City of Austin 2017
Black-capped Vireo *(Vireo atricapilla)*
Monitoring and Management Program

Balcones Canyonlands Preserve Annual Report



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City of Austin, Austin Water
Wildland Conservation Division
Balcones Canyonlands Preserve Program

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Disclaimer: The data and information presented in this report are provisional and subject to revision.

City of Austin
2017 Black-capped Vireo Monitoring and Management Program
Balcones Canyonlands Preserve Annual Report

This report summarizes the results of the City of Austin's 2017 black-capped vireo (*Vireo atricapilla*) endangered species monitoring and habitat management program. The 2017 field season was the twentieth year of endangered species monitoring on the City of Austin's Balcones Canyonlands Preserve (BCP) tracts.

INTRODUCTION

Background

The black-capped vireo (hereafter vireo) is an endangered, neotropical migrant that breeds in portions of Oklahoma, Texas, and Mexico (Grzybowski 1995). The U.S. Fish and Wildlife Service listed this species as endangered in 1987 (USFWS 1987). Major threats to the vireo's survival include habitat loss, habitat fragmentation, over-grazing/browsing, natural vegetation succession, and parasitism by brown-headed cowbirds (*Molothrus ater*). Rapid westward expansion of development from the City of Austin led to the creation of the Balcones Canyonlands Conservation Plan (a Habitat Conservation Plan). The U.S. Fish and Wildlife Service issued a 10(a)(1)(B) permit to the City of Austin and Travis County in 1996, to mitigate for the incidental "take" of habitat loss due to development, and to facilitate the local recovery of the vireo and seven other endangered species (USFWS 1996). The permit requires a minimum of 12,300 hectares of endangered species habitat in western Travis County be set aside as a preserve (the BCP) for these species. The BCP is owned and managed by a number of public and private entities, including the City of Austin, Travis County, Lower Colorado River Authority, The Nature Conservancy, Travis Audubon Society, and St. Edwards University/Wild Basin.

Vireos have been documented on several BCP tracts that are managed by the City of Austin. The largest known colony in Travis County formerly existed at the Wild Basin/Vireo Preserve. A 1961 wildfire created several hundred hectares of vireo habitat in this area. The vireo colony likely peaked sometime in the 1970s, but declined steadily from 32 territories (22 breeding pairs) in 1987 to one territory in 1997 (Grzybowski 1989; Steed 1988; DLS Associates 1989, 1990; Abbruzzese 1998), and intermittent sightings of single males in 2004 (Becker and Koehler 2004), 2011, 2012, and 2016 (City of Austin 2011, 2012, and 2016).

A small breeding colony of vireos (three to five territories) occupied habitat on the Cortaña tract from 2000 to 2011. A part of this colony spilled onto the adjacent River Place mitigation tract to the northeast. However, the number of territories in that colony dwindled to only one in 2011; no vireos established territories there from 2012 through 2014. A male established a territory on this site in 2015; he was possibly mated, but no evidence of nesting was confirmed. In 2016, five different males established territories, though only one pair successfully raised young (City of Austin 2016).

Two to seven vireo territories have been established on the Forest Ridge tract each year since 2009. On the Kent Butler Ecological Reserve (formerly known as the Ivanhoe tract, hereafter Kent Butler), one or two vireo pairs nested along electric transmission line corridors in 2008 and 2009, and again from 2013 to present.

Other records for vireos on the City of Austin's BCP tracts for the past decade include intermittent sightings of males on the Commons Ford and Sam Hamilton West tracts. Though other areas on City property have been managed to create vireo habitat – the Bohls tract, a ridge in the center of the Cortaña tract, and a small patch on the Lime Creek tract – no vireos have been detected at those sites, with one exception. In 2016, a single male vireo attempted to establish a territory on the Bohls tract, where he was caught and banded. However, he soon relocated to the Forest Ridge colony (City of Austin 2016).

Objectives

The Balcones Canyonlands Conservation Plan (USFWS 1996) states that "baseline monitoring will be gathered in accordance with the Land Management Plan Guidelines and approved land management plans, and should concentrate on determining basic population levels on preserve lands, key population parameters, and other ecological parameters that may affect the target species." The Tier IIA-8 land management plan (BCP 2007) identifies "distribution, abundance, productivity, and recruitment" as key population parameters to monitor. The City of Austin's vireo monitoring program continues to focus on estimating abundance, the extent of territories, pairing, nesting, and productivity for all vireos detected each year.

The land management plan (BCP 2007) emphasizes vegetation management and monitoring to maintain vireo habitat. Vireos occupy shrublands of mixed deciduous and evergreen species with irregular height and distribution. Open spaces between clumps of woody vegetation are also important, so optimal vireo habitat appears as a mosaic of shrubby patches separated by grassy or rocky spaces. Shrubs that have a skirt of vegetative cover extending down to the ground are especially important to conceal nests. Because this early successional stage of habitat must continually be manipulated to remain viable, restoration projects in conjunction with habitat monitoring are undertaken on various City of Austin tracts (see Black-capped Vireo Habitat Management).

METHODS

Sites and Survey Effort

Monitoring and color banding methods for vireos are similar to those for golden-cheeked warblers (warbler; see Methods in City of Austin and Travis County 2017). However, because the vireo population is much smaller than the warbler population on City BCP properties, monitoring takes the form of a complete census rather than a sampling. There are no defined plots; City of Austin BCP biologists search suitable habitat, and monitor vireos where they are found, for evidence of mated status and breeding success. Vireos are also not monitored as frequently as warblers, unless their territories are near a warbler study plot, and less effort is devoted to finding nests. Intensive monitoring typically

begins when the vireos first arrive in late March or early April and continues at least through the end of June, or until no indications of an active nest are observed.

During the 2017 field season, biologists mapped vireo territories in three locations: within, and adjacent to, the warbler intensive study plots on the Forest Ridge and Kent Butler tracts and in the shinnery of the Cortaña tract. In addition, biologists surveyed potential habitat on the Bohls tract, and the Wild Basin/Vireo Preserve.

After biologists detected vireos around the Forest Ridge and Kent Butler warbler study plots, they incorporated monitoring of the vireos into the regular warbler surveys. Because much of the habitat on these two study plots is more typically associated with warblers, the exact size of the vireo habitat in each area is undetermined.

The Forest Ridge warbler plot was surveyed at least twice each week in conjunction with the warbler monitoring program from March 15 through June 15, and then weekly until July 27. Once vireos were detected on March 21, staff collected data on the number of territories, territory locations, pairing success, breeding success, parasitism, and productivity, continuing surveys through July 27. After the first vireo was detected on the Kent Butler warbler plot on March 20, vireos were monitored once or twice a week from April 17 through June 27.

No vireos were detected in the Cortaña tract shinnery on March 28. Staff began active monitoring of the Cortaña tract shinnery on April 20, when at least four males and one female were detected. The site was then monitored at least every other week until July 27.

Table 1. Summary of Black-capped Vireo Survey Effort on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 2017

Study Plots	Observer(s)	Survey Hours (Mar. 20-July 27)
Bohls	John Chenoweth	6.0
Cortaña	William Reiner, Darrell Hutchinson, John Chenoweth	75.0
Forest Ridge	Jonathan Scalise, Jim O'Donnell, Laurel Moulton, Cristina Campbell	78.25
Kent Butler	William Reiner, Jonathan Scalise	13.75
Total		**173**

Data Collection and Analysis

Vireo observations were recorded with Garmin global positioning units (GPS), which have an accuracy ranging from 3 to 9 meters. Other sightings were recorded on topographic maps at a scale of 1:2,400 or 1:3,600, using a 100-meter UTM grid. Pairing status, breeding success, and number of fledglings

produced per pair were determined for each territory. For methodology and calculations, see City of Austin and Travis County (2017).

RESULTS AND DISCUSSION

Territory Delineations

In 2017, staff found 13 vireo males holding territories on the Forest Ridge (7 territories), Kent Butler (2 territories), and Cortaña (4 territories) tracts. Staff also observed an unbanded vireo singing along a road between the Forest Ridge and Kent Butler populations, first at the entrance to the Jester tract on May 2 and 5, then on the Kent Butler tract on May 19, 22, and 24. This may have been the same male in the two locations, which were more than 450 meters apart, but could not be confirmed since banding attempts were unsuccessful. Figures A-D provide maps of the 2017 vireo observations on City of Austin BCP tracts. No vireos were observed on the Bohls or Wild Basin/Vireo Preserve tracts in 2017.

Banding and Return Rates

In 2017, 8 vireos (6 males, 2 females) were captured and color-banded on the Forest Ridge and Cortaña tracts from April 24 to June 9 (Table 2). The only unbanded male that established a territory on the Kent Butler tract eluded capture. Of the 8 male vireos on City BCP property in 2016 that were banded, 3 returned in 2017 (a return rate of 38%). The one female vireo that was banded in 2016, on the Cortaña tract, was not re-sighted in 2017.

Table 2. Summary of Black-capped Vireos Banded on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 2017.

Date	Color Band Combination	USGS Band Number	Site	Sex	Age
24 April	YE/SI:OR/YE	1580-47381	Cortaña	male	SY
24 April	DG/SI:WH/YE	1580-47382	Cortaña	female	SY
24 April	YE/RD:DG/SI	1580-47383	Cortaña	male	ASY
2 May	WH/SI:BK/DB	1580-47384	Cortaña	male	SY
2 May	RD/DB:BL/SI	1580-47385	Cortaña	male	SY
2 June	BK/YE:BL/SI	2590-26322	Forest Ridge	female	ASY
2 June	DG/SI:YE/BL	2590-26323	Forest Ridge	male	SY
9 June	YE/SI:RD/WH	2590-26324	Forest Ridge	male	SY

Territory Mapping and Reproductive Success on the Forest Ridge Tract

Seven territorial male vireos were observed on and adjacent to the Forest Ridge intensive warbler study plot in 2017 (Figure B). Two of the five banded birds that had territories on Forest Ridge in 2016 returned in 2017. The males RD/SI:NB/RD and DG/SI:DB/WH (both banded in 2016 on Forest Ridge) returned and held territories. Five other unbanded vireo males held territories, and staff were able to band two of them as well as one female vireo.

Eight active nests were found on the Forest Ridge tract, from seven vireo pairs (Table 3). Two of these nests failed due to predation, and six successfully fledged at least one young. One pair was detected late in the breeding season, after already producing young, and no nest was found for this pair. See Table 4 for a summary of reproductive success.

Territory Mapping and Reproductive Success on the Kent Butler Tract

A male vireo banded in 2014 that had successfully mated and raised young for the past three years (DG/MV:YE/SI) returned to the same area in 2017 (Figure C). He again attracted a mate, and the pair fledged 4 chicks from their first nest (Table 3). The second nest attempt failed. A second male, unbanded, established a territory within the eastern habitat improvement area (first found on April 21). He successfully attracted a mate, but the pair were unable to fledge young from the two nests found by staff. See Table 4 for a summary of reproductive success.

Table 3. Summary of Black-capped Vireo Nests Found on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 2017.

Plot	Male ID	Nest Substrate	Breeding Success	Number of Fledglings*
Cortaña	RD/DB:BL/SI	*Rhus virens*	Yes	≥3
Cortaña	WH/SI:BK/DB	*Quercus sinuata*	No	
Cortaña	WH/SI:BK/DB	*Ptelea trifoliata*	No	
Forest Ridge	DG/SI:DB/WH	*Diospyros texana*	Yes	2
Forest Ridge	DG/SI:DB/WH	*Dermatophyllum secundiflora*	Yes	≥1
Forest Ridge	DG/SI:YE/BL	*Ptelea trifoliata*	Yes	≥1
Forest Ridge	RD/SI:NB/RD	*Diospyros texana*	Yes	≥2
Forest Ridge	UB	*Diospyros texana*	No	
Forest Ridge	UB	*Dermatophyllum secundiflora*	No	
Forest Ridge	UB	*Dermatophyllum secundiflora*	Yes	1
Forest Ridge	YE/SI:RD/WH	*Garrya ovata*	Yes	≥2
Kent Butler	DG/MV:YE/SI	*Quercus fusiformis*	Yes	4
Kent Butler	DG/MV/YE/SI	*Frangula caroliniana*	No	
Kent Butler	UB	*Celtis laevigata*	No	
Kent Butler	UB	*Diospyros texana*	No	

* Fledgling vireos were difficult to observe in dense vegetation, especially on the Forest Ridge tract, so a range of fledglings is listed for some nests. The lower number is the tally of fledglings actually observed. The higher number is the maximum that may have fledged given the number of eggs/chicks originally found in the nest, minus unhatched eggs or dead nestlings found after fledging.

Territory Mapping and Reproductive Success on the Cortaña Tract

At least four male vireos attempted to establish territories in the shinnery at the north end of the Cortaña tract in 2017 (Figure D). All were seen with females. All vireos arrived unbanded, but five – all four of the males and one female – were caught and banded (Table 2). The banded female – though she was seen to be collecting nest material when she was caught – was observed only on one subsequent date, and her mate was not observed on site after May 26.

Staff found three active nests (Table 3). One, tended by RD/DB:BL/SI and his unbanded mate, fledged 3 chicks (1 egg was apparently infertile). The other two nests, of WH/SI:BK/DB and his unbanded mate, both failed. However, their second nest was found in a portion of the shinnery that staff had improved several years ago, and where vireos had not previously been observed. Male YE/RD:DG/SI and his unbanded mate successfully fledged two broods before staff were able to locate their nests. See Table 4 for a summary of reproductive success.

Table 4. Summary of Black-capped Vireo Reproductive Success per Plot on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 2017.

Site	No. of Territories	No. of Territories w/ Female	Pairing Success	No. of Territories Producing ≥ 1 Young	Breeding Success	Productivity *	Productivity Per Successful Territory*	Total No. of Fledglings*
Cortaña	4	4	100	2 (4)	50%	2.25-2.75	4.5-5.5	9 -11†
Forest Ridge	7	7	100	6 (7)	86%	1.7 – 2.9	2 – 3.3	12 - 20†
Kent Butler	2	2	100	1 (2)	50%	2.0	4.0	4
Total/Avg.	**13**	**13**	**100**	**9 (13)**	**69%**	**1.9 – 2.7**	**2.8 – 3.9**	**25 – 35†**

* Ranges indicate fledglings actually observed vs. maximum possible (see note with Table 3). † Includes all fledglings found, including those from second broods.

Parasitism and Interaction with Predators

No brown-headed cowbirds (*Molothrus ater*) were observed during vireo surveys on the Forest Ridge, Cortaña, or Kent Butler tracts. No vireos were observed tending cowbird fledglings.

BCP staff and volunteers had managed cowbirds at the Cortaña colony every year since vireos were first observed there in 2000. However, BCP staff ceased active trapping of cowbirds on City of Austin properties beginning in 2013, after vireos abandoned the Cortaña tract colony in 2012, and have not resumed pending evidence of parasitism. Staff will continue to monitor vireo territories for the presence of cowbirds, and remain committed to reducing or eliminating the threat of cowbird parasitism of vireo nests if needed.

City staff did not directly observe any interactions between vireos and potential predators, nor any harassment of vireos by other species. Vireos on the Cortaña tract appeared to give alarm "shrad" calls in response to the intrusion of Woodhouse's scrub-jays.

Golden-cheeked Warblers in Black-capped Vireo Habitat

In some areas, vireo habitat may progress to warbler habitat through natural succession. Likewise, natural or anthropogenic disturbance patterns may convert warbler habitat to the early successional stage preferred by the vireo. These habitat types tend to overlap within the BCP. As in previous years, territorial warblers and vireos were observed in the same or neighboring areas on the Forest Ridge, Kent Butler, and Cortaña tracts in 2017. The Forest Ridge study plot supports a dense understory of vegetation

that is used by both species. On the Kent Butler tract, four electric transmission lines cross the tract at the north edge of the warbler study plot. Vireos concentrate their activity in the shrubby growth within the utility corridors, where vegetation has been trimmed short in some places, to prevent damage to the wires. Warblers occupy habitat on both sides of the utility corridors, and in a wooded strip between them. The vireo territories overlapped with the warbler territories in the wooded strip and on either side of the transmission lines. On the Cortaña tract, warblers occupy steep, wooded canyons on three sides of the shinnery, as well as a low, wooded knoll in the middle of the shinnery. Warblers were occasionally observed in the shinnery, and vireos were rarely observed within the edges of the mature forest.

BLACK-CAPPED VIREO HABITAT MANAGEMENT

The Balcones Canyonlands Conservation Plan (USFWS 1996) requires maintaining or creating 810 hectares (2,000 acres) of vireo habitat within the BCP, and the land management plan (BCP 2007) provides additional, general guidelines to help achieve this goal. The Balcones Canyonlands Conservation Plan recommends focusing potential vireo management areas in portions of the BCP that are not currently occupied by the warbler. Focal areas for vireo habitat management on City of Austin BCP lands include the parts of the Cortaña tract, infrastructure corridors (Kent Butler tract), Vireo Preserve, and Bohls tract. Previous management activities on these tracts are summarized in City of Austin (2016).

Expanding Vireo Habitat – Kent Butler

In the last three years, vireo nests were situated within two of the three areas mechanically treated in 2009, and vireos were frequently observed foraging in both areas (City of Austin 2016).

Maintenance of Formerly Occupied Habitat – Cortaña (north)

With the recolonization of the northern portion of the Cortaña tract by vireos in 2016, further habitat manipulation has been postponed (City of Austin 2016).

Habitat Creation – Cortaña (central)

Between 2003 and 2006, City staff coordinated mechanical clearing of junipers on 14.5 hectares in the center of the Cortaña tract, approximately 1.5 miles south of the existing shinnery. The intention was to create vireo habitat, but few suitable shrubs were growing on the site at the time. The resulting habitat has been a live oak savanna. However, staff have planted acorns of shin oaks (*Quercus sinuata*) collected elsewhere on the Preserve, as they have been available. Acorns are planted beneath established woody plants, especially junipers, in order to minimize desiccation and deer browse. The first planting, in autumn 2015, resulted in only four seedlings. However, acorns planted in the autumn of 2016 had a much better germination rate. Of approximately 280 acorns planted, at least 54 had sprouted.

Restoring and Creating Habitat – Vireo Preserve

Efforts continue to protect and rebuild soils and promote native plant diversity. The Vireo Preserve supports many of the habitat types observed throughout the BCP, so lessons learned at this site should be applicable to other areas (City of Austin 2016, Travis County and City of Austin 2018).

Habitat Creation – Bohls

City of Austin (2016) summarizes mechanical and prescribed burn treatments conducted at this site.

Monitoring Effects of Habitat Management Efforts

Staff have established photo points and vegetation transects on the above tracts in order to track changes to habitat over time. Monitoring of these sites takes place before and after habitat manipulation events, and otherwise when feasible. No photo point monitoring was conducted in 2017.

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V. FIGURES

Figure A: Sites Where Black-capped Vireos were observed on City of Austin BCP Tracts, 2017

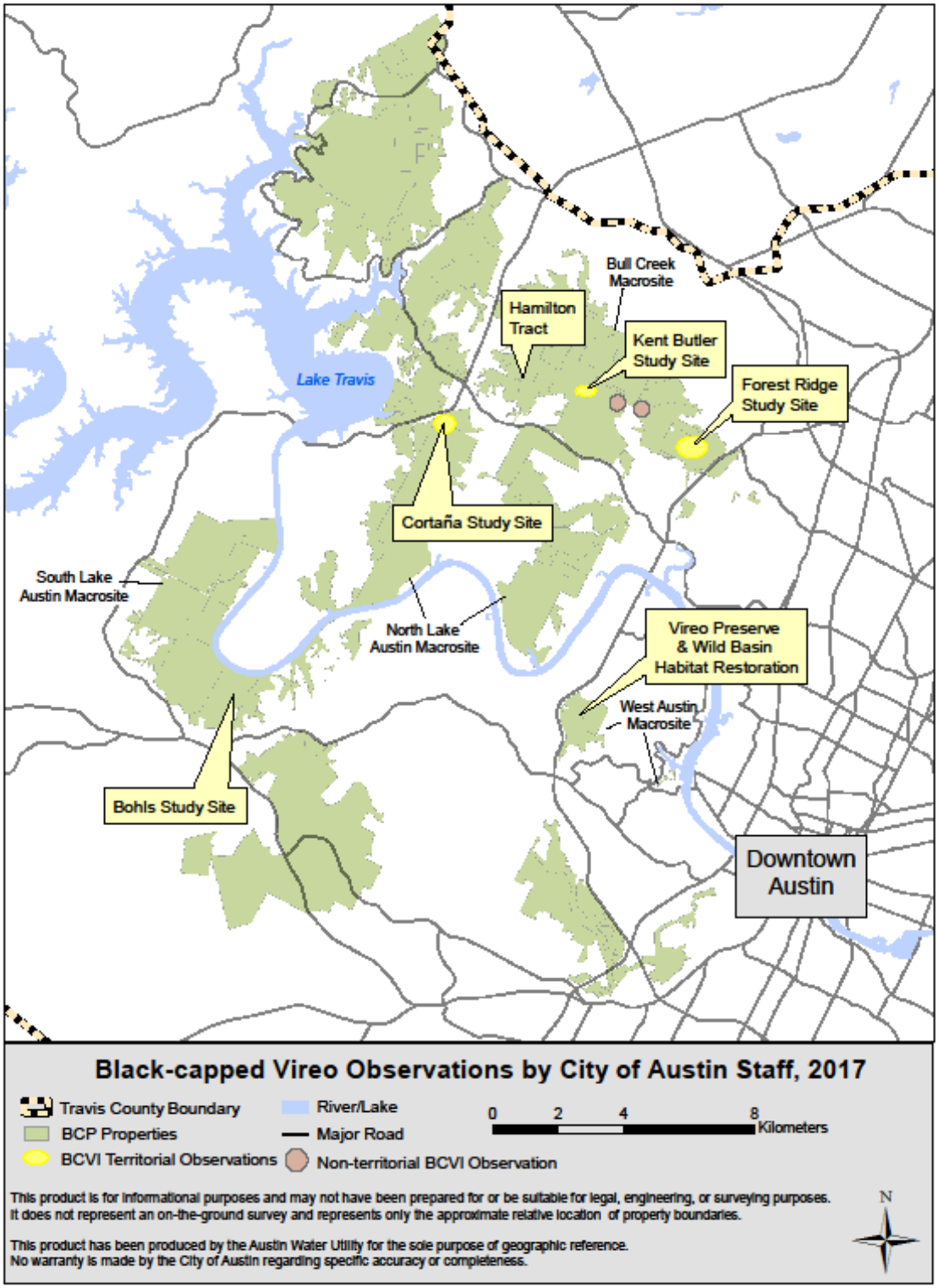


Figure B: Locations of Black-capped Vireos on Forest Ridge, 2017

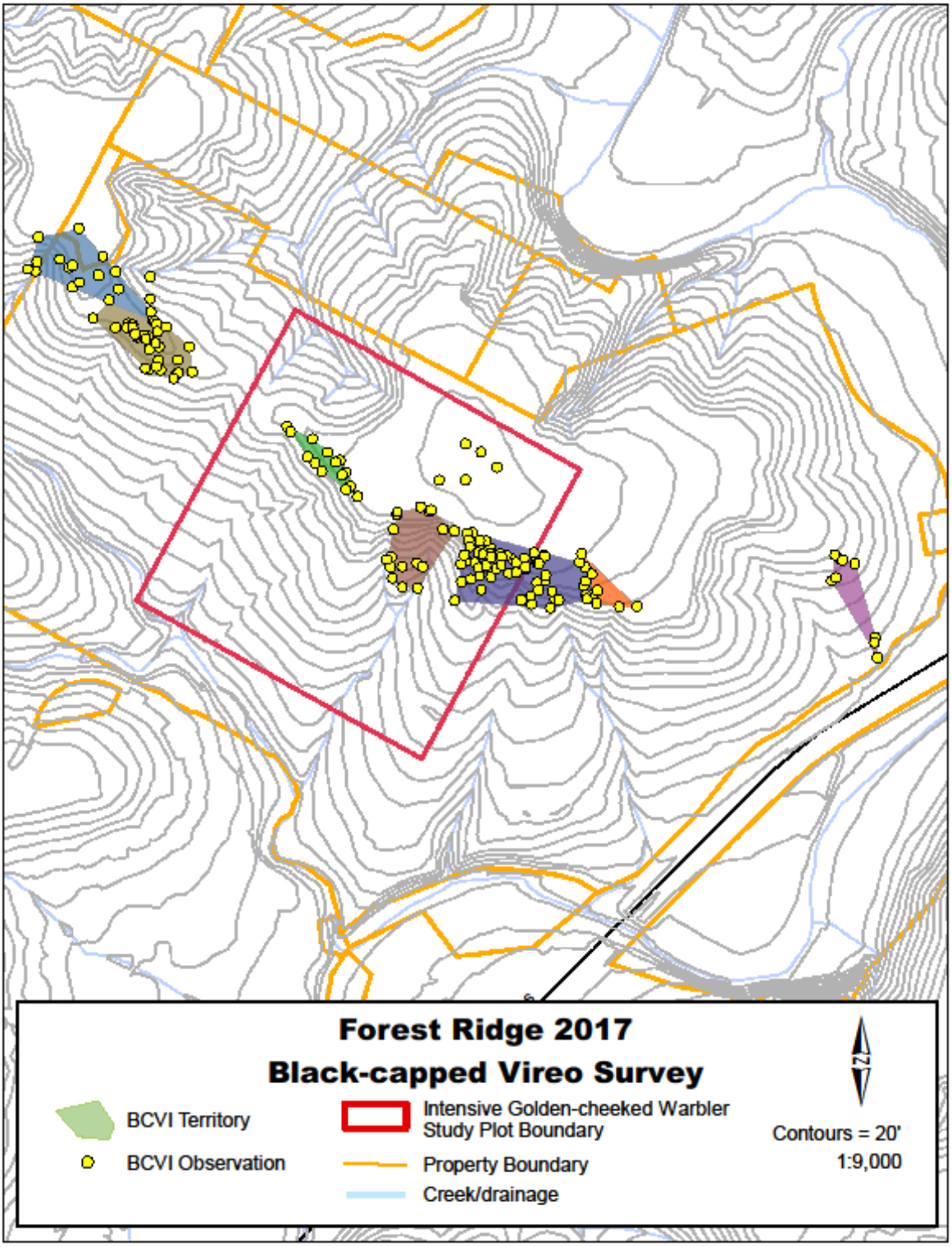


Figure C: Locations of Black-capped Vireos on Kent Butler Ecological Reserve, 2017

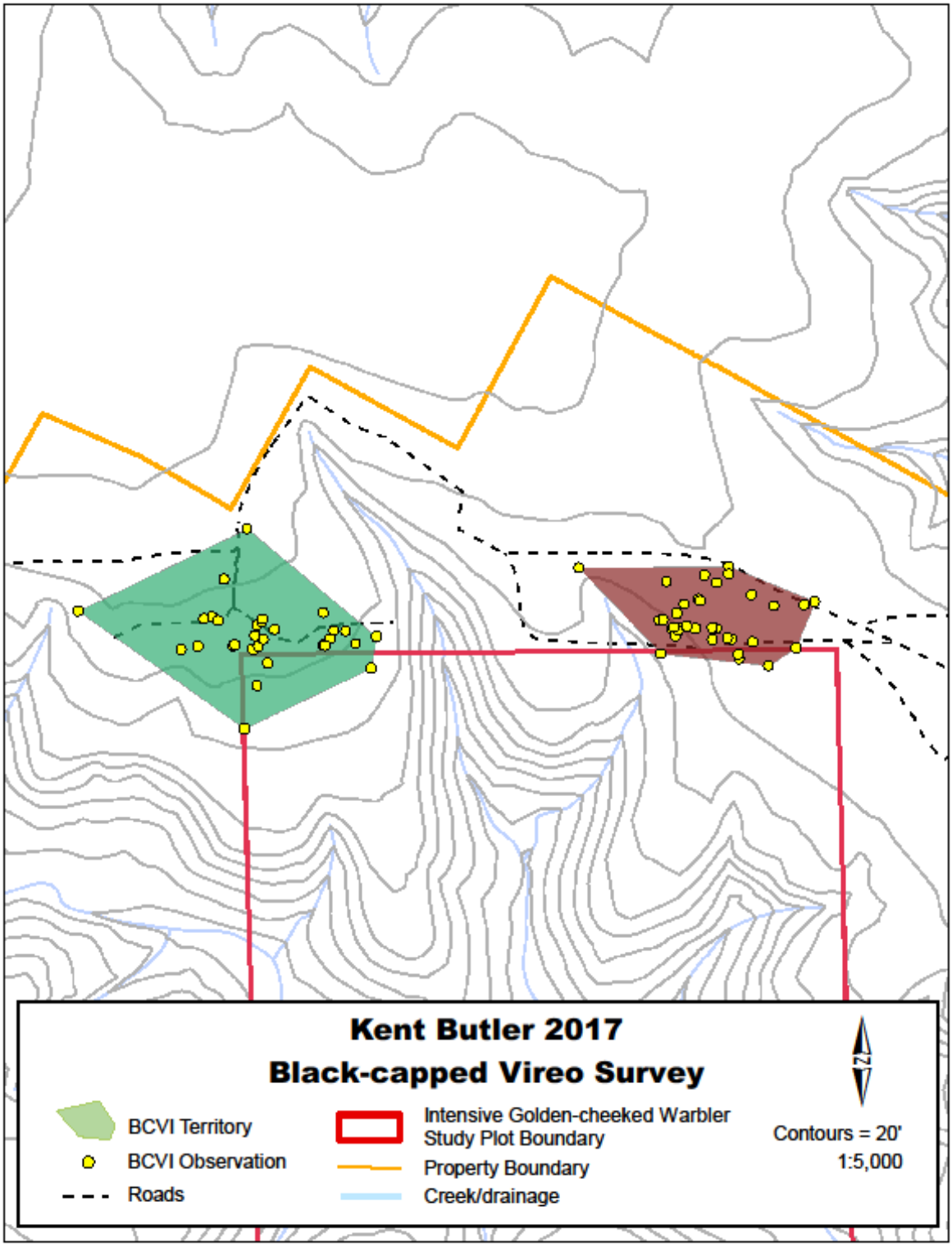


Figure D: Locations of Black-capped Vireos on Cortaña, 2017

