

United States  
Department of  
Agriculture

Forest Service

**Southern Forest  
Experiment Station**

New Orleans,  
Louisiana

General Technical Report  
SO-95  
August 1993

# **Fourth Meeting of the Southeast Management Working Group**

## **Abstracts**

**November 12-14, 1992  
E. J. Meeman Biological Station  
Memphis, Tennessee**

# **ABSTRACTS**

## **Fourth Meeting of the Southeast Management Working Group Partners in Flight**



**Edited and Compiled by**

**Winston Paul Smith  
Research Wildlife Biologist  
Southern Hardwoods Laboratory  
USDA/FS Southern Forest Experiment  
Station  
Stoneville, MS 38776**

**November 12–14, 1992  
E. J. Meeman Biological Station  
Memphis State University  
Memphis, Tennessee**

**AGENDA**

**SOUTHEAST MANAGEMENT WORKING  
GROUP  
PARTNERS IN FLIGHT**

**NOVEMBER 12-14, 1992**  
**E. J. MEEMAN BIOLOGICAL STATION**  
**MEMPHIS STATE UNIVERSITY**  
**MEMPHIS, TENNESSEE**

**THURSDAY, NOVEMBER 12**

**11:00**

WELCOME

Ron Escano, Chair Southeast Management Working Group,  
USDA Forest Service

**11:10**

WELCOME TO TENNESSEE

Gary Myers, Executive Director, Tennessee Wildlife Resources  
Agency

**11:25**

THE E. J. MEEMAN BIOLOGICAL STATION

Michael Kennedy, Director, Biological Station

**11:40**

PARTNERS IN FLIGHT IN TENNESSEE

Bob Ford, President, Tennessee Ornithological Society

**12:00 LUNCH**

**TECHNICAL PAPER SESSION**

**1:30**

HURRICANE EFFECTS ON NEOTROPICAL MIGRANTS AT A SOUTH CAROLINA BOTTOMLAND HARDWOOD SITE.

John Cely, D. Patrick Ferral, and Bryan A. Glover.

**1:45**

POINT COUNT RESULTS FROM 9 BOTTOMLAND HARDWOOD SITES IN SOUTH CAROLINA.

John Cely and Bryan A. Glover.

**2:00**

BIRD BANDING AT HILTON POND: MONITORING AND MANAGING FOR NEOTROPICAL MIGRANTS IN SOUTH CAROLINA'S PIEDMONT REGION.

Bill Hilton, Jr.

**ABSTRACT ONLY**

EFFECTS OF FOREST MANAGEMENT ON POPULATION PARAMETERS AND HABITAT USE OF WOOD THRUSHES.

Michael J. Conroy and David G. Krementz.

**2:15**

INFLUENCE OF RED-COCKADED WOODPECKER HABITAT MANAGEMENT ON THE ABUNDANCE OF NEOTROPICAL MIGRANT BREEDING BIRDS IN TWO LOBLOLLY PINE FORESTS OF MISSISSIPPI: STUDY DESIGN AND PRELIMINARY RESULTS.

Leonard A. Brennan, Kathleen E. Lucas, Bruce D. Leopold, and George A. Hurst.

**2:30**

WHAT EFFECT WILL MANAGEMENT STRATEGIES FOR THE GYPSY MOTH HAVE ON NEOTROPICAL MIGRATORY BIRDS?

Robert J. Cooper.

**2:45**

NEOTROPICAL MIGRATORY BIRD POPULATIONS IN BOTTOMLAND HARDWOOD FORESTS OF THE MISSISSIPPI ALLUVIAL VALLEY: DISTRIBUTION, ABUNDANCE, AND PRODUCTIVITY.

Robert J. Cooper, Paul B. Hamel, Robert P. Ford, and Winston P. Smith.

**3:00 BREAK**

**3:15**

POINT COUNTS OF LANDBIRDS IN BOTTOMLAND HARDWOOD FORESTS OF THE MISSISSIPPI ALLUVIAL VALLEY: HOW LONG AND HOW MANY?

Winston P. Smith, David A. Wiedenfeld, Paul B. Hamel, Daniel J. Twedt, Robert P. Ford, and Robert J. Cooper.

**3:30**

SAMPLING BIRD COMMUNITIES IN BOTTOMLAND HARDWOOD FORESTS OF THE MISSISSIPPI ALLUVIAL VALLEY: NUMBER OF POINTS VISITED VERSUS NUMBER OF VISITS TO A POINT.

Daniel J. Twedt, Winston P. Smith, Robert J. Cooper, Robert P. Ford, Paul B. Hamel, and David A. Wiedenfeld.

**3:45**

SPECIES RICHNESS AND RELATIVE ABUNDANCE OF BREEDING BIRDS IN FORESTS OF THE MISSISSIPPI ALLUVIAL VALLEY.

Curtis O. Nelms, Daniel J. Twedt, Robert J. Cooper, and Winston P. Smith.

**4:00**

SEASONAL DIFFERENCE IN THE EFFECTS OF FOREST FRAGMENTATION ON WEST TENNESSEE BIRD COMMUNITIES.

Paul B. Hamel, Robert P. Ford, and Winston P. Smith.

**4:15**

CERULEAN WARBLER: MODEL SPECIES FOR FOREST FRAGMENTATION STUDIES?

Paul B. Hamel, Robert J. Cooper, Robert P. Ford, and Winston P. Smith.

**4:30**

PARTNERS IN FLIGHT SLIDE SHOW

**4:45**

TEXAS PARTNERS IN FLIGHT VIDEO

**5:00 DINNER**

**7:00**

LATEST POPULATION TREND DATA AND IMPLEMENTING SURVEY, MANAGEMENT, MONITORING, AND RESEARCH ACTIONS AT LOCAL LAND MANAGEMENT UNITS—A GROUP DISCUSSION.

Chuck Hunter, U.S. Fish and Wildlife Service.

**9:00 ADJOURN**

**FRIDAY, NOVEMBER 13**

**8:00**

OVERVIEW AND FUTURE DIRECTION

Ron Escano, Chair, Southeast Management Working Group,  
USDA Forest Service

**8:30**

PHYSIOGRAPHIC AREA AND GROUP/COMMITTEE  
REPORTS

Area Coordinators, Committee/Group Chairs

**11:30 LUNCH**

**1:00**

THE TENNESSEE NEOTROPICAL BIRD PROGRAM—A  
PILOT FOR EASTERN STATES.

Gary Myers, Bob Hatcher, and Bob Ford.

**2:00**

FORUM FOR DISCUSSING STATE PARTNERS IN  
FLIGHT INITIATIVES

**3:00**

BUSINESS MEETING WITH TOPICS INCLUDING:

- SUMMARY OF ESTES PARK WORKSHOP
- IDENTIFYING "HIGH-PROFILE" INITIATIVES FOR 1993
- ESTABLISHING A RESEARCH REVIEW COMMITTEE
- JOINT INITIATIVES IN LATIN AMERICA AND THE WEST INDIES
- REVIEW OF CHARTER AND WORKPLAN
- LOGO AND LETTERHEAD FOR THE SOUTHEAST MANAGEMENT WORKING GROUP
- CHANGING OF THE GUARD-THE STEERING COMMITTEE FOR 1993
- NEXT REGIONAL MEETING

**5:00 ADJOURN**

**SATURDAY, NOVEMBER 14**

**6:00**

BIRDING FIELD TRIPS

Tennessee Ornithological Society, Anderson-Tully Company,  
U.S. Fish And Wildlife Service

**12:00**

RETURN TO FIELD STATION

## Hurricane Effects on Neotropical Migrants at a South Carolina Bottomland Hardwood Site

John E. Cely, South Carolina Wildlife and Marine Resources Department, Columbia, SC 29202

D. Patrick Ferral, South Carolina Wildlife and Marine Resources Department, Columbia, SC 29202

Bryan A. Glover, South Carolina Wildlife and Marine Resources Department, Columbia, SC 29202

An 8-ha (20 acres) breeding bird census plot was established in 1980 at an old-growth bottomland hardwood site in the Congaree Swamp National Monument. Four bird censuses, using the spot-mapping method, were conducted in 1980, 1981, 1982, and 1984. In September, 1989, Hurricane Hugo, a category four storm, damaged or destroyed six billion board feet of standing timber in South Carolina. Forest damage was most evident in parts of the outer Coastal Plain where 75–100 percent of the canopy was removed, but inland sites such as Congaree, 144.8 km (90 miles) from the coast, were also altered. About 16 percent of the canopy (30.5 cm [12"] dbh) at the Congaree census plot was removed. Eleven old-growth trees (91.4 cm [36"] dbh, 30.5 m [100 feet] high) were blown down on the 8-ha plot; the large canopy gaps created thick patches of cane and shrub vegetation in the understory within two growing seasons.

In 1991 a MAPS breeding bird-banding station was initiated at this bird census plot. Five neotropical migrants not recorded previously during the four spot-mapping censuses were banded: Indigo Bunting, Kentucky Warbler, Swainson's Warbler, Louisiana Waterthrush, and Eastern Wood-Pewee. The first three species occurred regularly in 1991–92 and have been found in breeding condition with established singing territories on the plot while the latter two were uncommon and possibly visitors only. Shrub thickets and openings created by Hurricane Hugo were considered responsible for the presence of at least four of these species: Indigo Bunting, Kentucky Warbler, Swainson's Warbler, and Eastern Wood Pewee. Two Neotropical Migrant Bird species present in small numbers on the plot before Hugo, White-eyed Vireo and Hooded Warbler, have shown dramatic increases in number with the creation of new thickets.

The influence of hurricane canopy removal on avian predators and parasites (cowbirds, crows, jays, and grackles) at the Congaree plot is unknown at this time. Before Hugo, all detrimental species had been recorded only as rare to uncommon visitors—none were considered to be breeders in the immediate vicinity, although it is possible that nest-seeking female cowbirds escaped detection during census points. In 1992, the first cowbirds (two females) were banded on the plot.

## Point Count Results from Nine Bottomland Hardwood Sites in South Carolina

John E. Cely, South Carolina Wildlife and Marine Resources Department, Columbia, SC 29202

Bryan A. Glover, South Carolina Wildlife and Marine Resources Department, Columbia, SC 29202

Forty-one breeding bird point counts were established in 1992 at nine coastal South Carolina bottomland hardwood locations with various silvicultural histories. Counts were 10 minutes long and had a point radius of 50 meters; 29 counts were repeated about 10 days later. Twenty Neotropical migrants (NTMB), 50 percent of the total land birds present, were recorded as probable breeding species. White-eyed Vireo was the most frequently occurring species (76 percent of all counts), followed by Northern Parula Warbler (71 percent), Acadian Flycatcher (68 percent), Blue-gray Gnatcatcher (66 percent), and Red-eyed Vireo (63 percent). The most abundant NTMB species was the Acadian Flycatcher ( $n = 45$ ), followed by Northern Parula Warbler ( $n = 42$ ), White-eyed Vireo ( $n = 41$ ), Blue-gray Gnatcatcher ( $n = 32$ ), and Red-eyed Vireo ( $n = 32$ ); Northern Cardinals were the most abundant bird ( $n = 60$ ), followed by Carolina Wren ( $n = 52$ ). Twenty-eight counts were in mature forests or those that had been selectively logged 15 years ago; 13 counts were in forests that had been clearcut within the past 5-15 years. Obvious differences in stand-age preferences were noted for some NTMB, but uncommon species at all sites were Summer Tanager ( $n = 8$ ), Kentucky Warbler ( $n = 8$ ), Swainson's Warbler ( $n = 7$ ), Yellow-throated Warbler ( $n = 7$ ), Yellow-throated Vireo ( $n = 6$ ), and Ruby-throated Hummingbird ( $n = 6$ ). The Wood Thrush was found at only one count, but beyond the 50-m circle. Swainson's Warbler, the highest ranking warbler for NTMB action in the South Atlantic Coastal Plain, was found in about equal abundance between older selective cut forests and younger forests with some canopy. Total numbers of avian predators and parasites (PP) (cowbirds, grackles, crows, and jays) correlated with three different logging treatments (8 counts per treatment): mature, uncut (1 PP); mature, selective cut (10 PP); and clearcut (13 PP); cowbirds were the most abundant PP. Variation among point counts at the same site was often high, and frequently exceeded variation between sites. The highest total number of birds per count was twice as likely to occur during the first visit (about the third week in May) as the second visit (about the first week in June); 75 percent of the species were recorded during the first visit.

# **Bird Banding at Hilton Pond: Monitoring and Managing for Neotropical Migrants in South Carolina's Piedmont Region**

**Bill Hilton, Jr., Hilton Pond, York, SC 29745**

More than 22,000 birds from 114 species have been banded since 1982 at Hilton Pond, a private nature sanctuary near York, South Carolina (Lat 34°50'N, Long 81°10'W, elevation 213.4 m [700 feet]); it is the only permanent banding station in the state's central Piedmont region. The rolling 4.5-ha (11-acre) tract includes many of the sub-habitats typical of the southern Piedmont: a house and 0.2-ha lawn; small old fields (0.2–1.2 ha [0.5–3 acres]) 7–13 years into succession after intensive farming or grazing; mixed hardwood stands and scattered pines; privet, honeysuckle, and trumpet creeper thickets; brush piles; and 0.8-ha (2-acre) Hilton Pond, with a small outlet stream flowing west through moist wooded bottomland into a second larger pond partly on the property. Adjoining to the north is a pine plantation; south and east are cattle pastures and hardwood stands. Hilton Pond, built in 1955, is rimmed by alders and new tree growth and by old field. Groomed trails meander about the property that—except for a controlled burn area—is otherwise left natural. Feeders at the house are stocked all year with black sunflower, whole or cracked corn, thistle, and/or white millet; hummingbird feeders are filled mid-March through November; platform feeders also serve as winter trap stands. Mist nets sample all habitat types on the property; unless weather is mild, nets are not deployed December through February when traps are the main capture method. Traps include McCamey, Potter, dove (ground), Wharton, thistle-funnel, "government sparrow," and various pull-string devices. As of 10 October 1992, about 47 percent ( $n = 10,438$ ) of all birds banded at Hilton Pond have been from just four temperate zone species—House Finch (15.9 percent), Purple Finch (14.4 percent), American Goldfinch (10.1 percent), and Pine Siskin (6.7 percent)—but many others have been neotropical migrants that either breed in the Piedmont or pass through during spring or fall migration. Of particular interest are 1,014 Ruby-throated Hummingbirds banded since 1984, some of which have returned from the wintering grounds for up to 4 consecutive breeding seasons. The banding station at Hilton Pond is valuable for several reasons: 1) it has been in near-continuous operation for 10 years, allowing for possible trend analysis; 2) it samples the Piedmont, a seriously under-studied southeastern physiographic providence; 3) it may provide information about the relationship between early vegetation succession and neotropical migrants, as well as techniques for management of Piedmont locales for those migrants; 4) it is the only southern Piedmont site providing information about hummingbirds, which may be a good neotropical migrant indicator species; 5) it offers a permanent site for training non-game personnel in the use of bird banding as a monitoring technique.

# Effects of Forest Management on Population Parameters and Habitat Use of Wood Thrushes

Michael J. Conroy, Georgia Cooperative Fish and Wildlife Research Unit  
University of Georgia, Athens, GA 30602

David G. Krementz, Patuxent Wildlife Research Center, Southeast Field Station, School of Forest Resources, University of Georgia, Athens, GA 30602

The cause of declines in populations of Neotropical migrant birds may include fragmentation of breeding forests through forest lost or silvicultural practices. Most investigations of the causes of these declines have not directly addressed underlying factors. Until the relationships between density, reproduction, dispersal, survival rates and habitat use and the vegetative mosaic are understood, managers will not be able to determine whether changes in silvicultural practices would benefit songbird populations. We propose to investigate the population response of Wood Thrush to experimental silvicultural treatments (regeneration cutting, thinning, and burning). Specifically, we will investigate thrush population responses as measured by density, reproduction, dispersal, survival rates and habitat use. To insure that we are investigating the desired treatment effect, the population dynamics from both control sites (little or no recent cutting or burning) and treatment sites (cutting and burning on up to 30 percent of a forest compartment) will be studied. Study sites will be located on the Piedmont National Wildlife Refuge (PNWR) and Oconee National Forest (ONF) in north-central Georgia. Both forests are predominantly loblolly (*Pinus taeda*) and shortleaf (*P. echinata*) pine. Hardwoods are scattered throughout both forests and are usually not harvested. Management on both forests is based on the compartment (about 400 ha) level. Typically, only a few (percent) of the many available stands are cut at one time, resulting in a mosaic of stands of different age and composition at the compartment level. Five paired compartments will be chosen, three pairs on ONF and two pairs on PNWR. Treatment compartments will undergo silviculture after the second year of study (September 1994–March 1995, after fall and before spring migration). Control compartments will have little or no silviculture over the term of the experiment (4 years). Starting Spring 1993, 50 wood thrushes (/compartment/year) will be mist-netted and marked with aluminum leg bands to estimate return rates for 1994, 1995, and 1996 (1 pre-treatment and 2 post-treatment years). In 1994–1996 thrushes will also be marked with individual visible markers in order to estimate survival and dispersal within a season through re-sighting; a sub-sample will be radio tagged for estimation of daily and habitat-specific mortality risk. Constant effort mist netting and plot mapping will be used to monitor densities on compartments and stands within compartments. Nests will be systematically located and monitored at 3–5 day intervals to estimate nesting success. At day 10, nestlings will be weighed and banded to estimate juvenile recruitment (survival and return of fledged young). Density, survival, reproductive success, and dispersal will be compared between the treatment and control compartments, with 1994 (pre-treatment) data allowing us to account for any baseline (non-treatment-related) differences between paired compartments, and 1995–96 (post-treatment) data allowing inferences about the effects of silviculture on population parameters. Cooperators were U.S. Fish and Wildlife Service, U.S. Forest Service, and Georgia Department of Natural Resources, Game and Fish Division.

# **Influence of Red-cockaded Woodpecker Habitat Management on the Abundance of Neotropical Migrant Breeding Birds in Two Loblolly Pine Forests of Mississippi: Study Design and Preliminary Results**

**Leonard A. Brennan, Department of Wildlife and Fisheries, Mississippi State University, MS 39762**

**Kathleen E. Lucas, Department of Wildlife and Fisheries, Mississippi State University, MS 39762**

**Bruce D. Leopold, Department of Wildlife and Fisheries, Mississippi State University, MS 39762**

**George A. Hurst, Department of Wildlife and Fisheries, Mississippi State University, MS 39762**

We initiated a study to assess the impact of Red-cockaded Woodpecker (RCW) habitat management on breeding neotropical migrant birds (NTMB) in loblolly pine forests of east-central Mississippi. The two study areas were: 1) Bienville National Forest, and 2) Noxubee National Wildlife Refuge. Study design involved using point counts to compare abundance of NTMBs in forest stands managed for RCWs and similar-aged stands that were not managed for or occupied by RCWs.

At Bienville, we identified 14 species of NTMBs in stands managed for RCWs. Three species (Great-crested Flycatcher, Indigo Bunting, and Yellow-breasted Chat) are apparently favored by RCW habitat management, whereas Hooded Warbler, Kentucky Warbler, and Summer Tanager were most frequently detected in stands not managed for RCWs. At Noxubee, 14 species of NTMBs were detected in stands managed for RCWs. Blue-gray Gnatcatcher, Common Yellowthroat, Eastern Wood-Pewee, Indigo Bunting, and Yellow-breasted Chat were most abundant in RCW stands. Black-and-white Warbler, Hooded Warbler, Red-eyed Vireo, Summer Tanager, Wood Thrush, and Yellow-throated Vireo were detected most frequently in mature pine stands that were not managed for RCWs at Noxubee.

Differences in breeding NTMB communities at Bienville and Noxubee may in part be a function of intensity of RCW management. At Noxubee, high intensity RCW habitat management has resulted in little (8 percent) overlap in structure of pine stands managed and not managed for RCWs. At Bienville, a lower intensity of RCW management has resulted in larger (24 percent) overlap in the structure of pine stands managed and not managed for RCWs. Although these results are based on only one year of survey data, they suggest that RCW habitat management influences the abundance of certain NTMB species.

## What Effect will Management Strategies for the Gypsy Moth Have on Neotropical Migratory Birds?

Robert J. Cooper, Biology Department, Memphis State University, Memphis, TN 38152

The gypsy moth (*Lymantria dispar*) has become the most important insect pest of eastern deciduous forests; eventually it will invade most southeastern deciduous forests. Management strategies to control damage caused by gypsy moths will directly affect forest birds. We studied the effects of three gypsy moth management strategies (no action, pesticide, and silvicultural options) on Neotropical migrant bird populations in West Virginia. After 2 years pre-defoliation and 5 years of partial or complete defoliation, untreated forests exhibited a 40 percent loss in basal area. Six species of deep-forest Neotropical migrant birds showed significant declines during that period, while five species increased. Many open-habitat species increased in number. Nest predation also was higher in gypsy moth-infested areas. Responses were similar to those of the same bird species to forest thinnings. There was no significant difference in abundance of 12 species of Neotropical migrant birds among areas treated with the pesticide Dimilin and untreated areas. Although Dimilin significantly reduced availability of some types of arthropod prey, reproduction of several species of Neotropical migrants was not affected. Results suggest that gypsy moth populations may negatively affect deep-forest bird populations by opening up sections of contiguous forest. Pesticides can counter that effect but have other negative environmental effects. Although the gypsy moth eventually will invade most of the Southeast, virtually no published research has been done on effects on interactions with Neotropical migrants, especially long-term effects. Neotropical migrant monitoring efforts, which are currently being established throughout North America, provide an opportunity to examine long-term responses of birds to several gypsy moth strategies over a wide region.

# **Neotropical Migratory Bird Populations in Bottomland Hardwood Forests of the Mississippi Alluvial Valley: Distribution, Abundance, and Productivity**

**Robert J. Cooper, Biology Department, Memphis State University, Memphis, TN 38152**

**Paul B. Hamel, Tennessee Department of Conservation and Environment, Nashville, TN 37243**

**Robert P. Ford, Tennessee Conservation League, Nashville, TN 37209**

**Winston Paul Smith, USDA Forest Service, Southern Hardwoods Laboratory, Stoneville, MS 38776**

In spring 1992, a project was initiated to monitor Neotropical migratory bird populations in bottomland hardwood forests of the lower Mississippi Alluvial Valley. Collaborators include Memphis State University, U.S. Forest Service, U.S. Fish and Wildlife Service, Tennessee Conservation League, Louisiana Nature Conservancy, Arkansas Nature Conservancy, and the Anderson-Tully Company. Study objectives are to relate population parameters (e.g., density, distribution, productivity, survivorship) of Neotropical migrant birds to forest habitat characteristics. In particular, the effect of forest management strategies and forest fragmentation on Neotropical migrants will be studied. The first field season involved establishing protocols for point count monitoring and measurement of vegetation. Surveys were mostly conducted on public lands (seven national wildlife refuges, Delta National Forest, Meeman-Shelby State Park), and some on private lands owned by Anderson-Tully. In addition, a study was initiated to investigate the population ecology of a species of special concern, the Cerulean Warbler. In 1992, two study plots were established in western Tennessee and one in eastern Arkansas to estimate territory size, spatial pattern, density, and productivity of Cerulean Warblers, and to assess habitat use on several geographic scales. In 1993, the study will be expanded to include public and private lands from Louisiana to Tennessee. Reproductive success also will be monitored for selected bird species in some study areas.

# **Point Counts of Landbirds in Bottomland Hardwood Forests of the Mississippi Alluvial Valley: How Long and How Many?**

**Winston Paul Smith, Southern Hardwoods Laboratory, USDA Forest Service, Stoneville, MS 38776**

**David A. Wiedenfeld, Museum of Natural Science, Louisiana State University, Baton Rouge, LA 70803**

**Paul B. Hamel, Tennessee Department of Environment and Conservation, Nashville, TN 37243**

**Daniel J. Twedt, National Wetlands Research Center, U.S. Department of the Interior, Fish and Wildlife Service, Vicksburg, MS 39180**

**Robert P. Ford, Tennessee Conservation League, Nashville, TN 37209**

**Robert J. Cooper, Biology Department, Memphis State University, Memphis, TN 38152**

To quantify efficacy of point count sampling in bottomland hardwood forests, we examined the influence of point count duration on corresponding estimates of number of individuals and species recorded. To accomplish this we conducted a total of 82 point counts 7 May–16 May 1992 distributed among three habitats (Wet, Mesic, Dry) in each of three regions within the lower Mississippi Alluvial Valley (MAV). Each point count consisted of recording the number of individual birds (all species) seen or heard during the initial three minutes and per each minute thereafter for a period totaling ten minutes. In addition, we included 384 point counts recorded during an 8-week period in each of 3 years (1985–1987) among 56 randomly-selected forest patches within the bottomlands of western Tennessee. Each point count consisted of recording the number of individuals (excluding migrating species) during each of four, 5 minute intervals for a period totaling 20 minutes. To estimate minimum sample size, we determined sampling variation at each level (region, habitat, and locality) with the 82 point counts from the lower (MAV) and applied the procedures of Neter and Wasserman (1974:493; Applied linear statistical models). Neither the cumulative number of individuals nor number of species per sampling interval attained an asymptote after 10 or 20 minutes of sampling. For western Tennessee bottomlands, total individual and species counts relative to point count duration were similar among years and comparable to the pattern observed throughout the lower MAV. Across the MAV, we recorded a total of 1,621 birds distributed among 52 species with the majority (872/1621) representing 8 species. More birds were recorded within 25–50 m than in either of the other distance categories. There was significant variation in numbers of individuals and species among point counts. For both, significant differences between region and patch (nested within region) occurred; neither habitat nor interaction between habitat and region was significant. For  $\alpha = 0.05$  and  $\beta = 0.10$ , minimum sample size estimates (per factor level) varied by orders of magnitude depending upon the observed or specified range of desired detectable difference. For observed regional variation, 20 and 40 point counts were required to accommodate variability in total birds (MSE = 9.28) and species (MSE = 3.79), respectively; 25 percent of the mean could be achieved with 5 counts per factor level. Corresponding sample sizes required to detect differences of rarer species (e.g., Wood Thrush) were 500; for common species (e.g., Northern Cardinal) this same level of precision could be achieved with 100 counts.

# Sampling Bird Communities in Bottomland Hardwood Forests of the Mississippi Alluvial Valley: Number of Points Visited Versus Number of Visits to a Point

Daniel J. Twedt, Vicksburg Field Research Station, National Wetlands Research Center, U.S. Department of the Interior, Fish and Wildlife Service, Vicksburg, MS 39180

Winston P. Smith, Southern Hardwoods Laboratory, USDA Forest Service, Stoneville, MS 38776

Robert J. Cooper, Department of Biology, Memphis State University, Memphis, TN 38152

Robert P. Ford, Tennessee Conservation League, Nashville, TN 37209

Paul B. Hamel, Tennessee Department of Environment and Conservation, Nashville, TN 37243

David A. Wiedenfeld, Museum of Natural History, Louisiana State University, Baton Rouge, LA 70803

Within each of 4 forest stands on Delta Experimental Forest (DEF), 25 points were visited 5 to 7 times from 8 May to 21 May 1991, and 6 times from 30 May to 12 June 1992. During each visit to a point, all birds detected, visually or aurally, at any distance were recorded during a 4-minute interval. Using these data, our objectives were to recommend the number of point counts and the number of visits to a point which provide the greatest efficiency for estimating the cumulative number of species in bottomland hardwood forest stands within the Mississippi Alluvial Valley, and to ascertain if increasing the number of visits to points is equivalent to adding more points. Because the total number of species detected in DEF were different between years, 39 species in 1991 and 55 species in 1992, we considered each year independently. Within each stand, we obtained bootstrap estimates of the mean cumulative number of species obtained from all possible combinations of six points and six visits (i.e., 36 means/stand). These bootstrap estimates were subjected to ANOVA; we modelled cumulative number of species as a function of the number of points visited, the number of visits to each point, and their interaction. As part of the same ANOVA we made an *a priori*, simultaneous comparison of the 15 possible reciprocal treatments (i.e., 1 point-2 visits vs. 2 points-1 visit, etc.). Results of analyses for each year were similar. Although no interaction was detected between the number of points and the number of visits, when reciprocals were compared, more points visited yielded significantly greater cumulative number of species than more visits to each point. Significant differences were detected among both the number of points visited and among the number of visits to a point. Scheffe's test of differences among means indicated that the cumulative number of species increased significantly with each added point, through five points, but six points did not differ from five points in 1991. Similarly, the cumulative number of species increased significantly with each revisit, up to four visits, but four visits did not differ significantly from five visits. Starting with one point, which yielded about 33 percent of the total species pool when averaged among one through six points, each subsequent point resulted in an increase of about 9 percent, 5 percent, 3 percent, and 3 percent, respectively. Each sequential increase in the number of visits, however, only resulted in increases of 7 percent, 4 percent, 2 percent, and 2 percent of the total species pool.

# Species Richness and Relative Abundance of Breeding Birds in Forests of the Mississippi Alluvial Valley

Curtis O. Nelms, National Wetlands Research Center, U.S. Department of the Interior, Fish and Wildlife Service, Vicksburg, MS 39180

Daniel J. Twedt, National Wetlands Research Center, U.S. Department of the Interior, Fish and Wildlife Service, Vicksburg, MS 39180

Robert J. Cooper, Department of Biology, Memphis State University, Memphis, TN 38152

Winston P. Smith, Southern Hardwoods Laboratory, USDA Forest Service, Stoneville, MS 38776

In 1992, the Vicksburg Field Research Station of the National Wetlands Research Center initiated research on the ecology of migratory birds within forests of the Mississippi Alluvial Valley (MAV). The MAV was historically a nearly contiguous bottomland hardwood forest, however, only remnants remain. These remnants are fragmented and often influenced by drainage projects, silviculture, agriculture, and urban development. Our objectives are to assess species richness and relative abundance, and to relate these to the size, quality, and composition of forest stands. Species richness and relative abundance were estimated for 53 randomly selected forest sites using 1 to 8 point counts per site, depending on the size of the forest fragment. However, statistical comparisons among sites will be restricted to an equal number of point counts within the sites being compared. Point counts, lasting five minutes, were conducted from 11 May to 29 June 1992, following Ralph, Sauer, and Droege (Point Count Standards; memo dated 9 March 1992). Vegetation was measured at the first three points on each site using a modification of the methods employed by Martin and Roper (Condor 90: 51-57; 1988). During 252 counts, 71 species were encountered, but only 62 species were encountered within a 50-m radius of point center. The mean number of species encountered within 50 m of a point, was 7.3 (s.d. = 2.7) and the mean number of individuals was 11.2 (s.d. = 4.2). The mean number of species detected at any distance was 9.6 (s.d. = 2.8) and the mean number of individuals was 15.6 (s.d. = 7.9). The most frequently encountered warblers in the MAV were Prothonotary Warbler and Northern Parula. Rarely encountered warblers were American Redstart and Worm-eating Warbler. The genera, *Quercus*, *Ulmus*, *Carya*, and *Celtis* were each encountered at 80 or more of the 152 points at which vegetation was sampled. Species most frequently encountered were: sugarberry (*Celtis laevagata*), water hickory (*Carya aquatica*), American elm (*Ulmus americana*), sweetgum (*Liquidambar styraciflua*), and willow oak (*Quercus phellos*). The mean basal area of all trees 10 cm diameter-at-breast height (dbh) was 28 m<sup>2</sup>/ha (range 7-70). The mean canopy cover was 87 percent, mean canopy height was 20 m, ground cover was 60 percent, and vegetation density (2-7 m) was 47 percent. The most frequently encountered understory species were sugarberry, ash (*Fraxinus* spp.), maple (*Acer* spp.), and elm (*Ulmus* spp.). A cooperative GIS effort among the U.S. Fish and Wildlife Service, the Nature Conservancy, and the University of Arkansas is currently classifying forested habitats within the MAV. This effort will provide information on stand size and topology which will be used in concert with our current data, and data from visits to additional forest stands in 1993, to assess the relationship between the size, quality, and composition of forests within the MAV and their breeding bird community.

# Seasonal Differences in Effects of Forest Fragmentation on West Tennessee Bird Communities

**Paul B. Hamel**, Tennessee Department of Environment and Conservation, Nashville, TN 37243

**Robert P. Ford**, Tennessee Conservation League, Nashville, TN 37209

**Winston P. Smith**, Southern Hardwoods Laboratory, USDA Forest Service, Stoneville, MS 38773

Recent advances in technology for handling geographic data, coupled with declining numbers of certain North American birds, present opportunities to investigate the role of landscape-scale phenomena in determining the distribution and abundance of birds. The role of tract characteristics, such as size, shape, and connectedness, as determinant of population distribution has become a central issue in this area. We sampled birds for 2 years on 60 carefully chosen sites in tracts of west Tennessee bottomland hardwood forest (size range 41 ha to 25,670 ha). We examined data on frequency and abundance of birds in relation to tract size, to season, and to species and guild membership of the avifauna. Our effort-standardized bird sampling design permitted determination that, for tracts of the sizes sampled, species richness and total density of birds are not significantly related to tract size, contrary to published results of others. However, composition of the bird communities, in both breeding and winter seasons, is related to tract size. Especially is this true for Neotropical migrant birds and for forest interior species in the breeding season, which are more commonly found in larger tracts; cavity nesters are more frequent in larger tracts in the winter. The relatively more common occurrence of tract sensitivity in the breeding season implies that explanations for tract size effects be sought among factors operative in the breeding season.

## **Cerulean Warbler: Model Species for Forest Fragmentation Studies?**

**Paul B. Hamel, Tennessee Department of Environment and Conservation, Nashville, TN 37243**

**Robert J. Cooper, Biology Department, Memphis State University, Memphis, TN 38152**

**Robert P. Ford, Tennessee Conservation League, Nashville, TN 37209**

**Winston Paul Smith, Southern Hardwoods Laboratory, USDA Forest Service, Stoneville, MS 38776**

Cerulean warbler numbers have experienced drastic declines of perhaps as much as 50 percent rangewide in the past 25 years, as estimated from Breeding Bird Survey data. Similarly, human population growth in the winter grounds is very rapid and likely is eliminating habitat for the birds. Popular birdwatching wisdom is clear on the habitat utilization of the species as dependent on tall, large trees. Recent survey work on forest fragments in several locations in the Southeastern United States indicates that the species is unlikely to be found in tracts other than the largest ones available. Initial observations of behavioral ecology of the birds reinforced the common wisdom of birders about the preference of the species. We have undertaken the present work in the Mississippi Alluvial Plain of Arkansas, Mississippi, and Tennessee in an effort to relate the biology of the species to landscape factors at local and regional scale. After a single year of fieldwork, we report on preliminary examination of data from three 50-ha study grids in Tennessee and Arkansas. We made detailed observations of behavior and habitat utilization by the birds on these study grids. Breeding densities ranged from 16-40 pairs/km<sup>2</sup>, territory sizes from 0.5-5 ha/territorial male, and parasitism by brown-headed cowbirds was present in Cerulean warbler nests as far as 1 km from the nearest road right-of-way. We have also undertaken work to study the birds on the winter grounds on the eastern slope of the Andes in Ecuador.

## **ANNOUNCEMENTS**

The Fifth Southeast Management Working Group Meeting will be held in Charleston, South Carolina, September 23–24, with field trips on September 25. Contact John Cely, South Carolina Wildlife and Marine Resources Department, P.O. Box 167, Columbia, SC 29202, for further information.

Smith, Winston Paul, ed. 1993. Proceedings of the 4th meeting of the Southeast Management Working Group: abstracts: partners in flight; 1992 November 12-14; Memphis, TN. Gen. Tech. Rep. SO-95. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station. 20 p.

Twelve abstracts give an overview of avian research done by members of the Southeast Management Working Group of Partners In Flight.

**Keywords:** Avian community structure, forest management, habitat loss, Mississippi Alluvial Valley, monitoring protocol, neotropical migrants, Southeastern United States.

Persons of any race, color, national origin, sex, age, religion, or with any disability are welcome to use and enjoy all facilities, programs, and services of the USDA. Discrimination in any form is strictly against agency policy, and should be reported to the Secretary of Agriculture, Washington, DC 20250.