Summer Bird Fauna of North Carolina's Grandfather Mountain

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In June of 1911 Bruner and Field (1912) visited Grandfather Mountain as part of a month-long excursion of observing and collecting birds in western North Carolina. They noted 49 species during their week's stay on the mountain. Although Grandfather Mountain (Avery, Caldwell, and Watauga Counties) has since become one of the most-visited attractions in North Carolina, little subsequent information on its bird life is available. A single exception to the sparse, random observations that have appeared from time to time in *The Chat* is a study by Alexander (1973) on the abundance and habitat preferences of birds on the north slope of this mountain. His study consisted of 28 weekly censuses between 11 April and 25 November 1969 on a single transect up one side of the mountain (elevation 4045 to 5800 feet). In this study he encountered 48 species of birds, at least 13 of which were migrants (or encountered only during the migration period). Unfortunately, he pooled observations of breeding and migration periods, so that his elevation information does not really reflect some of the more narrow distributional limits of species nesting on the mountain.

During the summer of 1984, we had the opportunity to add many species to the known summering fauna of the mountain and to gain some additional understanding of the habitat and elevational distributions of local summering bird life. Several of the records, although expected, were of species not known to breed locally, and one species was not previously known to breed in the state. Furthermore, our field effort fills an important gap in the understanding of the zoogeographical distribution of birds in the southern Appalachians. Several of the records, for example, partly fill an assumed hiatus between extreme southern Appalachian populations and ones in southwestern Virginia. Except for several studies on Roan Mountain (North Carolina-Tennessee), this study represents the only attempt to examine the high-elevation bird life between Mount Rogers (5729 feet) and White Top (5719 feet) in Virginia and Mount Mitchell (6684 feet) in North Carolina, a distance of more than 100 air miles. A good overview of what is known of the avifauna of the southern Appalachians is provided by Hubbard (1971). We highly recommend reading his paper to place our work in better perspective.

Lee visited Grandfather Mountain on 24 and 25 March 1984 and camped on the mountain on 9 through 11 July and 24 through 26 July 1984. He worked all elevations of the area from 2200 to 5960 feet. Audet and Tarr camped on the mountain from 21 May through 13 July 1984. During these periods, major habitats at elevations from 4000 to 5960 feet were surveyed intensively by both parties, although Audet and Tarr spent much of their period of stay above 5000 feet while attending a hacking station for Peregrine Falcons (*Falco peregrinus*), which were released on Grandfather Mountain. The lower elevations and disturbed areas received less intensive study. Because of the dates of coverage and, for most birds, the regularity of observation, we believe all species discussed here breed on the mountain or its slopes.

Elevation distributional patterns were discussed by Alexander (1973) for Grandfather Mountain, and others have presented species inventories and discussed

distributional limits for various birds in the southern Appalachians (Stevenson 1941; Johnston 1964, Highlands; Tanner 1955, Black Mountains; Stupka 1963, Smoky Mountains; Simpson 1976, Plott Balsam Mountains; Simpson 1972a, Mount Mitchell; Tate and Smith 1974, southern Blue Ridge Parkway). Nonetheless, the elevational habitat distributions are not clear for most species, and methods to quantify the complex variations in vegetative zonation with a bird's local occurrence and relative abundance have not been tried. Here we attempt to better illustrate, but not quantify, the effects of vegetative zonation on the breeding birds of Grandfather Mountain. Where possible, we have combined portions of Alexander's (1973) data and our own. Simplistic statements of maximum and minimum elevation records tell little about the normal environmental needs of breeding birds. For example we found that Winter Wrens (*Troglodytes troglodytes*) ranged from the highest peaks (5864 feet) to intermediate slopes (3880 feet), but more than 75% of the wrens encountered were above 5000 feet and 60% were over 5400 feet. This pattern may be even more extreme than indicated here once more encounters are tallied and the slopes receive a uniform and systematic census. Nevertheless, discussion of distributional limits does provide general insight into habitat preferences for many species.

During our visits we encountered 49 species of breeding birds that had not been previously reported (Alexander 1973, Bruner and Field 1912). Additionally we checked unpublished museum records and sight records published in *Chat* but found only two reports of resident species or breeding-season records. Plymire (1978) provided details of nesting by five species at Linville (Avery County). Wray and Wray (1948) reported 64 species from the spring-migration period (13 May); several of these were year-round residents, and two species were reported nesting. Based on birds recorded from other intermediate and high-elevation areas in the southern Appalachians, the list compiled here is certainly not definitive, and several species were encountered on only a few occasions. Thus, the local elevational limits for some species are not yet very well documented. Because of the terrain of Grandfather Mountain, reputed to be the most rugged mountain in southeastern North America, and the remoteness of many of the high-elevation areas of the mountain, several more field seasons will be necessary to complete this study. Nevertheless, we believe our findings are more than preliminary and should be of interest to people familiar with the bird life of the southern Appalachians.

AREAS AND HABITATS STUDIED

The top of Grandfather Mountain is a long ridge with a series of rugged peaks extending west from Linville Peak (mile-high swinging bridge and visitor center, 5300 feet) to MacRae (5939 feet), Attic Window (5949 feet), and Calloway (5964 feet) Peaks. Many unnamed peaks and scattered mountain balds lie in between. Adjoining or leading ridges form the Eastern Continental Divide. The highest point on the ridge is only 720 feet lower than the summit of Mount Mitchell (Yancey County, N.C.), the highest mountain in eastern North America. The 5000-acre "backcountry" covering the slopes above 4000 feet is one of the South's most spectacular wilderness preserves. At the base of the southwest side of the mountain are Linville Gap and the town of Linville, but on the southeast side the slopes continue downward to elevations of 2200 feet. These lower elevations are best reached by Rattlesnake Cliffs Road and other less-well-maintained

gravel roads. US 221 follows a contour of 4200 to 3900 feet around the south and east sides of the mountain, and NC 105 goes through a valley (3700 to 4000 feet) that contains several miles of cleared urban and agricultural development. The most ecologically diverse of the high-elevation areas, however, can be reached only by hiking. Although the rugged and steep trails are well maintained, sudden changes in weather may make even short explorations quite uncomfortable and occasionally dangerous. Probably because of these factors, there had previously been no intensive ornithological exploration of the summit ridge of the mountain.

Alexander (1973) divided his study transect (Shanty Springs Trail) into five natural vegetative communities. We have followed his system for this study with some modification (Table 1). First, the plant communities attain different elevational limits on various sides of the mountain. This causes some overlap in community position, a fact not noted by Alexander. Second, we also included disturbed habitats (road rights-of-way, urban communities, and farmlands) and lower extremes of the mesophytic forest. Third, scattered throughout the upper summits are mountain balds (meadows and shrub thickets) not inventoried by Alexander.

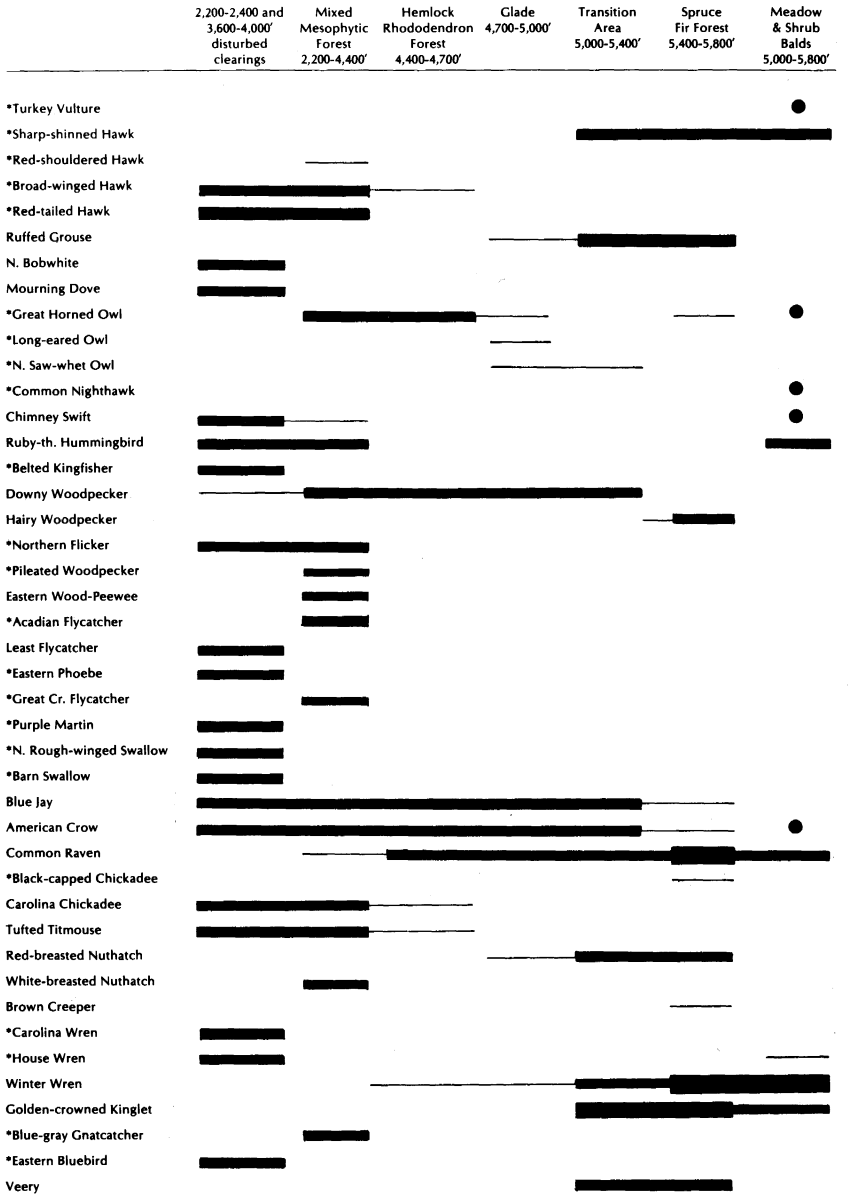
From 2200 to 4400 feet are mixed mesophytic forests. They are composed mostly of hardwoods, but along stream margins are Canada Hemlock (*Tsuga canadensis*), White Pine (*Pinus strobus*), and Great Laurel (*Rhododendron maximum*). Forest composition shifts with elevation, but dominant trees include Yellow Birch (*Betula lutea*), Sugar Maple (*Acer saccharum*), Striped Maple (*Acer pensylvanicum*), Beech (*Fagus grandiofolia*), Cucumbertree (*Magnolia acuminata*), Rock Chestnut Oak (*Quercus prinus*), and Hop Hornbeam (*Ostrya virginiana*). An understory of various viburnums and sprouts of American Chestnuts (*Castanea dentata*) is present, although in many places there is little subcanopy or shrub layer. The ground cover consists of scattered fallen logs, Shining Clubmoss (*Lycopodium lucidulum*), Cinnamon Fern (*Osmunda cinnamomea*), Christmas Fern (*Polystichum acrostichoides*), and various shade-tolerant herbs. Other major species that are most prevalent at the lower elevations include Red Oak (*Quercus rubra*), Black Oak (*Q. velutina*), White Oak (*Q. alba*), and Southern Red Oak (*Q. falcata*), the last two occurring below 3000 feet. Plant communities growing in the upper portion of this zone of the mountain are generally more dense but less diverse.

The hemlock-rhododendron community is confined to a relatively narrow, usually rocky zone from 4400 to 4700 feet on the northwest side of the mountain and from 3800 to 4000 feet on the south slope. The dominant plants are Canada Hemlock and Great Laurel. Scattered Red Spruce (*Picea rubens*), Black Locust (*Robinia pseudo-acacia*), Umbrella Tree (*Magnolia fraseri*), Serviceberry (*Amelanchier arborea*), and Cherry Birch (*Betula lenta*) are also present.

The Glades ["first transition area" of Alexander (1973)] occupy scattered sites between 4700 and 5000 feet on the northwest side of the mountain and about 4300 to 4400 feet on the south slope. These glades have an open understory with grass covering the forest floor. The overstory is composed mostly of hardwoods, the most abundant being Red Oak, White Ash (*Fraxinus americana*), Fire Cherry (*Prunus pensylvanica*), and scattered Beech. Canada Hemlock and Red Spruce are also present.

Between 5000 and 5400 feet (again lower on the south slope) is a broad transition area less open than the Glades; however, conspicious trees are similar with a scattering of

TABLE 1. Elevation and habitat distribution of the summer bird fauna of Grandfather Mountain, N.C. Definition of symbols: * new nesting-season record for area; ● seen soaring above this habitat. Bar distributions indicate relative abundance and lowest and highest elevations recorded in this study.



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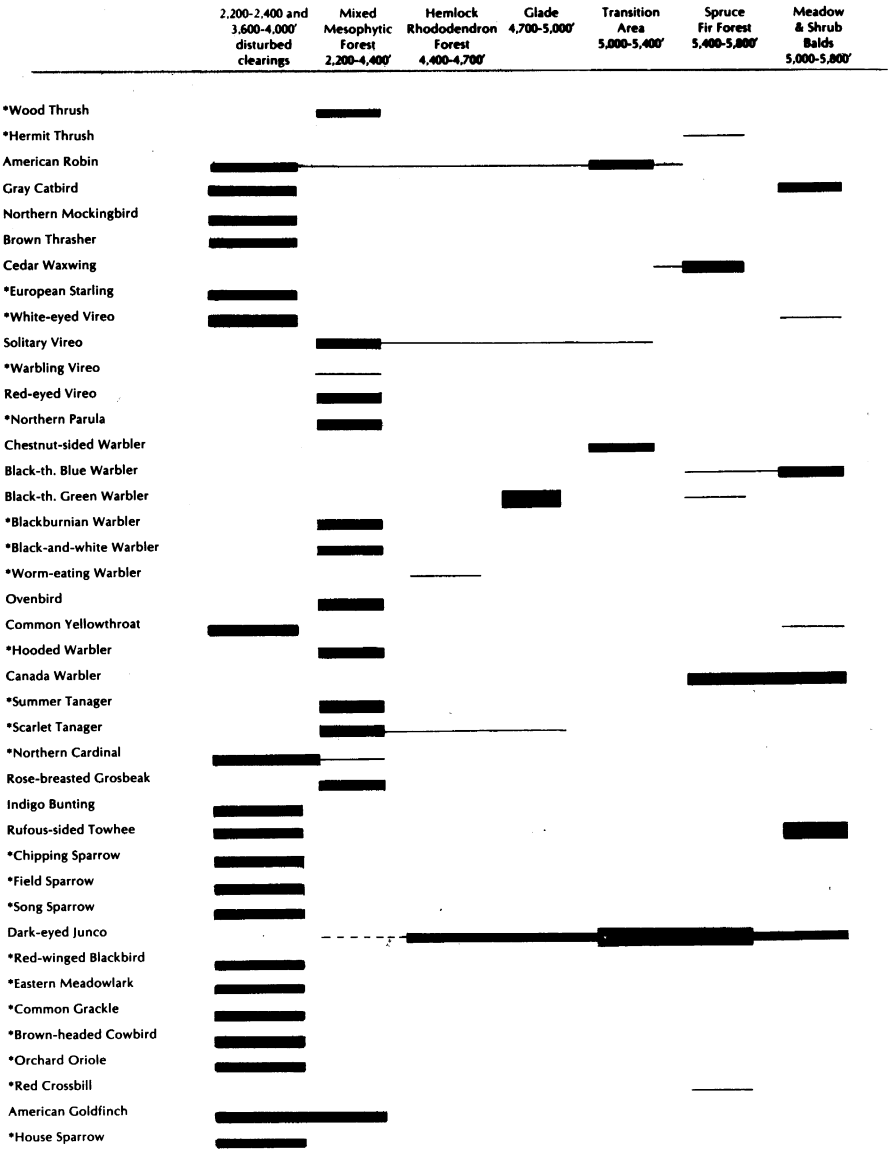

Fig. 1. Along the crest of Grandfather Mountain, the spruce-fir forest is stunted and bannered by the prevailing winter winds, which may exceed 100 mph.

Fraser's Fir (*Abies fraseri*) and with Red Spruce becoming abundant. Yellow Birch, Sugar Maple, and Striped Maple are more common than at lower elevations, and various viburnums dominate the understory. Scattered throughout are partial openings claimed by *Rubus* and various saplings.

The spruce-fir forest, 5400 to 5964 feet (starting at about 5000 feet on south slope) is dominated by lichen-covered Fraser's Fir and Red Spruce, but Yellow Birch, Red-berried Elder (*Sambucus pubens*), and Mountain Ash (*Sorbus americana*) are also common. An undergrowth of Mountain Rosebay (*Rhododendron catawbiense*), or Spineless Blackberry (*Rubus canadensis*) predominate in many areas. A dense, damp ground cover of various ferns, Mountain Fern Moss (*Hylocomium splendens*), Bluebead-lily (*Clintonia borealis*), False Lily of the Valley (*Maianthemum canadense*), and Common Wood Sorrel (*Oxalis acetosella*) occurs throughout this zone. Standing dead spruce and firs are common but seem to be little used by cavity nesters. At higher sites the trees obtain stunted and bannered growth forms (Fig. 1) from prevailing winter winds. (Winds of over 100 mph have been recorded, and gusts of nearly that intensity are not uncommon. A high-wind record of 161 mph has been documented.) These areas are similar to the subalpine zones of the Rockies and other higher mountain chains.

The balds occur on scattered, open rocky areas and in windswept gaps between peaks (Fig. 2). They are dominated by either grasses and sedges or low trees and shrubs such as Mountain Rosebay, spruce, fir, Red Maple (*Acer rubrum*), Sassafras (*Sassafras albidum*), Sand Myrtle (*Leiophyllum buxifolium*), and alder (*Alnus* sp.). Most balds are small and are so completely surrounded by forest with broad ecotonal areas that characterizing the breeding-bird fauna is difficult.

Fig. 2. Grassy and shrubby mountain balds provide suitable habitat for birds of open habitats on predominantly forested Grandfather Mountain.

Interestingly, Bruner and Field (1912) and Metcalf and Wells (1926) provide brief sketches of the plant communities of Grandfather Mountain. Our field work indicates that the mountain plant communities have not exhibited any major changes in the last 70 years.

SUMMER BIRD LIFE

In this study we documented 84 species of nesting birds on Grandfather Mountain and its lower slopes. Several of these are quite interesting zoogeographically, and one represents a new breeding-season record for the state. An additional 20 to 30 nesting species could reasonably be expected on the mountain. Even without the finding of additional species, those reported in this study document a remarkably diverse assemblage of nesting birds for such a small geographical area in the Southeast. This diversity is obviously a direct reflection of the variation of plant communities dictated by the elevational gradient.

In a brief comparison to the number of breeding birds reported here, Potter and LeGrand (1980) in a 1-day survey reported 27 species from Roan Mountain (Mitchell County), at elevations ranging from 5000 to 6285 feet. McConnell and McConnell (1983) listed 45 species from the Unicoi Mountains (10 miles of ridge, 4000 to 5472 feet). Simpson (1976) recorded about 100 breeding species from the Plott Balsam Mountains, this being a rather large area (about 17.5 miles in length) with considerable elevational variation. The Plott Balsams had been studied, though discontinuously, since the 1880s. Thus, the breeding fauna of Grandfather Mountain comes closer to what could normally be expected for an entire mountain chain rather than a single peak.

The birds identified appear in Table 1. The more geographically interesting and unusual summering species are discussed below.

Sharp-shinned Hawk (*Accipiter striatus*): We encountered single birds on various dates throughout the summer, the latest being 11 July. All sightings were at elevations above 5000 feet, and adults were seen frequently around Calloway Peak (5964 feet), once carrying prey. This represents the sixth recently published record indicating breeding for the mountain region. Meyer and Mueller (1982) provided a summary of the breeding-season records for North Carolina since 1960.

Ruffed Grouse: (*Bonasa umbellus*); This is the only bird typical of high elevations and reported by others (Alexander 1973, Bruner and Field 1912) that we did not personally encounter. Staff members of Grandfather Mountain stated that the species is still present.

Great Horned Owl (*Bubo virginianus*): Although it is not unusual to find these owls in the mountains, Grandfather Mountain was chosen for the first Peregrine Falcon hacking station in the southern Appalachians because of its supposed lack of resident Great Horned Owls, which are known to prey on unattended falcon chicks. Individuals were heard in areas below the Glades, and Tarr saw one once in the spruce-fir zone.

Long-eared Owl (*Asio otus*); First heard on 15 June (Audet) in the early evening in Glades on the north side of the mountain (4600 feet), it vocalized characteristic hoots for more than 5 minutes. The bird or birds were heard as late as 26 July by Lee, who camped for three nights specifically to listen for these owls. On 25 July an owl, assumed to be this species, was heard giving two loud "sissch" sounds. Two summer interns working for the museum camped in the same Glade from 17 to 20 July and heard an owl each night. Based on their description, it was certainly a Long-eared Owl. This record is the first breeding-season report of a Long-eared Owl south of Mount Rogers, Virginia. Because these owls seldom vocalize away from nesting sites, it is likely that this represents an extension of the documented breeding range. The secretive nature of Long-eared Owls and the remoteness of the area make it possible for the species to have nested locally for many years without being detected. It is reasonable to assume that these owls occur at other sites in the western part of North Carolina and adjacent Tennessee. Furthermore, this does not appear to be a case of recent range expansion. Robbins and Boon (in press), for example, note that Long-eared Owls have disappeared as part of the native breeding fauna of western Maryland. Thus, it seems unlikely that these birds are simply increasing in the Southeast.

Northern Saw-whet Owl (*Aegolius acadicus*): These owls were encountered by Lee on two occasions. One was seen on 9 July near the entrance to Black Rock Cliffs Cave. Canada Warblers (*Wilsonia canadensis*) and a Red Squirrel (*Tamiasciurus hudsonicus*) were fussing at a young owl (white face) just before dusk. On 25 July a single bird was heard in Glades on the north side of the mountain. These new breeding sites are on opposite sides of the mountain (elevation between 4600 and 4750 feet), and they partly bridge a 75- to 100-mile hiatus in the documented range of this seldom encountered owl. The nearest other known sites are Roan Mountain, Mount Mitchell, and Mount Rogers (Fig. 3). Simpson (1972b) summarized the

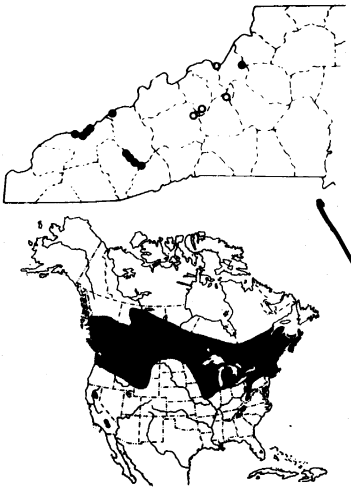

Fig. 3. Northern Saw-whet Owl

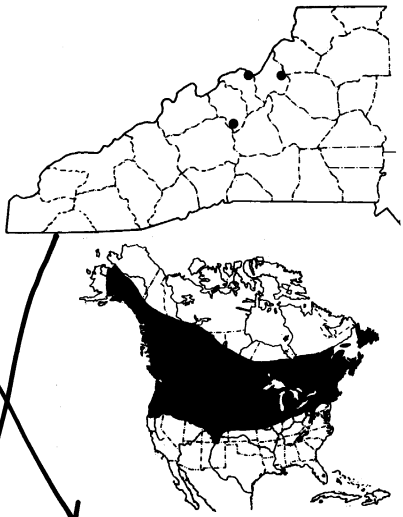

Fig. 4. Black-capped Chickadee

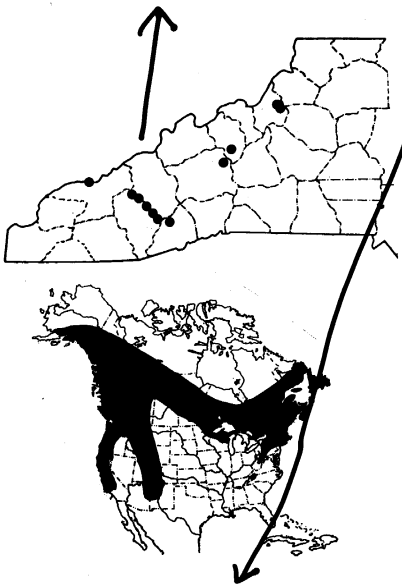

Fig. 5. Hermit Thrush

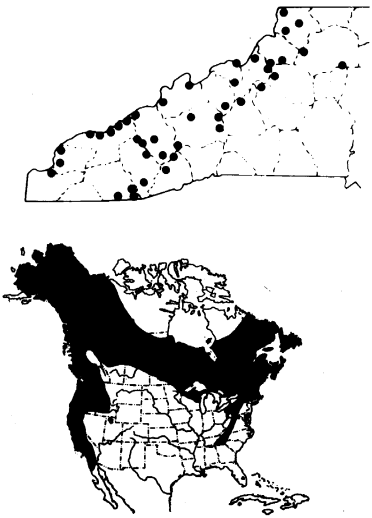

Fig. 6. Dark-eyed Junco.

Fig. 3-6. The above range maps illustrate the sites of known breeding in North Carolina for four species that are, at this latitude, confined to the mountains. Open circles in the Black-capped Chickadee map (Fig. 4) indicate former breeding. No nest has yet been found in the state for the Hermit Thrush (Fig. 5), but the several territorial males are presumed to have had mates. Darkened areas on the North American insert maps indicate the general breeding distribution for these species.

known breeding-season geographic and ecological distribution of the Saw-whet Owl in the Great Balsam Mountains and commented on its distribution and status in the Southeast. As Simpson suggested, the owls were living in the transition areas below the spruce-fir zone, not in it. Audet and Tarr did not hear any of these birds during their summer of camping on Grandfather Mountain at 5900 feet.

Least Flycatcher (*Empidonax minimus*): This flycatcher is fairly common in the margins of deciduous woodlands up to 4000 feet. Wray and Wray (1948) noted nesting as early as 13 May at Pineola.

Common Raven (*Corvus corax*): Grandfather Mountain may be the best place to watch ravens in the southern Appalachians. We have seen as many as 10 at one time playing on updrafts of the higher slopes. They constantly visit all communities discussed but nest and roost only on cliffs and ledges above 5000 feet. Although we estimate that as many as 15 pairs of ravens may nest on the mountain, we were unable to confirm this.

Black-capped Chickadee (*Parus atricapillus*): The occurrence of an extant population of Black-capped Chickadees on Grandfather Mountain may be the single most interesting find of this study. These birds were previously known from the nearby Black Mountains (including Mount Mitchell, Brewster 1886), but by the 1930s these birds had been extirpated as a result of extensive logging (Tanner 1952, Simpson 1977). The historic status of Black-capped Chickadees on Roan Mountain is not clear, but they currently do not occur during the nesting season. Within North Carolina these chickadees have been found since the 1930s only in the Great Smoky Mountains and in the Plott Balsam Mountains (Fig. 4). To the north they still nest on Mount Rogers in Virginia (Scott 1975). On Grandfather we encountered Black-cappeds at only a few sites (three family groups) in spruce-fir forests above 5000 feet. It is somewhat surprising that the birds' presence during the breeding season went undetected for so long, in spite of a 1975 Christmas Bird Count report from Avery County listing the species (Chat 40:41). These birds, like others reported in the state outside the known breeding range, were assumed to have been migrants from the north. Apparently, Black-capped Chickadees never have been abundant on Grandfather Mountain, for they were not found by Bruner and Field (1912) or Alexander (1973). Of all the birds found on Grandfather, this species appears to be most dependent on the spruce-fir zone. Because this zone is rather limited on Grandfather Mountain, it is especially surprising for these birds to nest here. Perhaps the unusually rugged nature of this mountain kept the logging from being as intense as it was in other high-elevation areas in northwestern North Carolina.

Brown Creeper (*Certhia familiaris*): One was seen and heard singing at Calloway Gap (5600+ feet) during June. The bird's behavior suggested a nest was nearby, but none was located. This represents a rather high elevational record for the Brown Creeper.

Hermit Thrush (*Catharus guttata*): A single bird was heard on 25 July adjacent to a partial clearing in the spruce-fir forest above Shanty Springs (5500 feet). Potter and LeGrand (1980) first reported this species during the breeding season in North Carolina from Roan Mountain, and it has been encountered subsequently (Amer. Birds 37:989). In 1983 several individuals were heard on Mount Mitchell (Chat

48:24). These three localities are the southernmost breeding-season stations in eastern North America and apparently represent a recent local range expansion (Fig. 5).

Warbling Vireo (*Vireo gilvus*): A single bird was heard and seen on 26 July at 2200 feet along a stream flood plain at the base of Grandfather Mountain. This is one of the few North Carolina localities where this vireo is known to reside in the summer months.

Black-throated Green Warbler (*Dendroica virens*): Extremely abundant in the Glades on Shanty Springs Trail, this warbler was seldom encountered elsewhere. One was heard in a clearing in the spruce-fir forest. Birds sang continuously from dawn to dusk and were still in full song as late as 26 July. Alexander (1973) found the species confined to the Glades area.

Red Crossbill (*Loxia curvirostra*): Birds were seen in flocks at high elevations (5500+ feet) on 27 May and 6, 8, and 29 June. They were heard singing on several other occasions.

Dark-eyed Junco (*Junco hyemalis*): Males were singing and actively defending territories as early as 24 March, and nest construction was under way as late as 24 July. This species is most abundant around openings at high elevations. Juncos are very uncommon below 4000 feet on Grandfather Mountain. The breeding-season distribution of this common mountain species is illustrated in Figure 6.

Many of the species discussed above and others listed in Table 1 are confined, at our latitude, to the Appalachian Mountains at high or intermediate elevations; several such populations are regarded as distinct, endemic southern Appalachian races. At least 19 avian species reach the southern limit of their known breeding distribution in eastern North America in the mountains of western North Carolina and eastern Tennessee. These are Ruffed Grouse, Long-eared Owl, Northern Saw-whet Owl, Least Flycatcher, Common Raven, Black-capped Chickadee, Red-breasted Nuthatch, Brown Creeper, Winter Wren, Golden-crowned Kinglet, Veery, Warbling Vireo, Chestnut-sided Warbler, Black-throated Blue Warbler, Blackburnian Warbler, Canada Warbler, Rose-breasted Grosbeak, Dark-eyed Junco, and Red Crossbill.

Several breeding species, mostly or exclusively confined to the southern Appalachians at our latitude, can be expected in summer on Grandfather Mountain but to date have not been found nesting there, although some have been seen on dates just outside expected breeding periods. These include Black-billed Cuckoo (13 May, 3500 feet; 29 September, 4500 feet; almost certainly a summer resident), Yellow-bellied Sapsucker (11 April, 13 May, 19 October; 4000 to 4500 feet), Alder Flycatcher, Olive-sided Flycatcher, Tree Swallow, Bewick's Wren, Northern Oriole, Vesper Sparrow, and Savannah Sparrow. Other potential nesting species that have been recorded on Grandfather Mountain include Peregrine Falcon (fall migrants), Yellow-billed Cuckoo (13 May, 3500 feet), Eastern Kingbird (13 May, 3500 feet), Yellow-bellied Flycatcher (29 May, 5500 feet), Tree Swallow (13 May, 3500 feet), Loggerhead Shrike (13 May, 3500 feet), Yellow-throated Vireo (1 May, 13 May, 16 September; 4000 to 5800 feet), Yellow Warbler (13 May, 3500 feet), Pine Warbler (13 May, 3500 feet), Yellow-breasted Chat (13 May, 3500 feet), and Blue Grosbeak (13 May, 3500 feet). Several

additional species (e.g. Swainson's Thrush, Magnolia Warbler, and Purple Finch) breed in the mountains of Virginia (Scott 1975) and could reasonably be expected in summer on Grandfather Mountain.

Of the 84 species presented in Table 1, twenty-one are not typically inhabitants of the natural vegetative zones discussed, or at least we did not find them in natural habitats on Grandfather Mountain. They are in fact dependent to semi-dependent on artificial clearings and other man-influenced habitats. Although many could occur on the mountain in natural temporary clearings caused by fire or storms, or around beaver ponds, we did not find them in such habitats. These species include Northern Bobwhite, Mourning Dove, Chimney Swift, Least Flycatcher, Eastern Phoebe, Purple Martin, Northern Rough-winged Swallow, Barn Swallow, Carolina Wren, Eastern Bluebird, Northern Mockingbird, Brown Thrasher, European Starling, House Sparrow, Red-winged Blackbird, Eastern Meadowlark, Common Grackle, Brown-headed Cowbird, Orchard Oriole, Chipping Sparrow, and Song Sparrow. With the exception of the Least Flycatcher, these are wide-ranging species in North Carolina.

Highest total density was recorded at high elevations, whereas lower density, but greater species diversity, was apparent at intermediate and low elevations and in disturbed areas. For some individual species (Winter Wren, Red-breasted Nuthatch, Golden-crowned Kinglet, and Dark-eyed Junco) population density also increased with elevation.

SUMMARY AND FUTURE STUDIES

In addition to compiling seasonal lists, the North Carolina State Museum is currently involved in a long-range study of the elevation/plant community requirements and relative abundance of the birds and mammals of Grandfather Mountain. This paper is an outgrowth of the preliminary field work for the long-range study. There is probably no other place in the southern Appalachians where such extremes in elevation exist in such close proximity. In a straight-line distance of only 6 miles one can climb from 1600 to 5964 feet above sea level from the base of the mountain in the upper piedmont to the summit. On most other high peaks in the southern Appalachians, the lowest slopes start from relatively high elevations. On Grandfather the altitudinal shifts in natural vegetative communities are striking, and scattered throughout the higher elevations are mountain balds and glades; at lower elevations, particularly along streams, there are hemlock-rhododendron communities. Further enhancing the species diversity are cleared farmlands, rural communities, farm ponds, and impounded lakes. It is likely that nowhere else in North Carolina is such a rich diversity of breeding birds attained in such a restricted area as Grandfather Mountain. With even a modest amount of additional field work, well over half of the state's nesting bird fauna may be documented from an area of less than 10 square miles.

ACKNOWLEDGMENTS

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mountain, and Mary K. Clark, while conducting a parallel study on the mammals of the area, assisted in the bird survey and processed the habitat photographs accompanying this article. Maps are from a distributional survey of the state's breeding birds, which is to be published by the museum and the North Carolina Biological Survey. This is contribution 1985-3 of the North Carolina Biological Survey.

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