Travis County FY 2025

Golden-cheeked Warbler (*Setophaga chrysoparia*) Monitoring Report



Staff banded this golden-cheeked warbler hatch year (unknown sex) in 2023. It was resighted as a male (with female and fledglings) on a 2025 enumeration plot. Photo courtesy of Travis County Natural Resources Staff.

Travis County

Department of Transportation and Natural Resources

Natural Resources and Environmental Quality Division

October 1, 2024 – September 30, 2025

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Introduction

As specified in the Balcones Canyonlands Conservation Plan (USFWS 1996; hereafter BCCP), the City of Austin and Travis County developed and implemented a Land Management Plan (LMP) to provide guidelines for managing the Balcones Canyonlands Preserve (BCP). The LMP Tier IIA-7 chapter (BCP 2007) describes the current management and monitoring goals for golden-cheeked warbler (*Setophaga chrysoparia*; hereafter GCWA) populations on the BCP. It states, "The GCWA population within the BCP will be monitored through a regional program to determine population size, territory density and trends, distribution, productivity, use of marginal habitat, and to determine the effects of habitat manipulation, urbanization, and recreation..." Guidelines are provided in the LMP for various levels of monitoring including presence/absence, territory mapping, pair detection and productivity.

In fiscal year 2025 (FY25), Travis County Natural Resources staff (Staff) and volunteers conducted various GCWA surveys and monitoring efforts on 929.75 hectares (ha) (2151.7 acres [ac]) of Travis County-managed BCP properties and 207 ha (512 ac) of Travis County Park-managed non-BCP properties (Table 1; Figure 1). This report summarizes the results of the Travis County Natural Resources GCWA monitoring program in FY25.

Table 1. GCWA survey and monitoring effort summary, FY25, Travis County BCP, Texas.

Survey Area [1]	Survey Type	Macrosite	Hectares Surveyed	Acres Surveyed	Survey Hours
Grandview Hills South	Enumeration	Cypress Creek	157	387	163.45
Hamilton Pool	Enumeration	Pedernales River	67	166	52.15
Origer	Enumeration	Bull Creek	5	12	16.5
Pace Bend[4]	Enumeration	*n/a*	187	462	48.6
Volente	Enumeration	Cypress Creek	503.5	1243.7	421.85
Woody Hollow	Enumeration	Bull Creek	3.25	8	10.83
Vista Point[2,3]	Intensive Monitoring	Cypress Creek	70	100	440.75
Wheless[2,3]	Intensive Monitoring	Cypress Creek	70	100	119.22
Collins[2,3]	Band Resighting	Cypress Creek	54	135	96.5
Mansfield Dam Park[4]	Presence/Absence	*n/a*	20	50	5.25
Total			**1136.75**	**2663.7**	**1326.5**

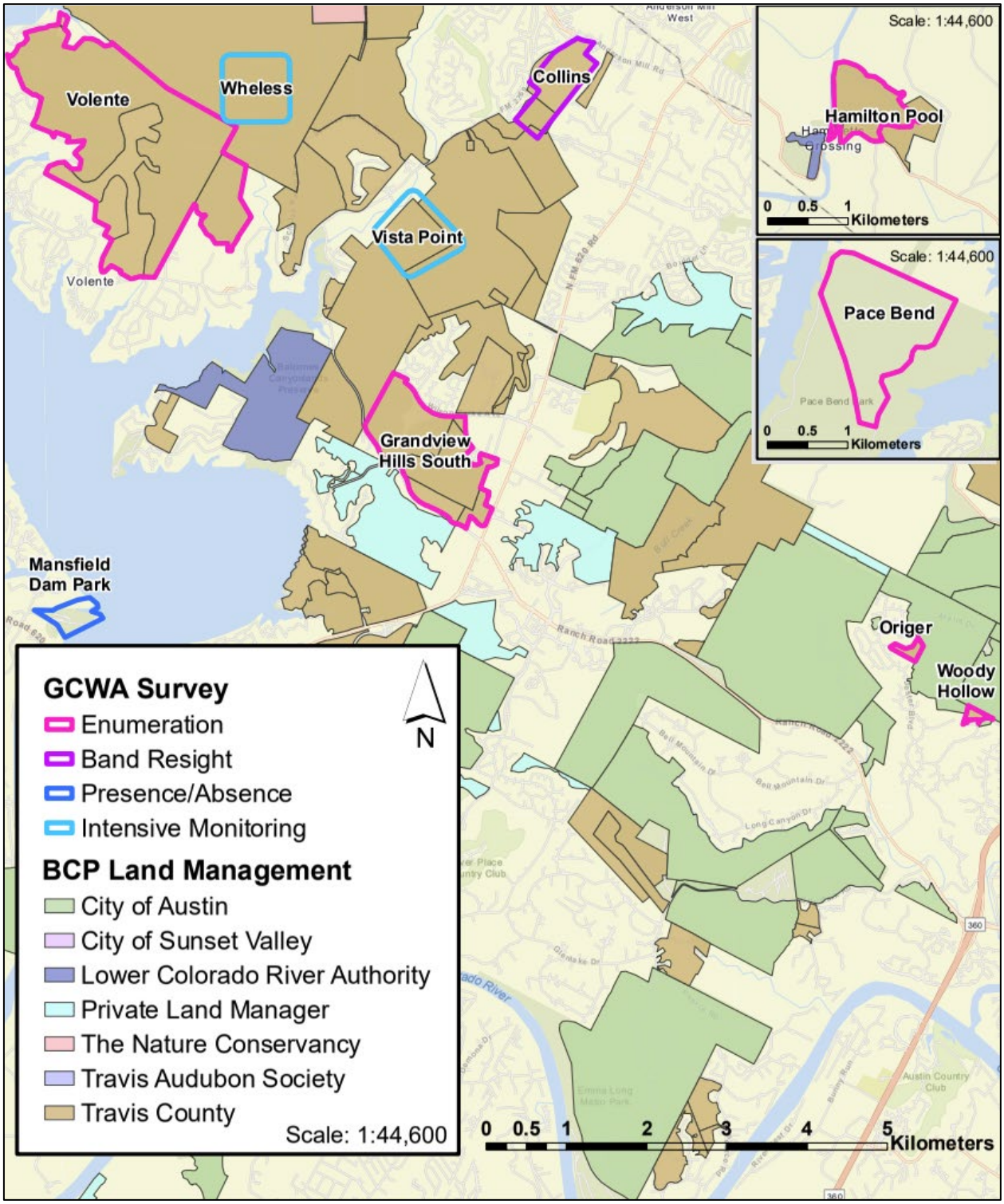
[1] Survey Areas may contain multiple BCP tracts.

[2] The City of Austin staff analyzed these data, see Appendix F of the FY25 BCCP Annual Report for additional information.

[3] Area surveyed includes 100-meter survey buffer.

[4] Non-BCP Travis County Parks.

Figure 1. GCWA survey area overview on the BCP, FY25, Travis County, Texas.



Methods

Enumeration Surveys

Enumeration surveys, or territory mapping, provide an estimate of GCWA abundance, occupancy, distribution, and territory density in selected study areas/plots. Surveys are typically carried out every five years or on an "as needed" basis should new or future potential disturbance activities occur on or adjacent to the BCP.

Surveys occur from 15 March to 25 May with a minimum of eight visits in each plot to ensure adequate plot coverage. Additional surveys may occur between 25 May - 15 June to determine late-season nesting or territorial behavior. Surveys may begin 30 minutes before sunrise and typically proceed for three to six hours depending on survey area size. Surveys are canceled or postponed if weather conditions produce a steady rain or if wind inhibits surveyor's ability to hear birds (approximately >12 miles/hour).

During each visit, surveyors attempt to audibly locate and follow male GCWAs and obtain several spatial and behavioral observations, while also recording male counter-singing to assist with the identification and delineation of male territory boundaries. GCWA locations are recorded using Garmin handheld global positioning units (GPS), ArcGIS Field Maps phone app (ESRI, Inc., Redlands, California), and/or on paper maps with an aerial imagery background using topographic lines and 100-meter Universal Transverse Mercator (UTM) grid. Data are recorded and analyzed in an ArcGIS 10.7 (ESRI, Inc., Redlands, California) geodatabase using a spatial reference of NAD 1983/UTM 14N. Data recorded for each observation include date, spatial coordinates, individual male observation ID, sex, song type, band information, counter-singing presence/directions, presence of a female/nest, and presence/number of fledglings.

Males are considered to have an established territory and are assigned a unique Territory ID post-hoc if any of the following occurred: 1) a male is observed on at least three occasions each separated by at least six days; 2) a male is with a female (appearing to be paired); 3) a male is observed attending a nest or feeding hatch-year fledglings.

After all field surveys are complete, territories are differentiated as either "Full", "Edge", or "Off-plot". A territory is designated as "Full" when the male is observed outside of the designated survey plot on no more than one visit. An "Edge" territory is designated when a male is regularly observed inside the plot but is also observed outside on more than one visit. An "Off-Plot" territory is designated when a male is observed inside the plot on

no more than one visit. “Off-plot” territories are not given a unique territory ID and are not included in further data analysis. A designation of “Unknown” is given, and no Territory ID is assigned to GCWA observations that do not meet the minimum requirements of a territory or when survey uncertainty cannot designate a Territory ID. After Territory IDs are assigned, minimum convex polygons (MCP) are subsequently created using ArcGIS, around each set of unique Territory ID observations to delineate projected GCWA male territory outer boundaries.

Staff use Verner’s (1985) method to calculate GCWA territory density within survey plots, where “Full” territories are counted as 1.0 territory and “Edge” territories are counted as 0.5 territories. Staff then divide the modified average of “Full” and “Edge” territories by the number of hectares in the survey plot to give an estimate of territory density (territories per hectares). Staff then calculated a GCWA abundance estimate by adding together the total number of “Full”, “Edge”, and other individual “Unknown” male observations within the survey plot. “Off-plot” males are not included in abundance calculations.

Observations of GCWA females and fledglings are recorded during enumeration surveys and assigned the Territory ID of an assumed associated male, post-hoc. If surveyors cannot determine if they are associated with an identified male territory, those females and fledglings are also designated as “Unknown”. Female and fledgling observations are used to aid in male territory determinations and may be used to assess mating pair status and nesting productivity; however, nesting productivity and mating behavior observations are not the focus of territory enumeration surveys and due to limitations inherent to territory mapping methods (i.e. differences in observer ability, observer bias, and mobility of the target species, etc.), results of all surveys should be interpreted as approximations.

Intensive Monitoring Plots and Nest Monitoring

In coordination with the City of Austin (CoA), Staff participate in a BCP-wide monitoring program of intensive monitoring plots. These previously established “100-acre plots” are arranged across a spectrum of GCWA habitats based on canopy height. The objective of these plots is to document and estimate long-term GCWA trends using data collected from color-banded males. The goal is to attempt to estimate return rates, dispersal, territory density/size, habitat use, territory age structure, pairing success, breeding success, and nest survival. For a detailed description of survey methods and results of the intensive monitoring program, see the CoA Appendix F of the 2025 BCCP Annual Report.

Color-Banding and Band Resighting

In coordination with the CoA, Staff assist with color-banding on Travis County BCP intensive monitoring plots. GCWAs are manually captured using mist-nets set up in known non-banded male territories. Staff lure GCWAs to the mist-nets by playing audible recordings of GCWA calls and songs. An imitation GCWA decoy may also be attached to nearby vegetation to assist in luring males into the net. Once a GCWA is captured, it is banded with a single silver aluminum USFWS band with a unique serial number and up to three additional colored plastic bands, giving it a unique color band combination. Additional information collected while banding includes date of capture, sex, age, and spatial coordinates. The GCWA is captured, banded, and released as quickly as possible to minimize stress on the bird.

Previously established intensive monitoring plots, not intensively monitored in the current survey year, are treated as band resighting plots. Resight plots are also established in areas surrounding active intensive monitoring plots to identify additional GCWA dispersal and movement. These resight plots are systematically surveyed for returning banded GCWAs. This will continue until no banded GCWAs are observed within these plots for one full survey season. Resight plots are surveyed four times between 20 March and 15 April, with one additional survey between 15 May and 25 May to detect dispersing GCWAs. For a more detailed description of survey methods and results of the intensive monitoring program, banding, and band resighting effort, see the CoA Appendix F of the 2025 BCCP Annual Report.

Presence/Absence Surveys

Staff may conduct presence/absence surveys on tracts where enumeration surveys may not be practical, or resources are not available to conduct more intensive monitoring efforts. These are typically tracts of smaller acreage, highly fragmented, or poor-quality GCWA habitats. Surveys are modeled after the USFWS (2022) presence/absence monitoring protocol. These surveys are a minimal effort method to determine GCWA occupancy of a BCP tract/unit. Surveyors also make notes about habitat conditions or general observations about the site and surrounding area.

Presence/absence surveys occur from 15 March to 15 May with a minimum of three visits in each plot to ensure adequate coverage. If no GCWA are detected in the initial three surveys, up to two additional surveys may be conducted between 15 May and 01 June. Surveys may begin 30 minutes before sunrise and typically proceed for three to six hours depending on survey area size. Surveys are canceled or postponed if weather conditions produce a steady rain or if wind inhibits surveyor’s ability to hear birds,

approximately 12 miles/hour or greater. During each visit, surveyors attempt to audibly locate and follow male GCWA and obtain several spatial observations. Data recorded for each GCWA observation include date, spatial location, individual male observation ID, sex, song type, and band information, if known. Spatial data are recorded using Garmin handheld GPS units and/or on paper maps with an aerial imagery background using topographic lines and 100-meter UTM grid.

Results

Enumeration Surveys Results

Staff and volunteer enumeration survey effort on Travis County BCP tracts and Travis County Parks covered 922.75 ha (2278.7 ac) and totaled 713.38 survey hours (Table 1). Estimated GCWA abundance, territories, and territory density are presented in Table 2.

Table 2. GCWA abundance, territories, and territory density estimates based on enumeration survey results, FY25, Travis County, Texas.

GCWA Enumeration Survey Plot	Hectares (ha)	Estimated Abundance	No. of Full Territories	No. of Edge Territories	No. of Modified* Territories	Territory Density (Terr. per ha)
Bull Creek Macrosite						
Origer	5	3	0	1	0.5	0.10
Woody Hollow	3.25	2	2	0	2	0.62
Cypress Creek Macrosite						
Grandview Hills South	157	38	36	1	36.5	0.23
Volente	503.5	103	97	5	99.5	0.20
Pedernales River Macrosite						
Hamilton Pool	67	6	6	0	6	0.09
Travis County Parks						
Pace Bend[1]	187	5	3	1	3.5	0.02
All Survey Plots Combined	**922.75**	**157**	**144**	**8**	**148**	**0.16**

*Modified territories are the number of full territories plus one-half of the number of edge territories (Verner 1985).

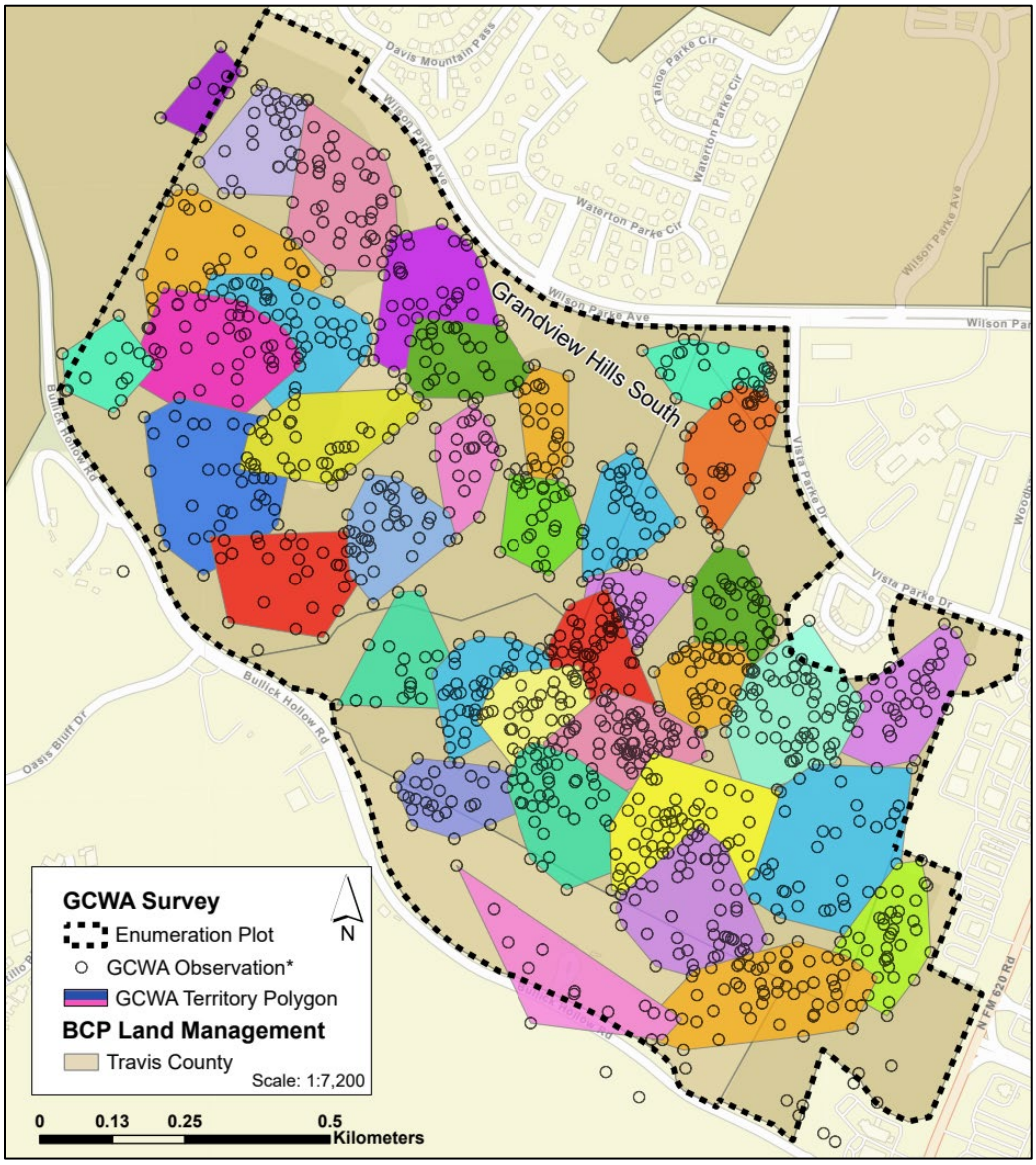
[1]Non-BCP Travis County Parks.

Grandview Hills South Enumeration Surveys Results

The 157 ha (387 ac) survey plot included the Grandview Hills South, Cuevas, Cuevas East, and Blackmore tracts. It is located in the City of Austin, between Bullick Hollow Road and Wilson Park Avenue, within the Cypress Creek macrosite.

Thirty-seven territories (full or edge) were delineated on this plot. The overall density was 0.23 territories per ha (0.09 per ac). Females were detected within 62.16% (n=23) of male territories and fledglings were detected in 8.11% (n=3) of territories. GCWA observation locations and delineated territories are presented in Figure 2.

Figure 2. GCWA observations and estimated territory delineations based on the Grandview Hills South enumeration surveys from FY25, Travis County BCP, Texas.



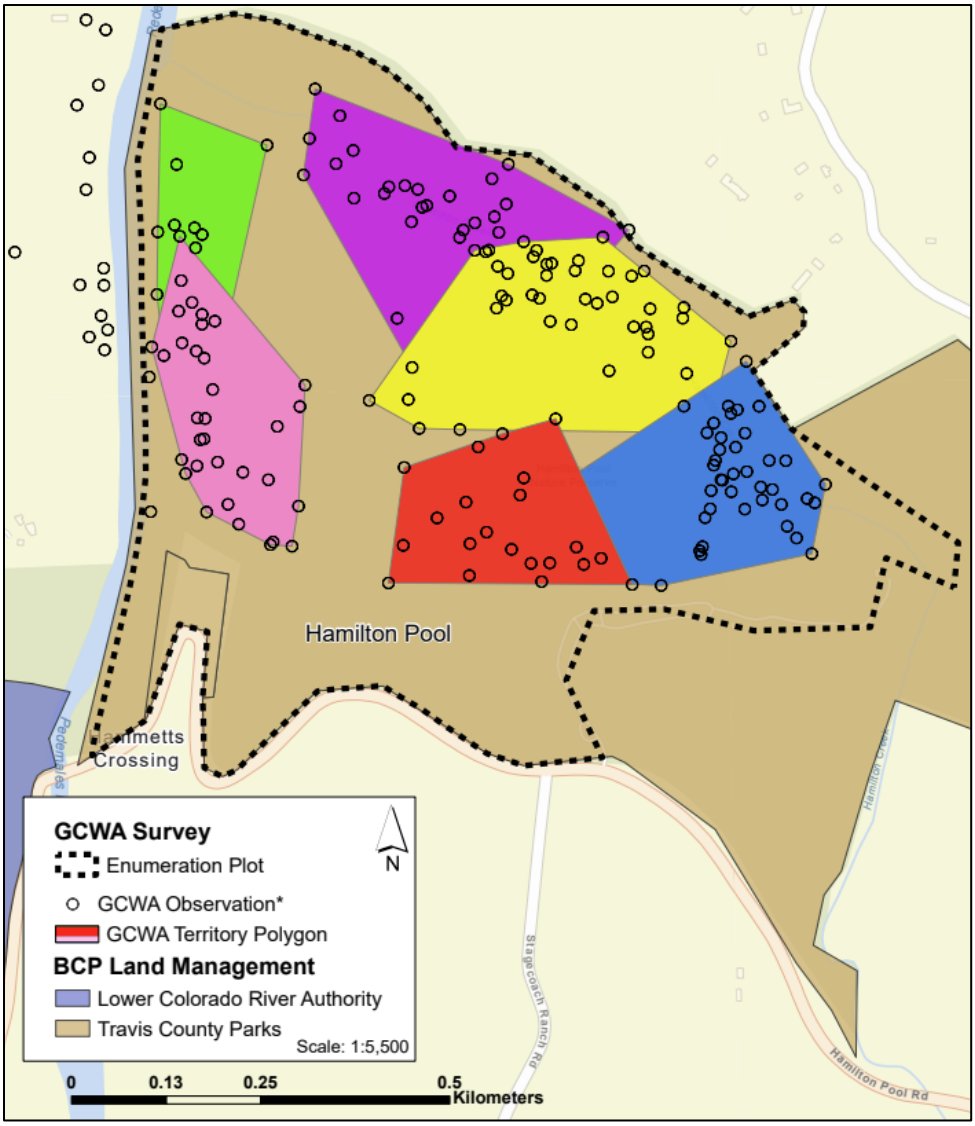
*GCWA Observations outside of designated survey boundaries are estimated locations, based on audible male detections.

Hamilton Pool GCWA Enumeration Surveys Results

The 67 ha (166 ac) survey plot included the Martin tract and 66 ha (163 ac) of Hamilton Pool Preserve, a Travis County Park that is included in the BCP. It is located north of Hamilton Pool Road in southwest Travis County, within the Pedernales River macrosite.

Six territories (full or edge) were delineated on this plot. The overall density was 0.09 territories per ha (0.04 per ac). Females were detected within 33.33% (n=2) of male territories and fledglings were detected in 16.67% (n=1) of territories. GCWA observation locations and delineated territories are presented in Figure 3.

Figure 3. GCWA observations and estimated territory delineations based on the Hamilton Pool enumeration surveys from FY25, Travis County BCP, Texas.



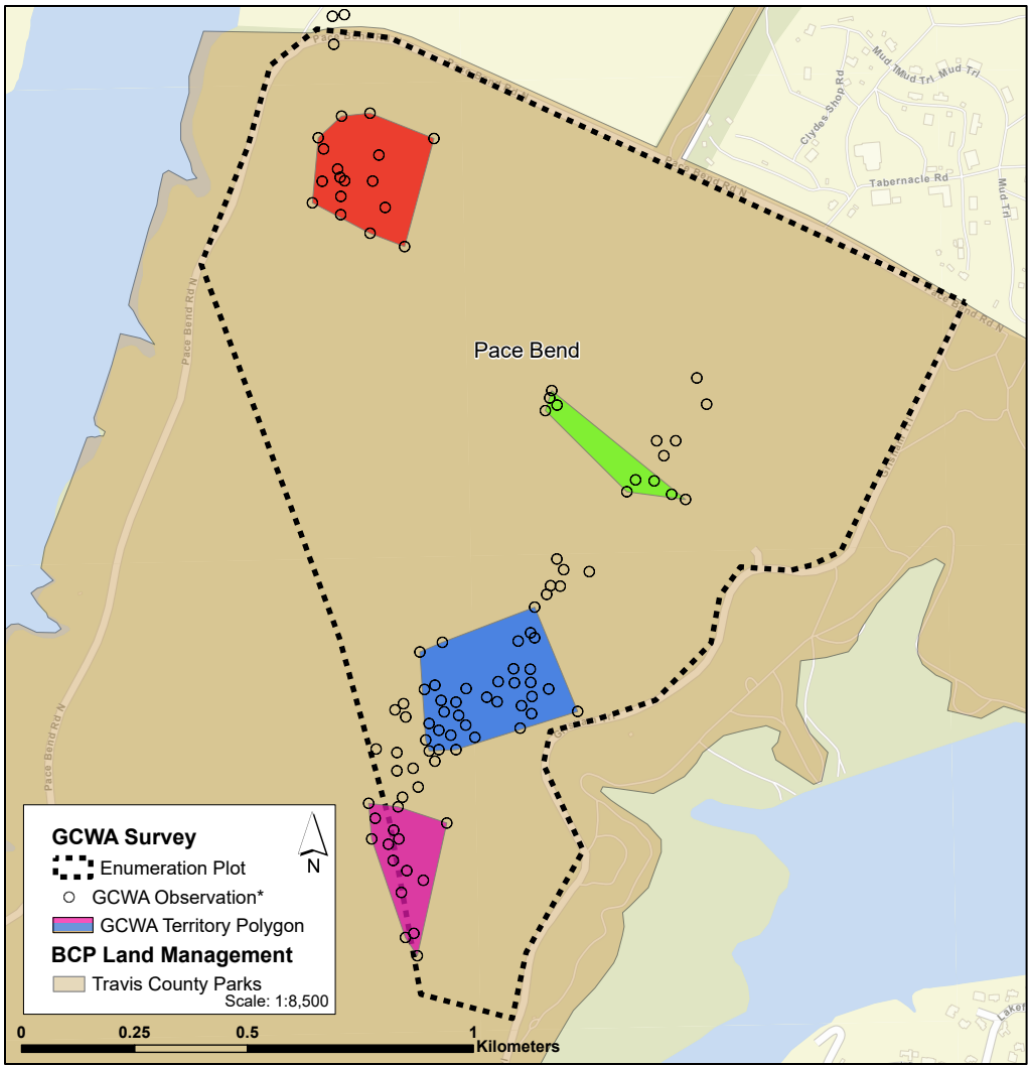
*GCWA Observations outside of designated survey boundaries are estimated locations, based on audible male detections.

Pace Bend GCWA Enumeration Surveys Results

This survey plot included 187 ha (462 ac) within Pace Bend Park in western Travis County. While not a part of the BCP, Staff work closely with Parks staff to periodically monitor Park properties. Knowledge of protected species may assist Parks staff in making future management decisions. Volunteers collected enumeration data as singing males were detected. GCWA detections were confirmed by Staff.

Four territories (full or edge) were delineated on this plot. The overall density was 0.02 territories per ha (0.01 per ac). Females were detected within 75% (n=3) of male territories and fledglings were detected in 75% (n=3) of territories. GCWA observation locations and delineated territories are presented in Figure 4.

Figure 4. GCWA observations and estimated territory delineations based on the Pace Bend enumeration surveys from FY25, Travis County, Texas.



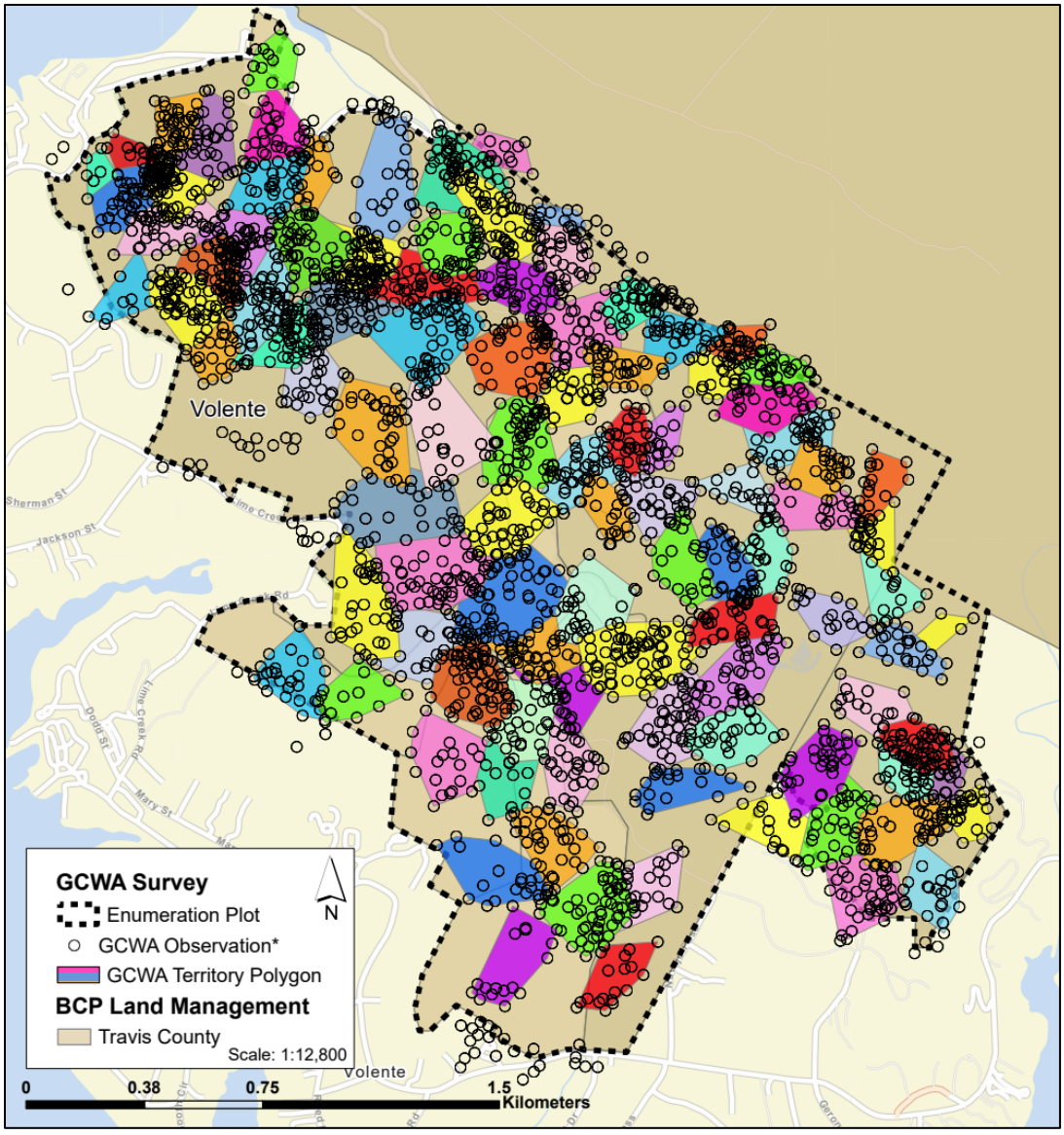
*GCWA Observations outside of designated survey boundaries are estimated locations, based on audible male detections.

Volente GCWA Enumeration Surveys Results

The 503.5 ha (1243.7 ac) survey plot included the Volente, Volente Valley, Volente Peak, Molberg, and Davenport tracts. It is located near the Village of Volente in western Travis County, within the Cypress Creek macrosite.

One hundred and two territories (full or edge) were delineated on this plot. The overall density was 0.20 territories per ha (0.08 per ac). Females were detected within 53.92% (n=55) of male territories and fledglings were detected in 10.78% (n=11) of territories. GCWA observation locations and delineated territories are presented in Figure 5.

Figure 5. GCWA observations and estimated territory delineations based on the Volente enumeration surveys from FY25, Travis County BCP, Texas.



*GCWA Observations outside of designated survey boundaries are estimated locations, based on audible male detections.

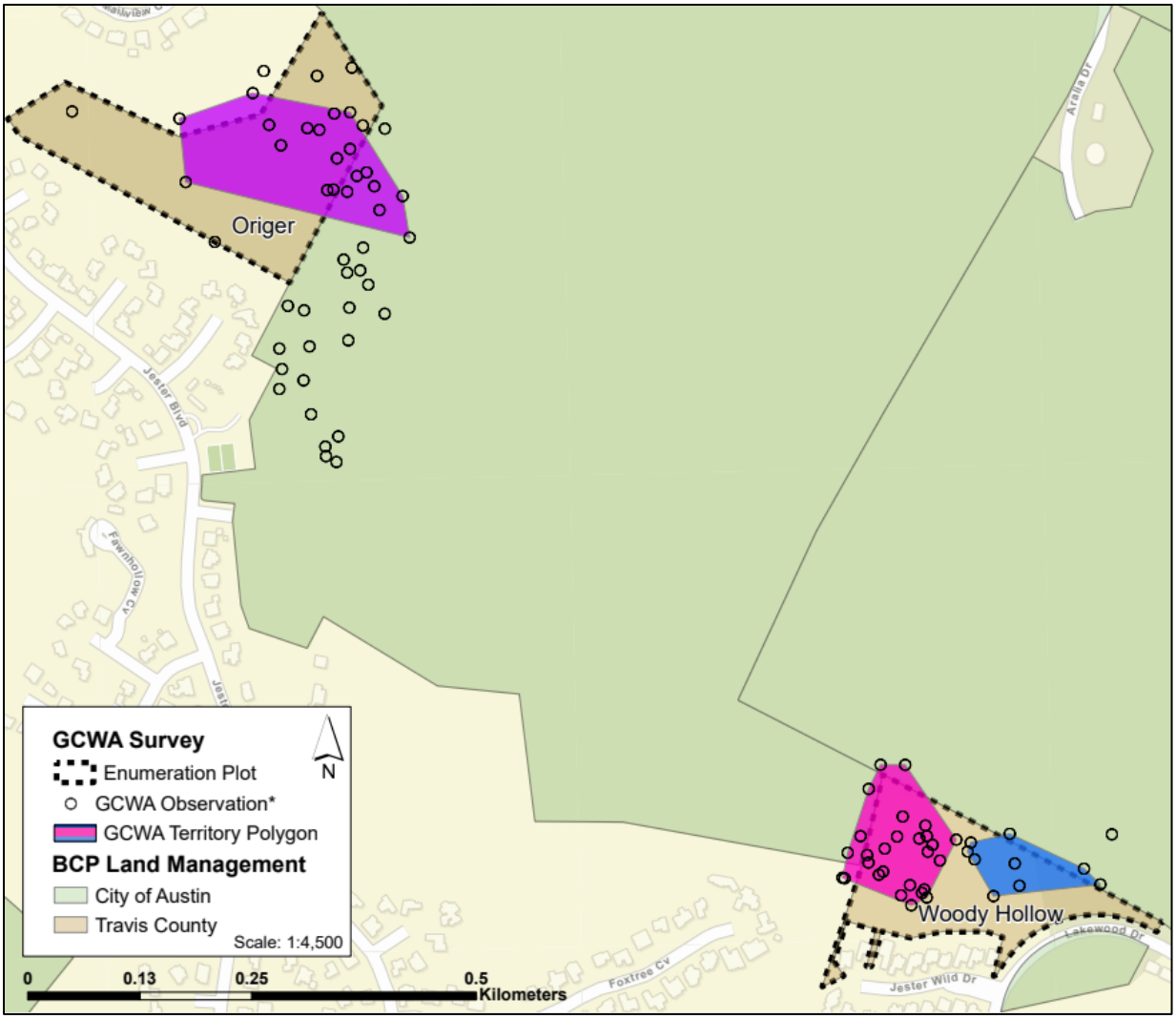
Woody Hollow/Origer GCWA Enumeration Surveys Results

The 3.25 ha (8 ac) Woody Hollow Preserve and the 5 ha (12 ac) Origer survey plots are located in the City of Austin, north of the Jester Estates neighborhood, within the Bull Creek macrosite.

One territory (full or edge) was delineated on Origer. The overall density was 0.10 territories per ha (0.04 per ac). One female and no fledglings were detected.

Two territories (full or edge) were delineated on Woody Hollow. The overall density was 0.62 territories per ha (0.25 per ac). No females or fledglings were detected. GCWA observation locations and delineated territories are presented in Figure 6.

Figure 6. GCWA observations and estimated territory delineations based on the Woody Hollow/Origer enumeration surveys from FY25, Travis County BCP, Texas.



*GCWA Observations outside of designated survey boundaries are estimated locations, based on audible male detections.

Intensive Monitoring Plot and Nest Monitoring Results

Staff conducted intensive plot monitoring on the Vista Point and Wheless plots (Figure 1). Staff surveyed weekly from 18 March 2025 to 25 May 2025 to delineate territory boundaries and monitor nesting activity. Additional weekly visits to continue monitoring nesting activity, obtain hatch-year bird observations, and gain additional band resight information occurred between 25 May 2025 and 15 June 2025. Staff contributed 440.75 and 119.22 hours of survey time to the Vista Point and Wheless plots, respectively.

Staff located 19 nests on Vista Point. Seventeen nests were observed in Ashe Juniper (*Juniperus ashei*) and two in live oak (*Quercus fusiformis).* Eight nests (42%) successfully fledged young, nine (47%) failed due to presumed depredation, and two (11%) were presumed to be abandoned. No nests were observed to have been parasitized by brown-headed cowbirds (*Molothrus ater*). No nests were found on Wheless.

Staff shared intensive plot monitoring and nest data with CoA staff for further analysis and publication. For a detailed summary of the results and discussion of the intensive monitoring program and nest monitoring effort, see the CoA Appendix F of the 2025 BCCP Annual Report.

Color-Banding and Band Resighting Results

CoA staff color-banded GCWAs on Travis County intensive monitoring plots, contributing 30 hours of banding effort. A summary of banding effort is shown in Table 3.

Table 3. GCWA color-banding results, FY25, Travis County BCP, Texas.

Banding Area	Date Banded	Sex	Age*	Color-Band Combination
Vista Point	4/13/2025	Male	SY	BL/SI:BL/WH
Vista Point	4/13/2025	Male	ASY	DG/SI:DB/PI
Vista Point	4/16/2025	Male	SY	MV/SI:DG/GR
Vista Point	4/18/2025	Male	SY	PI/SI:PI/BK
Vista Point	4/19/2025	Male	SY	RD/YE:NB/SI
Vista Point	4/22/2025	Male	ASY	YE/OR:RD/SI
Vista Point	4/23/2025	Male	ASY	MV/SI:OR/BL
Vista Point	4/29/2025	Male	SY	GR/YE:BK/SI
Wheless	4/16/2025	Male	SY	BK/SI:MV/MV
Wheless	4/16/2025	Male	SY	YE/SI:DG/PI
Wheless	4/16/2025	Male	SY	NB/SI:RD/BL
Wheless	4/16/2025	Female	SY	WH/SI:DG/OR
Wheless	4/16/2025	Male	ASY	DB/SI:OR/BL
Wheless	4/16/2025	Female	SY	GR/DB:BL/SI
Wheless	5/1/2025	Male	ASY	OR/WH:MV/SI

* SY = Second Year; ASY = After Second Year; AHY = After Hatch Year

Staff surveyed the Collins resight plot (Figure 1) four times between 20 March 2025 and 15 April 2025, with one additional survey between 15 May 2025 and 25 May 2025 to detect dispersing GCWA. Staff resighted two banded GCWAs during 96.50 hours of survey time.

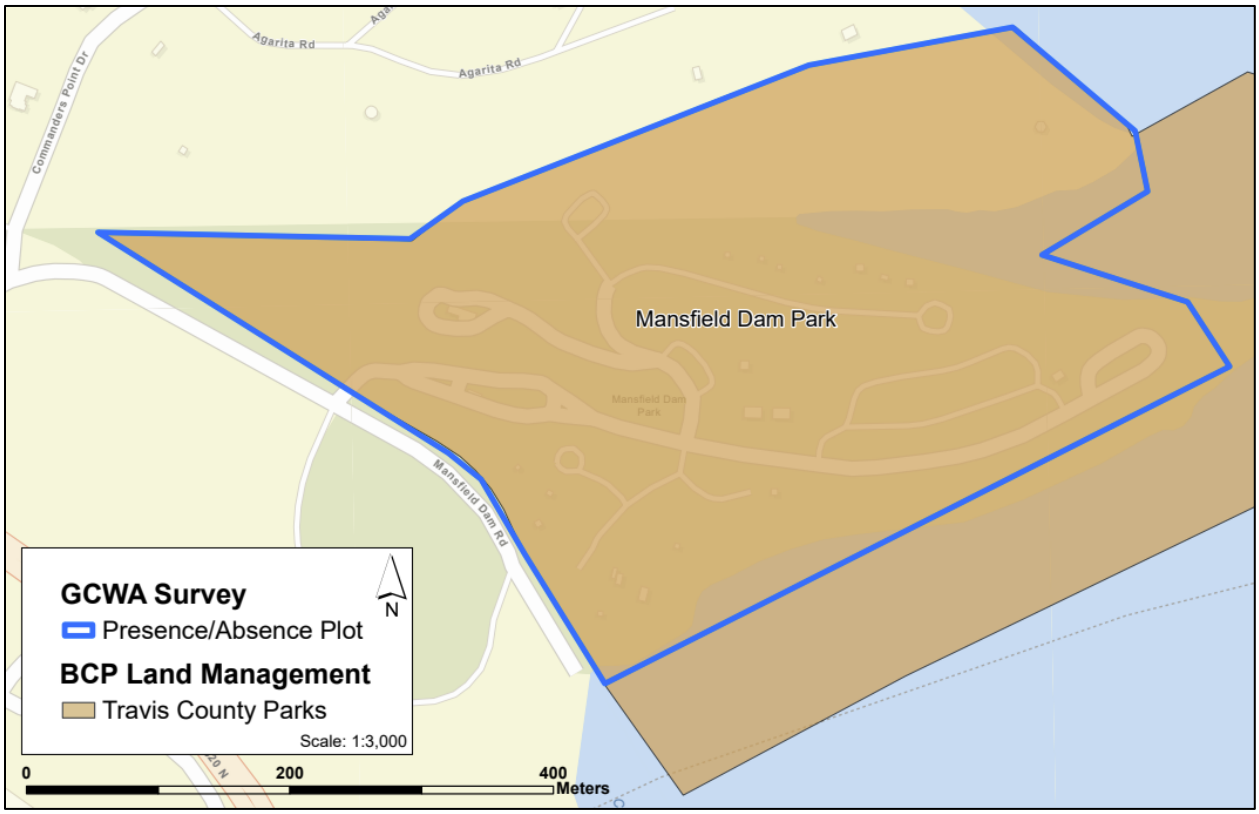
Volunteers assisted with resighting efforts surrounding the Collins resight plot and the Vista Point and Hamilton SE (CoA) intensive monitoring plots (Figure 1). Staff shared banding and resighting data with the CoA staff for further analysis and publication. For a detailed summary of the results and discussion of the band resighting effort, see the CoA Appendix F of the 2025 BCCP Annual Report.

Mansfield Dam Park GCWA Presence/Absence Surveys Results

The 20 ha (50 ac) Mansfield Dam Park survey plot is located adjacent to Mansfield Dam, along the Colorado river in western Travis County, and is managed by Travis County Parks. While not a part of the BCP, Staff work closely with Parks staff to periodically monitor Park properties. Knowledge of protected species may assist Parks staff in making future management decisions.

No GCWAs were detected on this survey plot.

Figure 7. Mansfield Dam Park presence/absence survey plot from FY25, Travis County, Texas.



Acknowledgements

Travis County thanks all the BCP partners and Staff for their collaboration in the 2025 GCWA survey efforts. Special thanks to contractor, Jenn Reidy, and our Travis County seasonal Natural Resource Technicians Addy Denton, Reese Williford, and Namara Timms. Thank you also to our dedicated volunteers and Travis County Parks staff.

Literature Cited

Balcones Canyonlands Preserve (BCP). 2007. Balcones Canyonlands Preserve land management plan, Tier IIA-7, golden-cheeked warbler management. City of Austin and Travis County, Austin, Texas.

U.S. Fish and Wildlife Service (USFWS). 1996. Final environmental impact statement/habitat conservation plan for proposed issuance of a permit to allow incidental take of the golden-cheeked warbler, black-capped vireo, and six karst invertebrates in Travis County, Texas. Prepared by Regional Environmental Consultants (RECON) and U.S. Fish and Wildlife Service. Albuquerque, New Mexico.

U.S. Fish and Wildlife Service (USFWS). 2022. USFWS Section 10(a)(1)(A) scientific permit requirements for conducting presence/absence surveys and habitat assessments for the golden-cheeked warbler. Prepared by USFWS Austin Ecological Services Field Office. Austin, Texas.

Verner, J. 1985. Assessment of counting techniques. Current Ornithology. 2:247-302.