

Mountain Coniferous Forest Birds Guild

Dark-eyed Junco *Junco hyemalis*
Golden-crowned Kinglet *Regulus satrapa*
Red Crossbill *Loxia curvirostra*
Red-breasted Nuthatch *Sitta canadensis*

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DESCRIPTION

Taxonomy and Basic Description

The mountain coniferous forest guild includes 4 widely distributed species that are primarily associated with mature spruce-fir/northern hardwood forests. The 4 members of this guild are songbirds (Order: Passeriformes) representing 4 families: Sittidae (nuthatches), Regulidae (kinglets), Fringillidae (crossbills), and Emberizidae (sparrows, buntings, and relatives). All 4 species are assumed to have distinct, high-elevation, Southern Appalachian Mountain populations.

Red-breasted Nuthatches are small, weighing approximately 10 g (0.35 oz.) and are distinguished by a black eye-line, white eyebrow stripe, and reddish underparts. Of note behaviorally, the Red-breasted Nuthatch tends to climb down tree trunks headfirst.

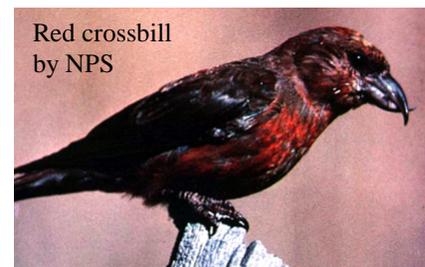


Golden-crowned Kinglets are distinguished by their small size of 6 g (0.21 oz.) and their yellow-and-orange crown patch that is bordered by black. The orange is absent in females.

Red Crossbills weigh 23 to 45 g (0.81 to 1.58 oz.), lack wingbars, and have distinctive crossed mandibles. The Dark-eyed Junco is 18 to 22g (0.63 to 0.77 oz.) (Nolan et al. 2002). The Dark-eyed Junco was formerly split into 5 distinct species. However, all of these are now lumped into one species (Nolan et al. 2002). The dark-eyed junco now informally consists of 5 distinctive “groups” encompassing 15 recognized subspecies. The Southern Appalachian subspecies (*J. h. carolinensis*) of the slate-colored junco group is a resident in South Carolina while another slate-colored junco subspecies, *J. h. hyemalis*, winters in the State as well (Nolan et al. 2002).



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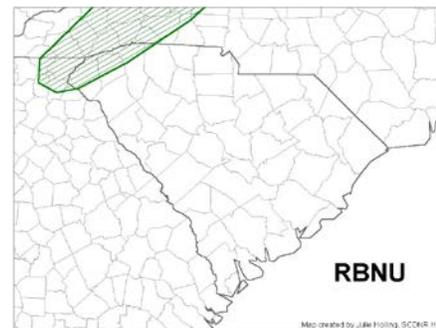
Status

All of these species are protected under the Migratory Bird Treaty Act; however, the Red-breasted Nuthatch, Golden-crowned Kinglet, and Dark-eyed Junco do not have a special federal status. NatureServe status for all 4 species is secure globally (G5). The Southern Appalachian populations of the Red Crossbill are a federal species of conservation concern (USFWS 2008). Partners in Flight (PIF) has listed the Southern Appalachian populations of these species in the highest priority category: Crisis Recovery (extremely vulnerable) (Hunter et al. 1999). None of these species is listed on the South Carolina Rare, Threatened and Endangered Species Inventory.

Regionally, Southern Appalachian populations of the Red Crossbill are categorized as a special concern species by the NC Wildlife Resources Commission. The Golden-crowned Kinglet and the Red-breasted Nuthatch are included on the North Carolina Natural Heritage Program Animal Watchlist.

POPULATION SIZE AND DISTRIBUTION

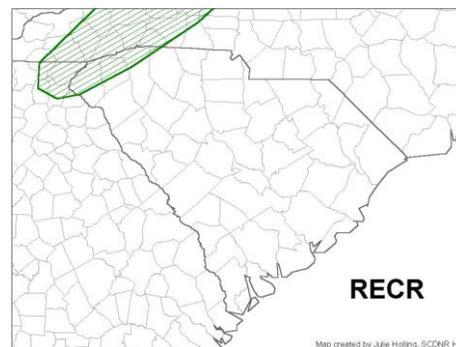
Global estimates of population size are roughly 18 million Red-breasted Nuthatches, 34 million Golden-crowned Kinglets, and 15 million Red Crossbills (Rich et al. 2004). Global population size estimates are 260 to 630 million for the Dark-eyed Junco (Rich et al. 2004; Nolan et al. 2002). Between 1966 and 2002, the Red-breasted Nuthatch population increased significantly by 1.5% annually throughout their range. The Golden-crowned Kinglet and Red Crossbill populations experienced insignificant annual declines of 0.8% and 0.7%, respectively (Sauer et al. 2004).



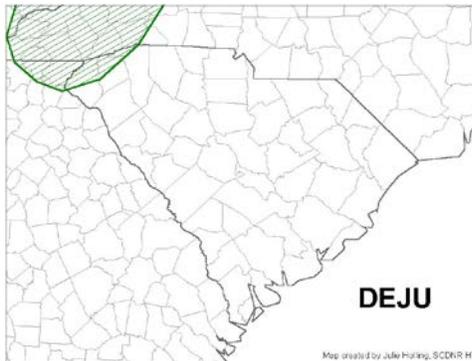
These 4 species have broad distributions and tend to occur in coniferous to mixed-coniferous forests between the Pacific and Atlantic Coasts of Canada, south into the mountains of the Southwestern US, and along the Appalachians into the Southeastern US. The high-elevation Southern Appalachian populations of these species, though not officially subspecies, are believed to be endemic and isolated from their northern and western populations (Hunter et al. 1999). Therefore,

these Southern Appalachian populations are considered equivalent to distinct “species” for conservation planning purposes (Hunter et al. 1999). Two ‘types’ (Type I and Type II) of Red Crossbills occur in the Southern Appalachians (Hunter et al. 1999).

In South Carolina, breeding habitat for the Mountain Coniferous Forest Guild occurs mainly in the Blue



Ridge Mountains, located in the northwest section of the State. Breeding habitat consists primarily of late-successional and old-growth hemlock and white pine stands (Hunter et al. 1999). According to the South Carolina Breeding Bird Atlas (1995), the Red-breasted Nuthatch has been detected in Oconee County during the breeding season. Breeding was confirmed for both the Red Crossbill (Greenville and Pickens Counties) and the Golden-crowned Kinglet (Oconee County). Additionally, the Golden-crowned Kinglet may have possibly bred in Greenville and Pickens Counties.



The Dark-eyed Junco breeds from Alaska south to northwest New Mexico, from western Canada to Maine, and south along the Appalachians to northern Georgia (Nolan et al. 2002). The Dark-eyed Junco breeds in Oconee, Pickens, and Greenville Counties and is likely a resident in extreme northwest South Carolina (Nolan et al. 2002). Populations of breeding Dark-eyed Junco are apparently rare in the State. Southern Appalachian Dark-eyed Junco populations (*J. h. carolinensis*) are partial, altitudinal short-distance migrants. As such, some males

remain near high-elevation breeding territories during the winter, whereas females and some males move to lower elevations during this period (Nolan et al. 2002).

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The mountain coniferous forest guild principally breeds in mature or late-successional coniferous forests, particularly those composed of spruce, fir, pine, hemlock, larch, and cedar (Adkisson 1996; Ingold and Galati 1997; Ghalambor and Martin 1999). Red-breasted Nuthatches are weak excavators; although they may nest in old or natural cavities, most excavate nests in decaying portions of dead or partially dead trees. Consequently, the density of decaying old or dead trees may influence their breeding densities. In the Appalachian Mountains, the highest summer densities of Red-breasted Nuthatch populations occur in silviculturally undisturbed high elevation coniferous forests (Shriner 2001). In North Carolina, they are found extensively within the ecotone of hardwoods and spruce-fir forests and use the hardwood component of this forest type. Golden-crowned Kinglets nest high in conifers, breeding mainly in boreal spruce or fir forests, though they will nest in a variety of forest types (Ingold and Galati 1997). Golden-crowned Kinglet breeding densities decline in logged or burned forests, in areas with open canopies, and in hardwood forests. Red Crossbill populations are nomadic and breed opportunistically from December through September (Adkisson 1996). Red Crossbill breeding is strongly influenced by conifer seed availability; they generally breed when adequate mature cone crops are present (Adkisson 1996).

Red-breasted Nuthatches primarily forage on the trunks of live conifer trees; they eat arboreal arthropods during the breeding season and conifer seeds during the non-breeding period. Golden-crowned Kinglets forage on the tips of branches, on conifer needles, and on the trunks of spruce, fir and pine trees. In the Southern Appalachians, Type I Red Crossbill populations have small bills and thus forage mostly on conifers that produce soft or small cones, such as red

spruce, white pine, and Eastern hemlock. Type II crossbills are large-billed and specialize on yellow pines (Adkisson 1996).

The Dark-eyed Junco often breeds in coniferous and deciduous forests, open woodlands, and bogs. In the Southern Appalachians, the Dark-eyed Junco is associated with eastern hemlock trees (Shriner 2001). Dark-eyed Junco nest site characteristics are highly variable; however, nests are often on or near the ground in a small cavity on a sloping bank or rock-face. A nest can also be found among roots, under projecting rock, or at bases of or elevated in trees. When nests do occur in trees, they are rarely located over 15 m (49 ft.) in height (Nolan et al. 2002). This species feeds mainly on seeds and arthropods taken from ground and leaf litter during the breeding season. During the winter, the Junco will feed from the ground and low plants (Nolan et al. 2002).

CHALLENGES

Range-wide, Red-breasted Nuthatch populations may be limited by the availability of dead or diseased trees that are suitable for nest sites and winter food source availability (Ghalambor and Martin 1999). In addition, red-breasted nuthatches avoid recent clearcuts and are more abundant in mature, diverse, conifer forests than homogeneous, even-aged stands (Ghalambor and Martin 1999).

Forest thinning and spruce die-off may reduce local Golden-crowned Kinglet populations. However, the Kinglet has expanded its breeding range in the Midwestern and Eastern United States due to the planting of spruce trees (Ingold and Galati 1997). Red Crossbills are habitat specialists; population estimates tend to be correlated with the availability of conifer seed. Crossbills will disperse from areas of reduced seed abundance (Adkisson 1996). Logging of mature conifer forests and shortened rotations of managed stands may negatively affect red crossbill populations because older conifers—those 60 years old or more—produce larger cone crops (Adkisson 1996).

In most of the Southern Blue Ridge, Red-breasted Nuthatches, Golden-crowned Kinglets, and Red Crossbills are currently associated with high-elevation red spruce/Fraser fir/northern hardwood forests, though historically these species may have been more abundant when the landscape contained more old-growth hemlock and white pine (Hunter et al. 1999). High-elevation spruce-fir forests remain and continue to endure extensive losses of mature Fraser fir due to balsam woolly adelgid infestations. Other factors potentially affecting spruce-fir forests include increased levels of acid deposition and ozone; however, this relationship is currently speculative (Hunter et al. 1999). The death of mature fir trees results in reductions in canopy cover and other changes to forest structure. Red-breasted Nuthatch and Golden-crowned Kinglet populations have declined. Red Crossbill populations have likely declined where adelgid infestations have caused significant changes to forest structure (Hunter et al. 1999). The PIF conservation statuses of these species are primarily due to concerns over the impacts of past and potential future losses of spruce-fir habitat. Although members of this guild depend on high elevation spruce-fir forest, they also occur in reduced densities in late-successional hemlock-white pine.

In South Carolina, breeding populations of these species are rare and largely restricted to late-successional conifer stands. Logging and management actions in these habitats that eliminate dead or decaying trees, reduce the amount or average age of cone-producing trees, and/or reduce conifer species diversity may negatively impact one or more species in this guild.

It should be noted that the Red-breasted Nuthatch is an irruptive migrant. Late-successional mixed-pine hardwood and mature Virginia pine stands appear to provide suitable wintering habitats for these birds. However, these Red-breasted Nuthatches may be from stable northern populations; the importance of these forest types for Southern Appalachian populations is unknown.

Although the specific effects of climate change are unknown for these species, there has been an assessment of effects and adaptation measures for ecosystem response to climate change in North Carolina spruce-fir forests. Because of the relatively small amount of this forest type in South Carolina, climate change effects could eliminate this forest type from South Carolina in the future. These forest types will most likely migrate northward and transition to a more oak-pine forest. Higher temperatures and drier climate could make these forest types vulnerable to catastrophic wildfires. With these changes in forest composition, it is likely that species associated with this forest type will likely migrate with the shift in range of the forest type and be vulnerable to extreme events while doing so.

The Dark-eyed Junco is currently an abundant species. However, Eastern hemlock declines due to the hemlock woolly adelgid are likely to have negative consequences on breeding populations of this species.

CONSERVATION ACCOMPLISHMENTS

In the Southern Appalachians, members of this guild mainly use high-elevation spruce-fir forest. Most (95%) of the remaining acreage of spruce-fir forests is on public lands, and nearly 80% of spruce-fir is late-successional. However, despite the protection afforded on public lands, spruce-fir forests continue to suffer from exotic pests (e.g. balsam woolly adelgid and hemlock woolly adelgid) and potentially from pollution originating elsewhere.

CONSERVATION RECOMMENDATIONS

- Determine the distribution, densities, and nest survival rates of breeding Red-breasted Nuthatch, Golden-crowned Kinglet, Red Crossbill, and Dark-eyed Junco populations in South Carolina.
- Determine the amount and distribution of late-successional hemlock and hemlock-white pine mixed stands that are necessary breeding habitat for this guild in South Carolina.
- Evaluate current and proposed land use strategies for existing habitats, and work with landowners to optimize habitat potential for breeding members of this guild. Proposed land use strategies and landowner outreach programs should address the following:
 - Conservation of existing mature coniferous forests.
 - Provide an increase in the amount and extent of late-successional hemlock and hemlock-white pine mixed stands.

- Cooperate on the restoration of high elevation spruce-fir forests.
- Support management actions that provide both 'soft' (decayed) and 'hard' snags and/or promote large and older trees, increasing habitat use, population densities, and reproductive success of red-breasted nuthatches. A study cited in Ghalambor and Martin (1999) suggests leaving 36 hard and 36 soft snags per 40 ha or 98.8 ac.
- Assess potential effects of predicted hemlock decline due to hemlock woolly adelgid on this guild.
- Verify the assumption that these bird populations are endemic, and genetically distinct from larger and more stable northern populations, through genetic studies.

MEASURES OF SUCCESS

Increases in the amount and quality of breeding habitat should lead to increases in population sizes and nest survival rates. In an adaptive management framework, population density and nest survival data should be collected before and after the implementation of management actions intended to improve habitat quality for this guild. This information should guide subsequent management activities.

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