Density and Habitat Use of Gray Vireos in Northwestern New Mexico

Probably the biggest threat to the gray vireo (*Vireo vicinior*) in New Mexico is habitat degradation, primarily due to habitat management activities and natural gas exploration. Natural gas development has fragmented habitats that were once relatively undisturbed by stripping areas of vegetation for the construction of new well pads and associated roads and pipeline right-of-ways (ROWs). In 2006-07, we randomly selected line transects and conducted distance sampling for gray vireos in San Juan and Rio Arriba Counties to estimate density and identify occupied habitat. We established 29 transects in 2006 and 29 in 2007, each 1.75 km in length, for a total of 50.75 km per year and 101.50 km over the 2-year study. To compare occupied gray vireo habitat to the proportion of available habitat in our study area, we established plots and collected data on selected habitat characteristics at gray vireo detection and randomly selected sites. The following variables were measured: elevation; slope; aspect; tree height; tree density; snag density; canopy cover; tree diameter at ankle height (DAH); shrub density; percentage of live ground cover, including shrubs, grasses, and forbs; and percentage of non-live ground cover, including rock, litter, woody debris, and bare ground. In addition to these variables, for each detection and random habitat plot we used ARCMAP to measure the distance to the nearest active natural gas well, road, and habitat edge. We also quantified the number of natural gas wells within a 2-km and 5-km radius of each gray vireo detection and random habitat plot.

Our best estimate of gray vireo density was 0.044 ± 0.013 (SE; $n = 23$) in 2006 and 0.066 ± 0.028 (SE; $n = 29$) in 2007. Our density estimates for gray vireo are similar to that from other recent studies utilizing distance sampling in Colorado, Utah, and California; therefore, our data suggests that current gray vireo density in the San Juan Basin of northwestern New Mexico is similar to that across the species' range. In a comparison of habitat variable means, only elevation differed between gray vireo detection plots and randomly selected plots. Multiple logistic regression analyses indicated that gray vireo use areas were slightly higher in elevation and contained a lower percentage of downed woody debris than randomly selected sites. Our data also suggests that gray vireo use areas have fewer trees >4 m in height and more trees <2 m in height than the proportion of available habitat. The results of our GIS analysis indicate that the density of natural gas wells and the proximity of wells and roads did not appear to influence gray vireo occupancy in the San Juan Basin.