FY 2019 Report on Monitoring

Golden-cheeked Warblers (*Setophaga chrysoparia*) on

Travis County-managed Balcones Canyonlands Preserve Tracts



Male golden-cheeked warbler

Photo: Courtesy of Heather Valley

Travis County

Department of Transportation and Natural Resources

Natural Resources and Environmental Quality Division

October 1, 2018 – September 30, 2019

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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 for various levels of monitoring including presence/absence, territory mapping, pair detection and productivity."

This report summarizes the results of the Travis County Natural Resources fiscal year (FY) 2019 GCWA monitoring program. In FY 2019, Travis County Natural Resources staff and volunteers conducted various GCWA surveys and monitoring efforts on approximately 1,593 hectares (ha) of Travis County-managed BCP properties (Figure 1; Table 1). County staff collected GCWA territory enumeration data within eight study areas totaling 1,247 ha. County staff also conducted GCWA presence/absence surveys on one tract of 28 ha (Table 1). In addition, as part of a collaborative monitoring program with the City of Austin, Travis County monitored GCWA on three intensive monitoring plots, totaling 180 ha and looked for banded bird returns on two former intensive monitoring plots, totaling 138 ha (Table 1).

Table 1. GCWA Survey and Monitoring Efforts, FY 2019, Travis County BCP, Texas.

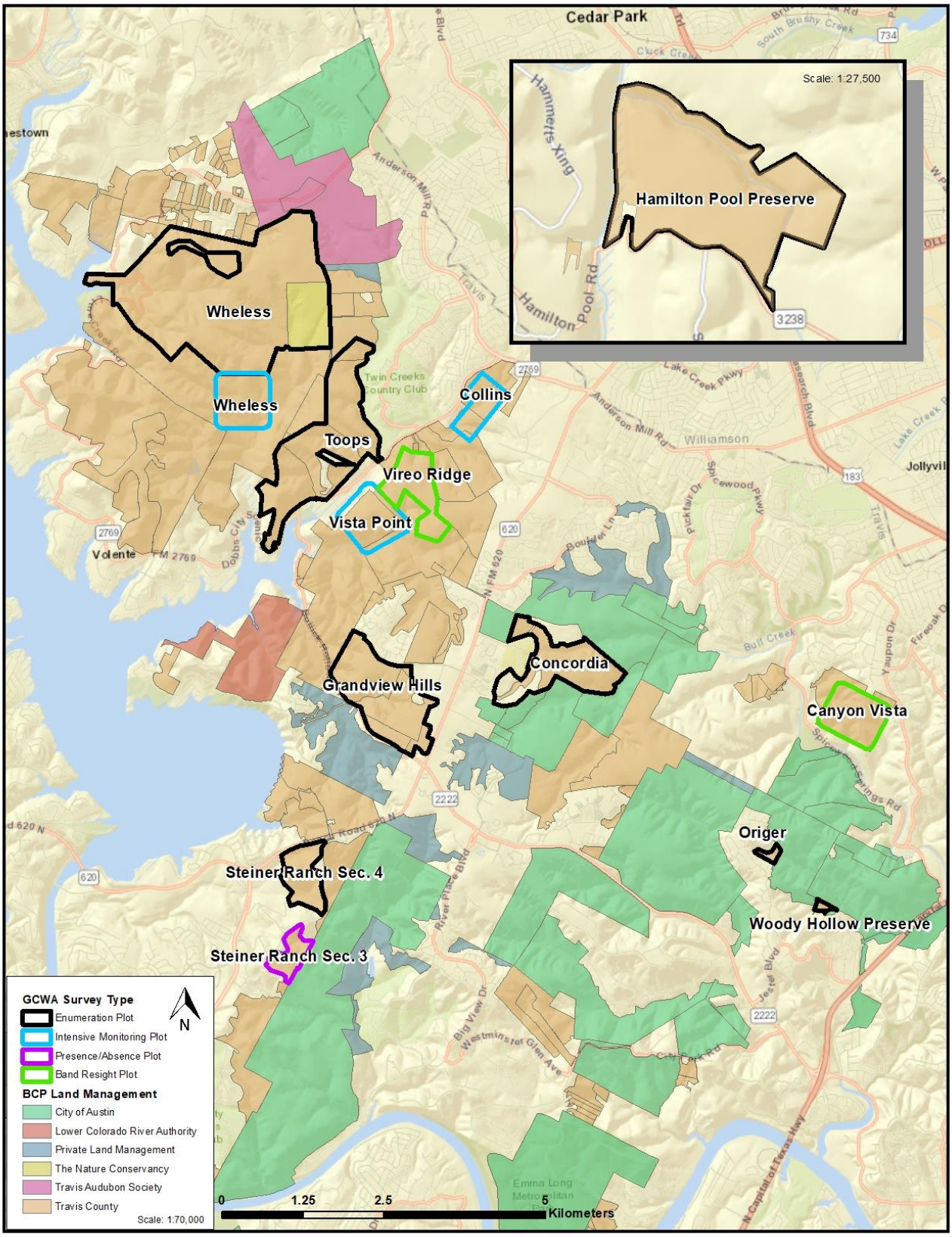
Survey Area[1]	Survey Type	Macrosite	Acres Surveyed	Hectares Surveyed	Total Survey Hours
Concordia	Enumeration	Bull Creek	309.7	125.3	140.8
Grandview Hills	Enumeration	Cypress Creek	395.2	159.9	178.5
Hamilton Pool Preserve	Enumeration	Pedernales River	235.6	95.3	38.5
Origer	Enumeration	Bull Creek	12.4	5.0	22.75
Steiner Ranch - Sec. 4	Enumeration	North Lake Austin	130.8	52.9	19.0
Toops	Enumeration	Cypress Creek	571.4	231.2	212.8
Wheless	Enumeration	Cypress Creek	1417.8	573.8	445.9
Woody Hollow Preserve	Enumeration	Bull Creek	8.0	3.2	12.0
Collins[2]	Intensive Monitoring	Cypress Creek	100.0	40.5	257.0
Vista Point[2,3]	Intensive Monitoring	Cypress Creek	172.2	69.7	162.5
Wheless[2,3]	Intensive Monitoring	Cypress Creek	171.7	69.5	77.5
Canyon Vista[2,3]	Band Resighting	Bull Creek	171.0	69.2	71.5
Vireo Ridge[2,3]	Band Resighting	Cypress Creek	171.0	69.2	62.5
Steiner Ranch - Sec. 3	Presence/ Absence	North Lake Austin	69.8	28.2	24.0
TOTAL			**3936.6**	**1593.1**	**1711.9**

[1] Study Areas may contain multiple BCP tracts

[2] The City of Austin staff analyzed these data

[3] Area surveyed includes 100 meter survey buffer

Figure 1. GCWA Survey Areas on the Balcones Canyonlands Preserve, FY 2019, Travis County, Texas.



Methods

Enumeration Surveys

County staff used enumeration surveys, or territory mapping, to provide an estimate of abundance, occupancy, distribution and territory density in selected study areas (plots). Enumeration surveys on Travis County-managed properties 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.

Enumeration plots were surveyed from 15 March to 15 June with a minimum of eight visits in each plot to ensure adequate plot coverage. During each visit, surveyors attempted to audibly locate and follow male GCWA and obtain several spatial and behavioral observations. In addition, male counter-singing was recorded to assist with the identification and delineation of male territory boundaries. GCWA locations were recorded using Garmin handheld global positioning units (GPS) and/or on paper maps with an aerial imagery background using topographic lines and 100-meter Universal Transverse Mercator (UTM) grid. Data were 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 GCWA observation included date, spatial location, individual male observation ID, sex, song type, band information, counter-singing presence and directions, presence of a mate/nests, and presence/number of fledglings.

Males were considered to have an established territory and assigned a unique Territory ID post hoc if any of the following occurred: 1) a male was observed on at least three occasions each separated by at least six days; 2) a male was with a female (appearing to be paired); 3) a male was observed attending a nest or feeding hatch-year fledglings. Territories were differentiated as either "Full", "Edge" or "Off-plot". A territory was designated as "Full" when the male was observed outside of the survey plot on no more than one visit. An "Edge" territory was designated when a male was typically observed inside the plot but was observed outside the plot on more than one visit. An "Off-Plot" territory was designated when all male territory observations occurred outside of the survey area. "Off-plot" territories were not given a unique Territory ID and were not included in further data analysis. GCWA observations that did not meet the minimum requirements or could not be assigned a territory with certainty did not receive a Territory ID and were designated as "Unknown". Subsequently, using ArcGIS, we created minimum convex polygons (MCP) around

each set of unique Territory ID observations to delineate estimated GCWA male established territory boundaries.

Travis County staff used Verner's (1985) method to calculate GCWA territory density within survey plots where "Full" territories were counted as 1.0 territory and "Edge" territories counted as 0.5 territories. Staff then divided 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). A GCWA abundance estimate was calculated by adding together the total number of "Full", "Edge", and "Unknown" male observations within the survey plot. Due to limitations inherent to territory mapping methods (i.e. differences in observer ability, observer bias, and mobility of the target species), results of all surveys should be interpreted as approximations.

Intensive Plot Monitoring and Band Resighting

In coordination with the City of Austin, Travis County Natural Resources staff participated in a BCP-wide monitoring program of established intensive monitoring plots which are arranged across a spectrum of GCWA habitat types. Intensive monitoring efforts included data collection of color-banded GCWA in order to estimate territory density/size/location, age structure, pairing success, breeding success, productivity and nest survival. County staff conducted GCWA intensive plot monitoring at Vista Point, Wheless, and Collins plots (Figure 1).

Previously established intensive plots that were not intensively monitored in the current survey year were treated as band resighting plots. This will continue until no banded GCWA are observed within these plots for one survey season. These resight plots were systematically surveyed for returning color-banded GCWA. In FY 2019, County staff and volunteers assisted with band resighting efforts at the Canyon Vista and Vireo Ridge plots (Figure 1). For a more detailed description of survey methods and results of the intensive monitoring program and band resighting effort, see the City of Austin's "Appendix F "of the 2019 BCCP Annual Report.

The Collins plot was established after Travis County Staff discovered a colony of invasive tawny crazy ants (*Nylanderia fulva*; hereafter TCA) on an adjacent property in 2017. TCAs are arboreal foragers and there are concerns of negative impacts to the GCWA prey-base. In response, Travis County staff began a pilot study to examine the composition of the canopy arthropod community within affected and adjacent areas, along with an intensive monitoring plot for GCWA within the Collins tract. Additional information on the ongoing TCA project is detailed in "Appendix T4".

Presence/Absence Survey

In FY 2019, Travis County staff conducted GCWA presence/absence surveys at the Steiner Ranch - Section 3 conservation easement to determine if potential GCWA habitat, breeding territories, or individuals were present within the 28 ha easement survey area. Staff conducted GCWA surveys and habitat assessments following USFWS (2010) presence/absence surveying protocol.

Results

Enumeration Surveys Results

In FY 2019, Travis County staff and volunteers contributed approximately 1,070 hours of survey effort to conducting GCWA territory enumeration surveys within eight study areas distributed across four macrosites, totaling approximately 1,247 ha (Table 1). Estimated GCWA abundance, territories, and territory density based on enumeration survey results are presented in Table 2.

Table 2. GCWA abundance and territory density estimates based on enumeration survey results from FY 2019, Travis County BCP, Texas.

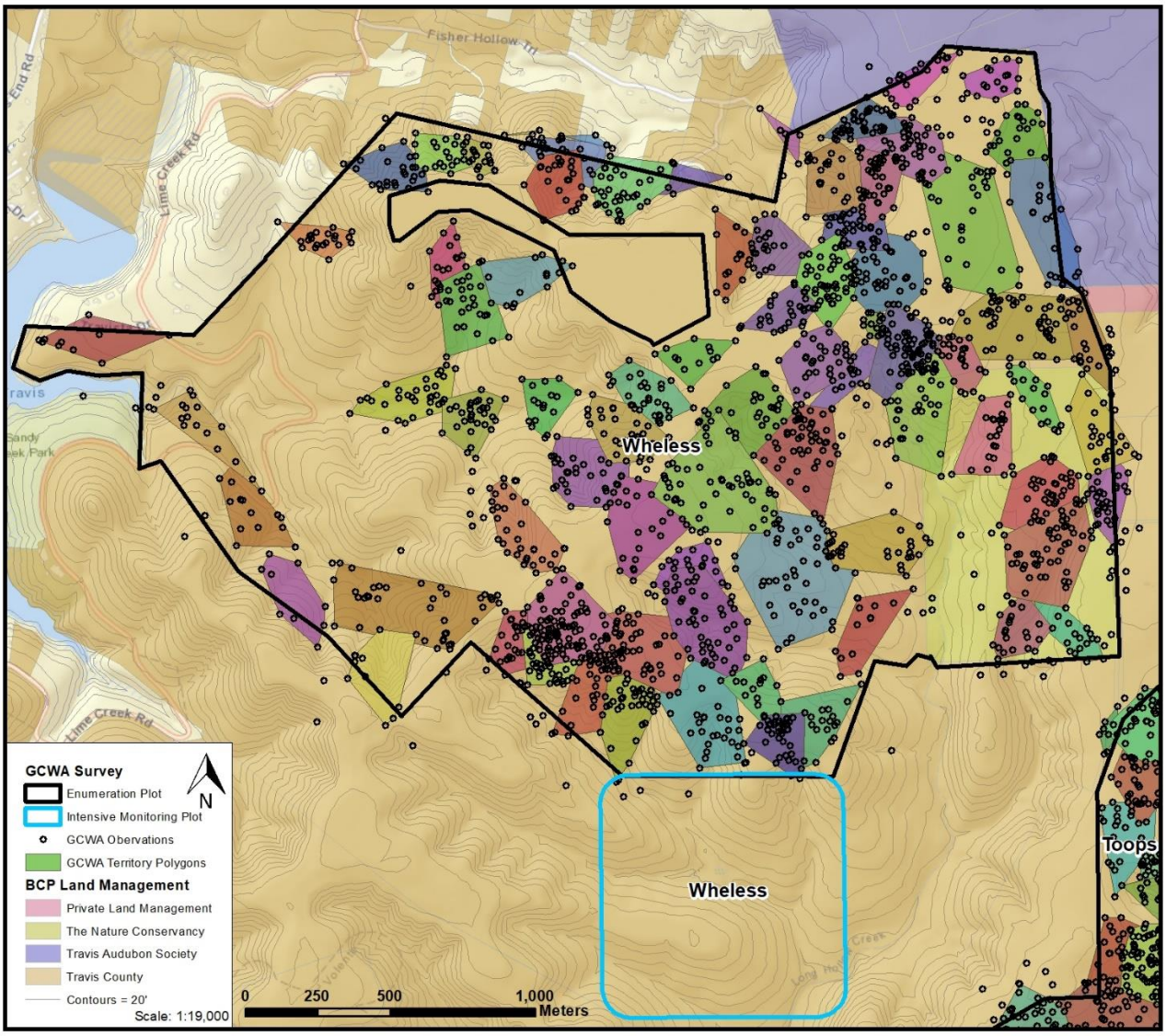
Survey Areas	Hectares	Acres	Abundance	No. of Full Territories	No. of Edge Territories	No. of Modified* Territories	Territory Density (ha)	Territory Density (ac)
Cypress Creek Macrosite								
Wheless	573.8	1417.8	162	62	14	69	0.12	0.05
Toops	231.2	571.4	97	34	4	36	0.16	0.06
Grandview Hills	159.9	395.2	70	27	3	28.5	0.18	0.07
Cypress Creek Combined	*964.9*	*2384.4*	*329*	*123*	*21*	*133.5*	*0.14*	*0.06*
Bull Creek Macrosite								
Concordia	125.3	309.7	45	18	6	21	0.17	0.07
Origer	5.0	12.4	4	0	2	1	0.20	0.08
Woody Hollow Preserve	3.2	8.0	2	0	2	1	0.31	0.12
Bull Creek Combined	*133.5*	*330.1*	*51*	*18*	*10*	*23*	*0.17*	*0.07*
Pedernales River Macrosite								
Hamilton Pool	95.3	235.6	8	4	1	4.5	0.05	0.02
North Lake Austin Macrosite								
Steiner Ranch-Sect. 4	52.9	130.8	8	5	0	5	0.09	0.04
All Study Areas Combined	**1,246.8**	**3080.9**	**396**	**150**	**32**	**166**	**0.13**	**0.05**

*Modified territories are the number of full territories plus one-half of the number of edge territories

Wheless GCWA Enumeration Survey Results

The Wheless GCWA enumeration survey area included the northern portions of Wheless tract of the BCP and the Lehmann tract (managed by The Nature Conservancy), totaling approximately 574 ha (1418 ac). The Wheless study area is located northeast of the Village of Volente within the Cypress Creek macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in Figure 2.

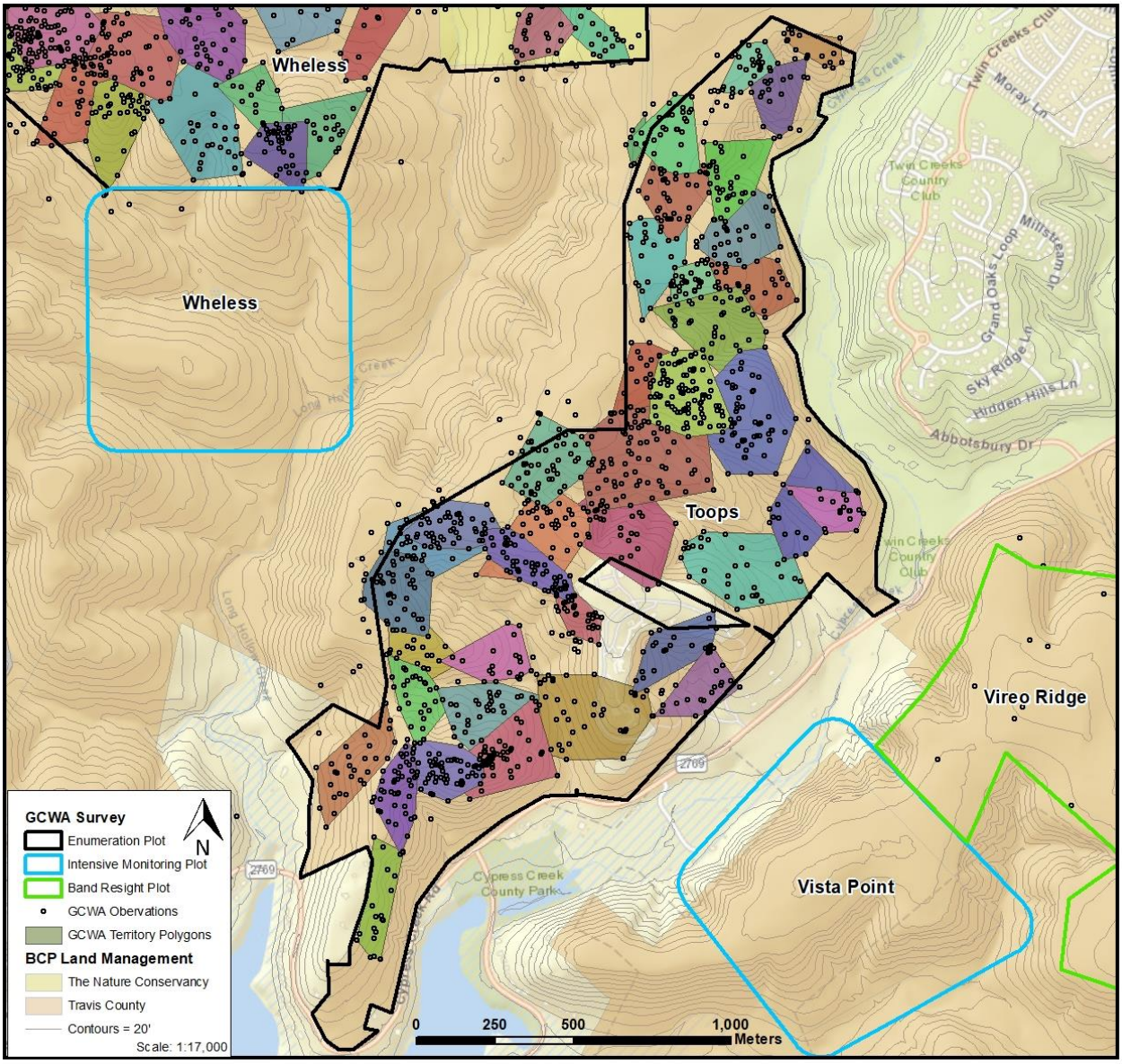
Figure 2. GCWA observations and estimated territory delineations based on the Wheless enumeration survey from FY 2019, Travis County BCP, Texas.



Toops GCWA Enumeration Survey Results

The Toops GCWA enumeration survey area included the Toops and Crossing tracts of the BCP as well as the eastern portions of the New Life tract and the southern portion of the Spezia tract, totaling approximately 231 ha (571 ac). The Toops study area is located east of the Village of Volente and northwest of Farm-to-Market (FM) 2769, within the Cypress Creek macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in Figure 3.

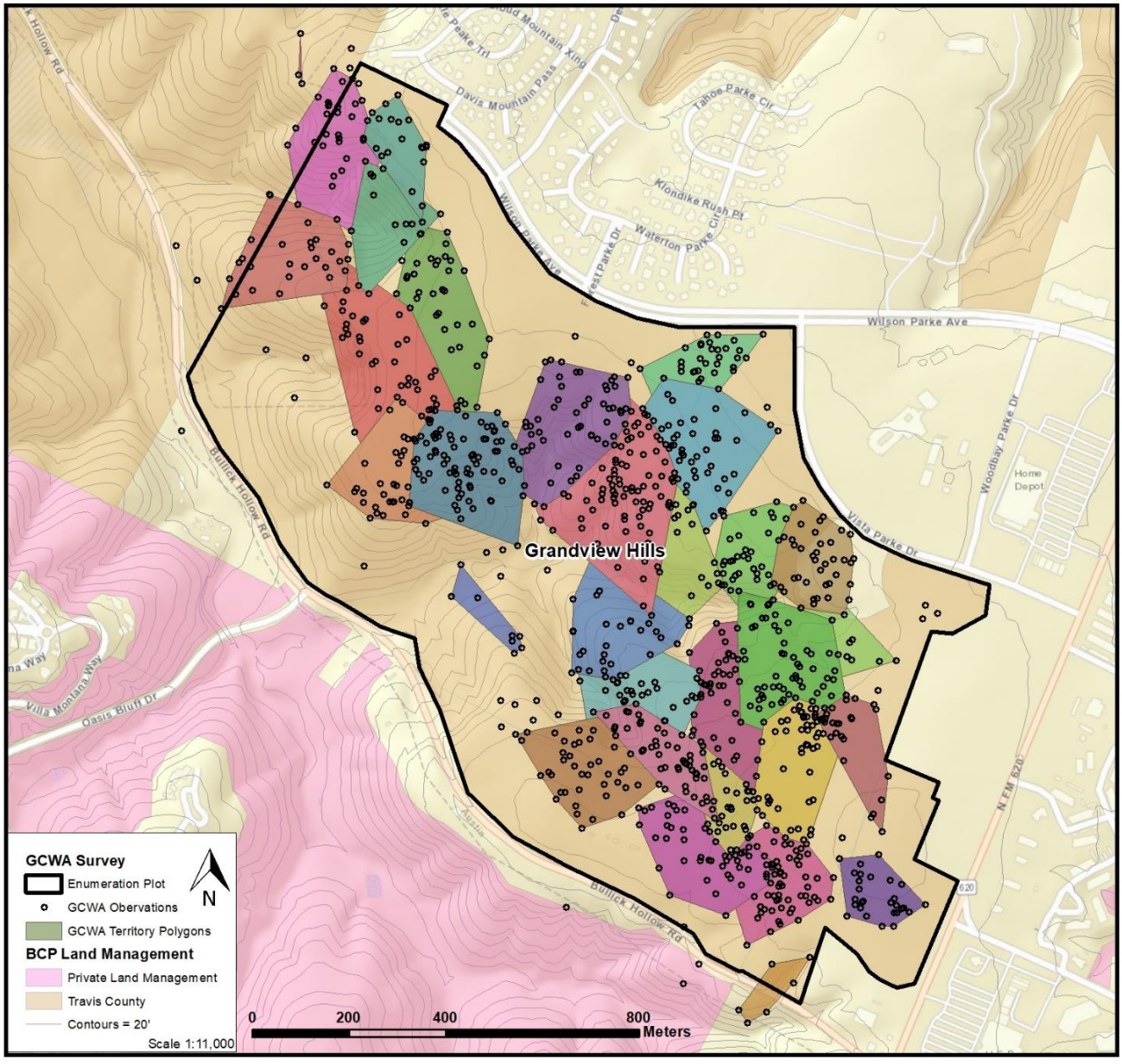
Figure 3. GCWA observations and estimated territory delineations based on the Toops enumeration survey from FY 2019, Travis County BCP, Texas.



Grandview Hills GCWA Enumeration Survey Results

The Grandview Hills GCWA enumeration survey area included the Grandview Hills South, Cuevas, Cuevas East, and Blackmore tracts of the BCP, totaling approximately 160 ha (395 ac). The Grandview Hills study area is located within the City of Austin, between Bullick Hollow Road and Wilson Park Avenue, within the Cypress Creek macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in Figure 4.

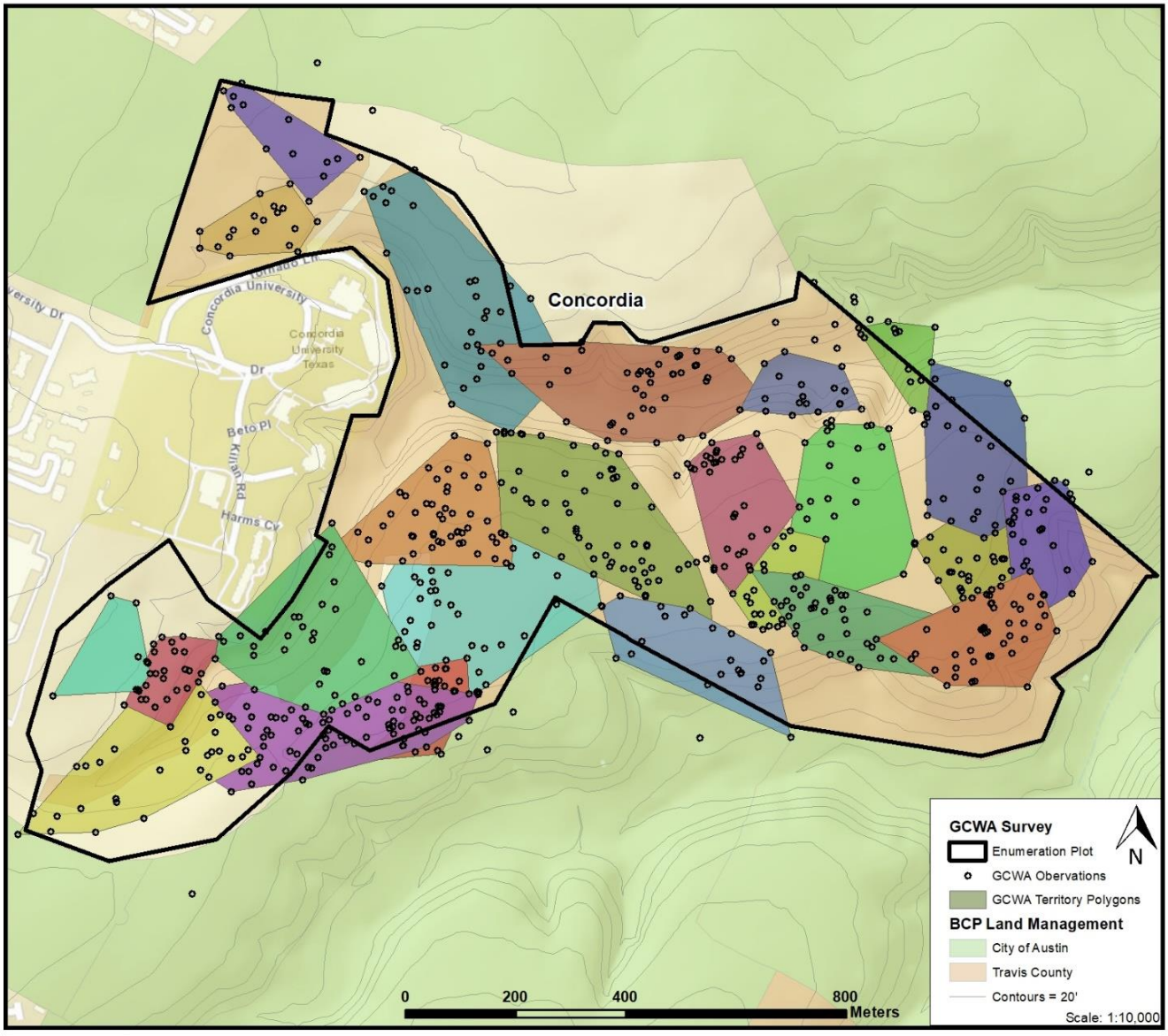
Figure 4. GCWA observations and estimated territory delineations based on the Grandview Hills enumeration survey from FY 2019, Travis County BCP, Texas.



Concordia GCWA Enumeration Survey Results

The Concordia GCWA enumeration survey area included the Concordia tract of the BCP as well as adjacent portions of potential GCWA habitat managed by Concordia University, totaling approximately 125 ha (310 ac). The Concordia study area is located within the City of Austin, east of the University of Concordia campus, within the Bull Creek macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in Figure 5.

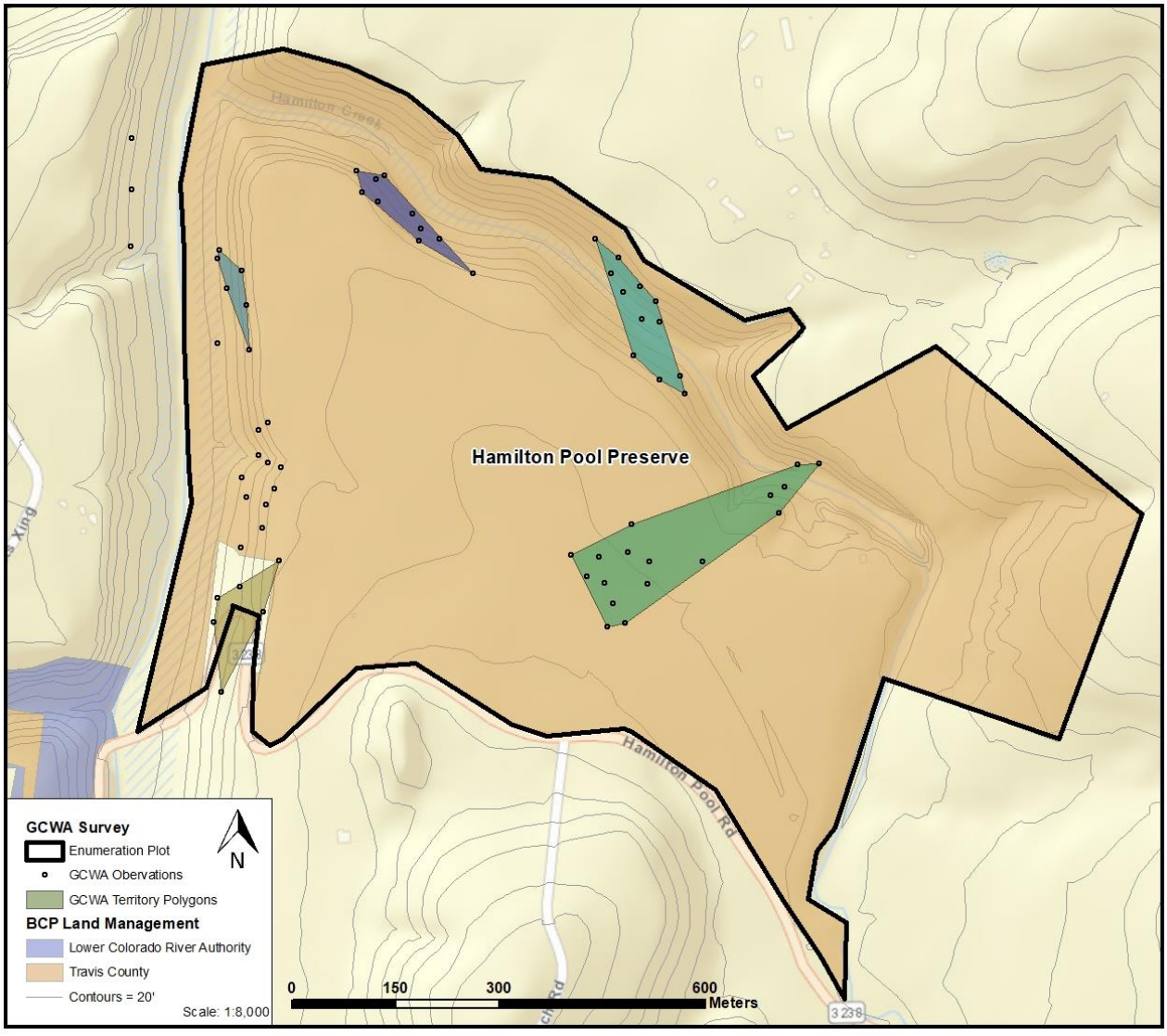
Figure 5. GCWA observations and estimated territory delineations based on the Concordia enumeration surveys from FY 2019, Travis County BCP, Texas.



Hamilton Pool GCWA Enumeration Survey Results

The 95 ha (236 ac) Hamilton Pool GCWA enumeration survey area includes the Martin tract and the Hamilton Pool Preserve, a Travis County Park that is included in the BCP. Hamilton Pool Preserve is located north of Hamilton Pool Road in southwest Travis County, within the Pedernales River macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in Figure 6.

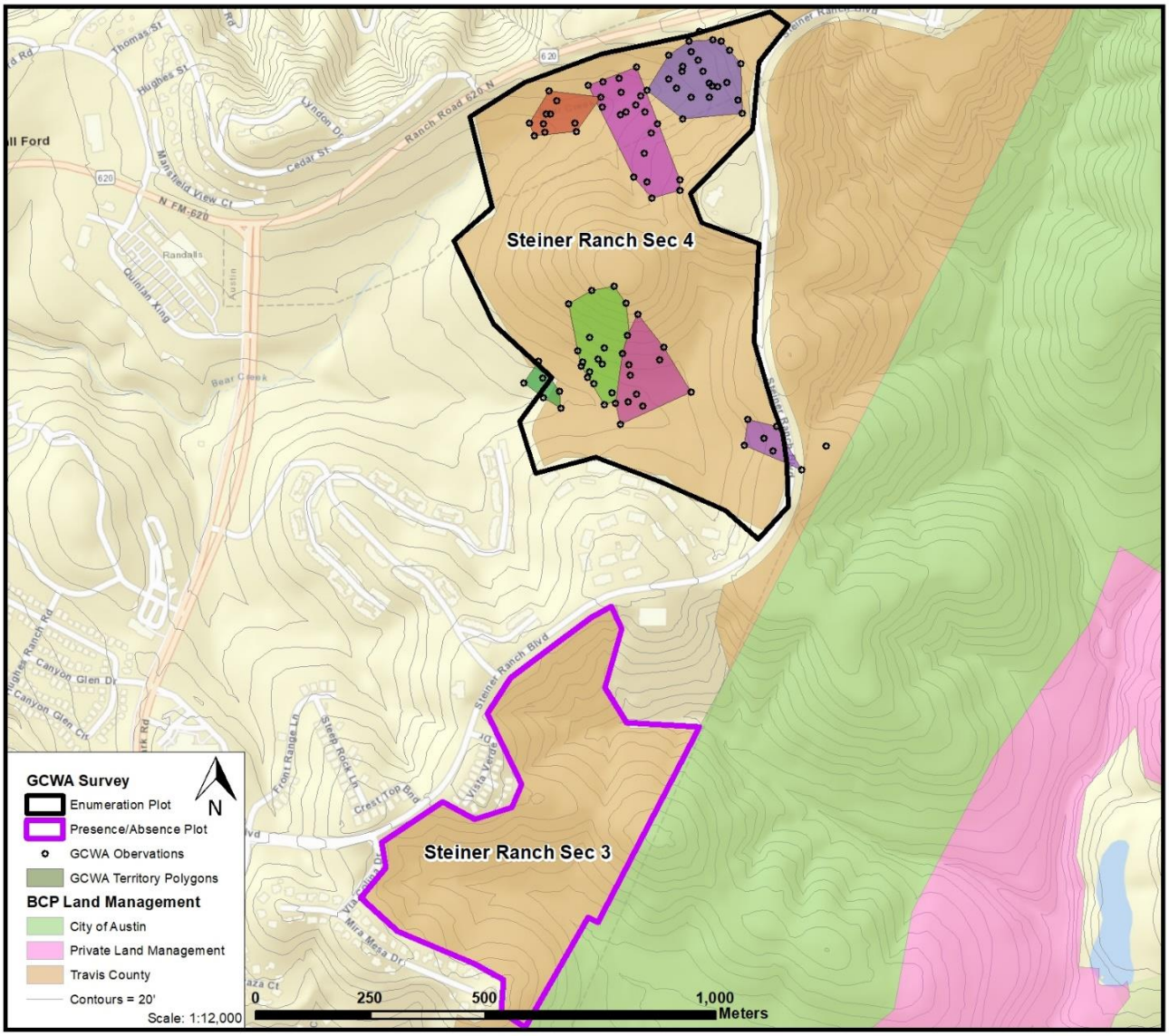
Figure 6. GCWA observations and estimated territory delineations based on the Hamilton Pool enumeration survey from FY 2019, Travis County BCP, Texas.



Steiner Ranch – Section 4 GCWA Enumeration Survey Results

The Steiner Ranch – Section 4 GCWA enumeration survey area includes approximately 53 ha (131 ac) of the Steiner Ranch – Section 4 conservation easement. This study area is located near the southeast side of Lake Travis, south of FM 620, within the North Lake Austin macrosite. GCWA observation locations and delineated territories from 2019 enumeration surveys are presented in Figure 7.

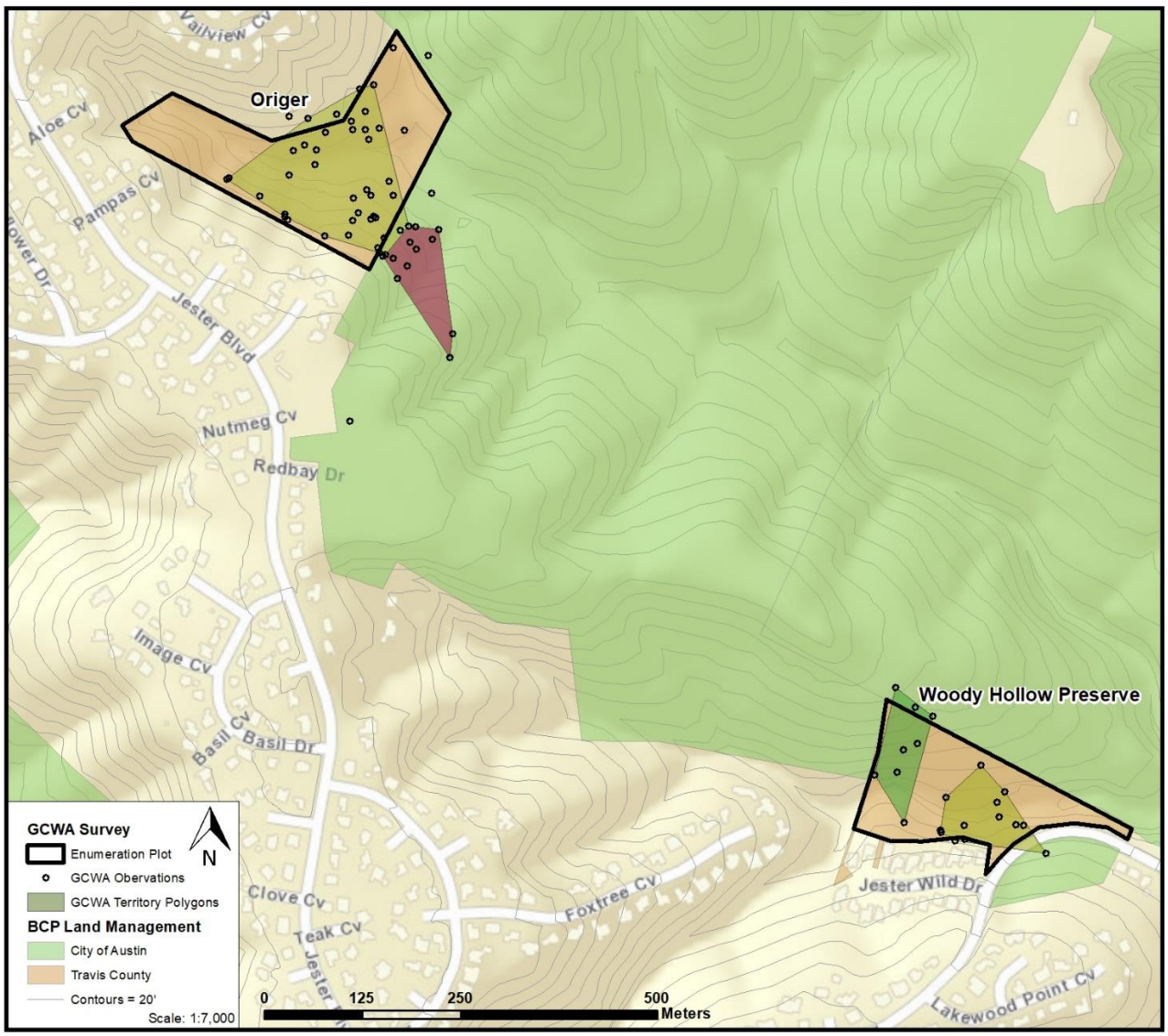
Figure 7. GCWA observations and estimated territory delineations based on the Steiner Ranch–Section 4 enumeration survey from FY 2019, Travis County BCP, Texas.



Woody Hollow/Origer GCWA Enumeration Survey Results

The Woody Hollow/Origer GCWA enumeration survey area includes the 3 ha (8 ac) Woody Hollow Preserve conservation easement and the 5 ha (12 ac) Origer tract of the BCP. These smaller acreage tracts are located in the City of Austin, north of the Jester Estates neighborhood, within the Bull Creek macrosite. GCWA observation locations and delineated territories from FY 2019 enumeration surveys are presented in in Figure 8.

Figure 8. GCWA observations and estimated territory delineations based on the Woody Hollow and Origer enumeration surveys from FY 2019, Travis County BCP, Texas.



Intensive Plot Monitoring and Band Resighting Results

In FY 2019, Travis County staff surveyed Intensive Monitoring plots weekly from 15 March 2019 to 25 May 2019. Additional weekly visits to the plots occurred between 25 May 2019 and 15 June 2019 to continue monitoring nesting activity, obtain hatch-year bird observations, and gain additional band resight information. Travis County staff contributed approximately 257.0, 162.5, and 77.5 hours of survey time to the Collins, Vista Point, and Wheless intensive monitoring plots, respectively.

Travis county staff and volunteers surveyed band resight plots four times between 20 March 2019 and 15 April 2019, with one additional survey between 15 May 2019 and 25 May 2019 to detect dispersing GCWA. Travis County staff contributed approximately 71.5 and 62.5 hours of survey time to the Canyon Vista and Vireo Ridge plots, respectively.

Travis County shared intensive plot monitoring and band resighting data collected in FY 2019 with the City of Austin staff for further analysis and publication. For a more detailed summary of the results and discussion of the intensive monitoring program and band resighting effort, see the City of Austin's "Appendix F" of the 2019 BCCP Annual Report.

Presence/Absence Survey Results

Travis County staff conducted two GCWA presence/absence surveys on Steiner Ranch - Section 3 conservation easement on 28 March 2019 and 11 April 2019. Habitat assessments conducted during presence/absence surveys observed the survey area did not contain suitable nesting habitat for GCWA. Habitat within the survey area is mainly characterized by rocky limestone slopes with open stands of short (<15 feet in height and <5 inches dbh second growth Ashe juniper (*Juniperus ashei*) and plateau live oak (*Quercus fusiformis*). Travis county staff used playback (playing a recording of a bird's song) intermittently during the final survey in an attempt to increase the probability of GCWA detection. County staff did not detect any GCWAs during the 2019 presence/absence survey efforts at Steiner Ranch - Section 3.

Acknowledgements

Travis County would like to thank all of the BCP partners and staff for their collaboration in the 2019 GWCA survey efforts. Special thanks go to our seasonal natural resource survey technicians Kristen Gold, Audrey Kuhl, Nancy Sandoval, and Ben Stubbs. Thank you also to our dedicated volunteers Julie Chapman, Nevin Durish, Amber Gosselin, Jeffery Jackson, Leigh Jandle, Jim Weber, and Lynne Weber.

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_____. 2010. USFWS Section 10(a)(1)(A) Scientific permit requirements for conducting presence/absence surveys and habitat assessments for endangered golden-cheeked warblers. (last updated 01/13/10). Ecological Services Field Office, Austin, Texas.