

# Brown-headed Nuthatch Enhancement Study

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## Objectives:

1. Assess the importance of pine density and competition with eastern bluebirds on the spatial distribution of Brown-headed Nuthatch nests.
2. Assess the numerical response of brown-headed nuthatches to the experimental exclusion of eastern bluebirds.
3. Assess the ability of eastern bluebirds to usurp nest sites from brown-headed nuthatches.
4. Provide golf course managers in the Southeast with recommendations to increase the numbers of brown-headed nuthatches on their golf courses.

**Start Date:** 2007

**Project Duration:** two years

**Total Funding:** \$7,400

The Brown-headed Nuthatch (*Sitta pusilla*) is a cooperatively breeding bird endemic to the southeastern United States. But for nearly half a century, its numbers have been in decline. At the same time, another cavity-nesting species has increased dramatically in number in the same region - the Eastern Bluebird (*Sialia sialis*). Bluebirds tend to fare well in a variety of human-altered habitats and have been the beneficiaries of nest box programs throughout their range.

Nest boxes on six golf courses near Davidson, North Carolina have been monitored since 2001. For each nest box, we measured the distance to the nearest three pine trees (*Pinus echinata*). The distance to the third was our measure of pine density. Boxes for which the third closest pine was less than 50 meters away were considered to be in "pine-rich" habitat. Boxes for which the third closest pine was more than 50 meters away were considered to be in "pine-poor" habitat.

We modified a subset of the nest boxes to exclude bluebirds. Standard 1.5" entrance holes accommodate both bluebirds and nuthatches; 1.25" holes accommodate nuthatches, but are too small for bluebirds. Prior to the 2005 breeding season, we randomly assigned boxes on three golf courses to the 1.25" treatment.

Results indicate that pine density had no significant effect on nesting by nuthatches. Hole size, however, had a highly significant effect on nuthatch settlement: nuthatches settle where competition with bluebirds is minimized, regardless of local pine density.

Inter-specific competition with bluebirds thus has a major influence on nuthatch distribution. We recorded the number of nuthatch nests on three courses



Brown-headed nuthatches breed in cooperative groups in the southeastern US. (photo by Austin Mercadante)

with a subset of 1.25" entrance holes vs. the number on three other courses on which all boxes had standard "bluebird-friendly" 1.5" entrance holes. We monitored boxes in 2004 to ensure that all six courses were similar in their lack of nuthatches.

For the 2005, 2006, and 2007 breeding season, we monitored the numbers of nuthatch nests on both experimental and control courses. Numbers of nuthatches increased in each year of the study, suggesting that bluebirds competitively exclude nuthatches from available habitat.

These results clearly demonstrate that nuthatches flourish only where bluebirds are excluded. Prior to the 2008 breeding season, we reversed the treatments on our six golf courses: our three "bluebird-friendly" courses became "nuthatch-friendly" and vice-versa. If bluebirds are truly the determinant of the distribution and abundance of Brown-headed Nuthatches on golf courses in the Southeast, we should expect in 2008 to find bluebirds nesting in boxes that contained nuthatches in 2007.

Of the 32 boxes containing

nuthatch nests in 2007, 31 contained bluebird nests in 2008. The competitive superiority of bluebirds is unquestionable. In the absence of bluebirds, nuthatch numbers increase; in the presence of bluebirds, nuthatch numbers plummet.

Golf course managers throughout the US are encouraged to make a subset of course boxes unavailable to bluebirds (via a smaller entrance hole). Course managers can ensure that Brown-headed Nuthatches can thrive. For golf courses in the distributional range of Brown-headed Nuthatches, we recommend that at least one-third of boxes be provided with small holes.

## Summary Points

- Brown-headed Nuthatch numbers have declined throughout the Southeast. Their supposed dependence on old growth pine forests - and susceptibility to habitat alteration - is usually blamed for this decline. We offer an alternative hypothesis - that nest site competition with a burgeoning Eastern Bluebird population is also responsible.

- We monitored nest box use by bluebirds and nuthatches on golf courses and found that pine density had little effect on nest box use by nuthatches. Instead, the exclusion of bluebirds (via smaller entrance holes) was the best predictor of nest box occupation by nuthatches.

- Brown-headed Nuthatch numbers increased dramatically on three golf courses where bluebirds were excluded from one-third of nest boxes. Control courses had few if any breeding nuthatches over the same period.

- When bluebird-friendly holes were returned to experimental boxes, bluebirds quickly evicted resident nuthatches.

- To prevent monopolization of nest boxes by bluebirds, golf courses in the Southeast should provide smaller entrance holes on a subset of their nest boxes.