

Conclusions and Next Steps

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OVERVIEW

This symposium was organized as a forum for disseminating current scientific information necessary for making decisions directed at ensuring the long-term persistence of the Gray Vireo (*Vireo vicinior*) in New Mexico. In addition, an attempt was made during the roundtable discussion to encourage dialogue and promote problem-solving discussions among land managers, scientists, and other stakeholders. The symposium contributors reported salient results from their current research on the Gray Vireo in New Mexico. They also identified threats to the Gray Vireo at their study areas, and they proffered some research and management needs. These topics were further explored during the roundtable discussion (Appendix 1).

RESEARCH RESULTS: POPULATION STATUS AND TRENDS

In DeLong and Williams (2006), the authors concluded that there was little evidence of increasing or decreasing population trends for the Gray Vireo in New Mexico. Information presented during the symposium did not increase our knowledge of the status of the Gray Vireo in the State; none of the studies included in the symposium were of sufficient duration to determine population status and trends at the respective study areas.

However, the symposium contributors did validate that population sizes vary across the State, likely in relation to availability of suitable habitat and survey effort. Population sizes ranged from 37 territories in the Sacramento Mountains (Britt and Lundblad) to 8 territories in 2006 on Kirtland Air Force Base (Frei and Finley). We also learned that breeding effort varies from year to year, likely influenced by such factors as weather patterns (Frei and Finley).

DeLong and Williams (2006) estimated a

minimum population size for Gray Vireos in New Mexico of between 549 and 827 birds and at least 418 territories. As new populations, such as those on Fort Bliss (Britt and Lundblad), are discovered with increasing survey effort, our estimates of the statewide Gray Vireo population will increase in size and accuracy.

RESEARCH RESULTS: HABITAT USE

Information was presented on breeding habitat use by the Gray Vireo at three spatial scales: landscape (where in New Mexico the species occurs), macrohabitat (where territories are placed on the landscape), and microhabitat (where nests are located within a territory).

At the landscape scale, we learned that Gray Vireos breed across most of New Mexico, from the southeastern part of the State (such as in the Organ, Sacramento, and Guadalupe mountains) to the northwestern part of the State (such as in the Four Corners area).

At the macrohabitat scale, we learned that Gray Vireos will occupy a variety of vegetation community types, including desert riparian communities along drainages in southern New Mexico (Britt and Lundblad), juniper (*Juniperus* spp.)-oak (*Quercus* spp.) woodland in southeastern New Mexico (Stake and Garber), juniper woodland and savanna in central and western New Mexico (Frei and Finley), and piñon (*Pinus* spp.)-juniper woodland in north and northwestern New Mexico (Stake and Garber, Wickersham and Wickersham). Although vegetation community type can be a useful indicator of whether Gray Vireos occur in an area, vegetation communities vary geographically. We learned that there are a number of variables that potentially can predict Gray Vireo occupancy across vegetation community types, including:

- Tree and shrub density;
- Tree and shrub height;
- Forest stand age;
- Presence of downed woody debris;

- Elevation;
- Topography, such as drainages and bowls; and
- Energy inputs.

Occupancy of habitats by Gray Vireo was not found to be related to density of natural gas wells nor to proximity of wells and roads in northwestern New Mexico.

At the microhabitat scale, we found out that Gray Vireos primarily build their nests in juniper, but that they also will nest in other trees and shrubs, such as piñon, oak, mountain mahogany (*Cercocarpus montanus*), and sumac (*Rhus virens*). Furthermore, we learned that Gray Vireos will build their nests at various heights and locations within a tree, but that they tend to build their nests 1 to > 6 m high in the outermost section of vegetation.

THREATS

Several threats to Gray Vireo were identified by the symposium contributors, including habitat loss due to such human activities as juniper removal, disturbance on military lands, and, potentially, the development of biofuel energy power plants. Another identified threat to the vireo was brood parasitism by the Brown-headed Cowbird (*Molothrus ater*). However, prevalence of brood parasitism varied among sites. For example, Stake and Garber reported that 62% of the nests found in the Guadalupe Mountains were parasitized, while only 11% of nests near Farmington were parasitized. The effects of oil and gas development on Gray Vireos were not clear. Density of natural gas wells and proximity of wells and roads did not appear to influence Gray Vireo breeding abundances in the northwestern part of the State, but such anthropogenic disturbance might indirectly negatively affect Gray Vireo nesting success by influencing population parameters of predators and Brown-headed Cowbirds.

RESEARCH NEEDS

The wealth of scientific information presented at the symposium is a good indication of the progress that has been made towards understanding Gray Vireo biology and ecology in New Mexico. Nonetheless, a number of information gaps remain. Specifically, more information is needed on Gray Vireo: 1) distribution across the State; 2) population

trends; 3) dietary requirements; 4) habitat requirements at multiple spatial scales; and 5) tolerances for a wide spectrum of human activities. Furthermore, which factors currently most limit Gray Vireo populations throughout their annual cycle and the effects of climate change on Gray Vireo population parameters need to be elucidated.

MANAGEMENT NEEDS

Although Gray Vireos have begun to be included in management discussions and decisions, targeted and effective conservation strategies for the Gray Vireo have not been implemented statewide. Factors identified as most limiting to management and conservation progress were the lack of 1) standardized survey protocols and 2) sound management guidelines that specify disturbance limits, buffer requirements, and habitat condition (e.g., tree density) requirements.

NEXT STEPS

In order to fulfill its mandate to protect the Gray Vireo, the New Mexico Department of Game and Fish (NMDGF) has supported the creation of a working database of sighting and nest site locations (DeLong and Williams 2006). NMDGF also supported the preparation of a report (DeLong and Williams 2006), which reviewed the distribution, status, and biology of the Gray Vireo in New Mexico and suggested a survey protocol for clearance-type inventories (see Appendix 2). In 2007, the *Gray Vireo (Vireo vicinior) Recovery Plan* (Pierce 2007) was completed.

This symposium was another benchmark in the recovery process. In order to best manage and protect the Gray Vireo in New Mexico, we need to build upon the success of the symposium by taking steps to fill information gaps and address management needs. It was the intent of the symposium to inspire collaborative efforts to protect the vireo, and we now need to:

- Maintain high levels of cooperation and coordination among interested parties.
- Complete studies that go beyond documenting presence or absence and improve our knowledge of the vireo's biology and status. Specifically, multi-year studies are needed that involve both proven methods and new technologies.

- Encourage wide scale sharing of information and data.
- Develop land management guidelines, and

effective agreements and strategies for recovering the Gray Vireo in New Mexico.