgling and adult near Mount Tomasaki, on 21 August 2008 and 25 July 2014, offer the only evidence of successful breeding in this mountain range (Utah Division of Wildlife Resources and U.S. Forest Service unpubl. data).

After several expeditions to the Deep Creek Mountains of west-central Utah, Behle (1955) failed to observe or collect the species there but noted that Walter P. Cottam observed several unidentified rosy-finches near Ibapah Peak, the highest point of these mountains, in June 1947. Richard Porter saw two possible rosy-finches at dusk on the north face of Bald Mountain on 4 June 1950. But French (1959) was unable to locate rosy-finches in the Deep Creek Mountains in June 1956. Miller (1955) concluded that the Black Rosy-Finch’s occurrence in the Jarbidge Mountains of northeastern Nevada makes it probable that the sight record in June 1947 in the Deep Creek Mountains was likewise of *L. atrata*.

In the Raft River Mountains, Clayton M. White, Gary Lloyd, and Guy Musser observed family groups with young on 27 July 1961, and White collected a single breeding female at cliffs near the head of Clear Creek on 16 July 1962 (Behle et al. 1963). Subsequently, Richard E. Johnson (pers. comm.) observed adult and immature Black Rosy-Finches in this mountain range on 12 August 1978. In the Tushar Mountains, there have been no reports in the breeding season since Priscilla R. Summers, Josh

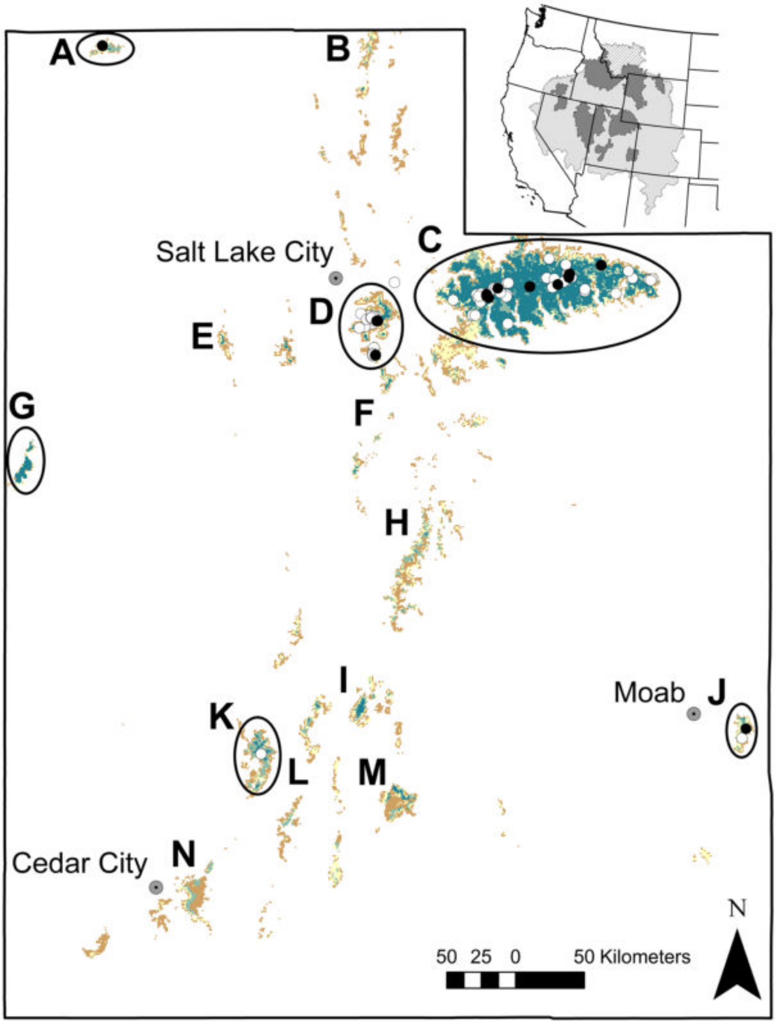

Figure 1. Occurrences and predicted distribution of the Black Rosy-Finch in Utah during the breeding season. The predicted distribution is a model based on a boosted regression tree modified from Conrad (2015). Areas with the highest probability of Black Rosy-Finch occurrence during the breeding season are represented in blue, followed in descending order of probability of occurrence by green, yellow, and tan. Circled mountain ranges indicate areas of known or suspected breeding. A, Raft River Mountains; C, Uinta Mountains; D, Wasatch Mountains; G, Deep Creek Mountains; J, La Sal Mountains; K, Tushar Mountains. Dots represent breeding-season records from Utah Natural Heritage Program (2018) and eBird.org. Black dots represent observations of breeding activity (e.g. nests, fledglings with adults); white represent observations without such evidence. Additional mountain ranges recommended for surveys for the Black Rosy-Finch during the breeding season are also shown: B, Bear River Mountains; E, Stansbury Mountains; F, Wasatch Mountains south of Mount Timpanogos; H, Wasatch Plateau; I, Fish Lake Hightop; L, Sevier Plateau; M, Aquarius Plateau; N, Markagunt Plateau. Inset: total range of the Black Rosy-Finch (hatching, summer only; dark gray, year round; light gray, winter only), modified from U.S. Geological Survey—Gap Analysis Project (2018).

Table 1 Utah Mountain Ranges in Which the Black Rosy-Finch Is Confirmed or Likely

Mountain range	Location[a]	Maximum elevation (m)	Evidence of breeding[b]	Source
Raft River Mountains	A	3028	RF	Behle et al. (1963); Utah NHP[c]
Bear River Mountains	B	3042	N	
Uinta Mountains	C	4123	BR	French (1959); Utah NHP
Wasatch Mountains	D	3581	RF	Behle and Selander (1952); Utah NHP
Stansbury Mountains	E	3363	N	
South Wasatch Mountains	F	3636	N	
Deep Creek Mountains	G	3684	AD?	Behle (1955)
Wasatch Plateau	H	3440	N	
Fish Lake Hightop	I	3546	N	
La Sal Mountains	J	3879	RF	Utah Div. Wildlife Resources and U.S. Forest Service unpubl. data
Tushar Mountains	K	3711	AD	Truan and Percival (1999)
Sevier Plateau	L	3422	N	
Aquarius Plateau	M	3453	N	
Markagunt Plateau	N	3446	N	

[a]Figure 1.

[b]BR, nesting observed; RF, recently fledged young; AD, adults present during breeding season (June–August); N, no evidence of breeding or no surveys.

[c]Utah Natural Heritage Program, Utah Division of Wildlife Resources, biotics database and files. Salt Lake City, examined December 2018.

Kreitzer, and Lew Wilkerson saw 8 individuals on 17 July 1999 (Truan and Percival 1999), and no evidence of breeding has been published.

In an effort to bolster breeding-season observations of Black Rosy-Finches outside of the Uinta and Wasatch Mountains, Paprocki made incidental surveys of potential breeding habitat in two remote mountain ranges in July 2018. On 7 July 2018, he observed Black Rosy-Finches at two separate locations in the southern La Sal Mountains, photographing a single adult foraging on a steep north spine of Mount Tukuhnikivatz (38.4424° N, 109.2582° W; elevation 3617 m) and observing another four individuals flying together above north-facing cliffs along the ridge between Mount Tukuhnikivatz and Mount Peale (38.4418° N, 109.2446° W; elevation 3583 m). On 21 July 2018, Paprocki and colleagues hiked to the top of Ibapah Peak (elevation 3684 m) in the Deep Creek Mountains. No Black Rosy-Finches were encountered during this survey made above tree line from 39.8275° N, 113.9234° W to 39.8400° N, 113.9139° W (~1.5 km north of Ibapah Peak). Our survey was not comprehensive, however, and we encourage additional efforts in this mountain range.

Recent surveys for breeding Black Rosy-Finches within the state of Utah were combined with surveys of the American Pika (*Ochotona princeps*) and were mostly unsuccessful (Utah Division of Wildlife Resources unpubl. data). However, two significant resources can direct future targeted survey efforts within Utah and across the

Black Rosy-Finch's breeding range: the field protocol proposed by Montana Audubon (2017) and the predictive distribution maps for all of North America's rosy-finches developed by Conrad (2015). He found that a boosted regression tree performed the best of the models tested. Variables most important for this model were annual precipitation (representing 23% of the variance the model explains), annual mean temperature (10%), isothermality, and cliff (both ~8%; Conrad 2015). As cliffs are known to be associated with breeding Black Rosy-Finches (Johnson 2002), this model likely overpredicts potential breeding habitat, but it is the most accurate model currently available. As closely related rosy-finches have been found breeding in less typical habitat (i.e., north- and east-facing cirques below treeline, and in small isolated ranges or outlying portions of major ranges; Johnson 1975, Hendricks 1977), Conrad's maps could still be used as a basis for prioritizing broad areas for breeding-season surveys.

In light of the environmental influences of climate change on montane regions (Johnson 2002, Elsen and Tingley 2015), additional surveys will be critical to our still limited, but improving, understanding of the Black Rosy-Finch's breeding distribution (Brown et al. 2018). As recommended by Conrad (2015) and others, the mountain ranges given highest priority for surveys should be those where the probability of the Black Rosy-Finch's occurrence is highest. Areas with previous records need surveys as well if extirpations are to be documented. Efforts should also be directed at other ranges where the Black Rosy-Finch has been confirmed or suspected during the breeding season but have received less survey coverage, including the Deep Creek, La Sal, Raft River, and Tushar Mountains (Figure 1, Table 1). Finally, cliffs suitable for breeding (Johnson 1975, Montana Audubon 2017), but where the rosy-finch has not been documented, should be assessed, especially in the Bear River Mountains, Stansbury Mountains, Wasatch Mountains south of Mount Timpanogos, Wasatch Plateau, Fish Lake Hightop, Sevier Plateau, Aquarius Plateau, and Markagunt Plateau (Figure 1, Table 1). Other mountain ranges where the Black Rosy-Finch is possible (Conrad 2015) but likely lack cliffs suitable for breeding should be the lowest priority for surveys.

We thank the following individuals and organizations for contributions to this paper: Barb Smith (U.S. Forest Service) and Scott Gibson and Lisa Horzepa (Utah Division of Wildlife Resources) for permission to publish historical sightings from the La Sal Mountains; Keith Day (Utah Division of Wildlife Resources) for information on potential breeding habitat in southern Utah; Evan Buechley and Johnna Eilers for accompanying Paprocki to the Deep Creek Mountains; Ed Conrad for openly and generously sharing his thesis research on modeling the distribution of the rosy-finches; and Carl Brown for providing extremely helpful information on survey methods for the Black-Rosy Finch. We thank Paul Hendricks and Carl Brown for their reviews of the manuscript.

LITERATURE CITED

Behle, W. H. 1955. The birds of the Deep Creek Mountains of central western Utah. Univ. of Utah Biol. Ser. 11(4):1–34.

Behle, W. H., and Selander, R. K. 1952. New and additional records for Utah birds. Wilson Bull. 64:26–32.

Behle, W. H., Bushman, J. B., and White, C. M. 1963. Distributional data on uncommon birds in Utah and adjacent states. Wilson Bull. 75:450–456.

Brown, C. W., Patla, S., and Johnson, R. E. 2018. Extension of the breeding range of the Black Rosy-Finch in Wyoming. W. Birds 49:82–85; doi 10.21199/WB49.1.7.

Conrad, E. C. 2015. Using species distribution models to quantify climate change impacts on the rosy-finch superspecies: An alpine obligate. Master's thesis, Univ. of Utah, Salt Lake City.

Elsen, P. R., and Tingley, M. W. 2015. Global mountain topography and the fate of montane species under climate change. Nat. Climate Change 5:772–776; doi 10.1038/nclimate2656.

French, N. R. 1959. Distribution and migration of the Black Rosy Finch. Condor 61:18–29; doi 10.2307/1365342.

Hendricks, D. P. 1977. Brown-capped Rosy Finch nesting in New Mexico. Auk 94:384–385; doi 10.1093/auk/94.2.384.

Johnson, R. E. 1975. New breeding localities for *Leucosticte* in the contiguous western United States. Auk 92:586–589; doi 10.2307/4084615.

Johnson, R. E. 2002. Black Rosy-Finch (*Leucosticte atrata*), *in* The Birds of North America (A. Poole and F. Gill, eds.), no. 678. Birds N. Am., Inc., Philadelphia; doi 10.2173/bna.678.

Miller, A. H. 1955. The breeding range of the Black Rosy Finch. Condor 57:306–307.

Montana Audubon. 2017. High alpine multi-species survey methodology. https://www.montanabirdsurveys.com/uploads/4/9/1/6/49162743/high_alpine_survey_methodology_2017_final.pdf.

Romme, W. H., and Turner, M. G. 1991. Implications of global climate change for biogeographic patterns in the greater Yellowstone ecosystem. Cons. Biol. 5:373–386; doi 10.1111/j.1523-1739.1991.tb00151.x.

Truan, V. A., and Percival, B. K. 1999. The nesting season: Mountain West region. N. Am. Birds 53:413–415.

U.S. Geological Survey—Gap Analysis Project. 2018. U.S. Geological Survey—Gap Analysis Project Species Range Maps CONUS_2001: U.S. Geological Survey data release, https://doi.org/10.5066/F7Q81B3R.

Utah Wildlife Action Plan Joint Team. 2015. Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listing under the Endangered Species Act. Utah Div. Wildlife Resources Publ. 15–14.

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A WHITE-EYED SPOTTED TOWHEE OBSERVED IN NORTHWESTERN NEBRASKA

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Towhees visually—and in rare cases vocally—resembling the Eastern Towhee (*Pipilo erythrophthalmus*) have been reported at least eight times this century in the Nebraska Panhandle (Silcock and Jorgensen 2018), far to the west of that taxon's expected range. As a result of the resplitting of the Eastern Towhee and Spotted Towhee (*P. maculatus*) (AOU 1995), observers have begun to once again pay close attention to the appearance and vocalizations of the region's towhees, a practice that had declined following the species' earlier taxonomic lumping (AOU 1954).

On 20 and 21 May 2018, I observed a Spotted Towhee (presumptively *P. m. arcticus*, which breeds in the area) with white irides in the campground at the Gilbert-Baker Wildlife Area (42° 46.02′ N, 103° 55.67′ W) in the extreme northwest of the Nebraska Panhandle, 10 km north of Harrison, Sioux County. I photographed the bird on the first date (Figure 1). The deep saturated black of the head indicated that this individual was a male; the browner primaries were presumably retained juvenile feathers, contrasting with the rest of the formative plumage, identifying this as an individual in its second calendar year. When I returned on the second date, the towhee was accompanied by a female Spotted Towhee of unknown age; her plumage and soft-part colors were unremarkable. Silent the day before, on this occasion the male sang several times, a series of loud ticking notes followed by a lower-pitched, buzzy trill indistinguishable to my ear from the vocalizations of other nearby Spotted Towhees.

The eye color of juvenile male Spotted Towhees was described by Davis (1957) as at first grayish brown and by Oberholser (1974) as light brown, the iris color gradu-

Figure 1. Spotted Towhee with white irides at the Gilbert–Baker Wildlife Area, Sioux County, Nebraska, 20 May 2018.

Photo by Rick Wright

ally intensifying to pale or dull orange and in most birds to an intense red by the end of May (Davis 1957). To my knowledge, based on review of the relevant literature and the online databases of several large museum collections, my observation is the first report of white eyes in the Spotted Towhee, though Oberholser (1974:896) recorded colors ranging from "carmine" to "light brownish yellow" in adult males of *P. m. arcticus* from Texas. As Davis (1957:200) noted, the true incidence of aberrant iris coloration in this species is obscured by the lack of eye-color data for "the great majority of museum specimens" of the Spotted Towhee. Though it is probably impossible to identify the mechanism responsible for the Nebraska individual's white irides, it can be assumed that a mutation resulted in a change in the pigments deposited in the layer of the iris, the stroma, responsible for color. In bird eyes, white as well as other colors is due to pigments within the cells of the stroma (Sweijd and Craig 1991). This mutation appears to have affected only iris color, leaving the colors of the other soft parts unchanged.

It is worth noting that pale yellow eyes prevail in the southernmost subspecies of the Eastern Towhee, *P. e. alleni*. In two further subspecies, *P. e. canaster* and *P. e. rileyi*, both breeding in the southeastern U.S., the iris color varies from red, as in the more northerly nominate race, to "straw color," only slightly darker than in *alleni* (Dickinson 1952:279). The occurrence of white irides in an adult Spotted Towhee, far from the range of any pale-eyed population of the Eastern Towhee, suggests that eye color in rufous-sided towhees is more plastic than hitherto believed, and that white-eyed birds should be looked for throughout the ranges of both the Eastern and Spotted towhees.

LITERATURE CITED

American Ornithologists' Union (AOU). 1954. Twenty-ninth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 71:310–312; doi 10.2307/4081674.

AOU. 1995. Fortieth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 112:819–830.

Davis, J. 1957. Determination of age in the Spotted Towhee. Condor 59:195–202; doi 10.2307/1364724.

Dickinson, J. C. 1952. Geographic variation in the Red-eyed Towhee of the eastern United States. Bull. Mus. Comp. Zool. 107:271–352.

Oberholser, H. C. 1974. The Bird Life of Texas. Univ. Texas Press, Austin.

Silcock, W. R., and Jorgensen, J. G. 2018. Eastern Towhee (*Pipilo erythrophthalmus*), *in* Birds of Nebraska—Online; www.BirdsofNebraska.org, visited 7 Dec 2018.

Sweijd, N., and Craig, A. J. F. K. 1991. Histological basis of age-related change in iris color in the African Pied Starling (*Spreo bicolor*). Auk 108:53–59; doi 10.1093/auk/108.1.53..

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FIRST BREEDING RECORD OF THE EARED GREBE IN SONORA, MEXICO

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The Eared Grebe (*Podiceps nigricollis*) is the most widespread and abundant grebe worldwide, with a distribution that includes Asia, Africa, Europe, and North America. In North America, the species breeds widely through the western and central United States and southern Canada. There is also a small, disjunct, and poorly known breeding population in the highlands of the volcanic belt of central Mexico (Wilson et al. 1988). Away from this population, breeding in Mexico is sporadic, with scattered records from Chihuahua, Nayarit, Jalisco, and Puebla (Dickerman 1969, Williams 1982). A former breeding population in Baja California had been presumed extirpated (Huey 1928, Cullen et al. 1999), but recently breeding has been documented annually in Mexicali (Erickson et al. 2011, Mellink and Hinojosa-Huerta 2018). In Sonora, there are infrequent summer records but no previous breeding records (Russell and Monson 1998; eBird.org).

On 2 and 3 September 2018 we observed an adult Eared Grebe in breeding plumage feeding a downy juvenile in the sewage-treatment lagoons at Puerto Peñasco ("Rocky Point"), Sonora, at 31.320° N, 113.495° W (Figure 1). Although we did not see the nest, the flightless juvenile had to have hatched locally. The shores of the lagoons were lined with ample emergent vegetation suitable for nesting. We did not observe the juvenile riding on the adult's back, but it was being fed frequently and therefore was likely 7 to 20 days old (Cullen et al. 1999).

Late August is relatively late in the season for nesting, and most Eared Grebes have concluded breeding by that time, but the timing of breeding in this species is notably variable (Cullen et al. 1999). In particular, late summer and early fall rains have induced

Figure 1. Adult Eared Grebe feeding a chick at the municipal sewage lagoons, Puerto Peñasco, Sonora, Mexico. This represents the first documented breeding of the species in the state of Sonora.

Photo by Ryan P. O'Donnell

 Western Birds 50:44–45, 2019; doi 10.21199/WB50.1.6

breeding in areas where water levels otherwise had been too low (Wilson et al. 1988). Breeding in northern Sonora might have been prompted by an unusually productive monsoon season in 2018, although we suspect water levels at this sewage-treatment facility are regulated so that rains did not have an appreciable effect on water levels. This breeding at Puerto Peñasco narrows the significant gap in the species' known breeding range between Arizona to the north, Chihuahua to the east, Baja California to the west, and Nayarit to the south.

We thank Lin Piest for coordinating our trip to the region for the study of the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) and Troy Corman for helpful comments on an earlier draft.

LITERATURE CITED

Cullen, S. A., Jehl, J. R. Jr., and Nuechterlein, G. L. 1999. Eared Grebe (*Podiceps nigricollis*), *in* The Birds of North America (A. F. Poole and F. B. Gill, eds.), no. 433. Birds N. Am. Inc, Philadelphia; doi 10.2173/bna.433.

Dickerman, R. W. 1969. Nesting records of the Eared Grebe in Mexico. Auk 86:144; doi 10.2307/4083560.

Erickson, R. A., Carmona, R., and Ruiz-Campos, G. 2011. Baja California peninsula. N. Am. Birds 64:90–91.

Huey, L. M. 1928. Some bird records from northern Lower California. Condor 30:158–159.

Mellink, E., and Hinojosa-Huerta, O. 2018. Breeding waterbirds of the Mexican portion of the Colorado River delta, *in* Riparian Research and Management: Past, Present, Future (R. R. Johnson, S. W. Carothers, D. M. Finch, K. J. Kingsley, and J. T. Stanley, tech. eds.), vol. 1, pp. 174–187. U.S. Forest Service Gen Tech. Rep. RMRS-GTR-377, Rocky Mountain Res. Sta., Fort Collins, CO.

Russell, S. M., and Monson, G. 1998. The Birds of Sonora. Univ. Ariz. Press, Tucson.

Williams, S. O. III. 1982. Notes on the breeding and occurrence of Western Grebes on the Mexican Plateau. Condor 84:127–130; doi 10.2307/1367839.

Wilson, R. G., Hernandez, C., and Melendez, A. 1988. Eared Grebes nesting in the Valley of Mexico. Am. Birds 42:29.

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BOOK REVIEWS

The Biology of a Desert Apparition: LeConte's Thrasher (*Toxostoma lecontei*), by Jay M. Sheppard. 2018. Studies of Western Birds No. 2. Western Field Ornithologists, Camarillo, CA. Xiv + 210 pp. Paperback, $33.50. ISBN 978-0-9790585-2-3.

This monograph is aptly titled for its ghostly topic, a bird that was largely hidden from science until the 1880s, and that continues to frustrate biologists and birders alike with its disappearing acts and ability to remain out of sight. As the author notes, "pairs would often vanish from view for a month or more at a time and suddenly reappear right where they were last seen." Not only a xerophile, but an extremophile, the LeConte's Thrasher lives in the hottest and driest deserts of the Southwest and spends most of its time on the ground.

Sheppard attempts to shed light on this mysterious and amazing bird by summarizing essentially all that is known about the species and its biology, which is largely thanks to his own study between 1968 and 1971 at a site near Maricopa in the San Joaquin Valley of Kern County, California. That monumental study involved 353 banded birds and about 2000 field hours. But Sheppard also spent 1000 field hours elsewhere in the range making behavioral observations, and examined 650+ specimens and 450+ egg sets.

Much of this information was published previously (e.g., Sheppard 1970, 1973) and also summarized in the *Birds of North America* account (Sheppard 1996), but this 210-page monograph is a gloriously detailed expansion and update on every topic in the bird's biology, from genetics to ecology to behavior. Sheppard includes information from interviews of other biologists and birders, and from the handful of other published and unpublished studies up through 2017. One of the most valuable aspects is his elucidation of the many areas in need of further research, such as the status of the Vizcaino Thrasher (*T. l. arenicola*), movement behaviors that could be revealed through telemetry study, physiological adaptation to desert extremes, and overall conservation needs.

This is a well-written, useful, and successfully thorough account, a must-have for researchers and anyone interested in LeConte's Thrasher, but also for anyone who enjoys the many facets of scientific study of a species. The useful tables (28), figures (89), and variety of light statistics will give ornithology students many ideas for how to approach the study of other species as well.

To summarize the content, I will simply outline the chapters and some of the subchapters below (probably showing my bias toward nesting ecology), but must emphasize the detailed treatment of each topic. There is something comforting about such a thoroughly careful and comprehensive approach. The exhaustive nature could be too much for some readers, but those will enjoy the succinct 6-page summary in the final chapter followed by a summary of topics needing further investigation. Major content is organized as follows: after a brief *Introduction*, *Materials and Methods*, especially regarding the 734-ha Maricopa study area (but some methods are instead included in subsequent chapters). *Systematics*, including interspecific relationships (covering 10 species in *Toxostoma* and with a proposal to resurrect the subgenus *Harporhynchus*). *Intraspecific Variation*, with comprehensive morphological measurements. *Distribution*, including an accounting of questionable records and evidence in support of the idea that LeConte's Thrasher is a permanent resident. *Ecology and Conservation*, with limiting factors (including the possible use of mammal burrows and an interesting suggestion for the design of an artificial nesting structure), habitat, competition, predators, human threats, and a discussion of various survey results and recommendations for survey protocols. *Reproduction*, with timing (triple brooding is possible) and all details of nesting (including the amazing use of an abandoned road grader with 5 nests by 3 different pairs). *Development and Molt, Reproductive Output*, and *Population Dynamics*, including 4 years of census results and a nice territory map. *Territoriality*, *Movements by Marked Individuals*, and *Pair Bonds*. *Behavior*, including wide array of interactive behaviors and display steps described, such as aggression, courtship, and wing-flashing at snakes. *Vocalizations* grapples with the difficulty of characterizing the vocal repertoire, "a wide variety of forms that will require much more analysis." Last is *Feeding and Food Preferences*. Appendices, images, recordings, and other information are at www.westernfieldornithologists.org/LThrasher.

Especially useful figures include Figure 13, which shows all distributional records and 9 demes across the mapped range. Tables include outcomes of 165 nesting attempts and 474 eggs (1968–1969). The apparent success rate was surprisingly high, but partly because "many nests were not found until the eggs had hatched." Throughout, Sheppard compares his results to other, smaller studies. For example, on the basis of 23 nests in Arizona, Blackman and Diamond (2015) found a much higher rate of predation of nestlings. Given the largely banded population studied, Sheppard was able to provide good details on many aspects of breeding biology such as the number of nests attempted per season, roles of females vs. males, growth rates, and dispersal of individuals. Yet the value of extrapolation from the Maricopa study area to the rest of the range may be limited. In many cases where facts are slim, such as our knowledge of predators, speculations and hypotheses are provided, but always supported by good reasoning. Entertaining notes include a detailed accounting of the first specimen collected in early winter of 1850–51 by John LeConte (Lawrence 1851), which involved a deadly Indian attack.

I highly recommend this wonderfully comprehensive life's work, especially for its thoroughness of detail, clarity of writing, and many useful tables and figures. What a refreshing contrast to the trend toward increasingly abbreviated scientific papers! This manuscript will be highly inspirational to many future ornithologists. And it lays an impressive foundation for the study of this species and its future conservation. In the *Epilogue*, Sheppard sadly describes his return to the Maricopa study area 50 years later, only to find that the thriving population he had once studied is now essentially extirpated, with habitat degraded by drought, overgrazing, and new houses. Hopefully this does not portend this thrasher's final disappearing act.

LITERATURE CITED

Blackman, S. T., and Diamond, J. 2015. Metapopulation dynamics of Le Conte's Thrasher (*Toxostoma lecontei*): A species at risk on three southwestern military installations. Year 3 report. Wildlife Contracts Branch, Ariz. Game and Fish Dept., 5000 W. Carefree Hwy., Phoenix, AZ 85086.

Lawrence, G. N. 1851 [1852]. Description of new species of birds, of the genera *Toxostoma* Wagler. *Tyrannula* Swainson, and *Plectrophanes* Meyer. Ann. Lyceum Nat. Hist. N.Y. 5:121–124.

Sheppard, J. M. 1970. A study of LeConte's Thrasher. Calif. Birds 1:85–95.

Sheppard, J. M. 1973. An initial study of LeConte's Thrasher (*Toxostoma lecontei*), M.A. thesis, Calif. State Univ., Long Beach.

Sheppard, J. M. 1996. LeConte's Thrasher (*Toxostoma lecontei*), *in* The Birds of North America (A. Poole and F. Gill, eds.), no. 230. Acad. Nat. Sci., Philadelphia; doi 10.2173/bna.230.

Lori Hargrove

Trends and Traditions: Avifaunal Change in Western North America, edited by W. David Shuford, Robert E. Gill, Jr., and Colleen M. Handel. 2018. Studies of Western Birds No. 3. Western Field Ornithologists, Camarillo, CA. Vii + 466 pp. Paperback, $53.50. ISBN 978-0-9790585-3-0.

That species and communities respond to biotic and abiotic environmental conditions over both short and long time scales and small and large spatial scales is, I would assert, a fundamental tenet of ecology. Describing the nature of the associations of bird distribution and abundance with environmental variables has formed the basis for much of avian ecological research for well over a century, with an increasing focus not just on the correlations but also elucidating the mechanisms (physiological, demographic, etc.) that account for those relationships. Importantly, there is also recognition that the underlying biotic and abiotic conditions that determine a species' distribution are dynamic in space and time, and that because of myriad anthropogenic factors, those conditions are changing at a pace likely unprecedented in the evolutionary history of most avian taxa. It is this recognition that motivates current research in establishing how bird species' abundances and distributions have changed through time, which environmental variables or suites of variables are associated with those changes, what mechanisms appear to drive those changes, and how we can use this knowledge to predict how species might redistribute themselves in response to continuing environmental changes in the future. The 25 chapters in this edited volume fit comfortably within this framework.

An informative introduction by the editors that I found to be an excellent synopsis of the contents of the volume is followed by 25 chapters unequally distributed among four sections: changes in distribution (5 chapters), population trends and changing demographics (10 chapters), response to changes in climate and the environment (8 chapters), and "looking back–looking forward" (2 chapters). Although chapter assignments to sections are not arbitrary, it is clear that many of them cover ground that could easily merit them reassignment to other sections.

"Avifaunal change in western North America" is not a new phrase in the literature. Indeed, this current volume is specifically cast as a follow-on to *Studies in Avian Biology* number 15, *A Century of Avifaunal Change in Western North America* (1994), edited by Joe Jehl and Ned Johnson, and published by the Cooper Ornithological Society. *SAB 15* chapters were mostly in the style of historical narratives (often strongly supported by quantitative data), whereas most *Trends and Traditions* chapters are much more analytically driven. The former lacks terms such as "Bayesian," "AIC," or "R," and the most sophisticated analyses in it relied on step-wise multiple regression, route-regression, and CART (classification and regression trees). This is in no way to imply any lack of robustness in the conclusions presented in *SAB 15*, but rather to highlight the enormous expansion our statistical toolbox has undergone in the last two decades. This is coupled with another distinction between the two volumes: whereas almost all of the chapters in *SAB 15* were "historical" in the sense of comparing current bird abundances or distributions to those of some specified period in the past (then vs. now), most of the ones in *Trends and Traditions* are "long-term," examining data collected more or less continuously (or at least intermittently) over some period of time. Familiar to all of us, the North American Breeding Bird Survey, established in 1966, is a prime example of a long-term data set, and it is used in this volume to explore range shifts in ravens, population trends in gulls, and range-wide declines in the Pinyon Jay. Thirty-six years of Christmas Bird Counts, which began early in the last century, are used to document changes in birds wintering in California's Central Valley. Although of considerably shorter duration, the ambitious MAPS (Monitoring Avian Productivity and Survival) program, started in 1992, shows considerable promise for revealing the demographic mechanisms that may drive population changes. Analysis in this volume shows a significant correlation between annual rates of regional population trends estimated from MAPS data and those estimated independently from the BBS.

A number of the long-term data sets analyzed in *Trends and Traditions* stem not from national-scale monitoring schemes like those mentioned above but rather from the continuation of individual projects established decades ago, frequently maintained by the dedication and persistence of project scientists and their students and colleagues. Frank Pitelka initiated shorebird studies at Utqiaġvik (formerly known as Barrow), Alaska, in 1951, with subsequent sampling recurring at various intervals at least through 2012. Significantly, since that time temperatures during shorebirds' breeding season have increased approximately 2 °C, about twice the global average. Findings from this study open a window into the future of shorebird distribution and abundance (the winners and losers) under continuing global warming. Two additional Alaska studies come from the Yukon–Kuskokwim delta, where birds' abundances and arrival times have been monitored since the 1960s. At a much warmer site, in 1986 Jared Verner initiated a sampling regimen in California oak woodlands at the San Joaquin Experimental Range near Fresno. That work continues today, and appears twice in this volume with an examination of trends in abundance and relations to changing climate. Analysis of counts of shorebirds on the central California coast at Bolinas Lagoon, counts started by Point Reyes Bird Observatory (now Point Blue Conservation Science) in 1972, reveal how shorebird numbers there are influenced by rainfall and agricultural management in the California Central Valley several hundred kilometers distant.

Whereas the foregoing yield data on the avian community at a site or in a region, some monitoring is directed toward a particular species, usually one of conservation concern. Examples here include examinations of Peregrine Falcon recovery in Alaska (a project started in 1952) and White Pelican dynamics throughout the West, including some surveys dating to the 1950s. At least one species with potentially negative conservation implications has been monitored as well, the California Gull in South San Francisco Bay, whose increase beginning in 1980 has had negative effects on other locally breeding birds.

Although they make up a smaller proportion of the chapters in *Trends and Traditions* than in *SAB 15*, several chapters take a historical approach to their question. Both latitudinal and downslope shifts in the distribution of multiple species are apparent in a comparison of current patterns to those of a century ago. Over a shorter interval (~25 years), both positive and negative changes in the abundance of introduced, naturalized species are documented, including the near extirpation of a few that were formerly considered well established. (As an aside, this is the only chapter that explicitly follows directly from one in *SAB 15*). Over a much longer time span (centuries to millennia), examination of bird bones from archaeological sites substantially expands our knowledge of previous distributional patterns, and effectively connects the historical record with prehistory.

Acknowledging the role of fire in driving environmental change, *Trends and Traditions* includes three chapters on this topic that differ in time scale and number of species studied. These range from how Flammulated Owls use habitat reoccupied 5–10 years after burning, on up to documenting the dynamics of the entire avian community over 5 decades of post-fire recovery. As fires in the western U.S. are growing in size and severity under a warming and drying climate, a chapter reporting surveys taken one to several years after what were then some of the largest fires in recent southern California history provides insight on potential winners and losers as a fire-prone future unfolds.

Three chapters don't neatly fit into the structure outlined above. One chapter describes the importance of systematics and taxonomy for tracking avifaunal changes; although not geographically specific, it is relevant for all species and clades. Another makes predictions about which species are likely to expand their ranges into Beringia, the junction between Asia and North America, under a warming climate. A third is a literature review, which comes to the (to me) somewhat surprising conclusion that there is a paucity of publications that actually document observed behavioral (mainly phenological) and distributional changes predicted to occur under a changing climate. This is not interpreted that such changes haven't or won't occur, but rather than more and better structured research is necessary.

Certainly much of the change in species' distributions and abundances is cast in the context of global climate, particularly the warming that seems almost inexorable. But other anthropogenic factors receive full consideration as well. Indeed, habitat loss, whether it occurs slowly as vegetation changes with changing rainfall and temperature, or more rapidly due to the expansion of agricultural and urban/suburban land uses, or even more rapidly under an accelerated fire regime produced by both climate change and human land management and conversion, is still habitat loss. And what is loss for some species will be gains for others; many of the chapters here, as noted above, will help us forecast the winners and losers.

Taken collectively, the chapters in this volume provide ample evidence of the likely trajectories of the changes in bird abundance and distribution that many of its readers will observe during their lifetime should trajectories of environmental variables persist on their present course. Indeed, many of us are old enough to have observed the path many species and communities described in these chapters have already taken. In many respects this volume, with a preponderance of long-term vs. historical studies, is more fine-grained than *SAB 15*, and as such is more complementary to it than repetitive of it. Together, they not only describe trajectories, but they also help establish baselines that we may hope will not shift as successive generations of avian biologists mature.

Perhaps *Trends and Traditions* will indeed start a trend in the sense that it is now a second point that defines a potential series of volumes, produced every 20–25 years or so, that summarizes the continuing changes in the distribution and abundance of birds in western North America. That would be a worthwhile tradition.

John T. Rotenberry

Far From Land: The Mysterious Lives of Seabirds, by Michael Brooke. 2018. Princeton University Press. 249 pp. Numerous drawings, maps and figures, 8 color plates, 13 color maps. Hardback, $29.95. ISBN 978-0-691-17418-1.

Anyone who spends time working with seabirds inevitably starts thinking about what the birds get up to in the vastness of the sea. Where do they go when they head away from land, diminishing to a tiny speck in the distance? What are they doing out there? How on Earth do they manage to search for food in those trackless blue expanses, braving the winds and the waves, before returning home again? Before the advent of tracking devices, the majority of a seabird's life at sea remained a mystery, but now—with the availability of an array of data loggers, satellite tags, geolocators, and other electronic devices—these mysteries are revealing themselves at a staggering pace. This new information forms the crux of *Far From Land: The Mysterious Lives of Seabirds* by Michael Brooke.

Armed with a formidable and first-hand knowledge of seabirds, Brooke tackles the topic in an accessible and readable style. Drawing from his own experiences and those of researchers from across the globe, he considers in detail a range of topics related to seabird tracking and seabird behavior at sea. *Far From Land* is also liberally dotted with fine illustrations by Bruce Pearson, whose art evokes the majesty and beauty of the subject matter, along with eight color plates and 13 color maps that help to bring these studies to life. The book also includes numerous figures and maps replicated from wide-ranging scientific publications. It is perhaps the latter that constitute the real strength of the book, as they make the results of scientific studies accessible to general readers, regardless of the depth of their seabird knowledge.

The book starts with a broad-brush summary of the world's seabirds. The next three chapters dive right into the tracking studies and their insights into the life stages of seabirds. We learn about the remarkable journey of male Thick-billed Murres as they swim (swim, not fly!) for 3000 km with their newly fledged chick on their first autumn migration. We are walked through the challenges of studying immature seabirds and the tantalizing information we are now learning about their formative years. Brooke then considers adults' migration, detailing seabird journeys as diverse as the pole-to-pole migration of the Arctic Tern, the fascinating east–west migrations of the diminutive Red-necked Phalarope, and patterns of movement of species breeding in areas as diverse as Réunion, New Zealand, and Hawai'i. This portion of the book is neatly tied up with a chapter on adults' movements during the breeding season, detailing where adult birds forage and considering some of the differences between males and females.

With seabird movements eloquently tackled, Brooke then moves onto a consideration of exactly how seabirds manage to undertake such incredible journeys and the adaptations required to do so in an energy-efficient manner, regardless of conditions (and even, in the case of the Great Frigatebird, when they are fast asleep). This is followed by chapters on foraging strategies and techniques. The book finishes up with "The Clash," a consideration of how seabirds interact with people, more often than not to their detriment. This chapter, though short, provides a summary of threats including introduced predators, overfishing, power-line collisions, and climate change.

I found *Far From Land* easy to read; Brooke's style is engaging. The pages are filled with factual information, seasoned with humor. It is rare that a book on a topic such as this could reach such a wide range of audiences, but I think that it should appeal to everyone from a beginner starting to explore the fascinating world of seabirds to a grizzled researcher with a lifetime of experience under his belt.

André F. Raine

FEATURED PHOTO

EVIDENCE FOR SUSPENSION OF PREBASIC MOLT IN A WHITE-EYED VIREO

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In most migratory North American passerines the preformative and prebasic molts occur largely on the breeding grounds in late summer following nesting (Pyle 1997), but there are some exceptions to this pattern. Some species initiate molt on the breeding grounds, then suspend it over migration, before resuming and completing molt in the nonbreeding range (Howell 2010). Within a species, populations may differ by latitude in the timing and location of molt, with southern populations breeding and molting earlier than northern ones (Pyle et al. 2018).

At the levels of both the species (Pyle et al. 2009) and the individual (Gow and Stutchbury 2013), numerous species move long distances from the breeding grounds to molt at a site short of the winter range, a pattern known as "molt migration." Among species that generally molt on their breeding grounds, second-year individuals, failed breeders, or birds with lower-quality territories may migrate or disperse elsewhere to molt (Pyle et al. 2018). In some cases, the dense cover and nutrition necessary for feather growth may not be available in their breeding territories (Gow and Stutchbury 2013).

The White-eyed Vireo (*Vireo griseus*) is typical of the Vireonidae in having a partial to incomplete (usually eccentric) preformative molt and complete prebasic molt (Pyle 1997). In their broad-scale assessment of migration or dispersal from breeding territories to areas of molt in North American landbirds, Pyle et al. (2018) concluded that White-eyed Vireos have a high probability of molting on their breeding territories rather than dispersing to molt elsewhere. Here we present the first evidence of a White-eyed Vireo suspending prebasic molt during migration and resuming molt in its winter range.

On 20 and 22 February 2018, we captured a single molting White-eyed Vireo while banding under the protocol "Monitoreo de Sobrevivencia Invernal" (DeSante et al. 2005) at Freshwater Creek Forest Reserve, Orange Walk district, Belize. We aged it as older than its second calendar year on the basis of the primary coverts being broad and dusky with distinct greenish edging and not contrasting with the secondary coverts in color or quality (Pyle 1997). As seen in the photo on this issue's back cover, the bird was symmetrically molting secondaries 2–7, and secondary 9 was contrastingly fresher than secondary 8.

This molt could be interpreted as an extensive and eccentric prealternate molt, as seen in a few other North American passerines of exposed habitats such as the Yellow Warbler (*Setophaga petechia*), Nelson's Sparrow (*Ammodramus nelsoni*), Indigo Bunting (*Passerina cyanea*), and Lesser Goldfinch (*Spinus psaltria*) (Pyle 1997, Pyle and Kayhart 2010, Wolfe and Pyle 2011). But we do not believe this White-eyed Vireo represented such molt because prealternate molt is unknown in this species, and most passerines that replace primaries or secondaries in the prealternate molt also replace a few secondary coverts (Pyle 1997, Wolfe and Pyle 2011). The secondary coverts in this White-eyed Vireo lack contrast, indicating that they are all from the bird's definitive prebasic molt.

Passerines generally initiate flight-feather molt at two or three nodes, with the primaries being replaced distally from the innermost primary. Once approximately half the primaries have been replaced, replacement of the secondaries begins at the outermost and proceeds proximally (Johnson and Wolfe 2018). Molt of the tertials often begins partway through replacement of the primaries and typically proceeds in the order s8, s9, and s7 (Johnson and Wolfe 2018).

In this White-eyed Vireo, the greater wear of the primaries, secondary 1, and secondary 8 in comparison to the relatively fresh secondary 9 and the molting secondaries 2–7 indicates that these feathers had all been replaced several weeks to several months earlier, suggesting a suspension of molt as in other passerines in which molt of the remiges is typically interrupted, such as the Lesser Goldfinch and adults of the Red-eyed Vireo (*Vireo olivaceus*) (Howell 2010).

White-eyed Vireos with territories in relatively poor habitat molt later than do those in good habitat (Butler et al. 2008), likely because of renesting after nest failure (Hopp et al. 1995). The timing of their molt also varies in correlation with the El Niño–Southern Oscillation, because in wet years they nest at least twice and initiate molt later (Butler et al. 2008). However, winter survival and subsequent reproductive success of individuals breeding and molting late may be reduced, in part because their feather quality and body condition may be reduced (Nilsson and Svensson 1996). Butler et al. (2008) suggested that late-molting adult White-eyed Vireos facing an oncoming migration compensate by retaining high-quality feathers. One such form of compensation may be to suspend molt, then resume it in the winter range.

It is possible that suspension of molt over migration is a semiregular response of passerines for late-breeding individuals from marginal habitats or northern populations dealing with the physiological and temporal demands of molt. We recommend that ornithologists and banders be aware of and investigate the possibility of suspended prebasic molt in other species not known to undergo molt migration.

Our research was made possible by a joint initiative of the University of Belize Environmental Research Institute, Corozal Sustainable Future Initiative, Black Rock Lodge, Belize Audubon Society, and the Institute for Bird Populations. Eduany Muñoz and Louis Peña Angel assisted in the field. Edits and suggestions by Dan Cooper, Jeremiah Kennedy, Eliseo Parra, and two anonymous reviewers greatly improved the manuscript.

LITERATURE CITED

Butler, L. K., Hayden, T. J., and Romero, L. M. 2008. Prebasic molt of Black-capped and White-eyed Vireos: Effects of breeding site and the El Niño–Southern Oscillation. Condor 110:428–440; doi 10.1525/cond.2008.8565.

DeSante, D. F., Sillett, T. S., Siegel, R. B., Saracco, J. F., Romo de Vivar Alvarez, C. A., Morales, S., Cerezo, A., Kaschube, D., and Milá, B. 2005. MoSI (Monitoreo de Sobrevivencia Invernal): Assessing habitat-specific overwintering survival of neotropical migratory landbirds, *in* Bird Conservation Implementation and Integration in the Americas (C. J. Ralph and T. D. Rich, eds.), pp. 926–936. Gen. Tech. Rep. PSW-GTR-191. U.S. Forest Service, Pac. Southwest Res. Sta., Arcata, CA

Gow, E. A., and Stutchbury, B. J. M. 2013. Within-season nesting dispersal and molt dispersal are linked to habitat shifts in a neotropical migratory songbird. Wilson J. Ornithol. 125:696–708; doi 10.1676/13-015.1.

Hopp, S. L., Kirby, A., and Boone, C. A. 1995. White-eyed Vireo (*Vireo griseus*), *in* the Birds of North America (A. F. Poole and F. B. Gill, eds.), no. 168. Acad. Nat. Sci., Philadelphia; doi 10.2173/bna.168.

Howell, S. N. G. 2010. Molt in North American Birds. Houghton Mifflin Harcourt, New York.

Johnson, E. I., and Wolfe, J. D. 2018. Molt in Neotropical Birds: Life History and Aging Criteria. CRC Press, New York.

Nilsson, J.-Å., and Svensson, E. 1996. The cost of reproduction: A new link between current reproductive effort and future reproductive success. Proc. Royal Soc. London B 263:711–714; doi 10.1098/rspb.1996.0106.

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

Pyle, P., and Kayhart, R. 2010. Replacement of primaries during the prealternate molt of a Yellow Warbler. N. Am. Bird Bander 35:178–181.

Pyle, P., Leitner, A., Lozano-Angulo, L., Avilez-Teran, F., Swanson, H., Gómez-Limón, E., and Chambers, M. K. 2009. Temporal, spatial, and annual variation in the occurrence of molt-migrant passerines in the Mexican monsoon region. Condor 111:583–590; doi 10.1525/cond.2009.090085.

Pyle, P., Saracco, J. F., and DeSante, D. F. 2018. Evidence of widespread movements from breeding to molting grounds by North American landbirds. Auk 135:506–520; doi 10.1642/AUK-17-201.1.

Wolfe, J. D., and P. Pyle. 2011. First evidence for eccentric prealternate molt in the Indigo Bunting (*Passerina cyanea*): Possible implications for adaptive molt strategies. W. Birds 42:257–262.

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Photo by © Bruce Aird of Lake Forest, California:
Snowy Plover (*Charadrius nivosus*)
Bolsa Chica State Ecological Reserve, Orange County California, 23 July 2017.
This bird was hatched on 15 June 2017 in an incubator at the Wetlands and Wildlife Care Center in Huntington Beach after the egg laid at Huntington State Beach, Orange County, was abandoned after 23 May.

"Featured Photo" by © Blaine H. Carnes of Coppell, Texas: White-eyed Vireo (*Vireo griseus*) at Freshwater Creek Forest Reserve, Orange Walk district, Belize, 20–22 February 2018. Note the active molt in the secondaries and tertials, unexpected at this time in a species with only a single prebasic molt per year. Evidently, the molt during the preceding fall had been suspended, then resumed while the bird was in its winter range.