

PROJECT PROPOSAL
Wildlife Research Section
Fish and Wildlife Research Institute

Project: **Avian Monitoring in Sandhill Habitat in Florida (9290 220 2685)**

Study Duration: July 2007-June 2008

Principal Investigator: James A. Rodgers Jr., Florida Fish and Wildlife Conservation
Commission, 4005 South Main Street, Gainesville, Florida 32601

Assistant: Stephen T. Schwikert, Florida Fish and Wildlife Conservation
Commission, 4005 South Main Street, Gainesville, Florida 32601
Matthew J. Reetz, OPS Biological Scientist III, Florida Fish and Wildlife
Conservation Commission, 4005 South Main Street, Gainesville,
Florida 32601

Prepared By: James A. Rodgers Jr., Florida Fish and Wildlife Conservation
Commission, 4005 South Main Street, Gainesville, Florida 32601

Date Prepared: June 13, 2007

INTRODUCTION

Sandhill habitat and 14 associated bird species of greatest conservation need (SGCN) were identified as a priority community by the Florida Wildlife Legacy Initiative (FWLI). The greatest threats to this community are conversion of native pine forests to high-density pine plantations, incompatible fire regimes (reduction in the use of prescribed fire), and disturbance (development, invasive plants, etc.), especially in the Gulf Coastal plain (Twedt et al. 2007). The evaluated status of sandhill habitat in Florida is poor and declining but there is little quantitative information on the status and trend of avian species dependent upon this habitat.

The Fish and Wildlife Research Institute (FWRI) received funding for development of a survey protocol for monitoring birds (e.g., northern bobwhite [*Colinus virginianus*], southeastern American kestrel [*Falco sparverius*], red-headed woodpecker [*Melanerpes erythrocephalus*], red-cockaded woodpecker [*Picoides borealis*], northern flicker [*Colaptes auratus*], brown-headed nuthatch [*Sitta pusilla*], and Bachman's sparrow [*Aimophila aestivalis*]) endemic to and characteristic of the sandhill community on public and private lands in Florida. Many of these species have experienced range-wide population declines (Sauer et al. 2005), especially the northern bobwhite (Twedt et al. 2007).

Sandhill parcels in Florida will be identified through the 2003 Florida Vegetation and Landcover Map. Parcels will be selected for surveying using a random design stratified by ownership, other parcel characteristics, and opportunities for partnering with landowners and other agencies as determined in conjunction with FWLI biologists. A database will be established for maintaining and sharing resulting data and to provide for use in future trend monitoring.

Results of this one-year project will serve as a model for establishing performance measures and monitoring protocols for other species and other priority habitats. Data resulting from this study and subsequent, periodic monitoring will provide a powerful data set for establishing performance measures for the sandhill community and associated wildlife and for assessing impacts of trends in sandhill habitat quantity and quality. Geo-referenced avian occurrence and abundance data will provide for identifying landscape features and vegetation characteristics that determine species occurrence. Such data, in conjunction with further analyses of GIS data, may also provide for prediction of species occurrence or abundance on private parcels not accessible for monitoring. Results will enable the FWC to collaborate with private landowners and other state and federal agencies to devise strategies for managing sandhill habitat and associated avian species in Florida.

This study also will support regional and statewide efforts to develop and implement FWC's long-term integrated Comprehensive Wildlife Conservation Strategy (CWCS) for monitoring, developing performance measures, and determining the success of FWC efforts to conserve Florida's avian diversity in sandhill habitats. The results of this project will allow FWC to model sandhill habitat management and develop protocols for other habitats and species. The program will make FWC a leader at the state and national level by setting objectives and performance measures for monitoring impacts to avian species and make conservation recommendations for avian communities. Because only about 55% of the identified sandhill habitat is in public ownership, a major goal of this study is to provide insight into the management of private lands for avian species. If this pilot project is successful, then we anticipate looking for additional sources of funding to continue this study.

Thus, the primary goal of this study is to develop a survey protocol for determining baseline distribution and relative abundance of birds characteristic of the sandhill vegetative community in Florida. These resulting data will provide for establishment of performance measures for these species and management recommendations for subsequent periodic implementation of the survey protocol to monitor their distribution and abundance. This monitoring will allow the FWC to assess the adequacy of sandhill management efforts at the landscape level and to identify areas where improved management is needed. This study will also serve as model for establishing performance measures and monitoring protocols for other taxa in sandhill habitat and for other priority habitats and their associated fauna.

OBJECTIVES

1. Estimate with a specified level of confidence the status of avian species in sandhill habitats in Florida.
2. Correlate the presence of avian species with sandhill habitat variables.
3. Make recommendations for avian monitoring in sandhill habitats.

STUDY POPULATION AND METHODS

Study area

The potential survey area covers the entire state but most remaining tracts of sandhill habitat occur in the north and central regions of Florida. In addition, we expect to have study sites on the Blackwater/Eglin (Okaloosa-Walton counties), Econfina (Washington-Bay-Jackson-Calhoun counties), Apalachicola/St. Marks (Leon-Wakulla counties), Camp Blanding Uplands (Clay County), Brooksville Ridge (Gilchrist-Alachua-Levy counties), Citrus/Marion (Citrus-Marion counties), and Chassahowitzka (Hernando-Pasco counties) sandhill focal areas identified by the FWC Landowner Assistance Program (LAP).

Agency Participation and Funding

Funding is provided by a Conserve Wildlife Tag grant number CWT 0708-04 during FY2007-2008. Match funding comes the salary of the principle investigator (JAR) and assistant (STS). The principle investigator is responsible for hiring the OPS staff. In addition to FWC wildlife management area and HSC staff, volunteer personnel from the Florida Division of Forestry, U.S. Forest Service, and private lands will be organized to survey plots under their jurisdiction. We also anticipate working with FWC staff with the LAP to access sandhill habitat on private lands.

Schedule and Duration

The study will begin with FY2007-2008 and the avian surveys will occur during the spring-summer period of 2008. A final report will be completed by January 15, 2009.

Study Approach

A systematic statewide survey of all sandhill habitat is beyond the budget and manpower of this study. Therefore, a sample of sandhill habitat will be used for monitoring avian populations designated as Species of Greatest Conservation Need (SGCN) in the FWLI and other avian species endemic to and characteristic of sandhill habitat (e.g., northern bobwhite, southeastern American kestrel, red-headed woodpecker, red-cockaded woodpecker, northern flicker, brown-headed nuthatch, and Bachman's sparrow).

Point-count techniques (Ralph et al. 1995) will be used to determine abundance or presence/absence of avian species. Sample sizes will be established based on the power to detect trends in species abundance or distribution and testing for spatial correlations the sandhill community statewide and for determining changes in community characteristics by strata (e.g., size of tract, land ownership, region of the State). Randomly located point stations within each

of the tracts of sandhill will be surveyed using volunteers and/or FWC staff. The date (mm/dd/yyyy format), observer(s), point station number, site name/code, and latitude/longitude will be recorded for each point station. The specific sampling protocol will include 6 point counts for each of the 60 sites and 3 visits per point station to accommodate variability in total number of species per site.

Many variables affect the auditory detection process of birds using point counts. Large distance or unlimited-radius counts tend to under count birds while 50-m radius counts tend to overestimate avian abundance (Simons et al. 2007). I have decided to use an intermediate 75-m radius count with a minimum of 200 m between centers of each count for this study.

A map of all potential sandhill habitat in Florida will be generated using GIS landscape information from the Closing the Gaps Program. Using the 2003 landcover dataset with a pixel resolution of 30x30 m (90 m²) maintained by FWC staff, there were 95,345 distinct tracts of sandhill pine habitat encompassing about 308,269 ha. Tract size ranged from 0.09 ha (1 pixel) to about 17,854 ha (195,000+ pixels), with a mean tract size of 3.23 ha and a standard deviation of 99.23 ha. About 47.1% of the tracts consist of 0.09 ha.

The relatively small size of most tracts and large variance in the size of tracts will present challenges determining suitable study sites to evaluate the effect of tract size on species presence and abundance. A minimum 1.77-ha tract is required to contain a single 75-m radius point count. Initially, a minimum of 20 sites each of small (< 12 ha), medium (12-24 ha), and large (> 24 ha) contiguous tracts (total = 60 sites) of sandhill habitat will be randomly selected across North and Central Florida. An alternative method may need to be used whereby single point counts within individual small (< 2 ha) but closely spaced tracts of sandhill habitat can be grouped in a cluster of 6 tracts within a ¼-degree block region of the state similar to the sampling “cluster” used in the Painted Bunting Survey in the Southeast United States designed by the USFWS. Some adjustment also may have to be made for rare species where the probability of detection is less than one (MacKenzie et al. 2002).

Some of the tracts and point count sites initially selected for the area sample may have characteristics that make them unreasonable to survey (e.g., landscape has been altered since the 2003 landcover dataset and habitat analysis). An additional set of randomly selected tracts will be identified for use in the event any of the initial 60 tracts is determined not to be suitable during the survey.

Survey protocol at each point station will follow standard operating procedures described in Knutson et al. (2007) and include the following:

1. Complete all surveys between 0.5 hour before sunrise to 4 hours after sunrise.
2. Record temperature, weather, noise level, wind speed using Beaufort Scale
3. Locate each point station with WAAS enabled GPS unit.
4. Minimum distance between stations will be 250 m.
5. Two-person survey team with recorder and observer.

6. 5-minute survey periods at each point station.
7. Count all birds heard or seen within 75 m radius of center for each point station.
8. Employ distance sampling method (distance to each observation recorded).
9. Digital timer to record the minute of each bird observation (both sighted and heard).
10. Observation codes (S=singing bird, M=male visual sighting, F=female visual sighting, V=unknown sex visual sighting, J=juvenile visual sighting, B=breeding display, N=nesting).

In order to evaluate the quality of sandhill habitat and associated occurrence by avian species, each point station will be characterized by several quantitative and character variables using the standard operating methods described in Mitchell et al. (1995):

1. Canopy height—average canopy height within 75 m of station point.
2. High canopy cover—percent coverage of high canopy layer within 75 m of station point.
3. Subcanopy cover—percent coverage of sub canopy layer within 75 m of station point.
4. Tree density—tree density of all trees >2.5 cm dbh within 10 m radius of station point.
5. Shrub density—shrub density of all trees <2.5 cm dbh within 10 m radius of station point.
6. Tree species—most frequent trees up to 5 tree species >2.5 cm dbh.
7. Shrub species—most frequent shrubs up to 5 tree species <2.5 cm dbh.
8. Time since last burn.

DATA MANAGEMENT

All data will be stored at the Wildlife Research Laboratory in Gainesville. Information on the data from this study also will be deposited in the FWRI MERMAid (Metadata Enterprise Management Aid) system.

SCHEDULE AND DELIVERABLES

The avian surveys will be conducted during the spring and summer breeding seasons during FY2007-08. Both quarterly and final reports will consist of an electronic submissions in Microsoft Word format.

Table 1. Reporting and Field Work Schedule for Avian Monitoring in Sandhill Habitat in Florida.

Tasks	Completion Date
FY2007-2008	
Reporting schedule	
First quarterly report	September 30, 2007
Second quarterly report	December 31, 2007
Third quarterly report	March 31, 2008
Fourth quarterly report	June 30, 2008

Field work	
Point station determination	March 31, 2008
Avian surveys	June 30, 2008
FY2008-2009	
Reporting schedule	
Final report	September 30, 2008

BUDGET AND PAYMENTS

The majority of the funding is derived from a Conserve Wildlife Tag grant (no. CWT 0708-04) from the Wildlife Foundation of Florida to the principle investigator. An avian survey coordinator will be hired to assist with the planning and implementation of the survey, partner with FWC staff in designing and implementing the survey, and partner with federal and other state agencies, non-profit organizations, private landowners, and volunteers. The avian coordinator would be filled at a Biological Scientist III level (2080 hrs/yr x \$18.75/hr x 7.65% fringe = \$41,984). Additional funds would provide expenses for travel, supplies, OPS staff to augment volunteers, and statistical support.

Table 2. FY 2007-08 Budget for Avian Monitoring in Sandhill Habitat in Florida.

Category	Description	Cost
OPS	Project/survey coordinator	\$41,984
	Field assistant	2,500
	Statistical analysis	2,500
Expense	Materials and supplies	4,200
	Travel	6,298
Total		\$57,482

Table 3. Estimated Person Days of FWC Staff during FY 2007-08 for Avian Monitoring in Sandhill Habitat in Florida.

Participants	Position-Office	Days Per Quarter				Total
		1	2	3	4	

		Days Per Quarter				
James Rodgers	Res. Admin. II, Gainesville	12	10	10	15	54
Steve Schwikert	Fish & Wildlife Tech, Gainesville			8	8	16
Matthew Reetz	OPS Biol. Sci. III, Gainesville	65	65	65	65	260

REFERENCES

- Knutsoknk, M., N. Danz, and B. Route. 2007. Passerine monitoring protocol for national wildlife refuges (midwest and northeast) and national parks of the Great Lakes network. Version 2.0. U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel, Maryland.
- MacKenzie, D. L. 2002. Estimating site occupancy rates when detection probabilities are less than one. *Ecology* 83:2248-2255.
- Mitchell, W. A., G. H. Huges, and L. E. Marcy. 1995. Prism sampling: section 6.2.3, U.S. Army Corps of Engineers Wildlife Resources Management manual. Technical report EL-95-24. U.S. Army Waterways Experimental Station, Vicksburg, Mississippi.
- Ralph, C. J., S. Droege, and J. R. Sauer. 1995. Managing and monitoring birds using point counts: standards and applications. Pages 161-168 in C. J. Ralph, J. R. Sauer, and S. Droege, technical editors. *Monitoring bird populations by point counts*. General technical report PSW-GTR-149, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2005. The North American breeding bird survey, results and analysis 1966-2005. Version 6.2.2006. USGS Patuxent Wildlife Research Center, Laurel, Maryland. <http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>.
- Savard, J.-P. L., and T. D. Hooper. 1995. Influence of survey length and radius size on grassland bird surveys by point counts at Williams Lake, British Columbia. Pages 57-62 in C. J. Ralph, J. R. Sauer, and S. Droege, technical editors. *Monitoring bird populations by point counts*. General technical report PSW-GTR-149, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.
- Simons, T. R., M. W. Alldredge, K. H. Pollock, and J. W. Wettroth. 2007. Experimental analysis of the auditory detection process on avian point counts. *Auk* 124:986-999.

- Smith, W. P., D. J. Twedt, R. J. Cooper, D. A. Wiedenfeld, P. B. Hamel, and R. P. Ford. 1995. Sample size and allocation of effort in point count sampling of birds in bottomland hardwood forests. Pages 7-18 in C. J. Ralph, J. R. Sauer, and S. Droege, technical editors. Monitoring bird populations by point counts. General technical report PSW-GTR-149, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.
- Twedt, D. J., R. R. Wilson, and A. S. Keister. 2007. Spatial models of northern bobwhite populations for conservation planning. *Journal of Wildlife Management* 71:1808-1918.
- Wolf, A. T., R. W. Howe, and G. J. Davis. 1995. Detectability of forest birds from stationary points in Northern Wisconsin. Pages 19-24 in C. J. Ralph, J. R. Sauer, and S. Droege, technical editors. Monitoring bird populations by point counts. General technical report PSW-GTR-149, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.