Status of the Black-capped Vireo on theVireo Ridge Tract Travis County, Texas 2001 Field Season

Travis County Natural Resources
Project Number 0810-00001



Photo: Sandee Harville, Ft. Hood, 1999

January 2002

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INTRODUCTION

This report is a summary of historical and current information on the population status of the black-capped vireo (*Vireo atricapillus*, hereafter vireo) on the Vireo Ridge tract of the Jollyville Unit, Travis County, Texas. The black-capped vireo is a migratory passerine whose breeding range in the contiguous United States has decreased markedly within the last few decades. Though not known to have been widespread in the United States, vireos were once found in Kansas, Oklahoma, and Texas (Grzybowski 1995). Today, however, the vireo breeds in a restricted range that includes only parts of Oklahoma and Texas. As of 1999, it occupied only three areas in Oklahoma and is probably extirpated from north central Texas; (U.S. Fish and Wildlife Service [USFWS] 1991; Grzybowski, Tazik, and Schnell 1994; Grzybowski 1995, Oklahoma Dept. of Wildlife Cons. 1999).

Known populations occurring in Texas include reports of vireos found in 34 south-central and central Texas counties (USFWS 1996). These reports are derived from population counts and observations from 1990 through 1996. In many Texas counties, thorough surveys have not been conducted. Vireos were observed in six additional counties that were last surveyed between 1985 and 1988. Large colonies of vireos in central Texas are found in Bell, Coryell, and Kerr counties.

Populations in Travis County have been drastically reduced by habitat destruction. In 1996, less than 100 individual vireos were estimated to occur in Travis County. Historic colonies no longer exist as urban sprawl limits already fragmented habitat. To prevent further losses, the U.S. Fish and Wildlife Service issued the Balcones Canyonlands Conservation Plan (BCCP) section 10 (a)(B) permit in 1996 to the City of Austin and Travis County. The plan calls for 30,428 acres of endangered species habitat in western Travis County of which at least 2000 acres of known and potential vireo habitat be set aside and managed within the Balcones Canyonlands Preserve (BCP).

Goals for vireo recovery outlined in the BCP Land Management Plan (1999) call for maintaining and increasing the current population while protecting contiguous blocks of habitat. As a managing partner of the BCCP, Travis County acquired several tracts to be managed as unit now called Jollyville (Fig. 1). The Jollyville Unit is comprised of 1806 acres (731 ha) which includes the following tracts: Grandview Hills 10(a), Lake Perspectives, Vireo Ridge, Vista Point, and Toops. Many tracts of the Jollyville Unit were not acquired prior to the 2001 field season thus we report vireos only for the Vireo Ridge.

Vireo Ridge, formerly known as The Parke, comprises 581-acres (234 ha)(Fig. 1) was purchased during the summer/fall of 2000. With this purchase, Travis County secured one of the largest historic vireo colonies that remain in the Austin area. During late November 2001, Travis County also purchased the adjacent 490 acre (198 ha) parcel, formerly known as the Shellburg Tract (hereafter Vista Point) (Fig. 1). Though Vista Point was not surveyed during 2001, baseline inventories will be conducted during spring/summer 2002. Vista Point is of importance in that potential vireo habitat does exist in close proximity to the Vireo Ridge colony. However no vireos have been documented on Vista Point since the mid-1990's.

During the mid-1960's, one or more pairs of vireos were found on Vireo Ridge (Sexton, pers comm). Intensive clear-cutting for cedar posts during the late 1970's through the mid-1980's eventually resulted in regrowth suitable for vireo habitat. Though vireos may not have been absent, none were detected since the clearing had begun (Sexton, pers comm). However, between 1984-1985, vireos were once again located on Vireo Ridge. Since the mid-1980's, the vireo colony has been present at Vireo Ridge (Table 1).

With knowledge of the colony history at Vireo Ridge, Travis County expected to locate vireos during the 2001 breeding season. However, an initial site visit during February 2001 revealed poor to marginal habitat conditions. It was anticipated that no more than a few breeding pairs would be found.

STUDY SITE

Vireo Ridge comprises 581 acres (235 ha.) and is located 13 miles (21 km) northwest of downtown Austin on FM 2769 (Figure 1). Both the golden-cheeked warbler and the black-capped vireo have been documented on this property in the past decade. Topography includes upland plateau incised by irregular, steep slopes and ravines. Ravines drain into an unnamed tributary of Lake Travis or into Cypress Creek. Drainages tend flow from the east to west. Total vertical relief is 250 feet (970-720 msl). Riparian soils are in the Volente complex; Brackett and Tarrant soils are found on steep slopes (USDA 1974). Tarrant soils also occur in upland areas. Closed canopy juniper-oak woodlands cover the majority of the canyons and slopes. Historic harvest of mature Ashe juniper has caused second-growth, shrubby junipers to dominate the uplands. Open grasslands are found in valleys, while riparian vegetation dominated by large pecans (*Carya sp.*) and elms (*Ulmus spp.*) is found along FM 2769. Optimal black-capped vireo habitat is located along the southwestern boundary of Vireo Ridge adjacent to the Grandview Hills subdivision.

METHODS

Data Collection

Black-capped vireos were surveyed at Vireo Ridge, from 30 March to 15 July 2001. Vireo data collected during 2001 would be considered baseline as no formal surveys had been completed since 1996 (Table 1). Territory mapping was used to estimate vireo densities and abundance. All observations (both visual and auditory) of male, female and juvenile vireos were plotted on hard-copy digital ortho-photo maps. For each observation, the following demographic data was recorded: sex, age, presence of a mate, and number of fledglings observed. Avian locations were later recorded in an ArcView database using the Texas State Plane Coordinate System. Spatial and demographic data was entered into the database via an ArcView script (Horne 2000).

To collect territory location data, methods similar to the "consecutive flush" described by Bibby et al. (1993) were employed. Bibby's method was modified to be less intrusive in order to avoid harassment and/or human induced behaviors (Holiman 2000). No more than five locations for an individual bird were attempted at one time. Counter-singing and contemporaneous conspecific singing were relied upon in most cases to differentiate between individual males. Vireos that could not be differentiated from surrounding individuals with any confidence were designated as "unknown." Playback tapes of vireo vocalizations were not used to elicit vireo responses.

Pairing status of male vireos was determined by observing one or more of the following conditions: a territorial male associating with a female; the nest of a territorial male; and/or a male tending ≥1 fledgling. Observations of fledglings tended by a male or female and the total number of fledglings observed at any one time provided data on productivity. All breeding territories were searched for nests. Nests were checked every 4-5 days from the date of discovery until a fate could be determined. Nest stage, contents, and behavior of the attending adult were recorded at each nest check.

All potential vireo habitat at Vireo Ridge was surveyed repeatedly throughout the breeding season. Vireo Ridge was surveyed 12.5 days (survey day = 8 hours) for a total of 100 survey hours. Due to the limitations inherent in territory mapping methods (Verner 1985), results should be interpreted as indices or baseline data, rather than complete counts. During the breeding season, county personnel recorded and mapped all incidental sightings of vireos outside of preserve boundaries and at county parks. For each observation, location, date, sex,

and behavior were noted. No attempt was made to determine the number or locations of breeding territories.

Data Analysis

Abundance is the sum of all individual male vireos at a given study site (regardless of territory status). Individual males that were observed using only habitat outside of preserve boundaries were not included in the abundance index. Species distribution comprises all locations where vireos were observed. This includes males, females, and fledglings and may include multiple sightings of the same individual.

An individual male was considered to have established a breeding territory if one or more of the following conditions was observed: a male was observed with a female; a nest was located for an individual male; a male was observed with fledglings; and/or a male was observed ≥ 3 times (on different days) using the same general location. Males observed using at least a portion of the study area were treated as if their territories fell entirely within preserve boundaries.

Pairing success rate was calculated as the number of territories determined to have pairing success divided by the total number of territories (Anders 2001). Productivity was calculated in two ways for each study site. First, a territory was considered successful if ≥ 1 fledgling was observed with a territorial male or female. Thus, the success rate is the number of territories that successfully fledged young divided by the total number of territories (Koloszar and Becker 2001). Second, productivity was measured by summing the highest number of fledglings recorded at any one time for each territory and dividing by the total number of territories.

RESULTS

Three hundred seventy-four observations were recorded for black-capped vireos on Vireo Ridge in 2001 (345 male, 28 female, 1 hatch year) (Fig. 2). These sightings include multiple observations of the same individual. Abundance for vireos at Vireo Ridge totaled 19 males with 13 known to have breeding territories. No color-banded vireos were found on Vireo Ridge during the 2001 season.

Of the 13 reported territories, 9 (69%) were considered as mated based on observations of both adults and number of observations, or the discovery of a nest. A summary of territories is presented in Table 2. Four of nine (44%) of monitored pairs (territories) successfully

fledged at least one young (Table 3). Of the nine paired territories, 14 nests were found. Two nest attempts were found for five of the nine territories (55%). No third or fourth nest attempts were observed during 2001. No nests were found parasitized nor were vireos observed feeding cowbird fledglings. Of the 14 nests found, nine (64%) were depredated, four (44%) fledged at least one vireo, and two (14%) were abandoned during the building stage.

DISCUSSION

During 2001, vireo territories were established in historically occupied areas of Vireo Ridge (Figs. 2 & 3). Though most territories were adjoining, 3-4 territories were isolated from main groupings. Such an arrangement may indicate that habitat degradation, due to later successional growth stages, has reduced patch quality and size. Further investigation should be initiated to determine if territorial arrangements are based on habitat conditions or merely a function of age dominance amongst individuals (Anderson and Gutzwiller 1996).

Based on historic numbers, abundance of males have been on a general decline from the 1994 peak of 27 (DLS 1994)(Table 1). Low bird densities, especially in and around isolated territories, may have biased detection rates thus effecting abundance. Verner (1985) found that in low-density populations of marsh wrens (*Cistothorus palustris*), song rates and duration of song bouts were much lower than in high-density populations. Though we did not use tape playback to elicit responses in areas with few detections, Horne (2000) found that tape playback can be useful to improve detections of vireos. Consequently, there may have been more than the 13 reported territories on Jollyville during 2001.

Habitat degradation may have also affected productivity. Though not quantified, nesting habitat characteristics of typical vireo habitat (see Grzybowski 1995 for description) are not exhibited at Vireo Ridge. For example, dense Ashe juniper has reduced the openings generally associated with deciduous cover in optimal vireo habitat. Therefore the vegetative growth pattern at Vireo Ridge is more vertical rather than horizontal. A vertical growth pattern is influenced by light competition, which decreases foliage density inside mottes particularly in the lower vegetation layers. Such growth may provide fewer preferred nesting sites resulting in poor nest concealment. Martin and Roper (1988) found that well concealed hermit thrush (*Catharus guttatus*) nests were more successful than less concealed nests. Suitable nest sites at our site may not be as abundant as in optimal habitat. Therefore high predation (9 of 14 nests depredated) coupled with poor nesting substrates may be limiting reproductive success. During 2001, no more than two nest attempts were observed for any

territory at Vireo Ridge. The total number of nest found (14) is probably an underestimate of the total number of nests on our site. It is not uncommon for open nesting species, especially vireos, to have several renesting attempts (Martin 1992, Koloszar and Becker 2000). One could assume that suitable nest sites may have not have been available, therefore limiting renesting success/attempts (Martin 1992). Further research is needed to better understand the breeding habitat dynamics and its function as related to reproductive success at Vireo Ridge.

Despite several years of data collection at Vireo Ridge, it is unclear whether the Vireo Ridge colony is a source or sink. Information regarding productivity and dispersal is very limited. Our initial findings of low reproductive success would indicate that the Vireo Ridge colony is a sink population. However, without comprehensive productivity and banding information and a complimentary data set for surrounding properties, we cannot make a definitive statement regarding Vireo Ridge and its role within the Austin metapopulation.

Data collected from other agencies (DLS 1989b, 1990a, 1992, SWCA 1996 and TXDOT 1991, 1993, 1994, 1995) document banding and returns. From 1991-1995, 36 males and 16 females were banded at Vireo Ridge (DLS 1992, TXDOT 1991, 1993, 1994, 1995). Though vireos were banded for several years at Vireo Ridge, no band returns were discovered during 2001. With the absence of data from 1997-2000 (Table 1), it is difficult to determine when band returns ceased at Vireo Ridge. Other researchers have noted that re-sightings of returns is directly related to the size of the study population, where a larger population yields a higher return rate and greater site fidelity (Hopp et al. 1999, Payne and Payne 1990). This may be the case for the Vireo Ridge colony in that the population is small while the habitat is patchy and varied in suitability. Such parameters may have effected dispersal patterns thus reducing band return detections.

RECOMMENDATIONS

- An intensive monitoring program, including color-banding, should be established at Vireo Ridge once long-term funding becomes available. Such research would answer many questions concerning the viability of the Vireo Ridge colony and its role in the Austin metapopulation. Long-term data sets would then be established to facilitate yearly comparisons. Data collected should include the following: abundance, age-classes, dispersal patterns, distribution, habitat associations during the breeding season, productivity, nest success, return rates and recruitment. Research should be focused upon answering questions of immediate relevance to setting management and recovery priorities.

- Quantitative habitat characterization data should be collected to facilitate future habitat suitability and prediction models. Quantitative data is needed to compare the results of habitat restoration treatments.

- Potential habitat should be identified and mapped on all tracts owned and managed by Travis County. Historic vireo locations on Travis County owned and managed properties should be visited during the field season to determine presence/absence.

- Habitat restoration efforts will continue on those tracts that support vireo colonies and on surrounding tracts that harbor potential habitat. Restoration methods will be evaluated to determine those that best create or restore suitable vireo breeding habitat. Field activities should be conducted at potential restoration sites to determine if activities will negatively affect golden-cheeked warblers.

- Conspecific tape playback should be utilized during the field season, especially in areas where few detections are recorded. Tape playback will increase detections of territorial males.

- Cowbird activity will continue to be monitored. Though no nests were found parasitized, cowbird activity at Jollyville was high. Trapping will continue on adjacent tracts. Shooting female cowbirds in habitat is also recommended.

DATA MANAGEMENT

Information regarding the disposition of data sets collected during the 2000 field season is provided below. Data will be archived to facilitate retrieval for further analysis. All data are currently stored in the Travis County Natural Resources office, 1010 Lavaca Street, 3rd floor, suite 318, Austin, Texas.

Avian Location Data

Data File Name: BCVI-01-ALR.xls
Documentation Update: 15 November 2001
Description: vireo location data from 2001 field season
Software: Microsoft Windows 2000, Excel 1997
Data File Archive Location:
Main Copy: D:\Users\Wes\Research\BCVI\Travis County\2001 Avian Data
Storage Location: Computer #101859

Data File Name: 2001-all-bcvi.shp
Documentation Update: 15 November 2001
Description: shapefile containing vireo location data from 2001 field season
Software: Microsoft Windows 2000, ArcView 3.2a
Data File Archive Location:
Main Copy: D:\GIS data\data\avian data\2001
Storage Location: Computer #101859

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TABLES

Table 1. Summary of black-capped vireo survey data collected by various agencies on the Jollyville Preserve, Travis County, Texas.

Year Surveyed	Agency	No. Males	No. Territories
1989	DLS	11	5
1990	DLS	11	5
1991	DLS	14	9
1992	TXDOT	No Data[1]	Unknown
1993	TXDOT	25	20
1994	TXDOT	27	27
1995	TXDOT	23	23
1996	SWCA	19-22	15
1997	No Data[1]	Unknown	Unknown
1998	No Data	Unknown	Unknown
1999	No Data	Unknown	Unknown
2000	SWCA[2]	3	Unknown
2001	Travis County	19	13

1 Restricted access on the Parke.

2 Detected while on brief site visit.

Table 2. Summary of black-capped vireo territories at Jollyville Preserve, Travis County, 2001.

Territory No.	Male	Mated?	Female	Nest	Status/Outcome	Comments
JV01	UB	Yes	UB	1	Fledged 3 young	No 2nd nest found
JV02	UB	Yes	UB	1 2	Depredated Depredated	N1 ripped off limb N2 eggs missing No 3rd attempt found
JV03	UB	Yes	UB	1 2	Fledged Failed	N1 fledged 4 N2 eggs missing No 3rd attempt found
JV04	UB	Yes	UB	1	Failed/Depredated	Nest intact, eggs missing No 2nd attempt found
JV05	UB	Yes	UB	None	Male sang throughout territory, no female obs. No female detected	
JV06	UB	Yes	UB	1	Failed/Depredated	Nest empty, no sheathings No 2nd attempt found
JV07	UB	Yes	UB	None	Male obs. w/HY & female on 5/7/01. No additional nests or locations recorded for remainder of season despite several visits.	
JV08	UB	No	UK	None	Several locations recorded for male, no female or young observed during season.	
JV09	UB	Yes	UB	None	Male very active throughout territory. Female observed shradding on separate visits. No nest found or young observed.	
JV10	UB	Yes	UB	1 2	Failed/Depredated Failed/Depredated	N1 empty/no sheathings or HY's obs. N2 fire ants covered 2 nestlings/2 eggs No 3rd attempt found
JV11	UB	Yes	UB	1 2	Failed/Abandoned Failed/Depredated	N1 Abandoned during building stage N2 empty/no sheathings or HY's obs. No 3rd attempt found
JV12	UB	No	UK	None	Consistently countersang against JV11. No female or young observed.	
JV13	UB	Yes	UB	1 2	Failed/Abandoned Fledged	N1 Abandoned during building stage. N2 Fledged 4 young, no 2nd brood nest found.
JV14	UB	Yes	UB	1	Failed/Depredated	Nest empty, no sheathings or young obs. No 2nd attempt found.
JV15	UB	No	UB	None	Initially located on 5/7/01. Not heard again until 5/29/01. Sang two phrases on the 29th, searched for nest and female, never heard again.	
JV16	UB	No	UK	None	Located on 5/15/01. Never relocated. No female or young observed.	
JV17	UB	Yes	UB	None	Located on Bunten tract on two seperated dates. No female or young observed. Never relocated despite several visits.	
JV18	UB	Yes	UB	None	Very active below JV02. Female observed, no nest found. Possibly had young late in season. No direct evidence of productivity.	
JV19	UB	No	UK	N	Discovered in early June on 3 separate dates. Possibly JV08 male moving through habitat.	

Table.3. Productivity (no. fledglings/territory) and pair success (percent successful) for black-capped vireo territories on Jollyville Preserve,Travis County, Texas, April-July 2001.

Study Site	No. Territories[a]	No. Monitored[b]	Percent Monitored[c]	No. Successful[d]	Percent Successful[e]	No. Fledglings[f]	Observed Productivity[g]
Jollyville	13	9	69.2	4	44	12	1.33

[a] No. territories values represent the total number of territories reported from 2001 avian location database.
[b] No. monitored represents the number of territories where productivity data was recorded.
[c] Percent monitored represents the percent of all territories that were monitored.
[d] No. successful represents the number of Monitored that fledged at least one young.
[e] Percent successful represents the percent of all Monitored that were successful.
[f] No. fledglings represents the number of fledglings produced by Monitored territories.
[g] Observed productivity represents the index of fledgling production for each monitored territory (No. Fledglings / No. Monitored).

FIGURES

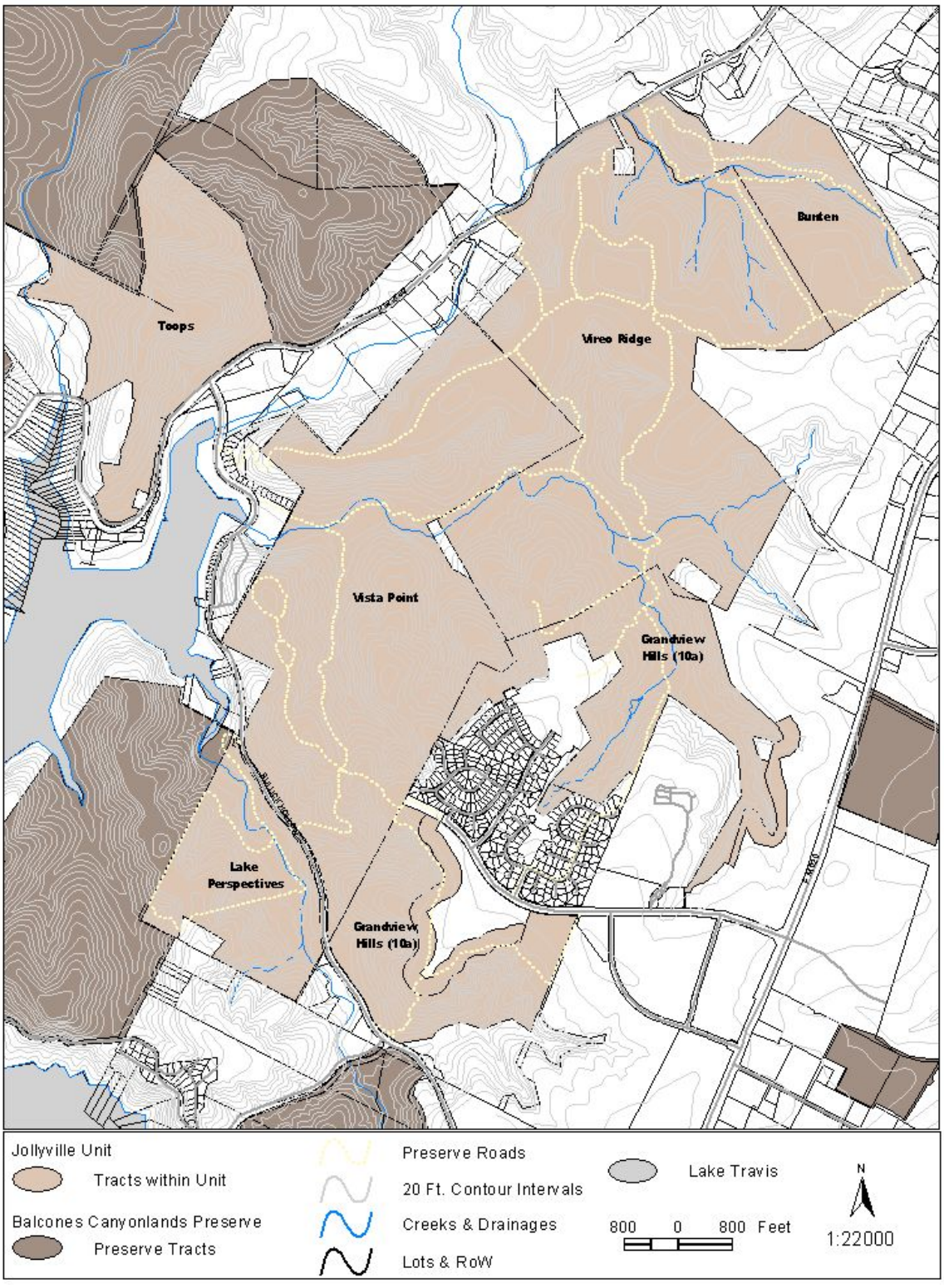

Figure 1. Jollyville Unit (Travis County owned/managed preserve lands within the BCP) 2001.

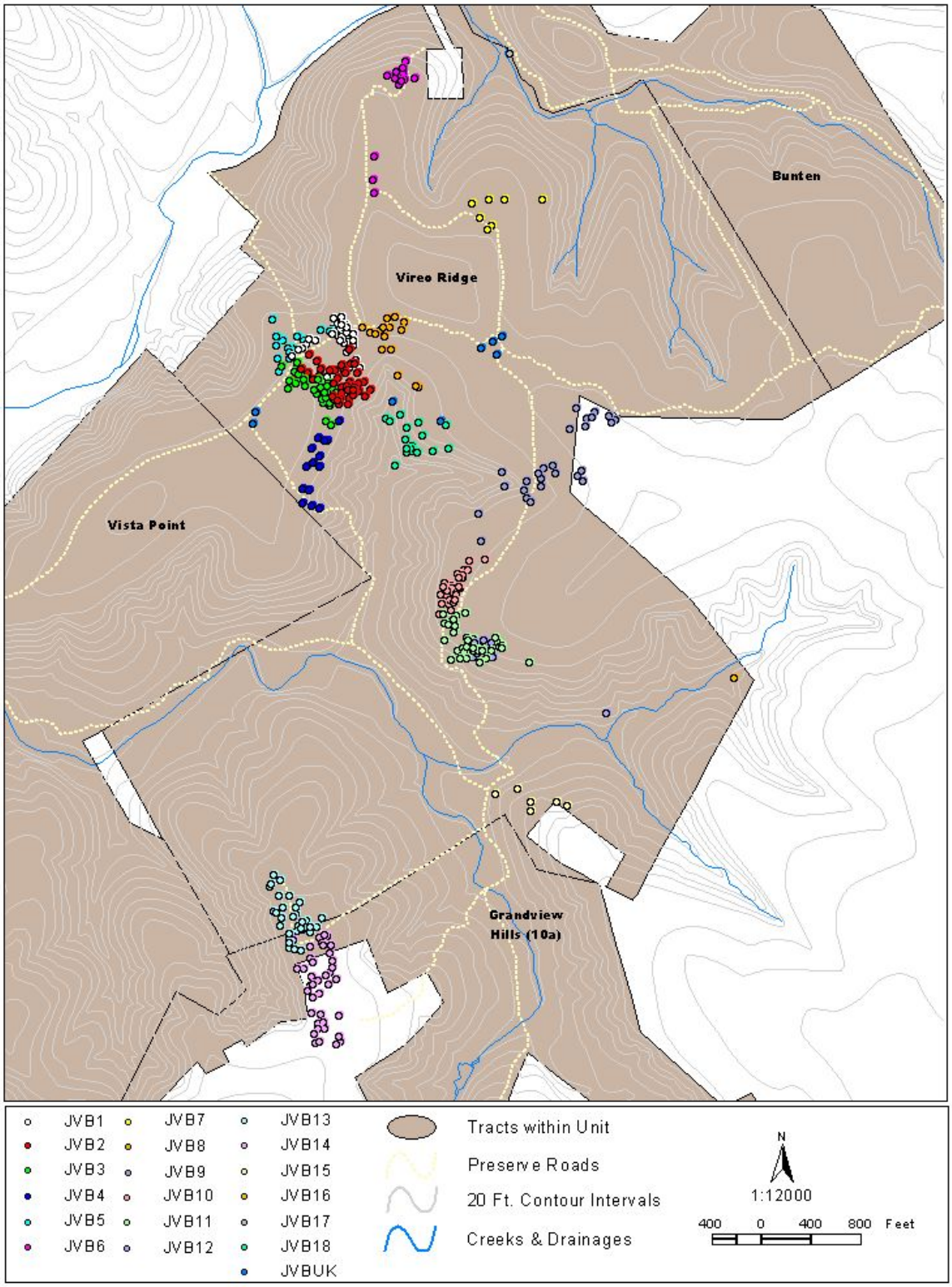

Figure 2. Distribution of black-capped vireos during 2001 at Vireo Ridge, Travis County, Texas.

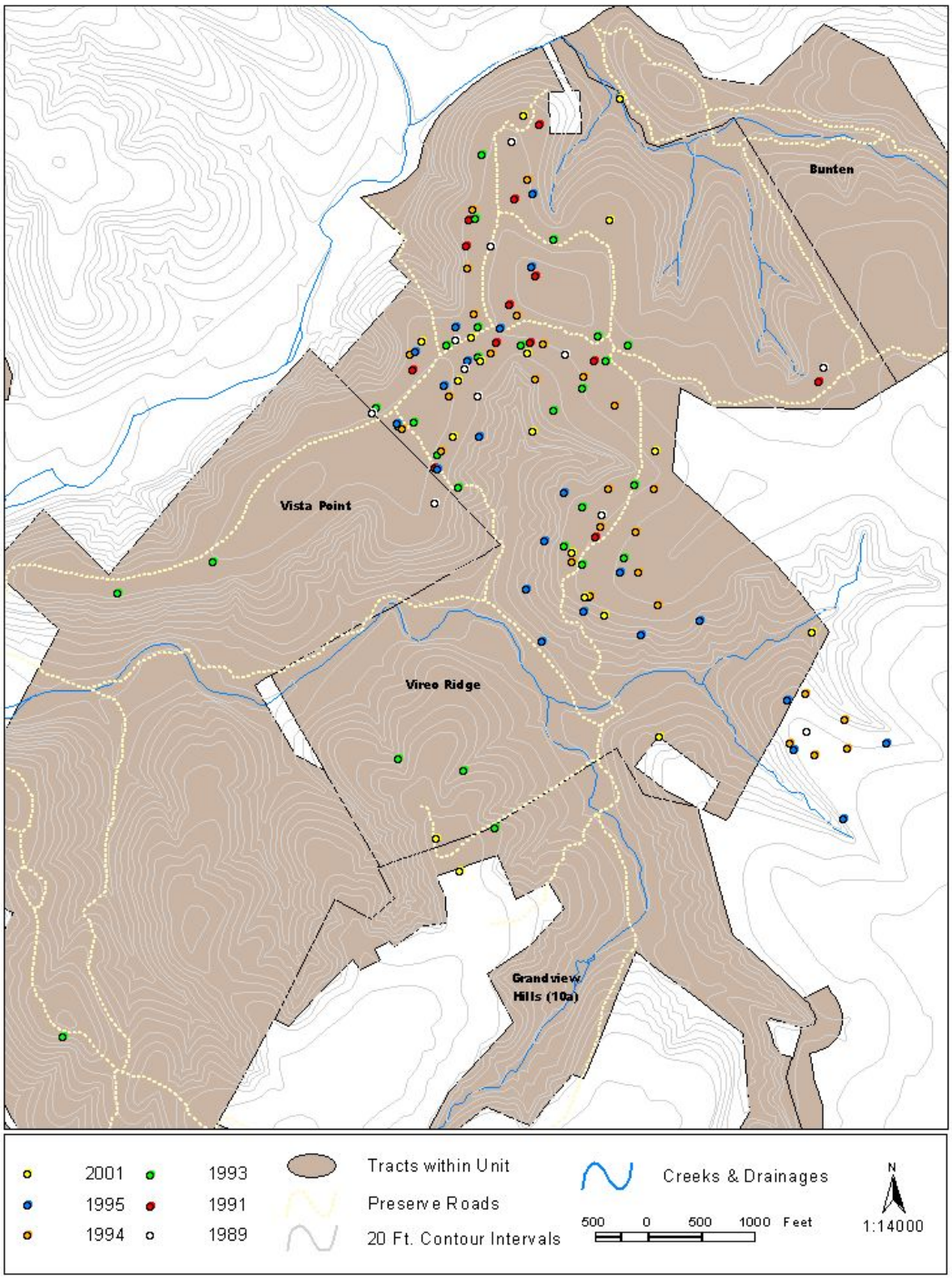

Figure 3. Current and historical black-capped vireo locations, Jollyville Unit, Travis County, Texas, 2001.