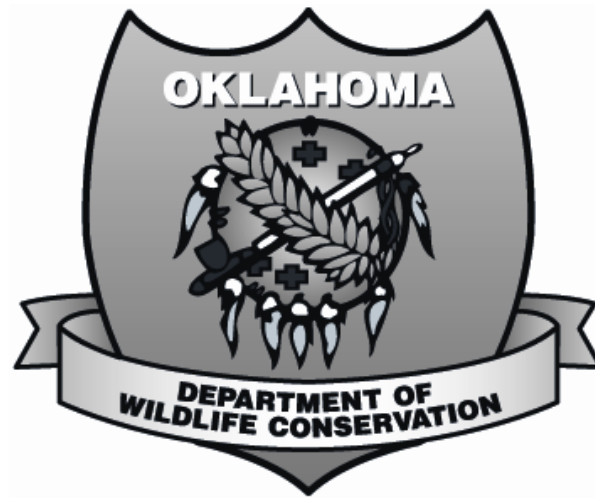


FINAL PERFORMANCE REPORT



Federal Aid Grant Number F15AP00188 (E-80-R-3)

**Assessing Black-capped Vireo Response to Wildfire in
Southwestern Oklahoma**

Oklahoma Department of Wildlife Conservation

Grant Period: April 1, 2015 – September 30, 2016

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STATE: Oklahoma

GRANT NUMBER: E-80-R-3 / F15AP00188

GRANT PROGRAM: Endangered Species Act Traditional Section 6

GRANT TITLE: Assessing Black-capped Vireo Response to Wildfire in Southwestern Oklahoma

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PRINCIPAL INVESTIGATOR: Joseph A. Grzybowski, University of Central Oklahoma

A. ABSTRACT:

Through this project, we collected data on the response of Black-capped Vireos to recent fires on private lands in the Wichita Mountains region. We chose specific sites to sample within the broader study area based on their fire history, pre-fire vegetation phases, and landowner cooperation. We collected field data regarding vegetation and vireo responses to fire, and will use these data to verify and refine vegetation phase classifications that can quantify transitions between the vegetative states. These data will be applied to mixed models that can predict vireo responses as a function of the post-fire vegetation, time since fire, and weather conditions. This report summarizes the final segment of what was planned to be a three-year study of the dispersal and post-fire distribution of Black-capped Vireos in the region surrounding the Wichita Mountains National Wildlife Refuge. During this segment, Black-capped Vireos were found at the following sites in 2015 and 2016: Salt Creek Canyon, Blaine Co.; west of Greenfield, Blaine Co.; and Mount Cummins, Comanche Co.

B. BACKGROUND:

Fire plays a major role in driving ecosystem structure and processes and many threatened and endangered species occupy fire-dependent ecosystems, including high profile species such as the Kirtland's Warbler (*Setophaga kirtlandii*) and Red-cockaded Woodpecker (*Picoides borealis*) (Hunter et al. 2001). The Black-capped Vireo (*Vireo atricapilla*) occupies fire-dependent shrublands in Oklahoma, Texas and northern Mexico (Grzybowski 1995, Wilkins et al. 2006) and most often occurs in early successional vegetation that is created or maintained by disturbances such as fires (Graber 1961, Benson and Benson 1990, USFW 1991). Previous research at several study sites in Texas (Tazik et al. 1993, Cimprich 2002, Dufault 2004) and Oklahoma (Grzybowski 1989, Grzybowski 1990) indicate that Black-capped Vireos move into sites with recent fire histories; however, such responses have not been quantified or placed into management planning or landscape-level planning for maintaining vireo populations.

The 2011 wildfires in and surrounding the Wichita Mountains in southwestern Oklahoma provide a unique and valuable opportunity to assess habitat-specific demographic responses of Black-capped Vireos to a wide range of fire effects. Because numerous other animal species occupy the general habitat conditions used by the vireo, this research is applicable to management and conservation to a broader suite of species. During the past ~25 years, Grzybowski and associates have gathered substantial data regarding the distribution, abundance, and general behavior of the Black-capped Vireo in the Wichita Mountains (e.g., Grzybowski et al. 1994, Grzybowski 1990, Grzybowski 2005). Thus, preliminary data already exist as a basis of comparison to examine the responses of vireos to recent fires and habitat changes. Black-capped Vireos show a strong tendency toward philopatry and vireos typically display short dispersal distances. The fire events of 2011 were extensive and potentially changed the vegetation structure and characteristics over nearly half of the area that was occupied by Black-capped Vireos in Oklahoma in 2010 and 2011. The effects of this dramatic, short-term disturbance on vireo breeding populations is unknown, but may trigger a much higher incidence of dispersal than is seen in typical years. Through this project, we will examine the response of the Black-capped Vireo population in the Wichita Mountains region to habitat-altering wildfire in terms of altered distribution and habitat use. Data that are collected with regard to habitat use will add to a larger effort to develop a management tool that allows land managers to determine the types, levels, intensities, and locations of fire and fuel management activities that will minimize their negative effects and enhance their positive effects on vireo habitat and populations.

C. OBJECTIVE:

The objective of this grant is to document and quantify the responses of Black-capped Vireos to the recent wild fires that have occurred in the Wichita Mountains region.

D. PROCEDURES:

The fundamental search and survey were primarily cursory in 2013, to identify areas that contained potential vireo habitat, and listen in habitat areas near roads for Black-capped Vireos. The primary intended search zone focused on areas of Kiowa and Comanche counties west and north of the federal lands on the Wichita Mountains Wildlife Refuge and Fort Sill Military Reservation containing a population of Black-capped Vireos. Additional areas in Caddo and adjacent Canadian, and Grady counties were also investigated along with parts of northern Jackson and eastern Greer counties (see below). The areas searched were mostly cruised by road. In areas with scrubland habitat near roads, attempts were made to hear singing Black-capped Vireos. A few contacts were made with private landowners along the western edge of the Wichita Mountains National Wildlife Refuge, and these properties surveyed. Areas of focus for the 2014 season were identified.

During the 2014 season, some areas were revisited (see below), with additional efforts to obtain access to private lands in Kiowa and Comanche counties. Historic sites of occupancy in Caddo County (see Grzybowski et al 1986) were revisited, as were the oak covered outcrops in the vicinity of the town of Snyder (Kiowa County).

During the 2015 and 2016 field seasons, the focus was in more northern areas of Blaine County; however, revisits were made to special areas previously identified in Caddo and southwestern Canadian County, and Comanche County. In recent years, also including 2012, the author also made excursions into eastern Dewey County, southern Major County and portions of the Arbuckle Mountains, Murray County, recovering from a significant fire event.

Specific areas searched:

- 1) **The area of Caddo Canyonlands (Caddo and extreme southwestern Canadian counties) historically containing Black-capped Vireos, and known to be maintaining some vireos in the late 1980's (see Grzybowski et al. 1986).** This area was bounded to the west by highway 281 from between the towns of Hinton and Binger, and by Highway 152 west of Binger to the edge of the canyonlands/scrubland habitats, to the south by highway 152 between just west of Binger to the town of Cogar and also just south of highway 152 near Cogar on Jean Graber's former study areas, to the east by highway 37 north of Cogar, and to the north by highway 37 to the town of Hinton. Areas north of highway 152 in Caddo County were also revisited in 2014, as was a patch of suitable-appearing vireo habitat just west of Binger (Caddo County).
- 2) **An area of scrubland habitat in southeastern Caddo County and immediately adjacent Grady County, and the very northeastern Comanche Counties** These areas were searched in 2013. Areas in Caddo County included all the area south of I-44 and for several miles to the north, also the part of this broader scrubland patch extending into western Grady County, and a fringe of area extending into northeastern Comanche County. One patch of suitable appearing habitat in Grady County contained only Bell's Vireos.
- 3) **Parts of Comanche, Greer, Jackson, and Kiowa counties.** Efforts were made to spot check areas of suitable habitat in Kiowa County, including specifically the oak-covered outcrops near Snyder, OK (Kiowa County), the Navaho Mountains (eastern Jackson County), the area of post-oak/blackjack east of the town of Blair in northern Jackson County, the public access areas of Quartz Mountain State Park in Greer County, and Mount Cummins in the Medicine Park area (Comanche County). The generalized search was extended to include the outcrops near Granite, OK (Greer County), and along the boundaries of Altus-Lugert Reservoir (Kiowa County). One oak covered area between the towns of Cache and Indianahoma was also visited. Permission to enter the larger roadless mountain area southeast of Quartz Mountain State Park, including King Mountain, Flat Top Mountain and Soldier Peak (partly owned by Quartz Mountain State Park, but kept inaccessible to the public) was obtained.
- 4) **Blaine County, and small portions of and/or special patches in Canadian, Caddo, Grady, Jefferson, and Love counties.** In 2015 and 2016, much of the effort focused on Blaine County. In 2015, patches of scrub-oak habitat in Blaine County on and west of the escarpment was searched systematically, road by road, stopping at small patches of potential-appearing habitat. Special patches identified in Caddo County (just west of Binger), and near Niles, southwestern Canadian County were also revisited. Areas in the eastern edge of Caddo County, overlapping slightly into Grady County, were also more systematically searched. In addition, an area of Jefferson County and adjacent Love County with woody-covered draws extending from the Red River valley were also examined. During the 2016 season, areas in Blaine Co. occupied by Black-capped Vireos in 2015

were subsequently revisited to confirm persistence of territories, including sites south of Watonga and throughout Salt Creek Canyon.

E. RESULTS AND DISCUSSION:

During 2015, Black-capped Vireos were located in:

- 1.) Mount Cummins, including areas along the south shore of Lake Lawtonka, Comanche County (Figure 1).
- 2.) A portion of the Salt Creek Canyon area known to be occupied by vireos in mid-naught years (Grzybowski 2005; Figure 2).
- 3.) An isolated incidental bird located in small habitat checks west of Greenfield, in Blaine County (Figure 3).

As might be expected, Black-capped Vireos were located on private lands in association with the public lands managed and monitored for Black-capped Vireos on the Wichita Mountains Wildlife Refuge and Fort Sill Military Reservation. However, they were located close in, on areas contiguous with the main mountain complex on these public properties. Outcrops of isolated suitable habitat patches located short distances away still contained no Black-capped Vireos, further providing evidence to the species' low dispersal rate from occupied areas.

Throughout this project, dispersal of Black-capped Vireos on various outcrops to the west of, and northwesterly of, the Wichita Mountains proper has not been detected; however, most of these outcrops contained limited woody vegetation and almost none contained suitable oaks. Woody vegetation, if present on these outcrops, was limited mostly to juniper, *Celtis* sp., skunkbush and mesquite. Some outcrops were barren even of this woody cover. It would appear that dispersal mechanisms of oaks on these outcrops were limited by distance and isolation. One patch of such does exist near the town of Snyder; however no vireos were found there.

One Black-capped Vireo was detected in the Snyder area some years ago by Vic Fazio and the author (separately). However, even given the buildup of the vireos in the Wichita Mountains proper, it would appear that dispersal to odd patches of habitat is random, representing odd individuals, and incapable of establishing subgroups even in a more significant patch of oak habitat as occurs near Snyder.

However, a pocket of Black-capped Vireos was located in a unique habitat patch of a shin-oak form in the Devil's Canyon area and adjacent Flat Top Mountain and Soldier Peak (southwestern Kiowa County). Nineteen males were located, included one isolated bird in the public area of Quartz Mountain State Park. It was estimated that between 66 – 75% of the habitat in this area was surveyed, projecting a group of about 25-30 males in this area. Much of the unsearched area was in difficult terrain along the north side of Soldier Peak. Because of its isolation from the Wichita Mountains proper, and the size of the group, it is likely that this pocket of vireos has been present at the site long-term. Scattered, but unconfirmed records have been noted in Quartz Mountain State Park during the 1960's (Ina Mery, pers. comm.). More recent visits by Vic Fazio also discovered an occasional Black-capped Vireo on the public area

of the State Park. Birds on the limited habitat of the State Park proper may have represented odd dispersal from the main group just to the southwest.

The expansion of Black-capped Vireos in the Wichita Mountains has followed somewhat of a disk pattern, with birds building up in focal areas or dispersing locally to the most adjacent areas of suitable habitat. This would predict limited dispersal to off-site areas, even those with limited isolation. Birds dispersing more broadly likely comprise a very small fraction of this Wichita Mountains population, increasing the likelihood of extirpation of satellite groups; this would also support the notion that the vireos located in southwestern Kiowa County are part of a long-term presence there.

During 2016, Black-capped Vireos were located in:

- 1.) The same portion of private land surveyed in 2015 that is located on Salt Creek Canyon, Blaine County; a small population of Black-capped Vireos has persisted on this site since its discovery in the mid-1980s.

By Area Summary:

A.) Much of the woody-cover area searched in Caddo county has matured beyond the stage of suitability for Black-capped Vireos. This includes all former sites containing Black-capped Vireos in the late 1980's, and Graber's old study site that had burned as recently as the mid-1990's (Grzybowski, pers. obs.). The two male Black-capped Vireos located near Niles in 2013 were in an expanding area of woody cover fringing taller woody cover (one patch of which was last known to be occupied in by two pairs in 1986). No Black-capped Vireos could be located here in 2015.

B.) Another patch of potentially suitable habitat approximating about one section was located southwest of the town of Binger, just south of Highway 152. No vireos could be located in this suitable-appearing area in 2015.

C.) Following previous years, Mount Cummins was searched again in 2015 with greater effort. Additional Black-capped Vireos were found at this location (Fig. 1). This area is more an extension of the eastern groups of vireos located on Fort Sill Military Reservation to the south.

D.) The mountains of Quartz Mountain State park and private lands to the southeast contained patches of scrub oaks at lower to mid-levels on some slopes and drainages. This area contains four more significant mountains (Quartz Mountain, King Mountain, Flat Top Mountain and Soldier Peak). Quartz Mountain (on the public access area of Quartz Mountain State Park) contained limited areas of oaks on the lower portions of some slopes. Two patches judged with some level of suitability were located; one near the campground and the other near the lodge. Although one male was found on slopes not far from state park lodge in 2014, no Black-capped Vireos were located here in 2015.

E.) Much of the scrub-oak habitat above the escarpment in Blaine County, and adjacent Dewey County (also northwestern Canadian County) is overgrown, victim to years of fire suppression. Fires

did occur in some areas, mostly 2011 and 2012, most notable of these in southeastern Dewey County (southeast of Oakwood), and south of Geary (Blaine County; in the higher drainage area of the Canadian River). These areas demonstrated recovery to potential vireo habitat during visits, but no vireos were located. The site in eastern Dewey County was actually visited under separate cover in 2012, soon after the burn, and not yet emerging any post-fire vegetation. Some edge areas to taller growth, and small territory-sized pockets were scattered about this area. One in Blaine County (west of Greenfield) contained a single isolated male Black-capped Vireo in 2015 (Fig. 3).

F.) Southern Major County was also visited during incidental travel into the area; no suitable habitat was found in this extension of the oak-scrub areas; last known occurrences here date back to the time of Graber's study in the 1950's (Graber 1957).

G.) The Salt Creek Canyon area is a site where vireos were known to be present ten years previous (Fig. 2). It is an area of canyons maintaining some lower growth and openness of vegetation by edaphic factors of slope and erosion. However, such is very spotty, and is currently largely overwhelmed by growth and invasion of juniper. One area in the northern arm of this canyon contains an enclave of shin-oak, likely *Quercus drummondi*. This patch in one portion of these canyons and some immediately adjacent areas seemed a focal point for about 6 territories, with an additional 4 in nearby portions of this canyon system.

The most significant find during the 2015 season was the small group of 10 males, possibly 5-6 females found in the Salt Creek Canyon area. This group has survived without cowbird trapping since 2006, although two nests found in these canyons were both parasitized. At least one of these males was a first-year male, indicating some reproductive success. While not a significant number, this was reminiscent of the number of females present here on initial re-discovery of this small population in the mid-1980s. Movement and gene flow of birds from this small population to nearby populations (e.g. Wichita Mountains Wildlife Refuge) is unknown; however, it is speculated that any genetic intermingling of these two populations would be facilitated by either females or males that fledged the previous breeding season.

F. SIGNIFICANT DEVIATIONS:

A large amount of precipitation in 2015 created unfavorable survey conditions for a number of days; in addition, the P.I. incurred some significant and unexpected cost-savings associated with hiring sub-contracted Black-capped Vireo surveyors for the project. As a result, this segment was granted a no-cost extension for an additional six months to cover field activities for the 2016 season.

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DATE: December 13, 2016

APPROVED BY: _____
Wildlife Division Administration

Oklahoma Department of Wildlife Conservation

Andrea Crews, Federal Aid Coordinator
Oklahoma Department of Wildlife Conservation

Figure 1.

**Black-capped Vireos located on Mount Cummins, Comanche County, Oklahoma, in 2015.
Solid dots identify male detections.**

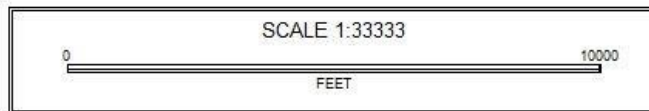
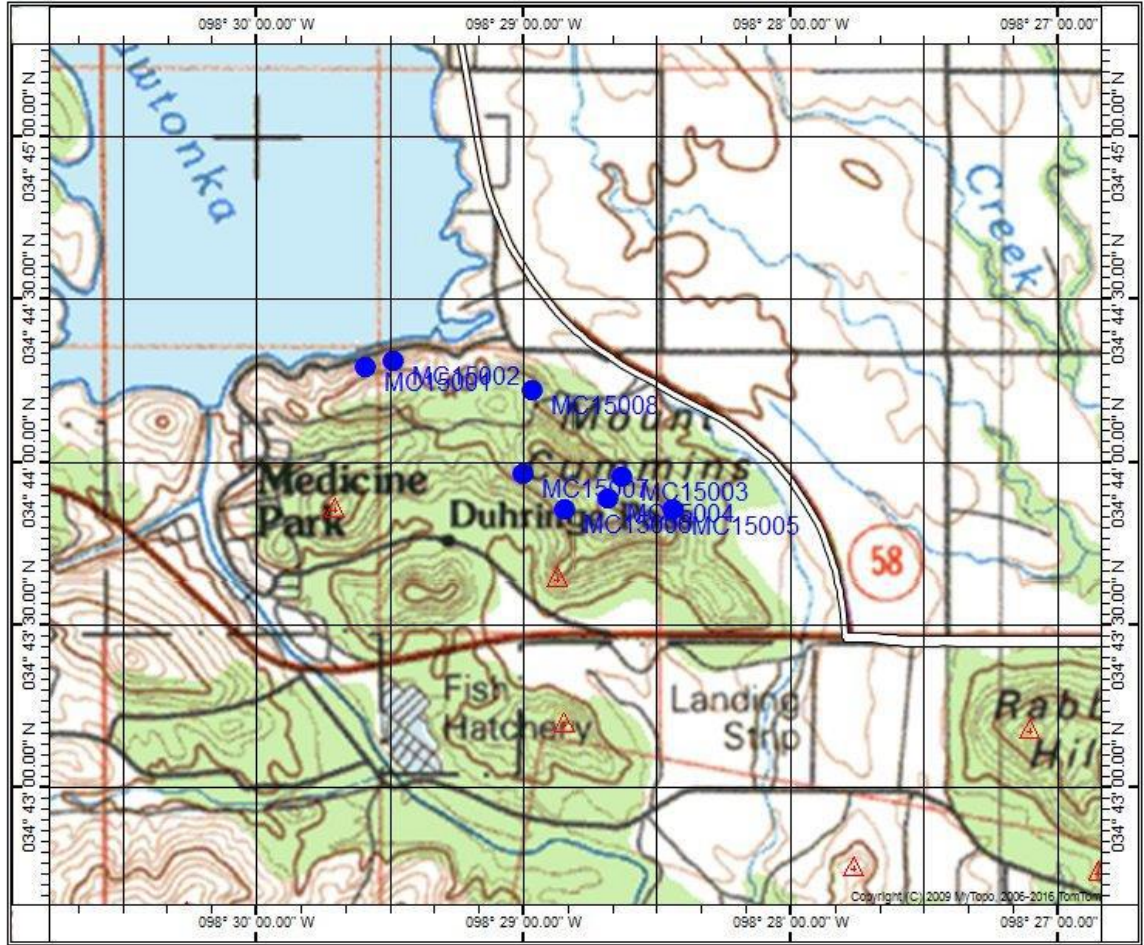
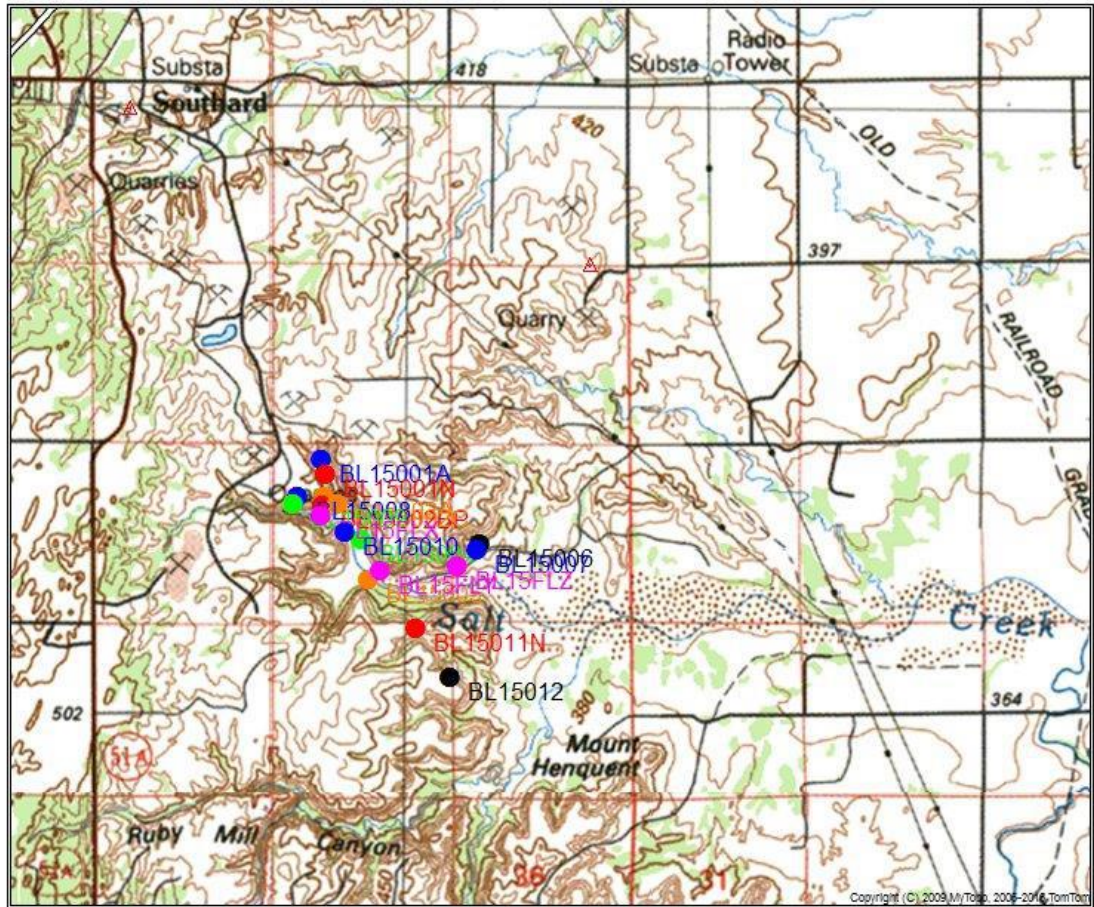


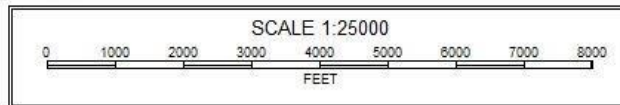
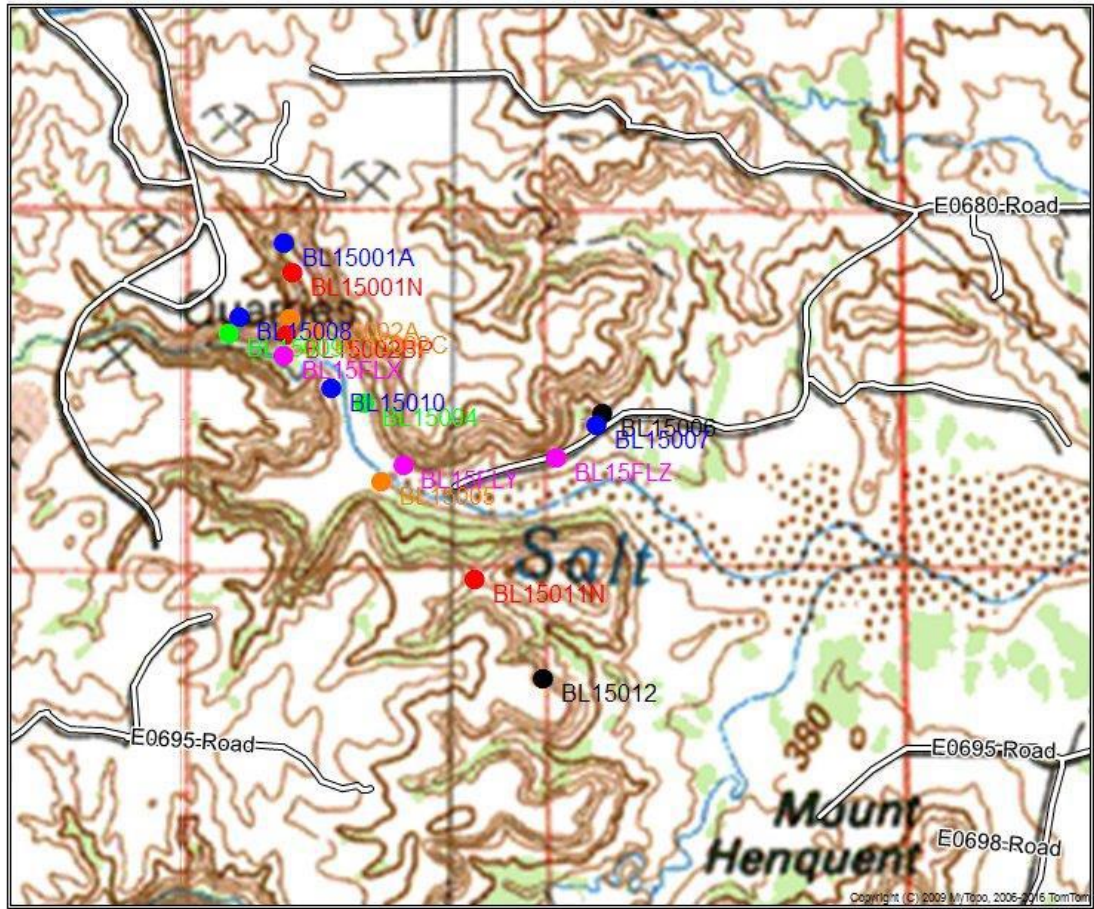
Figure 2. – Blaine Co.

Black-capped Vireos located in the Salt Creek Canyon area of Blaine County, Oklahoma. Maps provided at two scales (2a & 2b). Solid dots (in various colors) identify detections. Lavender dots represent males that could not be discretely assigned and may have been of floaters. Those dots in red identify two nest sites and one bachelor pad. Representative habitat (2c) of occupied Black-capped Vireo areas in Salt Creek Canyon, Blaine County, Oklahoma depicting the fractured edaphic condition of the vegetation. Bottom areas here are dominated by mesquite, back-dropped with oak mixed with Eastern Redcedar. Lastly, photos of a vireo nest onsite (2d). Five to six females were detected in 2015, with two nests located (both parasitized by Brown-headed Cowbirds); adult vireos feeding a young vireo were noted there in 2016.

2a.



2b.



2c.

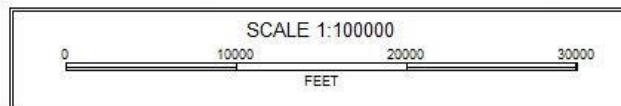
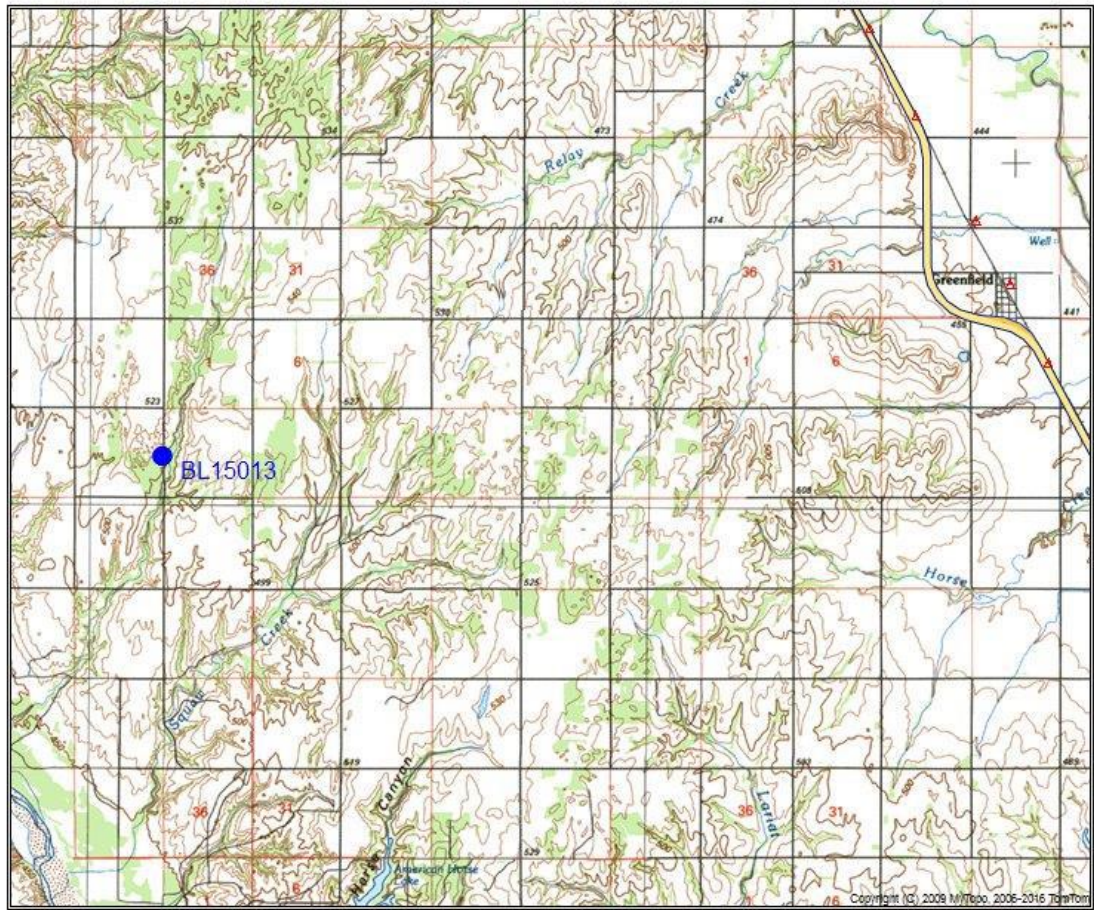


2d.



Figure 3.

Location of Isolated male Black-capped Vireo west of Greenfield, Blaine County.



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