BULLETIN OF THE

TEXAS ORNITHOLOGICAL SOCIETY

Vol. 37, No. 1 January 2004 Pages 1–16

CONFIRMED NESTING OF A LAZULI BUNTING WITH AN INDIGO BUNTING ON FORT HOOD, BELL COUNTY

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ABSTRACT.—Lazuli (*Passerina amoena*) and Indigo (*P. cyanea*) buntings readily hybridize where they co-occur; however, Texas has not been considered to be within the zone of overlap for these species. Despite a few historic reports of breeding in Texas, the Lazuli Bunting is currently considered a rare migrant through much of the state; whereas, the Indigo Bunting is a common to to abundant breeder in all but the western third of the state. During May 2003, we documented a male Lazuli Bunting breeding with a female Indigo Bunting on Fort Hood (Bell County), Texas. Although eventually depredated, their nesting attempt did produce nestlings. Confirmation of a lazuli breeding with an indigo, as well as previous observations of territorial male lazulis and lazuli x indigo hybrids on Fort Hood during the breeding season, suggest that lazulis have immigrated into indigo populations in central Texas, thus expanding the zone within which the species co-occur during the breeding season and hybridize.

Historically, the western Lazuli Bunting (*Passerina amoena*) was separated from the eastern Indigo Bunting (*P. cyanea*) by the Great Plains (Kroodsma 1975, Greene et al. 1996). However, the indigo has expanded westward over the past 40 years. Eastward expansion of the lazuli has been slower and less noticeable. Currently, the zone of overlap between the two species encompasses parts of Colorado, Kansas, Montana, Nebraska,

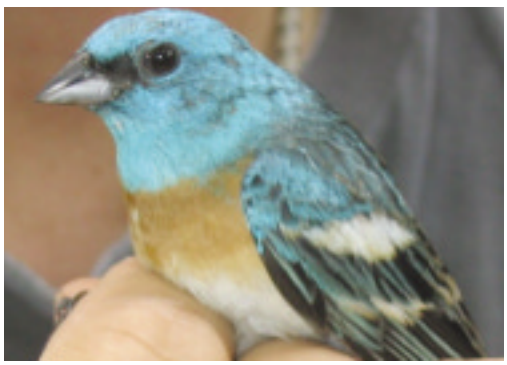

Figure 1. Male Lazuli Bunting (*Passerina amoena*) captured along Cowhouse Creek on Fort Hood, TX.

Figure 2. Female Indigo Bunting (*Passerina cyanea*) captured along Cowhouse Creek on Fort Hood, TX.

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North Dakota, Oklahoma, South Dakota, Utah, and Wyoming (Sibley and Short 1959, Kroodsma 1975, Greene et al. 1996). Both species readily hybridize where they co-occur (Greene et al. 1996).

The Lazuli Bunting is a rare migrant throughout much of Texas (Texas Ornithological Society 1995). Since the 1950s, there have been multiple records of singing, male lazulis, some with females, during June–August in the Panhandle, but no actual evidence of breeding has been documented (Seyffert 2001). Lazulis have lingered into early June in the Trans-Pecos (Texas Breeding Bird Atlas unpublished data), but these birds were likely only migrants. Breeding has only been confirmed on the Edward's Plateau, where two nests were found in Kerr County in 1903 (Lacey 1911). There has been no evidence of breeding on the Edward's Plateau since (Lockwood 2001). The Indigo Bunting is a common to abundant breeder in all but the western third of Texas (Texas Ornithological Society 1995).

On 1 May 2003, we observed a male Lazuli Bunting along Cowhouse Creek (Training Area 8) on Fort Hood, Bell County, in central Texas. The habitat along Cowhouse Creek is dominated by willow (*Salix nigra*) in the overstory and giant ragweed (*Ambrosia trifida*) in the understory. The male lazuli exhibited territorial behavior (i.e., singing from exposed perches; chasing and fighting with neighboring male indigos). Such behavior was observed on subsequent visits to Cowhouse Creek. On 22 May, we discovered an open cup nest situated approximately 0.3 m above the ground in a giant ragweed. The nest was supported by a dead stem. Three 2 day-old nestlings were in the nest. Subsequently, the male lazuli and a probable female indigo were observed bringing food to the nest. Both adults were mist-netted, measured, and banded with United States Fish and Wildlife Service bands. Measurements (weight: 15 g, wing chord: 62 mm, tail length: 45 mm) confirmed that the female was an indigo (Pyle 1997). The nest was checked on 27 May and was found to have failed, likely due to depredation. No nestling remains were visible and the nest was intact. Based on their proximity to the nest, a western diamondback rattlesnake (*Crotelus atrox*), which was found immediately below the nest, or a colony of red imported fire ants (*Solenopsis invicta*) may have been responsible for the nest failure. Following the nest failure, the male lazuli continued to attend to the female and exhibit territorial behavior. We speculate that they were attempting to re-nest. The male lazuli and his indigo mate were last observed on 1 July.

Interbreeding lazulis and indigos on Fort Hood is not unprecedented. A male lazuli and a female indigo were observed attending a nest with four nestlings in the early 1990s (John Cornelius, Army Natural Resource Management Branch, Fort Hood, TX, personal communication). Also, over the past three years, there have been multiple records of apparently territorial male lazulis during May–July on Fort Hood (Bell and Coryell Counties). Lazuli x indigo hybrids have also been observed on several occasions. Such observations and our confirmation of a lazuli breeding with an indigo suggest that lazulis have immigrated into indigo populations in central Texas, thus expanding the zone within which the species co-occur during the breeding season and hybridize.

Funding was provided by the U.S. Army through cooperative agreements DPW-ENV-97-A-0001 and DPW-ENV-02-A-0001 with The Nature Conservancy of Texas. The content of this manuscript does not necessarily reflect the position or policy of the United States government and no official endorsement should be inferred. K. A. Arnold provided unpublished Texas Breeding Bird Atlas data. J. C. Eitniear and M. Lockwood commented on the manuscript.

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THE HOUSE SPARROW IN TEXAS, 1867–1905

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ABSTRACT.—The House Sparrow (*Passer domesticus*) was introduced into Texas at Galveston in 1867, and by 1889 was found in Houston, Jefferson, San Saba and Brownsville. Between 1891 and 1905, it was reported from 78 additional localities in all regions of the state. Dispersal is believed to have occurred by incremental expansion from the cities into the countryside and by transport from one city to another in railroad freight cars. House Sparrows had a negative effect on native birds, often driving them from the area and occupying their nest sites.

The House Sparrow (*Passer domesticus*, Fig. 1) is today a permanent resident in all 254 counties of Texas. In less than 40 years following its introduction at Galveston in 1867, the House Sparrow spread into all regions of the state (Fig. 2). This paper describes the introduction and dispersal of the House Sparrow, the effect of the invaders on native birds, and provides a chronology for the arrival of the species at locations throughout the state (Table 1).

INTRODUCTION INTO TEXAS

The House Sparrow was introduced into Texas by James M. Brown at Galveston in 1867. The initial release of two pairs, obtained from England, was followed by additional releases until 1872 (Barrows 1889, Singley 1893). Sparrows were soon so numerous within the city that by 1880 it was necessary to close up openings on residences to prevent the birds from building their nests. They were also accused of destroying grasses and figs and of driving other birds out of the city (Anon. 1880). Word of this mischievous behavior spread rapidly and, when it was learned in 1881 of a plan to release sparrows in Waco, the *San Antonio Express* warned that within a few years they would become “an intolerable nuisance” (Anon. 1881).

DISTRIBUTION IN 1886

In 1886, Walter B. Barrows, assistant ornithologist with the USDA, Division of Economic Ornithology and Mammalogy, mailed 5,000 questionaires to cities and communities in the United States and southern Canada requesting information on the occurrence of the House Sparrow. One hundred and forty-one replies were

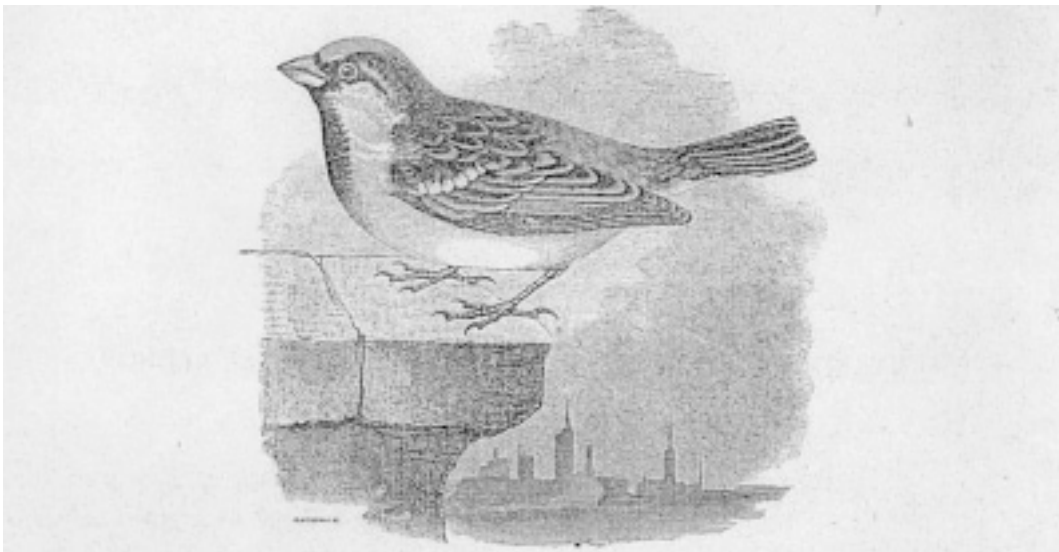

Figure 1. Illustration of the House Sparrow used by W. B. Barrows in his monograph, The English Sparrow (*Passer domesticus*) in North America. USDA, Division of Economic Ornithology and Mammalogy, Bulletin No. 1 (1889).

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received from 135 locations in Texas. The House Sparrow was reported present in only four locations: Galveston (introduced 1867), Jefferson (arrived 1882), Houston (arrived 1884), and San Saba (arrived 1886). Negative reports were received from the remaining 131 locations.

Contradicting the survey of 1886, George B. Benners, a respected ornithologist from Philadelphia, claimed that the House Sparrow was present in all parts of Texas that he visited during the spring of 1884 (Benners 1887). Benners, traveling across Texas by train, collected in Comal and Williamson counties, as well as at Laredo and Corpus Christi. Since the first specific reports of House Sparrows at Nuevo Laredo [Mexico] and Corpus Christi were in 1901 and 1905, respectively, it would seem that Benner's report of the widespread occurrence of the House Sparrow in Texas during 1884 was exaggerated, if not erroneous.

COLONIZATION OF THE INTERIOR OF TEXAS

Colonies of House Sparrows were reported from the interior of Texas as early as the 1880s. A planned release of birds at Waco in 1881, if indeed it ever occurred, apparently failed (Anon. 1881). In 1882 the first birds were seen at Jefferson in northeastern Texas, a distance of about 240 air miles from Galveston. Not surprisingly, sparrows were reported at nearby Houston in 1884. Then, in 1886, they arrived at San Saba on the Edwards Plateau. A pair of sparrows taken at Brownsville in 1889 (Phillips 1915) was presumably from a population that soon failed, and it was not until 1905 that the city was re-colonized (Montgomery 1907).

The origin of the populations at Jefferson, Houston, San Saba and Brownsville is unknown. Were they deliberately introduced? Did they originate from the founder population at Galveston? Or, did the House Sparrows that colonized the interior arrive in Texas from locations outside of the state?

TRANSPORT FROM ONE CITY TO ANOTHER

The transport of House Sparrows from one city to another was believed to occur in freight cars (Barrows 1889, Robbins 1973). Birds were commonly seen around rail yards feeding on the grain spilled from the cars. These birds would often roost in the cars which would then be closed and pulled to distant cities before being opened allowing the birds to escape. This explanation is supported by the observations of Henry P. Attwater on the arrival of House Sparrow in San Antonio. Before 1892, and in the years following, Attwater observed House

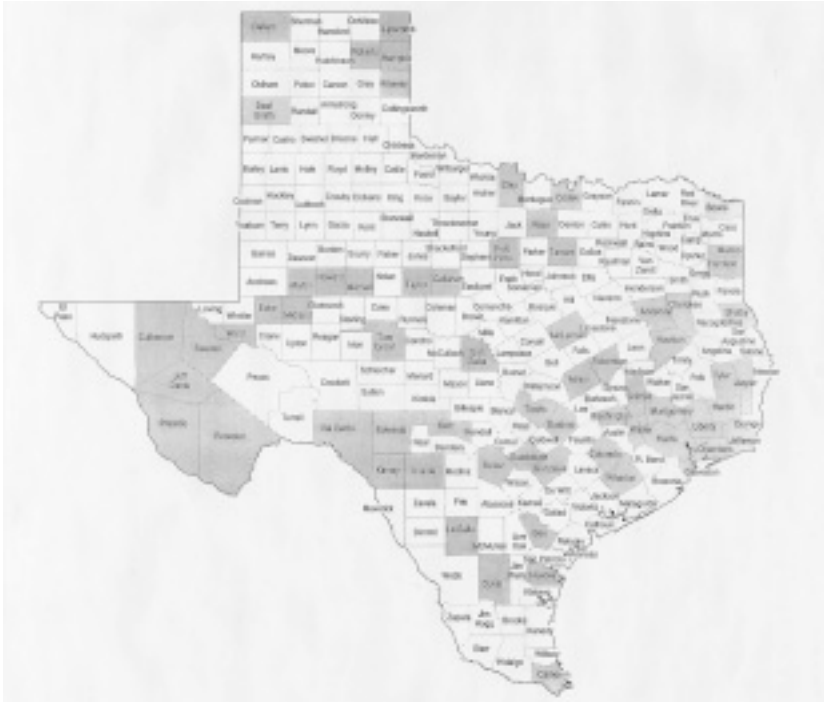

Figure 2. Texas counties reporting the House Sparrow, 1867–1905.

Sparrows escaping from freight cars as they were being unloaded. These birds, perhaps originating from points outside of Texas, were apparently unsuccessful in their colonizing efforts and it was not until 1896 that Attwater discovered a breeding population of five birds at the courthouse in downtown San Antonio (Attwater 1920).

Railroad transport cannot explain how some isolated communities were colonized. Sparrows were reported in San Saba in 1886 although the railroad did not arrive until 1911. Sparrows were "common" at Rocksprings in 1900 and at Mobeetie in 1901, although neither community was served by a railroad. One can only speculate that the sparrows in these locations originated from deliberate introductions or the escape of caged birds.

Colonies of sparrows followed a predictable pattern once they were established in a community. The number of sparrows would increase rapidly and they would drive away the native species with which they competed. Once the town was full of sparrows, they would overflow onto nearby farms and ranches and, by incremental expansion, sometimes reach other municipalities (Barrows 1889). This generalization is supported by reports of naturalists of the Biological Survey that sparrows ventured far into the countryside. Vernon Bailey saw a few birds in 1899 on ranches "out on the prairie" near Virginia Point and in 1902 Ned Hollister found birds at dwellings "far out on the prairie" near Antioch. In 1905 James Gaut saw sparrows in plowed fields several miles from the village of Columbus. These observations suggest that House Sparrows often crossed extensive open areas as they expanded through the rural areas of Texas.

EFFECT ON NATIVE BIRDS

House Sparrows had a devastating effect on native birds. In 1880, only 13 years after their introduction, they were accused of driving the songbirds out of Galveston (Anon. 1880). A decade later, J. A. Singley (1893) blamed the scarcity of birds in Galveston on the House Sparrows which occupied "every available point" and "hustled out or killed" any native species that visited the city. Singley specifically noted that the Northern Mockingbird (*Mimus polyglottos*), formerly abundant throughout the city, had been driven into the suburbs.

H. P. Attwater noted that in San Antonio the House Sparrow "disturbed the peace and harmony of many native birds and interfered with the nesting arrangements of several species . . . " Martins and swallows were the most severely affected. Northern Rough-winged Swallows (*Stelgidopteryx serripennis*) were driven from their former nesting sites in the city. Cliff Swallows (*Hirundo pyrrhonota*) that normally returned to nesting places in barns and sheds on the outlying ranches gave up the fight and no longer returned to breed at their former homesites. Wrens, titmice and flycatchers occupying nest boxes were also "turned out by the English Sparrows" (Attwater 1920). A similar effect was also noted in Waco following introduction of the House Sparrow in 1892. Ten years later House Sparrows were common, and 15 years after their introduction they had driven all of the Eastern Bluebirds (*Sialia sialis*) and Purple Martins (*Progne subis*) out of the city (Strecker 1927).

A 1900 report from San Angelo was more favorable to the sparrows. Although they had "pre-empted every available nesting place in and about the eaves and gutters of the buildings, barns and outhouses", there was no evidence that native species had decreased but were "still in full force and as exuberant of song and good cheer as ever." It was also reported that the thousands of House Sparrows within the city shared a communal roost in a grove of cottonwood trees with grackles and blackbirds without any evidence of conflict (Anon. 1900).

REPORTS OF THE BIOLOGICAL SURVEY

Before 1891 the House Sparrow was reported from only five locations in Texas: Galveston, Jefferson, Houston, San Saba and Brownsville. Then, from 1891 through 1905, it was reported from 78 additional locations in all regions of the state (Fig. 1). Most of these reports were received from naturalists working for the United States Biological Survey who, beginning in 1899, canvassed the state recording all species of birds that they encountered. Agents reporting the House Sparrow included such well known persons as Vernon Bailey, Harry C. Oberholser, Merritt Cary, Ned Hollister, Gordon Donald, Arthur H. Howell, James H. Gaut and Albert K. Fisher.

Field reports of the survey naturalists often contained notations that House Sparrows were "common", "abundant", or "numerous" in the areas visited. These notations convey some information about the probable arrival date of the original colonizers. For example, the report that sparrows were "common" in 1900 at Rocksprings and near ranch houses in the outlying areas implies that the area was colonized several years earlier. Assuming a lag time of 3–4 years between the arrival of the colonizers and the birds becoming noticeably "common", it can be concluded that the House Sparrow spread more rapidly than previously believed. In fact, most of the state was probably colonized in the decade between 1891 and 1901.

Table 1. Date of appearance or first report of the House Sparrow in Texas cities and towns, 1867–1905. BSR = Biological Survey Report; OT = Oberholser typescript of *The Bird Life of Texas*

Appearance or First Report	City or Town	County	Reference
1867	Galveston	Galveston	Barrows 1889
1882	Jefferson	Marion	Barrows 1889
1884	Houston	Harris	Barrows 1889
1886	San Saba	San Saba	Barrows 1889
1889	Brownsville*	Cameron	Phillips 1915
1891	Wrightsboro	Gonzales	Anon. 1891
1892	Austin*	Travis	G. Ragsdale (OT)
1892	Gainesville	Cooke	Ragsdale 1892
1892	Waco*	McLennan	Strecker 1927
1893	Decatur	Wise	J. Donald (OT)
1894	Pettus	Bee	"Provo" 1895
1895	San Angelo	Tom Green	Anon. 1900
1896	San Antonio*	Bexar	Attwater 1920
1897	Kerrville	Kerr	Lacey 1911
1899	Big Spring*	Howard	V. Bailey (BSR)
1899	Colorado City*	Mitchell	V. Bailey (BSR)
1899	Virginia Point	Galveston	V. Bailey (BSR)
1900	Beeville	Bee	H. Oberholser (BSR)
1900	Cotulla*	La Salle	H. Oberholser (BSR)
1900	Henrietta*	Clay	H. Oberholser (BSR)
1900	Rocksprings	Edwards	H. Oberholser (BSR)
1900	San Diego*	Duval	H. Oberholser (BSR)
1900	Uvalde*	Uvalde	H. Oberholser (BSR)
1901	Alpine	Brewster	H. Oberholser (BSR)
1901	Comstock	Val Verde	H. Oberholser (BSR)
1901	Hereford	Deaf Smith	H. Oberholser (BSR)
1901	Langtry	Val Verde	H. Oberholser (BSR)
1901	Nuevo Laredo	[Mexico]	Oberholser (n.d.)
1901	Mobeetie	Wheeler	H. Oberholser (BSR)
1902	Abilene*	Taylor	M. Cary (BSR)
1902	Aledo	Tarrant	M. Cary (BSR)
1902	Antioch	Houston	N. Hollister (BSR)
1902	Baird*	Callahan	M. Cary (BSR)
1902	Beaumont*	Jefferson	H. Oberholser (BSR)
1902	Benbrook	Tarrant	M. Cary (BSR)
1902	Boston	Bowie	H. Oberholser (BSR)
1902	Brazos	Palo Pinto	M. Cary (BSR)
1902	Brenham*	Washington	H. Oberholser (BSR)
1902	China	Jefferson	H. Oberholser (BSR)
1902	Clyde	Callahan	M. Cary (BSR)
1902	Conroe	Montgomery	H. Oberholser (BSR)
1902	Elgin	Bastrop	H. Oberholser (BSR)
1902	Gause	Milam	H. Oberholser (BSR)
1902	Grand Falls	Ward	M. Cary (BSR)
1902	Hearne	Robertson	H. Oberholser (BSR)
1902	Hempstead*	Waller	H. Oberholser (BSR)
1902	Jacksonville	Cherokee	H. Oberholser (BSR)
1902	Jasper	Jasper	H. Oberholser (BSR)
1902	Joaquin	Shelby	N. Hollister (BSR)
1902	Long Lake	Anderson	H. Oberholser (BSR)
1902	Monahans	Ward	M. Cary (BSR)
1902	Odessa	Ector	M. Cary (BSR)

Table 1. *Continued.*

Appearance or First Report	City or Town	County	Reference
1902	Paisano	Presidio	G. Donald (BSR)
1902	Pecos City	Reeves	M. Cary (BSR)
1902	Palestine	Anderson	H. Oberholser (BSR)
1902	Rockland	Tyler	N. Hollister (BSR)
1902	Sabine Pass	Jefferson	H. Oberholser (BSR)
1902	Sourlake	Hardin	N. Hollister (BSR)
1902	Stanton	Martin	M. Cary (BSR)
1902	Texarkana	Bowie	H. Oberholser (BSR)
1902	Valentine	Jeff Davis	G. Donald (BSR)
1902	Warfield	Midland	M. Cary (BSR)
1902	Waskom	Harrison	H. Oberholser (BSR)
1903	Alpine	Brewster	Oberholser (n.d.)
1903	Canadian	Hemphill	A. H. Howell (BSR)
1903	Lipscomb	Lipscomb	A. H. Howell (BSR)
1903	Miami	Roberts	A. H. Howell (BSR)
1903	Texline	Dallam	A. H. Howell (BSR)
1904	Boracho	Culberson	J. K. Strecker (OT)
1904	Columbus	Colorado	V. Baily (BSR)
1904	Eagle Lake	Colorado	V. Baily (BSR)
1904	Mont Belvieu	Chambers	A. R. Shearer (OT)
1904	Navasota*	Grimes	V. Baily (BSR)
1904	Seguin	Guadalupe	V. Baily (BSR)
1904	Wharton*	Wharton	V. Baily (BSR)
1905	Cleveland	Liberty	J. H. Gaut (BSR)
1905	Corpus Christi	Nueces	Montgomery 1907
1905	East Bernard	Wharton	J. H. Gaut (BSR)
1905	Kountze	Hardin	J. H. Gaut (BSR)
1905	Nome	Jefferson	J. H. Gaut (BSR)
1905	Nona	Hardin	J. H. Gaut (BSR)
1905	Samuels	Terrell	J. H. Gaut (BSR)
1905	Spofford	Kinney	A. K. Fisher (BSR)

*The House Sparrow was reported as "not present" at these locations in the autumn of 1886 and spring of 1887 (Barrows, W. B. 1889. The English Sparrow (*Passer domesticus*) in North America. USDA, Division of Economic Ornithology and Mammalogy, Bull. No. 1).

ACKNOWLEDGMENT

I thank Cliff Shackelford for his review of an early draft of this paper.

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EVIDENCE OF RED-COCKADED WOODPECKER NESTLING DISPLACEMENT BY SOUTHERN FLYING SQUIRRELS

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ABSTRACT.—Red-cockaded Woodpeckers (*Picoides borealis*) are unique among woodpeckers in that they excavate their roost and nest cavities entirely within living pines (Ligon 1970). A number of secondary cavity nesters and other vertebrates are dependent on Red-cockaded Woodpeckers for the cavities they create (Rudolph et al. 1990, Loeb 1993, LaBranche and Walters 1994, Conner et al. 1997). Harlow and Lennartz (1983), Rudolph et al. (1990), Loeb (1993), and Conner et al. 1996, 1997) showed that southern flying squirrels (*Glaucomys volans*) in Texas and South Carolina were the most common occupants observed in the cavities other than Red-cockaded Woodpeckers and that these cavities were selected primarily on the basis of entrance size. While these studies showed that there is a propensity for squirrels to use unenlarged cavities, none have shown evidence of Red-cockaded Woodpeckers being killed by southern flying squirrels. Stabb et al. (1989) proposed that smaller birds may suffer mortality or disturbance from flying squirrels usurping the occupied cavities. Jackson (1978a), along with Hooper and Lennartz (1983), noted that southern flying squirrels have usurped Red-cockaded Woodpecker cavities without killing the birds. We report an instance of two 12- to 15-day-old nestlings found dead at the base of the nest tree and 3 flying squirrels inside the nest cavity.

While examining nest trees of resident groups of woodpeckers for presence of eggs and/or nestlings on the Angelina National Forest (62,423 ha; 31°15′N, 94°15′W) we inserted a small camera attached to a telescoping 15-m pole into each cavity chamber. On 26 May 1999 we observed two dead 12- to 15-day-old nestlings at the base of a nest tree. These nestlings were last observed alive in the cavity on 23 May 1999. Upon subsequent cavity inspection, we found the tree to be occupied by 3 southern flying squirrels. There was a well-developed, copious resin flow surrounding the cavity, but it did not deter the squirrels from entering the cavity, which is consistent with findings in other studies (Rudolph et al. 1990, Loeb 1993).

While it is conceivable that a predator such as a rat snake (*Elaphe obsoleta*) could have ejected the nestlings and the flying squirrels moved in after the cavity was unoccupied, certain evidence suggests that this was not the case. The resin barrier on this particular tree was well established with clear fresh resin 0.5 m above the cavity and 1.5 m below the cavity. Thus, it is unlikely that a snake or any other small terrestrial vertebrate could have gained access to the cavity contents. Dennis (1971) and Jackson (1978b) documented two instances of *E. obsoleta* gaining access

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to cavities occupied by flying squirrels or Red-cockaded Woodpecker nestlings, but the resin barriers on those cavities were compromised. Other study results (Jackson 1974, Rudolph et al. 1990) have supported the hypothesis that pine boles coated with fresh, sticky resin reduce the access that rat snakes have to cavities. Had a rat snake entered the cavity, it is almost certain that it would have eaten the nestlings. Given the fact that these birds were found 20 cm from the base of the nest tree, we suggest that the flying squirrels ejected the nestlings and usurped the cavity from the woodpeckers. Because there were no bite marks on either nestling and all adult woodpeckers were still present, we suggest that the cavity was usurped without attempting predation on the nestlings or adults.

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DISTRIBUTION OF THE SUBSPECIES OF GREAT HORNED OWLS IN TEXAS

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ABSTRACT.—The ranges of two subspecies of Great Horned Owls (*Bubo virginianus virginianus* and *B. v. pallescens*) in Texas were determined by comparison of 157 specimens from Texas and smaller series of each subspecies from east and west of Texas respectively, with the same three specimens (pale, medium and dark). Six color characters were used. The values of these were summed, and mapped. The range of nominate *virginianus* was found to be closely dependent on the distribution of hardwood, pine and oak dominated wooded areas in Texas.

The Great Horned Owl, *Bubo virginianus*, is an abundant, widespread, and successful avian predator in diverse habitats. Two distinctive subspecies occur in Texas. In the wooded areas of the east is the dark, heavily barred, richly ochaceous nominate subspecies, *B. v. virginianus*, while the paler, more xeric adapted subspecies, *B. v pallescens*, (type locality: Watson Ranch, on the Medina River, 18 miles southwest of San

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Antonio, [Bexar Co.]) occurs in the western part of the State. Oberholser (1974), based apparently on 50 specimens (solid symbols on his map, p. 447) mapped the range of *pallescens* from Clay County on the Oklahoma border in a line bending eastwards to Navarro County, south to DeWitt County, and thence southwest to Webb County on the Rio Grande with *virginianus* occurring in the eastern third, and southern Texas.

This study was instigated because of the author's need to understand more fully the population upon which the name *B. v. pallescens* was based for an ongoing study of the geographic variation in the species in the Rocky Mountains. It is also, in part, a continuation of my defining the zone of intergradation between these two subspecies in the forest/prairie interface in the United States (Dickerman 1993 and 2002).

MATERIALS AND METHODS

To provide a standard by which to evaluate birds from Texas, a series of 21 specimens from the eastern states representing *virginianus*, and a series of 25 birds from Arizona and New Mexico, representing *pallescens* were compared to three specimens ranging in color from light to dark (Fig.4). Six color characters were selected as described beyond, and all specimens in this study were compared to the same three color standard specimens. The values for the relatively small series of non-Texas *virginianus* and *pallescens* that were color coded do not overlap (Fig. 2).

Thus summed values of 4.5 to 11.5 were considered to represent *pallescens*, and values of 14.0 to 19.5 were considered to represent *virginianus*. It should be noted that the summed color values for the type specimen of *pallescens* (8.5) falls well within the values for the Arizona and New Mexico population.

In January 1995 I first visited most of the collections in Texas (see Acknowledgments), comparing all specimens with full data to the series of three color standard birds. At that time, Texas specimens were assigned a value from one to four or five for six characters, and they were identified subjectively as *virginianus, pallescens* or intermediate. One color character was foot color which had to be thrown out because half or more of the large series at Texas A & M had been under water when the collection was housed in a basement and was flooded. Such specimens all had tan feet!

The process was repeated a year later, using another suite of six characters: dorsal blackness (0.5–4), crown blackness (0.5–4), ventral barring (0.5–5), extent of foot markings(0.5–3), depth of ochraceous coloration (0.5–4) and extent of dusky markings in the outer web of the second retrix (0.5–3). All specimens were reevaluated using those new standards. Interestingly the value of 5 was used for a single bird in the entire study.

Subsequently specimens in the American Museum of Natural History, the National Museum of Natural History and the Museum of Southwestern Biology were compared to the same color standards using the same suite of characters. A few additional specimens from Texas found scattered in other collections (see Acknowledgments) were identified to subspecies.

A total of 157 specimens from Texas were color-coded. The values for the six characters were totaled and were plotted on the bar-graph (Fig. 2) and mapped by county (Fig. 1).

RESULTS

When summed scores of eastern, western and Texas specimens were plotted on a bar graph (Fig. 2) about 30% of Texas birds fall in the gap between the values for *pallescens* and *virginianus*. When mapped those intermediate birds largely occurred within a county on either side of the line defining the range of the two subspecies (Fig.1).

When a line is drawn connecting the solid circles outlining the distribution of *B. v. virginianus* in Texas, its range proved to be far more extensive than was mapped by Oberholser (1974). When this distribution is compared with the distribution of wood- lands in Texas, including hardwood, and pine and oak dominated associations (derived from Frye, Brown and McMahan 1984, Figure 1) it is amazing how similar they are. The shadow of the former distribution of these wooded areas remains in some cases, *eg.* along the Red River in Wichita County, even though some habitats have been drastically modified. Typical specimens of *pallescens*, such as the type specimen, from well within the range of *virginianus* may occur in island-like pockets of suitable xeric habitat (Dickerman 1993).

Ten dark birds from central and Transpecos Texas were not mapped as they represent either long distant migrants (Dickerman ms), or a dark, undescribed Rocky Mountain subspecies occurring in the Transpecos region (Dickerman ms).

The transition from darker more mesic adapted *virginianus* to paler, more xeric adapted *pallescens* in Texas is very abrupt, essentially being only 2–3 counties wide, compared to this transition in the prairie states where

it is almost state-wide (Dickerman 1993).I suggest that this rapid transition from one form of Great Horned Owl to another may be more common than one might think *eg*. the border between the southern Rocky Mountain population and that of the northern Rockies is essentially the Snake River Valley (Dickerman unpubl.data),and the transition from the pale aspen parkland *subarcticus* to the very dark northern Rocky Mountain population *lagophonus*, occurs in the lower valleys of the eastern slopes of the Rockies (Dickerman 2002).

The paucity of material from certain regions of Texas must be stressed, particularly from the northern panhandle, although suitable habitat in that largely agricultural region is limited, but compare Figure 1 with the species distribution map in the Texas Breeding Bird Atlas (Benson and Arnold 2001). It is interesting to compare Texas with Nebraska, Kansas and Oklahoma combined (Dickerman 1993). Texas has 254 counties and covers about 267,000 square miles; these data for NE, KA, and OK combined have 258 counties and 250,000 square miles. A total of 163 specimens from Texas were used in this study (1/1647 sq. miles) compared to 115 specimens total for NE, KA, and OK (1/2173 sq. miles). No specimens were available from 168 Texas counties.

Finally the results of the two techniques; old fashioned color comparison, subjective subspesific identification, and the more precise assignment of color values by comparison with a standard series of specimens, were essentially the same. Both yielded maps plotting the range of *B. v. virginianus* in Texas coincident with the range of forests of pines, hardwoods and oaks.

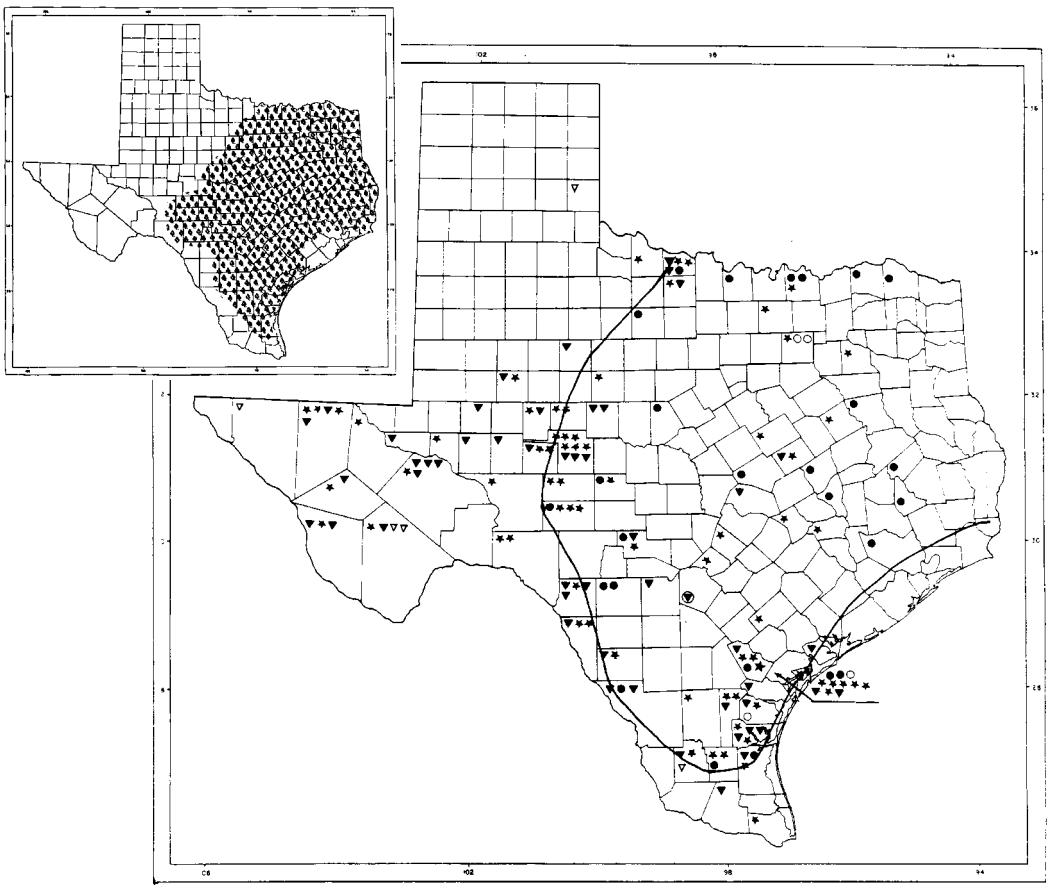

Figure 1. Distribution of specimens of Great Horned Owls by summed color values. triangles = values 6.5–11.5; stars = values 12.0–14.0 and circles = values 14.5–19.5. Solid line outlines western and southern limit of circles which denotes the range of *B. v. virginianus* in Texas. Inset shows the distribution of "wooded" lands in Texas, dominated by mixed hardwood, pine, and oak associations.

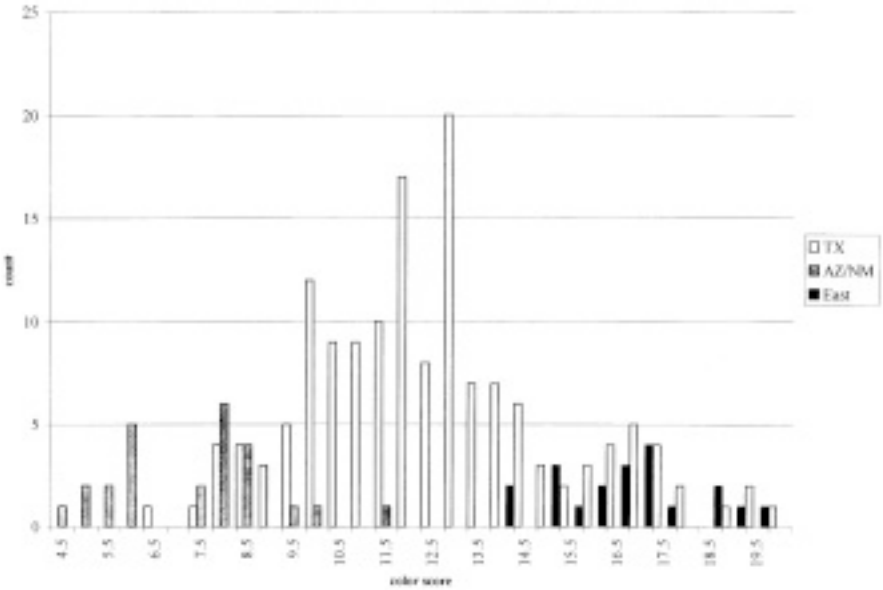

Figure 2. Distribution of specimens of *pallescens* (gray bars) from Arizona and New mexico, Texas specimens (white bars), and *virginianus* (black bars) from eastern states by summed color values for six characters (see text for explanation).

ACKNOWLEDGMENTS

The author is deeply indebted to the collectors, salvagers and the preparators; and the curators of the many collections in which he was able to examine specimens.

The curators and or collection managers of the following collections were most cooperative in allowing access to the collections under their care: American Museum of Natural History, New York; Angelo State University Natural History Collection, San Angelo; Sul Ross State University, Alpine; Texas Cooperative Wildlife Collection,

Figure 4. Specimens used as color standards, left to right: *B. virginianus virginianus* MSB 17940 Oklahoma, Muskogee Co., Warner, 7 mi. east, 10 April 1997; intermediate MSB 20403 Texas, Crocker Co., Sheffield, 14 mi. east, 26 December 1997; *B. v. pallescens* MSB 7684 New Mexico, Lincoln Co., Corona, 20 mi. south, 29 September 1991.

Texas A and M University; Texas Tech University, Lubbock; University of Texas Pan American, Edinburg; United States National Museum Natural History, Washington, D.C.; and Welder Wildlife Refuge, Sinton.

I examined some specimens collected by Warren M. Pulich, and he provided me with data on specimens not immediately available. A few specimens were examined in the University of Arizona, Tucson; James Ford Bell Museum of Natural History, University of Minnesota; Museum of Comparative Zoology, Harvard University, and the San Diego Museum of Natural History.

John P. Hubbard suffered through endless hours of discussion of my Great Horned Owl studies, and C. S. Houston and F. Gehlback thoughtfully reviewed the manuscript.

The Texas Department of Parks and Wildlife provided me with collecting and salvage permits.

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SHORT COMMUNICATIONS

OBSERVATIONS OF A BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*) FEEDING ON PRAIRIE DOGS (*CYNOMYS LUDOVICIANUS*) IN THE NORTHWEST TEXAS PANHANDLE

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The diet of the bald eagle (*Haliaeetus leucocephalus*) varies greatly across its range and throughout the year (Gerrard & Bortolotti 1988). Numerous studies have shown that fish comprise the majority of bald eagles' diets (Cash et al. 1985, Stalmaster and Plettner 1992), but some live primarily on waterfowl, carrion and small mammals (Todd et al. 1982, Lingle and Krapu 1986, Swenson et al. 1986, Gerrard & Bortolotti 1988, Knight et al. 1990).

In the northwest Texas Panhandle, prairie dogs (*Cynomys Ludovicianus*) are an important food source for many birds of prey, including ferruginous hawks (*Buteo regalis*), golden eagles (*Augila chrysaetos*), and Swainson's hawks (*Buteo swainsoni*) (Berry et al. 1998, Barko et al. 1999). However, there have been few accounts of bald eagles feeding upon prairie dogs. Lingle and Krapu (1986) found that black-tailed prairie dog remains constituted 1.6% of bald eagle pellets in south-central Nebraska. Allison et al. (1995) reported observing a bald eagle in Texas swooping into a group of ferruginous hawks and stealing a captured prairie dog. In this paper, we document bald eagles foraging on prairie dogs in the northwest Texas Panhandle.

On 25 January 2002 at approximately 3:00 p.m., we observed a juvenile bald eagle sitting on a fence post overlooking a prairie dog town on a private ranch in Sherman County, Texas approximately 12 km south of Stratford, Texas. We first spotted this bald eagle while driving along a ranch road. When we stopped to get a better look, it flew off out of sight.

Around 9:00 a.m. on 9 February 2002, we observed a mature bald eagle perched on a fence post overlooking the same prairie dog town. We watched this individual with binoculars from several hundred meters away

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for about one hour. It would occasionally look in our direction, but most of its time was spent watching the prairie dog town. We did not observe any prairie dogs leaving dens during this time, perhaps due to wind, which was blowing constantly at 8–25 km/hr, or the presence of the bald eagle.

Two days later at approximately 9:00 a.m., we saw an adult bald eagle on the ground within the same prairie dog town. After about 20 minutes, the eagle flew 5–10 meters up in the air before diving on a prairie dog, which is consumed on the spot. Afterwards, the bald eagle remained on the ground another 10 minutes before soaring over the prairie dog town, trying unsuccessfully to catch more prairie dogs. As the eagle dove, the prairie dogs would retreat into their dens. Eventually, it returned to the ground near the middle of the town.

The next day, we observed a bald eagle perched in the top of a cottonwood tree (*Populus deltoides*), located in the middle of a different prairie dog town. As we approached, it flew off and did not return.

The owner of the ranch, Mr. Fred Pronger, who has lived on this ranch his entire life, said that this was only the second time he had seen a bald eagle on his ranch. The first time was in the early 1990's, when he observed an individual also hunting prairie dogs.

This is a Texas Tech University, College of Agricultural Sciences and Natural Resources publication T-9–958.

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DISCOVERY OF A FLEDGLING AMERICAN BITTERN (*BOTAURUS LENGINOSUS*) IN CHAMBERS COUNTY, TEXAS

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On 6 June 2003 I discovered a fledgling American Bittern (*Botaurus lentiginosus*) on Anahuac National Wildlife Refuge (NWR) in Chambers County, Texas. The bird was engaged in foraging activity along a ditch edge vegetated with cattail (*Typha* spp.). The location was 1.1 kilometers west of Oyster Bayou, 29° 35′ 56″ N, 094° 31′ 04″ W. The flight feathers and coverts were developing and thus the bird was flightless. The crown still had residual wisps of down attached to it.

While the American Bittern commonly occurs as a winter visitor and migrant in marshes of the upper Texas coast, it rarely occurs during the summer (Richardson et al. 1998). Texas has only a handful of documented

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nesting records. Oberholser (1974) lists seven occurrences of finding eggs throughout the 1920s and one observation of young in 1931, all from Wilbarger County. He reports eggs found in April of 1941 in Galveston County (op.cit.). In Louisiana, Oberholser (1938) reports breeding records for 1891 and 1930. There has been no documented nesting of this species in Louisiana since 1930 (Lowery 1974, J. V. Remsen, pers. comm.). This observation of a fledgling bird is the first documented record of a nesting American Bittern for Chambers County and the first record for Texas in 62 years.

Interestingly, the occurrence of this fledgling coincides with an unusual abundance of summering American Bitterns in Chambers and Jefferson counties. Richardson et al. (1998) indicates these birds dwindle from common in mid-April to very rare by the third week of May on the upper Texas coast. Birds were observed during the month of May and June in this area, but detailed records were not kept. Eric Carpenter (pers. comm.) observed a high count of seven individuals on 25 May 2003 on Anahuac NWR. During July, eight American Bitterns were observed in Chambers and Jefferson counties (per. obs., P. Charland, P. K. McDowell, P. Walther, R. Weeks, pers. comm.). One of the Jefferson County birds was found dead on SH87, east of the Sea Rim State Park headquarters, and now resides in the Texas Cooperative Wildlife Collection, TCWC No. 14002, Texas A&M University, College Station. Two more bitterns were observed in August on Anahuac NWR (pers. obs., P. K. McDowell, pers. comm.). In addition to the presence of these birds, the "pump-er-lunk" vocalization, rarely heard on Anahuac NWR, was frequent during the month of April 2003 (pers. obs., P. Charland, P. K. McDowell, T. Teets, pers. comm.). While plentiful rainfall in the spring provided extensive freshwater habitat on the upper Texas Coast, it is unknown what role this played in the summering population of American Bitterns.

ACKNOWLEDGEMENTS

I would like to thank K. Arnold and C. Shackelford for their critical review of this manuscript. I would also like to thank E. Carpenter, P. Charland, P. K. McDowell, T. Teets, P. Walther, and R. Weeks for reporting observations of this species during the summer of 2003 and J. V. Remsen for the current status of American Bitterns in Louisiana.

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ERRATUM

Bulletin of the Texas Ornithological Society, Vol. 36, No. 2. page 22 paragraph 1 line 8

Should have read "Unfortunately Texas data for this species was not included in the recent The Birds of North America account (Nol & Humphrey 1994) for reasons that are not understood"

The editor, in error, inserted the additional citiations. JCE

Jack Clinton Eitniear, Editor E-Mail: Bulletin@Texasbirds.org

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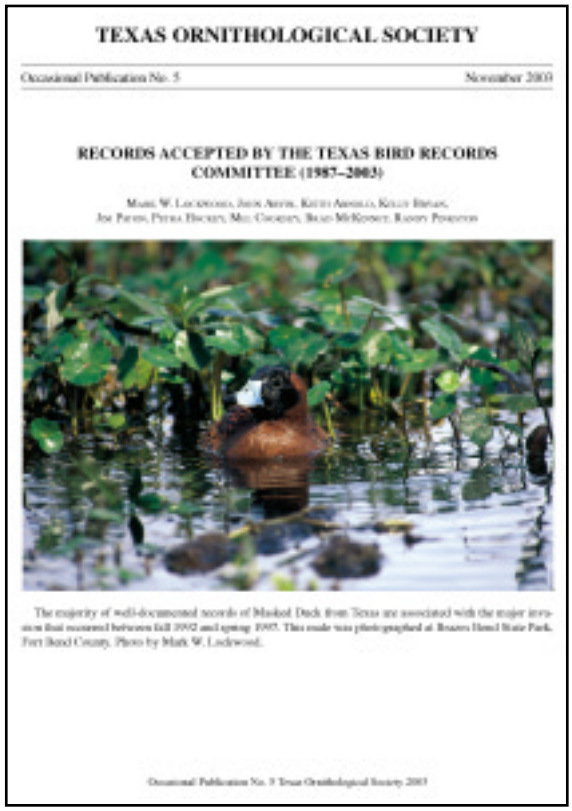

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