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Contents

Some Common Yellowthroat Subspecies in Texas

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ABSTRACT.—Common Yellowthroat racial identities and distributions in Texas are not well known. I examined 144 specimens and identified nine subspecies based on morphometric analyses and plumage. One of these subspecies is not currently recognized as occurring in Texas, while three others have not been recognized by the A.O.U. While appearing distinct in this specimen series, several of these subspecies may prove to be clinal forms of more widely accepted subspecies.

Introduction

The Common Yellowthroat (*Geothlypis trichas*) is a distinctive warbler that can be found throughout much of Texas. Yellowthroats inhabit marshes, swamps, and other vegetated areas near water, but on migration may occur almost anywhere (Oberholser 1974). Phenotypically, this species shows much variation, both geographically and among individuals. Consequently, the racial identifications and ranges in Texas are poorly understood. The A.O.U. (1957) recognizes eight subspecies occurring in Texas, with Peters (1968) recognizing seven. Oberholser (1974) lists 20 races, but the Texas Ornithological Society (1984) check-lists only seven races in Texas. The recognition of a large number of races based on phenotypic variation seems to be supported by a high degree of genetic differentiation (Zink and Klicka 1990).

The purpose of this study was to examine some Common Yellowthroat specimens from Texas in an effort to clarify some of the confusion regarding their identification and range within Texas. Since migrant and summer and winter residents occur in Texas, specimens from throughout the year were included.

Methods

I examined 144 Common Yellowthroat specimens (75 males and 69 females) from throughout Texas. Due to the sexual dimorphism found in this species, a separate analysis was performed for each sex. Due to feather wear, fall specimens were considered separately from spring specimens. In cases of nomenclatural conflict, I followed the A.O.U. (1957) designations. Plumage characters I considered included color and extent of yellow on chin, throat, and breast, colors of abdomen, crissum, flanks, crown, back, and upper tail-coverts, extent of black mask and gray band posterior to the mask on the males, and color of side of head and neck on females. Morphometric characters considered included measurements of wing chord, tail length, exposed culmen, and tarsal length. Due to the museum collection locations, the specimen series is biased towards the eastern half of the state and is certainly not comprehensive in regard to all subspecies potentially occurring in Texas. A listing of specimens by museum and catalog numbers is found in the Appendix.

Table 1. Dates and locations for Common Yellowthroat specimens used in this study.

Subspecies	County	Collection date
brachidactylus	Brazos	20 Apr., 12 Oct.
	Dallas	11 May, 28 Sep.
	Harris	27 Apr.
	Nacogdoches	21 Apr., 1, 11, & 16 May
	Smith	12 May
	Tarrant	28 Sep.
	Walker	3 Oct.
campicola	Brazos	27 Apr., 2, 3, & 5 May, 30 Sep., 10 Oct.
	Dallas	15 Oct.
	Denton	3 Oct.
	Grayson	8 & 20 May
	Kenedy	26 Mar.
	Nacogdoches	27 Sep., 2 Oct.
	Tarrant	15 Oct.
	Walker	16 Oct.
	Webb	16 May, 1 Oct.
chryseola	Presidio	21 June
	Val Verde	15, 26, & 28 May
coloradonicola	Aransas	1 Oct.
	Dallas	6, 11, 13, & 15 Oct.
	Grayson	12 May
	Tarrant	15 Oct.
	Tom Green	3 Oct.
minnesoticola	Brazos	21 Oct.
	Dallas	12 May, 28 Sep., 7 & 15 Oct.
	Fannin	29 Sep., 10 Oct.
	Galveston	27 Apr.
	Hunt	14 May
	Nacogdoches	19 Apr.
	Tarrant	1 Oct.
	Tom Green	3 Feb., 30 Apr.
	Walker	26 Mar., 2, 7, 8 & 10 May
occidentalis	Dallas	18 & 28 Sep., 11 Oct.
	Jim Wells	19 Oct.
	Val Verde	15 Apr.
	Webb	3 Jan.
roscoe	Brazos	24 Apr., 1, 9, & 18 May, 19 Oct.
	Dallas	9 & 28 Apr., 27 May, 8 Sep., 7, 11, & 15 Oct.
	Galveston	27 & 28 Apr.
	Harris	10, 13, 15, & 19 July, 9 Aug.
	Houston	23 Apr.
	Navarro	6 Oct.
	Newton	24 Apr.
	Tarrant	1 Aug.
	Webb	16 & 18 May
trichas	Brazos	5 May
	Dallas	28 Sep., 11 Oct.
	Fannin	5 May
	Nacogdoches	16 Apr.
	Rusk	31 Mar., 20 Apr.
	Walker	8 May
	Willacy	Apr. (exact date not known)
typhicola	Jefferson	5 Feb.

Table 2. Measurements for each subspecies for sex and seasonal classes of Common Yellowthroat specimens. Values are mean ± SE (N). Measurements in mm.

	Males		Females	
	Spring	Fall	Spring	Fall
brachidactylus				
Wing	55.67 ± 1.53 (3)	56.83 ± 1.29 (6)	51.40 ± 0.55 (5)	53.32 ± 1.12 (11)
Tail	52.50 ± 2.29	52.25 ± 1.72	46.90 ± 1.24	47.00 ± 2.24
Culmen	9.67 ± 0.58	10.17 ± 0.26	9.80 ± 0.27	10.04 ± 0.35
Tarsus	21.50 ± 1.32	21.75 ± 0.76	21.00 ± 0.79	21.86 ± 1.12
campicola				
Wing	57.12 ± 1.31 (4)	56.33 ± 1.40 (6)	52.63 ± 0.75 (4)	52.50 ± 1.29 (4)
Tail	50.12 ± 1.44	52.33 ± 1.33	47.88 ± 2.66	47.12 ± 0.85
Culmen	10.25 ± 0.50	10.33 ± 0.61	9.88 ± 0.48	10.25 ± 0.50
Tarsus	21.75 ± 1.55	22.08 ± 0.66	20.88 ± 0.48	21.88 ± 0.85
chryseola				
Wing	57.67 ± 0.58 (3)	—	—	—
Tail	55.33 ± 0.58	—	—	—
Culmen	11.17 ± 0.29	—	—	—
Tarsus	23.00 ± 1.00	—	—	—
coloradonicola				
Wing	—	57.00 — (1)	54.00 — (1)	52.86 ± 1.61 (14)
Tail	—	50.00 —	45.00 —	47.29 ± 1.82
Culmen	—	9.50 —	11.00 —	10.32 ± 0.50
Tarsus	—	22.00 —	20.00 —	21.50 ± 0.62
minnesoticola				
Wing	55.80 ± 1.04 (5)	55.00 ± 0.71 (2)	53.33 ± 1.33 (6)	52.20 ± 1.35 (5)
Tail	50.00 ± 1.58	50.25 ± 1.06	47.33 ± 1.97	45.50 ± 3.35
Culmen	10.40 ± 0.42	10.00 ± 0	9.92 ± 0.49	10.40 ± 0.42
Tarsus	20.70 ± 1.40	21.00 ± 0.71	20.92 ± 0.86	21.70 ± 1.20
occidentalis				
Wing	—	55.00 ± 3.83 (6)	55.50 — (1)	55.50 — (1)
Tail	—	50.33 ± 5.16	58.00 —	49.00 —
Culmen	—	10.00 ± 0.32	11.00 —	9.50 —
Tarsus	—	21.58 ± 0.74	22.00 —	21.00 —
roscoe				
Wing	52.20 ± 1.25 (10)	52.80 ± 1.89 (5)	50.93 ± 2.09 (7)	50.00 ± 1.84 (5)
Tail	46.55 ± 2.43	46.00 ± 1.06	45.78 ± 2.58	42.80 ± 1.92
Culmen	10.15 ± 0.53	9.90 ± 0.42	9.86 ± 0.75	10.00 ± 0.61
Tarsus	21.90 ± 0.81	21.20 ± 0.76	21.14 ± 1.34	21.00 ± 1.62
trichas				
Wing	54.22 ± 1.60 (11)	54.50 ± 1.80 (3)	—	51.00 — (1)
Tail	48.59 ± 2.02	49.50 ± 1.32	—	48.00 —
Culmen	10.32 ± 0.51	10.50 ± 0	—	10.00 —
Tarsus	20.91 ± 0.97	21.33 ± 0.29	—	21.00 —
typhicola				
Wing	56.00 — (1)	—	52.00 — (1)	—
Tail	52.00 —	—	48.00 —	—
Culmen	11.00 —	—	10.50 —	—
Tarsus	20.50 —	—	21.00 —	—

Principal component analysis (PCA) and cluster analysis (UPGMA) were performed on all morphometric characters. For racial identification, I attempted to give equal weight to plumage characteristics and to specimen locations in both PCA space and cluster dendrograms. In cases where two or more specimens were nearly identical morphometrically, plumage differences were used for identifica-

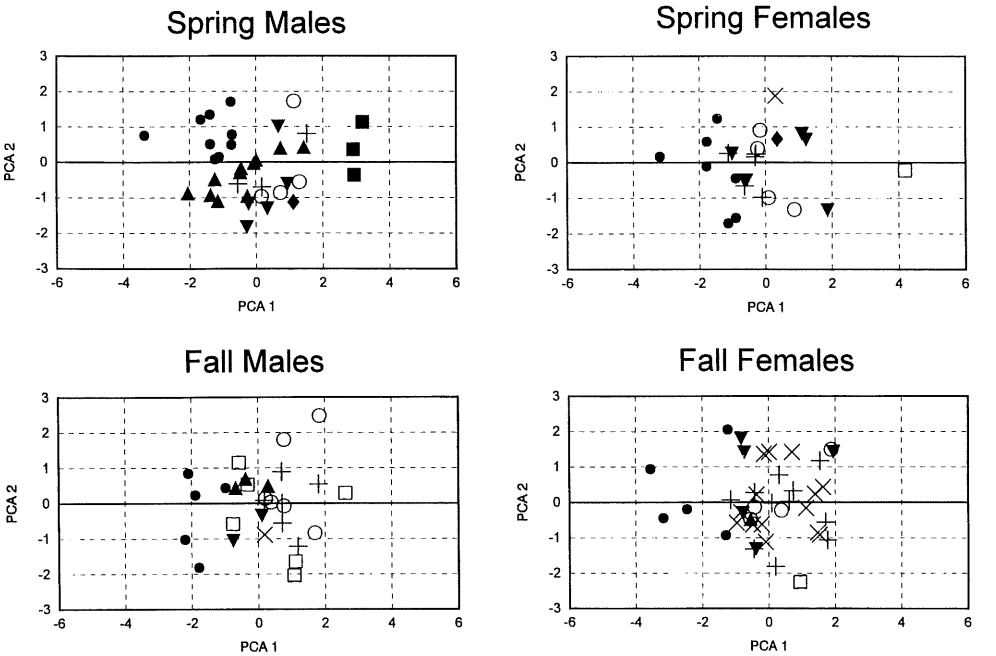

Fig. 1. Principal component plots for sex and seasonal classes of Common Yellowthroats. PCA1 represents increasing wing chord and tail lengths. PCA2 represents increasing exposed culmen and tarsal lengths for fall specimens, increasing tarsal lengths for spring males and culmen length for spring females. (+ *brachidactylus*, ○ *campicola*, ■ *chryseola*, × *coloradonicola*, ▼ *minnesoticola*, □ *occidentalis*, ● *roscoe*, ▲ *trichas*, ◆ *typhicola*).

tion. All specimens were examined with no preconceived ideas of racial identity. A type series was not available for comparison. All subspecies were considered valid to avoid bias resulting from *a priori* assumptions of subspecific validity. Due to missing or molting tail feathers and broken bills, several specimens were not included in the morphometric analyses. For these, racial identity was based entirely on plumage.

Results and Discussion

I identified nine subspecies of Common Yellowthroats in Texas: *brachidactylus, campicola, chryseola, coloradonicola, minnesoticola, occidentalis, roscoe, trichas,* and *typhicola.* Table 1 summarizes their distribution based on this specimen series.

Of the nine subspecies identified, three are not recognized by the A.O.U.: *coloradonicola, minnesoticola,* and *roscoe,* while a fourth, *brachidactylus,* is not listed by the T.O.S. as occurring in Texas. However, these results are consistent with previous studies. Pulich (1988) included these four in his listing of the birds of north-central Texas, while Maxwell (1979) identified the first three subspecies in the Concho Valley area of west-central Texas.

Table 2 contains a summary of the morphological measurements by subspecies and by sex and seasonal classes. Principal component plots of PCA1 versus PCA2 for the same sex and seasonal classes are shown in Figure 1. For all four plots, PCA1 represents increasing wing and tail lengths. For both sexes in the fall, PCA2 represents increasing exposed culmen and tarsal lengths. For the spring plots,

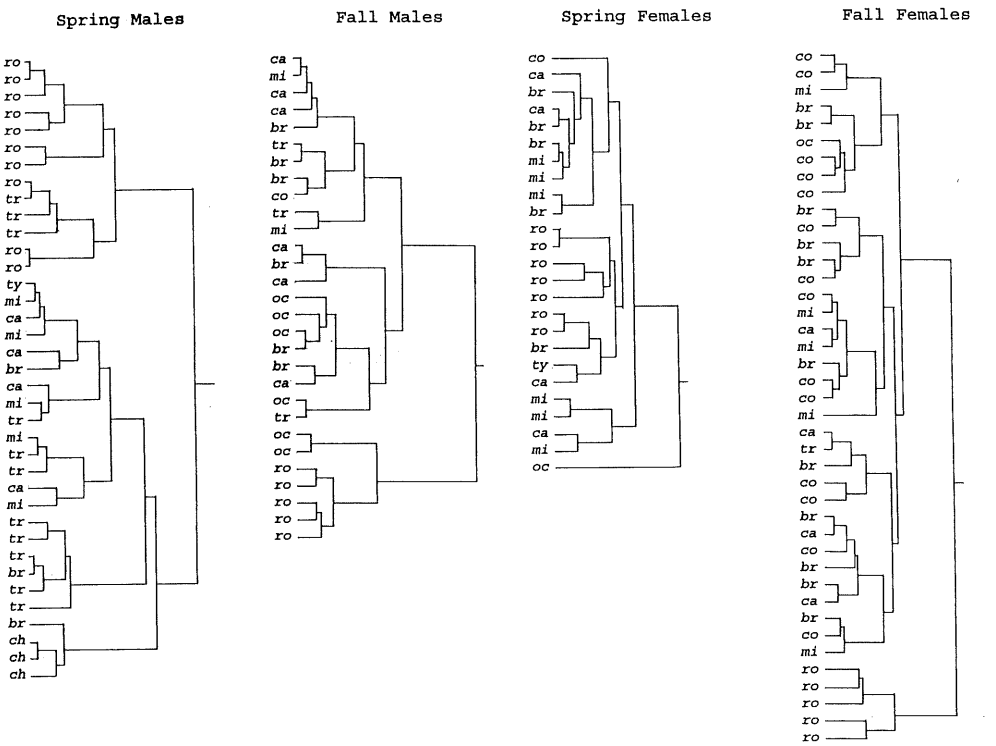

Fig. 2. Cluster analyses for Common Yellowthroats based on lengths of wing chord, tail, exposed culmen, and tarsus. (*br—brachidactylus, ca—campicola, ch—chryseola, co—coloradonicola, mi—minnesoticola, oc—occidentalis, ro—roscoe, tr—trichas, ty—typhicola.*)

PCA2 represents increasing tarsal lengths for males and increasing culmen length for females.

Figure 2 illustrates the results of the cluster analyses for each sex in spring and fall. Distances between clusters are not reported, but all four dendrograms are presented at the same scale.

Based on morphological measurements, both cluster and principal component analyses tended to yield three groups of Common Yellowthroat specimens. Groupings within PCA space showed more gradation between groups than the cluster dendrograms. The first group, representing the smallest birds, was composed almost entirely of *roscoe* specimens. Thus, *roscoe* may represent a valid subspecies. The second group contains *brachidactylus, campicola, coloradonicola, minnesoticola, trichas,* and *typhicola.* These are birds of intermediate size. In most cases, *occidentalis* also fell within this second group. The specimens of *chryseola* comprise the third grouping and are the largest of the Common Yellowthroat specimens I examined.

The *coloradonicola* specimens tended to be comparable in size to *occidentalis* and *campicola.* The geographic range of *coloradonicola* (Oberholser 1974) overlaps the ranges of *occidentalis* and *campicola* (A.O.U. 1957). Based on plumage, my *coloradonicola* specimens were distinct. However, Behle (1950) could not differentiate between *coloradonicola* and *occidentalis,* so a larger series may reveal my specimens of *coloradonicola* to be clinal forms of *occidentalis* or *campicola.*

The same may also be true of *minnesoticola.* Morphometric analysis shows it to be very similar in size to *brachidactylus.* Range descriptions show *minnesoticola* to be a subset of *brachidactylus* (A.O.U. 1957; Oberholser 1974). In this series, plumage differences showed *minnesoticola* to be distinct, but more specimens may reveal it to be a clinal form. Thus, while one or more of the subspecies not recognized by the A.O.U. may appear valid, a resolution of the racial identities of Common Yellowthroats will require a larger series of specimens and more genetic analysis.

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Appendix. Common Yellowthroat specimens used in this study. (AS = Angelo State University, SFA = Stephen F. Austin University, SHS = Sam Houston State University, TCWC = Texas Cooperative Wildlife Collection at Texas A&M University, and UD = University of Dallas.)

brachidactylus	SFA: 250, 2994, 2995, 3073; SHS: 303; TCWC: 11053, 11189, 11811; UD: 840, 843, 844, 845, 847, 848, 849, 864, 865, 876, 886, 887, 890, 903, 904, 952, 3014, 3015
campicola	SFA: 2232, 3111; SHS: 510, 823; TCWC: 7904, 8126, 8899, 9126, 9985, 10594, 10694, 10875, 10876, 11190, 11667, 11668; UD: 1044, 1129, 1157, 2669
chryseola	TCWC: 7456, 11354, 11484, 11496
coloradonicola	TCWC: 10237, 11669; UD: 685, 1045, 1052, 1078, 1096, 1097, 1098, 1101, 1125, 1130, 1145, 1175, 3110, 3112
minnesoticola	AS: 123; SFA: 483; SHS: 714, 759, 760, 811, 846, 1099; TCWC: 7153, 10236, 11440; UD: 883, 1043, 1126, 1140, 1158, 2533, 2745, 2749, 2803, 2912, 3017
occidentalis	TCWC: 10625, 11355, 11430; UD: 602, 655, 692, 693, 694, 879
roscoe	SFA: 1168; TCWC: 1728, 1729, 1730, 1731, 2577, 6423, 7152, 7154, 9601, 10874, 10877, 10930, 10931, 11054, 11720, 11721; UD: 686, 762, 861, 1084, 1088, 1148, 1149, 1155, 1407, 1777, 2436, 2807, 3057
trichas	SFA: 512, 738, 1798, 1906; SHS: 798, 808, 812; TCWC: 11044; UD: 672, 674, 675, 880, 2432, 2680, 3132
typhicola	TCWC: 1389, 1390

The Ornithological Collections of Frank B. Armstrong

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ABSTRACT.—Frank B. Armstrong (1863–1915) collected in both Texas and Mexico from 1885 through 1914. Over 8,000 of Armstrong's specimens are found in North American and European museums. Included within his collections are holotypes representing 3 new species and 11 new subspecies, as well as specimens establishing numerous distribution records.

Few collectors have been more productive or as controversial as Frank B. Armstrong. Collecting in both Texas and Mexico, he acquired thousands of specimens which were sold throughout North America and Europe. Included in this trove are several type specimens, as well as those establishing new distributional or seasonal records.

Armstrong was both a prodigious collector and a successful businessman. However, allegations that his specimen data were often incorrect have influenced all evaluations of his work even unto the present.

There has been no previous description of the ornithological activities of F. B. Armstrong. It is therefore the purpose of this paper to provide biographical information and a review of the work of this pioneer collector.

Childhood and Professional Training

Frank Armstrong, son of Richard and Janet Armstrong, was born on 10 May 1863 in St. Johns, New Brunswick, Canada. His interest in nature was acquired from his father who, although trained as a lawyer, held the study of natural history in high esteem. Richard Armstrong died in 1868 and, in 1870, the family moved to Medford, Massachusetts, just outside of Boston, where Frank was reared and educated. After graduation from the public schools, he studied taxidermy for two years in Boston under the mentorship of Charles Johnson Maynard, one of the foremost preparators and naturalists of the time (Anon. 1915; Brown n.d.; Palmer 1954; Wooldridge 1976).

Early Work in Texas and Mexico, 1885–1890

A Phainopepla (Univ. Mich. Mus. Zool., No. 43,534) collected at El Paso on 17 May 1885 represents the earliest known specimen collected by Armstrong in Texas. He evidently remained at El Paso for only a short time before moving to Laredo in Webb County, where on 12 November 1885 he collected the type specimen of the Western Field Sparrow (Table 1). He continued to collect in Webb County through January 1886 before moving downriver to Cameron County. Many specimens collected during this time were consigned to Frank Blake Webster's Naturalists' Supply Depot in Boston. An advertisement by Webster in the February 1886 issue of *The Ornithologist and Oologist* offered the skins of 22

FRANK B. ARMSTRONG

Taken on his wedding day, 2 April 1891. Photograph courtesy of Frank. B. Armstrong, III.

species from the Rio Grande. Armstrong is known to have displayed his work at Webster's business establishment and was, undoubtedly, the collector of the specimens described in the advertisement.

Armstrong established headquarters at Corpus Christi sometime during 1886. From this location, he explored as far east as Orange County where he collected

Table 1. Type specimens collected by F. B. Armstrong.

New taxa	Type locality	Date collected	Reference
Spizella pusilla arenacea subsp. nov. (Western Field Sparrow)	Laredo, TX	12 Nov. 1885	Chadbourne 1886
Phalaenoptilus nuttallii nitidis subsp. nov. (Frosted Common Poorwill)	Nueces River, TX	27 Feb. 1886	Brewster 1887
Micropallas whitneyi idoneus subsp. nov.[1] (Texas Elf Owl)	Hidalgo, TX	5 Apr. 1889	Ridgway 1914
Sturnella magna hoopesi subsp. nov. (Rio Grande Meadowlark)	Brownsville, TX	13 Mar. 1892	Stone 1897
Geothlypis poliocephalai ralphi subsp. nov. (Ralph's Gray-crowned Yellowthroat)	Brownsville, TX	4 May 1893	Ridgway 1894
Pitangus sulphuratus texanus subsp. nov. (Texas Great Kiskadee)	Brownsville, TX	8 Dec. 1893	van Rossem 1940
Amazilia cerviniventris chalconota subsp. nov.[2] (Northern Buff-bellied Hummingbird)	Brownsville, TX	29 May 1894	Oberholser 1898
Icterus gularis tamaulipensis subsp. nov. (Altamira Oriole)	Altamira, Tam., MEX	17 Oct. 1894	Ridgway 1901
Dendrornis striatigularis sp. nov.[3] (Ivory-billed Woodcreeper)	Altamira, Tam., MEX	18 Nov. 1894	Richmond 1900
Xiphorhynchus flavigaster saltuarius subsp. nov. (Ivory-billed Woodcreeper)	Altamira, Tam., MEX	19 Nov. 1894	Wetmore 1942
Geothlypis flavovelatus sp. nov. (Altamira Yellowthroat)	Altamira, Tam., MEX	5 Dec. 1894	Ridgway 1896
Dendroica aestiva ineditus subsp. nov.[4] (Yellow Warbler)	Matamoros, Tam., MEX	19 Aug. 1908	Phillips 1911
Strix virgata tamaulipensis subsp. nov.[5] (Tamaulipan Mottled Owl)	Rio Martinez, Tam., MEX	25 Feb. 1909	Phillips 1911
Heleodytes narinosus sp. nov.[6] (Spotted Wren)	Galindo, Tam., MEX	22 Mar. 1909	Phillips 1911

[1] Now *Micrathene whitneyi idonea.*
[2] Now *Amazilia yucatanensis chalconota.*
[3] Considered in the A.O.U. Checklist (1983) to be an aberrant individual of the Ivory-billed Woodcreeper, *X. flavigaster.*
[4] *aestiva* is not considered as a "group" within *Dendroica petechia.*
[5] Now *Ciccaba virgata.*
[6] Considered by Hellmayr, *Catalogue of Birds of the Americas and Adjacent Islands* (1934) as a synonym of *Campylorhynchus jocosus gularis. Campylorhynchus gularis* of the A.O.U. Checklist (1983).

Table 2. Distribution records based on specimens collected by F. B. Armstrong.

Taxon	Location	Date	First record
Cygnus buccinator (Trumpeter Swan)	Matamoros, MEX	21 Jan. 1909	Mexico
Micrathene whitneyi idonea (Texas Elf Owl)	Hidalgo, TX	5 April 1889	Texas
Buteo magnirostris griseocauda (Roadside Hawk)	Cameron Co., TX	2 April 1901	U.S.A.
Philomachus pugnax (Ruff)	Cameron Co., TX	10 Dec. 1902	Texas
Xema sabini sabini (Sabine's Gull)	Corpus Christi, TX	4 Oct. 1889	Texas
Sterna forsteri forsteri (Western Forster's Tern)	Brownsville, TX	19 Feb. 1894	Texas
Sterna dougallii dougallii (Northern Roseate Tern)	Corpus Christi, TX	10 April 1901	Texas
Thalasseus elegans (Elegant Tern)	Corpus Christi, TX	25 July 1889	Texas
Selasphorus rufus (Rufous Hummingbird)	Brownsville, TX	19 Jan. 1892	Texas
Amazilia yucatanensis chalconota (Northern Buff-breasted Hummingbird)	Brownsville, TX	1–9 Jan. 1890	Texas
Platypsaris aglaiae gravis[1] (Rose-throated Becard)	Brownsville, TX	30 Oct. 1891	Texas
Melanoptila glabrirostris (Black Catbird)	Brownsville, TX	21 June 1892	U.S.A.
Vireo olivaceus flavoviridis (Yellow-green Vireo)	Brownsville, TX	7 June 1892	Texas
Icteria virens danotia (Brownsville Yellow-breasted Chat)	Laredo, TX	25, 27 Jan. 1886	Texas
Basileuterus culicivorus brasierii (Golden-crowned Warbler)	Brownsville, TX	6, 20 Jan. 1892	U.S.A.
Icterus spurius fuertesi (Fuerte's Oriole)	Brownsville, TX	3 April 1894	U.S.A.
Icterus gularis tamaulipensis (Altamira Oriole)	Cameron Co., TX	11 April 1890	Texas
Aimophila botterii texana (Texas Botteri's Sparrow)	Corpus Christi, TX	27 May 1899	Texas
Zonotrichia atricapilla (Golden-crowned Sparrow)	Orange Co., TX	15 Mar. 1887	Texas

[1] Now *Pachyramphus.*

the first Golden-crowned Sparrow from Texas during March 1887 (Table 2). To advertise his work, Armstrong displayed several of his taxidermy mounts in William DeRyee's drugstore where they were seen by the ornithologist C. W. Beckham when he visited Corpus Christi in January 1887 (Beckham 1887).

During the spring of 1886, Armstrong and his assistant, Julian Priour, collected along the Rio Grande. In December, after returning to Corpus Christi, he wrote to the Englishman Frederick DuCane Godman seeking a contract to collect in Mexico (Armstrong 1886). The agreement eventually reached involved an expedition to Mexico, as well as an order for specimens from Texas. Much of 1887 was apparently spent in preparing this initial collection of Texas specimens (Armstrong 1887).

In mid-January 1888, Armstrong sent Godman a shipment of 822 bird skins collected mainly in Texas but also including a few specimens from Mexico (Armstrong 1888a). Shortly thereafter he left Corpus Christi, arriving at Laredo about

the last of February. He then crossed the Rio Grande to Nuevo Laredo, Mexico, where he and his assistant collected for several days before traveling to the Rio Salado about 50 miles to the south. In mid-March, he left Nuevo Laredo for Monterey where he remained until the last week in May. He then headed for Ciudad Victoria but, due to the condition of the roads, was unable to travel any further than Montemorelos (Armstrong 1888b). His last shipment of birds, bringing the total for the expedition to 1,020, was sent from Monterey on June 12th and, on the following day, he left for Boston (Armstrong 1888c). Armstrong's trunk was damaged during the trip resulting in the loss of all letters, records of shipments, and collection notes. Because of this loss, Godman requested that Armstrong sketch out on a set of maps the route and localities where he had collected (Armstrong 1888d). Some of the data from this expedition were published in the following year in a short article on Mexican birds (Salvin and Godman 1889).

By mid-July, Armstrong was back in Corpus Christi where he resumed collecting for the commercial market. In October, Godman authorized him to continue collecting Texas birds. Work began immediately and, by December, with the assistance of this younger brother George, many specimens had been obtained. Armstrong's plan was to have his brother continue to collect at Corpus Christi while he worked along the Rio Grande (Armstrong 1888e). He left Corpus Christi in late March 1889 for Brownsville, then traveled up the river to Hidalgo before returning home at the end of April. A total of 1,032 skins was sent to Godman as a result of the work done during the winter of 1888–1889 (Armstrong 1889).

In January 1890, Armstrong sent an additional 170 skins to Godman before again leaving for the border. During March, he worked at Rio Grande City moving from there to Hidalgo and then to Brownsville. On April 5th Armstrong wrote to Godman that he had decided to join the Brownsville firm of H. M. Field but would continue work on the Texas collection which would be completed by August (Armstrong 1890).

Association with H. M. Field

Henry M. Field came to Brownsville with the Union troops in 1865 and, after being mustered out, took up residence in the city. He later served as deputy collector of customs and as the county surveyor. In 1879, he went into business selling lumber and hardware as well as buying hides, wool, cotton, bone, horns, and pelts for shipment to eastern markets (Brown n.d.).

Field became interested during the mid-1880s in the sale of natural history specimens and, to further this end, took as his junior partner Emery C. Greenwood from Ispwich, Massachusetts. Greenwood, a brother-in-law of C. J. Maynard, was a noted collector in his own right. In the spring of 1889, Greenwood and John Caldwell left Brownsville to collect in the salt marshes north of Tampico. They both came down with a fever to which Caldwell quickly succumbed (Priour 1889). Greenwood made it back to Brownsville where he died on 21 July 1889 (Anon. 1889). Thus, when Armstrong arrived at Brownsville in March 1890, Field offered him the position previously held by Greenwood.

One of the advertisements for the new partnership appeared in the June 1890 issue of *The Ornithologist and Oologist.* Readers were advised that Armstrong would "give special attention to the collection, for scientific purposes, of all birds,

beasts and reptiles native to the interior and border of Mexico, and [would] furnish careful data with regard to the same." Everything went well until 18 October 1890 when a disastrous fire destroyed the record books and correspondence (Anon. 1890). However, all the specimens were saved and the business quickly returned to normal. Sometime during the summer of 1891 the partnership was dissolved, and Armstrong became the sole owner of the natural history business.

Sense of Adventure and Personal Life

Armstrong had a well developed sense of adventure. Several of his early letters to F. D. Godman contain offers to collect in Central or South America and other exotic locations. This youthful urge was finally laid to rest by his marriage on 2 April 1891 to Marie Isabel Schodts (1867–1934), the only child of Michael and Susan Diaz Schodts. Michael Schodts was a Belgian who came to Matamoros, Mexico, in 1862. He later relocated in Brownsville where he established a successful lumber business (Brown n.d.) which passed to Marie and Frank following his death in 1896. Three daughters and four sons were born to Frank and Marie Armstrong. The large two-storied, multi-columned house that Armstrong had built for his family in 1896 was later designated as a Texas Historic Landmark (Wooldridge and Vezzetti 1982).

Collecting Activities 1890 through 1907

Armstrong was trained primarily as a taxidermist. However, as interest in oology grew during the early 1890s, he devoted more time to the collection of eggs. As early as May 1890, he collected eggs for William L. Ralph of Utica, New York. The eggs, which Ralph purchased over several years, were eventually donated to the National Museum of Natural History in Washington, D.C. Other customers who also donated eggs collected by Armstrong to the National Museum include A. C. Bent, E. J. Court, R. B. McLain, T. W. Richards, J. E. Thayer, and W. F. Webb. A large collection of skins purchased sometime prior to 1897 by Josiah Hoopes was later donated to the Academy of Natural Sciences of Philadelphia.

George B. Sennett of Erie, Pennsylvania, was also one of Armstrong's customers. Although Sennett had personally collected in the Rio Grande Valley on three previous occasions, he was still interested in obtaining certain species. During 1891, Armstrong supplied Sennett with specimens of the Least Grebe, Sharpe's White-collared Seedeater, Fulvous Whistling-Duck, and Masked Duck, as well as various unidentified rodents (Armstrong 1891). An unidentified chiropteran was later determined to be a Hoary Bat (Allen 1894). All of Sennett's specimens were later donated to the American Museum of Natural History in New York City.

Trapping mice presented Armstrong with a real challenge. Unable to purchase effective traps, he had them made locally. Because hired collectors were unsuccessful, he personally ran a trap line hoping to devise techniques to capture these elusive rodents (Armstrong 1891). Armstrong eventually achieved some recognition in mammalogy as the collector of the subspecific type specimens of the Texas Opossum and the Texas Armadillo (Bailey 1931). Many of the mammal specimens collected by Armstrong are now found in the National Museum of Natural History.

Armstrong spent the winter of 1894–1895 collecting at Altamira, a small town northwest of Tampico, Mexico. The notice of his change of address indicated that

specimens would be shipped directly from that location. At intervals, specimens were sent to the National Museum where a total of sixty species was eventually identified (Richmond 1895). Significant specimens collected during this expedition included holotypes of the Altamira Oriole, Ivory-billed Woodcreeper, and Altamira Yellowthroat (Table 1).

By the mid-1890s, Armstrong was widely recognized for his work in the Lower Rio Grande Valley and adjacent Mexico. A price list from this period shows that his stock included the skins of 496 species or subspecies of birds, as well as the eggs of 68 different types. The mounts of 169 species of birds were offered, as well as the mounts of various mammals and reptiles (Armstrong n.d.). An 1893 account of Armstrong's business establishment described it as being "crowded with specimens of Natural History, and well worth the careful attention and examination which the courteous proprietor freely accords to all who visit . . ." (Chatfield 1893).

Around 1905, Armstrong began collecting live animals for sale to zoos, circuses and private individuals. The data for two Roseate Spoonbills in the National Museum indicate that they were collected by Armstrong and died in 1905 at the National Zoological Park. Similar data are found for a Tricolored Heron and Willet that died in 1907. During January 1906, Armstrong had a camp near Brownsville where he kept large numbers of waterfowl, snakes, and mammals (Anon. 1906a). In compliance with a recently passed law, he was the holder of a permit allowing him to collect birds and game animals for scientific purposes (Anon. 1906b).

Collecting in Tamaulipas

On 1 August 1908, Armstrong began a year of collecting in the Mexican state of Tamaulipas. Specimens collected during the expedition were shipped to the Museum of Comparative Zoology at Harvard where they were incorporated into the general collection. The localities visited ranged from Matamoros in the north to Altamira in the south. Most of Armstrong's time was, however, spent in the foothills of the Sierra Madre Mountains northwest of Ciudad Victoria. A description of the localities and habitats collected was later published along with an annotated list of species (Phillips 1911). About 2,350 individuals representing 259 species and subspecies were collected. Significant specimens included new subspecies of the Yellow Warbler and Mottled Owl, as well as a new species of Spotted Wren (Table 1). With the exception of a brief collecting trip during April and May 1910, Armstrong never again collected in Mexico.

In late 1913, Armstrong began to fail in health and, in January of the following year, he went to the Chisos Mountains in west Texas. During April, May, and June of 1914, he collected a large series of the Golden-cheeked Warbler at Kerrville (Pulich 1976). In April 1915, he left Kerrville for Corpus Christi where he spent some time before returning to Brownsville. Armstrong died in Brownsville on 20 August 1915 (Anon. 1915).

Type Specimens and Distribution Records

Over 8,000 of Armstrong's ornithological specimens are found in North American and European museums (Table 3). These known specimens probably rep-

Table 3. Locations of specimens collected by Frank B. Armstrong.[1]

Location of specimens	Skeletal or preserved	Skins	Egg sets	Total specimens
National Museum of Natural History[2]	19	309	559	887
Milwaukee Public Museum	—	1	6	7
Carnegie Museum of Natural History	—	257	27	284
Academy of Natural Sciences of Philadelphia	—	—	—	696
Western Foundation of Vertebrate Zoology	—	—	500–1,000 (est)	500–1,000 (est)
Delaware Museum of Natural History	—	—	49	49
Museum Vertebrate Zoology at Berkeley	12	63	1	76
Museum of Comparative Zoology (Harvard)[3]	—	2,352	—	2,352
British Museum (Natural History)[4]	—	3,044	—	3,044
University Michigan Museum of Zoology	—	155	8	163
Totals	31	6,181	1,150	8,058 (est)

[1] The list of locations given below represents only those institutions for which data could be obtained.
[2] Based on inventory data as of January 1990.
[3] Based on number of specimens listed by Phillips, *Auk* 28:67–89.
[4] Estimate of specimens derived from Armstrong's correspondence with F. D. Godman.

resent only a fraction of the total number collected by Armstrong during a career extending from 1885 through 1914.

Type specimens representing 3 new species and 11 new subspecies were collected by Armstrong (Table 1). Half of these types were collected in Texas and the remainder in the Mexican state of Tamaulipas.

Several species distribution records are based on specimens collected by Armstrong (Table 2). One of his more remarkable records is a Black Catbird collected at Brownsville on 21 June 1892. The skin was included in a large shipment to Josiah Hoopes of Philadelphia and only later identified as the Black Catbird, a species resident in the Yucatan Peninsula, Guatemala, Honduras, and Belize. This record, long ignored by most ornithologists, was accepted as valid by Oberholser (1974), and the Bird Records Committee of the Texas Ornithological Society has recently added the Black Catbird to the official Texas list (Lasley 1991).

The Question of Collection Data

Armstrong was keenly aware of the specimen standards required by his professional customers; therefore, it seems unlikely that he would consciously choose to jeopardize his business by providing specimens that did not meet these standards. Why then has it been repeatedly suggested that his specimen data were often incorrect? A review of the historical record seems to provide some insight into the origin of these allegations.

During the spring of 1888, John Marion Priour from Corpus Christi was under contract to collect for G. B. Sennett in Mexico. Armstrong was also scheduled to

collect in Mexico for Godman during this same time. John Priour and Armstrong were acquainted since Armstrong had previously employed Priour's brother, Julian, as an assistant. In a letter to F. D. Godman dated 2 March 1888, Armstrong complained that John Priour had started a rumor that he (Armstrong) was careless in labeling his skins. Armstrong apparently viewed this discount as an attempt by Priour to gain a competitive edge in the profitable business of collecting in Mexico.

In 1891, William Lloyd wrote to Sennett that Armstrong had a "lot of shiftless Mexicans hunting for him . . . he has collected thousands of eggs & now has all his forces hunting small mammals as I showed him how to make skins & trap them" (Lloyd 1891). Lloyd thus portrayed Armstrong as a collector of little talent who depended on illiterate and unskilled assistants to supply specimens. However, Lloyd also wished to sell specimens to Sennett and, thus, had ample motivation to discredit Armstrong.

The allegations that Armstrong's collection data were often incorrect continued even after his death. Roy Quillin claimed that many of Armstrong's Texas specimens were actually collected in Mexico (Hector 1987) whereas Ludlow Griscom asserted that "Brownsville, Texas" tags were placed on everything that Armstrong and his helpers shot anywhere between Corpus Christi, Texas, and Tampico, Mexico (Oberholser 1974). Recently it has been suggested that Armstrong often combined eggs from different nests and sold them as a "set" (Hector 1987).

Armstrong was heavily dependent on laboratory assistants and field collectors. At one time, he reportedly had over 80 hunters working under his supervision in Mexico (Armstrong 1970). Given the volume of specimens collected and the number of persons involved in their processing, it is inevitable that errors in recording data would occur.

It is perhaps worth noting that the first criticisms directed toward Armstrong originated from his fellow collectors rather than from his customers. It thus seems likely that the allegations against him were motivated, at least in part, by jealousy. He was, after all, the most successful collector in Texas, having built a natural history business that was unrivaled during his time.

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The Status and Distribution of the Piping Plover in Texas

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ABSTRACT.—The Piping Plover (*Charadrius melodus*) is a threatened/endangered species that winters along the Texas coast. In 1991 the Great Lakes/Northern Great Plains Piping Plover Recovery Team coordinated an international survey of the species throughout both its wintering the breeding ranges. This paper presents the findings of the census conducted in Texas, as well as the results of surveys by the author at three selected sites on the upper Texas coast.

Introduction

Shorebirds represent one of the most diverse and plentiful constituencies within the Texas avifauna. At present, 49 shorebird species have been documented in the state, including 7 species of *Charadrius* plovers (TOS 1993). One of these, the Piping Plover (*C. melodus*), is endemic to North America and winters extensively along the Texas coast (AOU 1957; Nicholls and Baldassarre 1990; Haig and Oring 1985).

Piping Plovers breed across three broad geographical areas: Atlantic coast beaches, on lake and river shores and islands within the Great Plains of the U.S. and Canada, and along beaches of Lake Superior and Lake Michigan (Haig and Oring 1985; Haig and Oring 1988a; Haig 1992). Although winter range data are still inadequate, current information suggests that Great Lakes/Great Plains birds winter primarily along the Gulf of Mexico from Florida to northern Mexico (Haig and Plissner 1993). The wintering range of the Atlantic population remains enigmatic. The configuration of sightings of marked birds suggests that most Atlantic breeding birds winter south along the Atlantic from South Carolina to Florida and various islands in the Caribbean (Haig and Oring 1988b; Haig 1992).

Increased attention has been given the Piping Plover in the years following its designation as threatened/endangered (Federal Register 1985). Efforts, however, have been primarily focused on the breeding ecology of the species (Gaines and Ryan 1988; Haig and Oring 1987; Haig and Oring 1988a; MacIvor 1990; Nordstrom 1990). Few studies on nonbreeding ecology have been conducted. Nicholls and Baldassarre (1990b) conducted the only investigation of habitat selection by Piping Plovers throughout the U.S. wintering range. Johnson and Baldassarre (1988) studied the wintering ecology of the species in coastal Alabama. In Texas, Leavens (1979) commented briefly on seasonal changes shown by Piping Plovers as a part of her larger study on habitat selection in shorebirds on Bolivar Peninsula. Chapman (1984) researched the seasonal abundance and habitat-use patterns in coastal shorebird populations, including the Piping Plover, along the central coast. Thus, no comprehensive study of the winter ecology of the species in Texas has yet been published.

Two surveys of Piping Plover winter distribution in Texas had been conducted prior to 1991. Haig examined the Texas coastline from Corpus Christi to Gal-

veston in 1983, followed by a survey of the Gulf coast from Mexico to the Florida Keys in 1984 (Haig and Oring 1985). Although this study multiplied the number of known wintering birds threefold, the 834 individuals counted represented less than 25% of the known breeding population. Of this total, 400 (48%) were found in Texas. A similar study by Nicholls yielded 1,730 plovers, with 834 (48%) located in Texas (Nicholls and Baldassarre 1990a). Nicholls estimated coverage of approximately 89% of the suitable habitat along the Texas coast. Both surveys admittedly bypassed important areas containing suitable plover habitat. Most critically, the algal flats of the lower Laguna Madre were not adequately covered (Haig and Oring 1985; Nicholls and Baldassarre 1990a).

Through 1990, conservation efforts in Texas were hampered by lack of information on Piping Plover wintering distribution and ecology. Piping Plovers may spend as much as eight to nine months away from breeding areas (Haig and Oring 1985). Significant mortality among migratory shorebirds can occur during this period (Baker and Baker 1973; Evans 1976; Myers 1980). Therefore specific delineation of winter distribution is critical to the formulation of conservation strategies for endangered migratory shorebirds. Recognizing this need, the Great Lakes/Northern Great Plains Recovery Team sponsored the 1991 International Piping Plover Census of wintering sites in January 1991. This paper presents the results of the census in Texas, describes the seasonality of this species based on field surveys at three sites along the upper Texas coast, and expands upon existing depictions of the general habitats frequented by the birds.

Methods

Counts were conducted from 1976 through 1991 at three major Piping Plover sites along the upper Texas coast: Bolivar Flats, Big Reef, and San Luis Pass. Sites were visited approximately on a semimonthly schedule, with increased coverage during the wintering period between 15 July and 15 May. Sites were surveyed using 10× binoculars and a Questar telescope. A total number of plovers present at each site was recorded, along with dates of seasonal arrival and departure.

As the coordinating body for the 1991 International Piping Plover survey, the Great Lakes/Northern Great Plains Recovery Team asked each state/province to conduct one complete census of all suitable Piping Plover habitats in their respective regions during the third week of January 1991. Standardized report forms were provided each participant. Surveys were primarily conducted from foot and automobile, but all-terrain vehicles, airboats, and conventional watercraft were used when necessary to reach otherwise inaccessible sites. Distance covered, mode of transportation, weather, and tidal conditions were recorded. Participants were asked to classify the habitat they covered as beach, sandflat, or mudflat. Participants were also asked to map major sites (those with 25 plovers or more). Band combinations on banded plovers were noted when possible. Descriptions of birds with injuries were solicited, particularly when the injuries were associated with marked plovers.

Results and Discussion

Migrant Piping Plovers arrived at selected sites along the upper coast during the second week of July. Discussions with observers in south Texas indicate a comparable timing of arrivals along the central and lower coast as well (T. Amos,

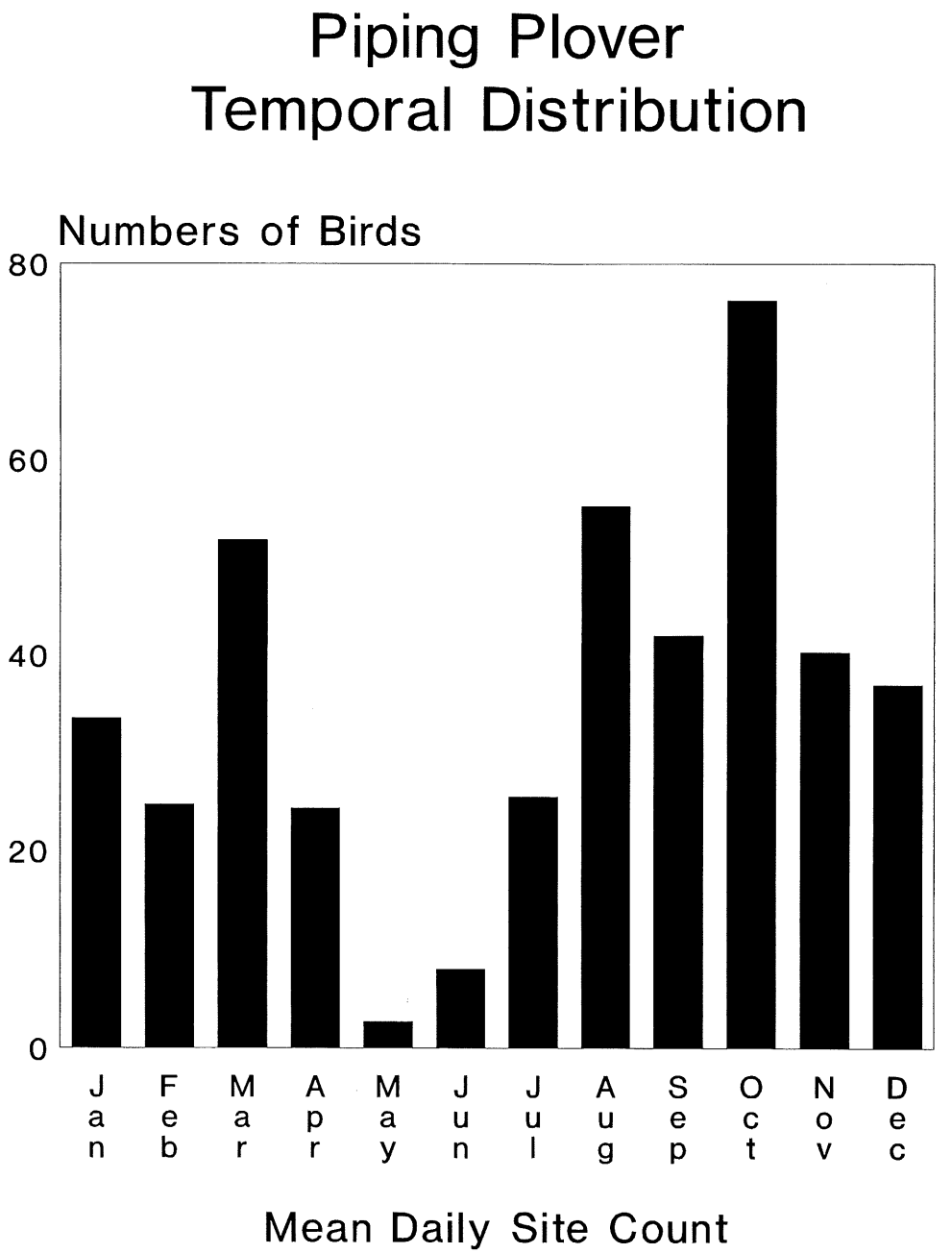

Fig. 1. Temporal distribution of Piping Plovers on the Texas Gulf Coast.

M. Farmer, pers. comm.). Plovers exhibited a bimodal fall passage (Figure 1), with two distinct pulses in mid-August and late October. These findings conform with those of Leavens (1979). Considering that breeding adults may depart Great Plains nesting grounds as early as late June or early July (M. Ryan, pers. comm.; Weins 1986), the correlation between Great Plains departure dates and the arrival

Table 1. 1991 International Piping Plover census data for Texas counties.

Region	County	Total Plovers
Upper Texas coast	Jefferson	0
	Chambers	0
	Galveston	154
	Brazoria	35
	Matagorda	221
	Calhoun	136
Central Texas coast	Aransas	248
	Nueces	410
	San Patricio	11
	Refugio	9
	Kleberg	80
Lower Texas coast	Kenedy	48
	Willacy	248
	Cameron	305
Total		1,905

of fall migrants along the Texas coast supports the notion that Piping Plovers migrate non-stop between the Great Plains and the Gulf of Mexico. The absence of Piping Plovers during migration at apparently suitable inland staging sites further supports this view (Haig 1992).

The winter population diminished from the late fall peak to a relatively stable number from late November through February. Spring migrants began to arrive in early March. This influx of apparently migrating birds in early spring is not limited to the upper Texas coast. Observers in both the Coastal Bend and in the lower Laguna Madre have noticed a similar pattern (T. Amos, and M. Farmer, pers. comm.). Such movements, particularly in the lower Laguna Madre, would suggest a sizable wintering population of Piping Plovers along the Gulf coast of northern Mexico.

Piping Plovers were found staging along the upper coast through late April, although numbers declined steadily after the peak movement in late March. Major sites were vacant by mid-May. A few non-breeding plovers (floaters) remained through the summer, although no lingering individuals were seen in the last two years of the study.

The results of the 1991 winter census (Table 1) doubled the known wintering population of Piping Plovers in Texas. Piping Plovers were found at 64 out of 83 potential sites covered by the 66 participants in the survey. Extensive search efforts along the central coast and in the lower Laguna Madre, particularly along the bayside of barrier islands, were responsible for most of this increase (Table 2). Despite the daunting task of covering 624 tidewater miles of coastline, observers completed the survey of potential habitat along both the upper and central coasts. As much as 25% of the potential sites along the lower coast remained unsurveyed, however, due to inaccessibility and a lack of observers.

Surveys in the lower Laguna Madre identified a specific habitat preference previously undocumented for the species. While the census confirmed that plovers prefer intertidal sandflats along the upper coast as had been reported by both Haig and Oring (1985) and Nicholls and Baldassarre (1990), this study revealed that birds wintering in the lower Laguna Madre additionally favor sandflats covered

Table 2. Major Piping Plover wintering areas in Texas.

General description	Total
Beach Mustang/Padre islands from Aransas Ship Channel south to northern boundary of Padre Island National Seashore	265
Bayside St. Joseph Island from Cedar Bayou south to Aransas Ship Channel	209
Bayside Padre Island south of Mansfield Pass	196
South Bay and Boca Chica	162
Bayside Matagorda Peninsula from Colorado River south to Pass Cavallo	132
Bayside Padre Island from Land Cut to Mansfield Pass	89
Bayside Matagorda Island from J Hook south to Panther Point	87
Bolivar Flats	73
Islands in north Corpus Christi and Redfish bays	68
Bayside Padre Island from Hwy 100 north to Deer Island	63
Buena Vista Ranch	46
Beach Matagorda Peninsula from Caney Creek south to Colorado River	41
Beach Padre Island from northern boundary Padre Island National Seashore south to Land Cut	41
San Luis Pass	40
Bayside Padre Island from Kennedy Causeway south to Land Cut	36
San Bernard Island	31
Spoil islands adjacent to Gulf Intercoastal Waterway from Kennedy Causeway north to marker 35	27
Big Reef	25

by blue-green algal mats (algal flats). Both prey selection and feeding techniques used by the plovers appeared to differ between habitats. Birds on the intertidal flats were observed feeding primarily upon bristleworms (*Polychaeta*) pulled from recently exposed substrate. Plovers on the algal flats, however, also gleaned insects that swarmed on and above the surface of the algal mats.

Although banding of Piping Plovers has greatly diminished, a significant pool of banded birds survived from previous efforts. Fourteen marked birds were observed during the 1991 winter survey. A bird marked at Bolivar Flats during the winter of 1984–1985 returned for the seventh consecutive year. Such winter site fidelity corresponds with findings in coastal Alabama (Johnson and Baldassarre 1988). Three plovers marked originally in North Dakota were observed south of the Mansfield Pass in Willacy County. Two of these could be positively identified: one adult marked 8 June 1985 on Pelican Lake, and one chick marked 10 July 1985 on the Missouri River. The third bird, while retaining the combination of a black band above a green flag on the left leg indicative of birds banded in North Dakota, lacked two of the three color bands on the right leg that would have allowed identification. Two birds reported with white flags in Matagorda and Calhoun counties were banded in Prairie Canada. One bird reported in Cameron County with a light blue flag was likely banded in Nebraska or South Dakota. The origins of the remaining marked birds could not be ascertained.

Three plovers with leg injuries were observed. Two unbanded plovers, each missing one leg, were seen in Nueces County. One plover with an obvious band trauma was observed in Cameron County. The foot was missing from a darkened and swollen right leg. A light or dark blue color band remained immediately above the stub of the missing foot. The left leg appeared unbanded and uninjured.

The 1905 Piping Plovers counted in Texas during the winter survey represent 55% of the total number of plovers recorded by the international census (Haig

and Plissner 1993). The five most significant sites identified by the survey were in Texas. After Texas, the only states with winter totals exceeding 100 plovers were Louisiana with 750 and Florida with 551. The 3,234 plovers found wintering around the Gulf of Mexico contrasted dramatically with the 218 found along the U.S. Atlantic and in the Caribbean. Most Atlantic breeding birds appear to winter further south on the Atlantic but some cross over to the Gulf (Haig and Plissner 1993). The 218 plovers counted along the Atlantic accounts for only 11% of the estimated 1991 Atlantic breeding population (Haig and Plissner 1993). Over 75% of the plovers observed during the winter census were located along the Gulf coasts of Louisiana, Texas, and Mexico. Perhaps the influx of plovers in late October and early November into the upper Texas coast may partially consist of Atlantic birds wandering west along the northern coast of the Gulf of Mexico.

Most importantly, the census further clarified the complex mosaic of habitats utilized by the species in Texas. For example, the survey revealed the importance of south Texas algal flats to Piping Plovers. Pulich and Rabalais (1986) stated that tidal flats comprise "the entire leeward barrier island intertidal zone and cover hundreds of km^2" in the Laguna Madre in Texas. They further estimated that blue-green algal mats cover thousands of hectares of these tidal flats. Aerial surveys of the Laguna Madre de Tamaulipas in northern Mexico, conducted by myself with Andres Sada in early July 1990, divulged similar expanses of algal flats. The combination of a defined movement of migrants along the Texas coast, and the abundance of suitable, yet unsurveyed, habitat in south Texas and northern Mexico, suggests that significant numbers of Piping Plovers remain to be discovered in these isolated areas.

Summary and Conclusion

Over 50% of the remaining Piping Plovers in the world reside along the coast of Texas for nearly 75% of their lives. The range of habitats utilized by the species in Texas is more complex than thought previously. Further research is needed into the wintering ecology of the species in Texas, the array of habitats required by a single plover throughout the winter season, the dynamics of migration along the coasts of Texas and northern Mexico, and the possibility that the influx of birds in October may represent some migrants from the Atlantic population.

Acknowledgments

I would like to express my appreciation to all of the Texas volunteers in the 1991 Piping Plover winter survey who braved inclement weather and interminable miles of muck to complete the project. I would also like to thank Dr. Keith Arnold, Dr. Susan Haig, and Dr. Mark Ryan for their helpful comments and criticisms of this paper. Finally, I would like to extend my thanks and support to Curt Zonick, whose current work on the wintering ecology of the Piping Plover in Texas will hopefully answer many of the important questions that challenge our abilities to save this marvelous bird from extinction.

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SHORT COMMUNICATIONS

First Specimen of Clark's Grebe for Texas: an Environmental Casualty

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The American Ornithologists' Union (1985) recognized the separation of the "light" morph of *Aechmophorus occidentalis,* now known as Clark's Grebe (*A. clarkii*), based on the work of Ratti (1979) and others. *A. clarkii* occurs as a regular winter visitor in the Trans-Pecos region of Texas. Lockwood (1992 [1994]) reviewed the status of the two *Aechmophorus* grebes in Texas, and reported on the first nesting of the genus for the state, a successful mating between the two species at Balmorhea Lake in Reeves county. Until 1993, all records for the Clark's Grebe were for the Trans-Pecos region. A single, well described Clark's Grebe found on the 1993 Waco CBC (McLennan County) represented the first record of this species outside the Trans-Pecos.

All previous specimens of *Aechmophorus* for Texas have been of *A. occidentalis,* the Western Grebe. Here I report on the first specimen of *A. clarkii* for Texas, with remarks on the cause of its death.

The single bird first appeared on 5 December 1993 at a caliche pit in Midland County, known locally as "gallinule pond." Joann and Don Merritt discovered the bird; Joann observed the bird on several occasions, including one time when the grebe surfaced with a fish in its bill. On 12 December the bird died. L. E. Grimes was present and gave this report:

> I went to see if the Clark's Grebe was still in the pit on the afternoon of December 12. When I saw it, it was almost on the shore, underneath some overhanging limbs of salt cedar. It was pecking at the "leaves" of the salt cedar and had some in its mouth. It was so close I went back to the car to get my camera. I was gone about three minutes. When I returned, the grebe was belly-up in the water, its head under water and its feet waving feebly. I pulled it from the water and laid it on the shore, but it died within a few minutes. I took the bird to the Merritt's home (they live nearby) where they placed it in plastic sacks and put it in their freezer. We called the Sibley Environmental Center, for the Director of the Center has a salvage permit.

That same day, I received a call form J. C. Henderson, alerting me of the specimen. I arranged to have a student from this department pick up the specimen and bring it to me. Shortly after I received the specimen, I prepared it as a standard

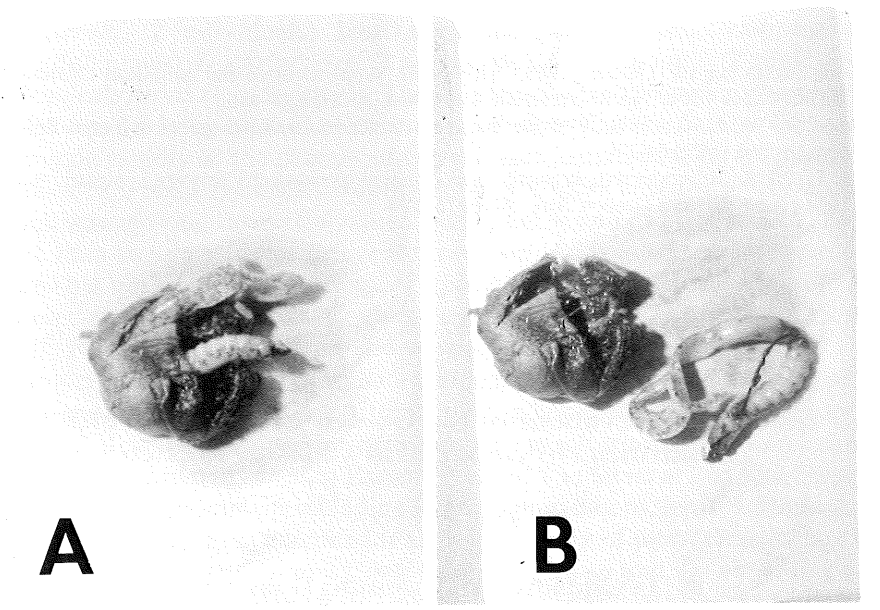

Fig. 1. A. Position of the lure in the gizzard. B. Close-up of the "Culprit Worm" lure.

study skin and gave the carcass to Dr. Norman Dronen of this department for inspection for internal parasites. During his examination for endoparasites, Dr. Dronen found a plastic fish lure lodged in the opening between the gizzard and the small intestine (Fig. 1). As indicated by the lack of fat and emaciated condition of the breast muscles, the bird had obviously starved to death. Two computer searches, one extending back to 1970, failed to locate any references to a fishing lure as the cause of mortality for any bird.

Howard Elder, a fisheries graduate student in our department, identified the lure as a "Culprit Worm;" in this case, a most appropriate name. In use, the hook remains *inside* the lure until the fish bites down on it; the hook then is forced to the outside of the lure and lodges in the mouth or stomach of the fish. Apparently, the grebe swallowed the lure—no fishing line was attached to the lure—and the force of the gizzard caused the hook to exit the plastic and embed in the wall of the gizzard. With the opening into the small intestine blocked, no food could pass into the remainder of the digestive tract and the bird died of starvation. Whether the lure broke free from a fishing line or was carelessly tossed into the pond remains unknown; I consider it unlikely that the grebe took the lure from a line, as the hook likely would have embedded in the mouth or esophagus of the bird.

The specimen, a female, has been deposited in the Texas Cooperative Wildlife Collections as no. 13016.

I thank Frances Williams for supplying the remarks of those who discovered the bird, observed its behavior, and salvaged the grebe. J. C. Henderson arranged for the safe transfer of the bird into my possession. L. E. Grimes and Joann Merritt deserve credit for preserving the specimen after its demise. Norm Dronen called my attention to the unusual cause of death and Howard Elder identified the "culprit." Two reviewers made important suggestions to improve the manuscript.

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Recent Observations of the Golden-cheeked Warbler (*Dendroica chrysoparia*) in Chiapas, Mexico

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Despite one published report of two sightings of Golden-cheeked Warblers (*Dendroica chrysoparia*) in southern Mexico in January, 1978 and January, 1983 (Braun et al. 1986), there has been continued doubt about whether the species actually spends the winter months in Mexico or only migrates through Mexico on its way to areas farther south (Pulich 1976; Pulich, pers. comm. 1992). There have been sightings of the species in Chiapas by F. Martin, R. and M. Adams, R. Greenberg, R. M. Vidal and others, although as of the date of this report none of these observations have been published. I herein report two additional sightings of Golden-cheeked Warblers in southern Mexico in mid-December 1992.

I was guided to two sites near San Cristóbal de las Casas (16°44′N, 92°38′W) by F. Martin of the Zoológico Miguel Alvarez del Toro in Tuxtla Gutiérrez, Chiapas. On 11 December 1992 we visited the first site, the Parque Nacional Rancho Nuevo/Grutas de San Cristóbal de las Casas, which is located approximately ten kilometers southwest of the city. On 13 December 1992 we visited the second site, San José Huitepec, a communal farm area located approximately nine kilometers west of San Cristóbal de las Casas. Both sites are located at an elevation of approximately 2,300 meters. Lyons and Martin identified one Golden-cheeked Warbler at each site, using, respectively, Zeiss 10 × 40B and Leitz 7 × 42 binoculars. Viewing conditions on both days were excellent.

The first sighting was made at 1540 hours when a mixed species flock was foraging in a 15-meter tall oak (*Quercus laurentina*) on a hillside facing southwest. The hillside was well illuminated in late afternoon sunlight. This particular hillside is within an extremely tall (30–40 meter) pine forest (*Pinus oocarpa* and other species) with an open understory and parklike appearance. We had observed most of the bird species in the flock sporadically throughout the day in various other areas within the park. Species included the following: *Melanerpes formicivorous* (several individuals), *Mitrephanes phaeocercus* (3 individuals), *Lepidocolaptes affinis* (3 individuals), *Empidonax* sp. (probably *E. minimus*) (1 individual), *Po-*

lioptila caerulea (2 individuals), *Vireo solitarius* (1 adult male), *Dendroica townsendi* (3 adult males), *D. chrysoparia* (1 adult male), *D. occidentalis* (2 adult males), *Cardellina rubrifrons* (1 individual). The Golden-cheeked Warbler was seen and identified separately by both of us from two different vantage points. We saw the bird foraging rapidly in the canopy of the oak and identified it by its pure white belly, black cap, black back and prominent black eyeline crossing a yellow cheek. The flock was moving through the area very quickly and did not stay in the oak for more than twelve minutes before it moved on. Additional species seen in the same area but not within this particular flock included: *Hylocharis leucotis, Trogon mexicanus, Contopus pertinax, Cyanocitta stelleri, Turdus rufitorques, Catharus ustulatus, Peucedramus taeniatus, Junco phaeonotus.*

The second sighting of an adult male Golden-cheeked Warbler occurred at San José Huitepec on 13 December. After dense fog began to lift at 0930 hours, we hiked uphill through a forested area which was much more humid and shorter than the pine-dominated forest of Rancho Nuevo. The forest at San José Huitepec contained a heavy understory including *Salvia* spp. in bloom, ferns, various shrubby plants, many blooming bromeliads as well as a mix of pine (*Pinus chiapensis, P. ochotorenai* and other species), oak (*Quercus rugosa* and *Q. laurentina*) and madrone (*Arbutus xalapensis*). Bird activity in this area was high. At 1105 hours we saw an adult male Golden-cheeked Warbler foraging with a large mixed flock. The location was approximately 1,500 meters from the roadside entrance to the forest and the elevation was approximately 2,340 meters. The bird was in good view during five minutes, then became hidden in the vegetation for a few minutes before it reappeared briefly. It then moved on rapidly and we lost sight of it. We stayed in the area for approximately 40 minutes but saw no other Golden-cheeked Warblers and no other similar mixed flock. The bird that was observed here stayed in the upper canopy of a mature madrone approximately 9 meters tall. Although there were many oaks and pines as well as numerous madrones in the vicinity, the warbler stayed in the same madrone while we were observing it. Since many Golden-cheeked Warblers have been banded on their breeding grounds, a conscious attempt was made to look for leg bands on this bird, but neither observer saw any bands. The bird made no vocalizations and had no visible interactions with other birds. Various other species of birds moved through this area during the time we were present, including: *Trogon mexicanus* (2 males and 1 female), *Colaptes cafer* (3 individuals), *Melanerpes formicivorous* (3 individuals), *Mitrephanes phaeocercus* (3 individuals, *Empidonax* sp. (1 individual), *Campylorhynchus zonatus* (total of 6 birds in a group), *Parula superciliosa* (1 adult male), *Peucedramus taeniatus* (1 male and 1 female), *Dendroica townsendi* (3 adult males and 1 immature), *D. occidentalis* (1 adult male and 1 female), *Wilsonia pusilla* (1 adult male), *Cardellina rubrifrons* (2 adult males), *Piranga flava* (1 adult male), *Pheucticus ludovicianus* (2 immature males). When we returned later, at 1315 hours, to the exact site, no birds were seen or heard in the area, although one *Melanerpes formicivorous* was heard (and later seen) a short distance away.

From this and other published and unpublished records it is apparent that Golden-cheeked Warblers do overwinter in Chiapas. However, additional work is needed to analyze the habitat and species assemblages of the species' winter home in Mexico. Presence and abundance in countries farther south should also be determined.

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NOTES AND NEWS

Information for Contributors

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Manuscripts, including tables, should be typed and double-spaced on one side of 8½ × 11 inch (22 × 28 cm) white paper. Allow 3 cm margins on all sides. Manuscripts may be printed using a high-resolution dot-matrix or letter-quality printer. The last name of the first author must be at the top of each page of the manuscript and on the back of every figure. Submitted articles should follow the format observed in this and subsequent issues of the *Bulletin of the Texas Ornithological Society.* Feature articles should include an abstract and a "Literature Cited" section. Short Communications do not need an abstract.

Scientific and common names of North American birds must follow the 1983 A.O.U. Check-list and supplements. The 24-hour clock (0730), the continental dating convention (3 January 1989), and the metric system should be used.

Submit an original and two complete copies of the manuscript. Each manuscript will be subject to editing and will normally be reviewed by at least two persons who are knowledgeable in the subject. The reviewers will provide the editor with advice on the article's acceptability and accuracy. If the article passes review and is correct in form, it will be scheduled for publication. A voluntary page charge of $35 per printed page will be assessed. Payment of complete page charges will normally result in earlier publication. Accepted articles will be published on a "space available" basis if the page charges are not paid. Authors will be sent proofs of their articles prior to the final printing; information on ordering reprints will be supplied at that time.

Articles, reports and other items submitted for inclusion in the *Bulletin* should be sent to the editor, Karen L. P. Benson, Department of Wildlife & Fisheries Sciences, Texas A&M University, College Station, Texas 77843-2258.

ARTISTS.—The *Bulletin* encourages submission of original artwork and photographs of Texas birds to be used on the inside front cover of the publication. Send art and photos to Karen L. P. Benson, Department of Wildlife & Fisheries Sciences, Texas A&M University, College Station, Texas 77843-2258.

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NEWS ITEM

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BULLETIN
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