

Bell's Vireo (*Vireo bellii*)

NMPIF level: Species Conservation Concern, Level 1 (SC1)

NMPIF assessment score: 17

NM stewardship responsibility: Moderate

National PIF status: Watch List

New Mexico BCRs: 34, 35

Primary breeding habitat(s): Southwest Riparian, Middle-elevation Riparian

Other habitats used: Chihuahuan Desert Shrub

Summary of Concern

Bell's Vireo has experienced significant declines and loss of local populations in several portions of its range, including the southwest United States. In many locations, including New Mexico, it suffers low productivity due to brood parasitism by Brown-headed Cowbirds, which in turn may be a consequence of habitat alteration.

Associated Species

Lucy's Warbler (SC1), Yellow-breasted Chat, Northern Cardinal, Blue Grosbeak, Painted Bunting (BC1), Abert's Towhee (BC1), Bullock's Oriole

Distribution

Four subspecies of Bell's Vireo are broadly distributed in appropriate habitat across the central and southwest United States and northern Mexico. The species range extends from portions of North Dakota, Minnesota and Wisconsin in the north to the Mexican states of Durango and Zacatepas, and from California in the west to Louisiana, Tennessee, and Indiana in the east. The range includes small portions of southern Nevada and Utah, most of western and southern Arizona, and southern New Mexico. Bell's Vireos winter along the Pacific coast of Mexico, from Baja California and Sonora south to Central America (Brown 1993).

In New Mexico, Bell's Vireos are locally distributed across the southern third of the state during the breeding season. The *medius* race is found in the Pecos valley north to drainages west of Roswell; in the

Black River and Rattlesnake Springs areas south of Carlsbad; and in the Rio Grande Valley north to San Antonio. The *arizonae* race occurs in southwestern New Mexico, with known populations in the lower Gila Box, San Simon Cienaga and Guadalupe Canyon (Williams 1999).

Ecology and Habitat Requirements

Across its range, Bell's Vireo breeds in dense, lowland shrub and understory vegetation, including riparian areas, second-growth forests and mesquite brushlands (Brown 1993). Dense shrubby vegetation appears to be a fundamental requirement of Bell's Vireo habitat; overhead canopy cover, patch size, and proximity to water may also be important (Parody and Parker 2002). However, within these basic structural requirements, the species occupies different habitat types in different portions of its range. It is often absent from areas of apparently suitable habitat, suggesting that criteria for habitat selection are variable or not fully known (Parody and Parker 2002).

Nesting occurs largely in broad-leafed deciduous trees in the Midwest, and narrow-leafed riparian shrubs in the Southwest. In the Grand Canyon in Arizona, the species is a habitat generalist and makes extensive use of non-native salt cedar (Brown 1993). Elsewhere in Arizona, in the Lower Colorado River Valley, it is a specialist in native seep willow and mesquite habitats, and salt cedar is rarely used (Rosenberg et al. 1991). In southern New Mexico habitats, both salt cedar and mesquite are present but rarely if ever used for nesting. In the southeast and southwest parts of the state, most nests occur in willow, seep willow, or hackberry (Parody 2001).

In one comparative study, Parody (2001) reported nesting success over twice as high (46% versus 20%) in the Gila Box area near Lordsburg than in the Rattlesnake Springs area near Carlsbad, possibly due to the presence of larger patches of denser vegetation and elimination of grazing activity in the former area. In both locations, the leading cause of nest failure was parasitism by Brown-headed Cowbirds, which in some years has exceeded 90% in the Carlsbad population.

Bell's Vireos arrive in southern New Mexico in early April, and nest from late April to August. In the Gila Box, birds arriving earlier in the breeding season were more likely to raise a second clutch and experienced higher reproductive success (Parody 2001). Nests are usually in terminal forks of low pendant branches, generally 1-2 m above ground, or higher when shrub density is lower. The species forages mostly in the lower 5 meters of vegetation, and consumes more large insects than any other *Vireo* species (Brown 1993).

Conservation Status

Species Assessment

DISTRIBUTION	5
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THREATS	4
GLOBAL POPULATION SIZE	3
LOCAL POPULATION TREND	3
IMPORTANCE OF NEW MEXICO TO BREEDING	2
COMBINED SCORE	17

Bell's Vireo is a Species Conservation Concern, Level 1 species for New Mexico, with a NMPIF combined score of 17. It receives a maximum vulnerability score of 5 from PIF for its small non-breeding distribution, and a score of 4 from NMPIF for threats to breeding in the state. Bell's Vireo is a national PIF Watch List Species, and is listed as threatened in New Mexico. Bell's Vireo is a U.S. Fish and Wildlife Service (2002) national Bird of Conservation Concern.

Population Size

Total population for the state is unknown. PIF estimates a global species population of 1,500,000, and that New Mexico holds less than one percent of the global species population. However, this species is relatively poorly sampled by the BBS in New Mexico (two routes), and state estimates based on a percentage of the global population should be considered with caution. The population in the lower Gila Box included at least 44 nesting pairs in 1998-1999. Population in the Rattlesnake Springs area includes about 10 nesting pairs.

Population Trend

Bell's Vireo has experienced significant declines in several portions of its range, including southern California, Texas and the Midwest. In California, sharp downward trends led to federal listing of the Least Bell's Vireo as an endangered species in 1986; more recently this population has increased. Virtually no data exist on trends in New Mexico's generally small and scattered Bell's Vireo populations; only two BBS routes in the state report the species. A local population trend score of 3 indicates uncertainty. BBS data for 1966-2004 are as follows:

	Annual Trend (%)	P-value	Number of Routes
New Mexico	10.4	0.37	2
FWS Region 2	-2.6	0.01	131

Western BBS	-0.7	0.51	42
Survey-wide	-2.7	0.00	291

Threats

High levels of brood parasitism on Bell's Vireos have been reported across the species' range, particularly in the Southwest and California (Brown 1993). Parasitism by Brown-headed Cowbirds greatly reduces vireo productivity due to nest abandonment and/or destruction or removal of vireo eggs. A model developed in California suggests that parasitism rates exceeding 30% may render a population vulnerable to stochastic events, while a rate of 48% may lead to extinction within 20 years (Laymon 1987). Extremely high levels of parasitism in the Carlsbad area suggest that without cowbird control this population is not sustainable, or may exist only as a sink population maintained by new arrivals each year.

Habitat loss or alteration also poses a significant threat, both directly through loss of suitable nesting habitat and indirectly by increasing rates of brood parasitism and nest predation (Brown 1993). In the Southwest, changes in water management, including agricultural diversions, reservoir construction, and flood control projects, have reduced the extent of favorable riparian habitat. Overgrazing in riparian areas can reduce shrub growth and hence the availability of suitable nest sites (Overmire 1963, Brown 1993). Fragmentation of formerly continuous habitat areas can increase cowbird parasitism, and can segregate vireos into smaller breeding subpopulations that are more vulnerable to extinction (Franzreb 1989).

Management Issues and Recommendations

Management for Bell's Vireo in New Mexico should focus on reducing rates of cowbird parasitism, and maintaining or increasing suitable nesting habitat in riparian areas.

NMPIF Recommendations

- Maintain or restore dense low and mid-story native vegetation in riparian areas, particularly along the Rio Grande south of Socorro and along the Gila River.
- Limit grazing in riparian areas in order to maintain dense understory and reduce cowbird parasitism.
- Prohibit grazing and ORV use in the lower Gila Box. Restrictions are especially important in the early part of the breeding season, from late April through late June.

- Where feasible and as needed, enhance breeding productivity by removal of cowbird eggs from nests and/or control of cowbird populations.

Species Conservation Objectives

PIF Objectives

The PIF North American Landbird Conservation Plan designates Bell's Vireo as a Management species, and sets an objective of doubling the present population over the next 30 years.

NMPIF Objectives

- Increase known viable breeding populations to at least 10 sites in southern New Mexico by 2020.
- Maintain populations along the Gila from Redrock to the Arizona border.
- Increase population to at least 20 breeding pairs in the Rattlesnake Springs area.
- Reduce brood parasitism to less than 30% in all breeding locations.

Sources of Information

Brown, B. T. 1993. Bell's Vireo (*Vireo bellii*). In The Birds of North America, No. 35 (A Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Franzreb, K. E. 1989. Ecology and conservation of the endangered Least Bell's Vireo. Biol. Rep. 89, USFWS, Washington, D.C.

Laymon, S. A. 1987. Brown-headed Cowbirds in California: historical perspectives and management opportunities in riparian habitats. Western Birds 18:63-70.

Overmire, T. G. 1963. The effects of grazing upon habitat utilization of the Dickcissel and Bell's Vireo in north-central Oklahoma. Ph.D. Diss., Oklahoma State Univ., Norman, OK.

Parody, J. M. 2001. Bird-habitat relationships and the utility of multiscale methods. Ph.D. Diss., Univ. New Mexico, Albuquerque, NM.

Parody, J. M., and T. H. Parker. 2002. Biogeographic variation in nest placement: a case study with conservation implications. Diversity and Distributions 8:11-20.

Rosenburg, K. V., R. D. Ohmart, W. C. Hunter, and B. W. Anderson. 1991. Birds of the Lower Colorado River Valley. Univ. of Arizona Press, Tucson, AZ.

U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, VA. 99 p.

Williams, S. O. 1999. Status of State of New Mexico Threatened and Endangered Species. New Mexico Dept. Of Game and Fish, Santa Fe, NM. Unpublished report.