DETERMINING THE BASELINE STATUS OF GOLDEN-CHEEKED WARBLERS IN TEXAS

Report of surveys conducted by Texas A&M University on
Travis County's Balcones Canyonlands Preserve

Report submitted by:

Julie Groce, Project Leader
Institute of Renewable Natural Resources
Texas A&M University
College Station, TX

Michael L. Morrison, Principal Investigator
Department of Wildlife and Fisheries Sciences
Texas A&M University
College Station, TX

Submitted to:

Rose Farmer, Program Manager
Balcones Canyonlands Conservation Program
Natural Resources and Environmental Quality Division
Austin, TX

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INTRODUCTION

The purpose of the Statewide Project is to determine the distribution and abundance of the endangered golden-cheeked warbler (*Dendroica chrysoparia*) (GCWA) throughout its breeding range in central Texas through the development of GCWA occupancy models. Current population estimates for GCWA are highly variable and based on few sampling points relative to the extent and variability in potential breeding habitat (e.g., Ladd and Gass 1999). In the spring of 2008 and 2009, we surveyed hundreds of points throughout the species' breeding range on both public and private properties in an effort to more accurately estimate its current distribution and abundance. Increasing the accuracy of population distribution and abundance estimates will allow for a better understanding of the trends in rangewide populations over time. In addition, we are examining patch-level and point-level occupancy estimates relative to certain habitat characteristics. The surveys and analyses will ultimately result in refined habitat suitability maps for GCWA breeding habitat in Texas, increased reliability of habitat availability predictions, and recommendations of sampling protocols for long-term monitoring. Information gathered through sampling on the Travis County's Balcones Canyonlands Preserve will be incorporated into the overall Statewide Project data set. In this report we outline the methods and analyses used, and present results of data collected on the Preserve during the 2009 field season.

METHODS

Sample sites

Given the endemism of GCWA to patches of oak-juniper (*Quercus* spp-*Juniperus ashei*; Pulich 1976, Ladd and Gass 1999) woodlands, we defined oak-juniper patches as being the operational sampling unit for determining occupancy and abundance for the overall Statewide Project. We delineated oak-juniper patches using supervised classifications of Landsat Thematic Mapper images with ERDAS IMAGINE 9.2 (ERDAS Inc., Norcross, Georgia, USA) for the entire 35-county range of the GCWA in central Texas. Of the resulting oak-juniper patches, we randomly selected ~250 patches proportional to patch size classes, percent landscape composition classes, and amount of potential habitat encompassed by each warbler recovery region. Approximately 95% of the randomly selected patches were located on private property.

In addition to the random samples on private properties, we were interested in supplementing our surveys with data collected on an assortment of public properties. We were granted access to certain Travis County Balcones Canyonlands Preserve (BCP) sites on which to conduct our statewide surveys. Sites included Canyon Vista, Hamilton Pool Preserve, Lionstone Group, Medway Ranch, Ribelin, Steiner Ranch (including J-Canyon, Middle, Northeast, and VMA), Vireo Ridge, and Wild Basin. Although data on the warbler has been collected by other researchers on the BCP sites, we must apply our statewide survey methods consistently across our sampling region. Our methods are not designed to provide detailed abundance estimates at

the scale of a site within the BCP; however, our methods and results will provide valuable data for habitat modeling throughout the species' breeding range.

Golden-cheeked warbler abundance surveys

We used ArcMap 9.2 (ESRI, Redlands, California, USA) to assign point count stations randomly within each oak-juniper patch; each point was 400-600 m from all other points and ≥30 m from the patch edge. Although the oak-juniper patches may have extended beyond the BCP site boundaries, only those points that fell within the BCP boundaries were surveyed (Appendix A).

We conducted double observer, fixed-radius point count surveys at each point count station in the patch (Nichols et al. 2000, Kissling and Garton 2006). Observers remained at each point count station for 5 minutes, noting the presence of and distance to GCWAs and 7 other species: black-capped vireos, American crows, blue jays, brown-headed cowbirds, bronzed cowbirds, common ravens, and western scrub-jays. Following Nichols et al. (2000), 2 independent observers surveyed each point count station together, randomly determining who had the role of Observer 1 and Observer 2 at each station. Observer 1 communicated to Observer 2 all birds seen and heard and the bird's distance from the point (0–50 m or >50–100 m). Observer 2 recorded all birds detected by Observer 1, along with surveying the area and recording birds not detected by Observer 1. Point count stations were visited 1 time by the 2 observers in late April and early May 2009. Observers did not broadcast recorded warbler calls during the abundance surveys. The actual locations of warblers were not recorded during the survey; rather, the data represent warblers occurring within 100 m of the point count station. Additional details for the abundance survey methods can be found in Appendix B.

RESULTS

We conducted double observer fixed-radius surveys at 1–7 points in each of 11 Travis County BCP sites between 22 April and 4 May 2009 (Table 1). We surveyed a total of 44 point count stations and detected 35 GCWAs at 25 of the stations. One black-capped vireo was detected during the surveys, located in the Vireo Ridge property. At least 1 GCWA was detected at all of the properties surveyed except Steiner Ranch-Middle. Point count station UTMs and number of GCWAs detected per point are listed in Appendix C. We are interested in returning to certain BCP sites in 2010 for additional warbler surveys, as well as surveys specific to the black-capped vireo.

Table 1. Travis County's BCP sites surveyed for golden-cheeked warblers (GCWA) by Texas A&M University, April–May 2009.

Property name	Survey date	# pts surveyed	# pts w/GCWA	# GCWA detected	Other spp detected[a]
Canyon Vista	24 April	5	3	4	AMCR, BLJA
Hamilton Pool Reserve	23 April	2	1	1	BHCO
Lionstone Group	27 April	7	6	8	AMCR
Medway Ranch	23 April	7	1	1	AMCR
Ribelin	29 April	5	4	7	BHCO
Steiner Ranch VMA	30 April	2	1	1	AMCR, WESJ
Steiner Ranch Northeast	30 April	1	1	1	WESJ
Steiner Ranch Middle	30 April	2	0	0	WESJ
Steiner Ranch J-Canyon	30 April	3	1	1	WESJ
Vireo Ridge	4 May	6	6	10	BCVI, WESJ
Wild Basin	22 April	4	1	1	
	TOTAL	**44**	**25**	**35**	

[a] Species' acronyms: AMCR = American crow; BCVI = black-capped vireo; BHCO = brown-headed cowbird; BLJA = blue jay; WESJ = western scrub-jay

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LITERATURE CITED

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Nichols, J. D., J. E. Hines, J. R. Sauer, F. W. Fallon, J. E. Fallon, and P. J. Heglund. 2000. A double-observer approach for estimating detection probability and abundance from point counts. The Auk 117: 393–408.

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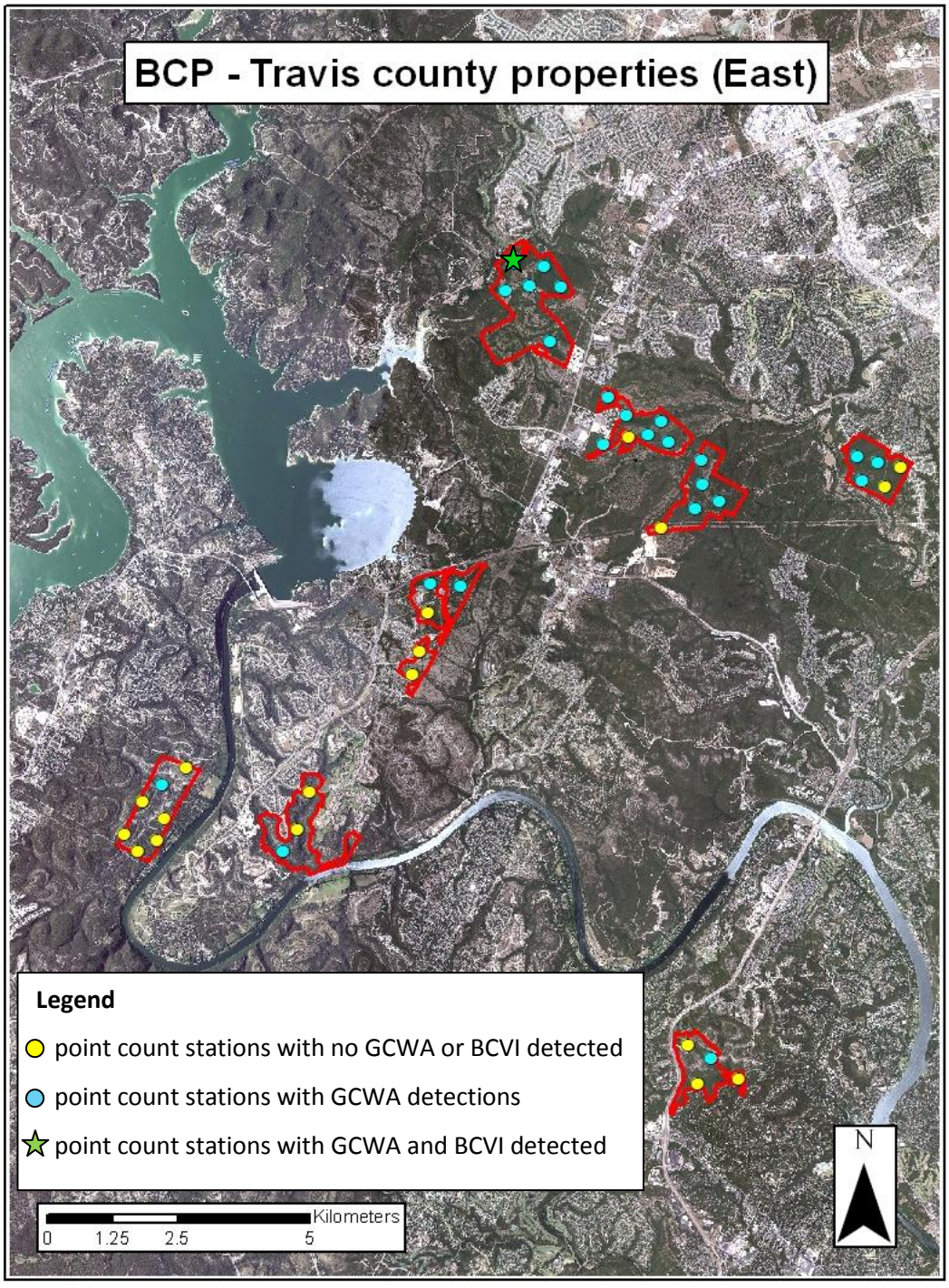
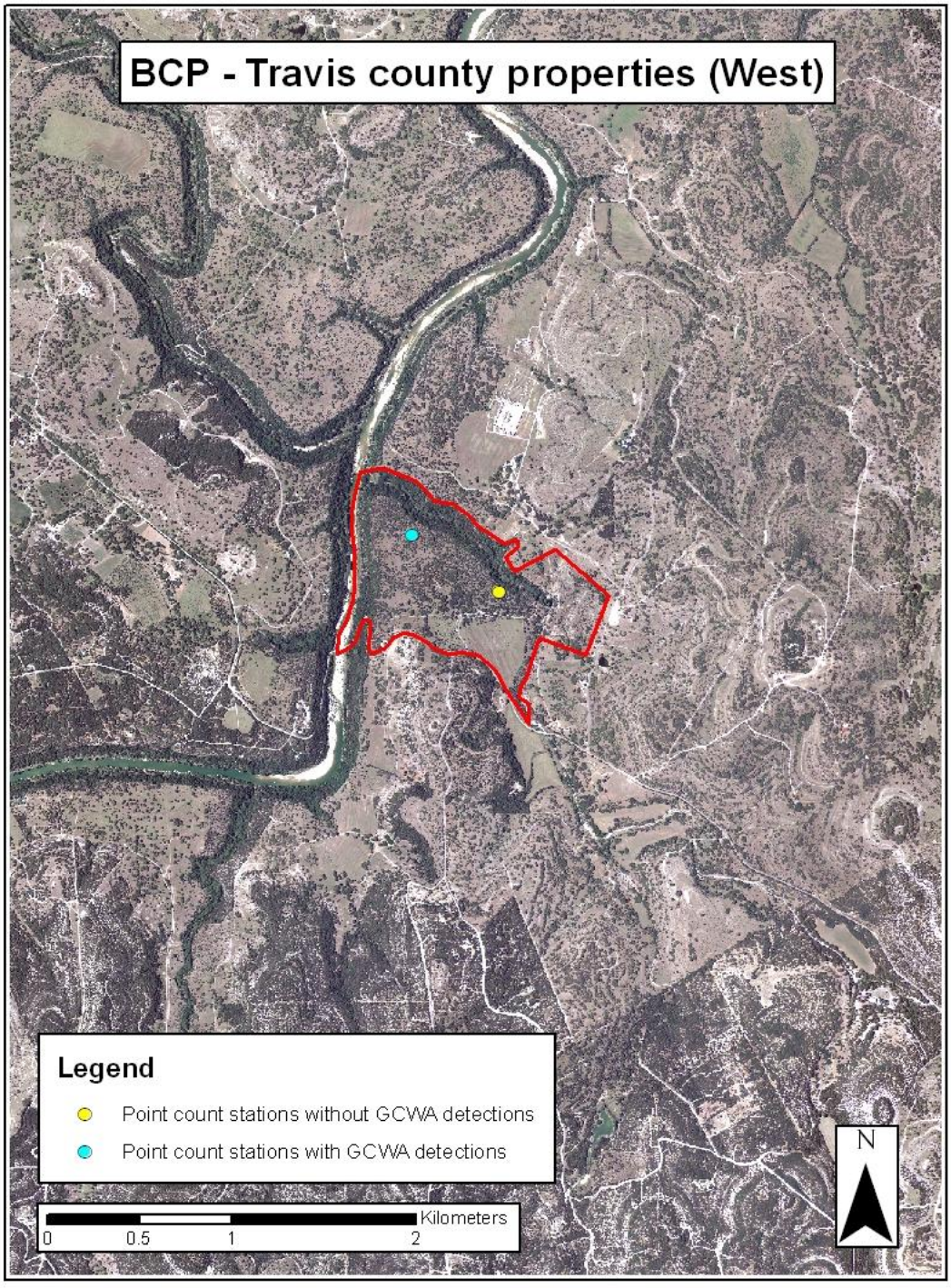
Appendix A. Texas A&M University's golden-cheeked warbler abundance surveys at Travis County's Balcones Canyonlands Preserve, April–May 2009.



Appendix A, cont'd. Texas A&M University's golden-cheeked warbler abundance surveys at Travis County's Balcones Canyonlands Preserve (Hamilton Pool Preserve), April 2009.



Appendix B. Protocol used by Texas A&M University for statewide golden-cheeked warbler abundance surveys, March–May 2009.

GCWA – Double Observer, Fixed Radius Protocol
Texas A&M University, 2009

OBJECTIVE To estimate abundance and density of golden-cheeked warblers in their breeding range of central Texas.

NECESSARY EQUIPMENT

GPS unit	compass	protocol
2-way radio	maps (local, state)	data sheets
extra batteries	pencils	clipboard
binoculars	field notebook	water

PROTOCOL

- Abundance sampling occurs at a subset of patches in which golden-cheeked warblers (GCWA) were detected during occupancy surveys (see Occupancy protocol).
- Point counts begin at sunrise and continue until 5 hours after sunrise (i.e., the last point count of the day must begin within 5 hours after sunrise).
- Point count stations are at least 400 m apart. The number of point count stations per patch depends on patch size.
- Two people survey each point count station together, standing ~1-2 m apart. It will be randomly predetermined who has the role of Observer 1 and Observer 2 at the first point count station; alternate the roles for every other point.
- Observers remain at each point count station for 5 minutes, noting the presence of, and distance to, golden-cheeked warblers (GCWA). Other species to record include black-capped vireos (BCVI), brown-headed cowbirds (BHCO), bronzed cowbirds (BROC), American crows (AMCR), common ravens (CORA), western scrub-jays (WESJ), and blue jays (BLJA).
- Observer 1 communicates to Observer 2 all birds seen and heard and their distance from the point (0–50 m or 51–100 m).
- Observer 2 records all birds detected by Observer 1, along with surveying the area and recording birds not detected by Observer 1. Observer 2 does not communicate with Observer 1.
- Record each bird detection, including different individuals of the same species, on a separate line on the data sheet.
- If no species of interest are detected at a point count station, enter NONE in the 'Species' column and enter 0 for both the 'Dist.' and 'Obs. 1 or 2' columns (thus, no boxes are left blank at the end of the survey).
- Conduct a vegetation survey at each point count station (see Vegetation Survey protocol).
- **Resighting:** If you get a visual detection of either a GCWA or BCVI, check if the bird has leg bands (see Resight protocol). If you see bands, record the color combo in the Notes field.
- Do not survey during inclement weather (e.g., excessive rain or wind >12 mph), or any conditions that would inhibit either our ability to detect the birds.
- Check your partner's data sheet at the end of each point count survey before moving on to the next point. Make sure all fields are filled in correctly; only the Notes field may be left blank at the end of the survey.

Appendix C. Locations of point count stations used by Texas A&M University for golden-cheeked warbler abundance surveys on Travis County BCP sites, April–May 2009.

Property name	UTM: Northing	UTM: Easting	Station #	Date surveyed	# GCWA detected
Canyon Vista	616376	3365120	1	24 April	1
Canyon Vista	616770	3365000	2	24 April	2
Canyon Vista	616460	3364647	3	24 April	1
Canyon Vista	616902	3364528	4	24 April	0
Canyon Vista	617192	3364896	5	24 April	0
Hamilton Pool Preserve	583171	3357401	1	23 April	1
Hamilton Pool Preserve	583646	3357089	2	23 April	0
Lionstone Group	611614	3366247	4	27 April	1
Lionstone Group	611969	3365887	5	27 April	1
Lionstone Group	612621	3365786	6	27 April	1
Lionstone Group	612775	3365400	7	27 April	3
Lionstone Group	612380	3365535	8	27 April	1
Lionstone Group	611997	3365474	9	27 April	0
Lionstone Group	611523	3365344	10	27 April	1
Medway Ranch	602649	3357588	1	23 April	0
Medway Ranch	603014	3357789	2	23 April	0
Medway Ranch	602392	3357917	3	23 April	0
Medway Ranch	603110	3358852	4	23 April	1
Medway Ranch	602729	3358535	5	23 April	0
Medway Ranch	603155	3358206	6	23 April	0
Medway Ranch	603556	3359189	7	23 April	0
Ribelin	613381	3365048	11	29 April	2
Ribelin	613409	3364580	12	29 April	2
Ribelin	613730	3364255	13	29 April	1
Ribelin	613272	3364125	14	29 April	2
Ribelin	612634	3363745	15	29 April	0
Steiner Ranch J-Canyon	608220	3362684	14	30 April	1
Steiner Ranch J-Canyon	608178	3362136	15	30 April	0
Steiner Ranch J-Canyon	608805	3362638	16	30 April	0
Steiner Ranch Middle	607879	3360967	7	30 April	0
Steiner Ranch Middle	608017	3361395	8	30 April	0
Steiner Ranch Northeast	605409	3357590	6	30 April	1
Steiner Ranch VMA	605690	3358018	1	30 April	1
Steiner Ranch VMA	605911	3358722	2	30 April	0
Vireo Ridge	610725	3368348	1	4 May	4
Vireo Ridge	610390	3368726	2	4 May	2
Vireo Ridge	609811	3368811	3*	4 May	1

Vireo Ridge	610110	3368367	4	4 May	1
Vireo Ridge	609659	3368263	5	4 May	1
Vireo Ridge	610506	3367313	8	4 May	1
Wild Basin	613315	3353151	1	22 April	0
Wild Basin	614099	3353256	2	22 April	0
Wild Basin	613131	3353903	3	22 April	0
Wild Basin	613572	3353637	4	22 April	1

* One black-capped vireo was also detected at this point count station.