

City of Austin 2014
Black-capped Vireo (*Vireo atricapilla*)
Monitoring and Management Program

Balcones Canyonlands Preserve Annual Report



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

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City of Austin
2014 Black-capped Vireo Monitoring and Management Program
Balcones Canyonlands Preserve Annual Report

This report summarizes the results of the City of Austin’s 2014 Black-capped Vireo (*Vireo atricapilla*) endangered species monitoring and habitat management program. The 2014 field season was the seventeenth year of endangered species monitoring on the City of Austin’s Balcones Canyonlands Preserve tracts.

Collaborative efforts to create and restore habitat continue for the Black-capped Vireo. The City of Austin is partnering with Travis County, St. Edwards University, Wild Basin, and volunteers to restore, create, and monitor vireo habitat on the Wild Basin/Vireo Preserve, including degraded areas that are currently not habitat for either the vireo or the Golden-cheeked Warbler. Since Wild Basin/Vireo Preserve supports many of the habitat types observed throughout the BCP, lessons learned at this site should be applicable to other areas within the BCP.

INTRODUCTION

Background

The Black-capped Vireo (*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. Rapid westward expansion of development from the city of Austin led to the creation of the Balcones Canyonlands Conservation Plan (a Habitat Conservation Plan) and issuance of a 10(a)(1)(B) permit in 1996 by the U.S. Fish and Wildlife Service to the City of Austin and Travis County 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 has 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 (City of Austin 2011), and 2012 (City of Austin et al. 2012). A small breeding colony of Vireos (three to five territories) had 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 in 2012 or 2013. Two to three 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), Vireos nested along electric transmission line corridors in 2008, 2009 and 2013. 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, Parke West, and Sam Hamilton West tracts.

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.

BCP staff actively monitor Vireo territories for the presence of cowbirds, and are committed to reducing or eliminating the threat of cowbird parasitism of Vireo nests. With the absence of Vireos on the Cortaña tract in 2012 and 2013, and the lack of evidence of cowbird parasitism at the Forest Ridge colony, BCP staff ceased active trapping of cowbirds on City of Austin properties beginning in 2013.

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 grassy or rocky spaces and clumps of shrubs. 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 frequently undertaken on various City of Austin tracts (see Black-capped Vireo Habitat Management).

METHODS

Sites and Survey Effort

To determine population trends, BCP biological staff begin by searching suitable habitat for Vireos every year during the breeding season. With the exception of the Cortaña tract shinnery, Vireo habitat on City of Austin BCP property is near to, or within, plots intensively monitored for the Golden-cheeked Warbler (Warbler). Vireos are first detected during the course of intensive Warbler monitoring (see Methods in City of Austin et al. 2014). When Vireos are detected in an area, staff biologists then monitor them once or twice weekly for evidence of mated status and breeding success.

During the 2014 field season, Vireos were mapped on, and adjacent to, the Warbler intensive study plots within the Forest Ridge and Kent Butler tracts. 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 intensive study plot was surveyed once or twice each week in conjunction with the Warbler monitoring program from March 15 through June 15. Once Vireos were detected on April 7, staff collected data on the number of Vireo territories, territory locations, pairing success, breeding success, parasitism, and productivity, continuing surveys through July 25, 2014, for a total of 121.3 hours.

The Kent Butler population was also monitored in conjunction with the Warbler monitoring program. The first Vireos were detected on April 22. They were continually monitored through July 25, 2014, to determine number of territories, territory locations, pairing success, breeding success, parasitism, and productivity. The Kent Butler population was surveyed for a total of 21.9 hours.

Until 2014, monitoring effort in the Cortaña Vireo habitat had been roughly equivalent, hectare-for-hectare, to the level of effort on the Warbler intensive study plots (See Methods in City of Austin et al. 2014). Staff had devoted at least 2.5 hours on each of the ten survey visits to the 15.8-hectare patch of habitat on the Cortaña tract (another 7.3 hectares on the adjacent River Place mitigation tract brings the size of the patch to approximately 23 hectares). However, since no Vireos had established territories on the site for two years, in 2014 staff reduced their survey effort to three visits, on April 25, May 14, and May 23.

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 et al. 2014. No playback tapes of Vireo songs or calls were used during this season's monitoring.

RESULTS AND DISCUSSION

In 2014, staff found Vireos holding territories on only two City-owned BCP tracts: Forest Ridge and Kent Butler. Staff also heard a male BCVI singing briefly on the Hamilton tract on April 23, 2014.

Territory Mapping and Reproductive Success on the Forest Ridge Tract

Four territorial male Vireos were observed on and adjacent to the Forest Ridge intensive Warbler study plot in 2014. On April 7, the first Vireo, OR/SI:BL/GR was seen and heard singing on the plot. OR/SI:BL/GR returned as a six-year-old male who was banded as a second-year male in 2009 on Forest Ridge by William Simper, Travis County BCP. A second male, unbanded, was first observed on April 17. A third male, also unbanded, was documented on May 1. OR/SI:BL/GR returned to the same ridge top and south facing slopes which he defended in prior years with both aforementioned unbanded males holding territories along the ridge top just east of OR/SI:BL/GR's territory. One of the unbanded males tended to stay on the upper, flatter section of the ridge, while and the other held the south-facing slope.

A fourth male, also unbanded, was first detected on May 28, along the ridge to the northwest of the banded male's territory and outside the western boundary of the study plot (See figure A for location data). On this same date, he was found singing nearby a straggling female who revealed the location of a completed nest in a Mexican buckeye shrub containing two eggs. When checked on June 10, this nest only contained 1 egg and appeared abandoned due to partial predation (pictured below, left). A second nest was located on June 19 with 3 eggs in a Texas persimmon, but later found empty on July 4. Two fledglings were being fed by the male on July 8.



Abandoned Black-capped Vireo Nest in Mexican Buckeye Post Partial Predation and Early Building Stage nest Found
Abandoned in OR/SI:BL/GR's Territory, Forest Ridge, © Jonny Scalise

Of the three other males on the tract, two were confirmed as mated with females, one of which had a successful nest. OR/SI:BL/GR was seen with a female on multiple occasions between June 19 and July 8. Neither the male nor the female showed behaviors of having nestlings or fledglings and no active nest was found, though an early-stage abandoned nest was found (pictured above, right). This male was heard singing as late as July 25.

The unbanded male on the upper, flatter ridge top, east of the banded male, was found on June 24 with a female who was feeding nestlings. This nest was about 6 feet above the ground in a low-hanging plateau live oak branch, and contained 3 nestlings. On July 1, the nest only contained a single unhatched egg (pictured below). The male was behaving as though he had fledglings nearby, though none were found by field biologists, and neither the male nor the female from this territory were found on subsequent visits.



Nest in Live Oak Post Fledging, Forest Ridge, © Jonny Scalise

On July 1, the unbanded male on the eastern south-facing slope was seen near a begging fledgling though he never was seen feeding it. Due to the presence of White-eyed Vireos in the area and the similarities in appearance between Black-capped Vireos and White-eyed Vireo young, this fledgling could not be confirmed as a Black-capped Vireo. Though unconfirmed as a mated pair, a female Vireo was documented in this male's territory on July 8. This male was documented on site through July 16.

Pairing success for the four territories at Forest Ridge was at least 75 percent, and breeding success was at least 25 percent using moderate estimations that do not include unknown or unconfirmed observations. As only 2 fledglings were confirmed within the Forest Ridge population, productivity is 0.5 fledglings per territory, however at least 4 more fledglings were believed to have fledged without being documented which could have inflated productivity to 1.5 fledglings per territory.

Territory Mapping and Reproductive Success on the Kent Butler Ecological Reserve

On April 22, an unbanded male Vireo was found singing within the same part of the habitat improvement area where Vireos had successfully nested in 2013. On May 2, this male was banded by William Simper of Travis County BCP staff as DG/MV:YE/SI, at which time it was determined to be a second-year male (ie: a different male than the one that had settled in this area in 2013). A female was heard calling and seen with DG/MV:YE/SI on May 27. On June 12, DG/MV:YE/SI was found with one fledgling, and then was feeding two fledglings on June 17. The female was also seen on June 17 but was not seen feeding young. Then, on July 10, DG/MV:YE/SI was found singing and straddling between the two western habitat improvement areas and gave away the location of a nest containing one old nestling in a Texas red oak. On July 11, this nest only contained an unhatched egg. One nestling from the second brood was documented with the adult male on July 25.

On May 5, a second male, unbanded, was seen about 200 meters northwest of the eastern habitat improvement area, though he was not detected again after this date. (See Figures B and C for locations of Vireo nests and observations in relation to habitat improvement areas.)

For the one established territory on the Kent Butler site, pairing and breeding success were both 100%, and productivity was 3 fledglings.

Territory Mapping on the Cortaña Study Site

No Vireos were detected on the Cortaña tract in 2014, making it the third consecutive year without a Vireo territory.

Parasitism and Interaction with Predators

No brown-headed cowbirds were observed during Vireo surveys on either the Forest Ridge or the 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, since no Vireo established a territory at this site in 2012 or 2013, trapping was discontinued.

The territorial male Vireo on the Kent Butler tract chased a Western Scrub-Jay for at least 50 meters on May 15, giving a “shrad” alarm call. City staff observed no other interactions between Vireos and potential predators, nor any harassment of Vireos by other species. Western Scrub-Jays were observed near Vireos at Forest Ridge.

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 often overlap. During 2014 within the City of Austin BCP, territorial Warblers and Vireos were observed in the same or neighboring areas on the Forest Ridge and Kent Butler tracts.

On both tracts, the Vireo territories were intermingled with Warbler territories within prime Warbler habitat on and near the intensive study plots. 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. Vegetation trimmed below its normal height in some places along these lines, to avoid damage to the wires, encouraged a shrubby growth that is suitable for Vireos. Warblers occupy and successfully raise young on both sides of the utility corridors, and in a wooded strip between them. The Vireo territory overlapped with the Warbler territories in the wooded strip and on either side of the transmission lines.

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. Consistent with these recommendations, BCP staff is implementing adaptive management to create Vireo habitat in areas within the BCP that are not currently suitable for either the Vireo or the Warbler. Since Vireos occupy an earlier successional stage, actively managing to create Vireo habitat may be a more realistic option in some areas than trying to restore mature, closed canopy woodlands. This would also protect existing Warbler habitat from conversion or fragmentation to create Vireo habitat. Focal areas for Vireo habitat management on City of Austin BCP lands currently include the Cortaña tract, Wild Basin/Vireo Preserve, the Bohls tract, and infrastructure corridors (Kent Butler). BCP staff is also evaluating areas with significant tree mortality from the 2011 drought for potential as future Vireo habitat.

Expanding Vireo Habitat – Kent Butler

In 2008, BCP staff found a pair of Vireos had established a territory and successfully fledged at least one chick on the Kent Butler tract. They had chosen an area bisected by four electric transmission lines. Utility crews had kept vegetation trimmed below its normal height in some places along these lines, where tree limbs might cause damage to the infrastructure; they also maintained roads for vehicular access. The trimming encouraged a shrubby growth that was apparently suitable for this pair of Vireos.

Since utility corridor maintenance would always prevent the vegetation in the corridors under these lines from becoming optimal Warbler habitat, BCP staff proposed to the Lower Colorado River Authority (LCRA) and Austin Energy (AE), who owned the lines, a new approach. In a few places where maintenance had kept vegetation at suboptimal structure for Warblers, but the trees were too tall for good Vireo habitat, the vegetation would be cut to the ground. Highest priority was given to areas where stump-sprouting shrubby species were already established.

The utilities agreed, and in February 2009, an LCRA crew removed the above-ground trunks of woody vegetation in three areas (Figure B). No vegetation was altered where the Vireo family had been seen in 2008 (City of Austin, 2009).

A Vireo pair established a territory in 2009, but failed to raise a brood. No Vireos were detected in the project area for the next three years, but in 2013 a pair again established a territory, and fledged three chicks. In 2014, a different male established a territory in this same area. He and his mate fledged two chicks by mid-June, then a third chick from a second brood in July. (See Figure B for locations of nests found in 2009, 2013, and 2014 in relation to habitat improvement areas, and Figure C for observations of Vireos in 2014.)

Though no Vireo nest has been found within any of the habitat improvement patches, the nests found in the past two years have each been within 30 meters of a patch. (Also of interest: each of the three nests found at this site has been on the southern edge of a wooded area.)

BCP staff continue to monitor the vegetation as it matures within the improvement areas, from six photo points established before or soon after the treatment.

Maintenance of Formerly Occupied Habitat – Cortaña

The Cortaña tract (709 hectares) in the North Lake Austin Macrosite has been under active management for over 15 years. In 1996, about 23 hectares of juniper-oak woodlands on the northern Cortaña tract and the adjacent, privately managed, River Place mitigation tract were cut back to establish a shrubby successional stage favorable to Vireos. Approximately 15.8 hectares were treated on Cortaña and 7.3 hectares on River Place. Both hand-clearing and hydro-axing methods were applied. In each year from 2000 to 2011, one to five males had established territories in this area. No Vireo has established a territory on the Cortaña tract during the past three years.

During winter 2009-10, City of Austin staff created fire lanes in anticipation of a prescribed burn to enhance habitat on approximately 4.5 hectares of the Cortaña tract. Burn bans and staffing limitations have prevented burning to date, and may make mechanical treatments more feasible than prescribed burns for future habitat revitalization. However, in fall 2014, staff prepared the site for a prescribed burn planned for early 2015.

Restoring and Creating Habitat – Wild Basin/Vireo Preserve

The Vireo Preserve and adjacent Wild Basin tract supported at least 32 Vireo territories during the mid-1980s, making this the largest concentration of Vireos known in Travis County. This area was once part of a larger ranch that was in the process of being cleared of brush in preparation for a cattle ranch and subsequently burned in April 1961 (Austin American-Statesman 1961, Respass 1987, Westlakehills undated). The wildfire was reportedly ignited by a cigarette tossed from a car along St. Stephens School Road, which started a grass fire. A strong cold front and the large piles of brush scattered throughout the ranch further fueled the fire, which burned for three days and spread over about 1,620 hectares. Although shrubs and many trees burned, pockets of mature Ashe juniper woodlands survived. The brush clearing followed by the 1961 wildfire converted what was formerly a closed-canopy Ashe juniper-oak woodland (preferred habitat of the Warbler) to mostly open shrub land (preferred habitat of the Vireo). Analysis of a decadal series of aerial photos of this area shows habitat succession progressing steadily since the 1961 fire (City of Austin et al. 2012). Assuming Vireo habitat in western Travis County has a life-span of 20 to 30 years following intense manipulation, and Warbler habitat takes at least 50 years to recover (BAT 1990), a decline of the Vireo colony as the habitat matured toward a taller, more closed-canopy woodland would be expected during the 1980s-1990s. Complicating this issue, however, is the simultaneous increase in urbanization (including the building of Loop 360 and surrounding subdivisions) that occurred during this same time period. The last Vireo observed nesting on the Wild Basin/Vireo Preserve (a 10-year-old male banded as an SY in 1987) was in 1996, 35 years after the 1961 fire.

The Wild Basin/Vireo Preserve collectively supports over 100 hectares of former Vireo habitat (13% of the 810-hectare requirement). Habitat restoration efforts to date have included a prescribed burn on about 2.8 hectares (February 16, 2010), perimeter fencing (fall 2010), and mechanical manipulation of about 20 hectares (fall 2010 and 2011). The primary focus of these habitat restoration efforts has been to encourage resprouting of mature evergreen sumac and other broad-leaved species, protect regenerating plants from browse by white-tailed deer, create a more open habitat with a diverse height structure on the

uplands, and protect the diversity of habitat types across Wild Basin/Vireo Preserve, including Warbler habitat. Due to the 2011 drought and subsequent burn ban, City of Austin staff revised plans for 7.5 hectares of woody vegetation that had been cut with a tree shear in preparation for a prescribed burn. During the fall of 2011, the majority of the slash was mulched to assist with other habitat restoration efforts within the BCP. More details on these restoration efforts are presented in City of Austin (2010 and 2011).

Since Wild Basin/Vireo Preserve supports many of the habitat types observed throughout the BCP, is easily accessible, and offers the opportunity to partner with Travis County and St. Edwards University, it is an ideal site to experiment with habitat creation and restoration techniques. Lessons learned at this site should be applicable to other areas within the BCP. We are continuing adaptive management efforts to restore areas degraded by past land use (Bray 1904) by rebuilding soils, controlling erosion, and increasing diversity, with the goal of creating and enhancing endangered species habitat. Adaptive management includes installing berms and swales on contour to capture, spread, and sink, water, and using locally and commercially available materials (mulch, mulch socks, biochar, mycorrhizal fungi, soil amendments, native seed and plants) to help rebuild soils and promote regeneration of woody plants. Mulch is a common by-product of juniper-oak forest clearing and thus readily available for habitat restoration projects. Allowing mulch to age and “compost” contributes additional nutrients and microorganisms. Biochar is a low temperature charcoal produced from the biomass of wood and leafy plant materials; it is a commercially produced soil amendment that increases plant growth yields by contributing carbon and increasing mycorrhizal fungi activity. Other soil amendments used to date include organic fertilizers, composts, and/or mycorrhizal fungi inoculants. Photographs showing examples of habitat restoration projects are presented in City of Austin et al. (2013).

In conjunction with the habitat restoration work, St. Edwards University continued two research projects initiated in 2012: abundance, distribution, and diversity of ants in recently manipulated and non-manipulated areas; and soil metagenomics to determine how microbial populations (bacteria, fungi) change in response to soil amendments.

Habitat Creation – Bohls

In an effort to create Vireo habitat, City staff coordinated a combination of mechanical cutting followed by a prescribed burn on about 12 hectares of the Bohls tract. The mechanical clearing took place during the winter of 2003-04, in September 2005, and in February 2007, and the prescribed burn in February 2007. City of Austin staff continues to monitor habitat succession on this site, which has not yet been occupied by Vireos. Additional work is planned to expand the Vireo habitat management area near the established shinnery, including either a prescribed burn or mechanical treatment.

Monitoring Effects of Habitat Management Efforts

Staff has established photo points and vegetation transects on the Bohls and Vireo Preserve tracts, and two locations on the Cortaña tract, in order to track changes to the habitat over time. Monitoring of these sites takes place before and after habitat manipulation events, and otherwise when feasible. BCP staff

also collected data on species diversity, abundance, and cover for the mulch sock project at the Wild Basin/Vireo Preserve in February and August 2013, and July 2014.

Identifying Other Potential Management Sites

Travis County and City of Austin BCP staff are continuing work on a comprehensive plan to identify existing and potential sites for Vireo habitat management. A GIS database has been developed to assess site characteristics and to locate suitable sites to restore or create Vireo habitat. Data layers include geology, soils, topography, historic Vireo sightings, and Warbler observations. Travis County staff has been conducting spatial analyses to quantify Warbler and Vireo habitat using landcover maps and territory data. These analyses are being used to identify both priority Warbler and Vireo management areas. Other variables that are being considered in identifying sites for Vireo management include size of the potential restoration area, history of occupation by Vireos, proximity to the nearest Vireo colony, proximity to urban development, and feasibility of management.

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V. FIGURES

Figure A: Locations of Black-capped Vireos on Forest Ridge, 2014
(2009 aerial photography)

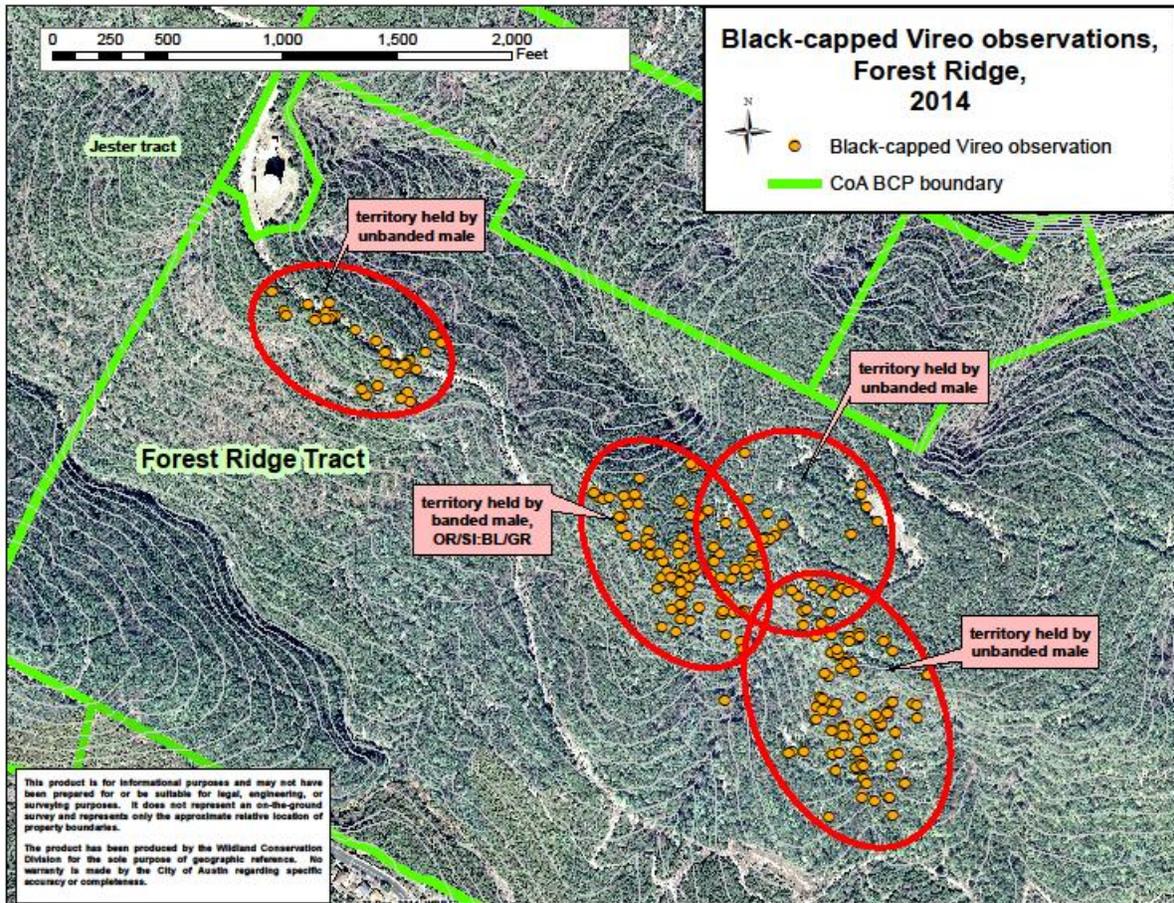


Figure B: Locations of 2009 Black-capped Vireo Habitat Improvement, Kent Butler Ecological Reserve, and Vireo Nests Found Since Treatment (2009 aerial photography)

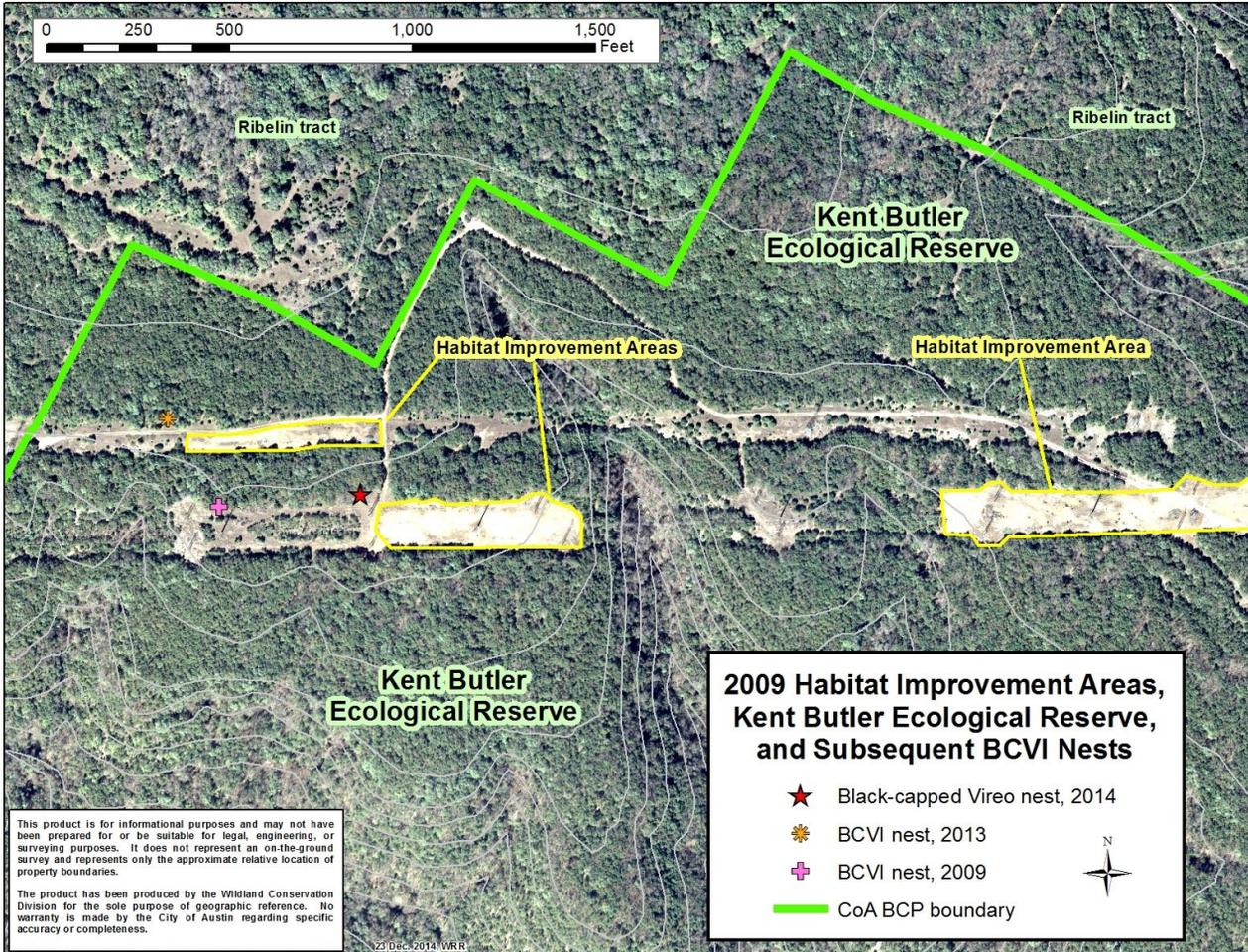


Figure C: Locations of Black-capped Vireos on Kent Butler Ecological Reserve, 2014
(2009 aerial photography)

