Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 37

BULLETIN OF THE

TEXAS ORNITHOLOGICAL SOCIETY

Vol. 41, No. 2 September 2008 Pages 37–72

TEXAS BIRD RECORDS COMMITTEE REPORT FOR 2007

MARK W. LOCKWOOD
402 E. Harriet Ave., Alpine, Texas 79830[1]

The Texas Bird Records Committee (hereafter "TBRC" or "committee") of the Texas Ornithological Society requests and reviews documentation on any record of a TBRC Review List species (see listing at the end of this report or TBRC web page at http://texasbirds.org/tbrc/). Annual reports of the committee's activities have appeared in the Bulletin of the Texas Ornithological Society since 1984. For more information about the Texas Ornithological Society or the TBRC, please visit www.texasbirds.org. The committee reached a final decision on 98 records during 2007: 85 records of 46 species were accepted and 13 records of 12 species were not accepted, an acceptance rate of 86.7% for this report. There were 120 observers who submitted documentation (to the TBRC or to other entities) that was reviewed by the committee during 2007.

The winter of 2006–07 produced two well-documented records of first-winter Iceland Gull. This individual was at Houston, Harris Co., from 20 December 2006–4 April 2007. Photo by Martin Reid.

[1]E-mail: mark.lockwood@tpwd.state.tx.us

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 38

In 2007, the TBRC accepted the first state records of Common Eider, Barred Antshrike, and Fan-tailed Warbler. These actions brought the official Texas State List to 632 species in good standing. This total does not include the four species listed on the Presumptive Species List.

In addition to the review of previously undocumented species, any committee member may request that a record of any species be reviewed. The committee requests written descriptions as well as photographs, video, and audio recordings if available. Information concerning a Review List species may be submitted to the committee secretary, Mark Lockwood, 402 E. Harriet Ave., Alpine, Texas 79830 (email: mark.lockwood@tpwd.state.tx.us). Guidelines for preparing rare bird documentation can be found in Dittmann and Lasley (1992) or at http://www.greglasley.net/document.html.

The records in this report are arranged taxonomically following the AOU Check-list of North American Birds (AOU 1998) through the 48th supplement (Banks et al. 2007). A number in parentheses after the species name represents the total number of accepted records in Texas for that species at the end of 2007. All observers who submitted written documentation or photographs of accepted records are acknowledged by initials. If known, the initials of those who discovered a particular bird are in boldface but only if the discoverers submitted supporting documentation. The TBRC file number of each accepted record will follow the observers' initials. If photographs or video recordings are on file with the TBRC, the Texas Photo Record File (TPRF) (Texas A&M University) number is also given. If an audio recording of the bird is on file with the TBRC, the Texas Bird Sounds Library (TBSL) (Sam Houston State University) number is also given. Specimen records are denoted with an asterisk (*) followed by the institution where the specimen is housed and the catalog number. The information in each account is usually based on the information provided in the original submitted documentation; however, in some cases this information has been supplemented with a full range of dates the bird was present if that information was made available to the TBRC later. All locations in italics are counties.

TBRC Membership—Members of the TBRC during 2007 who participated in decisions listed in this report were: Randy Pinkston, Chair, Keith Arnold, Academician, Mark Lockwood, Secretary, Eric Carpenter, Mel Cooksey, Brad McKinney, Cin-Ty Lee, Jim Paton, Willie Sekula and Ron Weeks. During 2007, Cooksey's second term ended and Cin-Ty Lee was elected as a voting member. The Secretary and Academician were re-elected.

Contributors—**A&DG -** Amber & David Gosselin, **AC -** Andrew Coker, **AH -** Anthony Hewetson, **AM -** Angela McKey, **BBe -** Brandon Best, **BBo -** Bill Bousman, **BBu -** Buck Buchanan, **BC -** Bill Clark, **BFr -** Brush Freeman, **BG -** Brian Gibbons, **BPr -** Brenda Prothro, **BR -** Bob Rasa, **BS -** Bob Stone, **BW -** Brian Williams, **BZ -** Barry Zimmer, **CF -** Carol Ferguson, **CM -** Charles Matsch, **COJ -** Carolyn Ohl-Johnson, **CSa -** Chris Sanchez, **CSe -** Chuck Sexton, **CTL -** Cin-Ty Lee, **DB -** Devin Bosler, **DDC -** D. D. Currie, **DDe -** David Desmidt, **DE -** Dodge Engleman, **DHa -** Doug Hanna, **DHo -** David Holbert, **DLa -** Dan Lane, **DLe -** Daniel Leavitt, **DO -** Dale Ohl, **DP -** Dick Park, **DVe -** Don Verser, **EB -** Erik Breden, **EC** - Eric Carpenter, **EH -** Earl Horn, **ES -** Eric Stager, **GC -** Greg Cook, **GH -** Gary Hodne, **GKe -** Glenda Keilstrup, **GKi -** Gordie King, **GLa -** Greg Lavaty, **HT -** Heidi Trudell, **JAm -** Julia Amburn, **JaP -** Jay Packer, **JB -** Joe Barnes, **JC -** Jeremy Clark, **JF -** Jonathan Frodge, **JG -** Javier Garcia, **JH -** John Hayes, **JJ -** Jimmy Jackson, **JM -** John Mittermeier, **JPa -** Jim Paton, **JPr -** James Prudente, **JSp -** John Sproul, **JSt -** Jim Stevenson, **JY -** John Yochum, **KB -** Kelly Bryan, **KD -** Kevin Dees, **KHa -** Katherine Hampton, **KHu -** Kenneth Hunt, **KL -** Keith Lockhart, **KT -** Kent Taylor, **L&PB -** Larry & Pat Botkin, **LBa -** Lynn Barber, **LBr -** Lamont Brown, **LD -** Larry Ditto, **LM -** Larry Mentz, **LS -** Larry Shriver, **LV -** Linda Vratis, **M&ME -** Marc & Maryann Eastman, **MA -** Mike Austin, **MC -** Mel Cooksey, **MD -** Merce Dostale, **MF -** Mark Flippo, **MGu -** Mary Gustafson, **MHa -** Martin Hagne, **MHe -** Mitch Heindel, **MKl -** Mark Klym, **MKo -** Mark Korducki, **ML -** Mark Lockwood, **MLi -** Michael Lindsey, **MO -** Mike Overton, **MR -** Martin Reid, **MW -** Matt Whitbeck, **NL -** Nick Lethaby, **PB -** Peter Billingham, **PD -** Pat DeWenter, **PJ -** Pal Julian, **PS -** Paul Sykes, **RB -** Ralph Browning, **RD -** Rich Damron, **RG -** Ron Gutberlet, **RK -** Rich Kostecke, **RMS -** Rose Marie Stortz, **RPi -** Randy Pinkston, **RR -** Roy Reinarz, **RW -** Ron Weeks, **RZ -** Ruben Zamora, **ScC -** Scarlet Colley, **ScL -** Scotty Lofland, **SCo -** Sheridan Coffey, **SF -** Sharon Finley, **SH -** Scott Haywood, **SLo -** Stephan Lorenz, **SM -** Steve Mayes, **SWe -** Steve Welborn, **SWi -** Sue Wiedenfeld, **T&PF -** Tony & Phyllis Frank, **TBa -** Terry Baldwin, **TE -** Ted Eubanks, **TFe -** Tim Fennell, **TLe -** Tony Leukering, **TLu -** Tim Ludwick, **ToB -** Tom Bartlett, **TP -** Todd Pepper, and **TR -** Thomas Roberts.

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 39

ACKNOWLEDGMENTS

The TBRC is very grateful to the many contributors listed above, without whom this report would not be possible. The committee would also like to thank John Arvin, Chris Benesh, Tony Gallucci, Kevin Kriegel, Ron Pittaway, Bill Pranty, Martin Reid, and Bob Ringler for providing the TBRC with expert opinion concerning records reviewed during 2007. The author thanks Eric Carpenter, Randy Pinkston, and Martin Reid for reviewing previous drafts of this report.

Additional Abbreviations—AOU = American Ornithologists' Union; NP = National Park; NWR = National Wildlife Refuge; SHS = State Historic Site; SNA = State Natural Area; SP = State Park; TCWC = Texas Cooperative Wildlife Collection (Texas A&M University); WMA = Wildlife Management Area.

ACCEPTED RECORDS

Brant (*Branta bernicla*) (23). One at Lubbock, *Lubbock*, from 4–5 January 2007 (**BBe**; 2007-10; TPRF 2469). This individual appears to belong to *B. b. hrota*.

Eurasian Wigeon (*Anas penelope*) (45). A male at O.H. Ivie Reservoir, *Concho*, from 2 December 2006–28 January 2007 (**JaP**, RPi, KHa; 2006-110). A male at Lake Amistad, *Val Verde*, on 27 December 2007 (**SWi**; 2007-20). A male at El Paso, *El Paso*, from 29 December 2006-10 February 2007 (**JSp**, BZ; 2007-19; TPRF 2474). A male at Carrollton, *Dallas*, from 16–25 March 2007 (GC, BS, PB; 2007-51; TPRF 2493).

Common Eider (*Somateria mollissima*) (1). An adult male collected by a hunter in the northern Laguna Madre, *Nueces*, on 8 January 2007 (**JG**; 2007-11; TPRF 2480). This is the first record for this species for Texas.

Masked Duck (*Nomonyx dominicus*) (72). A female-plumaged bird at Anahuac NWR, *Chambers*, on 10 December 2006 (**MW**; 2006-108; TPRF 2455; *TCWC 14,399). A female-plumaged bird near Ricardo, *Kleberg*, from 2–19 April 2007 (BBu, MGu, BW, PD; 2007-22; TPRF 2475). A pair near Riviera, *Kleberg*, from 11 May–23 June 2007 (ES, JY, L&PB, DHa, JJ, MLi, NL, TBa, JPr; 2007-44: TPRF 2489).

Red-necked Grebe (*Podiceps grisegena*) (20). One at Lake Kickapoo, *Archer*, from 28 January–4 March 2007 (**ScL**, **DHo**; 2007-12; TPRF 2470).

Brown Booby (*Sula leucogaster*) (27). An immature bird at South Padre Island, *Cameron*, from 22 August–3 September 2007 (**ScC**; 2007-68; TPRF 2504).

Greater Flamingo (*Phoenicopterus ruber*) (8). An adult near Green Is., lower Laguna Madre, *Cameron*, on 28 May 2007 (**LS**; 2007-59; TPRF 2498).

Snail Kite (*Rostrhamus sociabilis*) (3). An immature bird near Port Isabel, *Cameron*, on 14 July 2007 (**JF**, ScC; 2007-58; TPRF 2497).

Short-tailed Hawk (*Buteo brachyurus*) (33). A light-morph adult at Crown Ridge Park, San Antonio, *Bexar*, on 14 April 2007 (**SCo**; 2007-25). A light-morph adult at Bentsen-Rio Grande Valley SP, *Hidalgo*, on 14 April 2007 (**BC**; 2007-28). A dark-morph at Bentsen-Rio Grande Valley SP, *Hidalgo*, on 7 August 2007 (**BC**; 2007-61; TPRF 2500).

Northern Jacana (*Jacana spinosa*) (33). An adult at Estero Llano Grande SP, *Hidalgo*, from 5–19 August and 3 September–14 November 2006 (**RZ**, MGu, MO, EH, RPi, RG, ScC, EB, LD; 2006-88; TPRF 2449).

Curlew Sandpiper (*Calidris ferruginea*) (11). An alternate-plumaged bird at South Padre Island, *Cameron*, on 17 May 2007 (**KT**; 2007-49).

Red Phalarope (*Phalaropus fulicarius*) (32). One at Stillhouse Hollow Reservoir, *Bell*, from 23 October–14 November 2006 (**RPi**, MA, RR, TFe, RK, T&PF, LBa, CF, RG, BPr; 2006-103; TPRF 2454). One near Nome, *Jefferson*, from 18–21 November 2006 (**SM**, JH; 2006-116; TPRF 2459).

Little Gull (*Larus minutus*) (51). An adult at Lake Tawakoni, *Hunt*, from 21–22 November 2006 (RG; 2006-112). An adult at Lake Ray Hubbard, *Dallas*, on 10 December 2006 (**GC**; 2006-113; TPRF 2457). Two at White Rock Lake, *Dallas*, from 28 December 2006–19 March 2007 (BG, MR; 2007-04; TPRF 2465). A first-year bird at Bolivar Peninsula, *Galveston*, on 24 March 2007 (**JSt**; 2007-23: TPRF 2476).

Black-headed Gull (*Larus ridibundus*) (25). An adult at Lake Lewisville County Park, *Denton*, on 1 January 2007 (**MR**; 2007-09).

Mew Gull (*Larus canus*) (30). A first-winter bird at Lake Lewisville County Park, *Denton*, on 31 December 2006 (**MR**; 2007-08; TPRF 2468).

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 40

This Fan-tailed Warbler provided the first state record during its stay in Pine Canyon, Big Bend National Park, Brewster Co., from 13 August–24 September 2007. This bird completed its post-juvenal molt during it stay and had attained adult plumage before it departed. The image was obtained on 24 August when it was still primarily in juvenile plumage. Photo by Mark Lockwood.

Iceland Gull (*Larus glaucoides*) (4). A first-winter bird at Houston, *Harris*, from 20 December 2006–4 April 2007 (**MR**; 2007-06; TPRF 2466). A first-winter bird at El Paso, *El Paso*, from 25 December 2006–10 February 2007 (**JPa**, BZ; 2006-117; TPRF 2460).

Great Black-backed Gull (*Larus marinus*) (44). A first-winter bird at Houston, *Harris*, from 20 December 2006–21 February 2007 (**MR**; 2007-07; TPRF 2467). A first-winter bird at Houston, *Harris*, on 4 February 2007 (**CTL**; 2007-62).

Black-legged Kittiwake (*Rissa tridactyla*) (78). A first-winter bird at San Bernard NWR, *Brazoria*, on 12 November 2006 (**RW**; 2006-107).

Brown Noddy (*Anous stolidus*) (13). One on an anchored buoy 22 miles off Freeport, *Brazoria*, on 5 June 2006 (**AC**; 2007-24; TPRF 2477). Two on a petroleum platform off Port Aransas, *Nueces*, on 16 July 2006 (**SWe**; 2006-120; TPRF 2463).

Ruddy Ground-Dove (*Columbina talpacoti*) (16). A female at Estero Llano Grande State Park, *Hidalgo*, from 9-17 September 2006 (**MO**, TBa; 2006-96).

This Berylline Hummingbird made a brief visit to the Davis Mountains., Jeff Davis Co., from 25–28 August. It provided the fifth Texas record, but was the fourth for the county. Photo by Mark Lockwood.

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 41

This Northern Saw-whet Owl was in Lubbock, Lubbock Co., from 9 February–14 March 2007. Photo by Brandon Best.

Northern Saw-whet Owl (*Aegolius acadicus*) (29). An adult in the Davis Mountains Resort, *Jeff Davis*, on 24 October 2006 (**KB**; 2006-111; TPRF 2456). An adult in Lubbock, *Lubbock*, from 9 February–14 March 2007 (BBe; 2007-18; TPRF 2473).

Green Violet-ear (*Colibri thalassinus*) (57). One at Lost Creek, *Travis*, from 3–4 July 2006 (**A&DG**; 2006-92; TPRF 2479). One at Simms, *Bowie*, from 10–11 September 2006 (**JAm**; 2006-98; TPRF 2451). One at Bastrop, *Bastrop*, from 28 April–14 July 2007 (**SF**, MKl, RPi, HT; 2007-32; TPRF 2484). One near Burr,

Red-necked Grebes are less than annual visitors to Texas. This individual was present at Lake Kickapoo, Archer Co. from 28 January–4 March 2007. Photo by Scotty Lofland.

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 42

Wharton, from 10–13 May 2007 (**KD**; 2007-47; TPRF 2490). One near Ingram, *Kerr*, from 16 May–13 June 2007 (DP; 2007-71; TPRF 2506). One at Boerne, *Kendall*, on 13 June 2007 (DP; 2007-56; TPRF 2496).

Green-breasted Mango (*Anthracothorax prevostii*) (18). An adult male at Weslaco, *Hidalgo*, from 4–21 February 2007 (CSa; 2007-14). An adult male at Sabine Woods, *Jefferson*, on 26 April 2007 (**EB**; 2007-35; TPRF 2485).

White-eared Hummingbird (*Hylocharis leucotis*) (27). A female in the Chisos Mountains, Big Bend NP, *Brewster*, on 25 June 2006 (**JM**; 2006-105). At least 15 at the Davis Mountains Resort, *Jeff Davis*, from 11 May–16 September 2007 (ML, KB, RW; 2007-41; TPRF 2487). An immature bird at the Davis Mountains Resort, *Jeff Davis*, from 4–20 July 2007 (**M&ME**, ML; 2007-55; TPRF 2495). A female near Utopia, *Uvalde*, from 21–22 July 2007 (**MHe**; 2007-60; TPRF 2499).

Berylline Hummingbird (*Amazilia beryllina*) (5). One at the Davis Mountains Resort, *Jeff Davis*, from 25–28 August 2007 (**KB**, **RW**, ML; 2007-67; TPRF 2503).

Violet-crowned Hummingbird (*Amazilia violiceps*) (9). One at the Davis Mountains Resort, *Jeff Davis*, on 23 April 2007 (**M&ME**; 2007-31; TPRF 2478). One at the Davis Mountains Resort, *Jeff Davis*, from 31 August–10 October 2007 (**M&ME**; 2007-70; TPRF 2505).

Costa's Hummingbird (*Calypte costae*) (20). A male at Port O'Connor, *Calhoun*, from 18–19 December 2006 (**BFr**; 2006-114). A male at Hudson's Oaks, *Parker*, from 28 December 2006–20 February 2007 (BG, MR, AM; 2007-03; TPRF 2464). An immature male at Alpine, *Brewster*, from 20 August–4 October 2007 (**ML**; 2007-65; TPRF 2502).

Barred Antshrike (*Thamnophilus doliatus*) (1). A singing bird was recorded, but not seen, at Harlingen, *Cameron*, on 1 September 2006 (**MHa**; 2006-95). A digital version of the audio recoding will be deposited with the record in the TBRC files. This is the first record for this species, and family, for Texas.

Greater Pewee (*Contopus pertinax*) (20). One at Cottonwood Campground, Big Bend NP, *Brewster*, from 30 September–7 October 2006 (**RR**, DLe, SLo; 2006-99; TPRF 2452). One 9 miles w. of Fort Davis, *Jeff Davis*, from 19 December 2006–23 January 2007 (ML; 2006-118; TPRF 2461). One at El Paso, *El Paso*, on 8 May 2007 (**BZ**; 2007-48; TPRF 2491).

Buff-breasted Flycatcher (*Empidonax fulvifrons*) (16). Up to seven (two adults and five fledglings in two broods) at Madera Canyon, Davis Mountains Preserve, *Jeff Davis*, from 16 April–11 August 2007 (ML, JaP; 2007-29; TPRF 2482). One at Elbow Canyon, Davis Mountains Preserve, *Jeff Davis*, on 22 April 2007 (**ML**; 2007-30; TPRF 2483). Up to four at Road Canyon, Davis Mountains Preserve, *Jeff Davis*, from 29 May–27 June 2007 (**JaP**; 2007-73). Two at Madera Canyon, Davis Mountains Preserve, *Jeff Davis*, from 29 May–27 June 2007 (**JaP**; 2007-74).

Dusky-capped Flycatcher (*Myiarchus tuberculifer*) (34). Two at Boot Spring, Big Bend NP, *Brewster*, from 24 April–1 June 2007 (**MKo**, ML; 2007-40; TPRF 2486). Up to seven at the Davis Mountains Preserve, *Jeff Davis*, from 19 May–7 July 2007 (**ML**; 2007-43; TPRF 2488). One near Pinnacles Pass, Chisos Mountains, Big Bend NP, *Brewster*, from 12 June–13 July 2007 (**RPi**; 2007-52).

Gray Kingbird (*Tyrannus dominicensis*) (8). One at Corpus Christi, *Nueces*, from 26–29 October 2006 (MC, GH; 2006-115; TPRF 2458). One at Sea Rim SP, *Jefferson*, on 2 June 2007 (**DVe**; 2007-50; TPRF 2492).

Black-whiskered Vireo (*Vireo altiloquus*) (27). One at Sabine Woods, *Jefferson*, from 9 April–2 May 2006 (TR, LBa; 2006-97; TPRF 2450).

Tamaulipas Crow (*Corvus imparatus*). Up to four at Brownsville, *Cameron*, from 8 April–15 July 2007 (JY, PD, LBr, TBa, BBo; 2007-26; TPRF 2481).

Rufous-backed Robin (*Turdus rufopalliatus*) (13). One at Santa Ana NWR, *Hidalgo*, from 8–15 March 2007 (ToB, ScC, PD, JY, MD; 2007-17; TPRF 2472).

Varied Thrush (*Ixoreus naevius*) (36). One at Guadalupe Mountains NP, *Culberson*, on 15 November 2006 (**SH**; 2006-106). One at Balcones Canyonlands NWR, *Travis*, on 2 January 2007 (**CSe**; 2007-01).

Connecticut Warbler (*Oporornis agilis*) (10). One at Austin, *Travis*, on 13 May 2007 (**TE**; 2007-39).

Red-faced Warbler (*Cardellina rubrifrons*) (38). One at Denton, *Denton*, on 15 September 2005 (**LBr**; 2007-45). Red-faced Warbler is no longer a Review Species in Texas.

Slate-throated Redstart (*Myioborus miniatus*) (9). One at Boot Canyon, Big Bend NP, *Brewster*, on 25 April 2006 (**JB**; 2007-36).

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 43

Fan-tailed Warbler (*Euthlypis lachrymosa*) (1). One at Pine Canyon, Big Bend NP, *Brewster*, from 13 August–24 September 2007 (**EC**, COJ, DO, RD, TLe, PS, ML, BG, MA, DE, DB, T&PF, HT, RMS, RPi, RW; 2007-64; TPRF 2501). This is the first record for this species for Texas.

Rufous-capped Warbler (*Basileuterus rufifrons*) (25). Two at Concan, *Uvalde*, from 14 March–25 November 2006 (**DHa**, GKe, BR, MHe; 2006-31; TPRF 2448).

Baird's Sparrow (*Ammodramus bairdii*) (57). Up to four in western *Jeff Davis* from 7–9 October 2006 (**DLa**, KB, ML; 2006-101; TPRF 2453). One near Lehman, *Cochran*, on 4 November 2006 (**AH**; 2006-104). One three miles sw. of Marfa, *Presidio*, on 22 November 2006 (**DB**; 2007-02).

Golden-crowned Sparrow (*Zonotrichia atricapilla*) (31). An adult at Sierra Blanca, *Hudspeth*, on 5 May 2007 (**JPa**; 2007-37).

Snow Bunting (*Plectrophenax nivalis*) (7). One at Lewisville Lake County Park, *Denton*, from 26 December 2006–7 January 2007 (**KL**, DDC, MA, RPi, T&PF, MR, KHa; 2006-119; TPRF 2462).

Black-vented Oriole (*Icterus wagleri*) (5). An adult at Rio Grande Village, Big Bend NP, *Brewster*, on 6 October 2006 (**MF**; 2006-102).

Common Redpoll (*Carduelis flammea*) (9). An adult near Decatur, *Wise*, from 22 January–1 March 2007 (**KHu**, DDC; 2007-13; TPRF 2471). An adult on the Bolivar Peninsula, *Galveston*, on 13 June 2007 (**LV**; 2007-54: TPRF 2494).

NOT ACCEPTED

A number of factors may contribute to a record being denied acceptance. It is quite uncommon for a record to not be accepted because the bird was obviously misidentified. More commonly, a record is not accepted because the material submitted was incomplete, insufficient, superficial, or just too vague to properly document the reported occurrence while eliminating *all* other similar species. Also, written documentation or descriptions prepared *entirely from memory* weeks, months, or years after a sighting are seldom voted on favorably. It is important that the simple act of not accepting a particular record should by no means indicate that the TBRC or any of its members feel the record did not occur as reported. The non-acceptance of any record simply reflects the opinion of the TBRC that the documentation, as submitted, did not meet the rigorous standards appropriate for adding data to the formal historical record. The TBRC makes every effort to be as fair and objective as possible regarding each record. If the committee is unsure about any particular record, it prefers to err on the conservative side and not accept a good record rather than validate a bad one. All records, whether accepted or not, remain on file and can be re-submitted to the committee if additional substantive material is presented.

Masked Duck (*Nomonyx dominicus*). near Riviera, *Kleberg*, on 22 April 2007 (2007-38).

Sooty Shearwater (*Puffinus griseus*). South Padre Island, *Cameron*, on 17 May 2007 (2007-42).

Northern Goshawk (*Accipiter gentilis*). Lubbock, *Lubbock*, from 22 January–12 February 2007 (2007-16).

Long-tailed Jaeger (*Stercorarius longicaudus*). Aransas NWR, *Aransas*, on 26 March 2007 (2007-57).

Ruddy Ground-Dove (*Columbina talpacoti*). Uvalde National Fish Hatchery, *Uvalde*, on 5 May 2006 (2006-72). Big Bend NP, *Brewster*, on 6 March 2007 (2007-33).

Green Violet-ear (*Colibri thalassinus*). Corpus Christi, *Nueces*, on 15 March 2007 (2007-21).

Greater Pewee (*Contopus pertinax*). Sea Rim SP, *Jefferson*, on 28 April 2007 (2007-34).

Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*). Sabine Woods, *Jefferson*, from 10–11 September 2006 (2007-05).

Gray-crowned Yellowthroat (*Geothlypis poliocephala*). Sabal Palm Sanctuary, *Cameron*, on 29 March 2007 (2007-46).

Flame-colored Tanager (*Piranga bidentata*). Big Bend NP, *Brewster*, on 2 July 2006 (2006-84).

Golden-crowned Sparrow (*Zonotrichia atricapilla*). Victoria, *Victoria*, on 15 February 2007 (2007-15).

Common Redpoll (*Carduelis flammea*). Kennedale, *Tarrant*, from 21–22 November 2006 (2006-109).

LITERATURE CITED

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

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 44

BANKS, R. C., R. T. CHESSER, C. CICERO, J. L. DUNN, A. W. KRATTER, I. J. LOVETTE, P. C. RASMUSSEN, J. V. REMSEN, JR., J. D. RISING, AND D. F. STOTZ. 2007. Forty-eighth supplement to the American Ornithologists' Union Check-list of North American Birds. Auk 124:1109–1115.

DITTMANN, D. L., AND G. W. LASLEY. 1992. How to document rare birds. Birding 24:145–159.

LIST OF TEXAS REVIEW SPECIES

The TBRC requests details, including descriptions and photos if possible, of all records of the following species.

REVIEW LIST A: Rarities. These species, in general, include birds that have occurred four or fewer times per year anywhere in Texas over a ten year average. The TBRC requests documentation for review for any new or any previously unsubmitted record of the below species no matter how long ago the record occurred. The TBRC also requests details on any record of a species not yet accepted on the Texas State List.

Brant, Trumpeter Swan, Eurasian Wigeon, American Black Duck, White-cheeked Pintail, Garganey, King Eider, Common Eider, Harlequin Duck, Barrow's Goldeneye, Masked Duck, Yellow-billed Loon, Red-necked Grebe, Yellow-nosed Albatross, White-chinned Petrel, Stejneger's Petrel, Black-capped Petrel, Greater Shearwater, Sooty Shearwater, Manx Shearwater, Wilson's Storm-Petrel, Leach's Storm-Petrel, Red-billed Tropicbird, Blue-footed Booby, Brown Booby, Red-footed Booby, Jabiru, Greater Flamingo, Snail Kite, Northern Goshawk, Crane Hawk, Roadside Hawk, Short-tailed Hawk, Collared Forest-Falcon, Gyrfalcon, Paint-billed Crake, Spotted Rail, Double-striped Thick-Knee, Pacific Golden-Plover, Collared Plover, Northern Jacana, Wandering Tattler, Spotted Redshank, Eskimo Curlew, Surfbird, Red-necked Stint, Sharp-tailed Sandpiper, Purple Sandpiper, Curlew Sandpiper, Ruff, Red Phalarope, Little Gull, Black-headed Gull, Heermann's Gull, Black-tailed Gull, Mew Gull, Iceland Gull, Slaty-backed Gull, Western Gull, Glaucous-winged Gull, Great Black-backed Gull, Kelp Gull, Black-legged Kittiwake, Brown Noddy, Black Noddy, Roseate Tern, Arctic Tern, Elegant Tern, South Polar Skua, Long-tailed Jaeger, Ruddy Ground-Dove, Ruddy Quail-Dove, Dark-billed Cuckoo, Mangrove Cuckoo, Snowy Owl, Northern Pygmy-Owl, Mottled Owl, Stygian Owl, Northern Saw-whet Owl, White-collared Swift, Green Violet-ear, Green-breasted Mango, White-eared Hummingbird, Berylline Hummingbird, Violet-crowned Hummingbird, Costa's Hummingbird, Elegant Trogon, Red-breasted Sapsucker, Ivory-billed Woodpecker (presumed extirpated in Texas), Barred Antshrike, Greenish Elaenia, Tufted Flycatcher, Buff-breasted Flycatcher, Greater Pewee, Dusky-capped Flycatcher, Sulphur-bellied Flycatcher, Piratic Flycatcher, Social Flycatcher, Thick-billed Kingbird, Gray Kingbird, Fork-tailed Flycatcher, Rose-throated Becard, Masked Tityra, Black-whiskered Vireo, Yucatan Vireo, Brown Jay, Clark's Nutcracker, Black-billed Magpie, Tamaulipas Crow, Gray-breasted Martin, Black-capped Chickadee, American Dipper, Northern Wheatear, Orange-billed Nightingale-Thrush, Black-headed Nightingale-Thrush, White-throated Robin, Rufous-backed Robin, Varied Thrush, Aztec Thrush, Black Catbird, Blue Mockingbird, Bohemian Waxwing, Gray Silky-flycatcher, Olive Warbler, Connecticut Warbler, Gray-crowned Yellowthroat, Slate-throated Redstart, Fan-tailed Warbler, Golden-crowned Warbler, Rufous-capped Warbler, Flame-colored Tanager, Yellow-faced Grassquit, Baird's Sparrow, Golden-crowned Sparrow, Yellow-eyed Junco, Snow Bunting, Crimson-collared Grosbeak, Blue Bunting, Shiny Cowbird, Black-vented Oriole, Streak-backed Oriole, Pine Grosbeak, White-winged Crossbill, Common Redpoll, Lawrence's Goldfinch.

REVIEW LIST B: Subspecies of special interest. The taxa included on this list have occurred four or fewer times per year anywhere in Texas over a ten year average. Records of these subspecies will be formally reviewed by the TBRC.

Green-winged (Common) Teal, Dark-eyed (White-winged) Junco, and Orchard (Fuertes's) Oriole.

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 45

CAPT. JOHN POPE'S COLLECTION OF BIRDS FROM INDIANOLA

STANLEY D. CASTO
Department of Biology, University of Mary Hardin-Baylor, Belton, Texas 76513[1]

ABSTRACT.—The specimens taken at Indianola, Texas, by Capt. John Pope during February and March 1855 represent the first collection of birds from this location on the Texas coast. Pope's "Book of Descriptions" of the Indianola specimens is discussed along with the identities of the birds collected. Specimens of the Greater Scaup, Purple Martin, King Rail, Yellow-rumped Warbler, and American Golden-Plover from Indianola were the first of their species from Texas to be deposited at the Smithsonian Institution.

Magic Ridge Sanctuary owned by the Texas Ornithological Society now occupies a portion of the abandoned site of the once-thriving port city of Indianola on Matagorda Bay in Calhoun County, Texas (Elwonger 2007). Birds are abundant at Magic Ridge, and the sanctuary and surrounding area are favored destinations for birders hoping to observe migratory songbirds, as well as some south Texas species on the northern edge of their range (Elwonger 2007, Wolff 1999). However, for nearly a decade following the founding of Indianola, its birds remained unknown to the scientific world. This paper reviews the history of Indianola and the collection of birds made at that city during February and March 1855 by Capt. John Pope of the United States Army Corps of Topographical Engineers.

EARLY HISTORY OF INDIANOLA

Indianola, originally known as Indian Point, was founded in 1846 as a deep-water port to supply American troops during the Mexican War. In later years, the army depot at Indianola supplied frontier forts in western Texas, and the city was the point of departure for persons traveling inland to San Antonio and points further north and west. In August 1850 the United States Boundary Commission landed at Indianola en route to El Paso to begin a survey of the border between the United States and Mexico (Bartlett 1854, Malsch 1988). Although there were persons proficient in natural history among the group, there is no record of birds being collected. The army surgeons, Samuel Wylie Crawford and Ebenezer Swift, both of whom later collected birds in other regions of Texas, were at Indianola when Samuel Washington Woodhouse arrived at Indianola in March 1851. Woodhouse, who was on his way to San Antonio and Santa Fe to serve as the surgeon-naturalist of the Zuni River Expedition, spent only three days in the city and his diary contains no mention of the birds at Indianola (Casto and Tomer 1999, Wallace and Helvy 2007). Neither is there any record that Drs. Crawford and Swift collected birds at Indianola. In September of 1851, the newly appointed chief astronomer and surveyor of the Boundary Commission, Maj. W. H. Emory, arrived at Indianola on his way to El Paso. Accompanying Emory was "a small corps of experts" that included Arthur Schott who was employed as a "special scientific collector" (Goetzmann 1959:182). Schott later collected birds along the Rio Grande but there is no record that he collected birds on the coast. Not until the arrival of Capt. John Pope in early 1855 was there any attempt to collect and study the birds at Indianola.

CAPT. JOHN POPE

John Pope (1822–1892, Fig. 1) was born in Louisville, Kentucky, but the family later moved to Kaskaskia, Illinois. His father, Nathaniel, was a judge and his mother, Lucretia, had a college degree. Pope's father is said to have imparted to his son "a love of learning, and a splendid family library in which John might indulge his considerable intellectual curiosity" (Cozzens 2000:7). Nothing is known of Pope's early education. However, it is obvious that he had sufficient intellect and the political connections necessary to gain an appointment at the United States Military Academy where he was rigorously trained in mathematics and the physical sciences.

[1]Present address: 159 Red Oak, Seguin, TX 78155. E-mail: Sscasto2@aol.com

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 46

Figure 1. Brigadier General John Pope. Mathew Brady Collection, Prints and Photographs Division of the Library of Congress.

Pope graduated from the Military Academy in 1842 and was assigned to the Corps of Topographical Engineers. He served in the war with Mexico from 1846 to 1848, and later led a survey in Minnesota before being appointed in 1851 as the Chief Topographical Engineer of the Department of New Mexico (Dearen 1996). In 1854 he was sent to survey a Pacific railroad route along the 32nd parallel between Texas and New Mexico, and it was here that he first began to collect birds and other vertebrates for Spencer Baird at the Smithsonian Institution (Baird 1854).

Pope's experience in western Texas and New Mexico during 1854 convinced him that a railroad through this area would be feasible only if a dependable source of water could be found. To achieve this objective, he was dispatched in early 1855 to lead an expedition to drill artesian wells in western Texas.

COLLECTING AT INDIANOLA

Pope received orders to begin drilling operations on the Pecos River in western Texas on 5 January 1855 (Goetzmann 1959:366). He arrived at Indianola near the end of January or in early February and began to assemble his support staff while waiting arrival of equipment and supplies. George Getz Shumard, the geologist and surgeon who was to accompany the expedition, did not arrive in Texas until mid-February (Sprague 1855) and final arrangements for departure were not complete until the first week in April. During this two-month delay Pope and his staff collected fish, reptiles, mammals, and birds in the vicinity of Indianola.

Pope was at Indianola during the best time of the year to find birds. Species wintering on the coast had not yet left, and the first spring migrants were arriving. There was also a variety of locations at which to collect—the shoreline of Matagorda Bay, Powderhorn Lake, salt flats and marshes, chaparral, open prairie, as well as around the pens where livestock were held before being shipped to New Orleans.

Indianola was almost completely surrounded by salt water and at its rear were flats that were inundated during periods of heavy rain (Malsch 1988:271). Powderhorn Lake was a "great resort" for ducks and geese in

Texas_Bulletin-41-2.qxd 9/20/08 9:40 AM Page 47

the winter and during the summer was frequented by "cranes and flamingoes" [Roseate Spoonbills] (Moore 1936:97). Birds were so abundant that the air was said to have "creaked under the weight of millions of wild fowls" (Seeligson 1936).

Pope would have seen few trees as he approached Indianola from Matagorda Bay. An 1860 view of the city shows only scattered clumps of shrubs in the flats behind the city (Malsch 1988: dust cover). Mountain laurel, scrub oak, and the introduced Texas umbrella tree or chinaberry grew along the bay (Malsch 1988:29). Chinaberry, saltcedar, and oleander had also been planted throughout the city to serve as windbreaks and ornamentals (Malsch 1988:29). Mountain Laurel, a native species, "abounded" on the shores of Matagorda Bay (Malsch 1988:140) and a "great deal" of chaparral grew near Powderhorn Lake on the west side of town (Moore 1936:94). Inland from the city the vegetation changed into "a fine level prairie . . . covered with the richest grass with no tree or shrub to interrupt the broad expanse" (Bartlett 1854:15). It was on this prairie during 1850 that the members of the Boundary Commission noted "prairie fowl, the great curlew, and flocks of quail" that arose before them on the road from Indianola to Victoria (Bartlett 1854:15).

POPE'S "BOOK OF DESCRIPTIONS"

Natural history was not taught at the Military Academy, and Pope seemingly had no interest in the subject until he was assigned to the Corps of Topographical Engineers. Officers of this elite corps had a tradition of cooperation with scientists in the eastern United States (Goetzmann 1959:5), and it is probable that Pope considered acquiring specimens for the Smithsonian as one of his duties. Whether Pope collected his own birds and prepared their skins, or if members of his staff performed these functions is unknown. A fire at the Smithsonian during 1865 apparently destroyed any correspondence between Pope and Baird that might have answered this question.

Pope made no attempt to identify the birds that he collected. However, he did keep, or had his subordinates keep, a "Book of Descriptions" in which was entered the date, location, measurements of body length, wingspan, length of the wing from the carpal joint to the tip of the longest primary, and color of the eyes, bill, gums [buccal cavity] and feet of the birds collected (Pope 1855–1856, Fig. 2). Measurements of the specimens were usually made with "dividers" [measuring compass]. Standardized color charts were not available and the interpretation of colors was undoubtedly subjective and inconsistent. In addition, the colors of the soft parts of birds are variable and often change with age, the season in which the bird is collected, as well as following its death.

The exact procedure used by Pope and his aides in preparing specimens is unknown. Each bird was presumably tagged with an identifying number, as well as the date and location from which it was collected. Measurements and color attributes were recorded in the Book of Descriptions after which the birds were skinned, or preserved until time was available for skinning. The specimens taken at Indianola were carried to the drilling site in western Texas only to be brought back the following year and loaded onto a ship bound for New York. From the Port of New York the specimens were carried to Washington, D. C., and the Smithsonian. To whom Pope delegated oversight of the collection, preparation, and transport of specimens is unknown. Multiple individuals were probably involved, thus increasing the likelihood of errors in recording data, as well as the loss of specimen tags.

Pope's Book of Descriptions was sent to the Smithsonian along with the skins of the birds and mammals collected during 1855–1856 in Texas and New Mexico. This document, now located in Record Unit 305, Box 5 of the Smithsonian Archives, clearly shows that Pope collected forty specimens at Indianola—thirty-nine birds and an Eastern Cottontail.

The birds collected by Pope probably arrived at the Smithsonian during late 1856. Following their arrival the specimens would have been unpacked, identified, assigned a catalog number, and entered into the accession ledger. Baird obviously had Pope's Book of Descriptions before him while assigning catalog numbers. In the left margin by 26 of the 39 bird descriptions there is written a four-digit catalog number. Several numbers in the Book of Descriptions are identical with those in the report on the birds collected during the Pacific Railroad surveys (Baird et al. 1858).

Pope's specimens arrived at the Smithsonian at an opportune time. Baird and his collaborators were already well into the preparation of their report on the birds taken during the Pacific Railroad surveys. Baird undoubtedly welcomed the arrival of the collection made in Texas and New Mexico. However, not all of the specimens from Indianola were included in the Pacific Railroad Surveys Report (Baird et al. 1858). At least two of Pope's

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 48

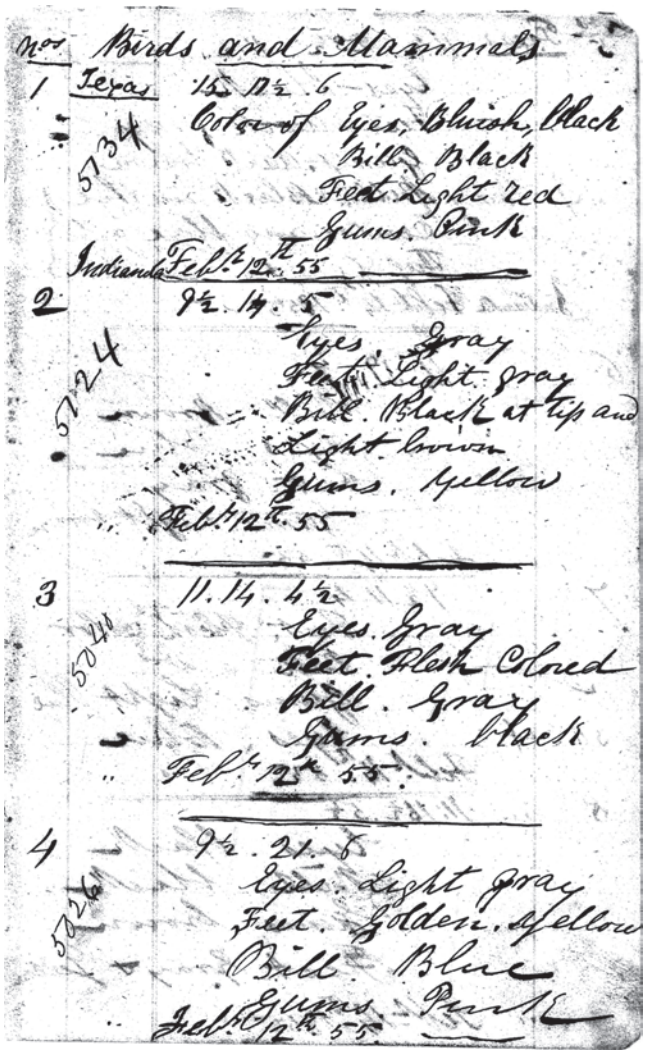

Figure 2. The first page of Capt. John Pope's Book of Descriptions. The four-digit numbers are the Smithsonian catalog numbers assigned by Spencer Baird.

specimens were exchanged with other museums as early as 1858 and all of the others, with the exception of one, have since been removed from the collection (Ludwig, pers. comm.). The only remaining specimen of the birds taken at Indianola is the Ruby-throated Hummingbird (USNM A5040) collected on 12 February 1855. Oddly, this specimen presents a mystery since the Book of Descriptions does not contain a profile of any bird taken at Indianola that even remotely resembles a Ruby-throated Hummingbird.

There are several discrepancies between the Book of Descriptions and Baird's report on the birds collected during the Pacific Railroad surveys (Baird et al. 1858). Particularly puzzling are the conflicting collection dates in the two documents. Pope was at Indianola during February and March 1855 yet in Baird's report he is given credit for taking a Yellow-rumped Warbler and American Golden-Plover during 1856 and an Eastern Kingbird in 1857. No birds were taken on 13 February 1855 whereas the report notes a Northern Pintail taken on this date. A Northern Mockingbird was taken on 26 February but the report gives the date as 21 February. No date is given in the report for the Lesser Yellowlegs, whereas, Pope records the date as 28 March.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 49

The last bird at Indianola, a Red-winged Blackbird, was taken on 29 March, whereas, the report notes that an Eastern Kingbird was collected on 31 March. Some of these discrepancies may have resulted from birds being dated on the day they were taken but not entered into the Book of Descriptions until later. Errors may have also been made while transcribing data from the Book of Descriptions or during the typesetting of the report.

SPECIES OF BIRDS COLLECTED AT INDIANOLA

Pope's Book of Descriptions contains the profiles of 39 birds and an Eastern Cottontail (USNM 1728) collected at Indianola. The Book of Descriptions, Baird's Pacific Railroad surveys report, and the Smithsonian accession ledgers indicate that at least 21 species were collected: Yellow-crowned Night-Heron (4 specimens), Great Egret, Green-winged Teal (2 specimens), American Wigeon, Northern Pintail, Redhead, Greater Scaup, King Rail, Lesser Yellowlegs, American Golden Plover, Semipalmated Sandpiper (2 specimens), Laughing Gull, American Kestrel, Horned Lark, Purple Martin, Northern Mockingbird, Yellow-rumped Warbler, Northern Cardinal, Eastern Meadowlark (2 specimens), Western Meadowlark, and Red-winged Blackbird (3 specimens). The profiles of three specimens seem to fit the Black-crowned Night Heron, Great Egret, and Short-billed Dowitcher that Pope collected on unspecified dates in "Texas" (Baird et al. 1858). Seven of the specimens cannot be identified with certainty from their descriptions or from the Smithsonian accession catalog. In addition to the 39 specimens named above, Baird et al. (1858) list the Ruby-throated Hummingbird and Eastern Kingbird as collected by Pope at Indianola even though the Book of Descriptions does not contain profiles that match either of these species.

FROM INDIANOLA TO WESTERN TEXAS

Pope, Shumard, two technical assistants, 41 laborers, and a military escort left Indianola for San Antonio on 4 April 1855 (Goetzmann 1959:366, Shumard 1886:53). Two days later they reached a point 50 miles from Indianola where Pope collected an American Kestrel (Baird et al. 1858:14). The expedition was joined in San Antonio by a detachment of 110 troops (Anon. 1855) and continued westward to Fort Clark, and then up the Devils and Pecos rivers to a point in Loving County near the Texas-New Mexico border. At this desolate location they began drilling operations that continued until the project was abandoned in July 1858 (Goetzmann 1959:367, Smith 2000). Pope's last specimen was taken on 14 July 1856 after which his 205 specimens of birds and mammals, as well as 13 containers of fishes and reptiles were packed and shipped to the Smithsonian (Pope 1855–1856).

Pope was not a trained naturalist or collector. He was, however, a conscientious officer who methodically performed his assigned duty. The assembly and shipment of such a large collection of vertebrates and other natural history specimens under difficult field conditions on the frontier is indeed a testimony to the determination and management skills of this early explorer of the Southwest. Unfortunately, Pope never wrote about his experiences as a collector, thus leaving historians with nothing by which to evaluate his personal view of natural history.

SIGNIFICANCE OF POPE'S COLLECTION

John Pope is seldom remembered as a collector of birds in Texas and New Mexico. Instead, he is most often recalled for a questionable performance as commander of the Union Forces during the second battle of Manassas [Bull Run] and for datelining his dispatches "headquarters in the saddle," a phrase sarcastically twisted by his adversaries into "he doesn't know his hindquarters from his headquarters." Sadly, Pope is remembered for his failures rather than his accomplishments. His substantial contributions to natural history have gone unnoticed by even his most recent biographer (Cozzens 2000).

All of the birds collected at Indianola by John Pope are residents or migrants along the Texas coast. Specimens of the Greater Scaup, Purple Martin, King Rail, Yellow-rumped Warbler, and American Golden-Plover were the first of their species from Texas to be deposited in the Smithsonian Institution (Baird et al. 1858). Acquisition of these specimens facilitated study of the geographical variation within a species, and in distinguishing similar species from one another. For example, Baird was able to compare the characteristics of the Purple Martin taken at Indianola with 24 other specimens taken in such far away locations as Pennsylvania, Nebraska, Kansas,

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 50

California, and Mexico (Baird et al. 1858:315). The American Golden-Plover taken at Indianola was compared with 14 other specimens from Pennsylvania, Illinois, Nebraska, Hudson's Bay, Rocky Mountains, Mexico, India, and France (Baird et al. 1858:691). Harry Oberholser (n.d.) would later cite Pope's specimens in *The Bird Life of Texas*. In a broader context, the collection made by Pope in Texas and New Mexico was an important contribution to the understanding of the natural history of the American Southwest.

Indianola changed dramatically following Capt. Pope's visit in 1855. The devastating hurricanes of 1875 and 1886 convinced residents that the site was unsuitable for permanent residence, and the town was abandoned. The trees planted as windbreaks and ornamentals have mostly disappeared leaving only the original chaparral. Species such as Hercule's club, brasil, granjeño, hackberry, tasajillo, devil's head cactus, huisache, retama, anacua, mesquite, and agarita are still found on the shell ridge near the old town site (Elwonger 2007). This association of plants provides cover for resident birds, as well as layover and feeding areas for migrants. Two hundred sixty-five species have now been identified at Indianola and the surrounding area (Wolff 1999). However, Pope's collection, as incomplete and insignificant as it seems in retrospect, represents the first scientific study of the birds at the protected area now known as Magic Ridge Sanctuary.

ACKNOWLEDGMENTS

I thank Mary Markey for her diligent search of the Smithsonian Archives for records of the birds collected at Indianola by Capt. Pope. Craig Ludwig assisted in identifying the birds in Pope's Book of Descriptions. Early drafts of the paper were improved by the suggestions of Horace Burke, John Hubbard, and Cliff Shackelford. Publication of this paper was supported in by a grant from the University of Mary Hardin-Baylor.

LITERATURE CITED

ANON. 1855. Pope's expedition. *Galveston Weekly News*, 3 April 1855, p. 2.

BAIRD, S. F. 1854. Preliminary report on the natural history. Appendix B, *Report of exploration for the Pacific railroad, near the thirty-second parallel of north latitude from the Red River to the Rio Grande by Brevet Capt. John Pope*. U. S. Congress, 33rd Congress, 1st Session, House Document 129. [The manuscript of Baird's preliminary report and a list of the birds collected by Pope during the survey of the 32nd parallel are found in the Smithsonian Institution Archives, Record Unit 305, Box 5].

BAIRD, S. F., J. CASSIN, AND G. N. LAWRENCE. 1858. Birds. In *Reports of explorations and surveys to ascertain the most practical and economical route for a railroad from the Mississippi River to the Pacific Ocean*, Vol. IX. Washington: Beverly Tucker.

BARTLETT, J. R. 1854. *Personal narrative of explorations and incidents in Texas, New Mexico, California, Sonora, Chihuahua, connected with the United States and Mexican Boundary Commission, during the years 1850, '51, '52, and '53.* Chicago: Rio Grande Press (1965 reprint).

CASTO, S. D. AND J. TOMER. 1999. Texas bird records of S. W. Woodhouse. *Bulletin Texas Ornithological Society* 32:13–25.

COZZENS, P. 2000. *General John Pope, a life for the nation*. Urbana and Chicago: University of Illinois Press.

DEAREN, P. 1996. *Crossing Rio Pecos*. Fort Worth: Texas Christian University Press.

ELWONGER, M. 2007. A primer on Magic Ridge. *TOS News* (Fall 2007), pp. 3–8.

GOETZMANN, W. H. 1959. *Army exploration in the American West*. Austin: Texas State Historical Association (1991 reprint).

MALSCH, B. 1988. *Indianola: The mother of western Texas*. Austin: State House Press.

MOORE, E. 1936. Recollections of Indianola. In *Indianola Scrap Book*. Victoria: Victoria Advocate (1974 reprint).

OBERHOLSER, H. C. (n.d.). Typescript of *The bird life of Texas* (Microfilm). Center For American History, University of Texas at Austin.

POPE, J. 1855–1856. "Book of Descriptions" of birds and mammals collected in Texas and New Mexico, 1855–1856. Smithsonian Institution Archives, Record Unit 305, Box. 5.

SEELIGSON, L. 1936. History of Indianola. In *Indianola Scrap Book*. Victoria: Victoria Advocate (1974 reprint).

SHUMARD, G. G. 1886. Journal of geological observations along the routes traveled by the expedition between Indianola, Texas, and the Valley of the Mimbres, New Mexico, Chapt. 1. *Geological and Agricultural Survey of Texas*. Austin: State Printing Office.

SMITH, T. T. 2000. *The old army in Texas*. Austin: Texas State Historical Association.

SPRAGUE, J. R. 1855. [letter to the editor concerning George Shumard.] *Galveston Weekly News*, 6 March 1855, p. 1.

WALLACE, A. AND R. H. HELVY. 2007. *From Texas to San Diego in 1851*. Lubbock: Texas Tech University Press.

WOLFF, L. 1999. Old Town-Indianola birding list, pp. 139–149. In *Indianola and Matagorda Island 1837–1887*. Austin: Eakin Press.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 51

PROJECT PRAIRIE BIRDS: A CITIZEN SCIENCE PROJECT FOR WINTERING GRASSLAND BIRDS

SUSAN A. HEATH[1], CLIFFORD E. SHACKELFORD[2], AND CECILIA M. RILEY[1]
[1]*Gulf Coast Bird Observatory, 103 W. Hwy 332, Lake Jackson, TX 77566*
[2]*Texas Parks and Wildlife Department, 506 Hayter Street, Nacogdoches, TX 75965*

ABSTRACT.—Coastal prairies are the primary winter destination for two dozen species of migratory grassland birds and losses of this habitat have proven detrimental to their populations. As a result, some of Partners in Flight's (PIF) highest priority birds are grassland species. To examine grassland bird use of coastal prairies, Project Prairie Birds survey methodology was designed and field work was initiated in 1998. Avian surveys were conducted at 34 sites, each with multiple transects for a minimum of two years by all-volunteer, three-person crews identifying all species flushed from vegetation. Seasonal vegetation surveys measured five variables using five one square-meter sample areas. We also measured vertical thickness using a density board. We selected nine sites (26.5%) with three or more years of survey data for analysis. Thirty-nine species were detected of which 36% have PIF combined species assessment scores of 10 or above. In addition, 24% of the individuals were Le Conte's Sparrows which are a PIF Tier II priority species. A multiple regression between abundance and vegetative data for these two species showed a weak but significant correlation between Sedge Wren and the 0.5 m vertical thickness parameter ($R^2 = 0.1544$, $p < 0.0001$) but no significant relationship for Le Conte's Sparrow. This is likely due to high variances in the data as over-wintering location choice for these species is a function of climatic variability.

Losses of coastal prairie have proven to be detrimental to many bird species, and some of Partners in Flight's (PIF) highest priority birds are grassland species including Le Conte's Sparrow (*Ammodramus leconteii*), Grasshopper Sparrow (*A. savannarum*), and Henslow's sparrow (*A. henslowii*). As a result, grassland birds are a key research priority for the conservation of migrant landbirds. The general decline of grassland birds in the United States can be attributed to intensification of agriculture, reforestation, and increased urbanization (O'Connor et al. 1999). In recent decades, researchers have been able to gauge the extent of these population declines by using data collected from Breeding Bird Surveys (Askins 1999). Approximately 20 species of prairie-dependent birds require contiguous, naturally-disturbed grasslands during their breeding season. As our once-vast grasslands continue to be fragmented and isolated into smaller "islands," the dynamics of bird populations have changed, and in many cases, suffered. We know that habitat loss affects avian populations and although this information is critical to land managers and policymakers (Donovan et al. 2002), few studies document these effects. Species such as the House Wren (*Troglodytes aedon*), for example, may be more tolerant of fragmented habitat caused by ever-expanding urban development and agrarian sprawl. Henslow's Sparrow, one of the highest priority grassland birds in the PIF Continental Plan, (Rich et al. 2004) once bred in the tallgrass prairies of the Upper Texas Coast. However, with the loss of 99% of its habitat (Grace 1998), no Henslow's Sparrow breeding population has been observed in Texas since 1982 (Arnold and Garza 1998).

The majority of research directed at determining causes of grassland bird population declines has been conducted on the breeding grounds (Vickery and Herkert 2001). Winter habitat use studies may provide additional information in our understanding of grassland bird population declines as well as provide opportunities to involve landowners and birders in population monitoring. While interest in this group of birds has greatly increased, especially on breeding grounds, few studies address winter distribution, densities, impacts of management practices, or habitat requirements (Askins 1993, Donovan et al. 2002, Vickery et al. 1999).

Coastal prairies, the most endangered ecosystem in Texas (TPWD 2005), are the primary winter destination for two dozen species of migratory grassland birds including large numbers of sparrows, pipits, and wrens. In winter, these birds use a mosaic of remnant native prairie, agricultural fields, improved pastures, marshes, and hedge rows. In response to the need for new information, the Gulf Coast Bird Observatory (GCBO), in

[1]E-mail: sheath@gcbo.org

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 52

conjunction with project partners, Texas Parks and Wildlife Department (TPWD), Texas Partners in Flight, and Raven Environmental Services, Inc. developed and initiated Project Prairie Birds (PPB) in the winter of 1998. Designed as a 5-year, citizen-science project, we hoped to collect bird and vegetative data to map distribution and identify specific habitat requirements of over-wintering avian grassland species in Texas coastal prairies and surrounding areas. In addition to identifying the area-distribution of winter grassland birds, we hoped to find associations between our vegetative samplings and avian censuses that may identify habitat preferences for target species. Historically, land management for songbirds has seldom been addressed, but because of the growing interest in bird-related tourism and sustainable economic development for landowners, this program could be a gateway for melding land management and conservation ideals for the benefit of bird populations.

One of the challenges of monitoring grassland birds is actually detecting these secretive and often elusive species. In the winter, identification is particularly difficult because birds are cryptically colored, do not sing identifiable songs, and often respond to disturbances by hiding in the grass or running along the ground beneath the herbaceous cover. Therefore, traditional sampling techniques, such as point counts or area search-method may not detect these birds. In order to increase their detection rate, we needed to create a survey methodology specifically designed to census birds that skulk in the grass and forb layer and go undetected. Thus, we designed the PPB methodology, which involves thrashing the grass with bamboo poles while surveying a transect to flush skulking birds.

METHODS

Surveys were conducted each winter beginning in December 1998 and ending in February 2003 at 34 volunteer selected sites on the Upper Texas Coast and included federal, state, and private lands. Transects at each study site were monumented at the beginning of each field season (Fig. 1). A detailed description of the tools

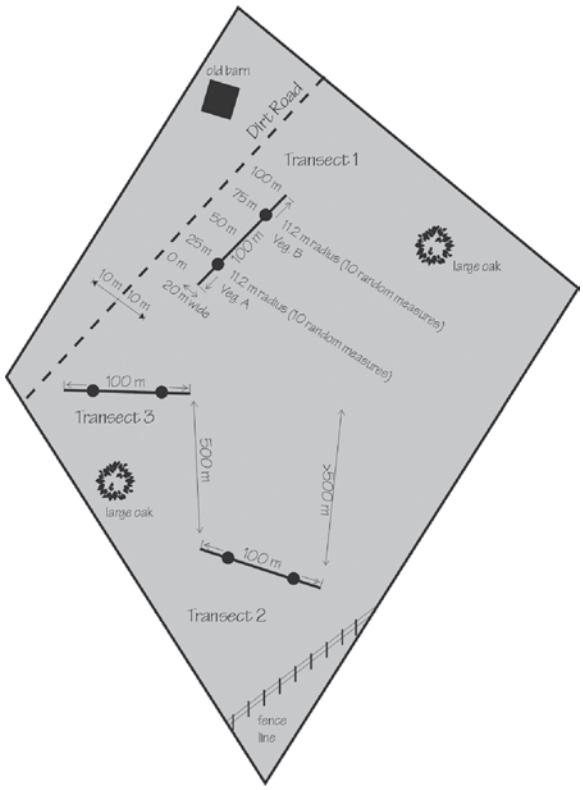

Figure 1. A sample field map showing that transects were 100 meters long, 20 meters wide, and separated by at least 200 meters to avoid flushing birds from transect-to-transect. Figure courtesy of Shackelford et al. 2001.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 53

used and methods can be found at http://www.tpwd.state.tx.us/huntwild/wild/birding/project_prairie_birds/ (Shackelford et al. 2001).

Each winter, volunteers conducted three avian surveys and one vegetative survey on each transect. Avian surveys were conducted between half an hour after sunrise and 1500 h if wind speeds were less than five on the Beaufort Scale, and skies were clear to overcast (no drizzle or rain). Avian surveys were performed from December through February with a minimum of two weeks time lapsed between surveys. Survey crews consisted of two pole operators beating the vegetation with bamboo or cane poles in order to flush skulking birds (Fig. 2) and a third person, the caller, who walked between the pole operators, monitoring for birds as they flushed in front of the survey line. The crew walked in a straight survey line and completed each transect within 90–120 seconds. Members of the survey crew identified and recorded the number of birds flushed and monitored birds until they landed to prevent double-counting. Unidentified birds were sometimes relocated after completing the transect to identify the flushed individuals.

Vegetation was measured once per year, after all avian surveys had been completed to minimize disturbance of birds occupying the study areas. This end-of-season survey gave a good representation of the actual vegetative structure used by birds. Cover data were collected from five randomly selected one square-meter sample areas per transect (Fig. 3). Percent composition of the following cover was determined: grass (standing alive or dead; includes sedges, rushes and reeds), forbs (broad-leaved herbaceous plants), woody shrubs, leaf litter (flattened, dead vegetation) and bare ground (soil). The number of fire ant mounds and gopher mounds within each sample square were also counted. The percent of the area in the sample square covered by water (not standing rainwater) and average water depth were also recorded.

Robel et al.'s (1970) density board technique was used to determine vertical thickness. In wooded or savannah-like situations, basal area of trees was measured using a 1-factor metric prism at each of the five sample squares. The total number of woody shrubs, the total number of trees, and the total number of snags (standing, dead trees) in the 20 $\times$ 100 m transect area were also recorded. In addition, participants recorded grazing, burning, and mowing histories if available as well as size of grassland.

All data were recorded on specially designed field data sheets and then entered in Microsoft Excel. Simple summary statistics for each site were compiled and the Shannon Diversity index was used to demonstrate variation in species diversity between sites and within sites by transects. A multiple regression between abundance and vegetation data was conducted for nine sites with three or more years of survey data.

Figure 2. Avian surveys were conducted by a survey crew of three that walked a transect attempting to flush and identify skulking grassland birds. Figure courtesy of Shackelford et al. 2001.

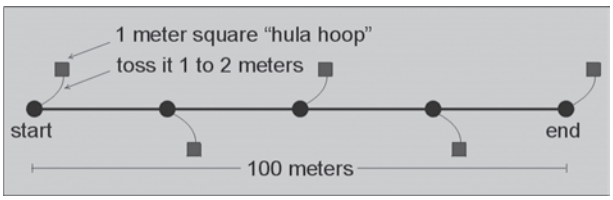

Figure 3. Participants collected cover composition and vertical thickness vegetation parameters by walking along the center of the transect and randomly tossing a 1 meter^2 hoop every 25 meters. Figure courtesy of Shackelford et al. 2001.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 54

RESULTS

A total of 1,666 avian surveys was conducted on 34 sites. Over 200 volunteers participated with a minimum of 4,000 volunteer hours dedicated to PPB. Thirty-nine species of birds were detected with a total of 4,761 individuals including high priority species such as Attwater's Greater Prairie-Chicken (*Tympanuchus cupido attwateri*), Henslow's, Nelson's Sharp-tailed (*A. nelsoni*), Seaside (*A. maritimus*), Le Conte's, and Grasshopper sparrows, Sprague's Pipit (*Anthus spragueii*), Sedge Wren (*Cistothorus platensis*), Northern Bobwhite (*Colinus virginianus*), and Short-eared Owl (*Asio flammeus*).

In the nine sites selected, each had three or more years of data and had the highest number of transects (253) for in depth analysis. For the most part, these sites (Fig. 4) were located along the Upper Texas Coast where we had a concentration of volunteers and near the headquarters of the Gulf Coast Bird Observatory whose staff coordinated and participated in many of the PPB surveys.

We calculated a diversity measure using the Shannon Diversity Index (H) to determine how diversity was impacted by different management practices and to give some indication of habitat quality for a given species. We also used the evenness measure to determine how individuals were distributed among the different species. Because the number of transects varied from site to site and from year to year, the number of transects used to calculate H varied from as few as two to as many as 19 (Table 1). These data show values of H varying from 0.23 to 1.19 where values closest to 0 represent transects that contained equal numbers of individuals of each species, and values of 1 or greater are transects that had one or more species that dominated the diversity (e.g., 90% species A, and 10% a mixture of Species B, C, and D).

With the exception of UH Coastal Center (UHCC), which clearly shows a near even distribution of species, all other sites showed a highly uneven distribution of species. The implication is that sites with values closest to zero are those that have the most homogenous habitat, and higher values may represent more habitat diversity. Nearly 36% of individual birds encountered on PPB surveys had Partners in Flight combined species assessment scores above 10 meaning these are species whose populations are showing the greatest declines (Table 2).

In addition, almost 32% of birds recorded from the surveys were either Le Conte's Sparrows ($n = 830$) or Sedge Wrens ($n = 709$). Le Conte's Sparrow is a PIF priority species for Gulf Coastal Prairie (the project's target habitat), during winter (Vermillion et al. 2008). Almost all sites detected Le Conte's Sparrow, and all but one site (Indiangrass Preserve) detected Sedge Wren. A plot of abundance of these two species over the first five years of surveys shows an obvious fluctuation of individual numbers among years (Fig. 5). This likely is a function of climatic variability (e.g., rainfall, temperature extremes), but the PPB protocol did not collect those data. In future studies of grassland birds, collection of weather data could prove a valuable addition to explain population fluctuations between or among years.

We used regression analysis to analyze the relationship between vegetative cover composition and abundance, diversity, and species richness of birds detected on surveys as well as occurrence of Le Conte's Sparrows and Sedge Wrens. The only significant result was a positive, but weak correlation between the occurrence of Sedge Wren and 0.5 m vertical thickness ($R^2 = 0.1544$, $p < 0.0001$).

DISCUSSION

The site profiles included in this analysis show some correlations that are obvious even without statistical analysis. Not surprisingly, larger sites with more transects recorded higher numbers of individual birds than small sites. Likewise sites with four or five years of participation recorded more individual birds than sites with two or three years. Factors that contributed to species diversity were only partially addressed by the methodology of PPB but some correlations between species diversity and habitat are clear from the anecdotal site descriptions. Few sites were restricted to a single microhabitat, and most contained varying amounts of pure prairie plus prairie grading into one or more non-prairie vegetative communities (freshwater marsh, salt marsh, and areas with shrubs and small trees). In these habitat gradations, or ecotones, non-prairie species co-occurred with typical prairie species raising the overall species diversity of those sites (Table 2).

Some of the species rated most at risk by PIF (Table 2) were recorded in low to very low numbers including Nelson's Sharp-tailed Sparrow, Henslow's Sparrow, Yellow Rail (*Coturnicops noveboracensis*), and Greater Prairie-Chicken. The prairie-chicken risk score is somewhat deceptive because it is a composite score for all populations of Greater Prairie-Chicken, not the critically endangered Attwater's race which, if considered separately, should qualify for the maximum PIF value of 20. Only one site recorded this species and only

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 55

Table 1. Annual summaries for the nine sites used in this analysis showing the total number of individuals and number of species encountered per winter as well as an average of the Shannon Diversity Index calculated per transect during each survey year at each site.

Site	Season	Number of individuals	Number of species	Average diversity (H) of transects
Anahuac NWR				
	1998–1999	54	9	0.7557
	2001–2002	113	11	0.6673
	2002–2003	76	12	0.6909
Armand Bayou				
	1998–1999	18	3	0.5992
	2001–2002	28	3	1.0365
	2002–2003	28	6	1.1910
Attwater Prairie Chicken NWR				
	1998–1999	140	10	0.7679
	1999–2000	133	5	0.6014
	2000–2001	236	9	0.7325
	2001–2002	220	7	0.6318
	2002–2003	108	7	1.0058
Brazoria NWR				
	1999–2000	116	6	0.8832
	2000–2001	31	4	0.5530
	2001–2002	92	5	0.4294
Brazos Bend SP				
	1999–2000	26	7	0.8747
	2000–2001	54	8	0.5533
	2001–2002	33	6	0.3112
	2002–2003	5	4	0.4192
Indiangrass Preserve				
	2000–2001	11	2	0.8739
	2001–2002	40	3	0.6072
	2002–2003	5	1	0.8390
San Bernard NWR				
	2000–2001	23	6	0.3850
	2001–2002	10	3	0.7805
	2002–2003	26	3	0.7100
TX City PP				
	1998–1999	83	9	0.6648
	1999–2000	56	8	0.6222
	2002–2003	13	5	0.3466
UHCC				
	1998–1999	59	5	0.3612
	1999–2000	43	8	0.2842
	2000–2001	28	4	0.2398
	2002–2003	44	7	0.2398

two individuals were found. In the case of Nelson's Sharp-tailed Sparrow, the low overall numbers (two sites, two individuals) reflect the tidal salt marsh habitat preference of this species along with its furtive nature within that habitat. In addition, this study focused on sites that were mostly upland prairie, not those properties with extensive salt marsh. Henslow's Sparrow was found somewhat more widely (six sites, 11 individuals). This species is known to favor pine savanna for wintering habitat, and indeed the one site in the project that contains significant amounts of this habitat accounted for four of six individuals. Yellow Rails were found at only one site, but are notoriously hard to detect. This species is highly likely to occur at coastal and near coastal sites but the search methodology probably was not adequate to detect them in representative numbers.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 56

Table 2. Avian species found on all PPB transects and their preferred habitats along with the Partners in Flight combined scores (higher scores are more threatened). PIF Combined Score is a continental score which reflects population size, breeding status, wintering status, and threats across the entire range of landbird species. Dashes indicate that no score is available for the species.

Species	PIF combined score (out of 20)	Habitat preference
Henslow's Sparrow (*Ammodramus henslowii*)	18	Pine Savanna
Attwater's Greater Prairie Chicken (*Tympanuchus cupido attwateri*)	17	Upland Coastal Prairie
Sprague's Pipit (*Anthus spragueii*)	16	Upland Coastal Prairie
Seaside Sparrow (*Ammodramus maritimus*)	15	Prairie-Salt Marsh Ecotone
Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni*)	14	Prairie-Salt Marsh Ecotone
Burrowing Owl (*Athene cunicularia*)	13	Upland Coastal Prairie
Le Conte's Sparrow (*Ammodramus leconteii*)	13	Upland Coastal Prairie
Short-eared Owl (*Asio flammeus*)	13	Upland Coastal Prairie
Grasshopper Sparrow (*Ammodramus savannarum*)	12	Upland Coastal Prairie
Field Sparrow (*Spizella pusilla*)	12	Prairie-Shrub Ecotone
Loggerhead Shrike (*Lanius ludovicianus*)	12	Prairie-Shrub Ecotone
Northern Bobwhite (*Colinus virginianus*)	12	Upland Coastal Prairie
Eastern Meadowlark (*Sturnella magna*)	11	Upland Coastal Prairie
Vesper Sparrow (*Pooecetes gramineus*)	11	Prairie-Shrub Ecotone
Northern Harrier (*Circus cyaneus*)	11	Generalist
Sedge Wren (*Cistothorus platensis*)	9	Upland Coastal Prairie
Barn Owl (*Tyto alba*)	9	Prairie-Shrub Ecotone
Orange-crowned Warbler (*Vermivora celata*)	9	Prairie-Shrub Ecotone
Savannah Sparrow *(Passerculus sandwichensis*)	9	Generalist
Song Sparrow (*Melospiza melodia*)	8	Prairie-Shrub Ecotone
White-tailed Kite (*Elanus leucurus*)	8	Prairie-Shrub Ecotone
Palm Warbler (*Dendroica palmarum*)	8	Prairie-Shrub Ecotone
Common Yellowthroat (*Geothlypis trichas*)	8	Prairie-Fresh Water Marsh Ecotone
Marsh Wren (*Cistothorus palustris*)	8	Prairie-Fresh Water Marsh Ecotone
Red-winged Blackbird (*Agelaius phoeniceus*)	8	Prairie-Fresh Water Marsh Ecotone
Common Grackle (*Quiscalus quiscula*)	8	Generalist
Eastern Phoebe (*Sayornis phoebe*)	8	Generalist
Northern Mockingbird (*Mimus polyglottos*)	8	Generalist
Lincoln's Sparrow (*Melospiza lincolnii*)	7	Prairie-Shrub Ecotone
Swamp Sparrow (*Melospiza georgiana*)	7	Prairie-Fresh Water Marsh Ecotone
House Wren (*Troglodytes aedon*)	6	Generalist
Yellow-rumped Warbler (*Dendroica coronata*)	6	Generalist
American Robin (*Turdus migratorius*)	5	Generalist
Mourning Dove (*Zenaida macroura*)	5	Generalist
American Bittern (*Botaurus lentiginosus*)	–	Prairie-Fresh Water Marsh Ecotone
Wilson's Snipe (*Gallinago delicata*)	–	Prairie-Fresh Water Marsh Ecotone
Virginia Rail (*Rallus limicola*)	–	Prairie-Fresh Water Marsh Ecotone
Yellow Rail (*Coturnicops noveboracensis*)	–	Prairie-Fresh Water Marsh Ecotone
Killdeer (*Charadrius vociferus*)	–	Generalist

PIF at risk species recorded in higher numbers included Seaside Sparrow, Sprague's Pipit, Le Conte's Sparrow, and Sedge Wren. Seaside Sparrow (four sites, 19 individuals) prefers salt marsh (Post and Greenlaw 1994) and Sprague's Pipits (three sites, eight individuals) prefer disturbed areas with short grass (Robbins and Dale 1999). The majority of sites included in this study were tall-grass prairie except where mowing, overgrazing, or burning occurred, thus there was little optimum habitat for either of these species among the study sites.

In contrast, both Sedge Wren (19 sites, 709 individuals) and Le Conte's Sparrow (24 sites, 830 individuals) were among the most numerous species recorded. Preferred habitat of Le Conte's Sparrows includes moist

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 57

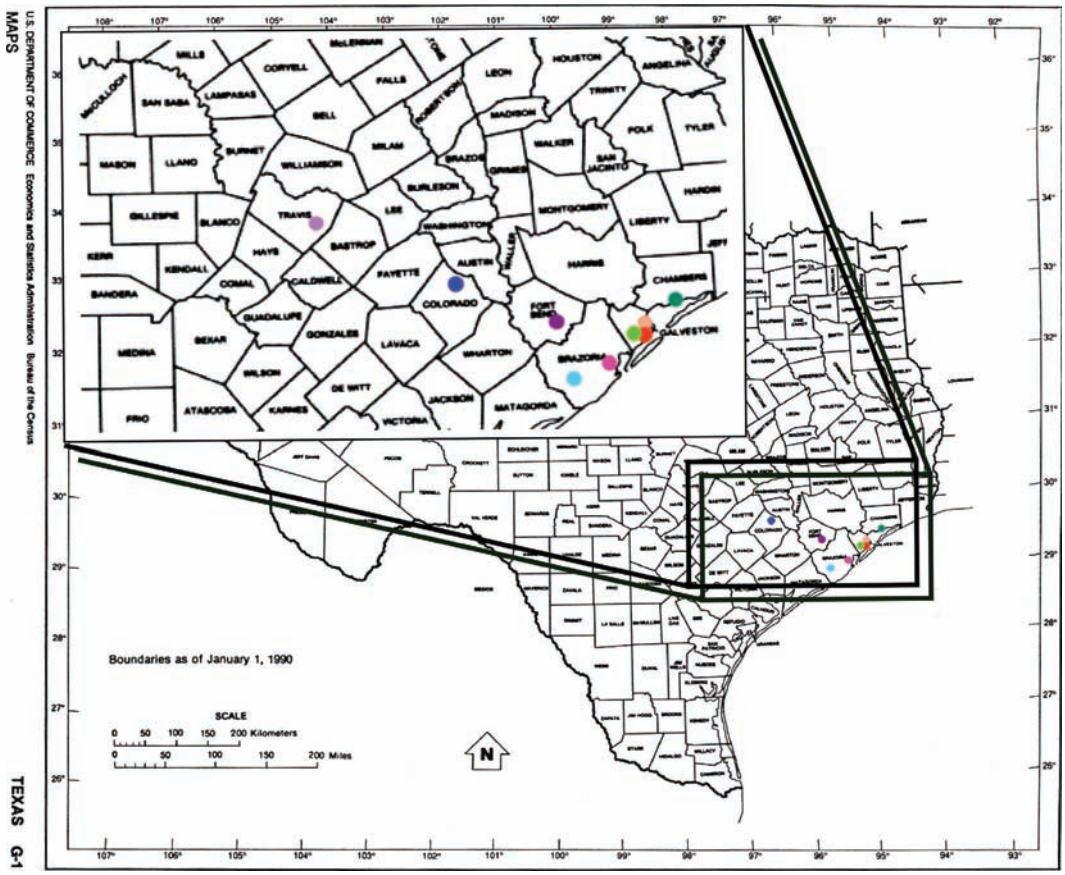

Figure 4. Sites included in this analysis included seven counties along the Upper Texas Coast. Figure courtesy of Shackelford et al. 2001.

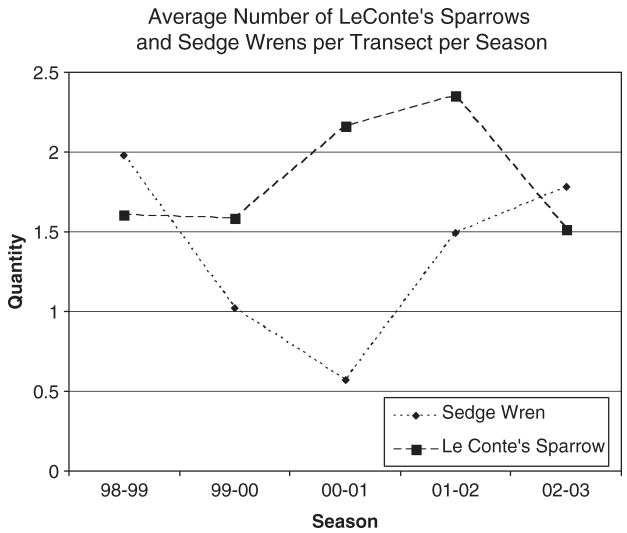

Figure 5. Le Conte's Sparrows and Sedge Wrens detected per season/transect showing fluctuation among years.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 58

fields of broomsedge (Lowther 1996), but little information is available on preferred winter habitats of Sedge Wrens in Texas (Herkert et al. 2001). These data reveal of clear tendency for Sedge Wren to occur in or near coastal locations and much less at inland ones, while Le Conte's Sparrow showed no similar coastal bias.

As a result of this study, we have demonstrated the large numbers of previously undocumented grassland birds that winter in coastal prairies, and that two species of concern for coastal prairie, Le Conte's Sparrow and Sedge Wren, are among the most abundant birds found in Texas coastal prairies in winter. We also determined that winter grassland bird studies are needed to determine habitat requirements for conservation purposes, and that the PPB protocol worked well for documenting the presence of grassland birds in coastal prairies.

We are satisfied that the protocol developed produced the desired outcome. Prior to the development of this grassland bird flushing technique, few attempts were made to monitor these secretive birds, especially on such a large scale. Peaking the interests and utilizing the energy of avocational birders, or citizen scientists, was a unique endeavor, and we fully recommend this technique for future bird monitoring activities. One of the most important objectives of this project was to raise awareness among the public and avocational birders about these little-known birds and their under-studied grassland communities. The numbers of volunteers who participated in this project attest to the interest generated, as well as the general public concern for grassland birds and prairie ecosystems. After interviews with participants, and after participating ourselves, we identified the primary problems associated with the protocol to be 1) the difficulty of identifying flushed birds to species, and 2) the physical effort required to traverse the rough terrain of most of the transects. Though there is little we can do to reduce the physical demands of the field work, it is possible to improve the training techniques for this unusual identification challenge. One option is to develop a video of prairie birds being flushed to allow practice identification sessions. Another is simply more time in the field with volunteers and trial sampling surveys prior to actually collecting data.

We have also considered the need to include additional vegetative sampling (plant species identification) to the current protocol, along with collection of climatological data, which may be archived elsewhere. Both of these inclusions would allow for a more in-depth comparison of species diversity and habitat selection. However, the collection of more variables would be an additional burden for the volunteers who had already committed a great deal of time to this project.

ACKNOWLEDGMENTS

We thank Ross and Dawn Carrie for their help in designing the protocols for this study and for the funding provided by the Texas Parks and Wildlife Department, the U.S. Fish and Wildlife Service Region 2, and the Bird Interest Group of Texas. Over 100 volunteers helped with this project and thus it is not possible to list each one individually. Without their generous donation of time and energy, this project would have been impossible. We are grateful for the access provided by national wildlife refuges, wildlife management areas, parks, nature centers, and private properties. We wish to thank Gregory Green, Daniel Brooks, and Sumita Prasad who served as PPB Field Coordinators over the years. Also, early reporting efforts and data analysis by Sumita Prasad added much to this current manuscript while employed at GCBO.

LITERATURE CITED

Arnold, K. A. and N. C. Garza, Jr. 1998. Populations and habitat requirements of breeding Henslow's Sparrows in Harris County, TX. Bulletin of the Texas Ornithology Society 31:42–49.

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Current Ornithology 11:1–34.

Askins, R. A. 1999. History of grassland birds in eastern North America. Studies in Avian Biology 19:60–71.

Donovan, T. M., C. J. Beardmore, D. N. Bonter, J. D. Brawn, R. J. Cooper, J. A. Fitzgerald, R. Ford, S. A. Gauthreaux, T. L. George, W. C. Hunter, T. E. Martin, J. Price, K. V. Rosenberg, P. D. Vickery, and T. B. Wigley. 2002. Priority research needs for the conservation of Neotropical migrant landbirds. Journal of Field Ornithology 73:329–450.

Grace, J. B. 1998. Can prescribed fire save the endangered coastal prairie ecosystem from Chinese tallow invasion? Endangered Species Update 15(5):70–76.

Herkert, J. R., D. E. Kroodsma, and J. P. Gibbs. 2001. Sedge Wren (*Cistothorus platensis*). The Birds of North America, No. 582.

Lowther, P. E. 1996. Le Conte's Sparrow (*Ammodramus leconteii*). The Birds of North America, No. 224.

O'Connor, R. J., M. T. Jones, R. B. Boone, and T. B. Lauber. 1999. Linking continental climate, land use and land patterns with grassland bird distribution across the conterminous United States. Studies in Avian Biology 19:45–49.

Post, W. and J. S. Greenlaw. 1994. Seaside Sparrow (*Ammodramus maritimus*), The Birds of North America, No. 127.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 59

RICH, T. D., C. J. BEARDMORE, H. BERLANGA, P. J. BLANCHER, M. S. W. BRADSTREET, G. S. BUTCHER, D. W. DEMAREST, E. H. DUNN, W. C. HUNTER, E. E. IÑIGO-ELIAS, J. A. KENNEDY, A. M. MARTELL, A. O. PANJABI, D. N. PASHLEY, K. V. ROSENBERG, C. M. RUSTAY, J. S. WENDT, AND T. C. WILL. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY.

ROBEL, R. J., J. N. BRIGGS, A. D. DAYTON, AND L. C. HULBERT. 1970. Relationships between visual obstruction measurements and weight of grassland vegetation. Journal of Range Management 23:295–297.

ROBBINS, M. B. AND B. C. DALE. 1999. Sprague's Pipit (*Anthus spragueii*), The Birds of North America, No. 439.

SHACKELFORD, C. E., N. R. CARRIE, C. M. RILEY, AND D. K. CARRIE. 2001. Project Prairie Birds: A citizen science project for Wintering Grassland Birds. Second Edition. Texas Parks & Wildlife PWD BK W7000-485.

TEXAS PARKS AND WILDLIFE DIVISION. 2005. Texas Comprehensive Wildlife Conservation Strategy. TPWD, Austin, TX.

VERMILLION, W., J. W. ELEY, B. WILSON, S. HEATH, AND M. PARR. 2008. Partners in Flight Bird Conservation Plan Gulf Coastal Prairie. Gulf Coast Joint Venture and Gulf Coast Bird Observatory. Lake Jackson, TX.

VICKERY, P. D. AND J. R. HERKERT. 2001. Overview: Recent advances in grassland bird research: Where do we go from here? Auk 118(1):11–15.

VICKERY, P. D., P. L. TUBARO, J. M. CARDOSA DE SILVA, B. G. PETERJOHN, J. R. HERKERT, AND R. B. CAVALCANTI. 1999. Conservation of grassland birds in the western hemisphere. Studies in Avian Biology 19:2–26.

USE OF ARTIFICIAL BURROWS BY WESTERN BURROWING OWLS AND OTHER VERTEBRATES DURING WINTER IN SOUTHERN TEXAS

JENNIFER L. KEPPERS[1,*], MARY KAY SKORUPPA[2,3], MARC C. WOODIN[2], AND GRAHAM C. HICKMAN[1]

[1]*Department of Life Sciences, Texas A&M University-Corpus Christi, 6300 Ocean Drive, Corpus Christi, TX 78412*

[2]*U.S. Geological Survey, Columbia Environmental Research Center, Texas Gulf Coast Field Research Station, 6300 Ocean Drive, Corpus Christi, TX 78412*

ABSTRACT.—Burrows are an integral part of the natural history of the Western Burrowing Owl (*Athene cunicularia hypugaea*), however, mammal burrows are uncommon in southern Texas where the Burrowing Owl overwinters. Seventy-two artificial burrows of 2.4 m length were monitored regularly for Burrowing Owl and other vertebrate use over two non-breeding seasons (October through March, 2001 to 2003). Six types of burrows, differing in diameter (15, 20, or 25 cm) and number of openings (two or three), were monitored. Small-diameter (15 cm) burrows accounted for 79% of all Burrowing Owl use. Burrowing Owl use of artificial burrows was not related to number of openings ($p = 0.1$), but diameter of openings was significant ($p = 0.05$). Vertebrates used all six types of artificial burrows.

The Western Burrowing Owl, *Athene cunicularia hypugaea*, is native to the grasslands and deserts of the western half of North America, including Mexico, the United States, and southern Canada (Haug et al. 1993). These birds are mostly migratory, breeding in Canada and the western U.S., and spending their winters in the southwestern U.S. and Mexico. Although once common, the Western Burrowing Owl has declined throughout much of its range and is listed as endangered in Canada, threatened in Mexico, and as a National Bird of Conservation Concern by the U.S. Fish and Wildlife Service (Klute et al. 2003). The decline of the Western Burrowing Owl has been due predominately to the loss of habitat from agricultural development and from loss of natural burrows through burrowing mammal control activities (Haug et al. 1993).

Western Burrowing Owls make use of abandoned burrows originally excavated by small to medium-sized mammals, such as prairie dogs (*Cynomys* spp.), large ground squirrels (*Spermophilus* spp.), American badgers (*Taxidea taxus*), nine-banded armadillos (*Dasypus novemcinctus*), skunks (*Mephitis* spp.), and rabbits (*Sylvilagus* spp.). Nesting in burrows helps the owls thermoregulate by providing a place to stay warm during

*Current address: 2305 Espanola St. N.E., Albuquerque, NM 87110

[3]E-mail: Mary_Kay_Skoruppa@usgs.gov

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 60

inclement weather and a cool retreat on hot summer days (Coulombe 1971). Burrows also provide protection from mammalian predators, such as coyote (*Canis latrans*) and red fox (*Vulpes vulpes*), as well as avian predators, such as larger owl species and buteonine hawks (Clayton and Schmutz 1999) and Northern Harriers (*Circus cyaneus*) (Williford et al. 2007).

Burrows are important to Burrowing Owls not only for nesting during the breeding season (Haug et al. 1993), but also for roosting during the winter (Williford et al. 2007). Most of the coastal prairies of southern Texas have been altered severely and are now predominantly agricultural land (Smeins et al. 1991, Woodin et al. 2008). Burrowing Owls might not be limited by habitat per se, but rather by the availability of burrow sites. Owls in southern Texas have been found to roost in unusual places, such as road culverts, concrete rubble piles and wood debris, holes formed by soil erosion, and irrigation pipes (Williford et al. 2007). Because of this behavioral plasticity, Burrowing Owls might be one of the raptors most capable of adapting to man-made environmental changes (Martin 1973).

Burrowing Owls frequently have used artificial burrows successfully for breeding (Collins and Landry 1977, Trulio 1995, Botelho and Arrowood 1998, Smith 1999, Smith and Belthoff 2001, Belthoff and King 2002, Poulin 2003, Barclay 2007). However, no studies have been conducted in southern Texas on the use of artificial burrows by non-breeding Burrowing Owls, and we are unaware of any other studies addressing this issue with winter-resident Burrowing Owls. If owls also accept and use artificial burrows during migration and winter, strategic placement of artificial burrows can be used to protect Burrowing Owl populations during the non-breeding part of their life cycle. Additionally, installation of artificial burrows could benefit other organisms by providing belowground refuges from extreme heat and solar radiation (Wone and Beauchamp 2003), especially important during drought conditions.

The objectives of this study were to: 1) determine if migrating and wintering Burrowing Owls will use artificial burrows, 2) determine characteristics of artificial burrow designs preferred by Burrowing Owls, and 3) document other vertebrate use of artificial burrows.

METHODS

Study Area.—Four sites in southern Texas were selected for artificial burrows, each with a different habitat, but all with primarily open landscapes. The sites were chosen because they were located within the Burrowing Owls' historical range (Wellicome and Holroyd 2001) and experienced relatively little human disturbance. The site located at Naval Air Station Kingsville (Kleberg County, 27° 29′ N, 97° 49′ W) is mowed, exotic grassland; Naval Auxiliary Landing Field Orange Grove (Jim Wells County, 27° 54′ N, 98° 03′ W) is mowed, native grassland. Artificial burrows at Rob & Bessie Welder Wildlife Foundation (San Patricio County, 28° 07′ N, 97° 23′ W) were installed in two habitats; grazed and fire-managed grassland and mesquite (*Prosopis glandulosa*) savanna. The Port Aransas sites (Nueces County, 27° 46′ N, 97° 06′ W) were located in both mowed and un-mowed native grasslands on Mustang Island (a barrier island).

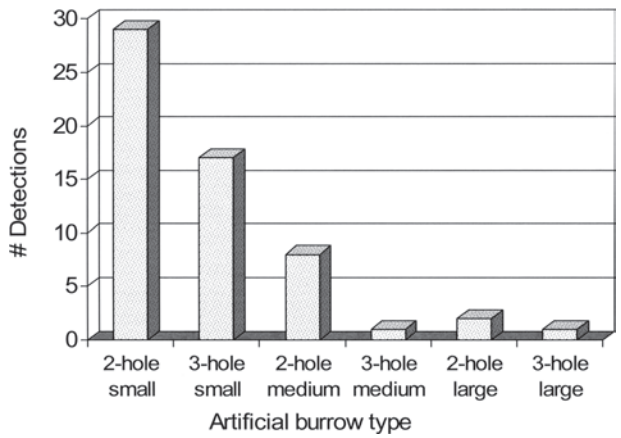

Figure 1. The number of Burrowing Owl detections at each of six artificial burrow types over two wintering seasons in southern Texas.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 61

Artificial Burrow Construction and Installation.—Artificial burrows were constructed from perforated, polyethylene drainage pipe cut into 2.4 m lengths and installed at the four study sites in southern Texas. Burrows of three diameters (15 cm, 20 cm, and 25 cm) were constructed with two options for numbers of openings (two openings and three openings), resulting in six different burrow designs (i.e., 15-cm diameter with two openings, 15-cm diameter with three openings, 20-cm diameter with two openings, 20-cm diameter with three openings, 25-cm diameter with two openings, and 25-cm diameter with three openings). The three-opening design was constructed by placing a T-joint between two 1.2 m lengths of drainage pipe, with the third opening facing upward (vertically) in the middle of the burrow.

The 15-, 20-, and 25-cm artificial burrows simulated the owls' natural choice of burrow size. Natural burrows used by Burrowing Owls in New Mexico averaged 11 cm × 20 cm (Martin 1973). Prairie dog burrows used by wintering owls in Oklahoma were 10 to 23 cm high and 10 to 20 cm wide (Butts 1976). Burrows used by owls in the Imperial Valley, California, averaged 20 cm (Coulombe 1971), while nest burrows in South Dakota were 13 cm in diameter (MacCracken et al. 1985).

A total of 72 artificial burrows were installed in southern Texas. At each of the four study sites, 18 artificial burrows were placed in three clusters of six burrows each. Each cluster of artificial burrows included one of each of the six burrow designs. Artificial burrows within a cluster were placed approximately 5 m apart, and clusters of burrows within the study sites were at least 100 m apart.

The relative positions in which burrows were placed in each cluster were chosen randomly, however, the openings at the ends of the burrows were facing east and west for protection from northern winds and to eliminate orientation of burrow opening as a source of variation in owl response. Artificial burrows were positioned above ground and then covered by soil, forming a mound on which the owls could perch while outside of the burrows. In some cases, as in the Port Aransas site clusters, burrows were placed in small trenches and then buried in order to stabilize the burrows in the sand and to prevent excessive erosion. Artificial burrow entrances were kept free of vegetation and other obstructions during the duration of the study.

Data Collection.—Artificial burrows were monitored for Burrowing Owl use approximately every 2 weeks from October 2001 through March 2002 (n = 19 monitoring visits to each of 72 burrows). During the second winter (October 2002 through March 2003), 48 artificial burrows were monitored approximately every 3 weeks (n = 7, 8, and 11 monitoring visits to Rob & Bessie Welder Wildlife Foundation, Port Aransas, and Naval Auxiliary Landing Field Orange Grove, respectively). The Naval Air Station Kingsville location, with 18 burrows, was not mowed during the second winter and therefore was not available for Burrowing Owl use after the first winter

Figure 2. Two Burrowing Owls using 15-cm diameter artificial burrows at Naval Auxiliary Landing Field Orange Grove, January 2003. The burrow in the background has three openings, and the burrow in the foreground has two openings.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 62

Table 1. Vertebrate species observed using artificial burrows in southern Texas during this study.

Vertebrate species	No. of sightings	Artificial burrow type
Virginia Opossum *Didelphis virginiana*	1	2-hole, small diameter
Striped Skunk *Mephitis mephitis*	4	2-hole, small diameter
Black-tailed Jackrabbit *Lepus californicus*	2	2-hole, large diameter
Mexican Ground Squirrel *Spermophilis mexicanus*	>20	All 6 types
Western Diamondback Rattlesnake *Crotalus atrox*	5	2-hole, small diameter

because of tall grass. One cluster of six burrows in Port Aransas was removed by vandals during the summer between sampling seasons, which left 12 burrows instead of 18 in Port Aransas during the second winter.

Burrowing Owl sightings, presence of regurgitated pellets, feces, and/or feathers were considered evidence of Burrowing Owl use of an artificial burrow. After each monitoring visit, pellets and feathers were removed, and tracks were swept away, to avoid during subsequent visits over-counting owls that had relocated or otherwise disappeared from the study site. When owls were present, care was taken to minimize disturbance in order to prevent abandonment of the burrows.

Owl detections were tallied by burrow type for reach monitoring visit to every site. Owl detections were totaled over two seasons of data collection to obtain total number of detections.

We determined selection of artificial burrow diameter and number of openings by documenting presence and absence of owls at each of the burrow types over the two winters. We used chi-square tests to test for significant differences among the frequency data. All statistical analyses were performed using version 8.2 of SAS (SAS Institute, Cary, North Carolina).

Any evidence of use by vertebrates other than Burrowing Owls was also documented for each artificial burrow during monitoring visits. Tracks, scat, and sightings were used to indicate burrow use by other vertebrates.

RESULTS

Repeated monitoring visits throughout the 2-year study period resulted in 58 detections of Burrowing Owl use, all of which occurred at two sites (Naval Auxiliary Landing Field Orange Grove and Port Aransas). We detected no Burrowing Owl use of artificial burrows installed at Rob & Bessie Welder Wildlife Foundation or at Naval Air Station Kingsville. Of the 58 detections, 46 (79%) occurred at small-diameter (15 cm) burrows. Only three instances of Burrowing Owl use were documented at large-diameter (25 cm) burrows, and these all occurred at Port Aransas (Fig. 1). The number of openings (two or three openings) was not statistically related to owl use ($\chi^2 = 2.70$, df = 1, $p = 0.10$), although 39 detections (67%) occurred at burrows with two openings. Diameter of openings (small, medium, or large) was significantly related to owl use ($\chi^2 = 5.94$, df = 2, $p = 0.05$).

Vertebrates other than Burrowing Owls also used the artificial burrows. All four study site locations received regular vertebrate use, as did all six types of burrows. However, scat was rare, and it was difficult to identify positively the species of vertebrate based on tracks alone. On a few occasions, however, the animal was present in the burrow at the time of the monitoring visit. Table 1 shows vertebrate species observed during the study and the type of burrow used by each.

DISCUSSION

This study documents the first occurrence of artificial burrow use as winter roost sites by Western Burrowing Owls in southern Texas (see also Ortega 2003). Previous studies reported use of artificial burrows and nesting boxes by breeding Burrowing Owls in California (Collins and Landry 1977, Trulio 1995, Barclay 2007), New Mexico (Botelho and Arrowood 1998), and Idaho (Smith and Belthoff 2001).

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 63

We found that Burrowing Owls preferred burrows with the smallest (15-cm) diameters. Use of larger burrows (20- and 25-cm diameters) was infrequent and might have been the result of the birds simply investigating potential roost sites prior to choosing a smaller burrow. Our results were consistent with those of a companion study in southern Texas, which found that Burrowing Owls selected roadside culverts with smaller (≤16 cm) openings for roost sites (Woodin et al. 2007). Other studies have shown that burrows with even smaller diameters (10 cm) are also used by Burrowing Owls. In Idaho, nest burrows used by owls included many with smaller dimensions (height, 8–24 cm; width, 12–28 cm) (Belthoff and King 2002). Burrowing Owls in California used smaller (10 cm) burrows (Barclay 2007), and in Idaho they selected the smaller 10-cm burrows over those with 15-cm diameters (Smith and Belthoff 2001).

The wintering Burrowing Owls that we observed in southern Texas usually were roosting at the entrance (not the interior) of the burrow (Fig. 2). Burrow interiors in winter seldom were used for daily activities, unlike interiors of nesting burrows, so results from this study support the hypothesis that Burrowing Owls select small-diameter artificial burrows primarily because they deter large mammalian predators, as opposed to other possible explanations (for example, microclimate characteristics) (Smith and Belthoff 2001).

We found that Burrowing Owls showed no preference for number of openings (two or three). Interestingly, another study in California found that owl pairs showed no preference for one- or two-entrance artificial burrows (Barclay 2007). Despite these findings, Barclay (2007) asserted that two-entrance burrows may provide an advantage by offering an escape route.

We do not know why two locations in our study failed to attract Burrowing Owls. The absence of Burrowing Owls at these sites indicated that factors beyond the burrow design are also important to this species. Although artificial burrows at unused sites were placed in undisturbed, open areas within the known range of Burrowing Owls, there are several factors that could have made the sites unsuitable for roosting Burrowing Owls. These factors include surrounding habitat, size of the grassland patch, distance to trees and/or brush lines, elevation, land use, or the presence of pervasive, introduced grass species. Determining which of these factors are important to Burrowing Owl roost selection was beyond the scope of this study and needs further investigation.

The vertebrates (other than Burrowing Owls) that visited the artificial burrows in this study are all known to use crevices, burrows excavated by other animals, or man-made structures. Animals in southern Texas probably use burrows for protection from high daytime temperatures (Wone and Beauchamp 2003, Schmidly 2004). Size of burrow openings can be important in burrow selection by different species (Kinlaw 1999), however, the variety of diameters that were provided (15, 20, and 25 cm) was probably best-suited for the medium-sized mammals (Table 1) that used the burrows. The small (15-cm) burrows might have been selected by the western diamondback rattlesnake (*Crotalus atrox*), since all five observations of rattlesnakes were at small-diameter burrows.

Mammal burrows are no longer abundant in much of southern Texas, due primarily to widespread cultivation and development. The installation of small (10-15 cm diameter) artificial burrows in suitable habitat (short or sparsely vegetated grassland) can provide a beneficial substitute to natural mammal burrows for migrating and wintering Burrowing Owls. Artificial burrows made of many different types of man-made materials have successfully attracted Burrowing Owls. Small-diameter pipes made of cast iron, concrete, clay, or polyvinyl chloride (PVC) are examples of materials that can be used as artificial burrows. In fact, the use of man-made burrows might actually be advantageous to Burrowing Owls in avoiding ectoparasites, especially fleas (Skoruppa et al. 2006), which are common inhabitants of mammal burrows (James and Harwood 1969). Artificial burrows are also beneficial to many other species of wildlife for shelter and provide a new opportunity for conservation-minded landowners to enhance their landscapes for wildlife.

ACKNOWLEDGMENTS

We thank the U.S. Geological Survey, Texas A&M University-Corpus Christi, Coastal Bend Bays & Estuaries Program, Inc., and The U.S. Filter Group for funding and materials. Geoff Holroyd and Helen Trefry of the Canadian Wildlife Service provided suggestions for the burrow design. David Moury and Robert McDonald helped with the study development.

We are grateful to the U.S. Navy, the City of Port Aransas, the University of Texas Marine Science Institute, and the Rob & Bessie Welder Wildlife Foundation for providing study sites and especially to Jim Rostohar, Arturo Mendez, Sandy Maynard, Norma Barrera, James Moses, Keith Skillin, Matt Eastman, Hans Schwarzbach, Kim Halbrook, Tom Brooks, Tony Amos, Joan Holt, Terry Blankenship, and Lynn Drawe for

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 64

their assistance. Also indispensable to this project were the many volunteers who provided hours of hard labor to install the artificial burrows. We also thank Carol Finley and Tim Anderson for providing helpful suggestions to an earlier version of this manuscript.

Any mention of trade names does not constitute government endorsement.

LITERATURE CITED

BARCLAY, J. H. 2007. Burrowing Owl management at Mineta San Jose International Airport. Pages 146–154 *in* Proceedings of the California Burrowing Owl Symposium, November 2003. Bird Populations Monographs No. 1 (J. H. Barclay, K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, Editors). The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, California.

BELTHOFF, J. R. AND R. A. KING. 2002. Nest-site characteristics of Burrowing Owls (*Athene cunicularia*) in the Snake River Birds of Prey National Conservation Area, Idaho, and applications of artificial burrow installation. Western North American Naturalist 62:112–119.

BOTELHO, E. S. AND P. C. ARROWOOD. 1998. The effect of burrow site use in the reproductive success of a partially migratory population of Western Burrowing Owls (*Speotyto cunicularia hypugaea*). Journal of Raptor Research 32:233–240.

BUTTS, K. O. 1976. Burrowing Owls wintering in the Oklahoma Panhandle. Auk 93:510–516.

CLAYTON, K. M. AND J. K. SCHMUTZ. 1999. Is the decline of Burrowing Owls (*Speotyto cunicularia*) in prairie Canada linked to changes in Great Plains ecosystems? Bird Conservation International 9:163–185.

COLLINS, C. T. AND R. E. LANDRY. 1977. Artificial nest burrows for Burrowing Owls. North American Bird Bander 2:151–154.

COULOMBE, H. N. 1971. Behavior and population ecology of the Burrowing Owl, *Speotyto cunicularia*, in the Imperial Valley of California. Condor 73:162–176.

HAUG, E. A., B. A. MILLSAP, AND M. S. MARTELL. 1993. Burrowing Owl (*Speotyto cunicularia*). The Birds of North America, Number 61.

JAMES, M. T. AND R. F. HARWOOD. 1969. Herms's medical entomology, sixth edition. The Macmillan Company, Collier-Macmillan Limited, London, England.

KINLAW, A. 1999. A review of burrowing by semi-fossorial vertebrates in arid environments. Journal of Arid Environments 41:127–145.

KLUTE, D. S., W. H. HOWE, S. R. SHEFFIELD, L. W. AYERS, S. L. JONES, T. S. ZIMMERMAN, M. T. GREEN, AND J. A. SHAFFER. 2003. Status assessment and conservation plan for the Western Burrowing Owl in the United States. BTP-R6001-2003, United States Fish and Wildlife Service, Washington, D.C.

MACCRACKEN, J. G., D. W. URESK, AND R. M. HANSEN. 1985. Vegetation and soils of Burrowing Owl nest sites in Conata Basin, South Dakota. Condor 87:152–154.

MARTIN, D. J. 1973. Selected aspects of Burrowing Owl ecology and behavior. Condor 75:446–456.

ORTEGA, J. 2003. Artificial burrow use by Burrowing Owls (*Athene cunicularia*) and other vertebrates during winter in south Texas. Thesis. Texas A&M University-Corpus Christi, Corpus Christi.

POULIN, R. G. 2003. Relationships between Burrowing Owls (*Athene cunicularia*), small mammals, and agriculture. Dissertation. University of Regina, Regina, Saskatchewan, Canada.

SCHMIDLY, D. J. 2004. The mammals of Texas, revised edition. University of Texas Press, Austin.

SKORUPPA, M. K., B. PEARCE, M. C. WOODIN, AND G. C. HICKMAN. 2006. Ectoparasites of Burrowing Owls (*Athene cunicularia hypugaea*) wintering in southern Texas. Texas Journal of Science 58:73–78.

SMEINS, F. E., D. D. DIAMOND, AND C. W. HANSELKA. 1991. Coastal Prairie. Pages 269–290 *in* Natural grasslands, introduction and western hemisphere (R. T. Coupland, Editor). Elsevier, New York.

SMITH, B. W. 1999. Nest-site selection, ectoparasites, and mitigation techniques: studies of Burrowing Owls and artificial burrow systems in southwestern Idaho. Thesis. Boise State University, Boise, Idaho.

SMITH, B. W. AND J. R. BELTHOFF. 2001. Effects of nest dimensions on use of artificial burrow systems by Burrowing Owls. Journal of Wildlife Management 65:318–326.

TRULIO, L. A. 1995. Passive relocation: a method to preserve Burrowing Owls on disturbed sites. Journal of Field Ornithology 66:99–106.

WELLICOME, T. I. AND G. L. HOLROYD. 2001, The Second International Burrowing Owl Symposium—background and context. Journal of Raptor Research 35:269–273.

WILLIFORD, D. L., M. C. WOODIN, M. K. SKORUPPA, AND G. C. HICKMAN. 2007. Characteristics of roost sites used by Burrowing Owls (*Athene cunicularia*) wintering in southern Texas. Southwestern Naturalist 52:60–66.

WONE, B. AND B. BEAUCHAMP. 2003. Movement, home range, and activity patterns of the horned lizard, *Phrynosoma mcallii.* Journal of Herpetology 37:679–686.

WOODIN, M. C., C. J. LITTLES, AND M. K. SKORUPPA. 2008. Land use patterns and historical changes in the status of the Western Burrowing Owl in southern Texas. Bulletin of the Texas Ornithological Society 41:6–13.

WOODIN, M. C., M. K. SKORUPPA, AND G. C. HICKMAN. 2007. Winter ecology of the Western Burrowing Owl (*Athene cunicularia hypugaea*) in southern Texas, 1999–2004. U.S. Geological Survey, Scientific Investigations Report 2007-5150.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 65

SHORT COMMUNICATIONS

AMERICAN CROWS SEPARATE IMPORTED RED FIRE ANTS FROM FOOD ITEMS USING WATER

BRUSH FREEMAN[1]
120 North Redbud Trail, Elgin, Texas 78621

I observed a family of American Crows, *Corvus brachyrhynchos*, for about 3 years in Bastrop County, Texas using a 20–60× scope and binoculars from a distance of approximately 21 m and noted many interesting behaviors. On almost a daily basis, I provided the current family of five, two adults and three hatch year birds, with treats ranging from dried cat food to nuts and raw meat portions. These morsels were placed on a flat platform feeder where other passerine birds as well as squirrels *Sciurus sp*. feed on standard bird seed.

The feeding platform was in an area with an abundance of imported red fire ants, *Solenopsis invicta*. Raw meats, meat fats or even dried pet foods were usually covered with ants within 0.5–1 h of being placed on the feeder during warm weather.

I observed the adult crows removing fire ants from food items by gingerly picking up food items covered with ants and quickly taking them to one of several bird baths within 5 m. The items were dropped into about 2–4 centimeters deep water. Meat items such as chicken necks, gizzards, and beef bones usually sink quickly. The fire ants, sometimes in the hundreds, immediately detached from food items to surface. The crows then easily retrieved the ant-free morsel from the water and consumed it. With dried pet foods that do not readily sink, the crows helped the process by repeatedly dipping or pushing the pieces below the surface.

Sometimes the crows stood and waited for the ants to leave the submerged morsel. This took up to 3 or 4 min. At other times, if additional morsels were available, they returned to the feeder for another item to drop into the water. In this manner these crows made an otherwise almost unpalatable meal, palatable in short order.

Food washing behavior has been documented in Common (*Quiscalus quiscula*) and Boat-tailed Grackles, *Cassidix major* (Wible 1975) but has not been reported in the American Crow (Verbeek and Caffrey 2002).

American Crows at a feeding platform in Bastrop County. Photo by Brush Freeman.

[1]E-mail: Brushf@earthlink.net

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 66

LITERATURE CITED

VERBEEK, N. A. AND C. CAFFREY. 2002. American Crow (*Corvus brachyrhynchos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/647

WIBLE, M. W. 1975. Food washing by grackles. Wilson Bulletin 87:282–283.

HACKED NESTLING MISSISSIPPI KITE SURVIVES SIX YEARS AND DEMONSTRATES PHILOPATRY

CLINT W. BOAL[1]

U.S. Geological Survey Texas Cooperative Fish and Wildlife Research Unit, Department of Natural Resources Management, Texas Tech University, Lubbock, Texas 79409

Concern for injured and orphaned wildlife has led to the formation of numerous wildlife rehabilitation centers in many countries. An indication of the level of interest in wildlife rehabilitation is the over 1,100 listings in the Wildlife Rehabilitation Information Directory for the United States alone (http://www.tc.umn.edu/~devo0028/index.htm; accessed 1-30-2007). Despite the vast time and resources dedicated to wildlife rehabilitation, there remains a paucity of data as to the survival, and hence, success of rehabilitation efforts, of animals following release (e.g., Sharpe 1996, Molony et al. 2006). Most efforts at assessing post-release survival have focused on species of conservation concern (Martell et al. 1991, Sweeny et al. 1997, Holz et al. 2006) or following events in which large numbers of individuals are impacted (e.g., Sharp 1996, Goldsworthy et al. 2000). Furthermore, many assessments of post-release survival of birds of prey have been based on band recoveries (e.g., Martell et al. 2000, Joys et al. 2003). However, few researchers band rehabilitated birds and the infrequent recoveries make quantitative assessment of post-release survival difficult.

In addition to injured raptors, wildlife rehabilitation centers commonly receive uninjured orphaned and suspected orphaned raptors. Because these nestlings must learn to fly and hunt independent of parental care, the technique of 'hacking' is often used (Naisbitt and Holz 2004). Hacking is a process that allows raptors free movement in and out of an aviary or other safe retreat where food is provided. The raptor learns to fly and hunt, while having the security of a safe refuge and food source until hunting skills are developed that allow it to disperse. Hacking is often used to reintroduce or augment wild populations of raptors (Negro et al. 2007); studies have indicated hacked individuals experience lower survival that do wild-reared young (Kauffman et al. 2003, Brown et al. 2006).

The Mississippi Kite (*Ictinia mississippiensis*) breeds in forests, rural woodlands, shelterbelts, and urban areas across the southeastern United States, the southern plains, and small pockets of the southwest (Parker 1999). It is a long distance neotropical migrant raptor with a wintering range that is not well known but suspected to be primarily in the regions of Bolivia and Paraguay (see Parker 1999 for review). This suggests two annual movements of over 8,000 km between the wintering and summering grounds by following the Central American isthmus. Although Mississippi Kites are a relatively common raptor, there remains a paucity of information on the species ecology and survival. According to Bird Banding Laboratory records, 1,259 Mississippi Kites were banded between 1955 and 2004, but only 15 had been re-encountered (http://www.pwrc.usgs.gov/BBL/homepage/spec.htm#3290). Only 4 of these re-encounters occurred between 1999 and 2004, indicating the very low recovery rate. An additional 3 banded by this author have been recovered since, one of which is the basis for this report.

On 21 August 2001 I banded a nestling Mississippi Kite at the South Plains Wildlife Rehabilitation Center in Lubbock Texas. This uninjured nestling had been brought to the Center from an unknown location in Lubbock, Texas. The release protocol for the nestling was a tame hacking process allowing kites the opportunity to leave an aviary at will, but return for food as necessary. Kites normally fledge at 30–35 days but adults continue to feed them for up to 20 days, after-which fledglings begin attempting to forage on their own

[1]E-mail: clint.boal@ttu.edu

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 67

(Evan 1981, Shaw 1985). All kites permanently left the aviary by mid-September, which approximately corresponds with normally fledging and independence, and is in conjunction with onset of the migration period of late August through mid-September (Parker 1999).

The kite in question was recovered as a road-kill on 19 July 2007 approximately 15 km east of the release location. This indicates the hacked nestling kite had survived for six years and five round trip migrations, and that it demonstrated a degree of philopatry by returning closely to its natal area and had likely been a member of the local breeding population.

Mississippi Kites are generally gregarious and form loose aggregations, sometimes numbering in the hundreds, that migrate together (Wolfe 1967, Eubanks 1971, Parker 1999). Although unconfirmed, Parker (1999) speculated young of the year kites leave their natal areas with the adults at the onset of migration; if so, this would likely increase their survival. It is possible the hacked nestling reported here had been able to join an aggregation of other kites prior to departure for the wintering grounds.

Mississippi Kites have become common nesting birds in urban areas of the Southern Great Plains. This has resulted in increasing numbers of nestling kites being brought to wildlife rehabilitation centers, whether legitimately orphaned and abandoned or mistaken as such. The common practice is to release these nestlings through hacking procedures. Although the success rates of hacking nestling Mississippi Kites from wildlife rehabilitation centers may never be determined, this report confirms that some individuals may survive into adulthood.

I thank K. Rylander and T. Brush for helpful suggestions on the manuscript.

LITERATURE CITED

Brown, J. L., M. W. Collopy, E. J. Gott, P. J. Juergens, A. B. Montoya, and W. G. Hunt. 2006. Wild-reared Aplomado Falcons survive and recruit at higher rates than hacked falcons in a common environment. Biological Conservation 131:453–458.

Evan, S. A. 1981. Ecology and behavior of the Mississippi Kite (*Ictinia mississippiensis*) in southern Illinois. Thesis. Southern Illinois University, Carbondale.

Eubanks, T. R. 1971. Unusual flight of Mississippi Kites in Payne County. Oklahoma. Bulletin of the Oklahoma Ornithological Society 4:33.

Goldsworthy, S. D., M. Gliese, R. P. Gales, N. Brothers, and J. Hamill. 2000. Effects of the Iron Baron oil spill on Little Penguins (*Eudyptula minor*). I. Post-release survival of rehabilitated oiled birds. Wildlife Research 27:573–582.

Holz, P. H., R. Naisbitt, and P. Mansell. 2006. Fitness level as a determining factor in the survival of rehabilitated Peregrine Falcons (*Falco peregrinus*) and Brown Goshawks (*Accipiter fasciatus*) released back into the wild. Journal of Avian Medicine and Surgery 20:15–20.

Joys, A. C., J. A. Clark, N. A. Clark, and R. A. Robinson. 2003. An investigation of the effectiveness of rehabilitation of birds as shown by ringing recoveries. Research Report No. 324, British Trust for Ornithology, Thetford, United Kingdom.

Kauffman, M. J., W. F. Frick, and J. Linthicum. 2003. Estimation of habitat-specific demography and population growth for Peregrine Falcons in California. Ecological Applications 13:1802–1816.

Martell M., P. Redig, J. Nibe, and G. Buhl. 1991. Survival and movements of released rehabilitated Bald Eagles. Journal of Raptor Research 25:72–76.

Martell, M., S. J. Goggin, and P. T. Redig. 2000. Assessing rehabilitation success of raptors through band returns. Pages 327–334 *in* Raptor biomedicine III, including bibliography of diseases of birds of prey (J. T. Lumeij, D. Remple, P. T. Redig, M. Lierz and J. E. Cooper, Editors). Zoological Education Network, Lake Worth, Florida.

Molony, S. E., C. V. Dowding, P. J. Baker, I. C. Cuthill, and S. Harris. 2006. The effect of translocation and temporary captivity on wildlife rehabilitation success: An experimental study using European hedgehogs (*Erinaceus europaeus*). Biological Conservation 130:530–537.

Naisbitt, R. and P. Holz. 2004. Captive raptor management and rehabilitation. Hancock House Publishers, Blaine, Washington.

Negro, J. J., J. H. Sarasola, and J. H. Barclay. 2007. Augmenting wild populations and food resources. Pages 401–410 *in* Raptor research and management techniques (D. M Bird and K. L. Bildstein, Editors). Hancock House Publishers, Blaine, Washington.

Parker, J. W. 1999. Mississippi Kite (*Ictinia mississippiensis*). The Birds of North America, No. 402.

Sharp, B. E. 1996. Post-release survival of oiled, cleaned seabirds in North America. Ibis 138:222–228.

Shaw, D. M. 1985. Breeding biology of urban-nesting Mississippi Kites (*Ictinia mississippiensis*) in west central Texas. Thesis. Angelo State University, San Angelo, Texas.

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 68

Sweeney, S. J., P. T. Redig, and H. B. Tordoff. 1997. Morbidity, survival, and productivity of rehabilitated Peregrine Falcons in the upper Midwestern U.S. Journal of Raptor Research 31:347–352.
Wolfe, L. R. 1967. The Mississippi Kite in Texas. Bulletin of the Texas Ornithological Society 1:2–3.

PREDATION OF A NORTHERN CARDINAL BY A FOX SQUIRREL

Michael F. Small,[1,3] John T. Baccus,[1] and Michael C. Frisbie[2]
[1]*Department of Biology, Wildlife Ecology Program, Texas State University – San Marcos, San Marcos, Texas 78666*
[2]*Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78744*

As part of a research project to band White-winged Doves (*Zenaida asiatica*) in Mason, Texas (Mason County, 30.750° N, 99.230° W), modified wire, funnel traps (Reeves et al. 1968) were set and baited with a mixture of seeds and grain. Traps were checked about every 1.5 h and fox squirrels (*Sciurus niger*) and non-target bird species were commonly found in traps eating the bait. On 30 April 2006 at 0815 h, a fox squirrel was observed in a trap feeding on a male Northern Cardinal (*Cardinalis cardinalis*). On approaching the trap, a fox squirrel was noticed in the trap holding and feeding on a half-eaten Northern Cardinal carcass. It was holding the carcass with its front feet and had blood smeared on its mouth area. When the trap was approached, the fox squirrel dropped the bird carcass and began trying to exit the trap (Fig. 1). The carcass was too destroyed to definitively determine age.

Fox squirrels primarily feed on plant seeds supplemented with flowers, buds, and merristimatic tissue (Reichard 1976). Animal food sources generally involve consumption of insects and arthropods (Packard 1956). Fairbanks & Koprowski (1992) reported fox squirrels scavenging dead fish and Allen (1943) reported incidences of cannibalism. Fox squirrels are known avian nest predators feeding on eggs, including those of Northern Cardinals (Halkin and Linville 1999), and occasionally, nestlings (Packard 1956, Chapman et al. 1982, Shaffer and Baker 1991). Shaffer and Baker (1991) also reported predation of a juvenile Blue Jay (*Cyanocitta cristata*) by a fox squirrel. However, there has been a single observation of predation on a Northern Cardinal by an eastern gray squirrel (*Sciurus carolinensis*) (Brackbill 1967).

While trapping White-winged Doves it was not unusual to incidentally capture Northern Cardinals, and in every other case they were released without harm. This report appears to be the first documented occurrence of a fox squirrel killing and consuming an adult or sub-adult Northern Cardinal.

Figure 1. Fox squirrel predation in a White-winged Dove trap with remains of a Northern Cardinal. Photo by Michael Small.

[3]E-mail: doveman@centurytel.net

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 69

LITERATURE CITED

ALLEN, D. L. 1943. Michigan fox squirrel management. Michigan Department of Conservation Game Division Publication 100:1–404.

BRACKBILL, H. 1967. Cardinal being eaten alive by gray squirrel. Bird Banding 38:236.

CHAPMAN, J. A. AND G. A. FELDHAMER. 1982. Wild mammals of North America. Johns Hopkins University Press, Baltimore, Maryland.

FAIRBANKS, L. AND J. L. KOPROWSKI. 1992. Piscivory in fox squirrels. Prairie Naturalist 24:283–284.

HALKIN, S. L. AND S. U. LINVILLE. 1999. Northern Cardinal (*Cardinalis cardinalis*). The Birds of North America, Number 440.

PACKARD, R. L. 1956. The tree squirrels of Kansas: ecology and economic importance. Miscellaneous Publications, University of Kansas 11:1–67.

REEVES, H. M., A. D. GEIS, AND F. C. KNIFFIN. 1968. Mourning Dove capture and banding. Special Scientific Report, Number 117, U.S. Fish and Wildlife Service., Washington, D.C.

REICHARD, T. A. 1976. Spring food habits and feeding behavior of fox squirrels and red squirrels. American Midland Naturalist 96:443–450.

SHAFFER, B. S. AND B. W. BAKER. 1991. Observations of predation on a juvenile Blue Jay, *Cyanocitta cristata*, by a fox squirrel, *Sciurus niger*. Texas Journal of Science 43:105–106.

FIRST RECORD OF THE SURF SCOTER FOR THE STATE OF VERACRUZ, MEXICO

EDUARDO MARTINEZ-LEYVA[1,3], IRVING CHAVEZ-DOMINGUEZ[1], AND AGNI MARTINEZ-VILLASIS[2]

[1]*Pronatura A. C. Veracruz, Bourbon No. 39, Fracc. La Mata, Coatepec, Veracruz, México 91500*

[2]*Centro de Ecología y Pesquerías, Universidad Veracruzana, Hidalgo No. 617, Col. Rio Jamapa, Boca del Río, Veracruz, México 94290*

The Surf Scoter (*Melanitta perspicillata*) is commonly distributed in the northern part of the American continent, breeding in Alaska and Canada and wintering along the Pacific and Atlantic coasts as south as Baja California and Texas (Savard, et al. 1998).

Although a common visitor (Howell & Webb 1995) to the northwest part of Mexico, records of the Surf Scoter on the Gulf of Mexico, outside the United States, and specifically for the state of Veracruz, are virtually non-existent (Martinez-Gomez 1996).

On May 5, 2007 we observed a single Surf Scoter swimming close to the shoreline (about 100 m offshore) of Playa Salinas (18°54′06″N, 95°56′22″ W), a small fishing town 35 kilometers south of the city of Veracruz. We observed the bird again, and photographed it on May 9, 2007 exactly in the same location.

This individual was first pointed out to one of us by local fishermen that said that a "strange-looking duck" had been observed by them at the beach during at least two weeks previous to our first sighting. We then searched for the bird and found it after a short period of time. The first time we observed the bird by using 8×42 and 10×50 binoculars, and used Sibley (2000) and National Geographic (1999) field guides to identify the bird. During our observation period the scoter spent the time swimming at the same spot and diving from time to time, presumably in search of food. During our second visit to the site we went directly to the point where we first saw the bird, and found it again in the same exact area. We photographed the bird using a Nikon digital camera mounted to a Kowa 35× spotting scope for identification and confirmation purposes (Fig. 1).

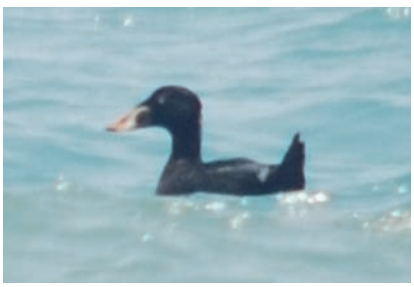

Figure 1. Surf Scoter swimming near the shore of Playa Salinas, Veracruz (Photo by Agni Martínez).

The bird seemed to be a second-year male, with an almost completely black plumage already showing some of the white patch of the nape (barely visible in the picture), but not on the

[3]E-mail: bichodemonte@gmail.com

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 70

forehead, and a bill already showing some of the orange and white color characteristic of an adult male. It also showed a clear patch on the back which suggested, together with the time of year of the sighting, that it could be molting prior to its return north to its breeding grounds.

The sea depth of the area where the Surf Scoter was observed does not surpass 2 m and the site is characterized by beds of rocks at the ocean floor, formed by highly compacted sand that were once part of the coastal cliffs.

We conducted two subsequent visits to the site on May 13 and 20 but were unable to locate the bird again there or at other nearby locations.

ACKNOWLEGMENTS

We thank to Gustavo Ramon and Alexaldo Garcia for field support and to Robert Straub for language reviewing and correction.

LITERATURE CITED

HOWELL, S. N. G. AND S. WEBB. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford University Press, Oxford.

MARTINEZ-GÓMEZ, J. E. 1996. La ornitofauna veracruzana: una revisión bibliográfica. La Ciencia y el Hombre 8:19–48.

NATIONAL GEOGRAPHIC SOCIETY. 1999. Field Guide to the Birds of North America, Third Edition. National Geographic Society, Washington D.C.

SAVARD, J.-P. L., D. BORDAGE, AND A. REED. 1998. Surf Scoter (*Melanitta perspicillata*). *In* The Birds of North America, No. 363.

SIBLEY, D. A. 2000. National Audubon Society The Sibley Guide to Bird. Alfred A. Knopf, Inc. New York.

A DECADE OF EDITING THE *BULLETIN OF THE TEXAS ORNITHOLOGICAL SOCIETY*

JACK EITNIEAR[1]
218 Conway Drive, San Antonio, Texas 78209-1716

Shortly after its founding in 1953 the newly fledged *Texas Ornithological Society* produced its first publication, a newsletter, edited by Edgar Kincaid, Jr. More than a decade would pass before a young, up and coming professor at Texas Tech, Kent Rylander would edit the first issue of the *Bulletin*. As stated by Rylander (2003), in an article in the anniversary issue of the *Bulletin*, "I urged contributors to aggressively challenge the conventional protocol for state ornithological bulletins and to experiment with unorthodox ways of describing and evaluating our everyday birding experiences."

Those early issues had articles by "birding giants" including George M. Sutton, Roger Tory Peterson and Alexander Skutch. These issues often contained press releases and short notices of various proposed laws, and research projects in need of assistance. The first *Bulletins* were small in size (15.0 × 22.5 cm) but in volume 2 (1968) the size was increased to 21.5 × 28 cm. With grand ambitions Kent hoped to produce four issues per year but the reality of the matter was that sufficient material often required combining issues resulting in the two issues per year that has continued to this day. These early *Bulletins* are a real treat to read. I encourage members to seek out these "gems" when visiting local university libraries or friends that may possess a complete set of the *Bulletin*.

After editing the first nine volumes the "sheer mechanics of editing the *Bulletin* became so overwhelming for a person trying to climb the academic ladder" that the editorship was passed on to Keith Arnold and Douglas Slack at Texas A&M in College Station. During this transition the size of the publication was reduced to its current

[1]E-mail: editor@texasbirds.org

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 71

The first *Bulletin* editor (seated) Kent Rylander and Jack Eitniear, the current editor. Photo by John Eitniear.

dimensions of 17.0 × 25.4 cm and the contents shifted towards what one would normally encounter in an ornithological journal. The editing of the *Bulletin* remained at TAMU (although the editorship changed to Robert and Karen Benson) until the fall of 1997 when at the TOS convention in Kingsville (then Texas A&I University) I took over the duties as editor.

Over the past decade the *Bulletin* has changed little. Due to financial restraints the cover was eliminated in 2000 but in 2002 the economic fitness of the organization improved so color was added. Despite the demise of many state ornithological bulletins, in recent years the *Bulletin of the Texas Ornithological Society* has experienced a bit of a renaissance with a record number of pages being printed in 2007. In 2008 John T. Baccus of Texas State University agreed to become the first Associate Editor allowing for quality control and expanded promotion.

Certainly our *Bulletin* would not have remained "extant" if it were not for the numerous authors and referees that contributed to it through the years. In recent years the contribution of images has enhanced the appeal of the publication. This would not have been possible were it not for the generosity of numerous outstanding bird photographers.

As I begin my second decade, as editor, I look forward to the *Bulletin's* continued growth. Posting the previous years issues on the TOS website (www.texasbirds.org), as downloadable PDF files, has expanded the accessibility of the publication. With the ever expanding applications of electronic and web-based publishing it's difficult to predict what form the *Bulletin* will take in the coming years. Members can, however, be rested assured that as we approach the *Bulletin's* 50th anniversary, in one form or another, it will continue to publish noteworthy papers on the birds of Texas.

Jack Clinton Eitniear
21 July 2008

Editors of the *Bulletin*

Kent Rylander	vol. 1–9	[1967–1975]
R. Douglas Slack	vol. 10–17	[1976–1982]
Robert Benson	vol. 18–21	[1983–1988]
Karen L. P. Benson	vol. 22–29	[1989–1996]
Jack Eitniear	vol 30–	[1997–present]

Texas_Bulletin-41-2.qxd 9/20/08 9:41 AM Page 72

CONTENTS

Jack Clinton Eitniear, Editor, E-mail: Bulletin@Texasbirds.org
John T. Baccus, Associate Editor, E-mail: jb02@txstate.edu
Bulletin of the Texas Ornithological Society Copyright ©2007 by the Texas Ornithological Society
Printed by Cadmus (a Cenveo company), Ephrata, PA 17522, USA

Leucistic Great-tailed Grackle (*Quiscalus mexicanus*)
Photo by Mark B. Bartosik