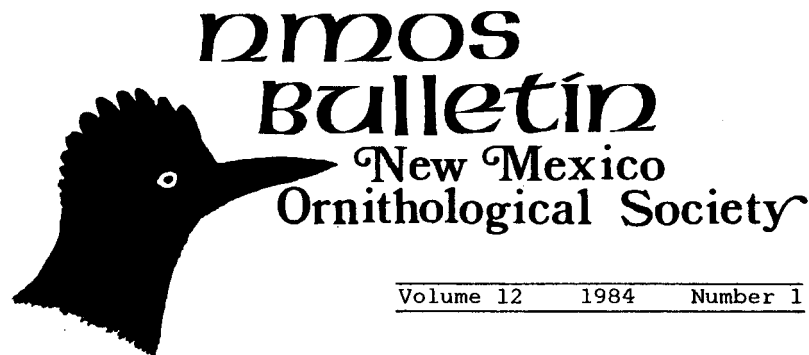


Disclaimer: This file has been scanned with an optical character recognition program, often an erroneous process. Every effort has been made to correct any material errors due to the scanning process. Some portions of the publication have been reformatted for better web presentation. Announcements and add copy have usually been omitted in the web presentation. We would appreciate that any errors other than formatting be reported to the NMOS at this web site. Any critical use of dates or numbers from individual records should be checked against the original publication before use as these are very difficult to catch in editing.



A STUDY OF POSSIBLE NICHE PREFERENCES OF CAVITY-NESTING
BIRDS IN THE COLORADO ROCKIES

Danny J. Ingold and Donald A. Ingold
Biology Department, East Texas State University
Commerce, TX 75428

INTRODUCTION

This study was initiated in order to examine the hypothesis that the availability of appropriate cavity sites may be a major limiting factor for some cavity-nesting bird species, as has been proposed for the Mountain Bluebird (*Sialia currucoides*) (Miller 1970, Barash 1976). Four objectives of the study were (1) to identify any preferences for cavity characteristics that may exist among a guild of eight species of birds, (2) to determine temporal patterns of utilization of cavities by each species, (3) to determine the extent to which intra- and interspecific competition for preferred cavities may occur, (4) to examine the extent to which the availability at appropriate times of preferred cavities may limit the reproductive success of any species in this area.

METHODS

The study was conducted at Snow Mountain Ranch--YMCA of the Rockies, from 20 May 1982 to 9 July 1982. This 1740-ha site is located approximately 130 km northwest of Denver and about 16 km south of Granby, in Grand County, Colorado. The elevation of the site is about 2600 m.

Trees along two established trails between 2500 m and 2800 m were examined

for habitable cavities. These trails passed through three forest plant communities: quaking aspen (*Populus tremuloides*), lodgepole pine (*Pinus contorta*), and aspen--lodgepole pine ecotones. Data were gathered for each cavity that was considered a potential nest site, and all cavity trees were marked, beginning on 20 May for easy relocation. Pole climbing hooks, standard measuring devices, and topographic maps were used at each cavity site to assist in obtaining the following data: forest community type, approximate canopy enclosure, elevation, condition of cavity tree (vigorous, dying, dead), diameter at breast height (DBH) of cavity tree, height of cavity tree, height of first lateral branch of cavity tree, height of cavity entrance, age of cavity (new=freshly excavated or 1 yr old; old >1 yr old), facing compass direction of cavity entrance. Measurements were made in English system units and converted to the metric system.

Cavity-trees, the majority of which were located in May, were visited regularly throughout the major portion of the nesting season (until 9 July) in order to identify cavity occupants and to determine the status of reproductive efforts. In many instances it was possible to examine the interior of the cavity. When such examination was not practical, reproductive status usually could be determined from the behavior of mated pairs (e.g., carrying nest materials, frequency of foraging trips, etc.), and in several instances the presence of nestlings was confirmed when vocalizations were first heard, sometimes in response to tapping on the tree trunk. Approximate dates for each of the following segments of the reproductive cycles were recorded: initial occupancy and nest-building, incubation, rearing nestlings, and fledging.

Analysis of Variance (ANOVA) was the statistical test used to determine if significant differences existed among the bird species for each of the niche-parameters that we measured.

RESULTS

We examined 55 cavities that we judged to be habitable. These were located in 45 trees. Although pine trees and pine forests were thoroughly inspected, 40 of these trees were quaking aspens, and only five were lodgepole pines. Three additional cavities were found in buildings (lodges) constructed of rough timber. Thirty-seven of the 55 tree cavities (67%), and all three of the lodge cavities were occupied during some stage of this study.

All species of cavity occupants except European Starlings (*Sturnus vulgaris*) showed an apparent preference for aspen communities or aspen-lodgepole ecotones (Table 1). Three of four pairs of starlings selected cavities in buildings, which was undoubtedly a reflection of their tendency to associate with human habitations rather than indicating a preference for the lodgepole pine forests in which these buildings were located. Canopy enclosure and elevation did not appear to influence cavity site selection on this study area.

Table 1. General community parameters at nest site locations for eight species of cavity nesting birds at Snow Mt. Ranch, Grand county, Colorado.

Bird Species	No. of Cavities	Floristic Community ^a	Canopy Enclosure ^b (%)	Mean Elevation ^b (m)
Northern Flicker	4	1 ASP 3 ASP-LP	31 (5-60)	2682
Yellow-bellied Sapsucker	7	3 ASP 4 ASP-LP	40 (10-70)	2685
Hairy Woodpecker	1	1 ASP-LP	10	2682
Tree Swallow	11	6 ASP 5 ASP-LP	44 (20-60)	2685
Mountain Chickadee	3	3 ASP-LP	47 (40-50)	2658
White-breasted Nuthatch	2	2 ASP-LP	55 (50-60)	2621
House Wren	8	3 ASP 5 ASP-LP	44 (20-60)	2673
European Starling	4	1 ASP 3 LP ^c	24 (5-70)	2621
Unoccupied cavities	18	2 ASP 1 LP 14 ASP-LP 1 SAM	39 (5-90)	2663

^aASP = aspen, LP = lodgepole pine, ASP-LP=aspen-lodgepole, SAM=subalpine meadow.

^bMean and range (in parentheses).

^cLodge area.

All bird species except starlings appeared to have a preference for cavity-sites in quaking aspen trees, but there was no detectable preference for living, dying, or dead trees, except for the apparent one shown by Yellow-bellied Sapsuckers (*Sphyrapicus varius*) for vigorous aspens (Table 2). Between-species comparisons (ANOVA) of possible preferences for tree size, as reflected by DBH and tree height, revealed no significant differences ($p >> .05$). Differences among species based upon the height of the lowest branch likewise were not significant, and 85% of all cavities were below the lowest branch.

Four parameters of cavity entrances were also examined (Table 3). Although mean heights of cavity entrances seemed to show that Northern Flickers (*Colaptes auratus*), Tree Swallows (*Tachycineta bicolor*), and European Starlings preferred higher cavities, these differences were not significant. The largest cavity-nesting species, the Northern Flicker, required cavity entrances with significantly larger horizontal diameters than all other species ($p << .05$). Diameter of the cavity entrance was also significantly greater ($p << .05$) for flicker nests than for unoccupied cavities. There were no other significant differences between species-pairs.

Members of the family Picidae excavated new cavities or occupied cavities that were excavated the previous year (and hence classified as "new" in Table 3). Other species required pre-existing cavities, and all cavities occupied by these five species were 2 yr old or older.

Table 2. Parameters of cavity trees at Snow Mt. Ranch, Grand County, Colorado.

Bird species	No. of Cav.	Tree Species & Cond. ^a	DBH ^b (cm)	Height of Tree ^b (m)	Height of First Branch ^b (m)
Northern Flicker	4	2 VA 1 MA 1 DA	26.7 (18.5–33.0)	12.5 (10.0–13.7)	8.4 (7.6–10.4)
Yellow-bellied Sapsucker	7	6 VA 1 DA	27.4 (20.3–38.4)	11.0 (9.8–13.7)	5.3 (2.3–9.1)
Hairy Woodpecker	1	1 VA	26.2	8.5	2.4
Tree Swallow	11	7 VA 2 MA 2 DA	29.7 (23.6–42.2)	11.8 (10.6–13.7)	6.1 (1.7–9.1)
Mountain Chickadee	3	1 VA 2 DA	21.6 (19.6–24.9)	10.5 (9.1–11.6)	5.1 (3.7–6.7)
White-breasted Nuthatch	2	1 VA 1 DA ^c	28.7 (27.4–29.7)	10.0	6.4
House Wren	8	4 VA 4 DA	26.9 (20.3–42.2)	10.4 (9.1–12.8)	6.5 (3.7–9.8)
European Starling	1	1 DA	18.5	10.0	7.8
Unoccupied cavities in aspens	13	7 VA 1 MA 5 DA	28.2 (18.3–33.5)	9.9 (7.0–13.7)	6.0 (1.8–8.5)
Unoccupied cavities in lodgepole pines	5	1 VP 4 DP	37.8 (25.7–44.7)	12.4 (9.1–19.8)	3.1 (1.5–5.5)

^aL= living. M = dying, D = dead. A = aspen, P = pine.

^b Mean and range (In parentheses).

^c The crown of this tree had broken off.

Table 3. Parameters of cavity entrances at Snow Mt. Ranch, Grand County, Colorado.

Bird Species	No. of Cav.	Height of Cav. Entrance ^a (m)	Diameter of Facing Cavity ^a (cm)	Age ^b	Directions
Northern Flicker	4	5.8 (3.4-7.0)	8.4 (7.1-9.4)	2 new 2 old	S-1, SE-1. SSW-1, E-1
Yellow-bellied Sapsucker	7	4.1 (1.8-8.8)	4.6 (4.1-5.6)	7 new	SE-2, SW-1 SSW-1, NE-1
Hairy Woodpecker	1	2.8	4.8	1 new	SSW-1
Tree Swallow	11	5.5 (2.4-8.5)	5.3 (3.8-7.1)	11 old	S-6, SW-1 E-2, ENE-1 N-1
Mountain Chickadee	3	3.2 (1.6-4.6)	4.8 (4.6-5.1)	3 old	S-2, SSE-1
White-breasted Nuthatch	2	4.8 (2.7-6.9)	5.8 (5.6-6.1)	2 old	S-1, SE-1
House Wren	8	3.4 (1.3-5.8)	4.6 (2.8-5.6)	8 old	S-1, SSW-2 E-1, N-2 NW-1, NNW-1
European Starling	4	6.4 (3.1-10.2)	5.3 (4.1-7.9)	4 old	E-1, WSW-1 W-1, NW-1
Unoccupied cavities in aspens	13	3.9 (2.4-6.7)	5.1 (3.6-7.6)	13 old	SW-5, E-2 SE-4, N-1 NW-1
Unoccupied cavities in lodgepole pines	5	4.6 (1.2-12.2)	6.1 (3.8-7.6)	5 old	S-2, SE-1 N-1, NW-1

^a mean and range (in parentheses).

^b new = freshly excavated or 1 yr old; old = >1 yr old.

For statistical analysis of orientation of cavity entrances 90-degree quadrants were assigned dummy values of 1-4. We found no significant differences among species for the facing directions of cavity entrances. When all cavity directions are considered collectively, 36 are facing some southerly direction, 14 some northerly direction, 7 directly east, and 1 directly west. When these bearings were assigned to the nearest of 16 cardinal compass directions the resulting distribution was far from uniform, i.e. the cavity orientations departed drastically from random compass directions (chi-square=63.3, p=0.005). Thus there was a collective preference, at least among the excavators of the cavities, for southerly directions and an avoidance of a westerly orientation.

As a result of a late spring (harsh weather, including snowfall, throughout May), the onset of reproductive activity may have been delayed in 1982. The

relative temporal pattern of the species, however, was probably preserved. The most striking niche differences among the eight species were associated with the timing of the onset of reproductive activities (Table 4). The earliest recorded breeding activity was in late May, when a pair of Hairy Woodpeckers (*Picoides villosus*) and a pair of European Starlings were both incubating. Incubation was first recorded for Yellow-bellied Sapsuckers during the first week of June, for Northern Flickers and Mountain Chickadees (*Parus gambeli*) during the second week, for House Wrens (*Troglodytes aedon*) during the third week, and for Tree Swallows during the fourth week. The onset of incubation was not determined for White-breasted Nuthatches (*Sitta carolinensis*), although one pair had nestlings by the first week in July, which indicates that they were also incubating during the latter part of June.

Because this study did not begin until 20 May, we obtained no data concerning the possible use of winter (shelter) cavities of permanent residents for summer nesting cavities.

Table 4. Temporal patterns of reproductive cycles^a of eight species of cavity nesting birds at Snow Mt. Ranch, Grand County, Colorado.

Bird Species	Dates					
	20-31 May	1-7 June	8-14 June	15-20 June	22-30 June	1-8 July
Northern Flicker		CAV	INC	INC	NES	NES
Yellow-bellied Sapsucker	CAV	INC		NES	NES	
Hairy Woodpecker	INC	NES				
Tree Swallow	CAV				INC	INC NES
Mountain Chickadee	CAV	CAV	INC	INC	NES	NES
White-breasted Nuthatch						NES
House Wren			CAV	INC	NES	NES
European Starling	INC	NES	NES	NES FLG		NES

^a CAV = cavity occupation, INC = incubation, NES = nestlings, FLG = fledglings.

Three pairs of Tree Swallows and one of Mountain Chickadees abandoned cavities, but these were not reoccupied by other birds. On the other hand, four trees were occupied simultaneously by two or more species. House Wrens and Tree Swallows shared one tree, House Wrens and Mountain Chickadees two others, and House Wrens, Tree Swallows, and Yellow-bellied Sapsuckers all nested in one tree. The only exception to this pattern of peaceful coexistence involved a pair of starlings and a pair of Violet-green Swallows (*Tachycineta thalassina*). These swallows, whose nest occupied a crevice in the wall of one of the cabins, were vigorously attacked by one of the

starlings. Although initially repelled, the starlings were raising young in this crevice only three weeks later.

The authors have kept summer checklists of the birds at Snow Mt. Ranch for eight of the past 11 years, including three of the past four summers. These checklists include two species of cavity nesters, Williamson's Sapsucker (*Sphyrapicus thyroideus*) and Mountain Bluebird (*Sialia currucoides*), that were not encountered during this study. Williamson's Sapsuckers are always of rare occurrence at Snow Mt. Ranch, and nesting pairs of Mountain Bluebirds, although common, occupied bird houses in the lodge area.

SUMMARY AND CONCLUSIONS

Niche differences for eight species of cavity-nesting birds were remarkably subtle. The species were minimally influenced by the various parameters that we measured for cavity trees and cavity entrances. Except for the requirement of Common Flickers for cavities with entrance sizes that are significantly larger than those for all other species, the data did not partition species with respect to preferences. Rather, there was considerable overlap of dimensions of cavities used by the eight species, and each appeared to be generally opportunistic with respect to selection of cavities.

The most pronounced differences between species had to do with temporal patterns of utilization of cavities. Although cavities were occupied on a "first-come-first-served" basis, there were no obvious advantages to early nesters with respect to gaining access to "choice" cavities. The late-nesting House Wrens and Tree Swallows apparently had numerous suitable cavities to choose from.

Apparently neither interspecific nor intraspecific competition for cavities occurred. Although four mated pairs of birds abandoned cavities, these cavities were never reoccupied. This suggests that cavities were not in short supply, and that abandonment was not the result of competition. Conversely, interspecific relations were characterized by harmony, with four trees occupied simultaneously by two or more species.

It is probable that the availability of suitable nesting cavities at appropriate times during the breeding season is not a limiting factor in this area for any of the eight species studied. This conclusion is based primarily upon the following considerations: (1) 18 cavities that were not occupied at any time during the study period did not differ significantly from the cavities used by any species except the Northern Flicker, (2) abandoned cavities were not reoccupied, and (3) no apparent interspecific nor intraspecific competition for cavities was detected. But, the apparent lack of competition reported in this study may not apply to other regions of the Rockies where these eight species coexist. The high availability of cavities at the Snow Mt. Ranch area obviously was associated with the presence of mature stands of aspens. In areas where such stands are not present, suitable nesting cavities may indeed be in short supply. Furthermore, The summer of 1982 was the first in which European Starlings appeared at Snow Mt. Ranch. It is therefore possible that interspecific relations among cavity nesting birds may become complicated in this area if an influx of the more aggressive starlings continues.

Finally, it should be noted that the results of this study concerning cavity preferences must be considered tentative for two reasons: 1) sample sizes were small, and 2) possible preferences concerning internal parameters of cavities were not studied.

ACKNOWLEDGEMENTS

The authors thank the summer teaching staff of East Texas State University at Snow Mt. Ranch for their helpful suggestions and for the use of appropriate field equipment. Special thanks go to Nona Harris for editing and typing the manuscript, and to Dr. Dennis Grantham, Math. Dept., E. T. S. U., for his assistance with statistical analyses.

LITERATURE CITED

BARASH, D. P. 1976. The male response to apparent female adultery in the Mountain Bluebird, *Sialia currucoides*: An evolutionary interpretation. Amer. Nat. 110:1097-1101.

MILLER, W. 1970. Factors influencing the status of the Eastern and Mountain Bluebirds in southwestern Manitoba. Blue Jay 28:38-46.

DIRECTORY OF NMOS MEMBERS, 1983-1984

The following people, institutions, and agencies comprise the membership of the Society, as of 1 July 1984. Some institutions have been granted complimentary memberships on a year-by-year basis. The purpose of these actions is to make the Society's journals available to a wider readership through placement in major libraries in the Southwest and around the country.

Members in good standing in 1983 who do not find their names below are in arrears; to reinstate their memberships they should remit \$7.50 for individuals, \$10.00 for families, or \$3.50 for students to membership chairman Bill Stone (address on back cover). Addresses listed without a state may be assumed to be in New Mexico (NM).

AHLBORN, Gary G., 5433 Carlton St., Oakland, CA 94618
ALLEN, Bertha, Box 5, Sandia Park 87047
AMER. MUS. NAT. HIST., 79 St/Central Pk W, New York, NY 10024
AMERICAN BIRDING ASSN., Box 4335, Austin, TX 78765
AMERICAN BIRDS, 950 Third Ave., New York, NY 10022
AMEY, Pamela, Box 35444 Sta. D, Albuquerque 87176
ANDREWS, Mr. and Mrs. Craig, 3416 Sierra Dr. NE, Albuquerque 87110
ARIZONA STATE UNIV. LIBR., ASU, Tempe, AZ 85281
ARTHUR, Mary Lou, 728 Monroe NE, Albuquerque 87110
BASHAM, Pat, Box 1646, Socorro 87801
BEDNARZ, James C., 3832 Goodrich NE, Albuquerque 87110
BIO-MED LIBRARY, Univ. Minn., Minneapolis, MN 55455
BIO-MED LIBRARY, UCLA, Los Angeles, CA 90024
BISSELL, Allyn L., 922 Bath #4, Santa Barbara, CA 93101
BIXLER, Sherry M., 2710 Highland, Roswell 88201
BLOYS, Mr. and Mrs. Warren D., 2306 Union Ave., Alamogordo 88310
BRIGHT, Robert R., Box 67, Angel Fire 87710
BROEMEL, Elizabeth, 3032 San Joaquin SE, Albuquerque 87106
CARTER, William A., Rt. 7, Box 394, Ada, OK 74820
CHANDLER, Mrs. David, Box 404, Moriarty 87035
COCHRAN, Carol, 1415 Phoenix NW, Albuquerque 87107
COLORADO FIELD ORNITHOLOGISTS, Div.ofWildl., 6060 Broadway, Denver, CO 80216
COMISKY, Stella, 8005 Hendrix 621, Albuquerque 87109
CONNER, Neppie, 102 W. Plainview, Fayetteville, AR 72701
COOK, Wesley, Box 523, Clayton 88415
CORS, Paul B., 1409 Garfield St., Laramie, WY 82070

DENVER PUBLIC LIBRARY, 1357 Broadway, Denver, CO 80203
DOLEZAL, Mr. and Mrs. Thomas R., 1712 Valencia, Las Cruces 88001
DONNELLY LIBR., N.M. Highlands Univ., Las Vegas 87701
DURRIE, Mr. and Mrs John, 614 Richmond NE, Albuquerque 87106
EDWARDS, Marcia A., Zoological Record, Regents Park, London, UK
EDWARDS, Tom, Sch. For. Resources, Univ. Florida, Gainesville, FL 32611
EGBERT, John, 465 Sycamore NE, Albuquerque 87106
EL PASO NATURAL GAS, John Sproul, Env. Affairs, El Paso, TX 79978
EPPICH, John W., 116 E. Gladden Dr., Farmington 87401
ESPINOZA, Ellen C., family, RFD 1, Box 431, Espanola 87532
FALZONE, Mr. and Mrs. John, Box 2603, Deming 88031
FINDLEY, James S., Box 44, Corrales 87048
FISHER, Ralph A., Jr., Box 1029, Silver City, 88062
FITZSIMMONS, Paul, 621 Vassar NE, Albuquerque 87106
FLINN, Mr. and Mrs. Glen, Box 613, Alamogordo 88310
FT. COLLINS AUD. SOC., Dept. Fish./Wildl., CSU, Ft. Collins, CO 80523
GENNARO, A. L., Nat. Hist. Mus., ENMU, Portales 88130
GEORGE, Luke, 313 1/2 Stanford SE, Albuquerque 87106
GOODMAN, Roland A., Rt. 9, Box 91F, Santa Fe 87501
GRAY, Charlotte, Box 4424, Santa Fe 87502
GREEN, Katherine, Box 187, Gila 88038
GRIFFING, James P., Box 322, Williams, AZ 86046
GROSSMAN, E. H., 925 W. Georgia 700, Vancouver, BC, Canada V6C 1R8
GUSTAFASON, Robert, 241 Fawn St., Golden, CO 80401
HALLETT, Mr. and Mrs. Harold, Box 396, Roswell 88201
HALVORSON, Gary, 6908 Bing Pl. NE, Albuquerque 87111
HARRIS, Mrs. E. W., Box A, Farmington 87401
HARTSHORNE, Mrs. Pierre, 812 Jornada, Las Cruces 88005
HAUFFLER, Gregory D., Box 116, Capitan 88316
HAWK, Walton, Box 40, San Cristobal 87564
HAWKINS, Les G., 7532 Bear Canyon Rd. NE, Albuquerque 87109
HAYES, Jeanne, 1601 W. Marr, Hobbs 88240
HAYWARD, Bruce J., Route 9, Box 160, Silver City 88061
HEFLEY, Mr. and Mrs. Harold, 612 Gary Dr., Roswell 88201
HILL, Randy, 1215 N. Third St., Las Cruces 88005
HOFFMAN, Stephen W., Box 1382, Albuquerque 87103
HOLEN, Herbert H., 600 W. 18th, Clovis 88101
HOWE, William H., 305 Wellesley SE, Albuquerque 87106
HUBBARD, Dr. and Mrs. John, 2016 Valle Rio, Santa Fe
HUEY, William and Mary, Box 565, Santa Fe 87504
HUNTINGTON, Mr. and Mrs. Dustin, 11 Calle Pueblo Pinado NW, Albuquerque 87120
HUNDERTMARK, Mr. and Mrs. Chuck, 6 Tumbleweed NW, Albuquerque 87120
HUSSEY, Barbara R., 3708 Gen. Chenault NE, Albuquerque 87111
INSLEY, Alice, 525 Agua Fria St., Santa Fe 87501
JACKSON, Nick M., Box 482, Junction, TX 76849
JENKS, Randolph, 2146 E. 4th St., Tucson, AZ 85719
JENKS, Robert, Dept. F.&W. Sc., NMSU Box 4901, Las Cruces 88003
JERVIS, Carlyn, 60 Barranca Rd., Los Alamos 87544
JOHNSON, Terrell H., Box 327, Los Alamos 87544
JONES, Daniel, Dept. F.&W. Sc., Box 4901, NMSU, Las Cruces 88003
JOSTE, Nancy, Dept. Biology, UNM, Albuquerque 87131
KARO, James, 1621 Cedar Ridge Dr. NE, Albuquerque 87131
KENNEDY, Patricia, LATA, Box 410, Los Alamos 87544
KREHBIEL, Adolf J., Box 40, Clayton 88415
LAMKIN, Joy, 2008 Cardenas ME, Albuquerque 87110
LANGE, David E., Hoffman Lab, 20 Oxford St., Cambridge, MA 02138
LEE, Dwight R., 4829 N. Alicia Ave., Tucson, AZ 85705
LEFKOFSKY, Mr. and Mrs. C., 8002 Morrow Rd. NE, Albuquerque 87110

LESPERANCE, H. H., 1801 N. Wagner, Farmington 87401
LEWIS, W. Burton, Box 665, Los Alamos 87544
LIBRARY, St. Johns College, Camino Cruz Blanca, Santa Fe 87501
LIBRARY, Colo. State Univ., Ft. Collins, CO 80523
LIBRARY, UNM, Albuquerque 87131
LIBRARY, Eastern N. M. Univ., Portales 88130
LIGON, J. David, Box 10, Cedar Crest 87008
LINDSAY, Bert, 2910 Utah NE, Albuquerque 87110
LOCKNER, Ruth, Star Rt. Box 300B, Tijeras 870S9
LUHRS, Ruth J., Box 551, Sandia Park 87047
MAKISHIMA, Eugene, 547 Flora Pl., Fremont, CA 94536
MARICOPA AUDUBON SOCIETY, Box 15451, Phoenix, AZ 85060
McCALL, Win. & Geraldine, 14101 Mocho Ave. NE, Albuquerque 87123
McCALLUM, D. Archibald, Biol. Dept., UNM, Albuquerque 87131
McKAY, Michael D., 3175 Arizona, Los Alamos 87544
McKERNAN, Robert, 86 N. San Mateo, Redlands, CA 92373
McKNIGHT, Mr. and Mrs. Daniel, Box 202, Glenwood 88039
McLEOD, Boyd, 4201 San Pedro NE, Albuquerque 87110
MERRILL LIBRARY, Utah State Univ., Logan, UT 84322
MILLER LIBRARY, Western N. M. Univ., Silver City 88061
MILLER, Mr. and Mrs. Julius, 3403 City St., T or C 87901
MOFFITT, Robert B., 2904 Royal Dr., Silver City 88061
MOELENRICH, Marjorie, 320 Gen. Marshall NE 4, Albuquerque 87123
MORRISON, George T., 4628 Franklin Rd SW, Los Lunas 87031
MORTON, Claribel F., Mtn. Rt. Box 115, Jemez Springs 87025
MORTON, Edward and Dorothe, Box 610, Capitan 88316
MUS. COMP. ZOOL., Harvard Univ., Cambridge, MA 02138
MUS. N. ARIZONA, Rt. 4, Box 720. Flagstaff, AZ 86011
MUS. VERT. ZOOL., Univ. California, Berkeley, CA 94720
NELSON, Alan P., 106 W. 33rd St., Farmington 87401
NEW MEXICO STATE UNIV. LIBR., Box 3475, Las Cruces 88003
NOCEDAL, Jorge, Biol. Dept., NMSU, Las Cruces 88003
NORTH AMER. BIRD BANDER, 3301 E. Linden, Tucson, AZ 85716
NORTHERN ARIZONA UNIV., Library, CU Box 6022, Flagstaff, AZ 86011
NOVEROSKE, Diane, 702 Jeffrey Pl., Los Alamos 87544
OAKS, Blanche, 101 Waneta, Clovis 88101
O'BYRNE, Mrs. Stuart L., 3305 Tom Lyons Dr., Silver City 88061
PACHE, Peter, 716 Alvarado SE, Albuquerque 87108
PETERSEN, Donald, 209 8th St., Lynden, WA 98264
PETERSON, Roger S., St. Johns College, Santa Fe 87501
PHILLIPS, Joanne J., 11033 Hwy. 85 NW, Albuquerque 87114
POWELL, Robert, 2840 Quay Loop, Holloman AFB 88330
PRICE, Mr. & Mrs. George, 503 8th St. NW, Albuquerque 87102
PRITCHARD, Judith, 3116 Cochiti Ave., Farmington 87401
RAITT, Ralph J., Dept. Biol., NMSU, Box 3AF, Las Cruces 88003
REDETZKE, Keith A., Biol. Sci., UTEP, El Paso, TX 79968
RHOADES, Terrence, St. Anthony Mission, Box 486, Zuni 87327
RICHARD, Harris M., 3701 N. Carlton Apt. 4, Farmington 87401
RICHARDSON, Mr. & Mrs. Norman W., 3212 Neptune Dr., Las Cruces 88001
RICKERT, Jon E., Birding News Survey, 122 N. Main, Elizabethtown, KY 42701
ROBBINS, C. S., Patuxent Wildlife Res. Ctr., Laurel, MD 20810
ROOT, Mary A., 1108 Columbia NE, Albuquerque 87106
ROTHROCK, James S., 2521 Kelton Ave., Los Angeles, CA 90064
RUDELL, Mr. & Mrs. J., Jr., 1875 Camino Mora, Los Alamos 87544
RUNNELS, Steve, Dallas Mus. Nat. Hist., Box 26193, Dallas, TX 75226
RUOSS, Mr. and Mrs. G. Martin, 10610 Central Ave. SE 100, Albuquerque 87123
RUSSELL, Stephen M., Dept. Ecol. Evol. Biol., Univ. Arizona, Tucson, AZ 85721
SMITHSONIAN INSTITUTION, Nat. Hist. Mus., Washington, DC 20560

SCHOLES, Dr. & Mrs. Robert, Box 117, Rodeo 88056
SCI. LIBR, UTEP, El Paso, TX 79968
SCI-ENG. LIBRARY, Univ. Arizona, Tucson, AZ 85721
SCI. LIBRARY, Univ. Colorado, Boulder, CO 80309
SEIBERT, Linda, 1001 S. Almendra, Las Cruces 88001
SHRADER, Tom, Bureau of Reclamation, Drawer P, El Paso, TX 79952
SKAGGS, Katherine E., Box 182, Glenwood 88039
SLEEPER, Jodi and Donald, Box 449, Espanola 87532
SLOWEN, Mr. & Mrs. Frank, 615 Calle de Leon, Santa Fe 87501
SNIDER, Patricia R., 90 Royal Crest, Los Alamos 87544
SNYDER, Mildred O., 161 Del Mar Circle, Aurora, CO 80011
SOIL CONSERVATION SERVICE, Box 2007, Albuquerque 87103
STEEL, Paul E., 5907 Princess Jeanne NE, Albuquerque 87110
STEIN, Patricia, 305 Potrillo, Los Alamos 87544
STEVENSON, Anita, 1 Mariposa Ct., Los Alamos 87544
STONE, Alice Jean, 1705 Mt. View, Alamogordo 88310
STONE, Dr. & Mrs. William, 9125 Copper NE Apt. 412, Albuquerque 87123
S. W. N. M. AUDUBON SOCIETY, Box 1473, Silver City 88061
SWAIN, Marjorie, Mt. Rt. Box 114, Jemez Springs 87025
TEUBER, Ross, 1612 Kentucky NE, Albuquerque 87110
TRAVIS, Dr. and Mrs. James, 9420 Avenida de la Luna NE, Albuquerque 87111
TROCHET, John, 633 46th St., Sacramento, CA 95819
TUCSON AUDUBON SOCIETY, Box 3981, Tucson, AZ 85717
TURNER, Mrs. Ellis, 308 La Plata NW, Albuquerque 87107
TYLER, Jack, Dept. Biol., Cameron Univ., Lawton, OK 73501
TYSON, John, 701 Solano SE, Albuquerque 87108
UNIVERSITY LIBRARY, Univ. of California, Berkeley, CA 94720
UNIV. UTAH MARRIOTT LIBR., Salt Lake City, UT 84112
VAN TYNE MEMORIAL LIBR., Univ. Michigan, Zool. Dept., Ann Arbor, MI 48109
WEST, Mr. & Mrs. Clarence, 10 Kachina, Los Alamos 87544
WEST, Steve, Box 308, Loving 88256
WESTERN BIRDS, Box 595, Coronado, CA 92118
WIENS, John A., Dept. Biol., UNM, Albuquerque 87131
WIGGINS, Dr. & Mrs. James W., 4409 Royene NE, Albuquerque 87110
WILLIAMS, Sartor O., III, 428 Pennsylvania Ave., Shreveport, LA 71105
WOOTEN, Thomas & Eleanor, Box 3574, Las Cruces 88003
WYNOHAM, Richard M., Box 9134, Albuquerque 87119
ZIMMER, Kevin J., 1690 Cole Village, Las Cruces 88001
ZIMMERMAN, Dr. & Mrs. Dale, 1011 W. Florence St., Silver City 88061

NEW MEXICO ORNITHOLOGICAL SOCIETY, INC.

Officers for 1984

President: Dustin Huntington, 11 Calle Pueblo Pinado NW, Albuquerque, NM 87120, 836-4109.
Vice-President: Charles A. Hundertmark, 6 Tumbleweed, Albuquerque, NM 87120, 897-2818.
Secretary: W. Burton Lewis, P. O. Box 665, Los Alamos, NM 87544.
Treasurer: Ross L. Teuber, 1612 Kentucky NE, Albuquerque, NM 87110, 265-8962.
Director (Term expires 1985): James R. Travis, 9420 Avenida de la Luna, Albuquerque, NM 87111, 821-5213.
Director (Term expires 1986): Bo West, 10 Kachina, Los Alamos, NM 87544, 988-1454.
Director (Term expires 1986): Steve West, P. O. Box 308, Loving, NM 88256, 745-3653.
Editor, Field-Notes: Roland A. Goodman, Route 3, Box 91F, Santa Fe, NM 87501,

982-5825.

Editor, Bulletin: Arch McCallum, Dept. of Biology, University of New Mexico,
Albuquerque, NM 87131, 277-2938.

Associate Editor, Bulletin: Jim Bednarz, Dept. of Biology, University of New
Mexico, Albuquerque, NM 87131, 277-3315.

Membership Chairman: William Stone, 9125 Copper NE, #412, Albuquerque, NM
87123, 296-5971.