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Timothy Brush
The University of Texas Rio Grande Valley

Mark H. Conway

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SUBSPECIFIC AND BREEDING STATUS OF THE COMMON YELLOWTHROAT (*GEOTHLYPIS TRICHAS*) AT SANTA ANA NATIONAL WILDLIFE REFUGE, HIDALGO COUNTY, TEXAS

TIMOTHY BRUSH* AND MARK H. CONWAY

Department of Biology, University of Texas Rio Grande Valley, 1201 West University Drive, Edinburg, TX 78539 (TB)
Lower Rio Grande Valley Avian Research, 2106 Emerald Lake Drive, Harlingen, TX 78550 (MHC)
**Correspondent: timothy.brush@utrgv.edu*

ABSTRACT—We confirmed the breeding of the Common Yellowthroat (*Geothlypis trichas*) during 2008–2015 at Santa Ana National Wildlife Refuge and presented measurement evidence that individuals belong to the Brownsville Common Yellowthroat, *Geothlypis trichas insperata*. This expands the known breeding distribution for this rare and local subspecies.

RESUMEN—Se confirmó la reproducción de la mascarita común (*Geothlypis trichas*) durante 2008-2015 en Santa Ana National Wildlife Refuge y se presentaron pruebas de medición que indican que los individuos pertenecen a la subespecie de mascarita común, *Geothlypis trichas insperata*. Esta información expande la distribución de reproducción conocida de esta subespecie rara y local.

The Common Yellowthroat (*Geothlypis trichas*) is a bird species breeding in wetlands across much of North America (Zink and Klicka, 1990; Guzy and Ritchison, 1999). Lockwood and Freeman (2014) list four subspecies breeding in Texas. One of these is the Brownsville Common Yellowthroat (*Geothlypis trichas insperata*), a sedentary subspecies endemic to the Lower Rio Grande Valley of Texas and adjacent Mexico (Oberholser, 1974). In 1908, before the subspecies was described, Frank B. Armstrong collected a female still in juvenile plumage across the Rio Grande in Matamoros, Tamaulipas, Mexico (Phillips, 1911). The subspecies was described from seven specimens, including two in juvenile plumage, taken in 1930 by H. H. Kimball downstream from Brownsville (Van Tyne, 1933). Klicka (1994) confirmed breeding of this subspecies in moist resaca (old river channel) habitats dominated by grasses (*Paspalum* sp.) with scattered shrubs (*Mimosa pigra*, *Salix exigua*, *Baccharis neglecta*) or reeds (*Arundo donax* or *Phragmites communis*; scientific names of plants from Richardson and King, 2011). He estimated a population of 100–150 breeding pairs in southern Cameron County but did not find any breeding birds in Hidalgo or Starr counties. Klicka (1994) expressed concern about the conservation status of the subspecies, given its small range and limited habitat under threat of development.

Between 1991 and 2002, Brush (2005) found a population of five or more territories of Common Yellowthroats during the breeding season at Santa Ana National Wildlife Refuge (26°04′24″N, 98°08′58″W, 23–40 m elevation; hereafter, Santa Ana NWR) and smaller numbers at other locations in Hidalgo County, Texas. Brush (2005) suspected that the Santa Ana NWR birds might belong to *Geothlypis trichas chryseola*, which occurs upriver along the Rio Grande in Texas and the remaining U.S.-Mexico border region (Oberholser, 1974; Lockwood and Freeman, 2014), given different song types and their use of cattail (*Typha domingensis*)-dominated marsh habitat. Roy et al. (2013) performed a genetic study in May–August 2008 and 2009 and concluded that a freely dispersing population of Brownsville Common Yellowthroats occurred at their 10 sites in Cameron County and also Santa Ana NWR (Hidalgo County). We used bird banding to determine the subspecific identity and current breeding status of Common Yellowthroats at Santa Ana NWR.

We captured and banded Common Yellowthroats during the breeding seasons of 2008–2015 and report here on banding conducted from June through early

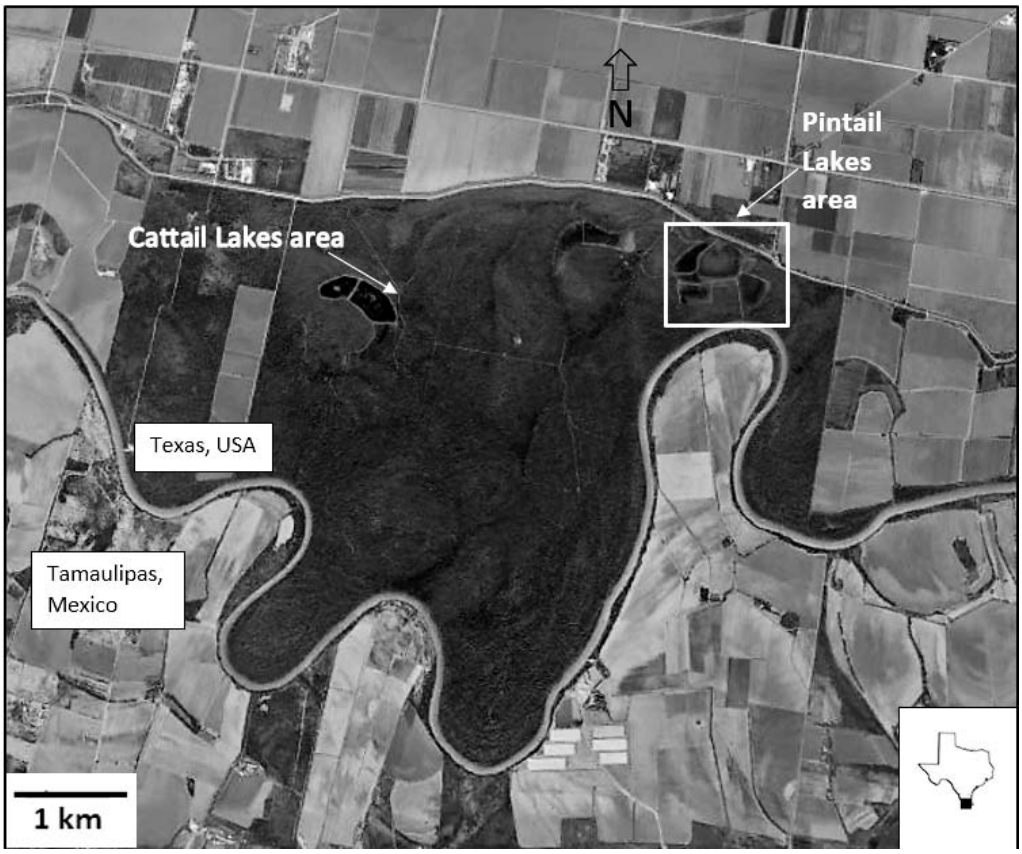

FIG. 1—Santa Ana National Wildlife Refuge, Hidalgo County, Texas, showing our main location in the Pintail Lakes area where Common Yellowthroats were banded during breeding seasons of 2008–2015 and the secondary banding location in the Cattail Lakes area.

August when only breeding birds should be present. Nearly all banding was done in the Pintail Lakes section of Santa Ana NWR because this area supported the largest numbers of Common Yellowthroat territories (TB, pers. obser.; Fig. 1). Approximately 50% of the 26.1 ha making up the Pintail Lakes section contained emergent marsh habitat dominated by cattail and bulrush (*Scirpus* species) due to varying amounts of rainfall in the region and differing management practices. In particular, prolonged high water in 2010 limited our access to Pintail Lakes and removed most vegetation from those wetland units. As a result, in 2011 we banded at Cattail Lakes, where a limited amount of wetland vegetation dominated by smartweed (*Persicaria pensylvanica*) and golden-fruited dock (*Rumex chrysocarpus*) was used by yellowthroats. By 2012, wetland vegetation and yellowthroats returned to Pintail Lakes, so we resumed banding there through 2015.

MHC did the banding, assisted by 2–4 people using nylon mist nets with 30-mm mesh. Most nets were placed parallel to the shoreline but some were placed within the wetland vegetation if conditions allowed. All birds (with a few exceptions due to escapes) were banded with standard U. S. Fish and Wildlife Service aluminum bands and released after morphological data were recorded. We banded from sunrise to approximately 1030h to assure safe conditions for the captured birds. We measured wing length, tail length, bill dimensions, lengths of selected toes, presence of brood patches or cloacal protuberances, and estimated feather wear. We also recorded other measurements such as primary 9 minus primary 4 (p9 − p4; thought to be crucial for determining subspecific identity), bill color (indicative of breeding status in males), and coloration of plumage areas suggested by Van Tyne (1933), Klicka (1994), and Pyle (1997) as means of distinguishing subspecies.

We captured 61 yellowthroats at Santa Ana during June–early August 2008–2015 (Table 1). Numbers of birds captured annually varied from 2–15 depending on habitat conditions and banding intensity. Habitats where birds were captured varied from cattail-dominated to mixed herbaceous wetlands. We banded 24 adult males, 45.8% of which had cloacal protuberances (one escaped before all observations were made). We banded 12 adult females, 11 of which had brood patches (one of these contained an unlaid egg in her lower abdominal region when banded). We caught 25 juveniles, with a peak of 10 in 2012 (40% of the total; Table 1). We estimated that more than five territorial males were present at Pintail Lakes in all years except 2010 and 2011 (TB, pers. obser.).

T-tests of measurement variables revealed significant

TABLE 1—Banding effort and numbers of adult (male, female) and juvenile (unsexed) Common Yellowthroats banded at Santa Ana National Wildlife Refuge during breeding seasons of 2008–2015.

Year	Banding days	Net hours	Adults, *n* (M,F)	Juveniles	Total
2008	4	105.0	7 (4, 3)	2	9
2009	5	127.0	10 (8, 2)	3	13
2010	3	77.8	2 (0, 2)	0	2
2011	4	92.5	1 (1, 0)	2	3
2012	6	111.0	5 (4, 1)	10	15
2013	3	43.5	6 (3, 3)	4	10
2014	3	56.2	3 (2, 1)	0	3
2015	2	40.0	2 (2, 0)	4	6
Total	30	653.0	36 (24, 12)	25	61

variation between adults and juveniles only for p9 − p4 and bill length (Table 2). In juveniles, p9 averaged 2.16 mm shorter than p4. This was a greater difference than among adults, in which p9 averaged only 0.82 mm shorter than p4. Twenty-two adults had obvious wear to p4 whereas four adults had obvious wear to p9 and p4. One juvenile had incomplete development of p4. Bill length (culmen) was 0.39 mm longer in adults than in juveniles.

Plumage coloration varies among subspecies, but we found it difficult to rigorously assign shades of color that might be useful in determining subspecies. However, we did find that the frontal band was whitish in all but two individuals. An adult male banded on 9 June 2012 was noted as having extensively yellow underparts and had a yellowish tinge in his postfrontal bar, both suggestive of *G. t. chryseola*. Unfortunately, p4 was broken on both sides, so we could not get a measurement of p9 − p4.

We found evidence that Common Yellowthroats were breeding at Santa Ana NWR during our study, given the presence of brood patches in nearly all females, cloacal protuberances in almost half the males, and the capture of 25 juveniles. We did not look for nests but suspect that they were low in wetland vegetation, as Klicka (1994) and other studies (summarized in Guzy and Ritchison, 1999) have found. Despite the 2010 floods, which temporarily cleared most of the wetland vegetation from our Pintail Lakes study area, yellowthroats responded favorably when the vegetation returned, consistent with the genetic evidence for frequent dispersal between wetlands in the Lower Rio Grande Valley (Roy et al., 2013).

Several measurements and other observations suggest that the Brownsville Common Yellowthroat is the subspecies breeding at Santa Ana NWR. The fact that p9 was significantly shorter than p4 strongly suggests that this population is not *G. t. chryseola*, in which p9 is 0–4 mm longer than p4 (Pyle, 1997). A smaller sample of birds banded by MHC in 2013–2016 at The Nature Conservancy's Lennox Southmost Preserve in Cameron County, where *G. t. insperata* is known to nest (Klicka, 1994), showed similar p9 − p4 values: adults averaged −0.70 mm ($n = 10$) and juveniles −2.0 mm ($n = 4$). Similarly, the wing lengths of the birds from Santa Ana NWR, averaging ~53 mm, are closer to the *G. t. insperata* average of ~55 than to the *G. t. chryseola* average of ~58 mm. Finally, the average outer tail-feather length of ~45 mm for the birds from Santa Ana NWR is closer to the *G. t. insperata* average of ~44 mm than to the *G. t. chryseola* average of ~48 mm (Oberholser, 1974; Klicka, 1994).

It is encouraging that Brownsville Common Yellow-

TABLE 2—Morphological measurements (mm) of Common Yellowthroats banded at Santa Ana NWR, Hidalgo County, Texas, during breeding season in June–August 2008–2015. Data are presented as mean ± *SD* (*n*). Birds were classified as juveniles (in their first year) or adults (in their second year or later). Overall means are presented if there was no significant difference between age classes; otherwise, the *P*-value of the adult-juvenile *t*-test comparison is shown.

Measurement	Adults	Juveniles	Overall
Wing length (chord)	53.70 ± 2.12 (34)	52.68 ± 2.04 (25)	53.20 ± 2.20 (59)
Tail	49.12 ± 3.09 (24)	50.65 ± 2.25 (23)	49.87 + 2.76 (47)
Primary 9 − primary 4	−0.82 ± 0.80 (32)	−2.16 ± 0.94 (22)	$P < 0.0001$
Outermost tail feather	44.04 ± 3.39 (23)	45.78 ± 2.50 (23)	44.91 ± 3.08 (46)
Bill length (culmen)	11.99 ± 0.55 (35)	11.60 ± 0.52 (24)	$P < 0.0086$
Nares to tip	8.43 ± 0.47 (35)	8.18 ± 0.54 (24)	8.33 ± 0.51 (59)
Bill width	3.31 ± 0.27 (35)	3.31 ± 0.39 (23)	3.31 ± 0.32 (58)
Bill depth	3.56 ± 0.22 (35)	3.50 ± 0.26 (23)	3.54 ± 0.23 (58)
Tarsus length	21.89 ± 1.13 (35)	21.31 ± 1.12 (24)	21.65 ± 1.15 (59)
Hind toe with claw	12.31 ± 1.05 (35)	12.48 ± 1.24 (24)	12.38 ± 1.12 (59)
Hind toe without claw	7.73 ± 0.53 (30)	7.56 ± 0.62 (22)	7.66 ± 0.57 (52)

throats breed in Hidalgo County as well as Cameron County, but small populations and threats to wetland habitat such as urbanization and limited water availability in the Lower Rio Grande Valley warrant continued concern. Current wetland tracts in Hidalgo County are small, ranging from 1–5 ha up to a few of ~40 ha, and many are maintained only by active management (U. S. Fish and Wildlife Service, 2016). Surveys of remnant wetlands in Hidalgo County suggest that the only other population of more than five pairs is in the cattail-dominated wetland at Delta Lake County Park, 41 km NNE of Santa Ana NWR (TB, pers. obser.). In Cameron County, only the Sabal Palm Sanctuary and the Lennox Southmost Preserve are known to support similar numbers. Coastal wetlands such as those along the Laguna Madre in eastern Cameron County are often large, but there is no evidence yet that Common Yellowthroats breed in these brackish and saline wetlands (Brush, 2005). We suggest a long-term monitoring program throughout freshwater wetlands of the Lower Rio Grande Valley, to detect future population changes, as well as banding studies of Common Yellowthroats farther upstream along the Rio Grande to determine range limits for the subspecies.

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SPATIAL VARIATION OF PARASITE INFRACOMMUNITIES IN THE AMERICAN ALLIGATOR (*ALLIGATOR MISSISSIPPIENSIS*)

Helen Sung and Marisa Tellez*

Department of Ecology and Evolutionary Biology, University of California, Los Angeles, Los Angeles, CA 90095 (HS)
Marine Science Institute, University of Santa Barbara, Santa Barbara, CA 93106 (MT)
**Correspondent: marisa.tellez@ucsb.edu*

Abstract—Parasites were harvested from lungs and gastrointestinal tracts of *Alligator mississippiensis* from Texas. We compared our results with previous parasitism findings from alligators harvested in 2011 in Louisiana and Florida. Florida alligators exhibited the greatest pentastomid prevalence and mean intensity and illustrated higher stomach prevalence and intensity than other locations. Prevalence and mean intestinal parasitism of western Louisiana alligators differed significantly from other locations. Collectively, 14 species of trematodes and 7 species of nematodes were identified among Texas, Louisiana, and Florida. Differences in