FY 2017 Report on Monitoring Golden-cheeked Warblers (*Setophaga chrysoparia*) on Travis County Tracts of the Balcones Canyonlands Preserve



Photo: Courtesy of Julia Land

Travis County

Department of Transportation and Natural Resources

Natural Resources and Environmental Quality Division

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Introduction

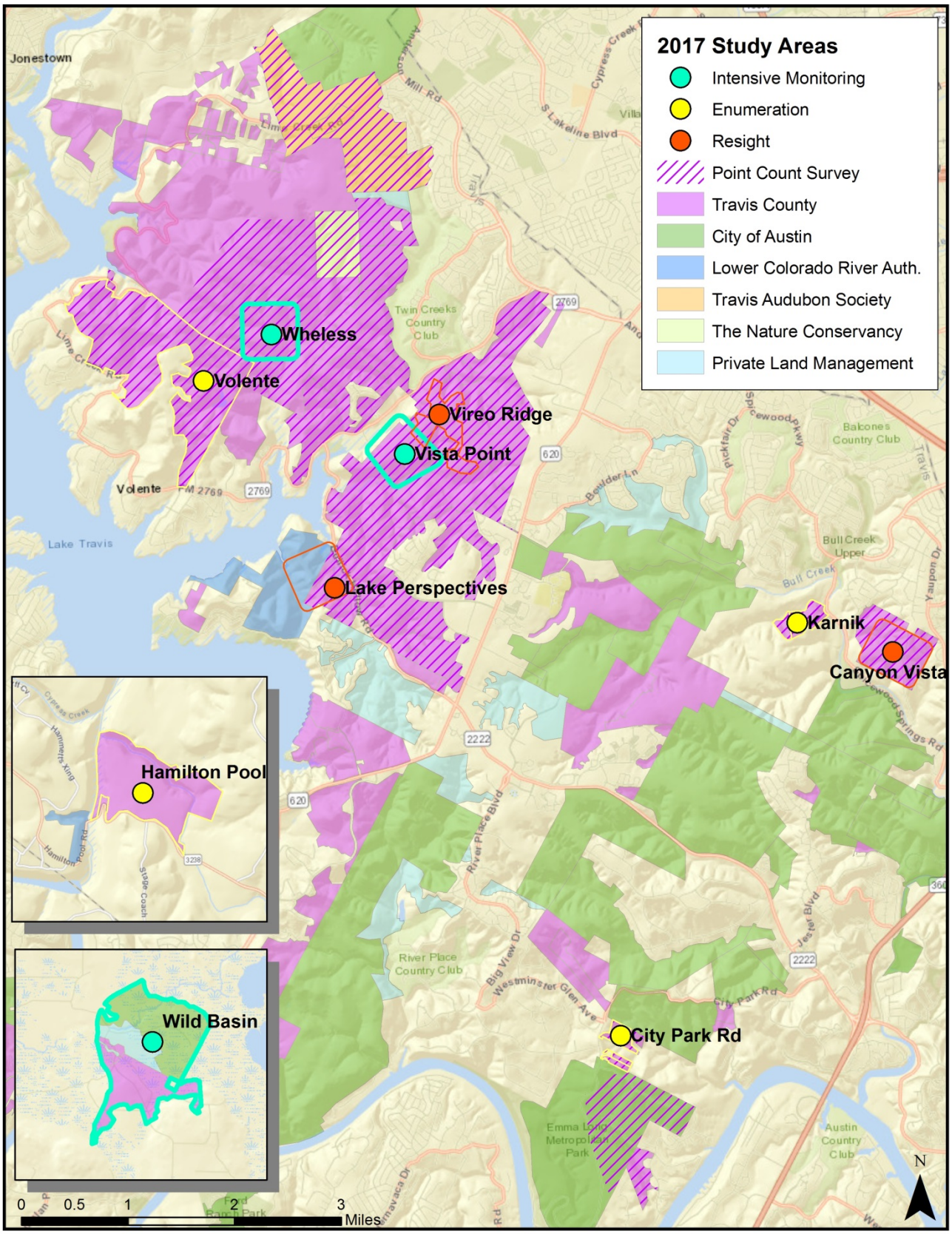
The Balcones Canyonlands Preserve (BCP) was created in March 1996 to protect the endangered golden-cheeked warbler (*Setophaga chrysoparia*) (GCWA) and seven other federally endangered species. Management of the BCP is carried out by Travis County, the City of Austin, and several other partners. Travis County manages 4,825 hectares (11,924 acres) of GCWA breeding habitat that consists primarily of mature oak-juniper (*Quercus-Juniperus*) forest. Travis County staff annually monitors the GCWA population on select County-managed BCP tracts and Parks. In FY 2017, Travis County Natural Resources staff conducted a pilot point count survey on approximately half of the Travis County BCP and enumeration surveys on selected tracts (Figure 2). In addition, County staff collected territory and productivity data on intensive monitoring plots as part of a collaborative monitoring program with the City of Austin. County staff and volunteers surveyed GCWAs for 849.5 hours throughout the 2017 season. See Table 1 for survey effort. City of Austin staff monitored the Wild Basin Preserve intensive monitoring plot.

Table 1. 2017 GCWA Survey Effort on Travis County managed lands.

Tract	Hectares Surveyed	Survey Type	Total Survey Hours	% Survey Effort
Point Count Survey*	2703	Point Count	178	21.5%
Volente	340	Enumeration	238.5	35.5%
Karnik	24	Enumeration	29.25	4.4%
City Park Rd	19	Enumeration	21.75	3.2%
Hamilton Pool	67	Enumeration	39.25	5.8%
Vista Point	69	Intensive Monitoring	159	23.7%
Wheless	69	Intensive Monitoring	72	10.7%
Wild Basin**	177	Intensive Monitoring	0	0%
Canyon Vista	69	Re-sight	46.5	6.9%
Vireo Ridge	50	Re-sight	40.25	6.0%
Lake Perspectives	69	Re-sight	25	3.7%
Total	**2487**		**849.5**	

*Travis County staff conducted surveys on the 66-ha Lehman Tract owned by the Nature Conservancy and on the 150-ha Emma Long Metropolitan Park owned by the City of Austin (included in point count total).
**The City of Austin staff conducted surveys on the Wild Basin tract.

Figure 1. 2017 Travis County GCWA Survey Sites on the Balcones Canyonlands Preserve.



Methods and Results

Point Count Survey

Point count surveys are a method for surveying birds over a large area to generate a relative abundance index (Buckland 2001, Farnsworth et al., 2005). During FY 2017 Travis County staff and volunteers conducted a pilot point count study on portions of the Travis County BCP, Travis Audubon Society (TAS), the Nature Conservancy (TNC), and the City of Austin (CoA) properties. See Appendix A for the protocol. Travis County staff consulted with the Department of Defense at Fort Hood and the Balcones Canyonlands National Wildlife Refuge to coordinate protocols so that GCWA data can be pooled with their survey efforts. A grid of survey points 250 meters apart was established across 2,703 hectares that included approximately 2,487 hectares of Travis County BCP, 66 hectares of TNC land, and 150 hectares of CoA land. The survey area covered approximately 52% of the Travis County BCP. The point count study area was focused on the relatively contiguous Jollyville and Cypress Creek Units. Non-contiguous plots were included in the point count survey where contemporaneous territory mapping or re-sighting efforts were underway. These included Hunt-Lemens-Martin-Hereford, Karnik-Richards-Wendland, Canyon Vista, and the City of Austin's Emma Long Metropolitan Park. The point count survey team consisted of three Travis County staff members and two volunteers. Surveyors recorded detections of singing male GCWAs at each point for a five minute interval. Distance and direction to the detected GCWA and time of detection were recorded. Surveys were conducted from sunrise to 11am during the month of April.

A total of 178 hours of survey time were dedicated to point count surveys of 430 points. Male GCWAs were detected at 224 of the points with a total of 323 male GCWAs detected across the study areas, yielding a density of 0.12 GCWA males per hectare. Figures 2-4 illustrate the detections from the point-count surveys.

Figure 2. GCWA detections documented in the 2017 Point Count Survey at the Jollyville & Cypress Creek Units.

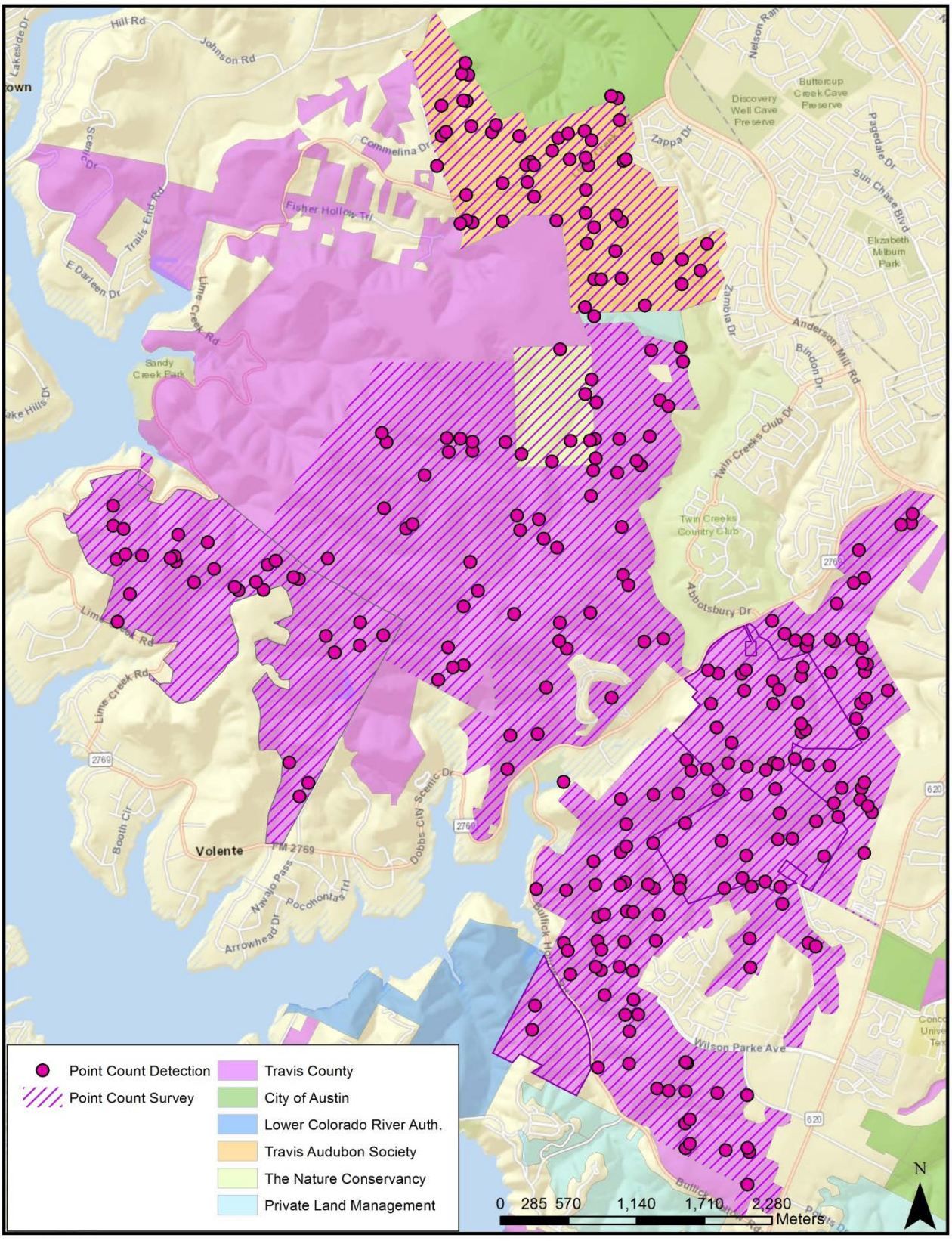


Figure 3. GCWA detections documented in the 2017 Point Count Survey at Karnik and Canyon Vista.

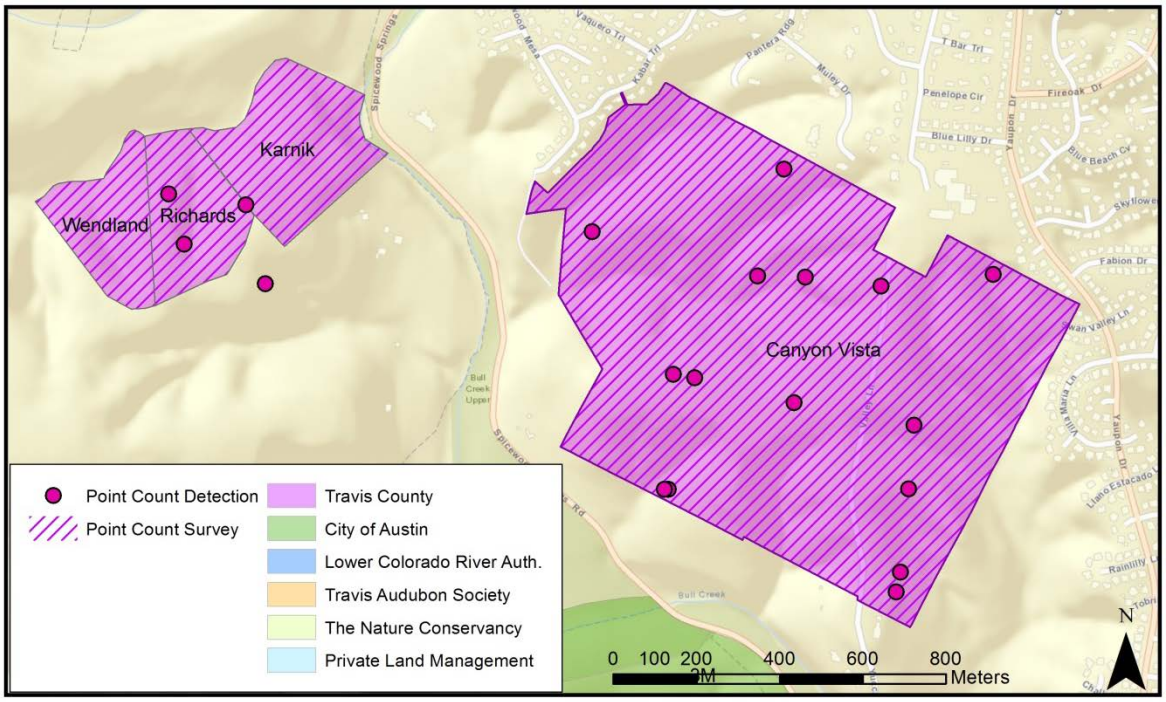
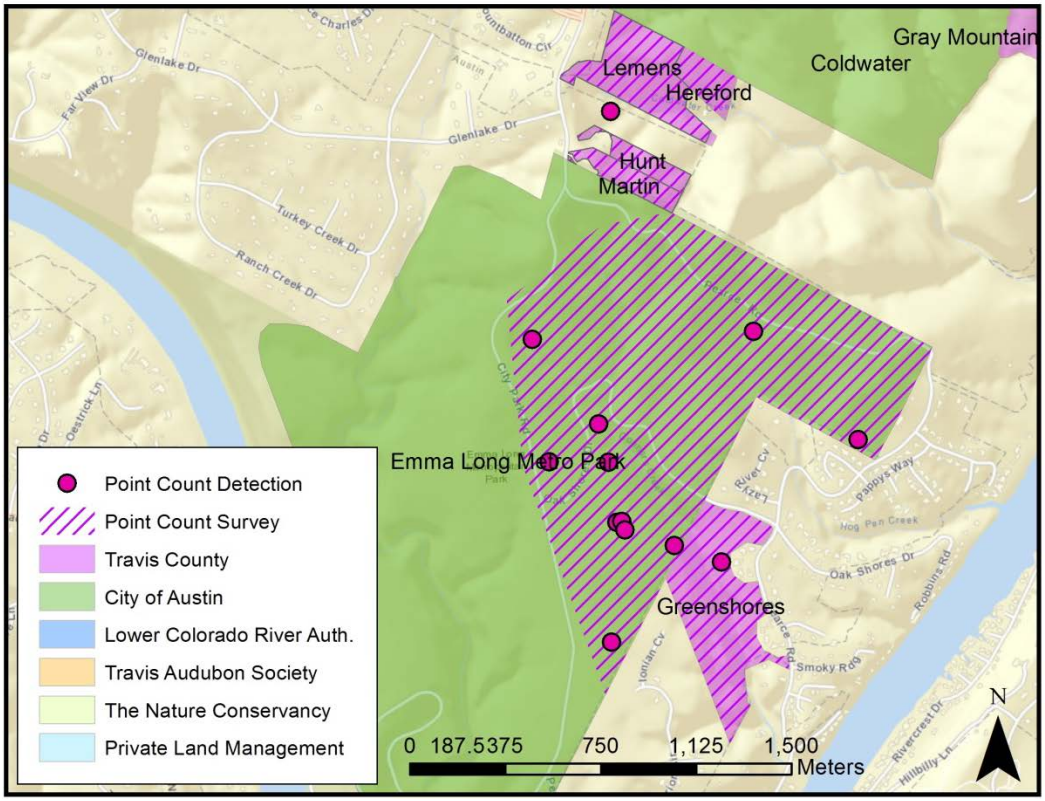


Figure 4. GCWA detections documented in the 2017 Point Count Survey at City Park Rd and Emma Long Metro Park.



Enumeration Surveys

Territory mapping (enumeration) is a survey method utilized to provide an estimate of abundance, occupancy, distribution and territory density in selected study areas. Weekly observations of GCWAs were recorded for approximately 10 weeks beginning in mid-March. Male GCWA that are observed on at least three occasions separated by at least seven days or observed with a female, attending a nest, or with fledglings are considered territorial. Territories are differentiated as either "Full" with all observations occurring within the study area, "Edge" with some observations outside the study area, or "Off-plot" with no observations occurring within the study area.

Enumeration surveys were conducted on Volente and Molberg (hereafter referred to as Volente), Karnik-Richards-Wendland (hereafter referred to as Karnik), Hunt-Lemens-Martin-Hereford (hereafter referred to as City Park Rd), and Hamilton Pool and Martin-Hamilton Pool (hereafter referred to as Hamilton Pool). Nine Travis County staff members and seven volunteers contributed 328.75 hours to enumeration surveys.

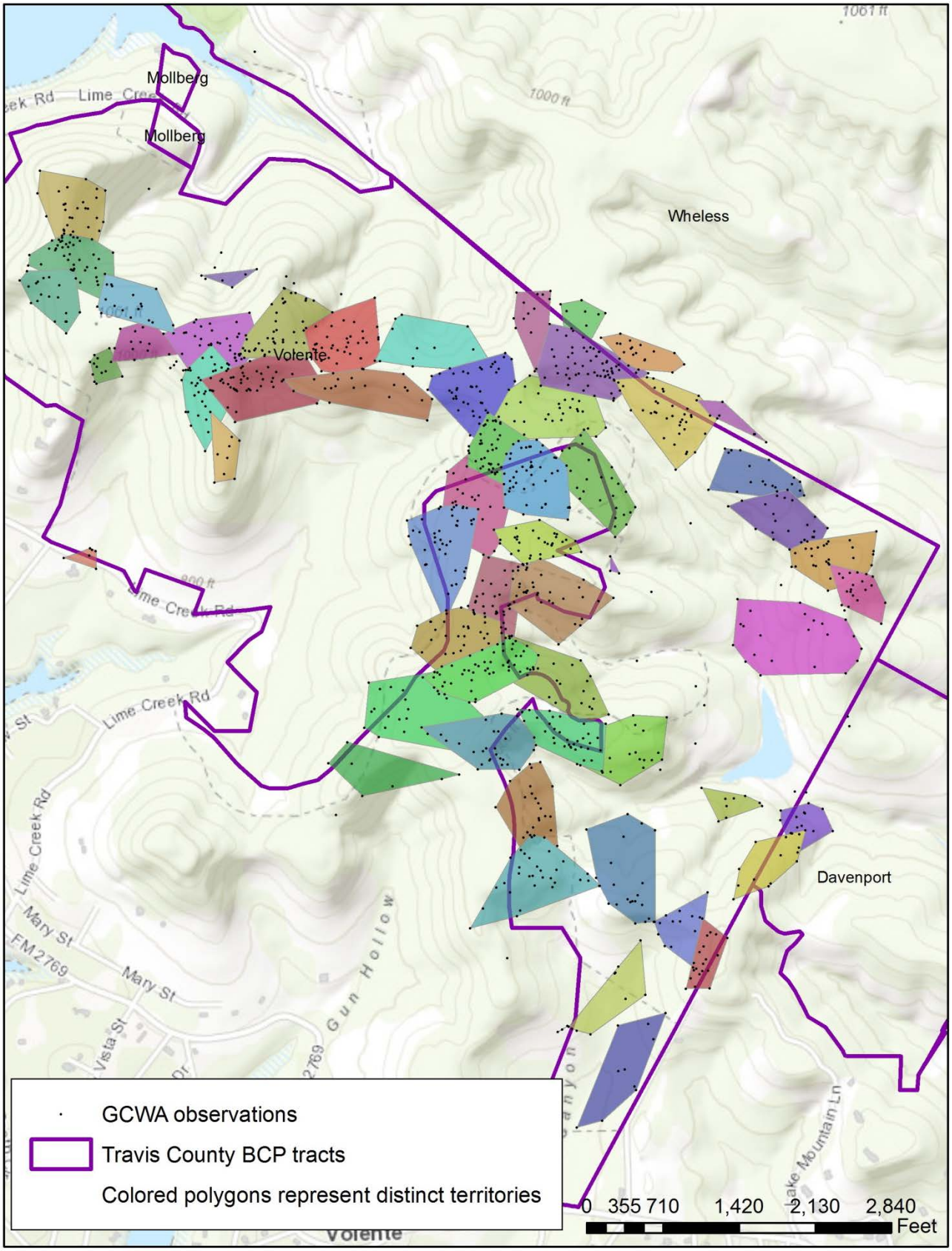
Table 2. 2017 GCWA abundance and territory density estimates based on enumeration survey results.

	Abundance	No. of Full Territories	No. of Edge Territories	Modified* number of Territories	Territory Density (ha)
Volente	58	25	27	38.5	0.11
Karnik	21	6	8	10	0.42
City Park Rd	1	0	1	0.5	0.03
Hamilton Pool	6	5	0	5	0.07

*Modified territories are the number of full territories plus half of the edge territories.

The Volente and Mollberg tracts are located near the Village of Volente in the Cypress Creek macrosite. Volente consists of 340 hectares (839 acres) of closed canopy woodland dominated primarily by Ashe juniper (*Juniperus ashei*) and plateau live oak (*Quercus virginiana*). A ridge runs through most of the tract from the northwest to the southeast. A plateau in the center of the Volente tract, often referred to as the "dinosaur", is not owned by Travis County. Of the 58 GCWA males observed, 25 established territories within the Volente tract and 27 were edge territories which extended beyond Travis County property. Territory density was calculated at 0.11 GCWA territories per hectare (Table 2; Figure 5). The results were similar for the 2010 enumeration survey with 34 territories within the study area and 17 edge territories with a density of 0.13 GCWA territories per hectare.

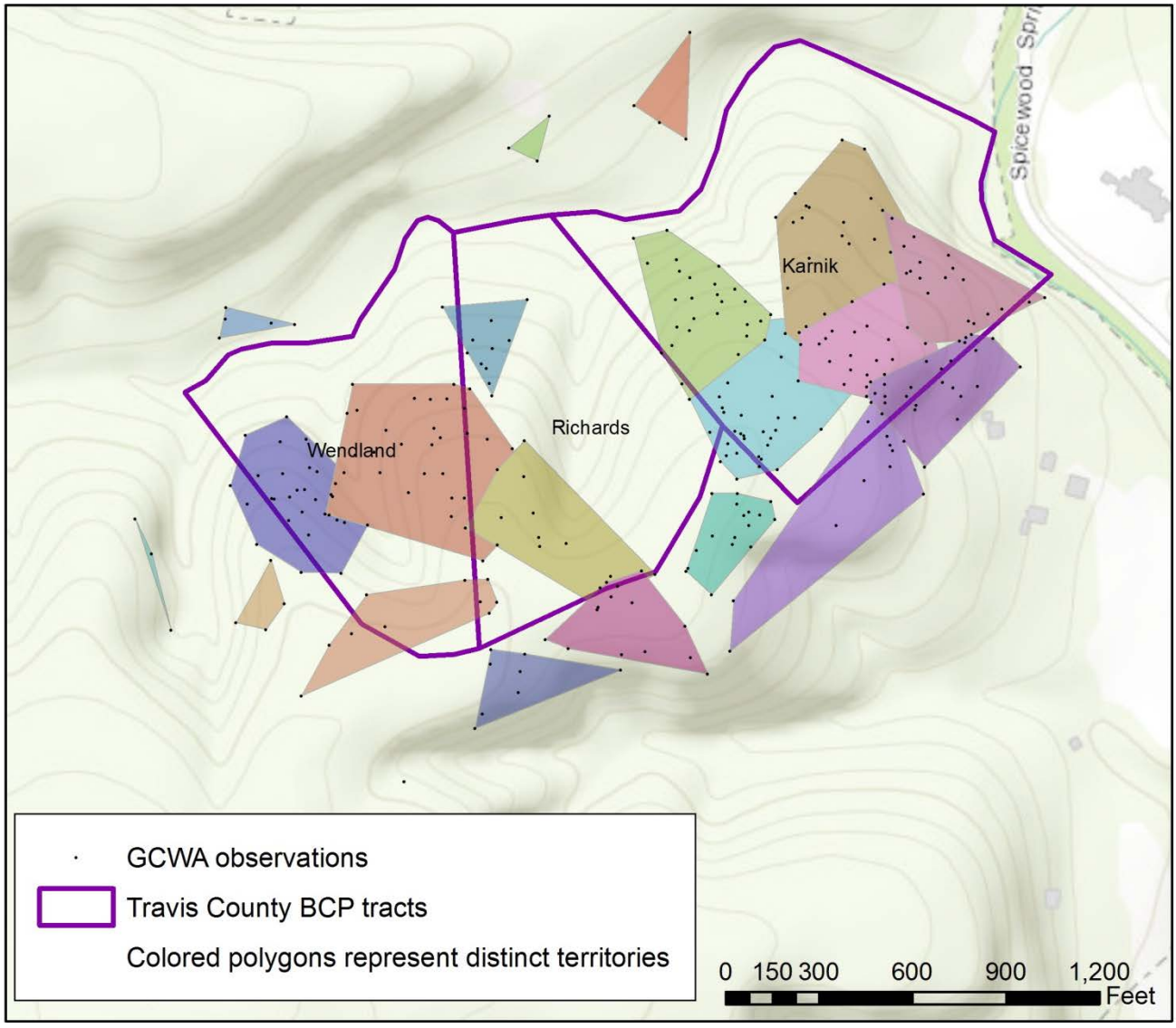
Figure 5. GCWA territories based on the 2017 Volente enumeration survey.



Karnik

The Karnik survey included the Karnik, Richards and Wendland tracts comprising 24 hectares (63 acres) in total. It is located in the Upper Bull Creek macrosite. The tract supports oak-juniper woodland with northwest facing slopes. In 2017, six full and seven edge territories were documented with a density of 0.42 GCWA territories per hectare (Table 2; Figure 6). The Karnik and Richards tracts were surveyed in 2010, but the Wendland tract had not yet been acquired. The density of GCWA documented on the Karnik and Richards tracts in 2010 were similar to the 2017 results at 0.40 territories per hectare.

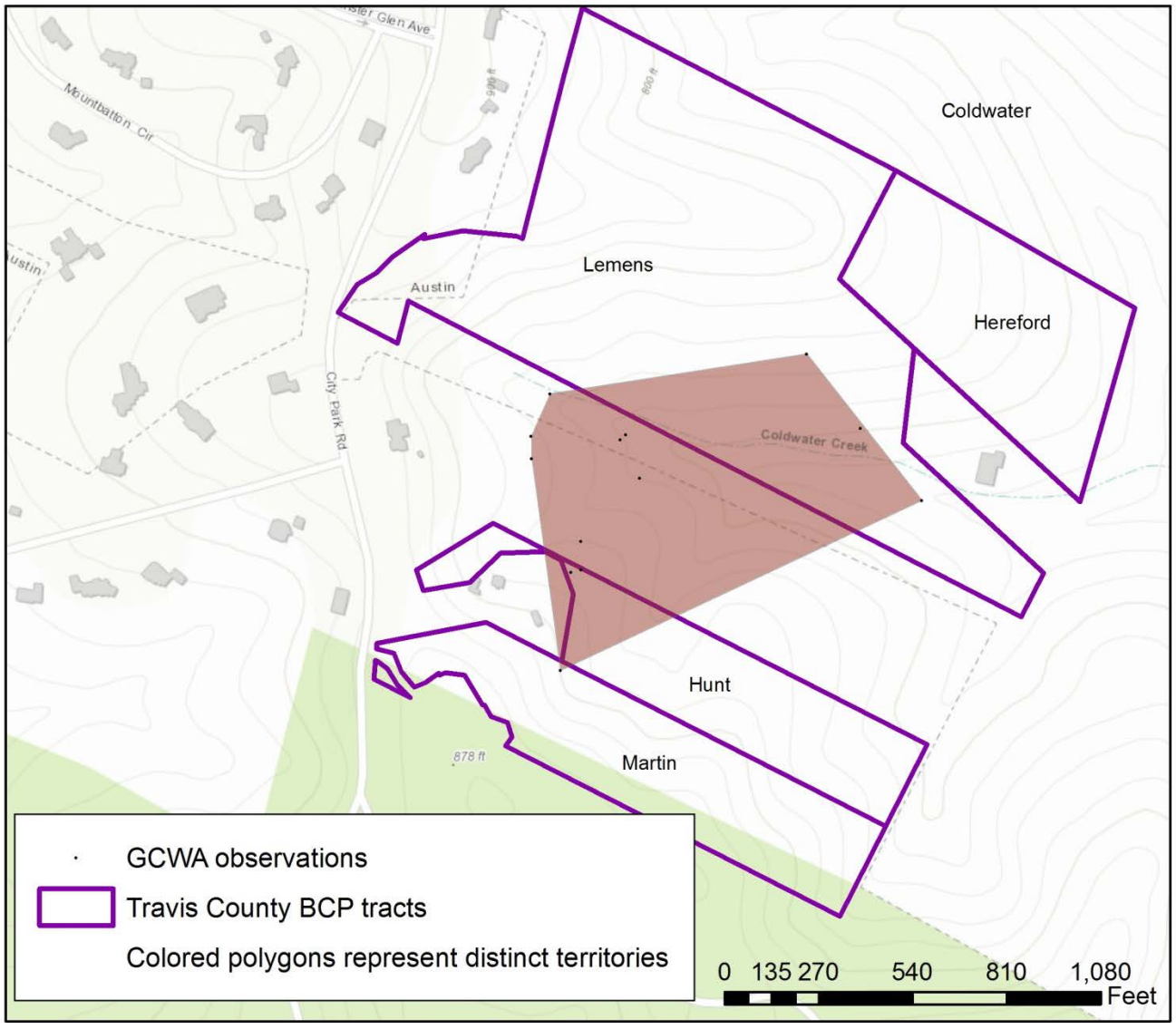
Figure 6. GCWA territories based on the 2017 Karnik enumeration survey.



City Park Road

The City Park Road survey covered a total of 19 hectares (55 acres) across the Martin, Lemens, Hunt and Hereford tracts. The survey area is located directly north of the City of Austin's Emma Long Metropolitan Park in the North Lake Austin macrosite. The landscape resembles a rough bowl with southeast facing slopes. In 2017, one GCWA male was detected for a density of 0.03 GCWA territories per hectare (Table 2; Figure 6). While that male was observed on three separate occasions, he was never observed counter-singing and was not detected after April 23rd despite three more attempts. In 2010, only the Hereford tract was surveyed but three GCWA males were detected, two of which established edge territories.

Figure 7. GCWA territory based on the 2017 City Park Road enumeration survey.



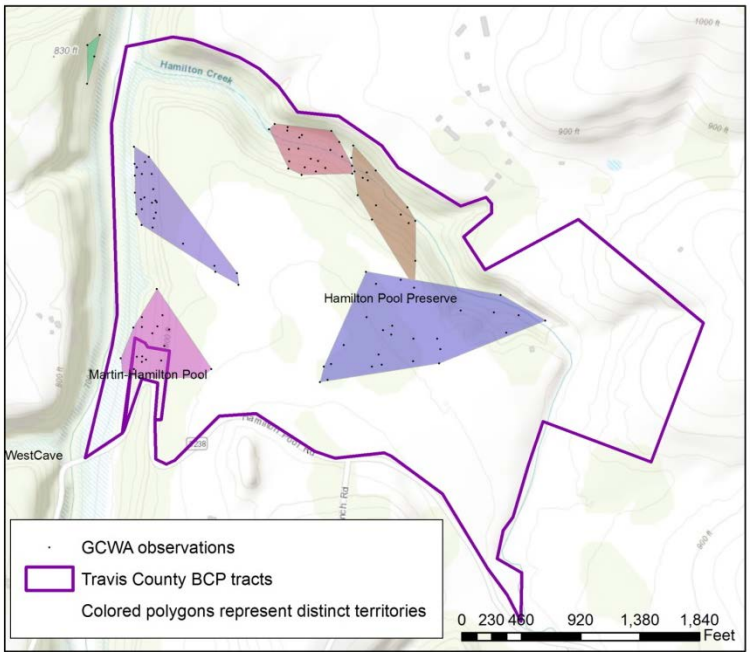
Hamilton Pool

Hamilton Pool Preserve is a 232 acre Travis County Park that is included in the BCP. It is located in far southwestern Travis County in the Pedernales macrosite. The riparian terrain supports mixed evergreen-deciduous woodland dominated by Ashe juniper, Texas oak (*Quercus buckleyi*), and cedar elm (*Ulmus crassifolia*). Travis County staff and volunteers have surveyed GCWA annually at Hamilton Pool since 1992 employing various protocols over the years. For the past five years, Travis County staff has surveyed areas that appear to contain habitat on 66 hectares (162 acres) of the property. In 2017, Travis County acquired the adjacent 1.6 ha Martin-Hamilton Pool tract which was subsequently included in the survey. Table 3 illustrates a sampling of the survey results. In the 2017 survey, six GCWA males were detected with five full territories observed for a density of 0.07 GCWA territories per hectare (Figure 8).

Table 3. Hamilton Pool GCWA Survey Results From Selected Years

Hamilton Pool	Abundance	No. of Full Territories	No. of Edge Territories	Modified number of Territories	Territory Density (ha)
2001 (66 ha)	9	-	-	9	0.18
2004 (40 ha)		7	9	8	0.19
2007 (40 ha)	13	7	3		0.21
2010 (40 ha)	15	7	3	8.5	0.21
2013 (66 ha)	7	4	2	5	0.08
2014 (66 ha)	14	6	1	6.5	0.1
2015 (66 ha)	7	3	0	3	0.02
2016 (66 ha)	4	2	0	2	0.005
2017 (67 ha)	6	5	0	5	0.07

Figure 8. GCWA territories based on the 2017 Hamilton Pool enumeration survey.



Intensive Plot Monitoring and 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. Intensive monitoring includes data collection of color-banded warblers to estimate territory density, territory size and location, age structure, pairing success, breeding success, productivity and nest survival. Plots have been established across the spectrum of habitat types. In FY 2017, intensive plot monitoring was conducted at Vista Point, Wheless, and Wild Basin Preserve.

Previously established plots that were not intensively monitored in 2017, were treated as resighting plots. These plots were searched for returning color-banded warblers. County staff and volunteers assisted with resighting efforts at Canyon Vista, Vireo Ridge and Lake Perspectives/McGregor.

For a more detailed description of methods and the results of the intensive monitoring program, see "Appendix X – Golden-cheeked Warbler Monitoring Program Balcones Canyonlands Preserve" of the 2017 BCCP Annual Report.

LITERATURE CITED

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. and Thomas, L. (2001). Introduction to Distance Sampling: Estimating Abundance of Biological Populations. Oxford University Press, Oxford, UK.

Farnsworth, G. L., Nichols, J. D., Sauer, J. R., Fancy, S. G., Pollock, K. H., Shriner, S. A., Simons, T. R., Ralph, C., and Rich, T. (2005). Statistical approaches to the analysis of point count data: a little extra information can go a long way. USDA Forest Service General Technical Report PSW–GTR–191 pages 735–743.

Appendix A

2017 Travis County GCWA Point Count Survey Protocol
(Adapted from BCNWR SOP)

1. Prior to the survey day, determine which points will be sampled and the order they are to be surveyed. Also, determine and upload the x,y coordinates for each point into a GPS.

2. Sampling will occur in the morning, from 30 minutes before sunrise to 4 hours after sunrise.

3. Do not conduct the count during high winds, heavy rains, or if fog reduces visibility to ≤100 m. Counts should not be conducted if it is raining hard (sky code 8) or if wind strength on the Beaufort Scale is a sustained 4 or greater. If these conditions are encountered, wait until the weather improves or cancel the sampling for the day and reschedule.

4. Approach the location, noting in the comments any target birds within 100 m of the counting station that are flushed, fly away, or retreat.

5. Record the data under Field Conditions.

6. Orient the bull's-eye data sheet to a fixed direction. Start the count. Use a pocket timer or watch to keep track of time.

7. When a target species is detected by song, plot the location on the map using the observation number. Record the species code, time (minute:second), and distance of the initial detection. (Note: You may use the range finder to assist with distance detection at this point or at the end of the survey. By plotting the location on the map, you may find it more efficient to continue to focus on detections until the end of the survey and then get your distances using the map and range finder, and GPS in step 11.)

8. Do not record visual detections of target species that are unaccompanied by song or other detections that are unaccompanied by song, for example *chips*.

9. Holding the sheet in a fixed position, spend part of the time facing different directions in order to better detect birds.

10. At the end of 5 minutes, stop recording bird observations. If no birds were detected, record this on the data sheet by writing NONE in the Species box for observation 1. Do not record any new birds seen or heard after the 5 minutes have passed.

11. After the survey, check the accuracy of your estimation ability by determining the distance to the nearest golden-cheeked warbler or black-capped vireo that is singing within 100 m. Do this by walking to the nearest individual and determining the distance with the GPS. Adjust your estimated distances on your data form if appropriate. If a GCWA was not detected, this step may be skipped.

12. Listen for BAWW, BCVI, and BHCO and circle if detected.