

## Mountain Coniferous Forest Guild

**Red-breasted Nuthatch** *Sitta canadensis*

**Golden-crowned Kinglet** *Regulus satrapa*

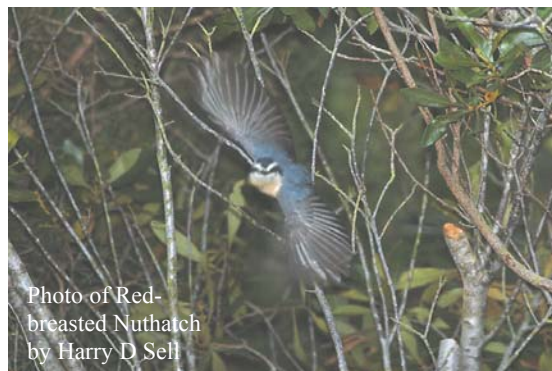
**Red Crossbill** *Loxia curvirostra*

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### DESCRIPTION

#### Taxonomy and Basic Description

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



Red-breasted nuthatches are small, weighing approximately 10 grams (0.35 ounces) and distinguished by a black eyeline, 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 grams (0.21 ounces) and their yellow and orange crown patch that is bordered by black. Orange is absent in females.

Red crossbills weigh 23 to 45 grams (0.81 to 1.58 ounces), lack wingbars and have distinctive crossed mandibles.

#### Status

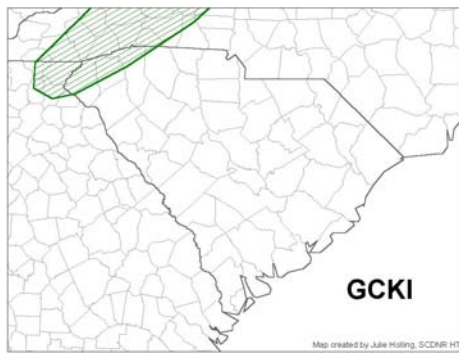
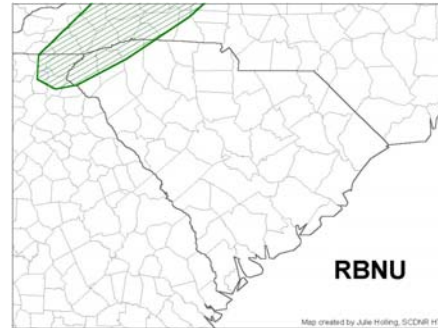
All of these species are protected under the Migratory Bird Treaty Act; however, neither the red-breasted nuthatch nor the golden-crowned kinglet receives special federal status. The southern Appalachian populations of the red crossbill are a federal species of conservation concern (USFWS 2002). Partners 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 are listed on the South Carolina Rare, Threatened & Endangered Species Inventory.

Regionally, southern Appalachian populations of the red crossbill are categorized as significantly rare on the North Carolina Natural Heritage Program List of Rare Animals. Breeding populations are described as “extremely rare and critically imperiled in the state...” in Tennessee (author

2004). The golden-crowned kinglet and the red-breasted nuthatch are included on the North Carolina Natural Heritage Program Animal Watchlist.

## POPULATION DISTRIBUTION AND SIZE

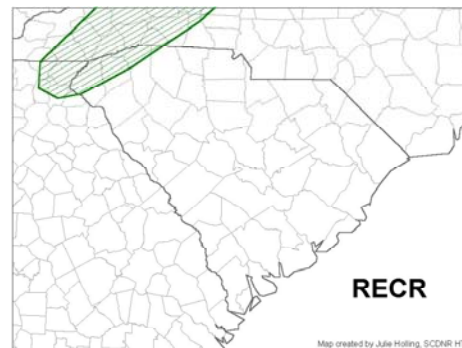
Global estimates of population size are roughly 18 million red-breasted nuthatches, 34 million golden-crowned kinglets and 15 million red crossbills (Rich et al. 2004). Between 1966 and 2002, the red-breasted nuthatch population increased significantly by 1.5 percent annually throughout their range. The golden-crowned kinglet and red crossbill populations experienced insignificant annual declines of 0.8 percent and 0.7 percent, respectively (Sauer et al. 2004).



These three species have broad distributions and tend to occur in 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 was present 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.



## 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). 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).

## 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 have endured 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 and 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.

## CONSERVATION ACCOMPLISHMENTS

In the southern Appalachians, members of this guild mainly use high-elevation spruce-fir forest. Most (95 percent) of the remaining acreage of spruce-fir forests is on public lands and nearly 80 percent 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 potentially from pollution originating elsewhere.

## CONSERVATION RECOMMENDATIONS

- Determine the distribution, densities and nest survival rates of breeding red-breasted nuthatch, golden-crowned kinglet and red crossbill 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 hectares or 98.8 acres.
- 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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