FINAL PERFORMANCE REPORT

Federal Aid Grant No. F13AP00781 (E-80-R-2)

Assessing Black-capped Vireo Response to Wildfire in Southwestern Oklahoma

Oklahoma Department of Wildlife Conservation

March 15, 2014 through March 14, 2015

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State: Oklahoma **Grant Number:** F13AP00781 **(**E-80-R-2)

Grant Program: Endangered Species Act Traditional Section 6

Grant Title: Assessing Black-capped Vireo Response to Wildfire in Southwestern Oklahoma

Grant Period: March 15, 2014 - March 14, 2015

Principal Investigator: Joseph A. Grzybowski, University of Central Oklahoma

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 on 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.

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 second year of what is 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 Wildlife Refuge.

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.

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 on the 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).

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 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 portion of Comanche County was searched in 2013. Additional areas included sites in Caddo County along the area south of I-44 and for several miles to the north and a fringe of area extending into northeastern Comanche County.

3) 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 Indiahoma 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.

RESULTS AND DISCUSSION:

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.

Dispersal of Black-capped Vireos on various outcrops to the west, and northwesterly of the Wichita Mountains proper was not 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, *Celti*s sp., skunkbush and mesquite. Some outcrops were barren even of this woody cover. It would appear that dispersal mechanisms of oaks on these outcrops was 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, including 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.

Black-capped Vireo Detections in 2014:

1.) The public access area of Quartz Mountain State Park in Greer County (Fig. 1).

2.) The mountains southeast of the area (1) above from the west-facing Flat Top Mountain to the north slope areas of Soldier Peak, focusing on Devil's Canyon, all in southwestern Kiowa County (Fig. 2)

3.) Mount Cummins, including areas along the south shore of Lake Lawtonka, Comanche County, sampled in 2014 and previously surveyed in 2013. (Fig. 3)

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 included 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.). No Black-capped Vireos could be located here in 2014.

(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 either 2013 or 2014.

(C.) There were several patches of upcoming scrub oak in the intersection of Caddo, Comanche and Greer counties. The most suitable of these areas fringe I-44. They were searched in 2013; only Bell's Vireos were located in the shortest and widely-spaced scrub of these sites; White-eyed Vireos were located in the more scrubby of the taller and more coalesced deciduous/juniper cover in this area at large.

(D.) Most outcrop areas in Comanche County north of federal lands could not be searched specifically. A few areas could be accessed within hearing from the road. However many contained clearly taller oaks. One area with clearly potential habitat north of the Refuge through which a road passed was unoccupied.

(E.) The hills along Lake Lawtonka were searched in 2013 and noted to contain at least two male Black-capped Vireos; One male was found here in 2014. Mount Cummins was more extensively traversed on foot in 2014, with additional Black-capped Vireos being found (Fig. 3). This area is more an extension of the eastern groups of vireos located on Fort Sill Military Reservation to the south.

(F.) Private property fringing and contiguous with the primary mountains of the western boundary of the Wichita Mountains Wildlife Refuge was searched in 2013. Both segments of private property searched contained Black-capped Vireos in 2013, including one area in Comanche County and the second in Kiowa County. It should be noted that no vireos could be located in the slightly more isolated outcrops just to the north and east of the more contiguous Kiowa County properties that contained Black-capped Vireos. These areas were not revisited in 2014. As one progressed north in Kiowa County, the outcrops contained limited to no deciduous cover. One small area of Longhorn Mountain (through gained access via previous environmental consulting) was known to contain scrub-oak cover, though it was found to be of very short stature. The Slick Hills (location of the current wind-farms) contained no meaningful habitat patches, and that mostly of non-oak species.

(G.) Among the outcrops in western Kiowa County, the Navaro Mountains in adjacent eastern Jackson County and in the vicinity of the town of Granite in Greer County, contains very little oak vegetation; some were largely barren of any woody vegetation or very sparsely vegetated. Woody vegetation in these areas consists primarily of small drainage patches of hackberry and skunkbush; a few contained a predominance of juniper. No Black-capped Vireos were heard in any patches near roadways. Some of these outcrops were laced with mesquite, even extending onto the hillsides. In this area (away from Quartz Mountain State Park; see item H), the only areas containing suitable oak habitat were outcrops just south of the town of Snyder; no vireos were detected on these sites, both with aural surveys from roads and right-of-ways as well as walks into the bases of these outcrops. Oak suitability on these outcrops appeared marginal for Black-capped Vireos, being at the taller end or beyond what might be considered optimal habitat.

(H.) 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. No vireos were located here in 2013; however, one male was found on slopes not far from the state park lodge in 2014 (Fig. 1). King Mountain had limited woody vegetation; surveys in this area located no Black-capped Vireos. Significant patches of scrub oak habitat occurred on the west slope of Flat Top Mountain, and in the Devil's Canyon area between these mountains, and extending onto the north side of Soldier Peak. This was unique to areas searched west of the

contiguous Wichita Mountains in Comanche County. Most of this area was dominated by a shin oak species (*Quercus sinuata* or *drummondi*). Eighteen male Black-capped Vireos were located in this group; six individuals were located on the west slope of Flat Top Mountain and twelve in the Devil's Canyon area (Fig. 2). This group represented a significant find of this effort.

(I.) Comanche and northern Jackson counties contain two significant patches of oak habitat within non-rock outcrop areas; one between the towns of Cache and Indiahoma in Comanche County, and another near the town of Blair in Jackson County. Both were largely of tall trees, the one near Cache could be considered more woodland rather than scrubland. No Black-capped Vireos were located in these areas.

SIGNIFICANT DEVIATIONS: None.

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Figure 1. Quartz Mountain State Park Black-capped Vireo Detections, Greer County, 2014.

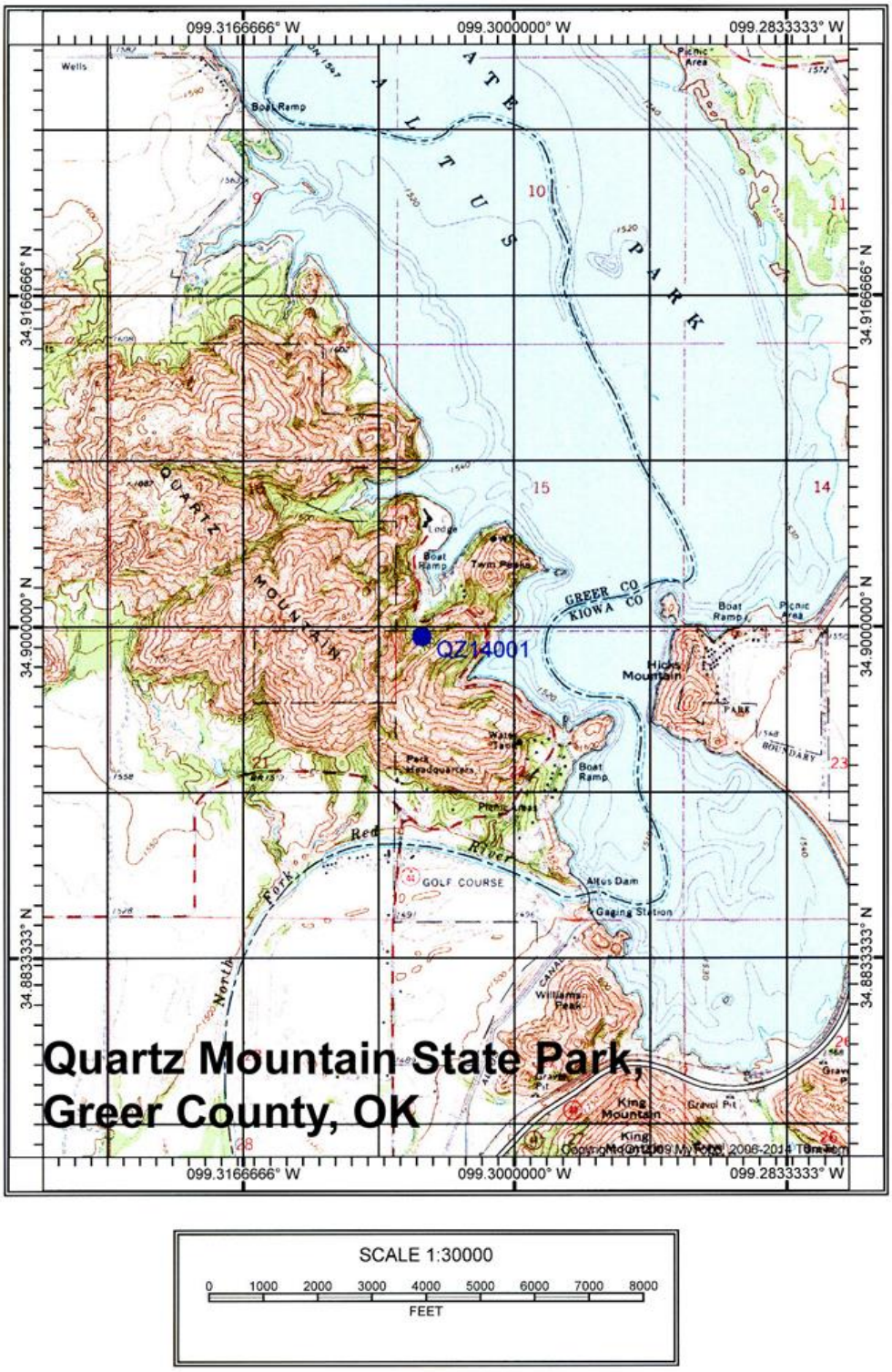
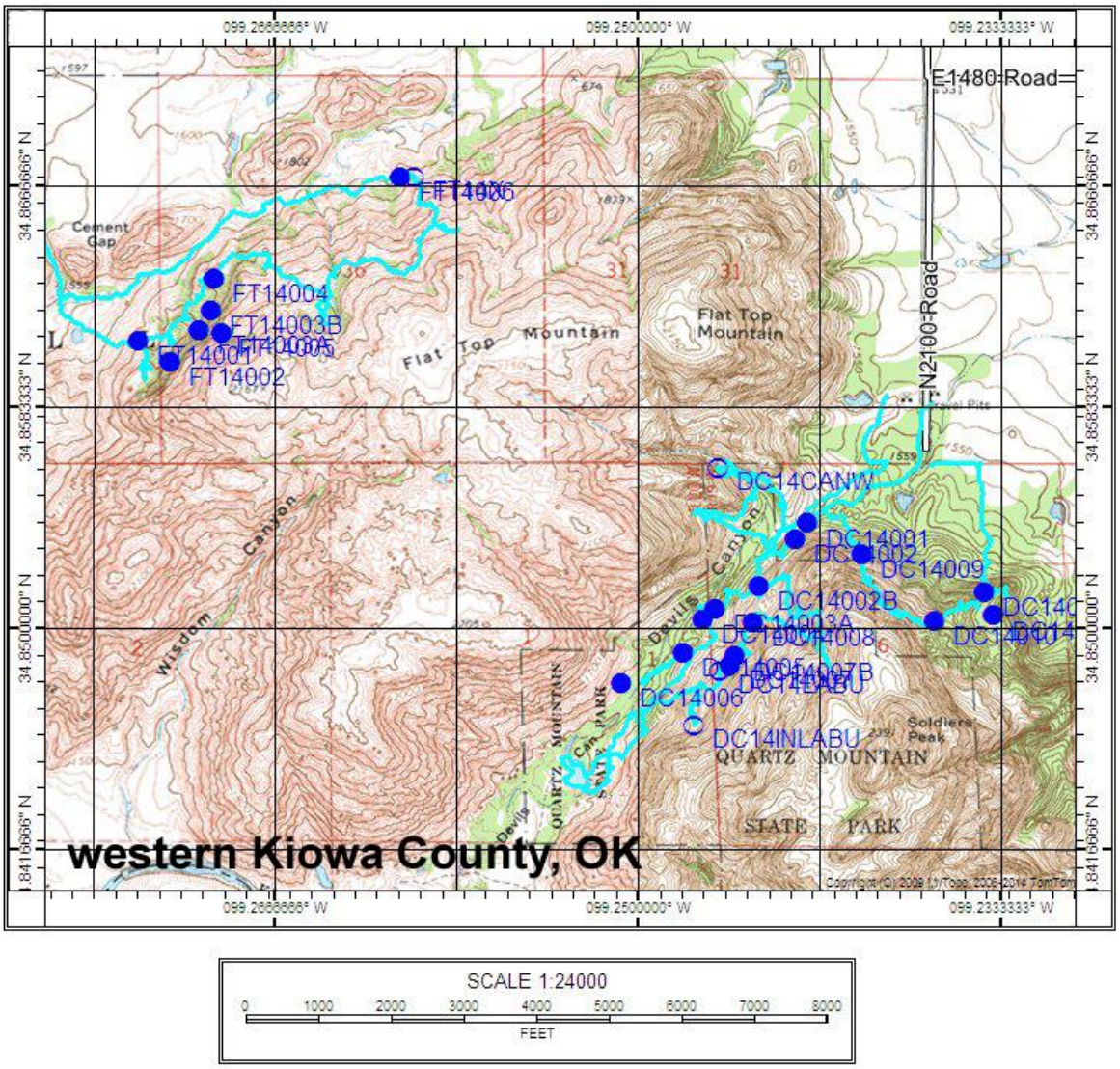
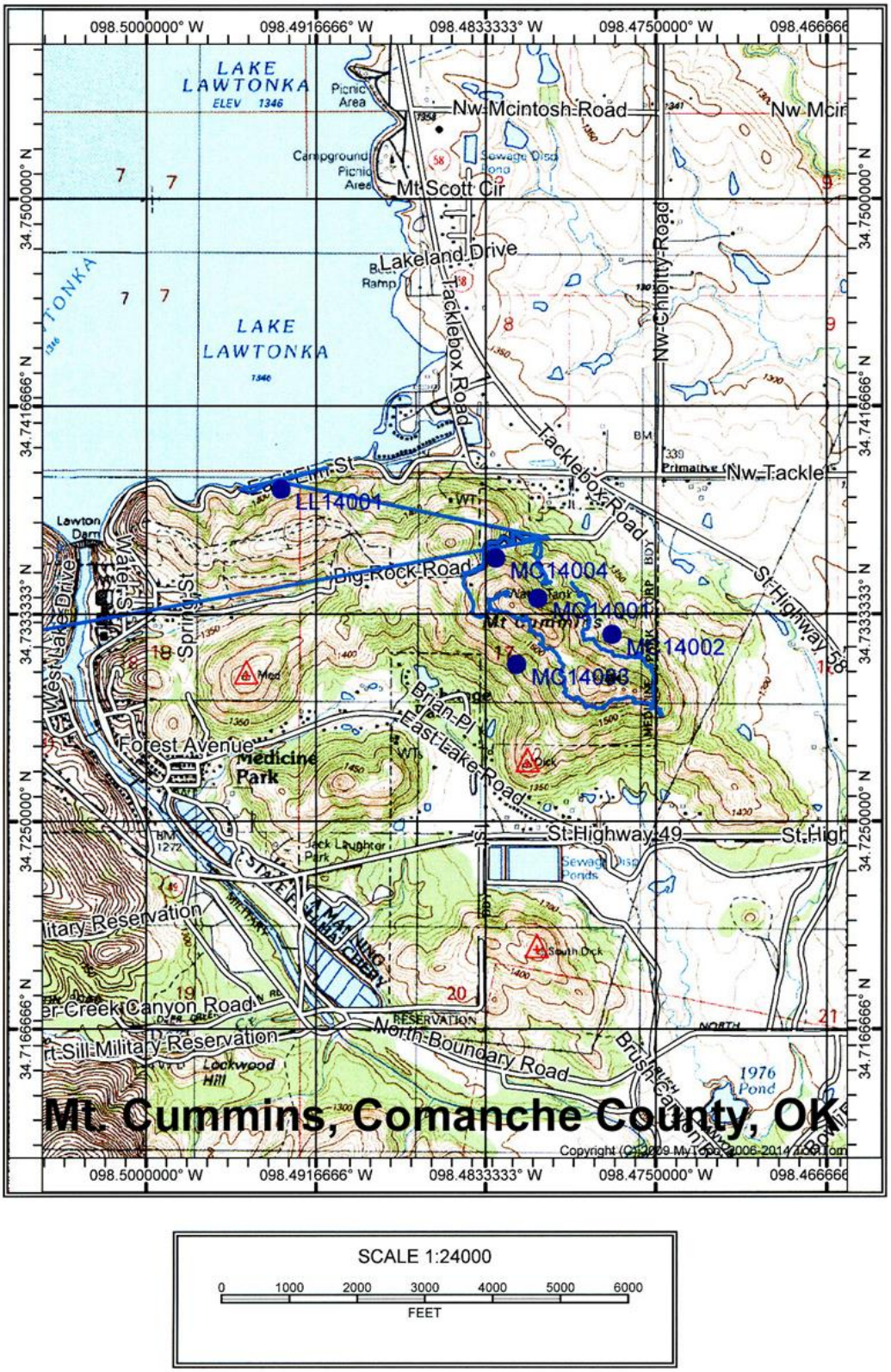


Figure 2. Black-capped Vireo Detections in Granite Outcrops. Southwestern Kiowa County, 2014.



Note: Solid circles indicate Black-capped Vireo territories and hollow circles indicate detections of other bird species (i.e. Lazuli Bunting and Canyon Wren)

Figure 3. Black-capped Vireo Detections in Granite Outcrops South of Lake Lawtonka, Comanche County, 2014.



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