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ESTIMATED SIZE OF BLACK-CAPPED VIREO POPULATION IN NORTHERN COAHUILA, MEXICO[1]

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The U.S. Fish and Wildlife Service formally listed the Black-capped Vireo (*Vireo atricapillus* Woodhouse) as endangered, effective 5 November 1987. At the time of listing, the total population in the United States and Mexico was assumed to be very low and fewer than 1,000 breeding pairs had been counted in North America (Marshall et al. 1985). Marshall estimated 48 to 131 pairs for northern Mexico. Low numbers were still being reported by Steed (1988). Sexton (pers. comm.) reported fewer than 1,000 pairs counted as recently as 1989. Unfortunately, these numbers have not been published in the archival literature. We report here the results of a census undertaken to estimate the size of the breeding population of Black-capped Vireos in northern Coahuila, Mexico.

CENSUS ZONE

The geographic area considered in this report was restricted to the mountainous region of northern Coahuila, Mexico. Our census zone was a 1° block located north of 28°30′N, south of 29°30′N, west of 101°30′W and east of 102°30′W (Fig. 1). The region was an elevated limestone plateau, deeply dissected, and with steep escarpments (Miller 1955). The higher mountains reached an elevation of approximately 2,300 m. The northern end of the mountain system was less than 80 km southeast of the Chisos Mountains in Big Bend National Park, Texas.

Distinct altitude-dependent vegetation belts occurred in our census zone (Miller 1955). Desert scrub laid at the base of the mountains and extended over the piedmont and up the arroyos to the mouths of the canyons. Above the desert scrub, the vegetation was dominated by live and deciduous oaks forming the "montane low forest" of Muller (1947). Pinyons and junipers occurred in this zone on the steeper slopes. Oaks, walnuts, and elms were common in the canyon bottoms. Elevations above 1,300 m were characterized by a zone of Ponderosa pine intermixed with oaks and other deciduous trees. The oaks in this zone often formed dense shinnery. Flat mesas above 2,000 m were dominated by extensive but open conifer stands.

We sampled the census zone at four locations. The transect distance at each site varied. These sites were as follows: (1) Canyon Las Huertas—a south-facing canyon that curves to the northwest and which has a smaller south-facing side canyon, El Infante. The mouth of Las Huertas is located at 102°04′W and 28°40′N. The Sierra El Carmen escarpment lies to the north of Las Huertas and the Sierra El Infante is to the east. We surveyed this canyon on 6–9 June 1987. The transect length was 28 km. (2) An unnamed, north-facing canyon bordering a tunnel into the Sierra La Encantada (Tunnel site). This short canyon is located at 102°16′W by 28°37′N. It opens out into a wide, shallow valley known as Valle Los Venados. This canyon was included in a survey previously undertaken by Marshall et al. (1985) where 15 territories were located. We surveyed the canyon on 8 July 1988. The transect length was 3 km. (3) An unnamed, west-facing canyon at the north end of Sierra El Tule. This canyon is drained by Arroyo Las Amapolas. The canyon mouth is at 102°16′W and 28°54′N. We surveyed this canyon on 9 July 1988. The transect length was 4 km. (4) A wide, east-facing canyon along Arroyo de La Zorra. To the north is Sierra El Bonito and to the south is Sierra El Veladero. We surveyed this canyon on 15–16 April 1989 and again on 22–25 May 1989. This survey started at 101°55′W and 29°02′N and followed the canyon west and north. The transect length was 16 km.

All survey areas except the Tunnel site were located in low-intensity ranching areas with similar vegetation and few cowbirds. The Tunnel site was located in a mining region which lacked dense deciduous vegetation. All place names used in this description were taken from maps published by Direccion General de Geographia, Cartas Topographias 1:50,000.

METHODS

We walked along each canyon noting species and numbers of all birds seen or heard. Although we spent more time near the bottoms of the canyons, however, our route was not restricted to the bottoms. We investigated habitat types throughout the canyons. From our field notes, we plotted the locations of all Black-capped

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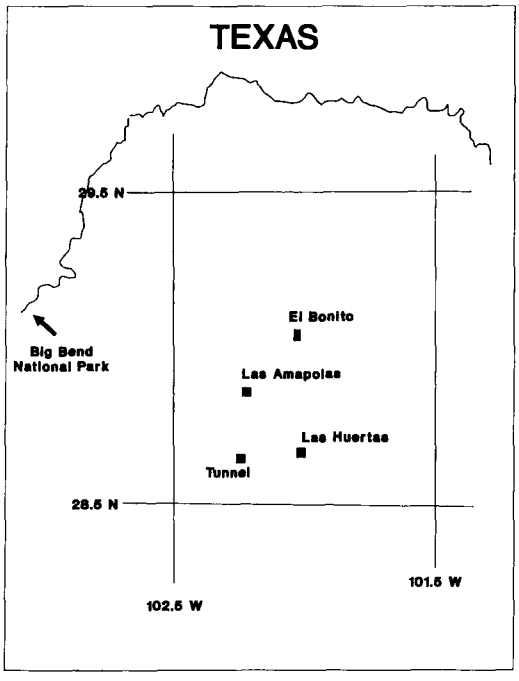

FIGURE 1. Location of Black-capped Vireo study sites in Coahuila, Mexico.

Vireos detected in the four canyons on 1:50,000 scale topographical maps of the census zone.

To estimate the size of the breeding population of Black-capped Vireos in our census zone, we assumed that we detected every singing male vireo present in a ⅓-km wide transect. This assumption resulted in a detection range of 166.5 m either side of the transect line. This width and survey length gave a total sampled area of 17 km². We also assumed that 73% (Grzybowski, pers. comm.) of the singing males represented a breeding pair and thus our density estimate should be reduced by a factor of 13%. We calculated the density of breeding pairs by dividing the total number of males detected at each site by the area surveyed at each site and then performing a weighted average based on the length of coverage at each site. Finally, we multiplied the density by 0.87 to correct for unpaired males.

We estimated the proportion of canyon habitat to be found in the census zone by generating 100 random coordinates and plotting them on a map of the region. Fifty-five of the plotted points fell in canyons. Based on our experience in the region (17 days in the field and more than 2,000 km of driving back roads in the area), we rejected 15 points as probably not similar to the canyons we surveyed. We concluded that 40% or 4,416 km² of the census zone represented terrain similar to that surveyed in the four canyons we studied. We realize that some variance is associated with this selection process, but having discarded 15 marginal points (which could have contained vireos), we remain confident that 40% was a conservative estimate. We should stress that only a fraction of the projected 4,416 km² was likely to be suitable Black-capped Vireo habitat.

TABLE 1. Black-capped Vireos detected at four sites in Coahuila, Mexico.

Survey site	No. singing males detected	Area surveyed (km²)
Tunnel	4	1.00
Las Huertas	13	9.33
La Amapolas	2	1.33
El Bonito	9	5.33

The estimated population size for the census zone was calculated by multiplying the weighted average density of breeding pairs (derived from the four transects) times 4,416 km² of projected similar habitat. Our sample variance calculation was also weighted according to survey effort at each site. We determined confidence limits by following the procedures given by W. G. Cochran (1977).

RESULTS

We discovered a total of 28 singing males at the four sites (Table 1). The weighted average density of breeding pairs in the four samples corrected for unpaired males was 1.43 pairs/km². The weighted standard deviation was 0.71 pairs/km². Based on the stated assumptions and the indicated calculations, we estimated the population of Black-capped Vireos breeding in our census zone to be 6,301 ± 3,162 pairs ($P < 0.1$).

DISCUSSION

Our work suggests that a relatively large breeding population of Black-capped Vireos exists in northern Coahuila. The most conservative view of our results indicates a minimum population size of 3,138 breeding pairs within 200 km of the Texas-Mexico border. This minimum number is more than 23 times the previously estimated population size in Mexico (Marshall et al. 1985).

Our sampling area of 1 km² surveyed for every 260 km² available in the census zone is relatively small. However, the small sampling area is fully considered in the calculations and is reflected in the wide confidence interval reported. It should be noted that in the United States the most important recurrent surveys taken by the government use samples of around 1 in 1,240 (Cochran 1977) or about five times smaller than our sampling area.

Our assumption that we detected 100% of the singing males along the survey route was designed to force a conservative estimate. Detecting all males within the area of the transect is highly unlikely owing to the secretive nature of Black-capped Vireos when not singing and the rather wide transect width. We found, in contrast to Marshall et al. (1985), that vireos in our census zone often became quiet by midmorning and remained so until late afternoon. Barlow (1967) reported that a male of a nesting pair was not heard to sing during 40 hr of careful observation. If we assume

that some substantial fraction of the males present in the transect area were not counted, the estimated population size would be increased proportionally.

We drove many miles of mountainous back roads throughout the census zone. We examined (with binoculars) openings to many canyons which appeared to contain vegetation similar to that found in canyons we surveyed. We believe our estimate that 40% of the region is structurally similar to the four canyons we sampled is conservative. Our survey sites were not chosen because we suspected Black-capped Vireos were present. We chose the four sites because we had obtained permission to enter them from local ranchers.

If this large population of Black-capped Vireos does exist in northern Mexico in a relatively small area, why is the population in Texas and Oklahoma so reduced? The birds are believed to be associated with a transitional type of habitat (Graber 1961) characterized as "scrub oak growth of irregular height and distribution with spaces between the small thickets and clumps" (Grzybowski et al. 1986). In contrast, we commonly found vireos in Mexico in dense thickets with few spaces between clumps of vegetation. These extensive scrub thickets may have resulted from the frequent uncontrolled wildfires which sweep through the canyons in this part of Mexico. This dense habitat type is uncommon in Texas and Oklahoma possibly owing to more intensive ranching and development in these states. We suggest that a denser structure with fewer open spaces may be better suited to breeding Black-capped Vireos and that this structure, along with less intensive ranching and fewer cowbirds accounts for a far larger population in northern Coahuila than in areas of similar size in Texas.

In speaking of this region of Mexico, A. R. Phillips (1974) says, "One may travel past range after range of mountains, and arroyo after arroyo, in which no ornithologist has ever set foot." The fate of the Black-capped Vireo in the United States is inextricably linked to the Mexican population of this bird. A full understanding of the species' status requires much more work in Mexico.

LITERATURE CITED

BARLOW, J. C. 1967. Nesting of the Black-capped Vireo in the Chisos Mountains, Texas. Condor 69: 605–608.

COCHRAN, W. G. 1977. Sampling techniques. John Wiley and Sons, New York.

GRABER, J. W. 1961. Distribution, habitat requirements, and life history of the Black-capped Vireo (*Vireo atricapilla*). Ecol. Monogr. 31:313–336.

GRZYBOWSKI, J. A., R. B. CLAPP, AND J. T. MARSHALL, JR. 1986. History and current population status of the Black-capped Vireo in Oklahoma. Am. Birds 40:1151–1161.

MARSHALL, J. T., R. B. CLAPP, AND J. A. GRZYBOWSKI. 1985. Status report: *Vireo atricapillus* Woodhouse, Black-capped Vireo. Office of Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, NM.

MILLER, A. H. 1955. The avifauna of the Sierra Del Carmen of Coahuila, Mexico. Condor 57:154–178.

MULLER, C. H. 1947. Vegetation and climate of Coahuila, Mexico. Madroño 9:1–32.

PHILLIPS, A. R. 1974. Summary of avian resources of the Chihuahuan Desert region, p. 617–620. *In* Transactions of the symposium of the biological resources of the Chihuahuan Desert region, United States and Mexico. Sul Ross State Univ., Alpine, TX.

STEED, D. L. 1988. The Black-capped Vireo (*Vireo atricapillus*) in Travis County, Texas. Technical Brief, DLS Associates, Austin, TX.

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AN OBSERVATION OF SOCIAL PLAY IN BEARDED VULTURES[1]

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Play behavior has been defined as "all postnatal motor activity that appears to be purposeless, in which motor patterns from other contexts may often be used in modified forms and altered temporal sequencing" (Bekoff and Byers 1981, p. 300). This note describes an observation that I interpreted to be social play (play directed towards another individual) in Bearded Vultures (*Gypaetus barbatus*: Accipitridae). Object play has been inferred in Bearded Vultures (Fagen 1981) when individuals drop and catch bones in the air (Olivier 1961, Huxley and Nicholson 1963) and when they drop stones from the air (Povolny 1966). I have found no reports

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