

# 2019 Golden-cheeked Warbler Report

Westcave Preserve
Travis County, Texas

Prepared by: Dawn Houston, Westcave Preserve
Prepared for: LCRA Natural Resource Conservation

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# Introduction

Westcave Preserve is a 76-acre preserve owned by the Lower Colorado River Authority (LCRA) and operated by the non-profit Westcave Outdoor Discovery Center. A portion of Westcave Preserve is part of the greater Balcones Canyonlands Preserve System, which was established and is operated by the Balcones Canyonlands Conservation Plan (BCCP), a regional multispecies habitat conservation plan, involving multiple governing entities, including LCRA. The BCCP also serves as a vehicle for U.S. Fish and Wildlife Service (USFWS) to issue permits to these entities under Section 10(a)(1)(B) of the Endangered Species Act.

Westcave Preserve is located near the western boundary of Travis County on Hamilton Pool Road, along the western bank of the Pedernales River. Originally, the preserve consisted of the 28.85 acres of high quality breeding habitat for the endangered Golden-cheeked Warbler (*Setophaga chrysoparia*) (GCWA). In 2008 and 2011, additional acreage surrounding the original property was purchased to serve as a buffer to protect water quality and expand the area of the preserve.

## Purpose

The purpose of this report is to present the findings of the 2019 Golden-cheeked Warbler survey at Westcave Preserve. The overall goal of this effort is to track the status of GCWA over time with specific goals to determine density and productivity for each survey year.

Territory mapping surveys were conducted encompassing the entire preserve as one survey unit, allowing a continuum of habitat use designation. LCRA previously conducted presence/absence surveys, dividing the original portion of the property, designated as the “preserve” and the recently acquired tract, designated as the “uplands”.

Survey methodology followed territory mapping protocol (Williamson 1964; Marchant 1983; Bibby, et al. 2000) where all breeding GCWA males were identified and territory boundaries were determined. This survey methodology adheres to and surpasses the USFWS recommended minimum procedures for determining the presence/absence of Golden-cheeked Warblers outlined in LCRAs federal Fish and Wildlife permit (Permit No. TE800900-0, issued 5 April 2011) and USFWS Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys and Habitat Assessments for Endangered Golden-cheeked Warblers (FWS 2010). In addition, opportunistic detections were recorded when staff encountered a GCWA during daily activities. Territory mapping will enable Westcave Preserve to monitor populations long-term and provide guidance for future land management decisions.

## Golden-cheeked Warbler Life History Summary

**Description**: The GCWA is a medium-sized (approx. 12-13 centimeters [cm] length) insectivorous passerine. Breeding adult males have black on the forehead, crown, nape, and back. The cheeks are a bright golden yellow, interrupted by a black eyeline. The throat and upper breast are black, which continues as streaking along the sides and flanks. The remaining underparts are white. The wings are black with two distinct white wing-bars. Adult females are similar in coloration, but are comparatively duller; the crown and back are olive-green with some black streaking (Oberholser 1974, Pulich 1976, Ladd and Gass 1999).

**Range**: The GCWA is the only bird species with a breeding range confined to Texas, specifically isolated to south-central areas of the state. Historically, this species nested in approximately 41 of Texas' 254 counties; however, current confirmed breeding records are restricted to 33 Texas counties (Pulich 1976, USFWS 1995, Ladd and Gass 1999, Lockwood and Freeman 2014). Currently, the species is found from Young and Palo Pinto counties, south through the eastern and south-central parts of the Edwards Plateau to Edwards and Kinney counties, and Val Verde County (Lockwood and Freeman 2014, USFWS 2013). GCWAs winter in pine and pine-oak woodlands in the highlands of southern Mexico, Guatemala, Honduras, Nicaragua and is a rare visitor to Costa Rica, Panama, and the western edge of Belize (Ladd and Gass 1999, James and Komar 2006, Avibase 2016).

**Habitat**: GCWA habitat consists of old-growth and mature regrowth juniper-oak woodlands with a high percentage of canopy cover in limestone hills and canyons on Central Texas (Pulich 1976, Ladd 1985, Wahlet al. 1990, USFWS 1992).

An essential component for GCWA breeding habitat, however, is Ashe Juniper. When mature, Ashe Junipers develop shredding strips of bark used by GCWA's as the primary nesting substrate (Pulich 1976, Kroll 1980 and Gass 1999).

The woodlands also consist of various species of oaks (*Quercus* spp.), such as Texas red oak (*Quercus buckleyi*) and plateau live oak (*Quercus fusiformis*). Other common tree species throughout nesting range include cedar elm (*Ulmus crassifolia*), walnut (*Juglans* spp.), hackberry (*Celtis* spp.), and Texas ash (*Fraxinus texensis*); less common tree species are escarpment black cherry (*Prunus serotina*), sycamore (*Platanus occidentalis*), American elm (*U. americana*), coma (*Bumelia lanuginosa*), redbud (*Cercis canadensis*), and rough-leaf dogwood (*Cornus drummondii*). Common undergrowth shrubs are Texas persimmon (*Diospyros texana*), agarito (*Berberis trifoliolata*), elbow bush (*Forestiera pubescens*), Texas mountain laurel (*Sophora secundiflora*), possum-haw (*Ilex decidua*), evergreen sumac (*Rhus virens*), and polecat bush (*R. aromatic* (Ladd 1985, Sexton 1987, Bearmore 1994).

On wintering grounds, GCWAs select for pine-oak woodlands that are ≥1,100 m in

elevation. (Monroe 1968, Rappole et al. 2000).

**Status**: On 4 May 1990, USFWS published an emergency listing of the GCWA as endangered (55 FR 18844), as well as a proposed rule to formally list the GCWA as endangered. On 27 December 1990, the USFWS published the final rule for listing as endangered (55 FR 53153). In 2015 a petition was submitted to USFWS to delist the GCWA from the Endangered Species Act. USFWS found the petition did not present substantial information that warranted delisting the GCWA and declared it would take no further action on the petition. The Texas Parks and Wildlife Department (TPWD) also lists the species as endangered. No critical habitat has been designated for the species.

**Threats**: Species endemism and habitat loss due to agricultural use, brush control and land development are the primary threats to GCWA viability and have been the major factors attributed to population declines (Wahl et al. 1990, FWS 1992, Ladd and Gass 1999). Indirect effects of habitat disturbance, such as Brown-headed Cowbird parasitism and increased predator populations, have further negatively impacted populations (Wahl et al 1990). Environmental factors such as climate change and drought may contribute to Ashe juniper die-off effecting essential breeding habitat components.

## Study Area

Due to the relatively small size of Westcave Preserve, the survey area includes the entire preserve with emphasize placed on breeding habitat along canyon slopes, adjacent woodlands and the abutting uplands.

**Description**: Westcave Preserve is comprised of a unique matrix of habitats found on the Edwards Plateau, supporting a diversity of native and endemic plant and animal species. The Preserve contains native grass and forb prairie, live oak savannah and old growth Ashe juniper-live oak woodlands and features a spring fed creek with a grotto and cave.

Riparian habitat is found surrounding the grotto and along the Heinz Branch Canyon creek bottom with mesic woodlands on adjacent slopes leading to the Pedernales River and following along the river edge. Mature hardwoods such as Bald cypress (*Taxodium distichum*), Sycamore (*Platanus occidentalis*), cedar elm (*Ulmus crassifolia*) and a various oak sp. (*Quercus sp.*) are found in this area while midstory species consists of Ashe Juniper (*Juniper ashei*), Mountain Laurel (*Sophora secundiflora*), Mexican buckeye (*Ungnadia speciosa)* and oak species. Understory species consists of a diverse plant community, which include, silk tassel (*Garrya ovate)*, American beautyberry (*Callicarpa Americana*) spicebush (*Lindera* benzoin) and redbay (*Persea borbonia*). Extending out from the canyon rims toward the upland area, dense stands of woodlands dominate with mature Ashe Juniper and Escarpment live oak.

The upland portion of the preserve consists of grassland savannah and native grassland/forb prairie. In the grassland savannah areas, Escarpment live oaks (*Quercus fuisformis*) are interspersed with native grasses such as little blue stem (*Schizachyrium scoparium*) and grama species (*Bouteloua sp*). Wildflowers, forbs, yucca species and prickly pear (*Opuntia sp.*) are also found in the open grassy areas. Prairie restoration efforts are currently underway in the upland grassland area south of the creek to promote a diverse growth of native grasses and forbs. In winter of 2016, brush management, prescribed fire and reseeding measures were employed for this project. An additional prescribed burn occurred in October 2019.

## Methods

Territory mapping surveys for GCWAs were performed by avian researcher, Dawn Houston (Federal permit for GCWA surveys: TE42737A) and Westcave Preserve conservation staff, Traci Foulkes and Amber Gosselin. Protocol was followed as described in Bibby *et. al*. 2000. All surveys were completed within the GCWA survey season, 15 March to 1 June, adhering to USFWS survey guidelines. Ten site visits were completed to designate GCWA territories and determine nest success. In addition, all incidental observations from conservation staff were included to supplement survey data. All areas of the preserve were surveyed with an emphasis placed on canyon slopes and adjacent woodlands in the uplands area. All GCWA detections were recorded and corresponding behavior was noted.
In conjunction with territory mapping, the preserve began collaborating with the City of Austin in 2017 in adherence to the long-term monitoring plan to obtain the most accurate estimate of return rates, dispersal and survival of GCWAs on the BCP by color banding territorial males. Audio records of GCWA songs were strategically projected adjacent to mist nets within a specific warbler territory and were used to lure males toward an "intruder" entering the given territory. Upon capture, GCWAs were banded and were visually detected to confirm banding status, color combinations and geographical positioning on a weekly basis. Initial banding took place 12 April, 2019 and resighting continued until the final survey was complete on 30 May 2019.

## Results

**Observations**: Fifty observations were recorded during 10 site visits and incidental observations from Westcave Preserve staff from 21 March to 30 May 2019. Additional data were collected with each observation including, date/time of detection, type of observation, sex and coordinates. Survey efforts hours totaled approximately 35 hours.

*Table 1: Number of Detections per Site Visit*

| **Site Visit Date** | 21 March | 27 March | 29 March | 2 April | 9 April | 12 April | 18 April | 23 April | 27 April | 2 May | 7 May | 14 May | 23 May | 27 May | 28 May | 30 May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Detections** | 2 | 2 | 6 | 3 | 4 | 2 | 2 | 3 | 6 | 2 | 5 | 4 | 1 | 4 | 2 | 2 |

**Territories:** Three territories were established within the preserve during the 2019 breeding season. Territories occupied similar areas to the 2018 breeding season with two territories situated along the eastern slope facing the Pedernales river (T-A and T-B) and one territory occupying the Heinz Branch Canyon (T-C).

**Color Banding/Resighting:** One banded male from 2018 breeding season (dark blue/dark green:white/silver) returned to Westcave Preserve and was first detected 21 March 2019. Although this male occupied Heinz Branch Canyon in 2018, the territory shifted by occupying an area primarily along the river slope.

In collaboration with the City of Austin banding program, banding efforts continued in 2019. On 12 April and 2 May, City of Austin biologist, John Chenoweth color banded the remaining two males which established territories within the preserve. T-A and T-B were resighted during the entirety of the survey season. T-C was last detected 7 May.

*Table 2: Band Color Combination*

| Territory | Band Color Combination<br>Left leg : Right leg | Sex |
|---|---|---|
| T-A | pink/pink:red/silver | Male |
| T-B | dark blue/green:<br>white/silver | Male |
| T-C | White/green:<br>Black/silver | Male |

**Nest/Fledglings**: Although no nests were found by surveyors in 2019, all three territories successfully paired with females, where females were present throughout the entire breeding season. T-B, however, was the only territory with a successful nest producing three fledglings.

On 13 May, the T-A female was observed feeding a Brown-headed Cowbird with no evidence of GCWA fledglings being tended to.

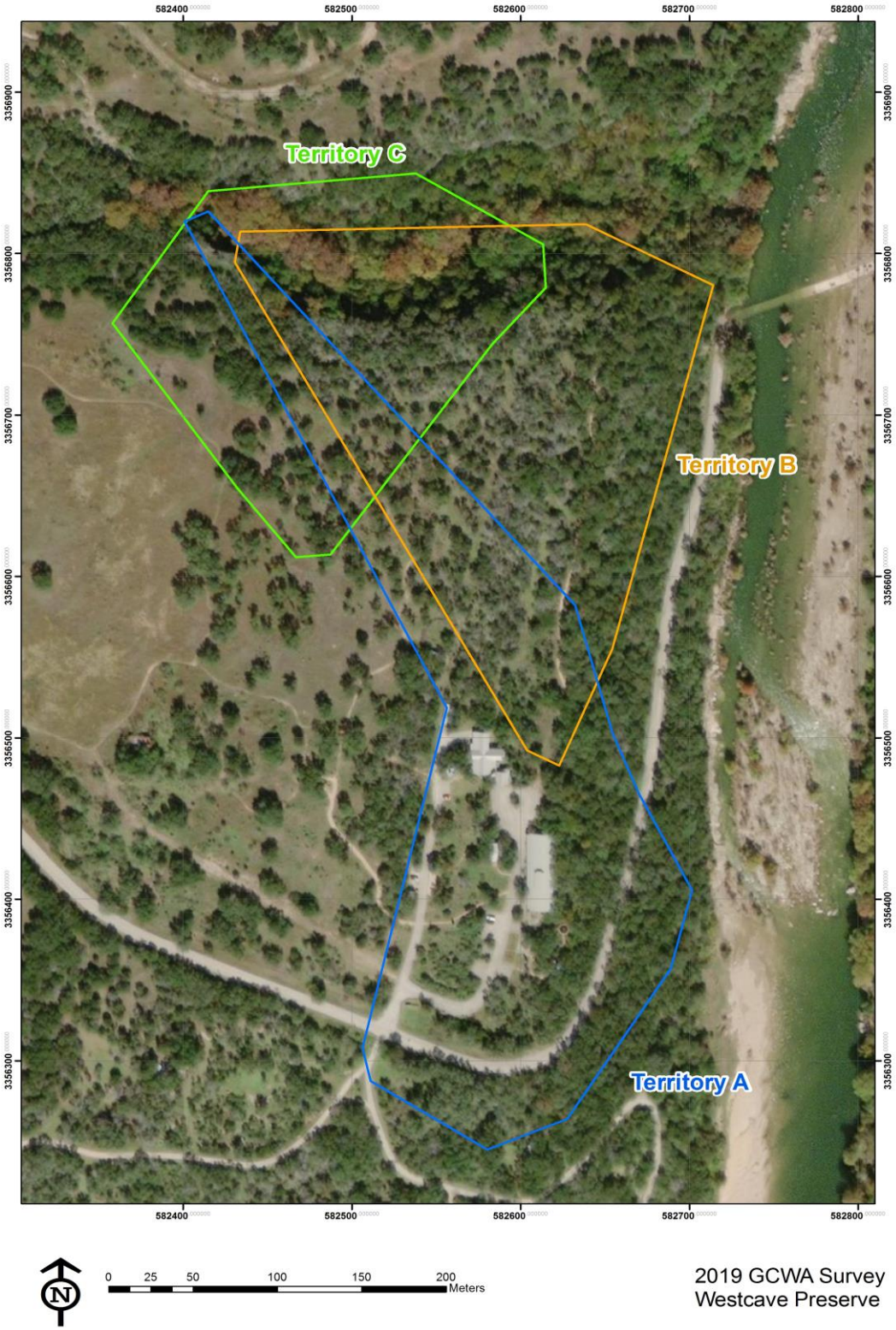



*Figure 1. Golden-cheeked Warbler Territories in 2019*

## Summary

Although suitable GCWA habitat is restricted to a small patch within Westcave Preserve, it continues to provide essential components for successful breeding GCWAs. During the 2019 GCWA breeding season, three territories were established within the study area with one previously banded male returning from the 2018 breeding season. This territory limit of three breeding males may reflect the capacity of the preserve to support GCWAs during breeding season under current vegetative conditions. However, land management efforts are currently allowing regrowth of woody vegetation to expand from the upland woodlands around the canyon into a portion of the upland savannah to allow for more GCWA habitat.

Spatially, males maintained territories similar to previous years, yet, males were observed more frequently in neighboring territories in 2019. This overlap of territories is likely due to increased observation efforts by on sight conservation staff, thereby providing more detailed detection data.

T-A was a successfully paired territory, however, the nest was parasitized with the female tending to a BHCO fledgling toward the end of the breeding season. No evidence of renesting was observed and no GCWA fledglings were detected within this territory.

T-B male was previously banded in 2018 and returned to Westcave Preserve establishing a territory within 50 meters from the previous year. This territory successfully produced three fledglings with the male and female tending to offspring until the end of the survey season.

T-C territory occupied the Heinz Branch Canyon extending from the grotto to Pedernales River. This was a successfully paired territory with the female present throughout the breeding season, however, the male was not observed past 7 May. A more complex vegetation structure within the canyon provides ample cover for the GCWA, reducing visual detections, however, additional survey effort did not result in auditory or visual detections for the remainder of the season.

As with previous survey seasons, the 2019 survey encompassed territory mapping within the preserve. GCWAs continue to establish territories adjacent to property boundaries, interacting with GCWAs found on property. The unbanded male detected on 30 May may be from adjacent land parcels or may be a “floater” male moving through the preserve prior to fall migration.

## Literature Cited

American Ornithologists' Union (AOU). (2016) Check-list of North American Birds. 7th edition, 57th Supplement. *Auk*: *133*: 534-560. Allen Press, Inc. Lawrence.

Beardmore, C. J. (1994). *Habitat use of golden-cheeked warblers in Travis County, Texas* (Doctoral dissertation, Texas A&M University).

Belize bird checklist – Avibase – Bird Checklists of the World. (2016). Retrieved September 11, 2016, from http://avibase.bsc-eoc.org/checklist.jsp?region=bz.

Colin, J. B., Burgess, N. D., & Hill, D. A. (1993). *Bird census techniques*. Academic Press

Fish and Wildlife Service (FWS), U.S. Department of the Interior. (1992). *Golden-cheeked Warbler (Dendroica chyrsoparia) Recovery Plan*. Albuquerque, NM.
——— (1995). *Threatened and endangered species of Texas (Revised*). U.S. Fish and Wildlife Service, Austin, Texas. June 1995.

——— (2010). *USFWS Section 10(a)(1)(A) Scientific permit requirements for conducting presence/absence surveys and habitat assessments for endangered Golden-cheeked Warblers*. U.S. Fish and Wildlife Service, Austin, Texas. Updated 13 January

——— (2013). Species profile: Golden-cheeked Warbler. Available on the internet: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B07W.

Jones, H. L.; Komar, O. (2007). Central America (in The Regional Reports: The Winter Season, December 2006 through February 2007). *North American Birds 61*: 144-148.

Kroll, J. C. (1980). Habitat requirements of the golden-cheeked warbler: management implications. *Journal of Range Management*, 60-65.

Ladd, C., & Gass, L. (1999). Golden-cheeked Warbler (*Dendroica chrysoparia*). *the Birds of North America*, (420), 24.

Lockwood, M. W., & Freeman, B. (2014). *The TOS handbook of Texas birds*(No. 47). Texas A&M University Press.

Oberholser, H. C., Fuertes, L. A., & Kincaid, E. B. (1974). Bird life of Texas.

Pulich, W. M. (1976). *The golden-cheeked warbler: a bioecological study*. Texas Parks and Wildlife Department.

Rappole, J. H., King, D. I., & Leimgruber, P. (2000). Winter habitat and distribution of the endangered golden-cheeked warbler (Dendroica chrysoparia). *Animal Conservation*, *3*(1), 45-59.

Sandoval, L., Sánchez, C., Biamonte, E., Zook, J. R., Sánchez, J. E., Martínez, D., ... & O'Donahoe, J. (2010). Recent records of new and rare bird species in Costa Rica. *Bulletin of the British Ornithologists' Club*, *130*, 237-245.

Sexton, C. (1987) A comparative analysis of urban and native bird populations in central Texas. *Ph.D. Dissertation. U.T. Austin, Texas.*

Wahl, R., Diamond, D. D., & Shaw, D. (1990). The golden-cheeked warbler: a status review. *Prepared for the US Fish and Wildlife Service, Fort Worth, Texas*.

Williamson, K., & Homes, R. C. (1964). Methods and preliminary results of the Common Birds Census, 1962–63. *Bird Study*, *11*(4), 240-256.

# Appendix A: Avian Species Observed During 2019 Survey

| Common Name | Scientific Name |
|---|---|
| Great Blue Heron | *Ardea Herodias* |
| Black Vulture | *Coragyps atratus* |
| Turkey Vulture | *Cathartes aura* |
| Osprey | *Pandion Haliaetus* |
| Mississippi Kite | *Ictinia mississippiensis* |
| Cooper's Hawk | *Accipiter cooperii* |
| Red-tailed Hawk | *Buteo jamaicensis* |
| Red-shouldered Hawk | *Buteo lineatus* |
| Wild Turkey | *Meleagris gallopavo* |
| White-winged Dove | *Zenaida asiatica* |
| Mourning Dove | *Zenaida macroura* |
| Yellow-billed Cuckoo | *Coccyzus americanus* |
| Eastern Screech-Owl | *Megascops asio* |
| Great-horned Owl | *Bubo virginianus* |
| Greater Roadrunner | *Geococcyx californianus* |
| Chimney Swift | *Chaetura pelagica* |
| Black-chinned Hummingbird | *Archilochus alexandri* |
| Ruby-throated Hummingbird | *Archilochus colubris* |
| Downy Woodpecker | *Picoides pubescens* |
| Ladder-backed Woodpecker | *Picoides scalaris* |
| Golden-fronted Woodpecker | *Melanerpes aurifrons* |
| Scissor-tailed Flycatcher | *Tyrannus forficatus* |
| Acadian Flycatcher | *Empidonax virescens* |
| Eastern Phoebe | *Sayornis phoebe* |
| Great-crested Flycatcher | *Myiarchus crinitus* |
| Ash-throated Flycatcher | *Myiarchus cinerascens* |
| Yellow-throated Vireo | *Vireo flavifrons* |
| White-eyed Vireo | *Vireo griseus* |
| Red-eyed Vireo | *Vireo olivaceus* |
| Woodhouse’s Scrub-Jay | *Aphelocoma woodhouseii* |
| Common Raven | *Corus corax* |
| Barn Swallow | *Hirundo rustica* |
| Purple Martin | *Progne subis* |
| Carolina Chickadee | *Poecile carolinensis* |
| Black-crested Titmouse | *Baeolophus atricristatus* |
| Canyon Wren | *Catherpes mexicanus* |
| Carolina Wren | *Thryothorus ludovicianus* |
| Bewick's Wren | *Thryomanes bewickii* |
| Ruby-crowned Kinglet | *Regulus calendula* |
| Blue-gray Gnatcatcher | *Poliopila caerulea* |
| Eastern Bluebird | *Sialia sialis* |
| Northern Mockingbird | *Mimus polyglottos* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Wilson’s Warbler | *Cardellina pusilla* |
| Common Yellowthroat | *Geothlypis trichas* |

| | |
|---|---|
| Orange-crowned Warbler | *Vermivora celata* |
| Black-and-white Warbler | *Mniotilta varia* |
| Louisiana Waterthrush | *Paresia motacilla* |
| Nashville Warbler | *Oreothlypis ruficapilla* |
| Tennessee Warbler | *Oreothlypis peregrina* |
| American Redstart | *Setophaga ruticilla* |
| Northern Parula | *Setophaga americana* |
| Magnolia Warbler | *Setophaga magnolia* |
| Yellow Warbler | *Setophaga petechia* |
| Black-throated Green Warbler | *Setophaga virens* |
| Golden-cheeked Warbler | *Setophaga chrysoparia* |
| Yellow-rumped Warbler | *Setophaga coronata* |
| Lark Sparrow | *Chondestes grammacus* |
| Rufous-crowned Sparrow | *Aimophila ruficeps* |
| Chipping Sparrow | *Spizella passerina* |
| Field Sparrow | *Spizella pusilla* |
| Lincoln Sparrow | *Melospiza lincolnii* |
| Spotted Towhee | *Pipilo maculatus* |
| Summer Tanager | *Piranga rubra* |
| Northern Cardinal | *Cardinalis cardinalis* |
| Indigo Bunting | *Passerina cyanea* |
| Painted Bunting | *Passerina ciris* |
| Brown-headed Cowbird | *Molothrus ater* |
| House Finch | *Haemorhous mexicanus* |
| Lesser Goldfinch | *Spinus psaltria* |
| Blue Grosbeak | *Passerina caerulea* |

# Appendix B: Field Data Submission to U.S. Fish and Wildlife Service

| Name | Property Name | Survey Name | Species | Territory | Type | Date | Year | Time | Observation Type | Latitude | Longitude | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 3/21/19 | 2019 | 10:38 | Visual | 30.335934 | -98.141248 | 2018 return DB/DG:WH/SI |
| 2 | Westcave Preserve | Westcave GCWA 2019 | GCWA | U | daily | 3/21/19 | 2019 | 11:00 | Visual | 30.339618 | -98.140236 | Off plot |
| 3 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 3/27/19 | 2019 | 09:40 | Audible | 30.338066 | -98.140227 | Countering to the south |
| 4 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 3/27/19 | 2019 | 09:40 | Audible | 30.336816 | -98.140206 | Countering to the north |
| 5 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 3/29/19 | 2019 | 08:26 | Visual | 30.337161 | -98.140074 | |
| 6 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 3/29/19 | 2019 | 08:28 | Audible | 30.335857 | -98.140936 | |
| 7 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 3/29/19 | 2019 | 08:36 | Audible | 30.335516 | -98.140489 | |
| 8 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 3/29/19 | 2019 | 08:54 | Audible | 30.339976 | -98.139571 | DB/DG:WH/SI |
| 9 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 3/29/19 | 2019 | 09:03 | Audible | 30.340230 | -98.140307 | |
| 10 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 3/29/19 | 2019 | 09:23 | Visual | 30.339829 | -98.140668 | |
| 11 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/02/19 | 2019 | 09:29 | Visual | 30.339113 | -98.140380 | |
| 12 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/02/19 | 2019 | 09:57 | Visual | 30.335706 | -98.141487 | |
| 13 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/02/19 | 2019 | 09:15 | Visual | 30.340070 | -98.140356 | Female |
| 14 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 4/09/19 | 2019 | 10:16 | Visual | 30.340110 | -98.140557 | Unbanded male countering |
| 15 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/09/19 | 2019 | 10:16 | Visual | 30.340079 | -98.140311 | |
| 16 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/09/19 | 2019 | 09:38 | Visual | 30.336490 | -98.140335 | |
| 17 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/09/19 | 2019 | 09:40 | Visual | 30.336260 | -98.139859 | La Tierra- off plot |
| 18 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/12/19 | 2019 | 10:10 | Visual | 30.335373 | -98.140835 | Banded – PI/PI:RD/SI |
| 19 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/12/19 | 2019 | 10:30 | Visual | 30.337566 | -98.140463 | |
| 20 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 4/18/19 | 2019 | 10:10 | Audible | 30.339962 | -98.140963 | |
| 21 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 4/18/19 | 2019 | 10:00 | Visual | 30.340511 | -98.142417 | |
| 22 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/23/19 | 2019 | 10:15 | Visual | 30.337431 | -98.140745 | |
| 23 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/23/19 | 2019 | 10:23 | Visual | 30.336697 | -98.140265 | |
| 24 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/23/19 | 2019 | 10:37 | Visual | 30.339956 | -98.140255 | |
| 25 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/27/19 | 2019 | 09:25 | Audible | 30.340193 | -98.140407 | |
| 26 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/27/19 | 2019 | 09:34 | Visual | 30.339821 | -98.140038 | |
| 27 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 4/27/19 | 2019 | 10:30 | Visual | 30.339984 | -98.140316 | Female carrying food |
| 28 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 4/27/19 | 2019 | 10:40 | Visual | 30.340052 | -98.140677 | |
| 29 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 4/27/19 | 2019 | 10:45 | Audible | 30.340518 | -98.141384 | |
| 30 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 4/27/19 | 2019 | 12:10 | Visual | 30.336688 | -98.139740 | |
| 31 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/02/19 | 2019 | 09:02 | Visual | 30.337752 | -98.140922 | |
| 32 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 5/02/19 | 2019 | 11:35 | Visual | 30.339886 | -98.142961 | |
| 33 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/07/19 | 2019 | 08:59 | Visual | 30.337528 | -98.140224 | |
| 34 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/07/19 | 2019 | 09:06 | Visual | 30.339942 | -98.140028 | Female with fledglings |
| 35 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/07/19 | 2019 | 10:45 | Visual | 30.340350 | -98.142532 | |
| 36 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 5/07/19 | 2019 | 11:09 | Visual | 30.338679 | -98.141947 | |

| Name | Property Name | Survey Name | Species | Territory | Type | Date | Year | Time | Observation Type | Latitude | Longitude | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/07/19 | 2019 | 13:50 | Visual | 30.337504 | -98.140300 | |
| 38 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/14/19 | 2019 | 09:36 | Visual | 30.337426 | -98.140384 | |
| 39 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/14/19 | 2019 | 09:38 | Audible | 30.336860 | -98.140350 | |
| 40 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/14/19 | 2019 | 10:40 | Visual | 30.340165 | -98.140855 | |
| 41 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/14/19 | 2019 | 10:55 | Visual | 30.339821 | -98.140035 | Female feeding fledglings |
| 42 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/23/19 | 2019 | 11:42 | Visual | 30.339252 | -98.141612 | |
| 43 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/27/19 | 2019 | 09:30 | Visual | 30.338161 | -98.140427 | |
| 44 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/27/19 | 2019 | 10:25 | Visual | 30.339945 | -98.141003 | fledgling |
| 45 | Westcave Preserve | Westcave GCWA 2019 | GCWA | C | daily | 5/27/19 | 2019 | 11:40 | Visual | 30.340262 | -98.142304 | Female |
| 46 | Westcave Preserve | Westcave GCWA 2019 | GCWA | A | daily | 5/28/19 | 2019 | 12:02 | Visual | 30.340262 | -98.142304 | |
| 47 | Westcave Preserve | Westcave GCWA 2019 | GCWA | U | daily | 5/30/19 | 2019 | 09:59 | Visual | 30.340262 | -98.142304 | Unbanded male |
| 48 | Westcave Preserve | Westcave GCWA 2019 | GCWA | B | daily | 5/27/19 | 2019 | 10:34 | Visual | 30.340262 | -98.142304 | |