City of Austin 2018
Black-capped Vireo *(Vireo atricapilla)*
Monitoring and Management Program

Balcones Canyonlands Preserve Annual Report



Female black-capped vireo with nest material © William Reiner

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 2018

Black-capped Vireo (*Vireo atricapilla*) Monitoring and Management Program

Balcones Canyonlands Preserve Annual Report

This report summarizes the results of the City of Austin's 2018 black-capped vireo (*Vireo atricapilla*) species monitoring and habitat management program. The 2018 field season was the twenty-first year of monitoring this formerly endangered species (delisted in May 2018) on the City of Austin's Balcones Canyonlands Preserve (BCP) tracts. We found twelve vireo males holding territories on the Forest Ridge (seven territories), Kent Butler (two territories), and Cortaña (three territories) tracts. While pairing success was high (100%), 77% of the 31 nests we observed failed due to predation or abandonment. Entire clutches of three nests did not hatch and were confirmed to have no fetal development. We also observed two males with leg injuries, including a missing foot and lesions.

INTRODUCTION

Background

The black-capped vireo (hereafter vireo) is a formerly listed as 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. The vireo was removed from the federal list of endangered and threatened wildlife effective May 16, 2018, citing recovery of the species. A post-delisting monitoring plan is mandatory under Section 4(g)(1) of the Endangered Species Act. Abundance and risks to the species will continue to be monitored for a minimum of 5 years to ensure that the species does not decline.

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 population of this 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 occurred on 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. Within the Balcones Canyonlands Preserve, which is primarily closed-canopy forest, vireo habitat typically occurs where oaks and other hardwoods re-sprout from well-established root systems. Because re-sprouting requires some form of disturbance (e.g., mechanical manipulation), restoration projects in conjunction with habitat monitoring are undertaken on various City of Austin tracts to promote vireo habitat (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 (hereafter warbler; see Appendix F – Methods, City of Austin and Travis County 2018). 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 2018 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 20. Once vireos were detected on March 19, staff collected data on the number of territories, territory locations, pairing success, breeding success, parasitism, and productivity, continuing surveys through July 20. After the first vireo was detected on the Kent Butler warbler plot on April 9, vireos were monitored once or twice a week from April 9 through August 3. Vireos were detected in the Cortaña tract shinnery on March 27. Staff monitored this site once a week from March 27 until early June when the monitoring increased to at least twice a week until July 31.

Table 1. Summary of Black-capped Vireo Survey Effort on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 201

Study Plots	Observer(s)	Survey Hours (Mar. 19-Aug. 3)
Bohls	John Chenoweth	10
Cortaña	William Reiner, Darrell Hutchinson, John Chenoweth	109
Forest Ridge	Jonathan Scalise, Cristina Campbell	118
Kent Butler	William Reiner, Jonathan Scalise	40.25
Total		**277.25**

RESULTS AND DISCUSSION

Territory Delineations

In 2018, staff found twelve vireo males holding territories on the Forest Ridge (seven territories), Kent Butler (two territories), and Cortaña (three territories) tracts. Figures A-D provide maps of the 2018 vireo observations on City of Austin BCP tracts. No vireos were detected on the Bohls or Wild Basin/Vireo Preserve tracts in 2018.

Banding and Return Rates

In 2018, four vireos (three males, one female) were captured and color-banded on the Forest Ridge and Kent Butler tracts from April 26 to June 15 (Table 2). One of these males (DG/SI:DG/BK) was banded in the transmission line just north of the Kent Butler plot on April 26; he was not seen again until found by Travis County staff defending a territory on the Ribelin tract (~1,000 meters away from where he was banded). One male that established a territory on the Kent Butler tract, and three males on Forest Ridge eluded capture and remained unbanded. Of the nine male vireos on City BCP property in 2017 that were banded (including returns from previous years and those banded in 2017), six returned in 2018 (a return rate of

67%). The two female vireos that were banded in 2017, one on the Cortaña tract and one on the Forest Ridge tract, were not re-sighted in 2018.

Table 2. Summary of Black-capped Vireos Banded on the Balcones Canyonlands Preserve, Travis County, Texas, Field Season 2018.

Date	Color Band Combination	USGS Band Number	Site	Sex	Age
26 April	OR/PI:OR/SI	2840-08601	Kent Butler	male	SY
26 April	DG/SI:DG/BK	2840-08602	Kent Butler	male	SY
7 May	PI/GR:GR/SI	2590-26325	Forest Ridge	male	ASY
15 June	MV/SI:RD/RD	2840-08603	Forest Ridge	female	ASY

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 2018 (Figure B). Three of the five banded birds that held territories on Forest Ridge in 2017 returned in 2018. The males banded as DG/SI:DB/WH (banded in 2016), DG/SI:YE/BL and YE/SI:RD/WH (banded in 2017) returned to the plot and held territories; all three birds were banded on Forest Ridge. Four unbanded vireo males also held territories; staff were able to band one of these males, as well as one female vireo.

Twenty-one nests were found on the Forest Ridge tract, from seven vireo pairs (with the possibility of a polygynous pairing) (Table 3). Eleven of the nests found on Forest Ridge failed due to predation, five nests were abandoned, one was found during the building stage that may have been abandoned prior to laying or predated before observers could confirm eggs, three nests successfully fledged at least two young each, and one nest had an unknown fate. The nest with unknown fate was suspected of fledging at least one, but because no fledglings were ever observed, the status could not be confirmed. Of the abandoned nests, two were confirmed abandoned during the building stage. Staff observed two nests that never hatched and were subsequently abandoned. Both nests had three eggs, were found later in the season, on June 21, and were actively incubated well past the point at which they should have hatched. We suspected the eggs were infertile and collected them on July 24, after the nests had been abandoned, to determine the fertility status. A third nest was found abandoned with 4 eggs, and those eggs were also collected to determine fertility status. Because this last nest was found in an abandoned state, we cannot say whether the abandonment was due to infertility or an outside stressor, nor do we know how long it had been abandoned. See Table 4 for a summary of reproductive success. Of the seven territories, two had two successful

broods, and a third may have had one successful brood, though fledges were never found.

One male on Forest Ridge may have been polygynous. On June 15, a female was banded (MV/SI:RD/RD) on the Forest Ridge plot in an unbanded male's territory. At the time of banding the female, the male and his fledglings from his first nest (possibly belonging to this banded female) were in the banding area together. The banded female was not re-sighted after banding. After banding this female, observers confirmed that the female tending this male's second nest remained unbanded. All other mated females on Forest Ridge were confirmed as unbanded. Either the banded female was a roaming vireo that was not mated to any of the territorial males on Forest Ridge, or she was one of two females that successfully reared young with the same male.

Territory Mapping and Reproductive Success on the Kent Butler Tract

Two territorial male vireos were observed on the northwest and southeast borders of the Kent Butler intensive warbler study plot (Figure C). Both males successfully paired to unbanded females. Five active nests were found, four of which were predated, but one nest fledged at least two young (Table 3).

Territory Mapping and Reproductive Success on the Cortaña Tract

Three male vireos established territories in the shinnery at the north end of the Cortaña tract in 2018 (Figure D). The males YE/RD:DG/SI, YE/SI:OR/YE and WH/SI:BK/DB (all banded in 2017 on the Cortaña Tract) returned and held territories. Each one successfully paired with an unbanded female. One unbanded male was observed June 21-22 north of these established territories but was not seen after these dates; he was accompanied by a fledgling on the latter date, near the property boundary, so was presumed to have held a territory off site. Staff found five active nests (Table 3). One nest fledged three nestlings and one nest fledged at least two; the other three nests were predated. One nest that was eventually predated, tended by YE/RD:DG/SI, was found with three nestlings and one egg that was presumably infertile. 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 2018.

Plot	Male ID	Nest Substrate	Nest Fate	Number of Fledglings*
Cortaña	WH/SI:BK/DB	*Quercus sinuata*	Fledged	3
Cortaña	YE/RD:DG/SI	*Quercus sinuata*	Predated	
Cortaña	WH/SI:BK/DB	*Quercus fusiformis*	Predated	
Cortaña	YE/SI:OR/YE	*Quercus sinuata*	Fledged	2-4
Cortaña	YE/RD:DG/SI	*Quercus sinuata*	Predated	
Forest Ridge	DG/SI:DB/WH	*Dermatophyllum secundiflorum*	Abandoned	
Forest Ridge	UB	*Quercus sinuata*	Fledged	3-4
Forest Ridge	PI/GR:GR/SI	*Diospyrus texanum*	Predated	
Forest Ridge	DG/SI:DB/WH	*Diospyrus texanum*	Predated	
Forest Ridge	DG/SI:YE/BL	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	DG/SI:DB/WH	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	DG/SI:YE/BL	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	DG/SI:DB/WH	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	PI/GR:GR/SI	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	UB	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	PI/GR:GR/SI	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	YE/SI:RD/WH	*Cercis canadensis*	Fledged	2-4
Forest Ridge	UB	*Dermatophyllum secundiflorum*	Fledged	2-3
Forest Ridge	UB	*Dermatophyllum secundiflorum*	Abandoned	
Forest Ridge	UB	*Dermatophyllum secundiflorum*	Predated	
Forest Ridge	PI/GR:GR/SI	*Dermatophyllum secundiflorum*	Abandoned**	
Forest Ridge	DG/SI:DB/WH	*Dermatophyllum secundiflorum*	Abandoned**	
Forest Ridge	DG/SI:YE/BL	*Dermatophyllum secundiflorum*	Predated/Abandoned	
Forest Ridge	UB	*Frangula caroliniana*	Predated	
Forest Ridge	UB	*Garrya ovata*	Unknown	?
Forest	UB	*Quercus fusiformis*	Abandoned**	

Ridge				
Kent Butler	OR/PI:OR/SI	*Sideroxylon lanuginosum*	Predated	
Kent Butler	OR/PI:OR/SI	*Frangula caroliniana*	Fledged	2-4
Kent Butler	UB	*Quercus buckleyi*	Predated	
Kent Butler	UB	*Ilex vomitoria*	Predated	
Kent Butler	UB	*Quercus buckleyi*	Predated	
Total 31 nests: 24 failed (77%), 6 successful (19%), 1 unknown fate (3%)				

* 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.
**Eggs never hatched, collected after they were abandoned and confirmed to have no fetal development.

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	Total No. of Fledglings*	Productivity*	Productivity Per Successful Territory*
Cortaña	3	3	100	2	67%	5-7†	1.7-2.3	2.5-3.5
Forest Ridge	7	7	100	2**	33%	9-13†	1.5-2.1	4.5-6.5
Kent Butler	2	2	100	1	50%	2-4	1.0-2.0	2.0-4.0
Total/Avg.	**12**	**12**	**100**	**5****	**45%**	**16-24†**	**1.5-2.2**	**3.2-4.8**

* Ranges indicate fledglings actually observed vs. maximum possible (see note with Table 3).
**Nest with unknown fate (fledge or predation) not included in this table and resulting productivity metrics are calculated based on territories with known outcomes (6 at Forest Ridge, 11 total).
† 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, or 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.



Non-Viable Eggs

Of the 31 nests we found, 23% contained non-viable eggs. We observed four nests with nestlings and one to two eggs that never hatched. Three nests contained an entire clutch of three to four eggs that never hatched. Two of these nests were incubated from the date we found them (June 21) until 17 and 20 July, at least 26 and 29 days, respectively. The fourth nest was found abandoned with 4 eggs. We collected all 10 abandoned eggs from these three nests. Based on our visual inspection of the contents, none of the eggs had any signs of fetal development. The two sets of eggs that had been incubated were either not fertilized or not viable. The eggs that were found abandoned were either not fertilized/not viable or abandoned before any development began to occur. We extracted DNA from the eggs for future genetic research.

Injuries

A banded male (DG/SI:DB/WH in 2017 on Forest Ridge) was observed holding up his right leg on April 23, a presumed leg injury that was not documented in earlier observations during the season. On May 31, we noted the foot on this injured leg had completely fallen off, and the male was using the remaining, now bandless part of his leg as a prop when perched. April and May of 2018 saw several days of hard rains (~3 inches) and one hypothesis is that wet weather may have bred bacterial and/or viral infections under the plastic bands that led to the infection and loss of this bird's foot.

On June 22 and 27, we observed male WH/SI:BK/DB (on Cortaña) holding his right leg up while perching. The behavior had not been observed earlier in the season. On June 29, staff captured the bird. Upon finding the right leg swollen above and below the DB band, they removed both bands from the right leg, and released the bird. Vireos with similar conditions have been observed at Fort Hood, with a

particularly high number in 2018 (at least seven; David Cimprich, personal communication).

Photo by BCP staff

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 2018. 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 often 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 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

For the fourth consecutive year, vireo nests were situated within two of the three areas mechanically improved 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). However, staff have harvested acorns of shin oaks (*Quercus sinuata*) from trees within the existing shinnery for use in habitat restoration. Some of these have been planted on a ridge immediately south of the shinnery that was cleared of most trees in 2005. This year, staff sowed 150 acorns here.

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 shin oak acorns 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. A productive harvest in 2018 allowed staff to sow more than 3000 acorns on this site in October and November. Of these, 1350 were planted in four marked areas, in order to assess germination rates.

Staff planted another 560 acorns of each of three oak species (*Quercus buckleyi*, *Q. fusiformis*, and *Q. sinuata* = 1680 acorns total) in plots in the mid-Cortaña habitat creation area, to study survival rates for seedlings in shaded (by trees or shade cloth), caged/unshaded, and uncaged/unshaded areas.

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 2018.

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FIGURES

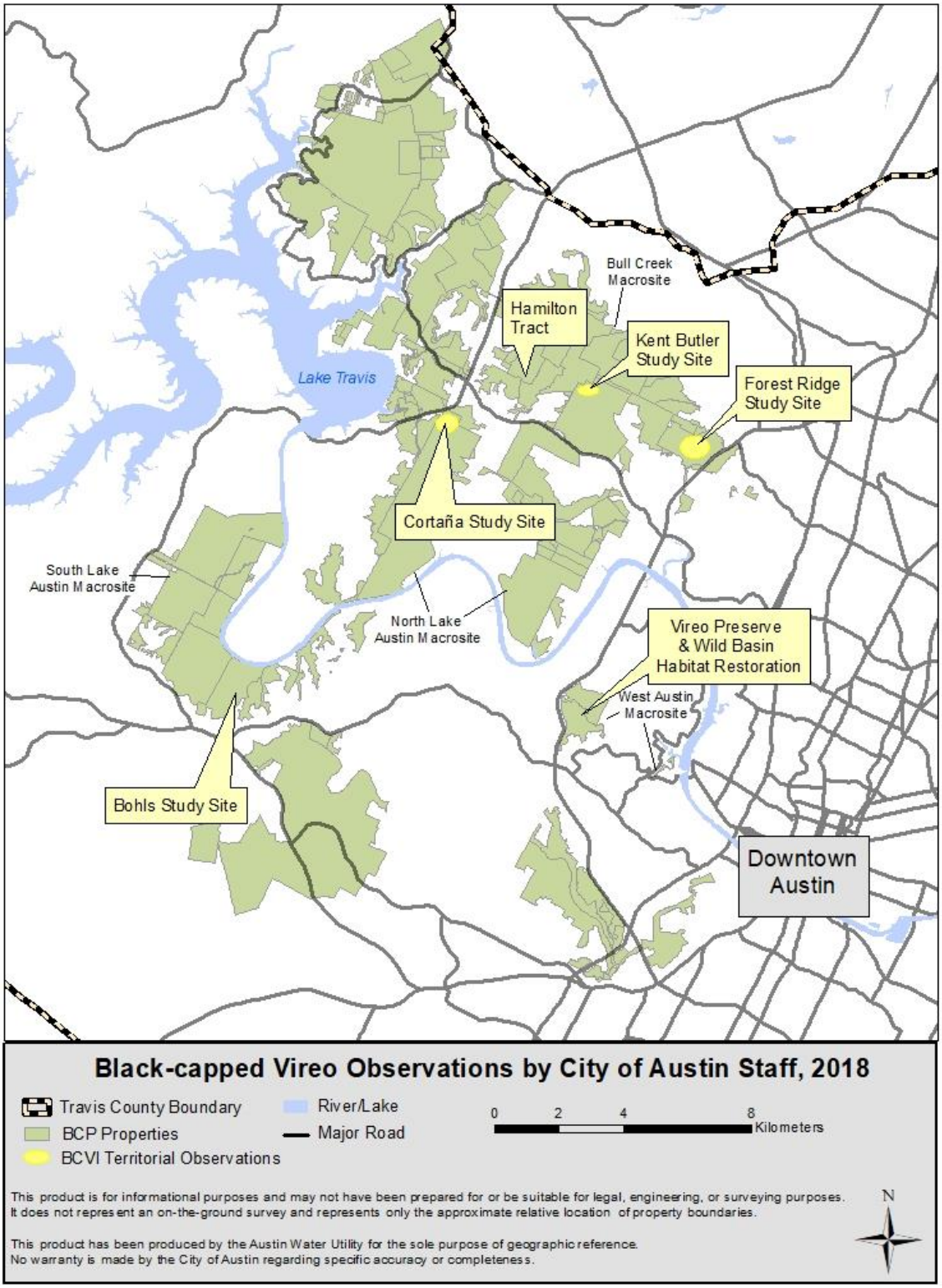


FIGURE A. SITES WHERE BLACK-CAPPED VIREOS WERE OBSERVED ON CITY OF AUSTIN BCP TRACTS, 2018.

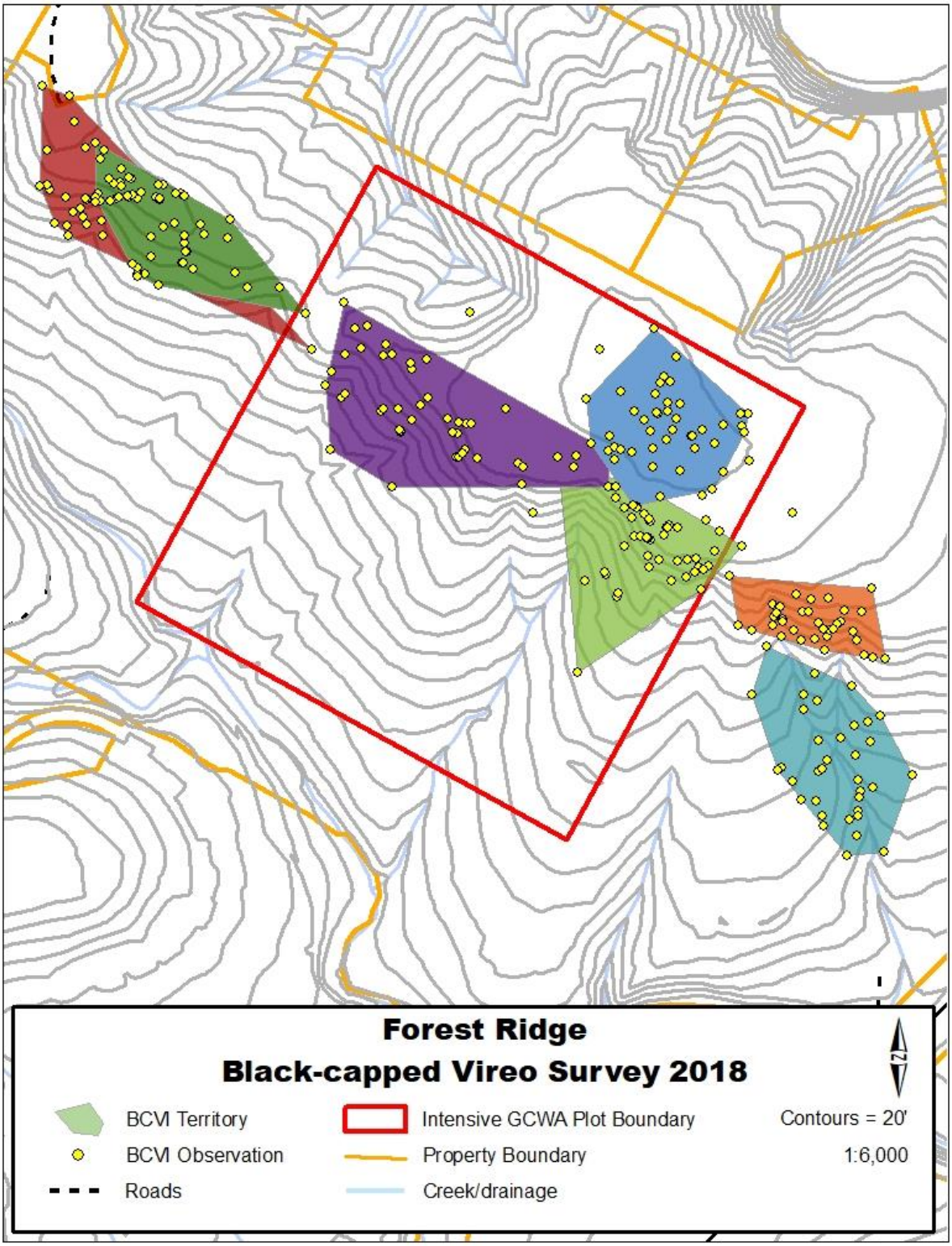


Figure B. Locations of Black-capped Vireos on Forest Ridge, 2018.

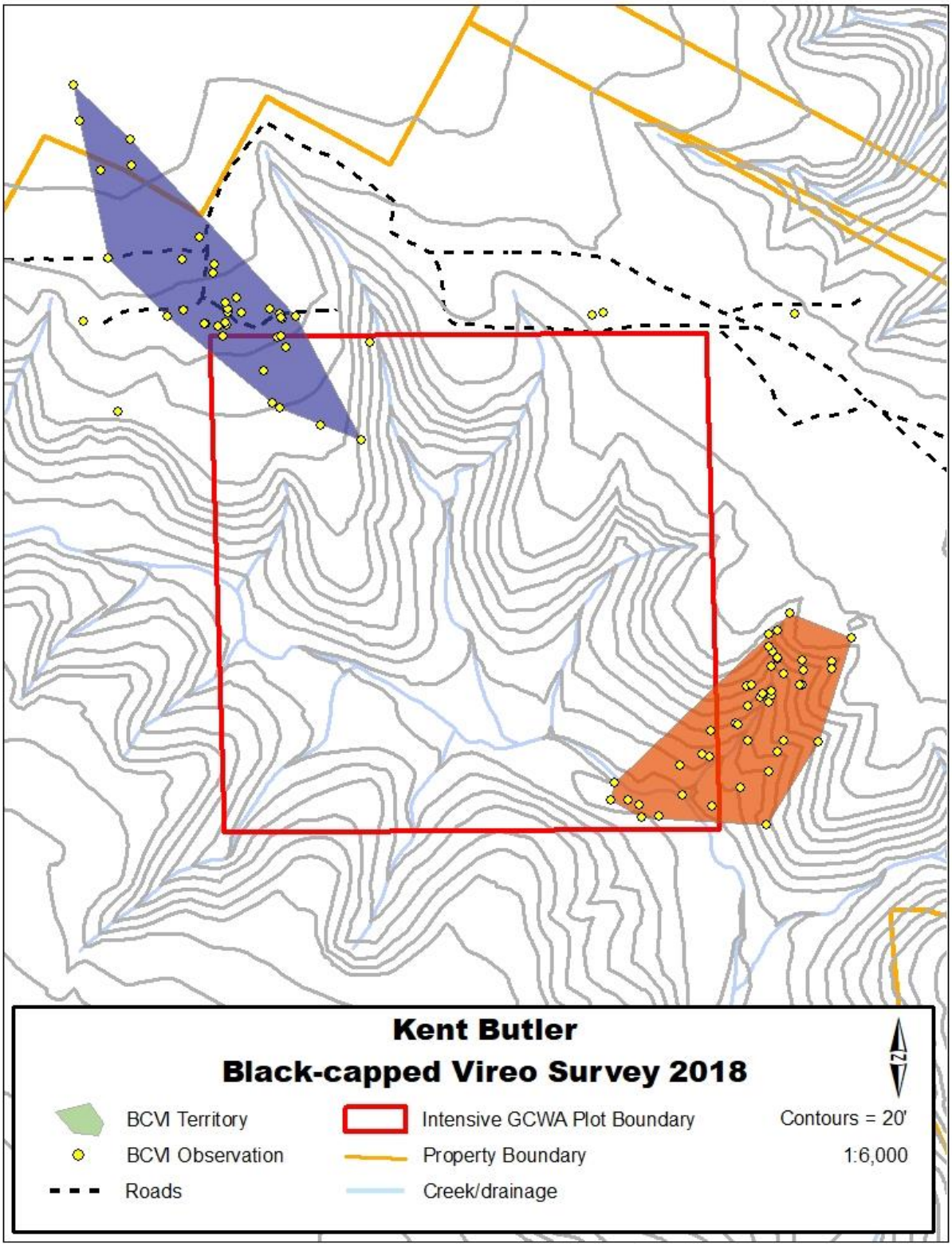


Figure C. Locations of Black-capped Vireos on Forest Ridge Ecological Reserve, 2018.

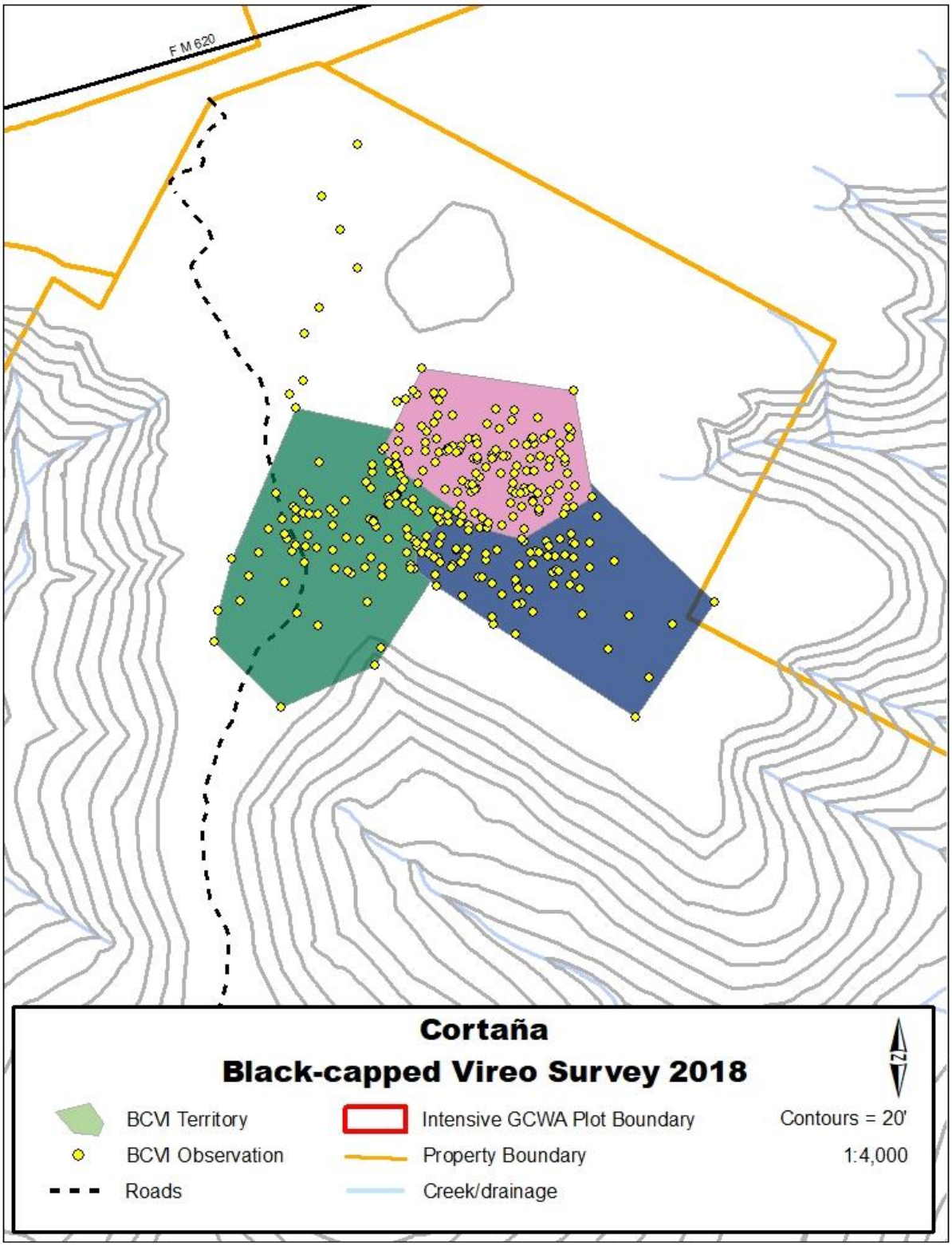


Figure D. Locations of Black-capped Vireos on Cortaña, 2018.