Pine Savannah Bird Group

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

Contributors: Laurel Moore Barnhill and Donald Imm

DESCRIPTION

Taxonomy and Basic Description

The Henslow's sparrow is a mid-sized insectivore-granivore songbird averaging 13 cm (5.11 inches) in length and 13 grams in weight (NatureServe 2005). 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 Bachman's sparrow is a large - songbird, averaging 15 cm (5.91 inches) in length and 19.5 g (0.69 ounces) 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 2005).

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

The American kestrel is the smallest falcon with a length of 27 cm (10.6 inches), wingspan of 58 cm (22.8 inches) and a weight of 117 g (4.13 ounces) (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 2005); 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 males of more northern races. However, the northern races are migratory and may

coexist with the southeastern subspecies outside of the breeding season (NatureServe 2005).

Status

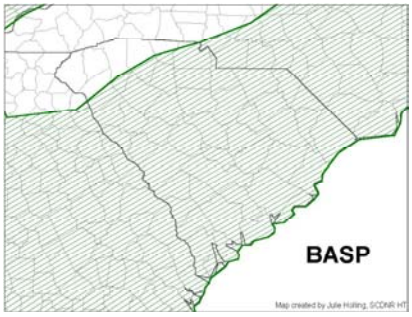
Bachman's sparrows, brown-headed nuthatches and Henslow's sparrows are all designated as species of high continental importance by the Partners In Flight (PIF) prioritization process (Hunter and Demarest 2005 and Rosenberg 2004). This designation indicates that the risk of significant population decline or range-wide extinction is high for these birds.

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 2005).

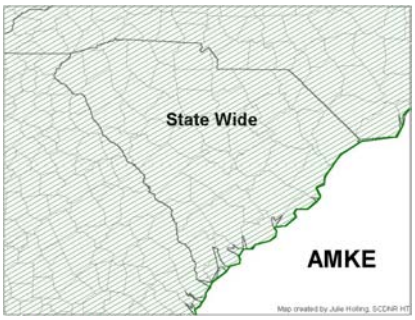
POPULATION DISTRIBUTION AND SIZE

The Bachman's sparrow, the brown-headed nuthatch and the southeastern subspecies of the American kestrel are resident species to 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 and American kestrels were scattered throughout the state (Cely 2003).

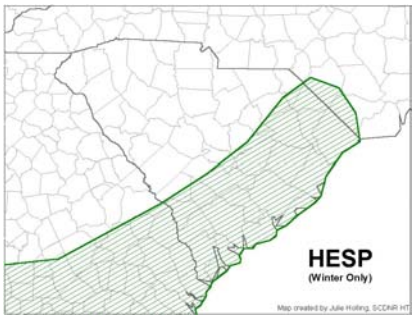


Immediate attention is necessary to reduce long-term population declines of Bachman's sparrow; the Breeding Bird Survey (BBS) indicates a 1.3 percent rate of decline per year for South Carolina from 1966 to 2003 (Sauer et al. 2004). The rate of decline is greater in the piedmont region (13.5 percent) than in the coastal plain (2.2 percent). 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)

The same BBS indicates a 1.2 percent rate of decline per year for brown-headed nuthatch in South Carolina and 1.6 percent decline throughout its range from 1966 to 2003 (Sauer et al. 2004). Due to this level of decline, the statewide objective is to increase the population by 50 percent 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 southeastern subspecies of the American kestrel has greatly declined; the BBS indicates an 8.3 percent rate of decline per year for the coastal plain from 1966 to 2003 (Sauer et al. 2004). 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 percent 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).



Henslow's sparrows winter throughout the coastal plain and piedmont, 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 across its range; the BBS indicates an 8.6 percent annual decline across the United States from 1966 to 2003 (Sauer et al. 2004). The statewide population objective is to double the population over the next 30 years (Rosenberg 2004).

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

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

Bachman's sparrows are ground nesters within dense cover. These birds also forage for insects and seeds on the ground. Traditionally, Bachman's sparrows have been associated with mature pine forests, especially longleaf with bunch grass understories comprised of wiregrass in the east (*Schizachyrium scoparium*) (Hunter et al. 2001). Highest breeding concentrations of these sparrows are found in open pinelands where a thick ground cover of grasses and forbs are present (Hamel 1992). This species can also be found nesting in overgrown fields with low numbers of

pine trees. In either case, the key elements appear to be a dense ground cover of grasses and forbs with low volumes of vegetation in the under- and midstory levels (Dunning and Watts 1990). The diameter of overstory pine does not seem to be a critical factor for Bachman's sparrows either in the breeding or wintering season. It is 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.

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). Brown-headed nuthatches avoid short rotation pine forests (less than 80 years) 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, increasing 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 lead to an increase in the population (Cely and Sorrow 1988). Optimal nest sites are in extensive open areas with scattered trees (pine or hardwood). Kestrel foraging occurs 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).

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 rights-of-way maintained in grasses (Champlin and Kilgo, unpubl. data). In South Carolina, pine savannas may be rarely used and soil moisture may not be as important as elsewhere; xeric upland rights-of-way supported as many sparrows as Carolina bays and no birds were found in pine savannas (Champlin and Kilgo, unpubl. data). However, moist areas beneath a pine canopy may be more important coastward; two birds were captured in such habitat in southern Allendale County. More information about the wintering habitat requirements of Henslow's sparrows is necessary.

CHALLENGES

The greatest challenge to viability of these species is directly related to the location and condition of their optimal habitat: the pine savannah. 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. Longleaf pine forest cover type extended over 92 million acres of the entire southeast landscape prior to European settlement of North American. However, by the 1930's, the majority of these pines had been harvested and today, less than three percent of the original longleaf forests remain (Frost 1993). The loss of longleaf and 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 two to three year rotation during the growing season (Tucker et al. 2005). However, only approximately half of the available longleaf stands were burned once within the last five years (Outcalt 2000). 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 in press). 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 *in press*). 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 would increase the efficacy of management actions in the future.

CONSERVATION ACCOMPLISHMENTS

Restoration of the longleaf pine ecosystem on state and federal lands across the state have provided the most significant accomplishment to date for conservation of these pine savannah species. The Natural Resources Conservation Service 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 in the effort to restore longleaf ecosystems. For example, the American Forest Foundation has supported the publication of the *Conservation Handbook for Birds in Georgia: a guide for family forest owners* (DeBerry in press) that can provide public outreach support for conservation and maintenance of these important ecosystems.

These efforts were also significantly benefited by completion and implementation of the updated red-cockaded woodpecker Recovery Plan in 2003 (U.S. FWS 2003). Management recommendations for longleaf ecosystems described in the recovery plan would also accomplish conservation goals for these pine savannah species. Additionally, development of forestry best

management practices for the state and implementation on federal, state and private lands have positively affected longleaf pine ecosystem conservation.

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 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 savannah 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 (USFWS, Land Owner Incentive Program; Department of Energy, Carbon Sequestration Initiative).
- Promote the use of best management practices for all pine species in 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, 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 use of 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 the development of a piedmont bird conservation region initiative.
- 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 quantities 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 increase 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*), pine warbler (*Dendroica pinus*), 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 that will also positively impact other state priority species including fox squirrel (*Sciurus niger*), flatwoods salamander (*Ambysitoma cingulatum*) and indigo snake (*Drymarchon corais couperi*).

LITERATURE CITED

Brockway, D., K. Outcalt, D. Tomczak and E. Johnson. 2005. Restoring longleaf pine forest ecosystem in the southern U.S. Pages 501-519 *In:* Restoration of Boreal and Temperate Forests, J. Stanturf and P. Madsen, editors. CRC Press. Boca Roton, Florida.

Burhans, D.E. 2002. Conservation assessment—Henslow's Sparrow *Ammodramus henslowii*. U.S. For. Serv. Gen. Tech Rep. NC-226. St. Paul, Minnesota. 46 pp.

DeBerry, D. In press. Forest Ecosystem Conservation Handbook for Birds in Georgia: A Guide for Family Forest Owners. American Forest Foundation, Washington, D.C.

Bohall-Wood, P. and M. Collopy. 1986. Abundance and habitat selection of two American kestrel subspecies in north-central Florida. Auk. 103:557-563.

Cely, J. and J. Sorrow. 1988. American Kestrel and Common Barn-owl Nest Box Use in South Carolina. South Carolina Wildlife and Marine Resources Department Report No. 2. 18 pp.

Cely, J. 2003. The South Carolina Breeding Bird Atlats 1988-1995. South Carolina Department of Natural Resources. Columbia, South Carolina. 305 pp.

Coordinated Bird Monitoring Working Group of the International Association of Fish and Wildlife Agencies (CBMWG). 2004. Monitoring Avian Conservation: Rationale, Design, and Coordination. Available: www.iafwa.org/bird_conservation/bird_monitoring.htm

Dunning, J. and B. Watts. 1990. Regional differences in habitat occupancy by Bachman's Sparrow. Auk. 107:463-472.

Franklin, R. 1997. Stewardship of Longleaf Pine Forests: A Guide for Landowners. Longleaf Alliance Report No. 2. The Longleaf Alliance, Solon Dixon Forestry Education Center, Andalusia, Alabama. 44 pp.

Frost, C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem, Pages 17-43. *In:* The Longleaf Pine Ecosystem: Ecology, Restoration, and Management, S. Hermann, editor. Proceedings of the Tall Timbers Fire Ecology Conference, No. 18. Tall Timbers Research Station, Tallahassee, Florida. 418 pp.

Hamel, P. 1992. Land Manager's Guide to the Birds of the South. The Nature Conservancy, Southeastern Region. Chapel Hill, North Carolina. 437 pp.

Hunter, W., D. Pashley and R. Escano. 1993. Neotropical migratory landbird species and their habitats of special concern within the Southeast Region. Pages 159-171. *In:* Status and Management of Neotropical Migratory Birds General Technical Report RM-229. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station, D. Finch and P. Stangel, editors. Fort Collins, Colorado. 422 pp.

Hunter, C., R. Katz, D. Pashley and B. Ford. 1999. Partners In Flight Bird Conservation Plan for the Southern Blue Ridge (Physiographic Area 23). American Bird Conservancy. The Plains, Virginia. 101 pp.

Hunter, W.C., L. Peoples and J. Collazo. 2001. Partners In Flight Bird Conservation Plan for the South Atlantic Coastal Plain (Physiographic Area 3). American Bird Conservancy. The Plains, Virginia. 166 pp.

Imm, D. and K. McLeod. In press. Plant communities. Ecology and management of a Forested Landscape: 50-years on the Savannah River Site, J. Kilgo and J. Blake, editors. Island Press. Washington, D.C.

Integrated Taxonomic Information System (IT IS). 2005. Online database for taxonomic information. Available http://www.itis.usda.gov/index.html.

National Geographic Society (NGS). 1999. Field Guide to the Birds of North America, Third Edition. National Geographic Society. Washington, D.C. 480 pp.

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.2. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer.

North American Bird Conservation Initiative (NABCI). 2005. Bird Conservation Regions. Available http://www.nabci-us.org/bcrs.html.

Outcalt, K. 2000. Occurrence of fire in longleaf pine stands in the southeastern United States. Pages 178-182. *In:* Fire and forest ecology: innovative silviculture and vegetation management, W. Moser and C. Moser, editors. Proceedings of the Tall Timbers Fire Ecology Conference, No. 21. Tall Timbers Research Station, Tallahassee, Florida. 225 pp.

Panjabi, A., C. Beardmore, P. Blancher, G. Butcher, M. Carter, D. Demarest, E. Dunn, C. Hunter, D. Pashley, K. Rosenberg, T. Rich and T. Will. 2001. The Partners In Flight Handbook on Species Assessment and Prioritization. Version 1.1. Rocky Mountain Bird Observatory. Brighton, Colorado. Accessed on June 13, 2005 at http://www.rmbo.org/pubs/downloads/Handbook.pdf

Plentovitch, S., N.R. Holler and G. E. Gill. 1999. Habitat requirements of Henslow's Sparrows wintering in silvicultural lands of the Gulf Coastal Plain. Auk. 116:109-115.

Rich, T., C. Beardmore, H. Berlanga, P. Blancher, M. Bradstreet, G. Butcher, D. Demarest, E. Dunn, W. Hunter, E. Inigo-Elias, J. Kennedy, A. Martell, A. Panjabi, D. Pashley, K. Rosenberg, C. Rustay, J. Wendt and T. Will. 2004. Partners In Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, New York. 84 pp.

Rosenberg, K. 2004. Partners In Flight Continental Priorities and Objectives Defined at the State and Bird Conservation Region Level: South Carolina. Cornell Lab of Ornithology. Ithaca, New York. 29 pp.

Rosenberg, K. and J. Wells. In press. Conservation priorities for terrestrial birds in the northeastern United States. *In*: Proceedings of the Third International Partners in Flight Conference, C. Ralph and T. Rich, editors. USDA Forest Service General Technical Report PSW-GTR-191. Albany, California.

Sauer, J.R., J.E. Hines and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.1. *USGS Patuxent Wildlife Research Center*. Laurel, Maryland.

Sibley, D. 2000. The Sibley Guide to Birds. National Audubon Society. New York, New York. 544 pp.

Taylor, T. 2003. Arthropod Assemblages on Longleaf Pines: a Possible Link between the Red-cockaded Woodpecker and Groundcover Vegetation. MS Thesis. Virginia Polytechnic Institute and State University. Blacksburg, Virginia. 106 pp.

Tucker, J., D. Robinson and J. Grand. 2005. Influence of fire on Bachman's sparrow, an endemic North American songbird. Journal of Wildlife Management. 68(4):1114-1123.

U.S. Fish and Wildlife Service. 2003. Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis*): second revision. U.S. Fish and Wildlife Service. Atlanta, Georgia. 296 pp.

Walker, J. and B. Van Eerden. 1996. Relationships between disturbance history and vegetation in Carolina sandhills. Bull. Ecol. Soc. Of America. 77:465.