

BREEDING BIRDS OF THE SANDIA MOUNTAINS AND THEIR ECOLOGICAL DISTRIBUTIONS

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The purpose of this study was to determine the breeding birds of the Sandia Mountains. Such a study has not previously been done. In fact, few major studies of birds have been conducted in the Sandias. Nelson (1890) was one of the first persons to record and publish data about birds in these mountains, and Bailey (1928), the first person to do a comprehensive study of New Mexican birds, mapped and recorded the presence of various species in the Sandias. Parker (1949), in his ecological study of a pinyon-juniper woodland, noted birds and their relative abundances in the Sandias. Ligon (1961) conducted a distributional study of New Mexican birds, but rarely mentioned birds in the Sandias. I studied the avifauna and other elements of the biota of this mountain range from June 1964 to March 1966, and the results are presented here.

The Sandia Mountains are in north-central New Mexico between 35° 05' and 35° 18' N latitude and between 106° 22' and 106° 30' W longitude. At its south end the mountain range is 12 miles east of the Rio Grande at Albuquerque, and, at its north end, is 6 miles east of the river.

The west face of the Sandia Mountains is steep and cliff-like, rising 3500 feet in approximately 1 mile to 10,600 feet at Sandia Crest. The east face is a gentle slope that rises 3500 feet in 4 to 5 miles (Naylor, 1964).

DESCRIPTION OF STUDY AREAS

Spruce-fir community. This is probably the most mesic of the plant communities studied and is the highest in elevation (10,000 to 10,600 feet). Immediately below the crest on the east side of the mountains, the spruce-fir community forms a dense forest. The study plot was 108.0 acres in area.

The tree stratum consists of *Abies lasiocarpa* var. *arizonica*, *Picea engelmannii*, *Populus tremuloides*, and *Pseudotsuga menziesii*. *Abies lasiocarpa* var. *arizonica* is the most abundant tree in the study plot; however, *Picea engelmannii* has the greatest foliage and basal cover. Dates visited: 12 June, 5, 10, 30 July 1964; 31 May, 15, 27 June, 2, 10, 12, 16, 26, 27 July, 8, 11, 31 August, 3, 15 September, 24 October, 27 November 1965; and 1 March 1966.

Aspen forest. Aspen stands occur from 8500 to 10,000 feet. Most of the aspen groves found at lower elevations are located in cool, moist, protected canyons. The study plot was 34.7 acres in area. Dates visited: 24 June, 9, 28 July 1964; 24 March, 31 May, 15, 23, 27 June, 10, 11, 26 July, 7, 10, 29 August, 13 September, 23 October, 4 December 1965; and 12 February, 1 March 1966.

Mixed conifer community. The dominant trees in this area are *Abies lasiocarpa* var. *arizonica*, *Abies concolor*, *Pinus ponderosa*, and *Pseudotsuga menziesii*. This forest is located at elevations between 8000 and 10,000 feet on both the east and the west slopes of the mountain. The study plot was 214.3 acres in area. Dates visited: 10, 28 June, 8, 22, 24 July 1964; 24 March, 4 April, 3, 5, 15, 18, 27 June, 9, 10, 23 July, 5, 9, 25, 26 August, 12, 15 September, 13 October, 21, 27 November, 27 December 1965; and 23 January, 12, 28 February 1966.

Ponderosa pine community. Dominants of the tree stratum are *Pinus ponderosa*, *Juniperus scopulorum*, *Quercus gambelii*, and *Pinus edulis*. On both the east and

west slopes of the Sandias, this community can be found at elevations between 7200 and 8800 feet. Two study plots were censused in this plant community: Cienega Canyon (37.4 acres) and Sulphur Springs Campground (46.5 acres). Dates of visits to Cienega Canyon: 21 July 1964; 15, 22, 27 June, 6, 10, 15, 19, 20 July, 1, 5, 7, 19, 24 August, 9 September, 6 October, 13 November, 14, 27 December 1965; and 8 January, 1 March 1966. Dates of visits to Sulphur Springs Campground: 25 June, 7 July 1964; 15 March, 28, 29 May, 15, 17, 27 June, 8, 10, 21 July, 2, 3, 22, 25 August, 10 September, 3 October, 20 November, 27 December 1965; and 9 January 1966.

Pinyon-juniper woodland. There are two dominants in the tree stratum, *Pinus edulis* and *Juniperus monosperma*. *Juniperus monosperma* is the dominant tree up to 7000 feet. *Pinus edulis* begins at about 6500 feet and increases in numbers as the elevation increases. Above 7300 feet *Pinus edulis* becomes the dominant member of the tree stratum. The woodland forms a belt completely around the Sandia Mountains between the elevations of 6200 and 7850 feet. There were three study plots in the pinyon-juniper woodland. One was along North State Route 10, encompassing 109.6 acres. Dates visited: 8, 23 June, 4, 17 July, 4 August 1964; 14, 24 March, 28 May, 1, 15, 27 June, 3, 10, 18, 19 July, 4, 18, 23 August, 8, 16 September, 9 October, 14 November, 20 December 1965; and 10 March 1966.

The second plot was Cedar Crest, a town 2 miles north of U.S. Highway 66 on North State Route 10. The study plot is a privately owned 14-acre plot frequently censused by the owner. The plot has a permanent stream which supports dense growths of *Salix* spp.

The third woodland study plot was the Juan Tabo area on the west slope of the Sandias. The dominant species of the tree stratum are *Juniperus monosperma*, *Pinus edulis*, *Quercus gambelii*, *Quercus grisea*, and *Quercus turbinella*. *Pinus edulis* and *Juniperus monosperma* are more numerous at higher elevations in the northern portion of this study plot, gradually becoming scattered at lower elevations, with an increase in *Quercus* spp. in the southern part of the plot. The study plot was 90.6 acres in area. Dates visited: 24 April, 9, 10, 11, 21 June, 5, 15, 16, 30 July, 15, 16 August, 4, 29 September, 22 October, 11, 26 December 1965; and 8 March 1966.

Oak woodland. This community is present between 6800 and 8500 feet on the Sandias. *Quercus gambelii*, the dominant species of the area, is abundant on the xeric slopes of the Sandias, and reaches 15 feet in height. The study plot is 41.9 acres in area. Because of the steepness of the slope and the density of the oak trees, it is difficult to see birds and their nests. Dates visited: 5, 20 June, 1, 16 July 1964; 1, 13 June, 14 July, 12 August 1965.

Riparian community. Las Huertas is located on the east slope of the Sandia Mountains on Highway 44 near Placitas (a town 5 miles east of junction of Highways 44 and 422). It is a relatively deep canyon with steep slopes. The vegetation of the east-facing slope of the canyon is predominantly oak, while the west-facing slope supports conifer growth. The study plot was 48.5 acres in area, and between 7300 and 7700 feet in elevation. Common trees include *Acer negundo*, *Alnus oblongifolia*, *Populus tremuloides*, and *Salix* spp. Dates visited: 2, 16, 18, 29, 30 June, 13, 15 July 1964; 2 February, 30 March, 28 April, 28 May, 1, 12, 13 June, 1, 13, 18, 29 July, 12, 13 August, 3, 7, 26 September, 28 October, 5 December 1965; and 6 March, 17 April 1966.

Chaparral community. Embudo Canyon is located on the west slope of the Sandia Mountains in Bernalillo County. Plot size was 48.8 acres, lying between 6350 and

6500 feet. Dominant vegetation includes *Rhus trilobata*, *Cercocarpus montanus*, *Quercus grisea*, *Quercus turbinella*, and *Juniperus monosperma*. Other common plants are *Chrysothamnus* spp., *Fallugia paradoxa*, *Nolina* spp., *Fendlera rupicola*, and *Opuntia* spp. Dates visited: 4 December 1964; 9, 24, 25 February, 28 March, 4, 29, 30 April, 19 May, 8, 10, 16, 28, 29 June, 12, 17 July, 3, 10, 17, 20 August, 6 September, 10 October, 7 November, 12 December 1965; and 9 March 1966.

SPECIES ACCOUNTS

A total of 154 species was recorded for the Sandia Mountains; of these, 92 species were considered to be breeding birds. In determining the status of a species in the Sandias, the carrying of food or nesting material was sometimes the only evidence that certain species were breeding. Other evidence admitted was the presence of the species through the nesting months (June, July, August). Pinyon-juniper woodland refers to the study plot on North State Route 10.

The following is a list of the breeding birds of the Sandia Mountains. With each breeding species the following information is usually given: permanent or summer resident; the plant community or communities in which the bird was reported; information about nests; and beginning and cessation of song for oscine birds. A representative sample of the breeding birds was collected and is now preserved in the Museum of Southwestern Biology, University of New Mexico.

Cathartes aura. Turkey Vulture. Summer resident. Common in mixed conifer community; uncommon in Cedar Crest, ponderosa pine, aspen, and spruce-fir forests.

Accipiter gentilis. Goshawk. Permanent resident. Uncommon in mixed conifer and ponderosa pine communities.

Accipiter striatus. Sharp-shinned Hawk. Summer resident. Uncommon to common in pinyon-juniper woodland and ponderosa pine and mixed conifer communities.

Accipiter cooperii. Cooper's Hawk. Permanent resident. Uncommon in Embudo Canyon, Juan Tabo area, Las Huertas Canyon, and from ponderosa pine community to aspen forest. Four nests: Carlito Springs (T 10N, R 5E, Section 15, elevation 6700-6800 feet), 23 March 1954, 26 May 1956; Cedar Crest, 2 May 1962; Cole Springs, 3 June 1966, female incubating eggs, 35 feet in *Pinus ponderosa*; Cedar Crest, noted calling young 10 August 1964.

Buteo jamaicensis. Red-tailed Hawk. Permanent resident. Uncommon in Juan Tabo area, pinyon-juniper woodland, and mixed conifer and aspen forests. Probably nests in the upper limits of the pinyon-juniper woodland.

Aquila chrysaetos. Golden Eagle. Permanent resident. Seen in Embudo Canyon, 7 December 1964, 24 February, 4 April 1965, and in Las Huertas Canyon, 29 July-26 September 1965; but uncommon in these areas. Probably nests among the rock escarpments near the crest rim.

Falco sparverius. Sparrow Hawk. Summer resident. Uncommon in Embudo Canyon, Juan Tabo area, and pinyon-juniper woodland. Bailey (1928) states it breeds between 5000 and 7000 feet; probably nests in Sandias in lower limits of pinyon-juniper woodland.

Callipepla squamata. Scaled Quail. Permanent resident. Common in Embudo Canyon and Juan Tabo area. Probably nests in lower limits of the pinyon-juniper woodland.

Meleagris gallopavo. Turkey. Permanent resident. One record, spruce-fir community, 10 July 1964.

Columba fasciata. Band-tailed Pigeon. Summer resident. Abundant in mixed conifer community; common from ponderosa pine community to spruce-fir community; uncommon in Las Huertas Canyon and Cedar Crest. One nest, spruce-fir community, 27 July 1965, in *Abies lasiocarpa* var. *arizonica*; nest 40 to 45 feet above ground. Dense growth of aspen and conifers near nest tree.

Zenaidura macroura. Mourning Dove. Summer resident. Common in Embudo Canyon, pinyon-juniper woodland, Juan Tabo area, and ponderosa pine community; uncommon in Las

Huertas Canyon, Cedar Crest, and mixed conifer community. One nest, pinyon-juniper woodland, 15 June 1965; nest 7 feet above ground in *Pinus edulis*; eggs present. *Pinus edulis* and *Juniperus* sp. near nest tree.

Geococcyx californianus. Roadrunner. Summer resident. Seen in Embudo Canyon, 10 October 1965, and in Juan Tabo area 17 July, 29 September 1965; but uncommon in these areas. Probably nests in rocky canyons on the west side of Sandias.

Bubo virginianus. Great Horned Owl. Permanent resident. Common in Embudo Canyon and Juan Tabo area. One nest, Embudo Canyon, 28 March 1965. Nest with two eggs in depression under large overhanging boulder, 30 feet above canyon floor. Eggs hatched 15 April. *Quercus grisea*, *Nolina* sp., and boulders near nest.

Glaucidium gnoma. Pigmy Owl. Summer resident. Reported in Cedar Crest, 20 October 1964 (MSB 2708), in Las Huertas Canyon, 1 June 1965, and in spruce-fir community, 1 June-26 July 1965; but uncommon in these areas. Probably nests in spruce-fir community in Sandias.

Phalaenoptilus nuttallii. Poor-will. Summer resident. Common in Embudo Canyon, Juan Tabo area, Las Huertas Canyon, ponderosa pine and mixed conifer communities; uncommon in Cedar Crest and pinyon-juniper woodland. One nest, Embudo Canyon, 27 May 1956, with two eggs.

Chordeiles minor. Common Nighthawk. Summer resident. Seen in Cedar Crest, 27 July 1958, 9 August 1962, and in Las Huertas Canyon, 13 June, 1 July 1965; but uncommon in these areas. Breeds on Mt. Taylor at 8000 feet (Bailey, 1928), and probably breeds in Sandias.

Aeronautes saxatalis. White-throated Swift. Summer resident. Common in spruce-fir community; uncommon in Embudo Canyon, aspen forest, pinyon-juniper woodland, and ponderosa pine community. Steep escarpments adjacent to the crest rim are adequate nesting areas.

Archilochus alexandri. Black-chinned Hummingbird. Summer resident. Seen in Embudo Canyon, 29 June 1965, and in Cedar Crest, 10 May, 25 July 1959; but uncommon in these areas. Each year from 1961 to 1965 one seen in late April. Usually at elevations of 5000-7000 feet (Bailey, 1928). Probably nests in pinyon-juniper belt of Sandias.

Selasphorus platyceris. Broad-tailed Hummingbird. Summer resident. Common in all study areas, except in Embudo Canyon, Juan Tabo area, and Cedar Crest where it is uncommon. Adults noted carrying nesting material, Las Huertas Canyon, 28 May 1965, spruce-fir community, 2 July 1965. Two nests: spruce-fir community, 12 June 1964, nest under construction 10 feet above ground in conifer near road in dense conifer growth; ponderosa pine community, 17 June 1965, nest under construction 4 feet above ground in *Acer negundo* bordered by road and conifers.

Colaptes cafer. Red-shafted Flicker. Permanent resident. Abundant in Las Huertas Canyon; common in all other study areas. Adults noted carrying food, ponderosa pine community, 17 June 1965; feeding young out of nest, mixed conifer community, 23 July 1965. Four nests, two in Las Huertas Canyon, two in spruce-fir community. Nest heights above ground varied between 6 and 35 feet; all located in aspen trees. All nest trees in small open areas in dense tree growth.

Sphyrapicus varius. Yellow-bellied Sapsucker. Summer resident. Common in Las Huertas Canyon, Cedar Crest, ponderosa pine and mixed conifer communities; uncommon in aspen forest. Ten nests: four in Las Huertas Canyon, four in mixed conifer community, one in spruce-fir community, and one in ponderosa pine community. Nest dates, 10 June-29 July. Nests usually in aspen trees; heights varied from 10 to 45 feet above ground; young noted in each nest. Usually nest trees within dense stand of trees.

Sphyrapicus thyroideus. Williamson's Sapsucker. Summer resident. Uncommon in mixed conifer community; rare in Cedar Crest and spruce-fir community. Adult carrying food, mixed conifer community, 9 July 1965. One nest, mixed conifer community, 10 June 1964, 15 feet above ground in aspen. Aspen and conifers near nest tree.

Dendrocopos villosus. Hairy Woodpecker. Permanent resident. Common in Las Huertas Canyon and from ponderosa pine community to spruce-fir community; uncommon in pinyon-juniper woodland and Cedar Crest. Adult carrying food, pinyon-juniper woodland, 23 June 1964. Five nests between 12 June and 27 June 1965, in Las Huertas Canyon and ponderosa pine, aspen, spruce-fir forests. Nest heights varied from 15 to 30 feet, always in aspen tree; dense vegetation near each nest tree.

Dendrocopos pubescens. Downy Woodpecker. Permanent resident. Uncommon from mixed conifer to spruce-fir community, Cedar Crest, and Embudito Canyon. Aspen forest, 9 July 1964, one nest with young 35 to 40 feet above ground in aspen tree; dense grove of aspen near nest tree. Adult feeding one young out of nest, mixed conifer community, 23 July 1965.

Dendrocopos scalaris. Ladder-backed Woodpecker. Permanent resident. Uncommon in Cedar Crest; common in Embudo Canyon and Juan Tabo area. Probably nests in Juan Tabo area and Embudo Canyon.

Picoides tridactylus. Northern Three-toed Woodpecker. Summer resident. Uncommon in aspen and spruce-fir forests. Sight records, 12, 27 July, 10, 11, 31 August 1965. Probably breeds in spruce-fir community in Sandias. An immature male was collected 12 July 1965.

Tyrannus vociferans. Cassin's Kingbird. Summer resident. Common in pinyon-juniper woodland; uncommon in Cedar Crest. Adult observed feeding young out of nest, pinyon-juniper woodland, 18 July 1965. Three nests, pinyon-juniper woodland, 4, 23 July 1964, 3 July 1965; usually in *Juniperus monosperma*, once in a cottonwood (*Populus* sp.), from 6 to 10 feet above ground; scattered *Juniperus* sp. and *Pinus edulis* always near nest.

Myiarchus cinerascens. Ash-throated Flycatcher. Summer resident. Common in Juan Tabo area and pinyon-juniper woodland; uncommon in Cedar Crest, Embudo Canyon, and ponderosa pine community. Probably nests in the pinyon-juniper belt around the Sandias.

Sayornis saya. Say's Phoebe. Summer resident. Common in mixed conifer community and Cedar Crest; uncommon in Juan Tabo area, pinyon-juniper woodland, and spruce-fir community. Five nests: Cedar Crest, 10 May 1960; 30 April 1961; 23 July 1963; 20 May 1965, nest under eave of a private home, 7.5 feet above ground, young present; 15 June 1965, second brood.

Empidonax hammondi. Hammond's Flycatcher. Summer resident. Uncommon in Las Huertas Canyon and mixed conifer community. Two nests, mixed conifer community, 18 June 1965. Nest 4 feet above ground in *Abies concolor* and 20 feet above ground in *Pseudotsuga menziesii*.

Empidonax difficilis. Western Flycatcher. Summer resident. Common in all study areas, except Embudo Canyon and pinyon-juniper woodland where it is uncommon. Fifteen nests, 28 May-19 July 1964 and 1965; nest heights varied from 1.5 to 6 feet above ground.

Contopus sordidulus. Western Wood Pewee. Summer resident. Common in Cedar Crest and ponderosa pine, mixed conifer communities; uncommon in pinyon-juniper and oak woodlands, aspen forest, and spruce-fir community. Adult noted with food, mixed conifer community, 8 July 1964. Four nests: Cedar Crest, 4 June 1960, 30 May 1964; mixed conifer community, 10 June 1964; ponderosa pine community, 22 June 1965. Nest heights varied from 10 to 25 feet above ground in *Abies concolor* and ponderosa pine. Nest trees usually in open areas.

Nuttallornis borealis. Olive-sided Flycatcher. Summer resident. Common in mixed conifer community; uncommon in Las Huertas Canyon, aspen and spruce-fir forests. One nest, mixed conifer community, 8 July 1964, under construction 20 feet above ground in *Abies concolor*. Young aspen and conifers near nest tree.

Eremophila alpestris. Horned Lark. Summer resident. Common at the entrances of Embudo and Embudito canyons. One nest, Embudo Canyon, 24 April 1965, on ground with eggs. *Bouteloua* sp. and *Opuntia* sp. near nest.

Tachycineta thalassina. Violet-green Swallow. Summer resident. Common in ponderosa pine, mixed conifer, and aspen forests; uncommon in all other study areas. Six nests: mixed conifer community, 10, 24, 28 June 1964; 19 June 1965; aspen forest, 23 June 1965; ponderosa pine community, June 1965. Nests from 15 to 45 feet above ground in aspen trees. Nest tree usually in open area.

Cyanocitta stelleri. Steller's Jay. Permanent resident. Abundant in Las Huertas Canyon; common in all study areas, except Juan Tabo area, Embudo Canyon, and pinyon-juniper woodland where it is uncommon. Adult with nesting material, ponderosa pine community, 22 June 1965, and Cedar Crest, 23 March 1966. Adult feeding young out of nest, Las Huertas Canyon, 29 July 1965. Two nests, Cedar Crest, 20 April 1958, 29 April 1959.

Aphelocoma coerulescens. Scrub Jay. Permanent resident. Common in pinyon-juniper woodland, Embudo Canyon, Cedar Crest; uncommon in ponderosa pine community. Adult noted carrying

food, Juan Tabo area, 16 August. Four nests: Cedar Crest, 13 May 1961, 11 May 1962, 19 April 1964, 19 April 1965. Nests 7 feet above ground in *Juniperus monosperma* in open area.

Corvus corax. Common Raven. Permanent resident. Common in spruce-fir community; uncommon in mixed conifer and aspen forests, Embudo Canyon, and Juan Tabo area. Probably breeds among rock faces below crest rim.

Corvus brachyrhynchos. Common Crow. Permanent resident. Common in ponderosa pine community; uncommon in Las Huertas Canyon, pinyon-juniper woodland, aspen and spruce-fir forests. One nest, ponderosa pine community, 25 June 1964, about 35 to 40 feet above ground in young *Pinus ponderosa*. *Abies concolor*, *Quercus* sp., *Pinus ponderosa* near nest tree. Ponderosa pine community, 25 June 1964, noted one young just able to fly.

Gymnorhinus cyanocephalus. Pinyon Jay. Permanent resident. Common in pinyon-juniper woodland; uncommon in Cedar Crest and Juan Tabo area. Probably nests in the pinyon-juniper belt around the Sandias.

Nucifraga columbiana. Clark's Nutcracker. Permanent resident. Uncommon in Sandias. Reported in aspen forest, 24 June 1964; in Juan Tabo area, 4 September 1965; and in spruce-fir community, 27 December 1965, 17 April 1966. One nest, spruce-fir community, 17 April 1966, 15 feet above ground in *Pseudotsuga menziesii*, two young.

Parus gambeli. Mountain Chickadee. Permanent resident. Common in Cedar Crest and from ponderosa pine community to spruce-fir community; uncommon in all other study areas. Adult noted carrying food, La Cienega Canyon, 5 August 1965. Six nests: Las Huertas Canyon, 16 June 1964, 12 June 1965 (2); mixed conifer community, 28 June 1964, 5 June 1965; aspen forest, 24 June 1964. Nests from 15 to 25 feet above ground, one nest 2 feet above ground; found in *Acer negundo*, *Quercus gambelii*, and conifers; usually found in or near open areas. Singing noted all year.

Parus inornatus. Plain Titmouse. Permanent resident. Abundant in pinyon-juniper woodland, Cedar Crest, and Juan Tabo area; uncommon in Embudo and Las Huertas canyons and ponderosa pine community. Adult noted carrying food, 4, 17 July 1964, pinyon-juniper woodland. Nine nests: 19 April, 28 May 1961; 18 April 1962; 26 March, 22 April 1963; 26 May, 23 June 1964; 19 May, 1 June 1965. Nests varied from 3 to 20 feet above ground, usually in *Juniperus monosperma*, but also in other trees and in pipe tubing. Singing noted all year.

Psaltriparus minimus. Common Bushtit. Permanent resident. Common in pinyon-juniper woodland and Juan Tabo area; uncommon in Embudo Canyon and Cedar Crest. Adults noted carrying nesting material, pinyon-juniper woodland, 1 June 1965, 21 April 1966. One nest, Cedar Crest, 21 April 1957. Noted one young, just able to fly, fed by adults, 17 July 1965. Pinyon-juniper woodland, 17 July 1965, one Black-eared Bushtit (= *P. melanotis*) collected; another seen 8 September 1965. The allocation of this form to *P. minimus* follows the practice of Phillips *et al.* (1964). Singing noted all year.

Sitta carolinensis. White-breasted Nuthatch. Permanent resident. Common in Las Huertas Canyon and from ponderosa pine community to spruce-fir community; uncommon in oak and pinyon-juniper woodlands. Four nests: Las Huertas Canyon, 2, 16, 30 June 1965; mixed conifer community, 28 June 1965. Nests varied in heights above ground from 20 to 35 feet in *Acer negundo* or conifer; young present in all nests; all nest trees in open areas. Singing noted all year.

Sitta canadensis. Red-breasted Nuthatch. Permanent resident. Common from ponderosa pine community to spruce-fir community; uncommon in pinyon-juniper woodland, Las Huertas Canyon, and Cedar Crest. One nest hole, aspen forest, 23 June 1965, 25 feet above ground in aspen; dense growth of conifers around nest tree. Observed two adults hew a nest hole in the aspen; the birds never nested in this hole. Bent (1948) states that these birds will excavate a few holes before nesting in one. In same area, 26 July 1965, a young was collected that had a pink gape and few well-developed feather tracts. Singing noted all year.

Sitta pygmaea. Pygmy Nuthatch. Permanent resident. Common in ponderosa pine and mixed conifer communities; uncommon in Las Huertas Canyon and aspen forest. Two nests: mixed conifer community, 8 July 1964, 30 feet above ground in dead aspen in open area, young present; ponderosa pine community, 25 July 1964, 25 feet above ground in dead *Pinus ponderosa*. Singing noted all year.

Certhia familiaris. Brown Creeper. Permanent resident. Common in ponderosa pine community to spruce-fir community; rare at Cedar Crest. One nest, aspen forest, 24 June 1964, 35 feet above ground in *Abies lasiocarpa* var. *arizonica*; young present. Fallen logs and dense conifer growth near nest tree. Noted an adult feeding young, aspen forest, 26 July 1965. Singing noted all year.

Troglodytes aedon. House Wren. Summer resident. Common in all study areas, except Cedar Crest, pinyon-juniper and oak woodlands. Thirteen nests: eight in mixed conifer community, 10 June-18 June 1964-1965; two in aspen forest, 24 June 1965; two in Las Huertas Canyon, 18-20 June 1965; one in spruce-fir community, 31 May 1965. Nest heights varied from 10 to 50 feet, usually in aspen trees. Singing noted 28 April-27 July.

Catherpes mexicanus. Canyon Wren. Permanent resident. Common in Juan Tabo, Embudo Canyon, Embudo Canyon; uncommon in Las Huertas Canyon. Nests in rocky canyons on west side of Sandias. Singing noted all year.

Salpinctes obsoletus. Rock Wren. Permanent resident. Common in Embudo Canyon and pinyon-juniper woodland; uncommon in oak woodland and Juan Tabo area. Pinyon-juniper woodland, 17 July 1964, and Embudo Canyon, 28 June 1965, observed adults feeding young out of nest; also at Sandia Crest young observed being fed. One nest, pinyon-juniper woodland, 17 July 1964, young present, tunnel nest in ground. *Pinus edulis* and *Juniperus* sp. near nest. Singing noted 30 May-30 July.

Mimus polyglottos. Mockingbird. Summer resident. Common in Juan Tabo area and Embudo Canyon; uncommon in pinyon-juniper woodland and Cedar Crest. Four nests: Cedar Crest, 4 June 1961; pinyon-juniper woodland, 17 July 1964; Embudo Canyon, 10 June 1965; Juan Tabo area, 11 June 1965. Nest heights varied from 3.5 to 7 feet above ground; 2 to 4 young per nest. Nest usually in low *Quercus* sp., once in *Pinus edulis*. Nest trees and shrubs usually near open areas. Adults noted feeding young out of nest, Juan Tabo area, 30 July, 16 August 1965. Singing noted 19 April-16 August. One record of a wintering bird in Cedar Crest, 1965-1966.

Toxostoma dorsale. Crissal Thrasher. Permanent resident. Common in Embudo Canyon; uncommon in Juan Tabo area. One nest, Embudo Canyon, 19 May 1965; nest 2 feet above ground in *Cercocarpus montanus*; two eggs and one downy young. Boulders, *Nolina* sp., and *Cercocarpus* sp. near nest. Singing noted all year.

Turdus migratorius. Robin. Permanent resident. Common in all study areas, except Embudo Canyon, oak woodland, and spruce-fir community where it is uncommon. Adult carrying food: Las Huertas Canyon, 12, 30 June, 4 July 1965; ponderosa pine community, 16 July 1965. Five nests: Cedar Crest, 2 June 1957, 6 May 1961; oak woodland, 15 June 1964, June 1965; Las Huertas Canyon, 18 June 1964, nest 6 feet above ground in *Acer negundo* near a road, young present. Singing noted 28 April-6 October.

Hylocichla guttata. Hermit Thrush. Summer resident. Common in Las Huertas Canyon, Cedar Crest, and from ponderosa pine community to spruce-fir community; uncommon in pinyon-juniper woodland. Adults carrying nesting material and food, aspen forest, 2, 24, 28 June 1964; Las Huertas Canyon, 13, 15 July 1964; spruce-fir community, 27 June 1965; ponderosa pine community, 8 July, 7 August 1965. Three young noted barely able to fly, Las Huertas Canyon, 15 July 1964. Singing noted 28 May-7 August.

Sialia mexicana. Western Bluebird. Permanent resident. Common in pinyon-juniper woodland, Cedar Crest, Juan Tabo area, and Las Huertas Canyon; uncommon in Embudo Canyon and from ponderosa pine community to spruce-fir community. One nest, Cedar Crest, 23 April (first brood, five young), 24 June (second brood, five young), 1963; nest 4 feet above ground in birdhouse. Singing noted all year.

Sialia currucoides. Mountain Bluebird. Permanent resident. Common in Cedar Crest and pinyon-juniper woodland; uncommon in Juan Tabo area. Nest records: Cedar Crest, 4 May 1958; 14 April, 15 June 1961; 20 May (first brood), 15 June (second brood) 1965, in birdhouse 4 feet above ground. Singing noted all year.

Myadestes townsendi. Townsend's Solitaire. Permanent resident. Common in Las Huertas Canyon, pinyon-juniper woodland, and ponderosa pine community; uncommon in Embudo Canyon, mixed conifer and spruce-fir communities. Reported two spotted young, able to fly, with two

adult birds, 12 July 1965, spruce-fir community. Cedar Crest, 2 August 1959, one spotty young. Singing noted all year.

Poliioptila caerulea. Blue-gray Gnatcatcher. Summer resident. Common in Embudo Canyon, Juan Tabo area, and pinyon-juniper woodland; uncommon in Cedar Crest and Las Huertas Canyon. Four nests: Embudo Canyon, June 1963, 10, 29 June 1965; Juan Tabo area, 11 June 1965; nest heights above ground varied from 4.5 to 6 feet in *Quercus grisea* and *Cercocarpus* sp.; *Juniperus* sp., *Opuntia* sp., and *Nolina* sp. near nest. Singing noted 24 April-16 September.

Regulus calendula. Ruby-crowned Kinglet. Permanent resident. Common in Cedar Crest, and from ponderosa pine community to spruce-fir community; uncommon in Embudo Canyon, Las Huertas Canyon, and Juan Tabo area. Adult noted feeding young out of nest, mixed conifer community, 11, 23 July 1965. One nest, aspen forest, 24 June 1964, about 30 feet above ground in conifer. Nest tree in small open area, bordered by conifers. Singing noted 31 May-13 October.

Lanius ludovicianus. Loggerhead Shrike. Summer resident. Uncommon in Embudo Canyon, Juan Tabo area, and pinyon-juniper woodland. Probably nests in isolated junipers on alluvial fan on west side of Sandias. Singing noted 7 November 1965.

Sturnus vulgaris. Starling. Permanent resident. Probably nests around human habitations in Cedar Crest. There has been a recent movement of these birds into the Sandias; a few years ago none were reported. No nest census was made for this species.

Vireo solitarius. Solitary Vireo. Summer resident. Common in all study areas, except Embudo Canyon, Juan Tabo area, and pinyon-juniper woodland where it is uncommon. Five nests: one in Cedar Crest, June 1964; one in mixed conifer community, 18 June 1965; one in ponderosa pine community, June 1965. Nest heights varied from 4 to 13 feet above ground; variety of nest trees used, usually in open areas. Singing noted 28 April-26 September.

Vireo gilvus. Warbling Vireo. Summer resident. Common in Las Huertas Canyon, oak woodland, and from ponderosa pine community to aspen forest; uncommon in Cedar Crest and spruce-fir community. Nine nests: six in Las Huertas Canyon, 28 May-30 June 1964-1965; one in oak woodland, 20 June 1964; one in ponderosa pine community, 22 June 1965; one in aspen forest, 26 July 1965. Nest heights varied from 6 to 50 feet above ground, usually near an open area in *Acer negundo* or aspen tree. Singing noted 28 April-26 July.

Vermivora celata. Orange-crowned Warbler. Summer resident. Common at Capulin Springs, Cedar Crest, and mixed conifer community; uncommon in Juan Tabo area, Embudo and Las Huertas canyons. Reported 17, 25 April, 23 July, 30 September 1965. Probably nests in the mixed conifer community of the Sandias.

Vermivora virginiae. Virginia's Warbler. Summer resident. Common in all study areas, except pinyon-juniper woodland, aspen and spruce-fir forests. Adults carrying food, 18-29 June, Las Huertas Canyon. Adults feeding young out of nest, ponderosa pine community, 6 July 1965; pinyon-juniper woodland, 18, 19, 21 July 1965; mixed conifer community, 23 July 1965. Two nests: Cedar Crest, 6 June 1964; oak woodland, 20 June 1964, nest with four young on ground under grass and *Quercus* sp. leaves. Dense growth of *Quercus gambelii* surrounding the nest. Singing noted 5 June-8 July.

Dendroica auduboni. Audubon's Warbler. Summer resident. Common in Cedar Crest, Las Huertas Canyon, and from ponderosa pine community to spruce-fir community; uncommon in pinyon-juniper community. Adults noted with food, mixed conifer community, 8 July; aspen forest, 9, 26 July; spruce-fir community, 2 July. Six nests: 12, 24 June, 7 July 1964; 18, 23, 27 June 1965. Nest heights varied from 15 to 45 feet above ground, usually in conifers. Nest tree commonly near open area. Singing noted 28 May-12 July.

Dendroica nigrescens. Black-throated Gray Warbler. Summer resident. Reported in pinyon-juniper woodland, Cedar Crest, and ponderosa pine community in April, July, August, and September 1964-1965; but uncommon in these areas. Probably breeds in pinyon-juniper belt around Sandias. Singing noted 4 July.

Dendroica graciae. Grace's Warbler. Summer resident. Common in ponderosa pine and mixed conifer communities; uncommon in Cedar Crest. Adult carrying food, ponderosa pine community, 22, 25 June 1964. Singing noted 29 May-24 August.

Oporornis tolmiei. MacGillivray's Warbler. Summer resident. Common in Las Huertas Can-

yon, oak woodland, Cedar Crest, and mixed conifer community; uncommon in Juan Tabo area, Embudo Canyon, and ponderosa pine community. Adults noted carrying food, Las Huertas Canyon, 18 June 1964, 2 feet above ground in *Ribes* sp. Dense *Ribes* sp. and *Parthenocissus* sp. surrounded the nest. Singing noted 19 May–1 July.

Icteria virens. Yellow-breasted Chat. Summer resident. Uncommon in Cedar Crest and in Las Huertas Canyon. One nest, Cedar Crest, 21 July 1963, in dense willow (*Salix* sp.) thicket.

Passer domesticus. House Sparrow. Permanent resident. Nests commonly around human habitations below 6800 feet. No nest census was made for this species.

Sturnella neglecta. Western Meadowlark. Permanent resident. Noted in Cedar Crest, 2 March 1965, Embudo Canyon, 19 May 1965, and Embudito Canyon, 30 May 1965; but uncommon in these areas. Nests in Sandias, probably on alluvial fan on west side. Singing noted on above dates.

Icterus parisorum. Scott's Oriole. Summer resident. Uncommon in Embudo Canyon and Juan Tabo area; rare in Cedar Crest. One nest, Juan Tabo area, 11 June 1965, in *Juniperus monosperma*, about 10 feet above ground; young present. *Pinus edulis*, *Bouteloua* sp., *Opuntia* sp. near nest tree. In same area noted an adult feeding three young out of nest, 30 July 1965. Singing noted 10 June–30 July.

Molothrus ater. Brown-headed Cowbird. Summer resident. Common in pinyon-juniper woodland, Juan Tabo area, and ponderosa pine community; uncommon in Embudo Canyon, Las Huertas Canyon, and Cedar Crest. Cedar Crest, 7 July 1963, a Western Wood Pewee feeding young Cowbird; Embudo Canyon, 3 August 1965, a Blue-gray Gnatcatcher feeding young Cowbird. Singing noted 1 June–3 August.

Piranga ludoviciana. Western Tanager. Summer resident. Common in all study areas, except Embudo Canyon and spruce-fir community where it is uncommon; not recorded in Juan Tabo area. Fourteen nests: Las Huertas Canyon, oak and pinyon-juniper woodlands, ponderosa pine and mixed conifer communities, and aspen forest, from 1 June to 1 July; heights above ground from 8 to 15 feet; mostly in *Abies concolor*; nest tree usually in open area. Singing noted 28 May–26 July.

Phœticus melanocephalus. Black-headed Grosbeak. Summer resident. Common in all study areas, except Embudo Canyon where it is uncommon. Adults carrying nesting material, Las Huertas Canyon, 29, 30 June 1964. Adults feeding young: Las Huertas Canyon, 13 July 1964, 30 July, 5 August 1965; ponderosa pine community, 21 July 1964, 19, 21 July 1965; spruce-fir community, 12, 25, 27 July 1965. Five nests: Cedar Crest, 15 June 1959, 28 May 1961, 23 May 1963, 6 June 1965; Juan Tabo area, 11 June 1965, nest 15 feet above ground in *Quercus grisea*, eggs present; *Juniperus monosperma*, *Yucca* sp., *Artemisia* sp., and *Opuntia* sp. near nest tree in Juan Tabo area. Singing noted 19 May–9 August.

Guiraca caerulea. Blue Grosbeak. Summer resident. Uncommon in Cedar Crest and ponderosa pine community. Adult carrying nesting material, Cedar Crest, 2 June 1960. Adult feeding two young out of nest, La Cienega Canyon, 9 September 1965. Singing noted 19 July.

Passerina cyanea. Indigo Bunting. Summer resident. Cedar Crest sight records: 24 May, 13 October 1963, 16 May, 8, 9 July 1964, 11, 17 July 1965. Probably breeds in Sandias near Cedar Crest. Singing noted 11, 17 July.

Passerina amoena. Lazuli Bunting. Summer resident. Cedar Crest sight records: 27 July 1960, 3 May 1962, 4 May 1964, 22 April 1965. One nest, Cedar Crest, 27 July 1960, three young.

Carpodacus mexicanus. House Finch. Permanent resident. Common in Juan Tabo area, Embudo Canyon, and pinyon-juniper woodland. Three nests: Cedar Crest, 28 May 1959; Tijeras Canyon, 14 May 1965; Cedar Crest, 15 June 1965. Commonly nests in eaves of houses, in billboards, and in trees close to human habitations. Juan Tabo area, 10 July 1965, noted an adult feeding three young out of nest. Singing noted 14 May–10 October.

Spinus pinus. Pine Siskin. Permanent resident. Common in all study areas, except Embudo Canyon, Capulin Springs, and oak woodland where it is uncommon. Two nests: spruce-fir community, 5 July 1964, nest 40 feet above ground in *Abies lasiocarpa* var. *arizonica*, dense growth of conifers near nest tree; mixed conifer community, 28 June 1964, nest about 45 feet above ground in conifer in open area. Singing noted all year.

Spinus psaltria. Lesser Goldfinch. Summer resident. Common in Cedar Crest and ponderosa

pine community; uncommon in Embudo Canyon and pinyon-juniper woodland. Probably nests in Sandias in ponderosa pine community. Copulating birds noted, ponderosa pine community, 22 June 1965. Singing noted all year.

Loxia curvirostra. Red Crossbill. Permanent resident. Common from mixed conifer community to spruce-fir community; uncommon in ponderosa pine community. Probably nests in Sandias above 7500 feet. Phillips *et al.* (1964) noted that nesting may occur in winter, early spring, and late summer. Singing noted all year.

Chlorura chlorura. Green-tailed Towhee. Summer resident. Common in Cedar Crest and mixed conifer, aspen, spruce-fir forests; uncommon in Embudo Canyon, Las Huertas Canyon, oak woodland, and ponderosa pine community. Two nests: spruce-fir community, 5 July 1964, in low bush, 40 feet below crest rim (west side), and 27 June 1965, 0.5 feet above ground in low bush, three young. Both nests in open areas. Singing noted 31 May-27 July.

Pipilo erythrophthalmus. Rufous-sided Towhee. Permanent resident. Common in all study areas, except aspen and spruce-fir forests where it is absent. Adult feeding young out of nest, Las Huertas Canyon, 30 June 1964, 1, 13, 14 July 1965. One nest, La Cienega Canyon, 17 June 1965, 1 foot above ground in old stump, with three eggs. *Quercus* sp., *Juniperus* sp., *Acer negundo*, conifers near nest. Singing noted 24 April-5 August.

Pipilo fuscus. Brown Towhee. Permanent resident. Common in Embudo Canyon, Juan Tabo area, Cedar Crest, and pinyon-juniper woodland. Adults carrying food: Embudo Canyon, 10 June 1965; Juan Tabo area, 12 June 1965. Singing noted 17 July-4 August.

Aimophila ruficeps. Rufous-crowned Sparrow. Permanent resident. Uncommon in Embudo Canyon and Embudito Canyon (2.5 miles north of Embudo Canyon). One nest, Embudo Canyon, 6 September 1965. Nest with three downy young on ground. Boulders, *Nolina* sp., and *Bouteloua* sp. near nest. Singing noted 29 April and 3 August.

Amphispiza bilineata. Black-throated Sparrow. Summer resident. Common in Juan Tabo area and Embudo Canyon; uncommon at Cedar Crest. Adults noted carrying nesting material and food, Juan Tabo, Embudo Canyon, between 19 May and 16 August. Two nests, Juan Tabo area, 11 June 1965. Nest with two fledged young, 1.5 feet above ground in *Brickellia* sp.; another nest under construction about 2 feet above ground in *Opuntia* sp. Both nests in open areas with *Pinus edulis*, *Juniperus monosperma*, and *Chrysothamnus* sp. Singing noted 29 April-20 August.

Junco caniceps. Gray-headed Junco. Permanent resident. Common in all study areas, except oak woodland where it is absent. Greatest numbers in mixed conifer community. Adults noted with food and nesting material, Las Huertas Canyon, 25, 29 June 1964; mixed conifer community, 1, 8 July 1964; aspen forest, 10 August 1965; pinyon-juniper woodland, 11 August 1965. Two nests in spruce-fir community, 5 July 1964, nest containing four eggs on ground under low limb of *Abies lasiocarpa* var. *arizonica*, dense conifer growth near nest; 2 July 1965, nest containing four young on ground under grass clump in small meadow. Singing noted 19 March-27 July.

Spizella passerina. Chipping Sparrow. Summer resident. Common in every study area, except oak woodland, Juan Tabo area, and Las Huertas Canyon where it is uncommon. Probably nests in Sandias from pinyon-juniper woodland to ponderosa pine community. Adult noted carrying nesting material and another undergoing courtship display, pinyon-juniper woodland, 23 June 1964; adults carrying food, ponderosa pine community, 21 July 1964; copulating pair, mixed conifer community, 5 June 1965. Singing noted 24 April-26 July.

Spizella atrogularis. Black-chinned Sparrow. Summer resident. Common in Embudo Canyon and Juan Tabo area. Adult noted carrying food, Embudo Canyon, 28 June 1965. Two nests: Embudo Canyon, 29 June 1965, nest under construction 1 foot above ground in *Cercocarpus montanus* with *Opuntia* sp., *Pinus edulis*, and *Juniperus* sp. near nest; Juan Tabo area, 30 June 1965, nest with three young 1.5 feet above ground in *Chrysothamnus* sp., located in small arroyo near same vegetation as mentioned above. Singing noted 29 April-20 August.

DISCUSSION

Ninety-two species of birds were found to breed in the eight vegetative zones of the Sandia Mountains. A study plot of known size was regularly censused for two

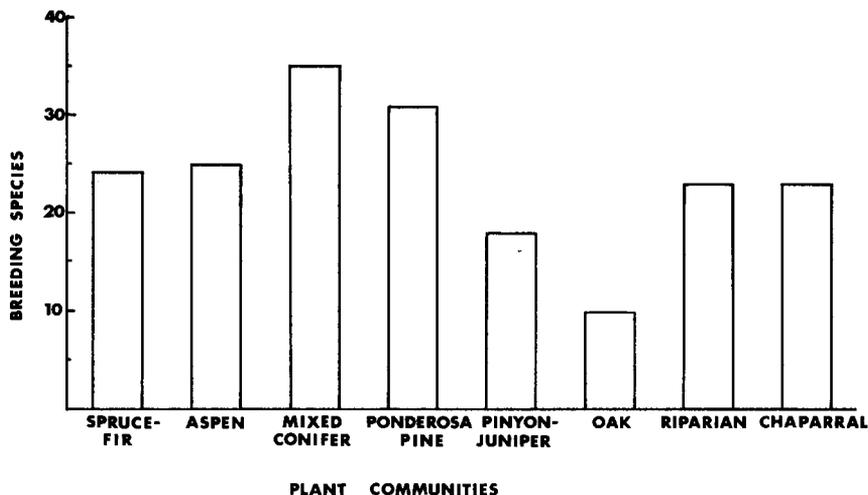


Figure 1. Histogram showing the number of breeding species per plant community.

years in each of the major plant communities of the Sandias. Figure 1 shows the number of breeding species found in each plant community. Evidence that certain species were breeding is already described in the text. Figure 2 shows the number of breeding pairs per 100 acres in each plant community. In each measured census plot, one singing male was counted as one breeding pair.

Hubbard (1965) did a somewhat similar study in the Mogollon Mountains of southwestern New Mexico. The Mogollon Mountains are a greater massif than the Sandia Mountains, and consequently have floral and faunal components not characteristic of the smaller, less mesic Sandia Mountains. Large expanses of coniferous forest, like those found in the Mogollon Mountains, seem to provide more suitable

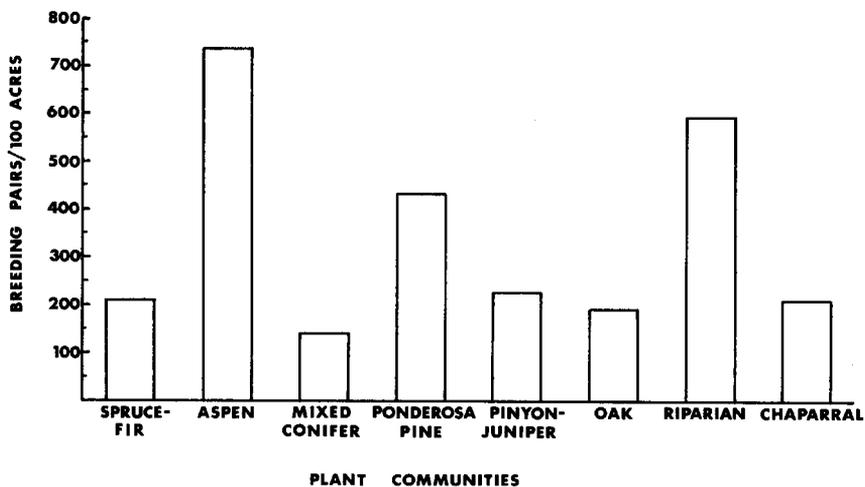


Figure 2. Histogram showing the number of breeding pairs per 100 acres in each plant community, based on censuses of study plots described in text.

habitats for certain birds than do comparatively smaller expanses of forest in the Sandias. Probably for this reason *Otus flammeolus*, *Cinclus mexicanus*, and *Regulus satrapa* breed in the Mogollon Mountains but not in the Sandias.

Some generalizations can be made on the habitat preferences of the breeding birds of the Sandias. No species were found breeding in all vegetative communities of the Sandias. Most of the species nested in only one vegetative community (e.g., *Aimophila ruficeps*, *Icterus parisorum*, *Oporornis tolmiei*) or commonly in as many as four (e.g., *Mimus polyglottos*, *Piranga ludoviciana*). The mixed conifer community contained the most breeding species (e.g., *Tachycineta thalassina*, *Contopus sordidulus*), while the lowest numbers were recorded for the oak community (e.g., *Pipilo erythrophthalmus*, *Vermivora virginiae*) (fig. 1). The greatest number of breeding pairs per 100 acres was found in the aspen forest (e.g., *Troglodytes aedon*, *Dendroica auduboni*), and the lowest number of breeding pairs was found in the mixed conifer community (e.g., *Accipiter cooperii*, *Vireo gilvus*).

SUMMARY

The Sandia Mountains of north-central New Mexico are a relatively small mountain range but contain an extensive ecological range. Eight vegetative communities, occurring from 6350 to 10,600 feet, are recognized in the Sandias. A total of 154 species of birds, 92 of which were considered to be breeding, was recorded for the Sandia Mountains. The number of species breeding in each plant community and the number of breeding pairs per 100 acres in each plant community were also recorded. The beginning and cessation of song for oscine birds, location of nests, and other nesting information were noted.

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