Volume 23 1995 Number 3

THE NEW MEXICO ORNITHOLOGICAL SOCIETY, INC.
P.O. Box 3068, Albuquerque, NM 87190-3068

OFFICERS FOR 1994-96

President: Dr. James Travis, 9420 Avenida de la Luna, Albuquerque, NM 87111; 821-0517
Vice-President: Mary Alice Root, 1108 Columbia NE, Albuquerque, New Mexico 87106; 266-0561
Secretary: Paul E. Steel, 41 Ridge Drive, Cedar Crest, New Mexico 87008; 281-4198
Treasurer: Ross L. Teuber, 1612 Kentucky NE, Albuquerque, New Mexico 87110; 265-8962
Director: Dr. W. Burton Lewis, P.O. Box 665, Los Alamos, New Mexico 87544; 662-3262
Director: Jackie McConachie, 5520 Granite NE, Albuquerque, New Mexico 87110; 268-3474
Director: Bill Willard, 3005 La Mancha NW, Albuquerque New Mexico 87104; 246-9429

Appointees: James Karo and Pat Stein

Editors: FIELD NOTES:
Dr. Sartor O. Williams III, 65 Verano Loop, Santa Fe, New Mexico 87505; 988-2697
Patricia R. Snider, 2435-C 45th St. Los Alamos, NM 87544; 662-3530

Editors: NMOS BULLETIN: M. A Root, P. Steel, and J. Travis

NOTES ON THE INCREASE OF THE BROWN-HEADED COWBIRD IN NEW MEXICO

DAVID W. MEHLMAN Department of Biology,
University of New Mexico Albuquerque, NM 87131

The Brown-headed Cowbird (*Molothrus ater*) is North America's best known brood parasite and has been implicated as at least a contributing factor in the declines of several rare, threatened, or endangered species (Lowther 1993). In particular, the cowbird has been implicated as a threat to the continued survival of New Mexico's most recently listed bird species, the Southwestern Willow Flycatcher (*Empidonax traillii extimus*; Tibbitts et al. 1994). It has been suggested that increasing human settlement of North America, conversion of native habitats to human-made ones, fragmentation of existing intact habitats, and introduction of livestock into areas which prior to settlement had no large mammals have all contributed to increases in the geographic range and population sizes of the cowbird (Ehrlich et al. 1988, Lowther 1993, Tibbits et al. 1994). Because of this increase and its potential impact on the avifauna of New Mexico, in this note I summarize information from the North American Breeding Bird Survey (BBS) on the recent abundance and distribution of the cowbird in New Mexico.

The BBS is a continent-wide survey designed to estimate population trends in breeding species of birds. Full details on the methodology used by the BBS are available in Bystrak (1981), Robbins et al. (1986), Droege (1990), and Peterjohn (1994). From the master BBS database, I computed the mean number of cowbirds counted per BBS route per year for the years 1968 to 1994. In calculating this mean, I used only routes on which cowbirds were found in each year. I also computed similar yearly means for each of the physiographic strata in New Mexico (see Table 1 for the list of strata). Since the number of BBS routes run annually in New Mexico has not been constant, I calculated the proportion of the total number of BBS routes run each year on which cowbirds were counted to provide an estimate of distributional change. Finally, I compared overall population trends between 1966 and 1993 in New Mexico to those of surrounding states with data supplied by the National Biological Service.

The mean number of Brown-headed Cowbirds counted annually in New Mexico has steadily increased from 1968 to 1994 (Figure lA, Table 1), with no sign of a leveling off in recent years. This increase in abundance is paralleled by an increase in the distribution of the cowbird within the state (Figure 18): the percent of BBS routes on which cowbirds were found has been steadily increasing through time and is asymptotically approaching a level of about 90%.

The rate of increase in cowbird numbers per year differed slightly between the different physiographic strata (Table 1). The Staked Plains stratum, which encompasses most of the eastern plains of New Mexico, had a higher rate of increase than either the entire state or the other strata. The Pinyon-Juniper Woodlands stratum had a very low and statistically insignificant increase in cowbird abundance through time.

Comparison of overall cowbird population trends in New Mexico to surrounding states shows that New Mexico, Colorado, and Utah have increasing trends while states to the east have declining trends (Table 2). Also of interest is the fact that the states with decreasing trends (Kansas, Oklahoma, Texas) have much higher cowbird abundances and presumably lie closer to the core of the cowbird's range.

This increase in both the abundance and distribution of the Brown-headed Cowbird is probably bad news for any New Mexican species that is potentially a host for the cowbird. In particular, this increase may be a problem not only for endangered species such as the Southwestern Willow Flycatcher, but also for currently more widespread species such as the Bell's Vireo (*Vireo bellii*), Gray Vireo (*v. vicinior*), Yellow Warbler (*Dendroica petechia*), Painted Bunting (*Passerina ciris*), and Abert's Towhee (*Pipilo aberti*) which are frequent cowbird hosts (Ehrlich et al. 1988) and may now have more populations exposed to cowbird parasitism. In light of the increasing concern over potential declines in neotropical migrants (Robbins et al. 1989, Terborgh 1989, Askins et al. 1990, Finch 1991), the cowbird increase can only be a more negative factor.

Table 1. Brown-headed Cowbird abundance change in New Mexican physiographic strata. Change is the slope of the linear regression of mean abundance per year on year; it is in units of cowbirds per year. *N* is the number of years for which a mean abundance could be computed in the particular stratum. The *P*-value expresses the probability that the change is statistically significantly different from zero.

Stratum name	Change	*N*
Entire State	0.114**	27
Staked Plains	0.148**	27
Chihuahuan Desert	0.120+	27
Southern Rockies	0.097	23
Mexican Highlands	no data	3
Pinyon-Juniper Woodlands	0.019	22
Intermountain Grasslands	0.120*	27

**P<0.001, *P<0.01, +P<0.1

Table 2. Brown-headed Cowbird population trends in New Mexico and surrounding states. Trend is in units of percent per year. *N* is the number of BBS routes from which the trend was calculated. Abundance is the mean number of cowbirds counted on BBS routes in the state. Data from Droege (unpubl. data).

State	Trend	*N*	Abundance
New Mexico	3.449	47	5.04
Arizona	-1.194	55	6.39
Utah	2.775	43	4.89
Colorado	7.739	72	4.42
Kansas	-1.182	39	34.85
Oklahoma	-2.124	56	24.88
Texas	-3.402	119	16.38

It is interesting to speculate on why this increase has occurred. It seems unlikely that livestock introduction contributes a major role in New Mexico, since there have been large numbers of livestock in the state since well before the BBS started. Similarly, it is not clear how increasing habitat fragmentation could contribute to this increase either. Most areas in New Mexico at lower elevations are grasslands or shrub deserts which are not prone to the deforestation that has introduced more edge habitats in eastern North America. More likely factors would seem to be increasing urbanization/suburbanization in New Mexico associated with an increase in human population and perhaps recent changes in agricultural practices which create more favorable environments for cowbirds. It is also conceivable, given the decrease in populations to the east of New Mexico, that a westward shift in cowbird abundance toward the western edge of the Great Plains is

underway. The factors contributing to this increase in cowbird abundance would be worthwhile topics of study for avian and conservation biologists in New Mexico.

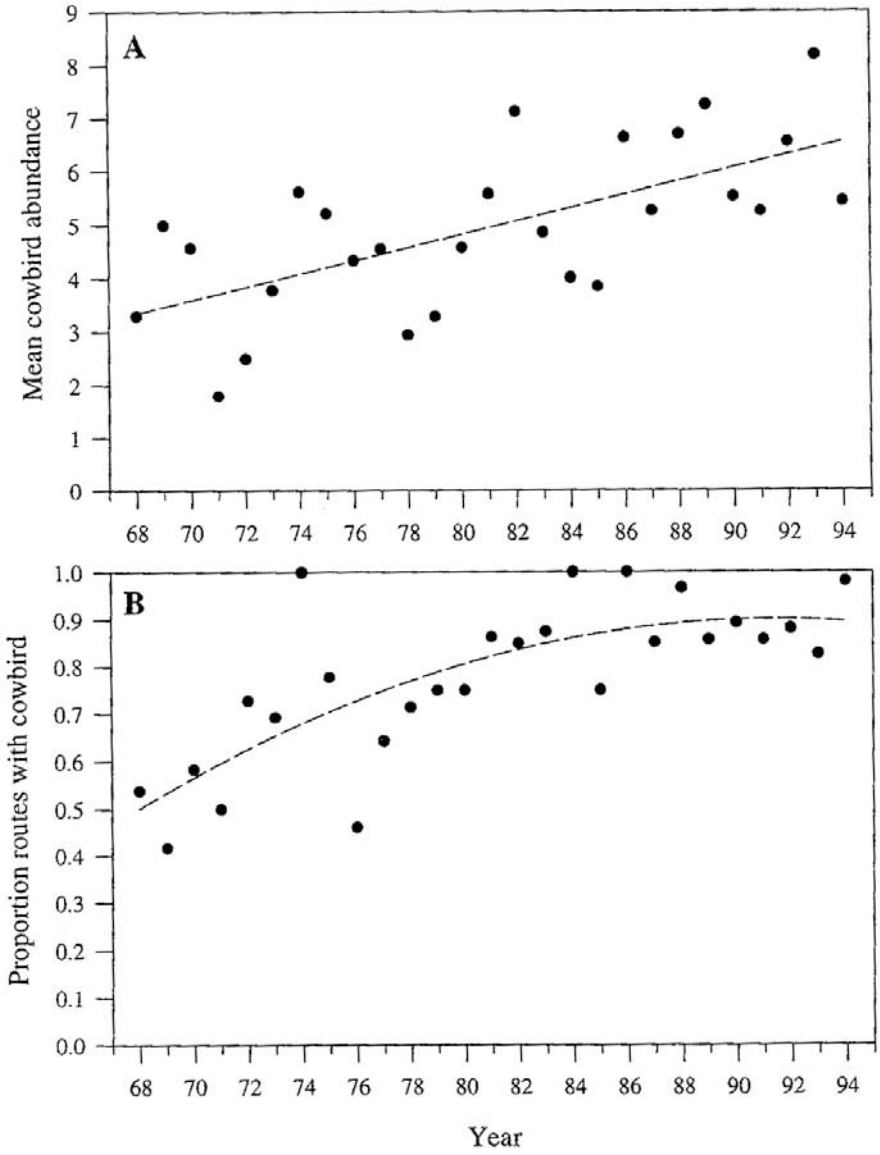

Figure 1. A. Increasing abundance of the Brown-headed Cowbird in New Mexico, as shown by the mean annual number of cowbirds counted on BBS routes. The dashed line indicates the best linear fit to these data.
B. Increase in the distribution of cowbirds in New Mexico, as shown by the annual proportion of BBS routes on which cowbirds were counted. The dashed line indicates the best quadratic fit to these data.

Received 14 August 1995

Acknowledgments

Bruce Peter john and Sam Droege of the National Biological Service provided copies of the BBS database and unpublished BBS trend analyses, respectively, for which I thank them greatly. The University of New Mexico, Department of Biology, provided computer facilities. The greatest thanks are due to the BBS volunteers in New Mexico and elsewhere who actually collect the data. An anonymous reviewer provided helpful comments on an earlier draft of the manuscript.

Literature Cited

Askins, R. A., J. F. Lynch, and R. Greenberg. 1990. Population declines in migratory birds in eastern North America. Current Ornithology 7:1-57.

Bystrak, D. 1981. The North American Breeding Bird Survey. Studies in Avian Biology 6:34-41.

Droege, S. 1990. The North American Breeding Bird Survey. Pages 1-4 in Survey designs and statistical methods for the estimation of avian populations trends, J. R. Sauer and S. Droege, editors. U.S. Fish and Wildlife Service, Biological Report 90(1).

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon & Schuster, Inc., New York.

Finch, D. 1991. Population ecology, habitat requirements, and conservation of neotropical migratory birds. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-205.

Lowther, P.E. 1993. Brown-headed Cowbird (*Molothrus ater*). In The Birds of North America, No. 47. The Academy of Natural Sciences, Philadelphia.

Peterjohn, B. G. 1994. The North American Breeding Bird Survey. Birding 26(6):386-398.

Robbins, C. S., D. Bystrak, and P. H. Geissler. 1986. The breeding bird survey: its first fifteen years, 1965-1979. U.S. Fish and Wildlife Service, Resource Publication 157.

Robbins, C. S., J. R. Sauer, R. Greenberg, and S. Droege. 1989. Population declines in North American birds that migrate to the neotropics. Proceedings of the National Academy of Science 86:7658-7662.

Terborgh, J. W. 1989. Where have all the birds gone? Princeton University Press, Princeton.

Tibbitts, T. J., M. K. Sogge, and S. J. Sferra. 1994. A survey protocol for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). National Park Service, Colorado Plateau Research Station, Technical Report NPS/NAUCPRS/NRTR-94/04.

LANDBIRD MIGRATION ALONG THE MIDDLE RIO GRANDE: SUMMARY OF BANDING DATA FROM SPRING AND FALL 1994

WANG YONG[1], DEBORAH M. FINCH[1], AND STEVE W. COX[2]
[1]Rocky Mountain Forest and Range Experiment Station 2205 Columbia SE,
Albuquerque, NM 87106 and [2]Rio Grande Bird Research, Inc, Albuquerque, NM 87107

Northbound and southbound movement along major waterways is characteristic of migratory birds nesting in North America. It is likely that river corridors are more important to migrating birds in arid parts of North America than in humid, more heavily vegetated areas (Wauer 1977). Although quantitative analyses of landbird migration along the Rio Grande corridor are not reported in the literature, the use of the Rio Grande as a migratory route by land birds is a well recognized behavior of southwestern birds. The riparian habitats along the Rio Grande are potential stopover sites for migratory land birds that use the Great Plains-Rocky Mountain "flight route" (Ligon 1961, Lincoln 1979). In central New Mexico, hot desert conditions prevail during a good portion of the spring and fall migration (personal observation). The availability of food, water, cover, and suitable north-south routing along the river may be critically important and strongly influential in directing migration of land birds (Ligon 1961, Stevens et al. 1977, Wauer 1977, Finch 1991).

Riparian habitats along the Rio Grande are under increasing pressure. Livestock grazing, logging, water management, recreation, transportation, urban development, and invasion of exotic plant species such as saltcedar *(Tamarix chinensis)* and Russian olive *(Elaeagnus angustifolia)* alter these riparian habitats, potentially disrupting migration activities. It is estimated that more than 90% of the original desert riparian habitat in the West has been eliminated by flood control and irrigation projects (Knopf 1988). Riparian ecosystems in New Mexico are listed as endangered in a recent assessment of endangered ecosystems in the United States (Noss et. al 1995). How habitat changes have affected or will affect the land birds migrating through the Rio Grande is unclear. Effective conservation strategies for neotropical and shorter distance land birds cannot be established without basic information about the importance of riparian corridors as stopover habitat during migration.

In spring 1994, the Rocky Mountain Forest and Range Experiment Station, at Albuquerque, NM, initiated a study to investigate the use of the Middle Rio Grande (from Elephant Butte Reservoir to Cochiti, NM) riparian habitats as migration corridors by neotropical and short-distance land bird migrants. The objectives of the study include: (1) to determine species composition, volume, and timing of spring and fall land bird migration in the Middle Rio Grande; (2) to monitor the distribution of migrants among different habitats and characterize the en route macro- and micro-habitat use by stopover migrants; (3) to investigate the biology of land bird migrants when they stopover in riparian habitats; and (4) to investigate the effect of habitat alteration on the stopover ecology of land bird migrants in the Middle Rio Grande. Here we report summarized banding data from 1994 spring and fall field seasons.

METHODS

Mist-nets were operated weekdays at two sites in the middle Rio Grande Valley of New Mexico. The two sites were Bosque del Apache National Wildlife Refuge (BNWR, N33°48' and WI06°52'), located about 90 miles south of Albuquerque, NM, and the Rio Grande Nature Center (RGNC, N35°07' and W106°41 '), Albuquerque, NM. Banding data were collected in spring from April 4 to June 15, and in fall from August 1 to November 13. At the RGNC during fall migration, the volunteers of Rio Grande Bird Research, Inc. banded migrants during the weekends.

Twenty nylon mist-nets (12 x 2.6 m with 30 mm or 36 mm mesh) were used to capture (and recapture) land bird migrants at each site. We checked nets about every 20 to 30 minutes. Unless rain, high winds, or temperature dictated a change, mist-nets were opened 15 minutes before sunrise, and operated approximately 6 hours each banding day.

Species, subspecies, age, and sex were identified by consulting Pyle et al. (1987), U.S. Fish & Wildlife Service Bird Banding Manual (1984), and various field guides. Body mass of each captured individual was weighed to the nearest 0.1 g using a digital electronic balance (ACCULAB V-333). Morphological measurements including unflattened wing chord, tarsus length, tail length, and molt condition were collected from each bird. Additional information such as feather length, wing span, and wing area were also collected for some species to assist in species identification and to meet other research goals. The amount of skull ossification was examined in fall to identify age. The main energy source for migratory flights in land bird migrants is fatty acids stored as triglycerides in fat deposits, which can constitute up to 50% of live body mass (Berthold 1975, Blem 1980). Migrants accumulate the fat deposits prior to, and during migration. We assessed fat stores of each bird by observing the subcutaneous fat deposits in the interclavicular fossa and abdomen according to a six-point scale developed by Helms and Drury (1960). Each individual was banded with a National Biological Service aluminum leg band. Birds were released immediately after this process.

RESULTS AND DISCUSSION

For the two sites combined, a total of 6,509 land birds of 102 species were banded during 1994 spring and fall field seasons (Table 1). During the 1994 spring migration we banded 436 individuals of 50 species and 421 individuals of 53 species at RGNC and BNWR, respectively. More birds were banded during the 1994 fall migration: 4,269 individuals of 77 species and 1,383 individuals of 55 species from RGNC and BNWR, respectively. The seasonal difference in the birds captured was large in some species. For example, a total 877 Wilson's Warblers were captured during fall migration from two study sites, while only 34 individuals of this species were captured during the spring migration. An extreme was Chipping Sparrow, while only 3 birds were captured during spring migration, a total of 950 birds were captured during fall migration. The causes for this large variation between seasons could include recruitment of young birds from the summer breeding grounds, different migration routes used by land bird migrants between spring and fall migrations, variation in the habitat use by migrants between spring and fall migration, and different stopover strategies used by spring and fall migrants. The variation in the netting efforts between spring and fall field seasons could partly result in this difference because the fall banding season was longer than the spring, although we do not believe this was a major factor. More detailed analyses are required to test these hypotheses.

Comparing the combined spring and fall data between the two sites, more species and more individuals were captured at the RGNC site (4,705 individuals of 87 species) than at the BNWR site (1,804 individuals of 71 species). In general, more individuals from a given species were captured at RGNC. The few species for which this did not hold true included Lucy's Warbler, Pyrrhuloxia, Summer Tanager, Verdin, Yellow-billed Cuckoo, Ruby-crowned Kinglet, Rufous-side Towhee, Yellow-breasted Chat, Western Wood-Pewee and Common Yellowthroat; more individuals of these species were caught at BNWR. The causes of these patterns are unclear, but could be related to the north or south limits of the distribution of a species, differences of habitat structure, quality, and quantity at each site, variation of migration routes among species, and weather conditions at stopover time. For example, in the middle Rio Grande valley, the BNWR probably represents the northern distribution limit of Pyrrhuloxia and Verdin. No individual of these two species was detected during intensive surveys at RGNC (Finch and Yong unpublished). The Yellow-billed Cuckoo, a sensitive species because of its population declines in parts of the West (Breeding Bird Survey of National Biological Service), was captured only at BNWR. This species generally prefers lowland deciduous woodlands, willow and alder thickets, second-growth woodlands, deserted farmlands and orchards (Johnsgard 1986). We suspected that habitat conditions were more favorable for this species at BNWR.

The most commonly-captured species at RGNC were Chipping Sparrow (882), Yellow-rumped Warbler (492), and Wilson's Warbler (484). The three species accounted for 39% of the total captures at the site. At BNWR, the most commonly-captured species were Wilson's Warbler (427), White-crowned Sparrow (159), and Ruby-crowned Kinglet (140). The three species accounted for 40% of the total captures at the site.

When we combined the captures from the two sites, the most commonly-captured species were Chipping Sparrow (953 captures), Wilson's Warbler (911), Yellow-rumped Warbler (539), and White-crowned Sparrow (450). These four species made up 44% of total captures. Nineteen additional species comprised another 38% of the captures. Arranged in decreasing abundance, these were Dark-eyed Junco (283), MacGillivray's Warbler (210), House Finch (203), Orange-crowned Warbler (193), Ruby-crowned Kinglet (190), Lark Sparrow (167), Brewer's Sparrow (149), Vesper Sparrow (144), Song Sparrow (135), Blue Grosbeak (121), Savannah Sparrow (118), Black-headed Grosbeak (111), Lazuli Bunting (104), Lincoln's Sparrow (101), American Goldfinch (97), Yellow Warbler (97), and Dusky Flycatcher (92).

Some species that breed mostly in the eastern United States and are rare or otherwise unusual in the Middle Rio Grande Valley were also captured but in low numbers. These species included Black-and-white Warbler, Dickcissel, Gray Catbird, Kentucky Warbler, Magnolia Warbler, Mourning Warbler, Nashville Warbler, Swainson's Thrush, Painted Bunting, Orchard Oriole, Red-eyed Vireo, Rose-breasted Grosbeak, and White-throated Sparrow. Brown-crested Flycatcher, a species not previously reported in the Middle Rio Grande Valley, was captured at BNWR during both spring and fall migration seasons. Western Palm Warbler, a regular migrant along the Pacific Coast but rare in the interior Southwest, was captured at RGNC

during the spring migration. One Golden-crowned Sparrow, another regular Pacific Coast species which is rare in the Middle Rio Grande Valley was captured at the RGNC in the fall. Several species such as Kentucky Warbler, Mourning Warbler, Swainson's Thrush, and Red-eyed Vireo were not on the bird checklist of BNWR. Others such as Magnolia Warbler, Palm Warbler, and Cassin's Sparrow were not on the bird checklist of RGNC.

Of the 539 Yellow-rumped Warblers captured from the two sites, most of them are Audubon subspecies *(Dendroica coronata auduboni),* only 3.65 % were individuals of the Myrtle subspecies *(D.* c. *coronata),* which is distributed mostly in the East. Among all the White-crowned Sparrows captured, 63% and 19% were identified as Gambel's *(Zonotrichia leucophrys gambelii)* and Mountain (Z. *l. oriantha)* subspecies, respectively, and the rest were not identified to subspecies. Of the 283 Dark-eyed Juncos captured, 31 (11 %) were Gray-headed *(Junco hyemalis caniceps),* 251 (89%) were Oregon *(J. h. montanus* and *shufeldti),* and only 1 was Slate-colored Junco *(J. h. hyemalis).* No White-winged Juncos *(J. h. aikeni)* were detected. The relative abundance of subspecies within these three species was consistent with earlier studies. Both Ligon (1961) and Hubbard (1978) documented that the majority of Yellow-rumped Warblers in New Mexico were Audubon subspecies and Myrtle subspecies were rare to locally fairly common (in the eastern New Mexico) during spring and fall migration. Hubbard (1979) indicated that the Mountain White-crowned Sparrow was less common in migration while the Gambel's subspecies was more widespread in New Mexico. Hink and Ohmart (1984) documented that in the Middle Rio Grande, large flocks of Dark-eyed Juncos were mainly composed of Oregon subspecies, Gray-headed was uncommon and less numerous but consistently more numerous than Slate-colored. No eastern subspecies of Rufous-sided Towhee, Summer Tanager, Solitary Vireo, or Northern Oriole were captured during this study.

Most Western Flycatchers captured during this study could be Cordilleran Flycatcher *(Empidonax cordilleran)* or "Interior Flycatcher" (Johnson and Marten 1988). No effort was made to separate them from the Pacific-slope Flycatcher or "Costal Flycatcher" (including *E. d. difficilis, E. d. inulicola, and E. d. crineritius)* because at present, there are no established criteria for separating the two in the field other than by vocalizations (Rosenberg et al. 1991). All the Yellow-bellied Sapsuckers captured during this study were Red-naped subspecies *(Sphyrapicus varius nuchalis)(AOU* 1957), which some ornithologists consider *S. nuchalis* as a species distinct from *S. varius.*

A total of 22 Willow Flycatchers was captured at the two sites, of which some of them were identified as the Southwestern race *(Empidonax traillii extimus)* based on morphology measurements and body color (see Aldrich 1951, Unitt 1987, Hubbard 1987, Browning 1993 for identification criteria). This subspecies is listed as Endangered by the states of New Mexico, Arizona, and California, and was recently federally listed. Southwestern Willow Flycatcher is a riparian obligate species nesting in cottonwood-willow and similar habitats. It is believed that the decline of this species is due to progressive loss of riparian habitat, especially of shrub willow and backwater ponds that the birds use for breeding. Hubbard (1987) speculated that only about 100 pairs of a breeding population were in New Mexico.

The data presented in this study document the large volume and complexity of migratory species composition in the Middle Rio Grande Valley, and suggested the importance of Middle Rio Grande riparian habitats as stopover sites for migratory land birds. Successful migration depends on a bird's ability to replenish energy reserves rapidly, locate suitable stopover sites and travel routes, avoid predation, and cross unfamiliar habitats. The persistence of migratory land bird populations depends on the health of the ecosystem to provide favorable conditions for survival throughout the annual cycle (Moore et al. 1993, Sherry and Holmes 1993). Consequently, factors associated with the en route ecology of migrants must figure into any analysis of population dynamics and should be emphasized in habitat management.

In our continuing research, we will evaluate in-depth use of Middle Rio Grande riparian habitats by migrating birds, assess the value of different kinds of riparian habitats to the stopover migrants, and identify potential effects of habitat alteration on land birds.

ACKNOWLEDGMENTS

We thank John Taylor, Phil Norton, Karen Brown, and the staff of Bosque del Apache National Wildlife Refuge and the Rio Grande Nature Center for access, housing, and assistance with our migratory bird studies at these sites. We thank Rio Grande Bird Research, Inc. for providing logistical support for banding at RGNC. Many volunteers helped us, including members of Rio Grande Bird Research, Inc. who helped with mist-netting operations. John Hubbard, Chuck Hundertmark, and Chuck Hunter provided valuable information for establishing the banding sites. Gustva R. Bodner and Heather Bingham assisted with data entry and analysis. Field work was assisted by Gustva R. Bodner, David Hawksworth, Matthew Mahrt, Jennifer Sevigney, Michael Sevigney, Greg Trujillo, Lee Vento, Robert Wolbert, and Richard Young. We thank Sartor O. Williams III, Willam Howe, Mike Means, and an anonymous reviewer for helpful comments on earlier versions of the manuscript.

LITERATURE CITED

Aldrich, J. W. 1951. A review of the races of the Traill's Flycatcher. Wilson Bull. 63:192-197.

American Ornithologists' Union. 1957. Check-list of North American Birds, 5th ed. American Ornithologists' Union, Baltimore, Maryland. 691pp.

American Ornithologists' Union. 1983. Check-list of North American Birds, 6th ed. American Ornithologists' Union, Lawrence, Kansas. 877pp.

Berthold, F. 1985. Body weights and fat deposition of Palaearctic passerine migrants in the central Sahara. Oecologia 66:141-146.

Blem, C. R. 1980. The energetics of migration. Pages 175-224 in S. A. Gauthreaux, Jr. , editor. Animal Migration, Orientation, and Navigation. Academic Press, New York.

Browning, M. R. 1993. Comments on the taxonomy of *Empidonax trailli* (Willow Flycatcher). Western Birds 24:241-257.

Finch, D. M. 1991. Population ecology, habitat requirements, and conservation of neotropical migratory birds. USDA Forest Service, General Technical Report RM-229. 26pp.

Johnson, N. K. and J. A. Marten. 1988. Evolutionary genetics of flycatchers. II. Differentiation in *Empidonax difficilis* complex. Auk 105: 177 -191.

Ligon, J. S. 1961. New Mexico birds and where to find them. The University of New Mexico Press, Albuquerque, NM. 360pp.

Lincoln, F. C. 1979. Migration of birds. Circular 16. Fish and Wildlife Service, United States Department of the Interior. 119pp.

Hubbard, J. P. 1987. The status of the willow flycatcher in New Mexico.

Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 29pp.

Helms, C. W. and W. H. Drury. 1960. Winter and migratory weight and fat: field studies on some North American buntings. Bird-Banding 31:1-40.

Hink, V. C. and R. D. Ohmart. 1984. Middle Rio Grande Biological Survey. Report submitted to U.S. Army Corps of Engineers, Albuquerque, New Mexico. 300pp.

Knopf, F. L. 1988. Conservation of riparian ecosystems in the United States. Wilson Bulletin 100:272-284.

Moore, F. R., S. A. Gauthreaux, Jr., P. Kerlinger, and T. R. Simons. 1993. Stopover habitat: management

implications and guidelines. Pages 58-69 in D. M. Finch and P. W. Stangel, editors. Status and management of neotropical migratory birds. USDA Forest Service, General Technical Report RM-229.

Noss, R. F., E. T. LaRoe III, and J. M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. National Biological Service, Biological Report 28. 58pp.

Pyle, P., S. N. G. Howell, R. P. Yunick, and D. F. DeSante. 1987. Identification guide to North American Passerines. Slate Creek Press, Bolinas, California.

Rosenberg, K. V., R. D. Ohmart, W. C. Hunter, and B. W. Anderson. 1991. Birds of the Lower Colorado River Valley. The University of Arizona Press, Tucson. 416 pp.

Sherry, T. W. and R. T. Holmes. 1993. Are populations of neotropical migrant birds limited in summer or winter? Implications for management. Pages 47-57 in D. M. Finch and P. W. Stangel, editors. Status and management of neotropical migratory birds. USDA Forest Service, General Technical Report RM-229.

Stevens, L. S., B. T. Brown, J. M. Simpson, and R. R. Johnson. 1977. The importance of riparian habitat to migrating birds. Pages 156-164 in R. R. Johnson and D. A. Jones, technical coordinators. Importance, preservation and management of riparian habitat: a symposium. USDA Forest Service, General Technical Report RM-43.

U. S. Fish and Wildlife Service and Canadian Wildlife Service. 1984. North American Bird Banding Techniques. Canada Wildlife Service, Ottawa, Ontario.

Unitt, P. 1987. *Empidonax traillii extimus:* an endangered subspecies. Western Birds 18:1337-162.

Wauer, R. H. 1977. Significance of Rio Grande Riparian Systems upon the avifauna. Pages 165-174 in R. R. Johnson and D. A. Jones, technical coordinators. Importance, preservation and management of riparian habitat: a symposium. USDA Forest Service, General Technical Report RM-43.

Table 1. Landbirds captured at Rio Grande Nature Center (RGNC), Albuquerque, NM and Bosque Del Apache National Wildlife Refuge (BNWR), San Antonio, NM during spring and fall migration seasons of 1994.

		RGNC			BNWR			
COMMON NAME	SCIENTIFIC NAME[1]	SP	FA	TOT	SP	FA	TOT	GTOT[2]
Accipitridae								
Sharp-shinned Hawk	*Accipiter striatus*	0	2	2	1	0	1	3
Cooper's Hawk	*Accipiter cooperii*	1	0	1	0	0	0	1
Falconidae								
American Kestrel	*Falco sparverius*	0	1	1	1	0	1	2
Columbidae								
Mourning Dove	*Zenaida macroura*	2	1	3	1	0	1	4
Cuculidae								
Yellow-billed Cuckoo	*Coccyzus americanus*	0	0	0	4	2	6	6
Alcedinidae								
Belted Kingfisher	*Ceryle alcyon*	0	3	3	0	0	0	3
Picidae								
Downy Woodpecker	*Picoides pubescens*	3	3	6	1	5	6	12
Hairy Woodpecker	*Picoides villosus*	0	0	0	1	3	4	4
Yellow-bellied Sapsucker	*Sphyrapicus varius*	0	1	1	0	0	0	1
Northern Flicker	*Colaptes auratus*	1	8	9	2	5	7	16
Tyrannidae								
Olive-sided Flycatcher	*Contopus borealis*	1	3	4	0	0	0	4

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Western Wood-Pewee	*Contopus sordidulus*	4	14	18	19	9	28	46
Willow Flycatcher	*Empidonax traillii*	6	9	15	2	5	7	22
Least Flycatcher	*Empidonax minimus*	0	1	1	0	0	0	1
Hammond's Flycatcher	*Empidonax hammondii*	0	4	4	0	2	2	6
Dusky Flycatcher	*Empidonax oberholseri*	21	30	51	33	8	41	92
Gray Flycatcher	*Empidonax wrightii*	5	9	14	5	8	13	27
Western Flycatcher	*Empidonax difficilis*	0	17	17	0	3	3	20
Black Phoebe	*Sayornis nigricans*	4	8	12	5	0	5	17
Say's Phoebe	*Sayornis saya*	0	4	4	0	0	0	4
Ash-throated Flycatcher	*Myiarchus cinerascens*	4	1	5	5	0	5	10
Brown-crested Flycatcher	*Myiarchus tyrannulus*	0	0	0	3	1	4	4
Western Kingbird	*Tyrannus verticalis*	0	6	6	0	0	0	6
Hirundinidae								
Violet-green Swallow	*Tachycineta thalassina*	0	0	0	1	0	1	1
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	0	0	0	9	0	9	9
Corvidae								
Scrub Jay	*Aphelocoma coerulescens*	1	3	4	0	3	3	7
Paridae								
Mountain Chickadee	*Parus gambelli*	0	5	5	0	1	1	6
Black-capped Chickadee	*Parus atricapillus*	0	11	11	0	0	0	11

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Remizidae								
Verdin	*Auriparus flaviceps*	0	0	0	0	1	1	1
Aegithalidae								
Common Bushtit	*Psaltriparus minimus*	0	6	6	0	0	0	6
Sittidae								
Red-breasted Nuthatch	*Sitta canadensis*	0	2	2	0	1	1	3
White-breasted Nuthatch	*Sitta carolinensis*	4	2	6	2	4	6	12
Troglodytidae								
Bewick's Wren	*Thryomanes bewickii*	1	25	26	9	12	21	47
House Wren	*Troglodytes aedon*	4	19	23	0	3	3	26
Marsh Wren	*Cistothorus palustris*	0	0	0	0	1	1	1
Muscicapidae								
Ruby-crowned Kinglet	*Regulus calendula*	5	45	50	6	134	140	190
Blue-gray Gnatcatcher	*Polioptila caerulea*	0	0	0	1	0	1	1
Swainson's Thrush	*Catharus ustulatus*	0	0	0	0	2	2	2
Hermit Thrush	*Catharus guttatus*	14	54	68	2	4	6	74
American Robin	*Turdus migratorius*	31	18	49	13	0	13	62
Mimidae								
Gray Catbird	*Dumetella carolinensis*	1	0	1	0	1	1	2
Northern Mockingbird	*Mimus polyglottos*	0	0	0	1	0	1	1

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Sage Thrasher	*Oreoscoptes montanus*	1	0	1	0	0	0	1
Sturnidae								
European Starling	*Sturnus vulgaris*	0	0	0	2	0	2	2
Vireonidae								
Solitary Vireo	*Vireo solitarius*	0	8	8	1	3	4	12
Warbling Vireo	*Vireo gilvus*	0	15	15	1	12	13	28
Red-eyed Vireo	*Vireo olivaceus*	0	0	0	0	1	1	1
Emberizidae								
Parulinae								
Orange-crowned Warbler	*Vermivora celata*	5	165	170	3	20	23	193
Nashville Warbler	*Vermivora ruficapilla*	0	1	1	0	0	0	1
Virginia Warbler	*Vermivora virginiae*	6	42	48	6	13	19	67
Lucy's Warbler	*Vermivora luciae*	0	0	0	4	0	4	4
Yellow Warbler	*Dendroica petechia*	9	59	67	10	20	30	97
Magnolia Warbler	*Dendroica magnolia*	1	0	1	0	0	0	1
Yellow-rumped Warbler	*Dendroica coronata*	87	405	492	5	42	47	539
Black-throated Gray Warbler	*Dendroica nigrescens*	0	1	1	0	0	0	1
Townsend's Warbler	*Dendroica townsendi*	0	3	3	0	1	1	4
Palm Warbler	*Dendroica palmarum*	1	0	1	0	0	0	1
Black-and-white Warbler	*Mniotilta varia*	0	1	1	0	0	0	1
Northern Waterthrush	*Seiurus noveboracensis*	2	8	10	0	1	1	11
Kentucky Warbler	*Oporornis formosus*	0	0	0	1	0	1	1

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Mourning Warbler	*Oporornis philadelphia*	0	0	0	1	0	1	1
MacGillivray's Warbler	*Oporornis tolmiei*	27	109	136	34	40	74	210
Common Yellowthroat	*Geothlypis trichas*	4	5	9	17	18	35	44
Wilson's Warbler	*Wilsonia pusilla*	11	473	484	23	404	427	911
Yellow-breasted Chat	*Icteria virens*	0	1	1	5	2	7	8
Thraupinae								
Summer Tanager	*Piranga rubra*	1	0	1	10	12	22	23
Western Tanager	*Piranga ludoviciana*	2	53	55	1	11	12	67
Cardinalinae								
Pyrrhuloxia	*Cardinalis sinuatus*	0	0	0	0	1	1	1
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	0	1	1	0	0	0	1
Black-headed Grosbeak	*Pheucticus melanocephalus*	32	42	74	25	12	37	111
Blue Grosbeak	*Guiraca caerulea*	5	62	67	27	27	54	121
Lazuli Bunting	*Passerina amoena*	3	95	98	0	6	6	104
Indigo Bunting	*Passerina cyanea*	0	1	1	0	1	1	2
Painted Bunting	*Passerina ciris*	0	1	1	0	0	0	1
Dickcissel	*Spiza americana*	0	1	1	0	0	0	1
Emberizinae								
Green-tailed Towhee	*Pipilo chlorurus*	1	35	36	2	9	11	47
Rufous-sided Towhee	*Pipilo erythrophthalmus*	1	17	18	20	12	32	50
Cassin's Sparrow	*Aimophila cassinii*	1	0	1	0	0	0	1
Chipping Sparrow	*Spizella passerina*	2	880	882	1	70	71	953

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Clay-colored Sparrow	*Spizella pallida*	0	43	43	0	27	27	70
Brewer's Sparrow	*Spizella breweri*	0	97	97	1	51	52	149
Vesper Sparrow	*Pooecetes gramineus*	0	137	137	2	5	7	144
Lark Sparrow	*Chondestes grammacus*	1	119	120	1	46	47	167
Lark Bunting	*Calamospiza melanocorys*	0	6	6	0	0	0	6
Savannah Sparrow	*Passerculus sandwichensis*	1	85	86	0	32	32	118
Grasshopper Sparrow	*Ammodramus savannarum*	0	3	3	0	0	0	3
Song Sparrow	*Melospiza melodia*	1	72	73	0	62	62	135
Lincoln's Sparrow	*Melospiza lincolnii*	3	78	81	0	20	20	101
White-throated Sparrow	*Zonotrichia albicollis*	1	4	5	1	0	1	6
Golden-crowned Sparrow	*Zonotrichia atricapilla*	0	1	1	0	0	0	1
White-crowned Sparrow	*Zonotrichia leucophrys*	38	253	291	73	86	159	450
Dark-eyed Junco	*Junco hyemalis*	2	184	186	5	92	97	283
Icterinae								
Red-winged Blackbird	*Agelaius phoeniceus*	66	6	72	0	0	0	72
Western Meadowlark	*Sturnella neglecta*	1	1	2	0	0	0	2
Great-tailed Grackle	*Quiscalus mexicanus*	5	0	5	0	0	0	5
Brown-headed Cowbird	*Molothrus ater*	2	0	2	7	1	8	10
Orchard Oriole	*Icterus spurius*	0	2	2	0	0	0	2
Northern Oriole	*Icterus galbula*	0	27	27	3	5	8	35
Fringillidae								
House Finch	*Carpodacus mexicanus*	0	201	201	2	0	2	203
Pine Siskin	*Caduelis pinus*	0	15	15	0	0	0	15

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME[1]	RGNC SP	RGNC FA	RGNC TOT	BNWR SP	BNWR FA	BNWR TOT	GTOT[2]
Lesser Goldfinch	*Carduelis psaltria*	0	38	38	0	0	0	38
American Goldfinch	*Carduelis tristis*	0	97	97	0	0	0	97
Total		436	4,269	4,705	421	1,383	1,804	6,509

[1]Common names and scientific names are based on the A. O. U. Check-list of North American Birds (1983).

[2]SP = spring (4 April - 15 June), FA = fall (1 August - 13 Nov), TOT = site total, and GTOT = total of two sites combined.

Received 15 August 1995

ROLAND GOODMAN 1911-1995

Roland "Rollie" Goodman died in Santa Fe on 26 September 1995. Rollie was the editor of the NMOS Field Notes for 13 years.

Before his retirement Rollie edited the *Standard and Poor's Stocks Newsletter* in New York City. During World War II he wrote for the Office of War Information. An avid stamp collector, he won the Gold Medal of the Royal Philatelic Society in London for a two volume book on the history of Guatemalan stamps.

A supporter of the International Museum of Folk Art in Santa Fe, Rollie donated a large collection

of Central American weavings and embroidery that he obtained while a reporter for the International Wire Service in Guatamala. He was also a supporter of the Santa Fe Symphony.

He will be remembered fondly for his years of dedication and attention to detail while editing the NMOS Field Notes.