

## Pine Savannah Bird Guild

**American Kestrel (southeastern race)** (*Falco sparverius paulus*)  
**Bachman's Sparrow** (*Aimophila aestivalis*)  
**Brown-headed Nuthatch** (*Sitta pusilla*)  
**Henslow's Sparrow** (*Ammodramus henslowii*) – **winter population**  
**Pine Warbler** (*Dendroica pinus*)

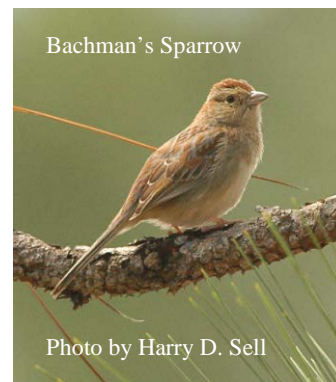
*NOTE: The Red-cockaded Woodpecker is discussed in its own species account.*

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### DESCRIPTION

#### Taxonomy and Basic Description

The Bachman's Sparrow is a large songbird, averaging 15 cm (5.91 in.) in length and 19.5 g (0.69 oz.) in weight. This species has a large bill, fairly flat forehead and a long, rounded dark tail (NGS 1999). Adults are gray above and heavily streaked with chestnut or dark brown. Their breast and sides are buff or gray with a whitish belly and a thin, dark eye line (NGS 1999, Sibley 2003). Three subspecies exist; however, populations are seldom differentiated by subspecies (NatureServe 2013).

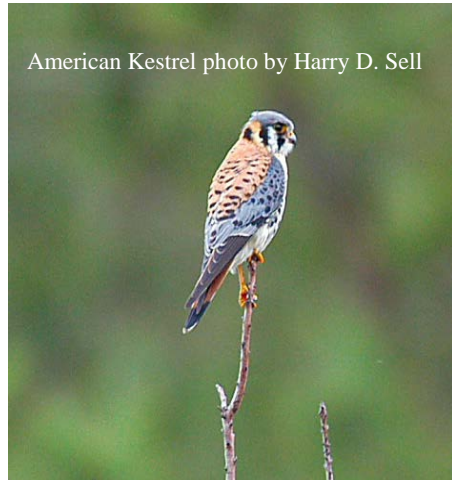


The Henslow's Sparrow is a mid-sized, insectivore-granivore songbird averaging 13 cm (5.11 in.) in length and 13 g in weight (NatureServe 2013). This species has a large flat head, gray bill, and short tail. Adults are greenish on the head, nape, and central crown strip with dark chestnut wings (NGS 1999).

The Brown-headed Nuthatch is a small bird, approximately 11 cm (4.3 in.) in length and 10.5 g (0.37 oz.) in weight. This nuthatch has a brown cap, dark back, and dull buff underparts (NGS 1999).



The American kestrel is the smallest falcon with a length of 27 cm (10.6 in.), wingspan of 58 cm (22.8 in.), and a weight of 117 g (4.13 oz.) (NGS 1999; Sibley 2003). Adults are identified by a russet back and tail, double black stripes on a white face, and blue-gray wings (NGS 1999). Howe and King first described the Southeastern subspecies in 1902 (NatureServe 2013); this subspecies is nonmigratory and resides primarily in the Piedmont and Coastal Plain of South Carolina. The male of the Southeastern subspecies is smaller and less spotted ventrally than the



American Kestrel photo by Harry D. Sell

males of more northern races. However, the northern races are migratory and may coexist with the Southeastern subspecies outside of the breeding season (NatureServe 2013).

The Pine Warbler is a stocky, long tailed songbird, averaging 14 cm (5.5 in.) in length and 12 g (0.4 oz.) in weight (Rodewald et al. 1999). This warbler lacks the strong patterning seen in other warblers. Pine Warblers are yellowish birds with an olive back, whitish belly, and strong white wing bars. Females and juveniles are drabber, often appearing to be more of a gray-brown color (Sibley 2003).

## Status

Bachman's Sparrows, brown-headed nuthatches, and Henslow's Sparrows are all designated as species of high continental importance by the Partners in Flight (PIF) prioritization process (Hunter and Demarest 2005; Rosenberg 2004). This designation indicates that the risk of significant population decline or range-wide extinction is high for these birds. In South Carolina the Bachman's Sparrow is currently ranked as S3, the brown-headed nuthatch is ranked as S4, and the Henslow's Sparrow is not currently ranked.

Bachman's Sparrows and Henslow's Sparrows are species that are affected by many issues across their entire range; PIF recommends immediate action to address multiple causes of concerns (Rich et al. 2004). The Brown-headed Nuthatch is considered moderately abundant or widespread, but is experiencing declines and threats. While the Brown-headed Nuthatch is still widespread, the species will require significant management action to prevent range-wide extirpation and further population declines.

PIF designates the American Kestrel as a species of high regional responsibility at the continental level (Rosenberg 2004). The Southeastern subspecies is an extremely high priority species for the South Atlantic Coast physiographic area (Hunter et al. 2001). The American Kestrel is ranked as secure globally (G5), but the Southeastern subspecies is vulnerable (T4) (NatureServe 2013). The American Kestrel is currently considered apparently stable (S4) in South Carolina.

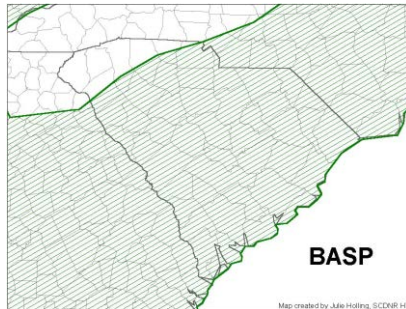
The Pine Warbler is designated as secure globally (G5) and is not currently ranked in South Carolina. PIF currently considers this species to be of moderate conservation priority (Hunter et al. 2001). The current population trend of this species appears to be increasing (BirdLife International 2012).



Pine Warbler by USGS

## POPULATION SIZE AND DISTRIBUTION

The Bachman's Sparrow, the Brown-headed Nuthatch, Southeastern subspecies of the American kestrel, and the pine warbler are resident species in South Carolina. Historically, the core distribution of each of their ranges coincided closely with the distribution of the red-cockaded woodpecker (*Picoides borealis*), longleaf pine (*Pinus palustris*), and short leaf pine (*Pinus echinata*) (Hunter et al. 2001). Breeding bird atlas records for Bachman's Sparrows transect the State within the Piedmont and Coastal Plain while records for Brown-headed Nuthatches, American Kestrels, and Pine Warblers were scattered throughout the State (Cely 2003).



Immediate attention is necessary to reduce long-term population declines of Bachman's Sparrow; the Breeding Bird Survey (BBS) indicates a 0.9% rate of decline per year for South Carolina from 1966 to 2010 (Sauer et al. 2012). The rate of decline is greater in the Piedmont region (13.5%) than in the Coastal Plain (2.2%). The statewide objective for the Bachman's Sparrow is a doubling of the population over the next 30 years due to severe declines in the population trend during the past 30 years (Rosenberg 2004). Statewide

objectives are defined based upon trends at the continental level (Rosenberg 2004), but species assessments based on physiographic region scales also indicate population declines that make this species an extremely high conservation priority (Hunter et al. 2001). The current population estimates for the Piedmont and the Coastal Plain physiographic regions of South Carolina are 21,000 and 1,700 individuals, respectively (Rosenberg 2004).



Henslow's Sparrows winter throughout the Coastal Plain, extending inland from the coast and through the Sandhills (Cely 2003). The State population estimate is currently unknown in part due to the BBS being a survey based upon breeding bird data. Long-term declines are evident for this species both within the State (McNair and Post 2000) and across its range; the BBS indicates a 0.6% annual decline across the United States from 1966 to 2010 (Sauer et al. 2012).

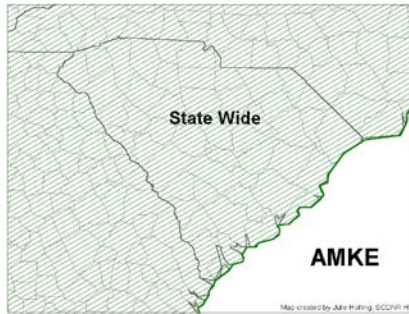
The statewide population objective is to double the wintering population over the next 30 years (Rosenberg 2004).



The same BBS trend data indicates a 1.2% rate of decline per year for Brown-headed Nuthatch in South Carolina and a 0.6% decline throughout its range from 1966 to 2010 (Sauer et al. 2012). Due to this level of decline, the statewide objective is to increase the population by 50% over the next 30 years (Rosenberg 2004). Statewide objectives are defined based upon

trends at the continental level (Rosenberg 2004), but assessments considering area importance also indicate population declines at the physiographic region scale that call for significant action (Hunter et al. 2001). The current statewide population objective is 174,000 individuals (98,000 in the South Atlantic Coastal Plain and 76,000 in the Piedmont).

The American Kestrel of the Southeastern Coastal Plain is also declining; the BBS indicates a 1.3% rate of decline per year from 1966 to 2010 (Sauer et al. 2012). There are currently no BBS



trend scores available for South Carolina. The overall population trend for the Coastal Plain indicates a need to increase the population by 50% over the next 30 years (Hunter et al. 2001). Continental population estimates are available for this species, but caution should be exercised when extrapolating to the state level due to consideration of various subspecies. All subspecies are common during the winter due to migration; however, breeding activity of the Southeastern subspecies is low (Hamel 1992).



Pine Warblers are common statewide residents of South Carolina, both overwintering and breeding here. Different populations may be present seasonally, since some populations may move beyond South Carolina into more temperate regions during the summer (Hunter et al. 2004). The BBS indicates a 2.1% increase of Pine Warblers in South Carolina, and a 1.3% increase throughout its range from 1966-2010 (Sauer et al. 2012).

## HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Each of these species is dependent upon southern pine-dominated landscapes for all or part of their life cycles.

Bachman's Sparrows are ground nesters within dense cover. These birds also forage for insects and seeds on the ground. Bachman's sparrows are associated with pine forests that possess a relatively dense grass and forb layer and few tall shrubs or understory trees (Dunning and Watts 1990). The size, age, and even presence of overstory pines are not important, as the youngest (1- to 5-year-old clearcuts) and oldest age classes (mature pine  $\geq 80$  years old) are most frequently occupied, but mid-rotation stands may be used if vegetation structure is adequate (Dunning and Watts 1991). This species can also be found nesting in overgrown fields with low numbers of pine trees. However, because Bachman's Sparrows seem to be poor dispersers, newly created habitat (e.g. young clearcuts) that is isolated and distant from existing populations often remains unoccupied. It is also likely that, in areas not subject to frequent prescribed fire, grasses and forbs could become too thick for this species to nest and forage, as a degree of openness is necessary.

The winter habitat requirements of Henslow's Sparrows are poorly understood. In the Gulf Coastal Plain, the species winters in moist grassy areas (pitcher plant bogs) under open pinewoods. They can also be found in broomsedge (*Andropogon spp.*) or other grasses that are moist (Hamel 1992; Plentovitch et al. 1999; Burhans 2002). Soil moisture and the density and

height of ground vegetation may be important factors determining habitat quality (Hunter et al. 2001). In the Coastal Plain of South Carolina, Henslow's Sparrows winter in grassy, non-inundated Carolina bays and in utility right-of-ways maintained in grasses, particularly those wider than 65 m (213 ft.) (Champlin 2007). Upper Coastal Plain pine savannas may be rarely used, and soil moisture may not be as important as elsewhere; xeric upland rights-of-way supported more sparrows than Carolina bays, and no birds were found in pine savannas in Aiken and Barnwell counties (Champlin and Kilgo, unpubl. data). However, moist areas beneath a pine canopy may be more important coastward, as several birds were detected in such habitat in southern Allendale County. More information about the wintering habitat requirements of Henslow's Sparrows is necessary.

While the Bachman's Sparrow occupies the understory of open pinelands, the brown-headed nuthatch occupies the overstory of mature, open pinelands. This cavity nesting species requires dead or older trees as a nesting substrate and forages on both dead and live trees to glean insects (Hamel 1992). They have been known to use bark chips as a tool for prying up other bark in their search for insects (Withgott and Smith 1998). These birds also eat pine seeds and use the seed wings as nest material (Withgott and Smith 1998). Brown-headed Nuthatches avoid short rotation pine forests (<80 years old) because these birds excavate nests in older pine trees which often have dead limbs present (Hunter et al. 2001). Frequent fire rotations benefit this species, as well as the sympatric Red-cockaded Woodpecker, by maintaining a sparse midstory and diverse groundcover composition which may, in turn, increase arthropod biomass for forage (Taylor 2003).

The American kestrel is a secondary cavity nesting species. Currently, very few of these birds nest in natural cavities due to a lack of standing snags in open pinewoods and agricultural areas (Hunter et al. 2001). Use of artificial nests in South Carolina has led to an increase in the population (Cely and Sorrow 1988). Optimal nest sites are in extensive open areas with scattered trees (pine or hardwood). Kestrels forage in open areas, such as plowed and grassy fields, roadsides, savannas, and woodland margins (Hamel 1992). The productivity of foraging habitat may be influenced by land use. In Florida, kestrels nesting in longleaf-dominated sandhills were more productive than those nesting in agricultural areas, primarily due to the quality and abundance of prey items (Bohall-Wood and Collopy 1987).

Pine warblers build their nests 8-20 m (26-66 ft.) above ground on horizontal branches of pine trees or among foliage at the branch tip. Pine Warblers are often found in mixed pine-hardwood forests, but they tend to prefer nesting in pure pine stands (NatureServe 2013). Despite range-wide habitat degradation as native pine forests are converted into pine plantations, Pine Warblers continue to increase in numbers. They exhibit a tolerance of commercial forestry operations and will breed among the stands (NatureServe 2013).

Pine Warblers frequent open pine stands with high canopy cover and low levels of understory (Larson et al. 2003). They prefer pine varieties with long needles over short (Stevenson and Anderson 1994). Pine Warblers forage in the top of pine trees by picking arthropods off of the bark and needles (Rodewald et al. 1999). In the winter months, Pine Warblers are often found foraging in the leaf litter of Southern pine forests or in fields, pastures, and forest edges

(NatureServe 2013). Pine Warblers are the only warbler to consume large amounts of seeds, primarily from pine trees. This mainly occurs in the winter months (Rodewald et al. 1999).

## CHALLENGES

The greatest challenge to viability of these species is directly related to the location and condition of their optimal habitat: the pine savanna. Although longleaf pine is ecologically the most important species of pine within the Southeast region and South Carolina, other pine species, such as loblolly (*P. taeda*) and slash pines (*P. elliottii*) have become more important economically. The longleaf pine forest cover type extended over 92 million acres of the entire Southeast landscape prior to European settlement of North America. However, by the 1930s, the majority of these pines had been harvested; today, less than 3% of the original longleaf forests remain (Frost 1993). The loss of longleaf pine stands, especially those with intact understory, is particularly devastating to plant and animal species that are dependent upon a fire-maintained ecosystem for ground layer composition and structure. This effect is evident in areas where frequent fire rotations are not presently conducted. It is suggested that restoration of longleaf communities can best be accomplished by burning on a 2 to 3 year rotation during the growing season (Tucker et al. 2005). However, Outcalt (2000) estimated that only about half of available longleaf stands were burned within the previous 5 years. Additionally, in sites where longleaf and other pine species are planted after significant agricultural use, a seed bank for a desirable herbaceous layer may no longer be present, decreasing the ability to restore important habitat for these species (Walker and Van Eerden 1996; Frost 1993; Imm and McLeod 2005). Therefore, loss of the longleaf pine ecosystem seems to be limiting populations of birds in this guild.

Management actions that reduce or completely eliminate fire rotations, shorten timber rotations, and/or reduce forest diversity of pinewoods adversely affect the overall structure of this habitat (Frost 1993). Additionally, restored and planted pine sites may no longer provide the appropriate herbaceous ground cover due to deficiencies in the existent seed bank (Imm and McLeod 2005). An increase in land conversion to agricultural and urban uses has also resulted in significant losses of all forested habitat types across the State. Although it is unlikely that historical acreage of longleaf can be restored, if managed correctly, all species of pine can provide benefits to wildlife (Franklin 1997; Brockway et al. 2004).

Additionally, lack of survey and monitoring programs to supplement BBS and other existing programs (point counts, call surveys, mist net stations) can result in inaccurate population estimates and trends. Additional monitoring efforts could help increase the efficacy of management actions in the future by providing information on which practices were beneficial and which were not.

## CONSERVATION ACCOMPLISHMENTS

Restoration of the longleaf pine ecosystem on state and federal lands across the State has provided the most significant accomplishment to date for conservation of these pine savanna species. The Natural Resources Conservation Service (NRCS) developed the Longleaf Pine Ecosystem Conservation Priority Area in 1998 in order to promote longleaf restoration on private lands. Private organizations, such as the Longleaf Alliance and the American Forest

Foundation have also contributed to the effort of restoring longleaf ecosystems. For example, the American Forest Foundation has supported the publication of the *Forest Ecosystem Conservation Handbook for Birds in Georgia: A Guide for Family Forest Owners* (DeBerry 2005) that can provide public outreach support for conservation and maintenance of these important ecosystems.

These efforts were also significantly benefited by the completion and implementation of the updated Red-cockaded Woodpecker Recovery Plan in 2003 (USFWS 2003). Management recommendations for longleaf ecosystems described in the Recovery Plan would also accomplish conservation goals for these pine savanna species. Additionally, development of forestry Best Management Practices (BMPs) for the State and implementation on federal, state and private lands have positively affected longleaf pine ecosystem conservation.

At the Santee Coastal Reserve, placed within longleaf and loblolly pine ecosystems, are 25 nest boxes dedicated to Brown-headed Nuthatches. During the 2013 nesting season, prior to the exclusion of bluebirds, there were 200 nest boxes with 6.5% utilization by nuthatches. Retrofitting more nest boxes for nuthatch-only use will hopefully result in higher usage by the species within the Reserve. [M. Martin, pers. comm.]

Finally, measuring accomplishments for these species depends on participation by State employees and volunteers in the Breeding Bird Survey and other bird surveys established in South Carolina (Christmas Bird Count, International Migratory Bird Day, Backyard Feeder Watch). Volunteers have also assisted with monitoring efforts to measure population increases and declines in order for researchers and managers to best determine habitat objectives.

## CONSERVATION RECOMMENDATIONS

- Continue the restoration of longleaf pine ecosystems across the State.
- Enhance the wildlife value of agricultural lands by partnering with NRCS, FSA, and others to develop conservation programs. Integrate monitoring objectives into such programs, where appropriate.
- Increase acreage to reduce forest fragmentation at the landscape scale while protecting and building upon existing areas that support source populations of pine-dependent species. Develop corridors linking forested tracts across the State. Conduct a landscape level spatial analysis to determine total forest area, geographic distribution of pine forest types (and all other forest types), fragment size, and quantitative characteristics (ownership patterns) to assess ecosystem change and current potential.
- Consider utilization of models based on spatial analysis and geographic information system tools to highlight areas of greatest conservation need for pine savanna habitats. Such methods could increase efficiency in land acquisition and implementation of private lands programs.
- Continue involvement in and delivery of private, state, and federal conservation programs targeted towards pine savanna restoration and management (USFWS, Land Owner Incentive Program; Department of Energy, Carbon Sequestration Initiative).
- Promote the use of BMPs for all pine species in Forest Stewardship Plans, including increased rotation length, decreased stocking densities, promotion of site prep burning,

decreased use of chemicals, increased use of growing and dormant season prescribed fire, increased width of Streamside Management Zones, and the selection of site-specific species.

- Implement measures to reduce concern about air quality and burning. Educate the public about the importance of burning for wildlife species.
- Promote retention of snags and other potential cavity trees to increase the number of structures available for cavity nesting species.
- In the case of American kestrels, promote the placement of nest boxes in appropriate habitat types.
- In areas devoid of site-appropriate savanna species or with depauperate seed banks, establish wiregrass (*Aristida stricta*, *A. beyrichiana*) and other herbaceous species through propagation from local seed sources.
- Identify wintering habitat requirements of Henslow's Sparrows in South Carolina.
- Assess attainability of continental-level bird population objectives for the species identified in South Carolina based on land-use patterns, population trends, and habitat needs; develop biological models of population/habitat relationships.
- Derive quantitative population-based habitat objectives for priority pine savanna species and test assumptions (identify habitat-specific densities, limiting factors) in order to model habitat requirements necessary to meet population objectives.
- Develop and implement monitoring programs to better assess breeding and wintering bird population sizes. Management and surveillance monitoring techniques will need to be assessed to quantify short- and long-term population responses in order to answer specific monitoring questions. Measures will need to be developed to integrate state monitoring results into regional and national level databases.
- Continue to use the Breeding Bird Survey as a surveillance monitoring technique and consider modifications to make the survey more robust across the State.
- Increase the collection of survey and monitoring data. For example, develop training workshops or establish a bird counting team.
- Continue participation in the Atlantic Coast Joint Venture at the management board and science committee levels.
- Promote existing and develop new partnerships to facilitate increased land acquisition.
- Include information in all media outlets available about the value of the longleaf ecosystem to the State and region in order to promote conservation ethics.
- Promote participation of volunteers for collection of survey and monitoring data.

## MEASURES OF SUCCESS

Restoring the longleaf pine ecosystem in significant acreages across South Carolina and the Southeastern landscape will provide benefits to a wide range of taxa. At the very least, restoration of understory characteristics in all types of pine savannas should result in increased ecological function of that habitat. By restoring the understory, the increased plant species richness will result in increased food web complexity and expand species-specific relationships (plant-pollinator). Further, restoration of the understory can facilitate burning by reducing maintenance costs due to modified fuel conditions.



Calculating habitat objectives will indicate if population objectives are attainable for South Carolina and whether changes to these objectives are necessary. In some cases, it may be unrealistic to achieve PIF continental population objectives due to significant and permanent habitat loss. In other cases, South Carolina will be a source for some populations and measures will need to be developed to integrate monitoring results into regional- and national-level databases.

Collecting monitoring data based on habitat restoration and management objectives should result in measurable population responses at the local level. Other bird species that are likely to be positively affected by pine savanna management and restoration include: Red-cockaded Woodpecker, Prairie Warbler (*Dendroica discolor*), Eastern Towhee (*Pipilo erythrophthalmus*), Wood Thrush (*Hylocichla mustelina*), Northern Bobwhite (*Colinus virginianus*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Yellow-throated Warbler (*Dendroica dominica*), White-eyed Vireo (*Vireo griseus*), Carolina Wren (*Thryothorus ludovicianus*), Red-shouldered Hawk (*Buteo lineatus*), Red-bellied Woodpecker (*Melanerpes erythrocephalus*), and Yellow-throated Vireo (*Vireo flavifrons*) (Rich et al. 2004).

Management efforts for species identified within this plan will also positively impact other state priority species including the fox squirrel (*Sciurus niger*), flatwoods salamander (*Ambystoma cingulatum*), and indigo snake (*Drymarchon corais couperi*).

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